



NEW NIAGARA OFFICIAL PLAN

Natural Environment Work Program: Natural Environment Background Study

Niagara Region
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SUSTAINABLE REGION



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1.0 Introduction

From an ecological perspective, every place is defined by a unique suite of conditions including landform, soils, water resources and climate, which gives rise to the vegetation and wildlife that characterizes it. Niagara Region is no exception. Niagara Region is bound by Lakes Erie and Ontario and the Niagara River, is bisected by the Niagara Escarpment World Biosphere Reserve, and boasts a high diversity of flora and fauna owing to the climate that supports Carolinian species and their habitats. The physical and biotic features of the Region provide the character that defines it, and which constitute the Region's natural environment. The natural environment is a broad term that includes natural heritage (e.g., woodlands, wetlands, and fish habitat), water resources (e.g., aquifers, groundwater recharge areas, seepages), natural hazards (e.g., floodplains, dynamic beaches), and recognizes the contributing land uses (e.g., agricultural land) and surrounding landscapes that support a healthy environment.

Niagara Region initiated a process to develop a new Niagara Official Plan (N.O.P.). A key element of the new N.O.P. will be policies and mapping that incorporate Provincial requirements on natural environment planning.

Through consultation with the area municipalities, the Niagara Peninsula Conservation Authority (N.P.C.A.) and stakeholders the Region's Planning and Development Services (P.D.S.) staff report P.D.S. #6-2018 identified the following components of the Natural Environment Work Program:

- Natural Heritage Features:
 - All features as identified in the Provincial Policy Statement (P.P.S.) and Provincial Plans including significant woodlands, provincially significant wetlands, significant wildlife habitat, habitat of endangered and threatened species, fish habitat, significant valleylands, etc.
- Hydrologic Features:
 - All features as identified in the P.P.S. and Provincial Plans including streams, seepage areas, wetlands, etc.
 - The significant work recently completed on the Region's watercourse identification and mapping project (known as the "contemporary mapping of watercourses")
- Water Resource Systems:
 - Groundwater systems
 - Surface water systems
- Natural Hazards:
 - All features as identified in the P.P.S. and Provincial Plans including flooding hazards, erosion hazards, and dynamic beach hazards, etc.
 - Wildland Fires as per Section 3.1.8 of the P.P.S.
- Provincial Natural Heritage Systems:
 - Greenbelt Natural Heritage System and Urban River Valley designation
 - Growth Plan Natural Heritage System
- Niagara Escarpment Plan as it relates to the municipal planning process

1.1 Overview of Natural Environment Background Study

The purpose of Natural Environment Background Study technical report is to provide discussion, analysis, and recommendations for all of the components of the work program listed above. A list of specific topics to be addressed in the background study at a minimum, were noted in the Request for Proposal; additional topics have been included in order to provide a fulsome review of topics related to natural environment planning. This technical report is organized into the following sections:

- **2** - Trends, Issues and Policy Directions for Natural Environment Planning
- **3** – Provincial Policy Review
- **4** – Guidelines and Technical Criteria
- **5** – Endangered Species Act
- **6** – Natural Environment Work Completed by the Niagara Peninsula Conservation Authority
- **7** - Comparator Municipal Approaches to Natural Environment Mapping
- **8** - Climate Change
- **9** - Invasive Species
- **10** - Natural Hazards
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- **15** - Setbacks, Buffers, Vegetation Protection Zones and Riparian Vegetation
- **16** - Contemporary Mapping of Watercourses Project
- **17** - Natural Environment Planning in Niagara Region
- **18** - Moving Forward: A Framework for Natural Environment Policies for the New Regional Official Plan
- **19** - Preliminary Criteria to Evaluate Natural Environment Planning Options

Definitions from relevant natural environment sections of Provincial Plans and the current R.O.P. have been provided in **Appendix 1** for reference throughout the report. Please note, the references to technical documents and Provincial plans are current as of May 1, 2019 and may not be consistent with subsequent changes to Provincial Plans or other documents.

2.0 Policy Directions, Issues and Trends in Natural Environment Planning

Through the development of urban areas in southern Ontario throughout the 20th century, little regard was given for the protection or incorporation of natural areas into the urban fabric. As a result, woodlands were removed, wetlands drained and filled, streams channelized or conveyed through culverts, and large-scale grading replaced natural landforms. There was also little regard for or recognition of the inherent dangers for developing in flood plains, on unstable slopes, or other natural hazards. With the increased recognition of the value of the natural environment through the 1960s/1970s, planning in Ontario began to incorporate natural heritage features into urban design. This began with the identification of Environmentally Sensitive (or Significant) Areas, which were first adopted by the Region of Waterloo in 1977, where they were referred to as 'Environmentally Sensitive Policy Areas'. This approach was soon adopted by other municipalities and conservation authorities.

It was soon acknowledged, however, that the approach for the identification of Environmentally Sensitive Areas resulted in isolated patches of green throughout the urban and rural context. This features-based approach to natural environment planning was soon replaced with a more ecologically-based 'systems' approach following the principles of 'landscape ecology' that recognize the importance of connections, linkages and the role of intervening lands in providing a robust and resilient natural heritage system (N.H.S.). The planning framework in Ontario began to incorporate stronger policies for the identification and protection of the natural environment, as described in the proceeding section.

2.1 Provincial Land Use Plans and Policies

The provincial natural environment policy framework has been evolving for a number of years. This policy framework began to be formalized in the context of provincial policy when the Province issued the Wetlands Policy Statement under the authority of Section 3 of the Planning Act on May 14, 1992.

On March 28, 1995 the Comprehensive Set of Policy Statements ('C.S.P.S.') replaced the Wetlands Policy Statement along with three other policy statements. The C.S.P.S. was in effect until May 22, 1996. The Planning Act was also amended at that time to require that planning decisions be consistent with the C.S.P.S. The Provincial Policy Statement ('P.P.S.') then replaced the C.S.P.S. in 1996, and the Planning Act was also amended to require that all decisions have regard to the P.P.S. An updated P.P.S. was released in 2005 and most recently in 2014 and within each iteration of the P.P.S., the principles and policies that affect the natural environment have been strengthened. This was evident in the 2014 P.P.S. which required the identification of an N.H.S. as part of municipal official plans (O.P.s).

Certain lands within the Region are also subject to the Niagara Escarpment Plan ('N.E.P.'), which came into effect in 1985. The N.E.P. was also significantly updated in

2017. Other lands within the Region are also subject to the Greenbelt Plan, which was initially released in 2005, and also significantly updated in 2017. The last provincial plan that applies to the Region and which contains policy on natural heritage is the Growth Plan, which was first released in 2006 and also significantly updated in 2017. In 2018, the Growth Plan N.H.S. mapping was released, further demonstrating the direction of increasing priority for the identification and protection of the natural environment system. As of the writing of this report in August 2019, some minor changes were made in the May 2019 version of the Growth Plan and proposed changes to the Provincial Policy Statement were released for comment in July 2019. This background report does not specifically reference the May 2019 Growth Plan or the proposed changes to the Provincial Policy Statement.

2.2 Issues and Trends in Natural Environment Planning

The identification and protection of the natural environment features and systems has evolved in Ontario, in part in response to the recognition of the ecosystem services the natural features provide, the costs of not protecting the natural environment, as well as the recognition that the remaining features and ecological functions are continually being threatened and degraded. In addition to N.H.S. identification and protection, there is now recognition and direction for the identification and protection of a water resource system. Although there are components of the water resource system that overlaps with and are contained within the N.H.S., the water resource system goes further to recognize the important role of the hydrologic and hydrogeologic features in supporting the natural environment as a whole.

Natural environment system identification and the strengthening of related policies has largely dealt with the threats to the features and functions as a result of habitat loss and destruction. Policies are continually being developed and strengthened in recognition of new and emerging threats. For example, there has been an increased recognition of the impacts to natural features and ecological functions resulting from invasive species and climate change. The combination of these impacts may require a new thinking and approach to the identification of component features in the natural environment system and how these features are protected through policy. An example of this is the combined impact to the canopy and understory of woodlands where the canopy trees are dying from invasive insects leaving an understory dominated by invasive shrubs - this topic is discussed in detail in later sections.

Another new approach to natural environment planning is the recognition of ecosystem services and attributing economic value to components of the natural environment system (e.g., floodplains and wetlands providing water storage and flood attenuation that help to protect downstream built areas and neighbourhoods), thereby directing resources, including active management of features and functions of the natural environment system, in order to ensure the features and ecological functions continue to provide the ecosystem services we rely on. The features that provide ecosystem services are sometimes referred to as “green infrastructure”, which includes both natural features and functions as well as bioengineered features (e.g. bioswales, engineered

wetlands and stormwater ponds), green roofs and green walls, urban parks, gardens and grassed areas. The term green infrastructure is intended to recognize that infrastructure requires investment and maintenance, as is the case with roads and other 'grey' infrastructure that is designed to support a thriving community.

These topics will be further explored throughout this background report in order to inform mapping and policy direction for natural environment planning in the new N.O.P.

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3.0 Provincial Policy

The intent of this section of the report is to review Provincial plans and relevant natural environment policies and evaluate their implications on the development of the natural environment section in the new N.O.P.

3.1 The Planning Act

The Planning Act establishes the basic framework for making land use planning decisions in Ontario. **Section 1.1** of the Act states that the purposes of the Act are:

- a) To promote sustainable economic development in a healthy natural environment within the policy and by the means provided under this Act;
- b) To provide for a land use planning system led by provincial policy;
- c) To integrate matters of provincial interest in provincial and municipal planning decisions;
- d) To provide for planning processes that are fair by making them open, accessible, timely and efficient;
- e) To encourage co-operation and co-ordination among various interests;
- f) To recognize the decision-making authority and accountability of municipal councils in planning.

Sub-section (a) above is intended to support sustainable economic development while providing for a healthy natural environment. Sub-section (b) clearly articulates the Provincial requirement that the 'land use planning system' in Ontario be 'led by Provincial policy'. In this regard, provincial policies clearly set out the requirements for the establishment of a natural heritage system (N.H.S.). Sub-section (c) builds upon sub-section (b) by indicating that matters of Provincial interest should be integrated into Provincial and municipal planning decisions.

Sub-section (d) provides for open planning process while sub-section (e) encourages co-operation among various interests. Lastly, sub-section (f) recognizes the decision-making authority and accountability of municipal councils in making planning decisions.

Section 2 of the Planning Act sets out the responsibilities of the Council of a municipality and the Local Planning Appeal Tribunal (previously the Ontario Municipal Board). Below is the full list of those Provincial interests with those that are particularly relevant to the development of an N.H.S. underlined:

The Minister, the council of a municipality, a local board, a planning board and the Municipal Board, in carrying out their responsibilities under this Act, shall have regard to, among other matters, matters of provincial interest such as,

- (a) The protection of ecological systems, including natural areas, features and functions;**

(b) The protection of the agricultural resources of the province;

- (c) The conservation and management of natural resources and the mineral resource base;
- (d) The conservation of features of significant architectural, cultural, historical, archaeological or scientific interest;
- (e) The supply, efficient use and conservation of energy and water;
- (f) The adequate provision and efficient use of communication, transportation, sewage and water services and waste management systems;
- (g) The minimization of waste;

(h) The orderly development of safe and healthy communities;

- (h.1) The accessibility for persons with disabilities to all facilities, services and matters to which this act applies;
- (i) The adequate provision and distribution of educational, health, social, cultural and recreational facilities;
- (j) The adequate provision of a full range of housing, including affordable housing;
- (k) The adequate provision of employment opportunities;
- (l) The protection of the financial and economic well-being of the province and its municipalities;

(m) The co-ordination of planning activities of public bodies;

(n) The resolution of planning conflicts involving public and private interests;

- (o) The protection of public health and safety;

(p) The appropriate location of growth and development;

- (q) The promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians;
- (r) The promotion of built form that,
 - (i) Is well-designed,
 - (ii) Encourages a sense of place, and
 - (iii) Provides for public spaces that are of high quality, safe, accessible, attractive and vibrant.
- (s) The mitigation of greenhouse gas emissions and adaptation to a changing climate.

Section 3(5) of the Planning Act requires that decisions 'in respect of the exercise of any authority that affects a planning matter' shall be consistent with the P.P.S. (2014).

The overall context for decision making in this regard is established in the first two paragraphs of the Part 1 Preamble to the P.P.S.

“The Provincial Policy Statement provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario’s policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians.

The Provincial Policy Statement provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. The Provincial Policy Statement supports improved land use planning and management, which contributes to a more effective and efficient land use planning system.”

The matters of Provincial interest mentioned in the first paragraph above are included within Section 2 of the Planning Act, as discussed above.

It is also noted that this section of the Planning Act also requires that decisions shall conform with the Provincial Plans that are in effect on the date of the decision, or shall not be in conflict. In the case of Niagara region, the Provincial Plans are: The Provincial Policy Statement, A Place to Grow: Growth Plan for the Greater Golden Horseshoe (A Place to Grow), the Greenbelt Plan and the Niagara Escarpment Plan.

3.2 The Provincial Policy Statement (P.P.S.)

Please note: the writing of this report commenced in prior to the proposed changes to the P.P.S. on July 22, 2019. As such, this background report contains a review of the 2014 P.P.S. and does not reference or review the 2019 proposed changes to the P.P.S.

3.2.1 P.P.S. Vision

Part IV of the P.P.S. establishes the vision for Ontario's land use planning system and it clearly indicates that one of the keys to the long-term prosperity and social well-being of Ontario residents is a clean and healthy environment. Below are those components (underlining added for emphasis) of the vision that speak to natural heritage resources and which have a bearing on the development of a natural environment systems:

“The long-term prosperity and social well-being of Ontario depends upon planning for strong, sustainable and resilient communities for people of all ages, **a clean and healthy environment**, and a strong and competitive economy.”

“Some areas face challenges related to maintaining population and diversifying their economy, while other areas face challenges related to accommodating and managing the development and population growth which is occurring, while protecting important resources and the quality of the natural environment.”

The Provincial Policy Statement focuses growth and development within urban and rural settlement areas while supporting the viability of rural areas. It recognizes that the **wise management of land use change may involve directing, promoting or sustaining development**. Land use must be carefully managed to accommodate appropriate development to meet the full range of current and future needs, while achieving efficient development patterns and **avoiding significant or sensitive resources and areas which may pose a risk to public health and safety**.

“Efficient development patterns” ... “minimize the undesirable effects of development, including impacts on air, water and other resources. Strong, liveable and healthy communities promote and enhance human health and social well-being, are economically and environmentally sound, and are resilient to climate change”.

“The Province’s natural heritage resources, water resources, including the Great Lakes, agricultural resources, mineral resources, and cultural heritage and archaeological resources provide important environmental, economic and social benefits. The wise use and management of these resources over the long term is a key provincial interest. The Province must ensure that its resources are managed in a sustainable way to conserve biodiversity, protect essential ecological processes and public health and safety, provide for the production of food and fibre, minimize environmental and social impacts, and meet its long-term needs.”

“It is equally important to protect the overall health and safety of the population. The Provincial Policy Statement **directs development away from areas of natural and human-made hazards**. This preventative approach supports provincial and municipal financial well-being over the long term, protects public health and safety, and minimizes cost, risk and social disruption”.

“Taking action to conserve land and resources avoids the need for costly remedial measures to correct problems and supports economic and environmental principles.”

“Strong communities, a clean and healthy environment and a strong economy are inextricably linked. **Long-term** prosperity, human and **environmental health** and social well-being **should take precedence over short-term considerations**.”

The introductory paragraph in Section 2.0 (Wise Use and Management of Resources) of the P.P.S. states the following:

“Ontario's long-term prosperity, environmental health, and social well-being depend on conserving biodiversity, protecting the health of the Great Lakes, and protecting natural heritage, water, agricultural, mineral and cultural heritage and archaeological resources for their economic, environmental and social benefits.”

It is noted that this paragraph sets the stage for the remaining policies in Section 2.0 of the P.P.S. as a result of the use of the word ‘accordingly’ that follows.

One of these policies is Section 2.1.2, which states the following:

"Natural features and areas shall be protected for the long-term."

Section 2.1.2 of the P.P.S. also states the following:

"The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of N.H.S.s, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features in areas, surface water features and ground water features."

3.2.2 Use of Words in the P.P.S.

The P.P.S. significantly expanded upon Part III (How to Read the Provincial Policy Statement) from the P.P.S. (2005).

There is now a discussion in Part III on the need to read the entire P.P.S., the need to consider specific policy language and the geographic scale of the policies. This section also confirms that the policies represent minimum standards and it also articulates the relationship of the 2014 with Provincial Plans.

This new section also contains direction on defined terms and meanings and guidance material. There is one enhancement in Part III of interest that was made in 2014 and it deals with the language used in the 2014. This enhancement is reproduced below:

When applying the Provincial Policy Statement it is important to consider the specific language of the policies. Each policy provides direction on how it is to be implemented, how it is situated within the broader Provincial Policy Statement, and how it relates to other policies.

Some policies set out positive directives, such as "settlement areas shall be the focus of growth and development." Other policies set out limitations and prohibitions, such as "development and site alteration shall not be permitted." Other policies use enabling or supportive language, such as "should," "promote" and "encourage."

The choice of language is intended to distinguish between the types of policies and the nature of implementation. There is some discretion when applying a policy with enabling or supportive language in contrast to a policy with a directive, limitation or prohibition.

On the basis of the above, it is clear that the Province, in writing and updating the P.P.S. in 2014, was very cautious and deliberate with respect to the words used. Of particular interest to decision-makers is whether a particular policy incorporates the word "*shall*", "*should*", "*promote*" or "*encourage*". The latter three are enabling or

supportive, while the first (shall) when applied to a policy is a directive, limitation or prohibition. This is supported by the statement in Part III of the P.P.S., which indicates that there is some discretion when applying a policy with enabling or supportive language in contrast to a policy with **a directive, limitation or prohibition**. In this regard, wherever the word 'shall' is used, it is a directive, limitation or a prohibition.

With respect to the development of an N.H.S. in Niagara Region, below is a list of a few of the relevant directives, limitations and prohibitions (using the word 'shall') from the 2014 P.P.S. that will need to be considered:

- **Section 1.2.4 e)** - Where planning is conducted by an upper-tier municipality, the upper-tier municipality in consultation with lower-tier municipalities **shall identify and provide policy direction** for the lower-tier municipalities on matters that cross municipal boundaries.
- **Section 1.6.7.5** – Transportation and land use considerations **shall be integrated at all stages of the planning process.**
- **Section 2.1.1** - Natural features and areas **shall be protected** for the long term.
- **Section 2.1.3** - Natural heritage systems **shall be identified** in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.
- **Section 2.1.5** - Development and site alteration **shall not be permitted** in..... unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.
- **Section 2.1.8** - Development and site alteration **shall not be permitted** on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
- **Section 4.4** - This Provincial Policy Statement **shall be read in its entirety** and all relevant policies are to be applied to each situation.
- **Section 4.7** - The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans. Official plans **shall identify provincial interests** and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required. Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. **Official plans shall provide clear, reasonable and attainable policies** to protect provincial interests and direct development to suitable areas.

3.2.3 Technical Review of the P.P.S.

Appendix 2 reviews each of the relevant policies of the P.P.S. and their applicability to Niagara Region.

3.2.4 Natural Heritage Systems and the P.P.S.

The definition of N.H.S. in the P.P.S. was significantly expanded in the 2014 version of the P.P.S. Below, the additions to the definition have been underlined:

“Natural heritage system: means a system made up of natural heritage features and areas, **and linkages intended to provide connectivity (at the regional or site level) and support natural processes** which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. **These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features,** lands that have been restored and areas with or have the potential to be restored to a natural state, **areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be used.**”

The revised definition of N.H.S. in the P.P.S. expands upon the nature of the features and functions that need to be considered in developing such a system and it recognizes that municipal approaches that **achieve or exceed the same objective** may also be used.

The first sentence in the definition of N.H.S. in the P.P.S. indicates that the N.H.S. is “a system made up of natural heritage features and areas, and linkages”. ‘Natural heritage features and areas’ include:

- Significant wetlands and significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Significant areas of natural and scientific interest;
- Other coastal wetlands;
- Fish habitat; and
- Habitat of endangered species and threatened species.

In addition to the N.H.S. being “a system made up of natural heritage features and areas, and linkages”, the definition of N.H.S. also notes that the system 'can' include:

- Natural heritage features and areas;
- Federal and provincial parks and conservation reserves;
- Other natural heritage features;

- Lands that have been restored or have the potential to be restored to a natural state;
- Areas that support hydrologic functions; and,
- Working landscapes that enable ecological functions to continue.

3.2.5 Water Resource Systems and the P.P.S.

Section 2.1.2 of the P.P.S. recognizes the linkages and relationships that exist between the natural heritage and water resource systems. In this regard, Section 2.2.2 of the P.P.S. includes policies on water resource systems that will also need to be considered. This section indicates the following in Section 2.2.1 c):

“Planning authorities shall protect, improve or restore the quality and quantity of water by:” ... “identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed.”

The comments made above about the identification of N.H.S.s apply to water resource systems as well. According to the P.P.S., the water resource system will consist of the following components:

- Ground water feature
 - Recharge/discharge areas
 - Water tables
 - Aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeologic investigations
- Hydrologic functions
 - “means the functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water’s interaction with the environment including its relation to living things” (M.M.A.H. 2014).
- Surface water features
 - Shoreline areas which are necessary for the ecological and hydrological integrity of the watershed
 - Headwaters
 - Rivers
 - Stream channels
 - Inland lakes
 - Seepage areas
 - Recharge/discharge areas
 - Springs

- Wetlands
- Associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.

3.2.6 Natural Hazards and the P.P.S.

Sections 3.1.1 to 3.1.8 of the P.P.S. contains a number of policies that are intended to protect public health and safety by directing development away from:

- a) Hazardous lands adjacent to the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes which are impacted by flooding hazards, erosion hazards and/or dynamic beach hazards;
- b) Hazardous lands adjacent to river, stream and small inland lake systems which are impacted by flooding hazards and/or erosion hazards; and
- c) Hazardous sites.

In many cases, these hazardous lands correspond with natural heritage features and surface water features that are part of water resource system. As a result, hazardous lands are often included within natural heritage systems. A more fulsome discussion of natural hazards and the role of Conservation Authorities and municipalities in identifying natural hazards and restricting development within them is contained in **Section 10.0** of this report.

Section 3.1.8 is a new P.P.S. policy that deals with hazardous forest types for wildland fire. This section states the following:

"Development shall generally be directed to areas outside of lands that are unsafe for development due to the presence of hazardous forest types for wildland fire. Development may however be permitted in lands with hazardous forest types for wildland fire where the risk is mitigated in accordance with wildland fire assessment and mitigation standards."

The P.P.S. 2014 provides the following definitions related to the wildland fire policy:

Hazardous forest types for wildland fire: means forest types assessed as being associated with the risk of high to extreme wildland fire using risk assessment tools established by the Ontario Ministry of Natural Resources, as amended from time to time.

Wildland fire assessment and mitigation standards: means the combination of risk assessment tools and environmentally appropriate mitigation measures identified by the Ontario Ministry of Natural Resources to be incorporated into the design, construction and/or modification of buildings, structures, properties and/or communities to reduce the risk to public safety, infrastructure and property from wildland fire.

A more fulsome discussion on natural hazards is contained in **Section 10.0** of this report.

3.3 Growth Plan for the Greater Golden Horseshoe

3.3.1 Overview

The Provincial Government adopted the Places to Grow Act in June 2005. The Act provides a framework for the adoption of regional-scale Growth Plans. The first of these, the Growth Plan for the Greater Golden Horseshoe (herein referred to as “the Growth Plan”), was adopted by Regulation in June 2006 and then updated in 2013 and 2017.

The Growth Plan is a statement of Provincial policy directing growth-related planning decisions in the Greater Golden Horseshoe ('G.G.H.') over the next 30 years. The intent of the Growth Plan is to significantly reduce urban sprawl and land consumption while making more efficient use of existing infrastructure. The Growth Plan requires that municipalities look to new ways to accommodate growth **that breaks from the past**, in terms of how communities are designed, and how land uses are mixed, all in an effort to improve quality of life, health and general well-being.

The Growth Plan as amended and updated in 2017 contains a vision for 2041 for the Greater Golden Horseshoe. This vision is described through a series of maps and text, and contains policies dealing with the essential aspects of the Plan. The Growth Plan contains specifics on where and how the area will grow and the infrastructure that may be needed to support that growth.

The Growth Plan establishes specific policies dealing with forecasts, intensification, urban growth centres and intensification corridors, employment areas, urban boundaries, and small cities and towns. It also establishes minimum densities that new development must achieve, requires that urban growth centre and intensification corridor boundaries be delineated, creates strong policies dealing with the preservation of employment areas and lists the criteria to be met to justify urban boundary expansions.

A chapter on infrastructure deals with transportation and water/wastewater systems. A chapter entitled "Protecting What is Valuable" establishes policies related to the natural environment systems, agricultural system, rural areas, mineral aggregate and cultural heritage resources. There is also a chapter providing for implementation measures, including monitoring and review of the Plan's policies and projections.

The Growth Plan was recently updated in 2017 and it contains updated requirements for municipal comprehensive reviews, and it increases the minimum intensification target and the minimum designated Greenfield area target. The updated Growth Plan also establishes the basis for the preparation of agricultural system and N.H.S. mapping (with such Provincial mapping released in February 2018). An updated policy framework for both systems also supports this mapping.

It should be noted that in the fall of 2018 the Ministry of Municipal Affairs and Housing commenced consultation with municipalities and the development sector, along with stakeholder representatives, to review concerns regarding implementation challenges. The writing of this report commenced in prior to the changes made to the Growth Plan in May 16, 2019. As such, this background report does not specifically reference the May 2019 Growth Plan.

3.3.2 Technical Review of the Growth Plan

Appendix 3 reviews each of the relevant policies of the Growth Plan and their applicability to Niagara Region. The following section discusses the relationship between the natural heritage policies in the P.P.S. and the Growth Plan.

3.3.3 Relationship between the Agricultural and Natural Heritage Systems

Section 2.3.1 of the P.P.S. states the following:

"Prime agricultural areas shall be protected for long-term use for agriculture. Prime agricultural areas are areas where prime agricultural lands predominate. Specialty crop areas shall be given the highest priority for protection, followed by Canada Land Inventory Class 1, 2, and 3 lands, and any associated Class 4 through 7 lands within the prime agricultural area, in this order of priority."

This section is mandatory and indicates that prime agricultural areas shall be protected for long-term use for agriculture. In the case of this policy, long-term means the planning period at a minimum (20 years).

Section 2.3.2 of the P.P.S. then states the following:

"Planning authorities shall designate prime agricultural areas and specialty crop areas in accordance with guidelines developed by the Province, as amended from time to time".

This section requires that planning authorities designate prime agricultural areas in their Official Plans. While the term 'designate' implies that the creation of a mutually exclusive land use designation is required, other approaches that achieve the same objective could be considered; however, the requirement to 'designate' was added to the current version of the P.P.S.

Section 4.2.6.2 of the Growth Plan states the following:

"Prime agricultural areas, including specialty crop areas, will be designated in accordance with mapping identified by the Province and these areas will be protected for long-term use for agriculture."

This section requires all municipalities to designate prime agricultural areas in accordance with Provincial mapping and to protect these lands for long-term use for agriculture. It is noted that the policy references the protection of prime agricultural

areas for the long term, not permanently. It is also noted that later policies allow for the refinement of the agricultural system before it is implemented in Official Plans.

Section 3.1.1 of the Greenbelt Plan states in part the following:

"Prime agricultural areas are those lands designated as such within official plans to permanently protect these areas for agriculture."

On the basis of the above, there is an expectation that prime agricultural areas will be 'designated' in Official Plans.

This differs for the N.H.S., as is evident by Section 4.2.2.2 of the Growth Plan:

"Municipalities will incorporate the Natural Heritage System as an overlay in official plans, and will apply appropriate policies to maintain, restore, or enhance the diversity and connectivity of the system and the long-term ecological or hydrologic functions of the features and areas as set out in the policies in this subsection and the policies in subsections 4.2.3 and 4.2.4."

This is also a requirement of the Greenbelt Plan as per Section 5.3 of the Greenbelt Plan:

"Official plans shall contain policies that reflect the requirements of this Plan together with a map(s) showing the boundaries of the Greenbelt Area, the Protected Countryside, the Natural Heritage System and the agricultural land base. Municipalities shall provide a map showing known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones identified in this Plan. The identification of the Natural Heritage System boundary will form the basis for applying the policies of section 3.2."

Notwithstanding the above, Section 1.4.2 of the Greenbelt Plan states the following:

"The Natural Heritage System is not a designation in and of itself with a list of permitted uses. Rather, it is an overlay on top of the prime agricultural area, including specialty crop areas, and rural lands designations contained in official plans. As such, permitted uses are those set out within the prime agricultural area and rural lands policies of this Plan and designations of official plans, subject to the Natural System policies of this Plan."

The Growth Plan as amended in 2017 suggests a similar approach to that of the Greenbelt Plan. In this regard, Section 4.1 of the Growth Plan states in part the following:

"This Plan also provides for the identification and protection of a Natural Heritage System for the G.G.H. outside of the Greenbelt Area and settlement areas, and applies protections similar to those in the Greenbelt Plan to provide consistent and long-term protection throughout the G.G.H."

In recognition of the overlap between the Provincial Agricultural System and Natural Heritage System mapping, the Province has identified four options with respect to mapping in a document entitled 'Implementation Procedures for the Agricultural System in the Greater Golden Horseshoe' dated February 2018. In this regard, the following is stated on in the remaining paragraphs of this section in this report:

"Key natural heritage features within the Natural Heritage System and key hydrologic features often overlap with prime agricultural areas. For clarity and consistency across the G.G.H., it is recommended that as a best practice, one of four options be used by municipalities for official plan mapping where prime agricultural areas overlap with key natural heritage features and key hydrologic features. In all four options, the Natural Heritage System would be an overlay. As well, permissions for new agricultural uses, agriculture-related uses and on-farm diversified uses where features and prime agricultural areas overlap would be restricted by protective policies (i.e., no development or site alteration)."

It is noted as per the above that in all four options, the Natural Heritage System would be an overlay. However, key natural heritage features and key hydrologic features within the N.H.S. could be designated within a mutually exclusive land use designation in an Official Plan as per Option 4 below. The four options from the February 2018 Guidelines are below:

1. "Overlay: Prime agricultural areas, key natural heritage features and key hydrologic features would be shown on the same land use schedule, with overlay symbology (e.g., hatching) used for key natural heritage features and key hydrologic features, such that prime agricultural areas are visible beneath the overlays. The policies imposed by an overlay would be in addition to, and not in lieu of, the permissions or restrictions associated with the underlying designation.
2. Dual designation: Two different designations for the same geographic area would be shown on two separate land use schedules. Prime agricultural areas could be shown on one land use schedule (potentially on the main land use schedule), and key natural heritage features and key hydrologic features mapped on another land use schedule.
3. Hybrid designation: A hybrid designation (e.g., 'Natural Features in Prime Agricultural Areas') would only be used in areas of overlap between prime agricultural areas and key natural heritage features and key hydrologic features. Permitted uses in the hybrid designation would be distinct and clearly identified, without requiring two sets of policies to be considered.
4. Single designation: Separate, distinct key natural heritage feature and key hydrologic feature designations would be used. Policies could explain how prime agricultural areas within features are to be addressed."

It is noted that all of the above approaches involve identifying prime agricultural areas in a land use designation to recognize the primacy of the use. There also appear to be a range of options respecting how key natural heritage features and key hydrological features are dealt with (overlay, dual designation, hybrid designation and mutually exclusive).

3.3.4 Implications of Growth Plan on Mineral Aggregate Resources

The 2005 Greenbelt Plan introduced new and different policies on mineral aggregate extraction. The most recent iteration of the Growth Plan has applied the Greenbelt Plan policy framework to the Growth Plan N.H.S. In this regard, Section 4.2.8.2 of the Growth Plan states the following:

“2. Notwithstanding the policies in subsections 4.2.1, 4.2.2, 4.2.3 and 4.2.4, within the Natural Heritage System, mineral aggregate operations and wayside pits and quarries are subject to the following:

a. No new mineral aggregate operation and no new wayside pits and quarries, or any ancillary or accessory use thereto, will be permitted in the following key natural heritage features and key hydrologic features:

- i) Significant wetlands;
- ii) Habitat of endangered species and threatened species; and
- iii) Significant woodlands unless the woodland is occupied by young plantation or early successional habitat, as defined by the Province, in which case, the application must demonstrate that policies 4.2.8.4 b) and c) and 4.2.8.5 c) have been addressed and that they will be met by the operation;

b. Any application for a new mineral aggregate operation will be required to demonstrate:

- i) How the connectivity between key natural heritage features and key hydrologic features will be maintained before, during, and after the extraction of mineral aggregate resources;
- ii) How the operator could replace key natural heritage features and key hydrologic features that would be lost from the site with equivalent features on another part of the site or on adjacent lands;
- iii) How the water resource system will be protected or enhanced; and
- iv) How any key natural heritage features and key hydrologic features and their associated vegetation protection zones not identified in policy 4.2.2.3 a) will be addressed in accordance with policies 4.2.8.4 b) and c) and 4.2.8.5 c); and

c. An application requiring a new approval under the Aggregate Resources Act to expand an existing mineral aggregate operation may be permitted in the Natural Heritage System, including in key natural heritage features, key hydrologic features and any associated vegetation protection zones, only if the related decision is consistent with the P.P.S. and satisfies the rehabilitation requirements of the policies in this subsection.”

The implication of this new section above is that new mineral aggregate operations are no longer permitted within significant woodlands within the Provincial N.H.S., but would be permitted within significant woodlands outside of the Provincial N.H.S. subject to the

policies of the P.P.S. Given the directive nature of this policy, this means that there would be two policy frameworks applying to mineral aggregate resources in the Region depending on whether the lands were within the Provincial N.H.S. or subject to the P.P.S. There are also a number of new policies on rehabilitation in Sections 4.2.4 and 4.2.5, some of which are specific to lands within the Provincial N.H.S. and others, which would apply to the entire Region. The aggregate policies for the new N.O.P. are being concurrently prepared under another work program.

3.4 Greenbelt Plan

3.4.1 Overview

In 2005, the Province of Ontario created the Greenbelt Plan, to permanently protect approximately 728,000+ hectares (1.8 million acres) of agricultural lands and ecological features/systems, from urban development, within the Greater Golden Horseshoe and beyond. The Greenbelt is the largest geographical area of its kind in the world, and includes the previously protected Oak Ridges Moraine and Niagara Escarpment. The Greenbelt Plan was established under Section 3 of the Greenbelt Act, 2005.

Section 1.2.1 of the Greenbelt Plan (2017) sets out the vision for the Greenbelt Plan area as set out below:

“The Greenbelt is a broad band of permanently protected land which:

- Protects against the loss and fragmentation of the agricultural land base and supports agriculture as the predominant land use;
- Gives permanent protection to the natural heritage and water resource systems that sustain ecological and human health and that form the environmental framework around which major urbanization in south-central Ontario will be organized;
- Provides for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation and resource uses; and
- Builds resilience to and mitigates climate change.”

The context for the three elements of the Vision set out above is that the Greenbelt is a broad band of “permanently protected” land. This Vision to a very large extent implements the context for the Greenbelt Plan established in Section 1.1 of the Greenbelt Plan. Section 1.1 states the following:

“The Greenbelt was introduced in 2005 to help shape the future of this region. The Greenbelt is the cornerstone of Ontario's Greater Golden Horseshoe Growth Plan (Growth Plan) which is an overarching strategy that provides clarity and certainty about urban structure, where and how future growth should be accommodated and what must be protected for current and future generations.

The Greenbelt Plan, together with the O.R.M.C.P. and the N.E.P., identifies where urbanization should not occur in order to provide permanent protection to

the agricultural land base and the ecological and hydrological features, areas and functions occurring on this landscape.”

This desire to permanently protect land is a significant over-riding principle of the Greenbelt Plan. The Greenbelt Plan was updated in 2017 to make it consistent with the updated Growth Plan.

While the Greenbelt Plan includes land within the Niagara Escarpment Plan Area, the Greenbelt Plan policies do not apply to these lands, with the exception of Section 3.3, which addresses parkland, open space and trails. Otherwise, the policies of the N.E.P. apply within the Niagara Escarpment Planning Area.

The Greenbelt Plan is made up of two primary designations - Protected Countryside and Urban River Valleys. The Protected Countryside is composed of an Agricultural System and a Natural System, together with a series of settlement areas.

3.4.2 Technical Review of the Greenbelt Plan

Appendix 4 below reviews each of the relevant policies of the Greenbelt Plan and their applicability to Niagara Region.

3.5 The Niagara Escarpment Plan

3.5.1 Overview

The Niagara Escarpment Commission ('N.E.C.') was established in June 1973 in accordance with the Niagara Escarpment Planning and Development Act.

The first Niagara Escarpment Plan ('N.E.P.') was prepared by the Ministry of Natural Resources in 1985 and it has been updated from time to time as required to deal with emerging policy issues and site-specific development applications. In 2017, a significantly updated N.E.P. was released, as were updates to the Oak Ridges Moraine Conservation Plan, the Growth Plan and the Greenbelt Plan. In contrast to the Greenbelt Plan and the Growth Plan, which are implemented by municipalities, the N.E.P. is implemented by the Niagara Escarpment Commission ('N.E.C.').

The N.E.P. applies to about 180,000 hectares of land between the Niagara River and Tobermory. The N.E.P. is implemented to varying degrees in upper and lower tier Official Plans, but not through the application of zoning by-laws pursuant to the Planning Act. Instead of zoning, the N.E.C. oversees the issuance of development permits for all development within the N.E.P. area. In addition, the N.E.C. also is responsible for processing applications to amend the N.E.P. and for commenting on applications to amend the Regional and Local Official Plans as required. In addition, the development permit process administered by the N.E.C. also allows for conditions to be included and attached to development permits. To a very large extent, the development permit system relied upon by the N.E.C. is very similar to the development permit process established by the Province through amendments to the Planning Act (now known as the Community Planning Permit System).

One of the other significant differences between the N.E.P. and the Greenbelt Plan is that the N.E.P. itself does not establish an N.H.S. Instead, the N.E.P. contains a number of policies on the individual natural features that are found within the N.E.P. area.

In terms of how the N.E.P. relates to other Provincial Plans, the extract below from the N.E.P. provides some context:

“The Greenbelt Act, 2005 authorized the preparation of the Greenbelt Plan, which was first approved in February 2005. The Greenbelt Plan identifies where urbanization should not occur in order to provide permanent protection of the agricultural land and the ecological features and functions occurring in the Greenbelt Plan Area, which includes the Niagara Escarpment Plan Area, as well as the Oak Ridges Moraine Conservation Plan Area, and the Protected Countryside of the Greenbelt Plan. The Greenbelt Plan provides that the policies of the Niagara Escarpment Plan are the policies of the Greenbelt Plan for the Niagara Escarpment Plan Area and the Protected Countryside policies do not apply with the exception of section 3.3 (Parkland, Open Space and Trails).

The Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Greenbelt Plan work within the framework set out by the Growth Plan for the Greater Golden Horseshoe for where and how future population and employment growth should be accommodated. Together, all four provincial plans build on the Provincial Policy Statement to establish a land use planning framework for the Greater Golden Horseshoe and the Greenbelt Plan Area that supports a thriving economy, a clean and healthy environment and social equity.”

3.5.2 Technical Overview

It is noted that since N.E.C. implements the N.E.P., the Region will need to decide on the level of detail included in the new N.O.P. on the N.E.P. In this regard, some municipalities simply indicate that the N.E.P. applies and direct the reader to the N.E.P. to determine what is permitted and under what conditions. Others repeat the policy framework word-for-word, or translate the policy framework into the language of the Official Plan. Since the N.E.P. permits municipalities to be more restrictive than the N.E.P. depending on the context, these additional restrictions would need to be spelled out in the Official Plan if this was the case.

Appendix 5 reviews each of the relevant policies of the N.E.P. and their applicability to Niagara Region.

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4.0 Guidelines and Technical Criteria

The following documents provide technical guidance and criteria that may be considered in developing the Region's natural environment system(s).

4.1 Natural Heritage Reference Manual

The Natural Heritage Reference Manual (N.H.R.M.) (2010) is a provincial guidance document specifically written to assist in the implementation of the P.P.S. (2005). The N.H.R.M. collectively articulates the approach the Province recommends for achieving consistency with the P.P.S. 2005. Although it was developed to provide guidance for implementing the 2005 P.P.S., and its usefulness and relevance has diminished (as discussed further down) with time, the N.H.R.M. is often cited as it still contains relevant technical information that is extremely helpful in undertaking studies related to the identification and protection of natural heritage features. It also remains relevant for addressing policies that are unchanged from the 2005 P.P.S.

The N.H.R.M. is a substantial and comprehensive document of 233 pages, divided into 16 sections:

1. Introduction
 2. Provincial Policy Statement Implementation
 3. Natural Heritage Systems
 4. Natural Heritage Features and Areas
 5. Significant Habitat of Endangered and Threatened Species
 6. Significant Wetlands and Significant Coastal Wetlands
 7. Significant Woodlands
 8. Significant Valleylands
 9. Significant Wildlife Habitat
 10. Significant Areas of Natural and Scientific Interest
 11. Fish Habitat
 12. How to Protect: Municipal Planning Techniques and Tools
 13. Addressing Impacts of Development and Site Alteration
 14. Performance Indicators
 15. Provincial Land Use Planning Documents
 16. Annotated Bibliography: Adjacent Lands and Buffers Research
- Section 1 provides an overview and the purpose of the manual, which is to provide "technical guidance for implementing the natural heritage policies of the P.P.S. 2005. The manual represents the Province's recommended technical criteria and approaches for being consistent with the P.P.S. in protecting natural heritage features and areas and N.H.S.s in Ontario."

- Section 2 provides an overview of the P.P.S. natural heritage policies and how municipalities can go beyond the P.P.S. and discusses the relationship of the P.P.S. and official plans and provincial plans.
- Section 3 outlines a recommended approach to N.H.S. planning for authorities to use for protecting natural features and implementing the P.P.S. according to policy 2.1.2
- Section 4 reviews the meaning and importance of “significant” and “adjacent lands” for natural heritage features and areas identified in the P.P.S. (policies 2.1.3, 2.1.4, and 2.1.5). This section also describes the relationship and difference between adjacent lands and buffers as they relate to implementing the P.P.S.
- Sections 5 through 11 describe each of the natural heritage features and areas identified in P.P.S. policies 2.1.3, 2.1.4, 2.1.5, provides a rationale for the need to protect these features/areas, gives criteria and/or evaluation procedures for the identification of these features/areas, and discusses adjacent lands widths.
- Section 12 reviews various municipal planning techniques and implementation tools (e.g. zoning by-laws) available to planning authorities as a means of protecting N.H.S.s and natural heritage features and areas.
- Section 13 provides guidance for evaluating potential impacts resulting from development and site alteration on natural heritage features, functions and adjacent lands. This section also provides guidance for undertaking an environmental impact study.
- Section 14 provides a general overview of the requirement by the Province to identify performance indicators for measuring the effectiveness of the policies related to natural heritage protection. Municipalities are “encouraged to establish performance indicators to monitor the implementation of the policies in their official plans” (reflected in P.P.S. 2014, policy 4.15).
- Section 15 provides a list (not comprehensive and now out of date) of relevant provincial land use planning documents, including policies, implementation direction and guidance that can be used to support the application of the P.P.S. natural heritage policies.
- Section 16 includes a compilation of research, provided in the form of an annotated bibliography, used as reference to develop recommendations for the width and composition of adjacent lands and buffers to be used to protect natural heritage features and ecological functions.

The existing R.O.P. has been updated through several Official Plan Amendments resulting in a consolidated version (2014) that postdates the publication of the N.H.R.M. (2010); thus, the guidance from the N.H.R.M. has not been necessarily been reflected in

the natural environment sections, including criteria for significant features (e.g., significant woodlands). It should be noted that as a guidance document, as opposed to a policy document, the N.H.R.M. is only indirectly relevant to the R.O.P. The Purpose and Scope in the N.H.R.M. (s.1.1) specially states that "... it does not add to or subtract from policy." In this respect the 2005 P.P.S. itself is far more relevant to the R.O.P. review.

4.1.1 Relevance to new Niagara Official Plan

As a guidance document issued by the Province to assist with the implementation of the Provincial Policy Statement, the N.H.R.M. is highly relevant, notwithstanding that it is becoming dated in some respects. The guidance it provides for the development of N.H.S.s and protection of the features that comprise them is still very helpful and should be considered in the development of criteria for identifying key features and refinement of policies in the N.O.P. However, its greater utility is for giving guidance during the development process to ensure development applications conform with Provincial policy.

The status of the N.H.R.M. and the obligation to consult it is somewhat unclear, since it was specifically written to assist with implementation of the P.P.S. 2005, and the P.P.S. has undergone revisions since that time. Also, the N.H.R.M. is very clear in the Purpose and Scope (s.1.1) that additional approaches for achieving the desired outcomes of the P.P.S. may exist and puts the onus on a development proponent to demonstrate that there is consistency with the P.P.S.

The guidance in the N.H.R.M. that relates directly to policy conformity is no longer relevant for those areas where the P.P.S. has changed since 2005, but that it is still entirely relevant where policies are unchanged. Moreover, the majority of the science behind the inventory and analysis of natural heritage features, and the process and considerations for developing N.H.S.s, have not substantially changed since 2010, thus the technical guidance in the N.H.R.M. is still relevant, albeit some methods and protocols may have been refined. Criteria for establishing significance will have changed since that time, especially with respect to the habitat of threatened and endangered species (Species at Risk), and more recent sources should be consulted in that regard.

The guidance provided by the N.H.R.M. for the identification of the following features is still widely used:

- Significant Habitat of Endangered and Threatened Species
- Significant Wetlands and Significant Coastal Wetlands
- Significant Woodlands
- Significant Valleylands
- Significant Wildlife Habitat
- Significant Areas of Natural and Scientific Interest
- Fish Habitat

4.2 Significant Wildlife Habitat Technical Guide

The Significant Wildlife Habitat Technical Guide (S.W.H.T.G.) (O.M.N.R. 2000) was prepared by the Ministry of Natural Resources to assist planning authorities and other participants in the land use planning system, particularly as it related the identification of significant wildlife habitat (S.W.H.) which was identified in the 1996 P.P.S. as a natural heritage feature. Although described in general in the 1999 Natural Heritage Reference Manual (O.M.N.R. 1999), The S.W.H.T.G. provided the most up to date information available at

the date of publication on specific technical issues related to the identification and protection of S.W.H. The document recognizes that the information presented will need to be updated as technology or techniques are improved to identify S.W.H.; as well the S.W.H.T.G. recognizes that other acceptable approaches to identifying S.W.H. could be utilized. The S.W.H.T.G. notes that the document provides guidance and is not intended to add or detract from policy.

The S.W.H.T.G. provides detailed technical information on the identification, description, and prioritisation of significant wildlife habitat. This document is intended to provide guidance on “the development of strategies to identify and protect significant wildlife habitat in the municipal planning process. More specifically it:

- describes in more detail some of the techniques, issues, and processes identified in the [1999] Natural Heritage Reference Manual
- provides recommended approaches to describe, identify and prioritise significant wildlife habitat
- provides a compilation of relevant technical support materials and references”

The S.W.H.T.G. is divided into three sections:

- Background and approach to significant wildlife habitat (Chapters 1–2)
- Identifying significant wildlife habitat (Chapters 3–7), including:
 - Seasonal Concentration Areas
 - Rare Vegetation Communities or Specialized Habitat for Wildlife
 - Habitat of Species of Conservation Concern.
 - Animal Movement Corridors
- Evaluating and ranking significant wildlife habitat (Chapters 8–9)
- How much habitat to protect (Chapter 10)
- Assessment of the Natural Heritage System (Chapter 11)

The appendices are extensive and include:

- Appendix A. A description of Ramsar sites, biosphere reserves, Carolinian Canada sites and Western Hemisphere Shorebird Reserve Network and their application in landuse planning.

- Appendix B. Ecological considerations underlying Natural Heritage System planning.
- Appendix C. A list of area sensitive species and key references.
- Appendix D. Guidelines for conducting field investigations.
- Appendix E. Natural heritage gap analysis methodologies used by the Ontario Ministry of Natural Resources.
- Appendix F. List of agencies and organisations and information that may be obtained.
- Appendix G. Wildlife habitat matrices and habitat descriptions for rare vascular plants.
- Appendix H. Suggested terms of reference for the formation and operation of a Conservation Advisory Committee (C.A.C.).
- Appendix I. Information sources for the identification of specific significant wildlife habitats.
- Appendix J. Natural heritage resources of Ontario: Vegetation communities of Southern Ontario.
- Appendix K. Significant waterfowl habitat.
- Appendix L. Practical approaches for identifying rare vegetation communities using the southern Ontario Ecological Land classification approach.
- Appendix M. Locations of known rare vegetation communities in Ontario.
- Appendix N List of indicator species of Alvar, Tall Grass Prairie, Savannah and Carolinian forest habitats in southern Ontario.
- Appendix O. Finding and identifying raptor nests.
- Appendix P. List of endangered, threatened and vulnerable plant and animal species in Ontario.
- Appendix Q. Evaluation criteria for significant wildlife habitat.
- Appendix R. Summary

Up until the release of the Eco-region Schedules (Draft 2012, final 2015) that provide more detailed criteria, Appendix Q was used to evaluate S.W.H.

4.2.1 Relevance to new Niagara Official Plan

Although the S.W.H.T.G. is an older guidance document (almost 20 years) much of the concepts and technical information contained therein are still relevant to the identification of S.W.H. including measures to avoid or mitigate impacts to S.W.H.. This document should continue to be referred to for detailed technical information to support the identification of S.W.H..

4.3 Significant Wildlife Habitat Mitigation Support Tool Version 2014

The Significant Wildlife Habitat Mitigation Support Tool (O.M.N.R.F. 2014) is a guidance document that provides technical information regarding the functions of S.W.H., potential impacts resulting from changes in adjacent land use or from direct impacts and

proposes mitigation strategies. The Significant Wildlife Habitat Mitigation Support Tool is intended to accompany the S.W.H.T.G. (OM.N.R. 2000) with respect to S.W.H. types and measures to implement to avoid or mitigate impacts to S.W.H..

The Significant Wildlife Habitat Mitigation Support Tool is a comprehensive document of 533 pages, divided into the following sections:

- General introduction, concepts, and types of development considered, including:
 - Residential and commercial development
 - Major recreational development
 - Aggregate and mine development
 - Energy development
 - Road development
- Seasonal Concentration Areas (Index #1 - #16)
- Rare Vegetation Communities (Index #17 - #23)
- Rare or Specialized Habitat (Index #24 - #31)
- Habitat of Species of Conservation Concern (Index #32 - #37)
- Movement Corridors (Index #38 - #40)

Each index reviews the type of S.W.H. and habitat function and composition, and reviews the development types, their potential for impact and recommends mitigation options.

4.3.1 Relevance to new Niagara Official Plan

Although this document may not directly inform the policies or mapping of natural environment systems in the new N.O.P., the Significant Wildlife Habitat Mitigation Support Tool is an important guidance document that should be used in studies evaluating potential impacts resulting from development (e.g. Environmental Impact Study). Direction for referring to this document can come from the Niagara Region Environmental Impact Study Guidelines. Indirectly, the Official Plan could refer to the requirement to follow the E.I.S. Guidelines therein containing the direction for referring to the Significant Wildlife Habitat Mitigation Support Tool when undertaking an evaluation of impacts to S.W.H..

4.4 Significant Wildlife Habitat Ecoregion Criteria Schedules

The Significant Wildlife Habitat Ecoregion Criteria Schedules (herein referred to as the S.W.H. Ecoregion Schedules) (O.M.N.R.F. 2015), first released as a Draft in February 2012, provides recommended criteria for identifying S.W.H.. A separate “schedule” is provided for each of Ecoregions 3E, 5E, 6E and 7E. Due to the geographical and ecological differences in these Ecoregions, the criteria are specific for each Ecoregion.

This document supports the Significant Wildlife Habitat Technical Guide (OM.N.R. 2000). It provides detailed information on the description, criteria, information sources and assessment methods for significant wildlife habitat in each Ecoregion. The criteria

for each S.W.H. type are based on both scientific literature and expert knowledge (i.e., professional opinion). For each S.W.H. type, the following information is provided to assist with evaluation of habitat as S.W.H.:

- Rational for identification as S.W.H.
- Indicator wildlife species
- Candidate S.W.H. indicators:
 - Habitat identifiers based on Ecological Land Classification (E.L.C.) vegetation communities (Lee et. al. 1998)
 - Habitat descriptions and Information Sources
- Confirmed S.W.H. criteria
 - Describes the extent of S.W.H. as it relates to the E.L.C. unit(s) and buffers/radius from the E.L.C. unit(s)

The S.W.H. Ecoregion Schedules provide a set of detailed criteria for evaluation of S.W.H. beyond the guidance provided in the S.W.H.T.G.. This can allow S.W.H. to be more easily identified or at least candidate S.W.H. to be identified either using currently available information, or based on information gathered through site specific studies (e.g., E.I.S., sub-watershed study, Environmental Assessment).

4.4.1 Relevance to new Niagara Official Plan

Since S.W.H. criteria may be updated from time to time by the M.N.R.F. based on more recent information or changes in the listing of Species at Risk (which can inform the identification of S.W.H. for Special Concern and Rare Wildlife Species) caution should be applied to mapping S.W.H. as part of the natural environment system identified in Official Plan schedules, because the very criteria that led to their mapping in the first place may change.

4.5 Greenbelt Plan Technical Paper

The Greenbelt Plan technical paper, titled “Greenbelt Plan 2005 - Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area: Technical Paper 1” (OM.N.R. 2012), was developed by the Province to assist planning authorities and others with technical assistance to identify and delineate Key Natural Heritage Features (KNHFs) in the N.H.S. of the Protected Countryside. This technical paper does not include those Key Hydrologic Features that are not also KNHFs: permanent and intermittent streams, lakes (and their littoral zones), and seepage areas and springs.

Guidance for the identification and delineation of the following KNHFs are provided:

- Significant habitat of endangered species, threatened species and special concern species;
- Fish habitat;
- Wetlands;

- Life science Areas of Natural and Scientific Interest (A.N.S.I.s);
- Significant valleylands;
- Significant woodlands; and
- Sand barrens, savannahs, tallgrass prairies and alvars.

It should be noted that the 2017 Greenbelt Plan has made the following change:

- “Significant habitat of endangered species, threatened species and special concern species” is now identified as “habitat of endangered species and threatened species”

This has been updated to recognize the update to the Endangered Species Act (2007) that affords habitat protection to Endangered Species and Threatened Species. In addition, the habitat of species of conservation concern is now included as a category for significant wildlife habitat, which is recognized in the update to this category of KNHF in the 2017 Greenbelt Plan to “Significant wildlife habitat (including habitat of special concern species)”.

The technical paper is structured including the following sections:

- 1.0 Introduction
- 2.0 Purpose
- 3.0 Policy Context
- 4.0 Mapping
 - Includes guidance on making mapping refinements
- 5.0 Data Sources
- 6.0 Vegetation Protection Zone
- 7.0 Criteria for Identifying and Delineating Key Natural Heritage Features
- 8.0 Review of Boundaries of Key Natural Heritage Features
- 9.0 Roles and Responsibilities in the Implementation of this Technical Paper
- Appendices – provides detailed information on the delineation of the following:
 - Details to assist in the identification and delineation of Significant valleylands and Significant woodlands
 - A list of mid to late successional or site-restricted tree species
 - Definitions

4.5.1 Relevance to the New Niagara Official Plan

Although this technical paper was developed to support the implementation of the policies of the 2005 Greenbelt Plan, the technical guidance remains relevant to the identification of KNHFs and interpretation of policies in the 2017 Greenbelt Plan. Unofficial communication from the M.N.R.F. has indicated this technical paper, or an equivalent technical paper will be distributed to support the identification of key features in the Greenbelt Plan N.H.S. and the Growth Plan N.H.S. Until such time that an update to this paper is released by the M.N.R.F., direction has been provided by the M.N.R.F. that this technical paper remains relevant and should be used to identify

KNHFs in the Greenbelt Plan N.H.S. Protected Countryside and Growth Plan N.H.S. within Niagara Region.

It should be noted that this technical criteria paper does not apply to lands subject to the Niagara Escarpment Plan. Furthermore, beyond the N.H.S. within the Protected Countryside, Section 3.2.5.3 of the Greenbelt Plan (M.M.A.H. 2017) indicates that KNHFs are to be defined pursuant to, and subject to the policies of, the P.P.S. That said, the P.P.S. does not provide technical guidance for the identification of natural heritage features – technical guidance for the P.P.S. is provided in the Natural Heritage Reference Manual. However, this technical document could also be used to inform the development of criteria to identify natural environment features in Niagara Region.

4.6 How Much Habitat is Enough?

Environment Canada's publication *How much habitat is enough?* (Environment Canada, 2013) provides a strategic framework and set of guidelines for protecting and enhancing wetland, riparian, forest and grassland habitats. It is intended to serve as a starting point for the development of N.H.S.s. The framework acknowledges the need for a systematic approach that "better captures the complexity of life and the multiple and often known linkages that allow species to flourish." (Environment Canada, 2013). Moreover, is the recommendation to look beyond the boundaries of specific planning units, such as municipal boundaries, and to take into account surviving habitat corridors and to promote linkages across the landscape.

The *How Much Habitat is Enough?* provides minimum guidelines (twenty-one) to support ecological requirements with the objective to maintain wildlife populations and prevent local extirpations of species. These guidelines can inform targets for habitat types, and in turn, targets for the natural environment system.

An assessment of the degree to which select N.H.S. targets for forest, wetlands, riparian and grassland habitats are to be protected can be determined by applying minimum guidelines against existing conditions.

For example, select guidelines for the following features are provided for consideration in developing N.H.S. targets for an area:

- Forest habitat
 - At least 30% forest cover
 - At least 10% of forest cover should be interior forest >100 m from edge
 - At least one large contiguous forest within each watershed (>200 ha)
- Wetland habitat
 - At least 10% wetland habitat and 6% of each subwatershed, or 40% of the historic watershed wetland coverage should be protected and restored
 - Protection of a Critical Function Zone (C.F.Z.) of (e.g., 100 m from edge of wetland)

- Urbanizing watersheds should maintain less than 10% impervious land cover in order to preserve the abundance and biodiversity of aquatic species
- Riparian habitat
 - 75 % of stream lengths natural vegetated cover
 - Minimum 30 m vegetated buffer along streams
- Grassland habitat
 - Maintain and create small and large grassland patches in existing and potential local grassland landscapes, with an average grassland patch area of greater than or equal to 50 hectares and at least one 100-hectare patch

The main content of the report describes the four habitat types, their functions, important considerations for shape, proximity to other features, species that rely on them and the rationale for minimum size thresholds.

4.6.1 Relevance to the New Niagara Official Plan

The How Much Habitat is Enough? document provides a science-based rationale for guidance to set targets for features and the natural environment system. The targets provided can inform the Region's objectives for natural environment protection and inform policies regarding the identification and protection of these features. For example, grassland habitat is not currently a feature identified as part of the Region's Core N.H.S. Although grasslands that support indicator species and have a minimum size of 10 ha could qualify as S.W.H. for "Shrub/Early Successional Bird Breeding Habitat" (O.M.N.R.F. 2015), smaller grasslands could be considered as locally significant (i.e., within Niagara Region) if this type of habitat is uncommon and subject to land use change.

5.0 Endangered Species Act

5.1 Preamble

This review of the Endangered Species is current as of May 1, 2019. It should be noted that “the Ontario government is currently undertaking a review of the Endangered Species Act (E.S.A.) to improve protections for species at risk, consider modern and innovative approaches to achieve positive outcomes for species at risk, as well as to look for ways to streamline approvals and provide clarity to support economic development” (Ministry of the Environment, Conservation and Parks, 2019). The review period was from January 18, 2019 to March 04, 2019. As such, the review of the E.S.A. and relevance to the Region may change following the anticipated update to the E.S.A.

5.2 Overview

The E.S.A. (M.N.R.F., 2007) was developed with several objectives:

1. “To identify species at risk (SAR) based on the best available scientific information, including information obtained from community knowledge and aboriginal traditional knowledge.
2. To protect species that are at risk and their habitats, and to promote the recovery of species that are at risk.
3. To promote stewardship activities to assist in the protection and recovery of species that are at risk.”

One of the principles on which the E.S.A. has been developed is based on the precautionary principle. The United Nations Convention on Biological Diversity takes note of the precautionary principle, which, as described in the Convention, states that, “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation” (Principle 15, Convention on Biological Diversity, 1992). The precautionary principle is applied to SAR with the recognition that not enough is known about their decline and significant efforts to protect and enhance their habitats is required to prevent further decline or reverse the trend.

A species determined to be "at risk" in the province is reviewed by the Committee on the Status of Species at Risk in Ontario (C.O.S.S.A.R.O.). The C.O.S.S.A.R.O. is an independent body made up of members from private and public sectors that classifies native plants or animals in 1 of 4 categories of at risk status:

- “Extirpated: lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario
- Endangered: lives in the wild in Ontario but is facing imminent extinction or extirpation
- Threatened: lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it

- Special concern: lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.”

The C.O.S.S.A.R.O. reviews species in Ontario and reports the risk classifications back to the Minister of Environment, Conservation and Parks. Once a species is classified as being “at risk” by the Minister, it is added to the Species at Risk in Ontario (SARO) list.

The E.S.A. provides automatic legal protection for species classified as endangered or threatened. When a species is classified as endangered or threatened, their general habitat is also automatically protected. The Act provides for two distinctive definitions of habitat: general and regulated. General habitat is considered the habitat a species depends on, such as areas for breeding, feeding, rearing, migration and hibernation. SAR and their general habitat are protected until a species-specific habitat regulation is created. Regulated habitat is species-specific and provides a clearer description of the habitat by identifying features and geographic boundaries, and areas that may impact species recovery. The specific habitat regulation is developed following the development of a species-specific recovery strategy. Following the publication of a government response statement, the general habitat protection is replaced, and the specific habitat of threatened and endangered species will be regulated under the E.S.A.

The E.S.A. provides strict timelines associated with creating habitat regulations. For species listed after June 30, 2008, regulated habitat must be identified within 2 years for endangered species, and within 3 years for those listed as threatened. Unless a regulated habitat for a species has been defined, the general habitat protection remains in place.

The E.S.A. specifically protects species listed as extirpated, endangered or threatened by prohibiting killing, harming, harassment, or capture. Under the E.S.A. it is illegal to possess, transport, collect, buy, sell, lease or trade any live or dead extirpated, threatened or endangered species. Similarly, it is prohibited under the E.S.A. to damage the habitat of endangered or threatened species.

The E.S.A. requires that a recovery strategy be prepared for each species listed as endangered or threatened, that includes the identification of the habitat needs of the species, a description of threats to the species survival and recovery, objectives for the protection and recovery of the species, and approaches to achieve the recovery objectives. Within nine months of preparing the recovery strategy, the Minister is required to publish a statement that summarize the actions the Province intends to take in response to the recovery strategy and the priorities with respect to taking those actions.

The Ministry of Environment, Conservation and Parks (MECP) can issue a permit or agreement to engage in activities that would otherwise be prohibited under the E.S.A., including an Overall Benefit Permit (OBP). An OBP can be issued if it is of the opinion

of the MECP that the main purpose of the activity is to assist in the protection or recovery of the species specified in the permit. There are additional considerations for obtaining an overall benefit:

- achieving a significant social or economic benefit to Ontario;
- demonstrating the activity would not jeopardize the survival or recovery of the species in Ontario;
- demonstrating that reasonable alternatives have been considered; or
- demonstrating that steps to minimize adverse affects have been identified.

Regulatory exemptions for specific species can be provided for activities that would otherwise not be allowed under the E.S.A. For these activities, a set of specific conditions must be met, including:

- implementing measures to minimize the adverse effects of the activity on SAR
- creating and following a mitigation plan
- monitoring and reporting on the effectiveness of mitigation measures

Proponents must ensure the criteria are met and may have to register the activity with the MECP before commencing with the activity.

Enforcement of the E.S.A. is the responsibility of “enforcement officers”, including:

- A person who is a conservation officer for the purposes of the Fish and Wildlife Conservation Act, 1997
- A park warden for a provincial park as designated by the Minister
- Other persons designated by the Minister as enforcement officers for the purposes of the E.S.A.

The E.S.A. is a proponent-led process, meaning that a landowner wishing to undertake activities within habitat of SAR must collect and submit sufficient information to the approval authority. The MECP is the only agency responsible for enforcing the E.S.A. and to respond to matters pertaining to Threatened and Endangered Species. However, the approval authority can involve agencies (e.g., municipal governments) responsible for interpreting Section 2.1.7 of the P.P.S. (M.M.A.H. 2014):

“Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.”

SAR and habitat of endangered species and threatened species may be identified in Environmental Impact Studies (E.I.S.), that are triggered through a Planning Act application, as required by an Official Plan. Matters pertaining to SAR and the habitat of endangered species and threatened species will require MECP consultation and possibly approval (i.e., overall benefit permit). However, the municipal government is the approval agency of an application that includes an E.I.S. Although the municipality

does not have jurisdiction over the E.S.A. and matters pertaining to SAR, the municipality may require proof of permits or correspondence from other agencies (e.g., N.P.C.A., N.E.C., MECP) prior to issuing an approval for the application, or may issue a condition of approval that requires all permits be obtained. Therefore, the municipality can ensure conformance with the P.P.S. related to Section 2.1.7 is met pending proof of correspondence, demonstration of meeting regulatory requirements, or providing proof of appropriate permits.

5.3 Relevance to the New Niagara Official Plan

The New Niagara Official Plan will be required to remain consistent with relevant Provincial Plans (e.g., Provincial Policy Statement) and legislation (e.g., Endangered Species Act) as it relates to SAR, specifically Endangered species and Threatened species, including their habitat (whether general or specific). Although the municipality is not responsible for ensuring conformance with the E.S.A., or providing permits related to SAR, the municipality can require proper correspondence, documentation and permits are submitted prior to issuing an approval for an application, or at least issue a condition of approval that requires all relevant correspondence be provided and permits be obtained.

6.0 Natural Environment Work Completed by the Niagara Peninsula Conservation Authority

The following provides a review of documents and reports prepared for or by the N.P.C.A. where relevant information has been summarized as it relates to natural environment planning.

6.1 Natural Areas Inventory 2006-2009 (N.P.C.A. 2009)

6.1.1 Overview

This study identifies, classifies and maps natural areas in the N.P.C.A. jurisdiction with the exception of the City of Hamilton and the Town of Fort Erie. Data collection occurred from 2006 to 2009 and used modern methods, including Ecological Land Classification (E.L.C.) (according to Lee et. al. 1998), analysis of digital air photos, ground truthing and Bio Blitz events, to capture current data on the composition (wetland, woodland, etc.) and biodiversity of the natural areas within the Niagara Watershed. Ground truthing was performed on 527 sites where landowner permission was granted and E.L.C. was taken to the most detailed level of vegetation type. The Niagara Escarpment Area was surveyed extensively prior to the creation of this document and was not a focus of field verification in this NAI. The NAI includes species lists, characterization of natural areas, and maps with E.L.C. communities.

Sites were chosen based on designations of Area of Natural and Scientific Interest (A.N.S.I.), Environmentally Significant Area (E.S.A.) or Evaluated Wetlands that constituted large areas of natural cover followed by natural areas adjacent or proximal to these areas by water connections, physiographic or topographic features (beaches, dunes, escarpments, etc.) and natural occurring corridors. Ground truthing was undertaken in representative vegetation types of every community defined by analysis of aerial photography to increase the level of accuracy.

6.1.2 Relevance to new Niagara Official Plan

The NAI provides a detailed E.L.C. mapping for the Niagara Region that was ground-truthed where land access was granted. This can be incorporated into the Region's mapping to provide additional information and increase the accuracy of current datasets (e.g., woodland). This dataset can also form the baseline of mapping for the Region to update the E.L.C. mapping across the Region. The NAI report is also a supportive tool for the region to determine locations of rare plant communities and rare flora and fauna species that would be a priority for protection. In addition, invasive species are also recorded in the species lists that can be used to inform future management decisions regarding invasive species management.

6.2 Nature for Niagara's Future (N.P.C.A. 2013)

6.2.1 Overview

"The Nature for Niagara's Future project is an assessment of the natural features within the Niagara watershed and their contributions towards a healthy and sustainable

system. The Niagara watershed covers an area of 2,424 square kilometers encompassing all of the Region of Niagara, 21% of the City of Hamilton, and 25% of the County of Haldimand” (N.P.C.A., undated executive summary of project). The purpose of Nature for Niagara’s Future report is to be an information tool for the maintenance and enhancement of biodiversity, protection of species at risk, mitigating threats, improving water quality and fulfilling public values including economy and cultural heritage. The vision statement of this project is: “Through a consensus-based process create a natural heritage system for the Niagara watershed that embodies our shared vision for a sustainable natural environment in balance with socio-political, economic and cultural interests and values.” This document conceptualizes several options for an N.H.S. for the N.P.C.A. jurisdictional area by evaluating features classified in the NAI (2006-2009) (N.P.C.A. 2009). The development of options for the N.H.S. were based on a GIS modeling system, MARXAN, that produced spatial arrangements of areas under different scenarios based on ecological objectives and targets subject to constraints and costs (not monetary). “Marxan uses a mathematical (not ecological) optimization algorithm to objectively search through millions of design options. The software effectively identifies near-optimal spatial arrangements of areas that best meet the objectives and targets established for the system by the project’s Scenario Development Team” (N.P.C.A., undated executive summary document of project).

Ecological scenarios are presented as three natural heritage system options; baseline (most natural areas included in N.H.S.), compromise (middle ground between extremes) and most constrained (least natural areas included in N.H.S.). Targets are provided for forests (patch size, age class, proximity to other patches) wetlands (patch size, proximity to other patches and upland cover) and watercourses (riparian cover).

6.2.2 Relevance to new Niagara Official Plan

Although the purpose of Nature for Niagara’s Future was not intended to be a land-use planning tool, it is an informative document that includes analysis of various scenarios to be considered by the Region when developing options for the Natural Environment System(s). Targets provided in the document can be referenced if proposing targets for inclusion in the N.O.P. The mapping also provides suggestions for “linkages” or “natural heritage corridors” and identifies priority areas for restoration that may inform the Region’s evaluation of potential linkage or restoration areas. Areas of groundwater discharge and recharge were mapped which can be considered for use in mapping the water resource system. Targets for vegetation cover in riparian areas can also be considered if developing policies for vegetation protection zones / buffers from watercourses.

6.3 N.P.C.A. Watershed Planning Documents

The following provides a review of watershed planning documents prepared by or for the N.P.C.A. with the intention of informing the Natural Environment Work Program. A more detailed review of relevant documents pertaining to watershed planning is

provided in the Watershed Planning Discussion Paper (Ecosystem Recovery Inc., 2019).

6.3.1 Overview

The goal of watershed plans, as well as other associated reports and strategies, is to aid in protecting and enhancing the resources in the watershed through the management of land/water interactions, aquatic life and aquatic resources in order to protect the health of the ecosystem. Watershed plans include watershed characterization (geologic, hydrologic and terrestrial natural features), descriptions of natural heritage resources, aquatic habitat, summary of water quality and groundwater resources, comments on challenges and opportunities within the watershed, ecological restoration and environmental planning tools, restoration targets, an overall watershed strategy and recommended management actions with implementation responsibilities. The following watershed plans written by or for the N.P.C.A. were reviewed:

- Beaverdams and Shiners Watershed Plan Phase One (N.P.C.A. 2011)
- Lower Welland River Characterization Report (N.P.C.A. 2011)
- Upper Welland River Watershed Plan (N.P.C.A. 2011)
- Central Welland Watershed Plan (N.P.C.A. 2010)
- Lake Erie North Shore Watershed Management Plan (N.P.C.A. 2010)
- Fifteen-Sixteen-Eighteen Mile Creeks Watershed Plan (N.P.C.A. 2008)
- South Niagara Falls Watershed Report (N.P.C.A. 2008)
- Fort Erie Creeks Watershed Plan (Philips Engineering LTD et al. 2008)
- Niagara-on the-lake Watershed Study (Aquafor Beech LTD. 2008)
- Twenty Mile Creek Watershed Plan (N.P.C.A. 2006)
- One Mile Creek Watershed Plan (Aquafor Beech 2005)

The previously completed Watershed Plans include a range of management actions. A summary is included below. It is recommended that the age and relevancy of these be considered when developing mapping and policy for the new N.O.P.

- Include water quality protection in regional and municipal planning documents;
- Continue to monitor water quality to achieve Ontario Water Quality Objectives;
- Develop and implement a Source Water Protection Plan;
- Implement the Groundwater Management and Protection Strategy proposed in the Groundwater Study (N.P.C.A. 2005);
- Develop and implement a specific Groundwater and Management Protection Strategy for medium and high susceptibility areas identified in the Groundwater Study (N.P.C.A. 2005)
- Identify and map surface and groundwater “hot spots” to determine areas with poor water quality including salt vulnerable areas;
- Develop and adopt by-laws for the elimination of lawn fertilizers, pesticides and herbicides;

- Incorporate surface and groundwater protection policies into regional and municipal planning documents;
- Policies and programs for the redevelopment or rehabilitation of brownfield (contaminated) sites;
- Permit no new development in the 1 in 100-year storm floodplain;
- Riparian buffer guidelines that consider the amount of natural vegetation cover as well as the width of the width of the buffer;
- Program to improve riparian buffer quality in terms of cover of natural vegetation;
- Develop and implement an erosion remediation plan including a drain maintenance and management program (using natural design and buffer zone concepts) to reduce erosion and sedimentation of waterways;
- Shoreline protection policies that consider natural coastal processes and incorporate natural elements into the design and does not impeded natural dune processes or animal movement;
- Create and implement Downspout Disconnection By-laws for the City of Hamilton, Town of Smithville and settlement areas in the Town of Lincoln;
- Implement the N.P.C.A. Stormwater Policies and BMP's into regional and municipal planning documents;
- Implement a rain barrel program for entire South Niagara Falls Watershed;
- Implement recommended restoration actions outlined in the Fifteen-Sixteen-Eighteen Mile Creeks Watershed Geomorphic Assessment (N.P.C.A. 2006);
- Update Regional and Local Official Plants to current Provincial standards for natural heritage areas;
- Use conservation easements, land dedication and acquisition to secure critical linkages as desired lands become available for purchase;
- Continue review of new developments and building permits; ensure compliance with P.P.S. and N.P.C.A. Generic Regulations;
- Create new wetland or enlarge existing wetlands based on wetland suitability mapping;
- Identify the extent of both flora and fauna invasive species and make specific recommendations for their removal;
- Identify and incorporate significant natural areas and ecological linkages into planning documents and policies to ensure they are buffered from development;
- Continue to implement N.P.C.A. Plan Input and Review Policies (N.P.C.A. 1993 as amended in 2003; 2005); and
- Restoration/ enhancement and corridor reinforcement through the extension of riparian buffers and coastal communities.

6.3.2 Relevance to the New Niagara Official Plan

Watershed plans often include accurate (often ground truthed) E.L.C. mapping for wetlands and woodlands in the various watersheds of the Niagara Region. Watershed plans also map hazard lands; where this data is more recent or accurate than current hazard mapping maintained by the N.P.C.A., it may be considered for inclusion in natural environment mapping such as for floodplains and top of bank of valleylands.

Watershed plans also include lists of flora, and locations of fish habitat that can be used to inform N.H.S. mapping (e.g., for fish habitat GIS-dataset) as well as prioritize areas for linkages, or restoration. The watershed plans provide restoration recommendations for each subwatershed within them and give detailed descriptions for sites that may be used to inform future invasive species management decisions. In some cases BMPs are provided for the watershed.

In addition, recommendations related to watershed planning and mapping of water resources could inform gaps for mapping of the water resource system and policies to support watershed planning in Niagara Region.

6.4 N.P.C.A. Groundwater Study Final Report (Waterloo Hydrogeologic Inc. 2005)

6.4.1 Overview

The Groundwater Study contains groundwater characterization that compiles baseline data in order to assess the threats and impacts on local groundwater. The study area included both rural and urban parts of the three primary watersheds within the N.P.C.A. jurisdictional area. The study assesses basic groundwater functions (recharging, transmitting, assimilating potential contaminants, storing, and discharging water) that are necessary for providing safe clean water within the study area. The study was completed using compiled information from regional geological and hydrogeological datasets and previous hydrogeological studies completed at regional-scale or local-scales within the various municipalities (Regional Municipality of Niagara, Haldimand County and City of Hamilton).

The goal of the N.P.C.A. Groundwater Study was “to provide the required analyses and recommendations to support the following main objectives:

- Limit or eliminate the risk of groundwater contamination from historical, existing, and future land uses,
- Manage groundwater quantities to ensure sustainable uses, and
- Promote water conservation and good well management and decommissioning practices.”

6.4.2 Relevance to new Niagara Official Plan

The Groundwater Study provides information relevant to source water protection planning. This study recommends that spill contingency plans are in place where development with the potential to contaminate ground water sources is proposed. Potential land uses of concern were identified including industrial, commercial, and extractive industrial, located in medium or high susceptibility areas. Contaminants of concern included fuel storage, PCB storage, hazardous waste generating and receiving sites, active and closed landfills, biosolid sites, cemeteries, and automotive/machinery sites, to name a few.

This study also includes mapping datasets, such as hydrologically sensitive areas, that could be used as part of the mapping of the water resource system for the Region. It is

recommended the available mapping be considered for inclusion in the mapping of the water resource system.

The study recommends that Official Plan amendments address specific land uses and define different sensitive groundwater zones; zones are to include areas of high intrinsic susceptibility. The study also recommends mandatory requirement of site-specific information prior to the approval of specific land uses as a means of controlling land use in sensitive areas. These recommendations should be considered when drafting the N.O.P. policies for the water resource system in addition to source water protection.

This study also recommends that buffers be provided between watercourses and potential contaminant sources. With respect to policy considerations, this study recommends land use planning documents establish policy for instituting effective land use controls for future developments where ground water could be compromised.

7.0 Comparator Municipal Approaches to Natural Environment Planning

The following section provides a review of the natural environment sections from the Official Plan of three upper or single-tier municipalities in order to inform how Niagara Region may move forward with natural environment mapping and policy development.

7.1 Policy Review

7.1.1 Halton Region Official Plan

Overview

The Region of Halton embarked on the Sustainable Halton Planning process ('S.H.P.') in 2008/2009 that led to the eventual adaption of R.O.P.A. 38, which was a comprehensive update to the Official Plan. The primary objective of the S.H.P. was to determine how population and employment would be allocated to the four lower tier municipalities in the Region. A further objective of the S.H.P. was to identify and protect those features and resources which are an integral component of the Region (environmental and agricultural lands) and/or which are required in the future to support growth (aggregates).

On April 22, 2009, through report LPS46-09, the Region released a report entitled *"Directions Report - Towards Sustainability"*. The purpose of the Directions Report was to identify additional policy directions for inclusion in the Regional Official Plan that implement the policies of the Provincial Growth Plan and contribute to a growth management strategy that will guide the Region's growth to 2031.

The Directions Report drew upon the research undertaken and results presented in the 22 technical background reports to the S.H.P. process, subsequent reports that have been prepared on the natural heritage system, agricultural and aggregate sectors and health issues, and the 13 reports prepared in Phase 3 of the S.H.P. process.

The theme of the Regional Directions Report was "Towards Sustainability". In report LPS32-09/CA, staff identified ten "Draft" Sustainability Principles that were to be the basis of a consultation process. The Region's proposed approach to sustainability was based on four system conditions adapted from "The Natural Step":

- Natural resources are not being over-used;
- Waste generated does not accumulate over time;
- The natural environment is not being degraded; and,
- This and future generation's capacity to meet their needs is not being undermined.

The overall planning vision of the R.O.P. as amended by R.O.P.A. 38 was to deliver:

- Strong, vibrant, healthy and complete communities;
- An enhanced Natural Heritage System;
- A strong and sustainable agriculture industry; and
- A sustainable land use decision-making process.

A key component of the R.O.P.A 38 process was the establishment of a Regional Natural Heritage System ('R.N.H.S.'). Initially, it was proposed to establish one Natural Heritage System for the entire Region. However, based on feedback received from the Towns of Milton and Halton Hills and the Halton Federation of Agriculture, an alternative approach was agreed upon that deferred the planning policy framework for the area north and west of the Niagara Escarpment Plan (N.E.P.) Area (i.e. above the Brow) to the Greenbelt Plan.

Below the brow however, the R.N.H.S. was applied to lands within the Greenbelt Plan. The Natural Heritage System in the Region is therefore comprised of the R.N.H.S. and the Greenbelt Natural Heritage System. With respect to the N.E.P. (which does not contain a natural heritage system policy framework), the R.N.H.S. was applied to the Escarpment Natural and Escarpment Protection Areas of the N.E.P.

The Ministry of Municipal Affairs and Housing approved R.O.P.A 38 with 165 modifications to the text and mapping on November 24, 2011. Some of the modifications made were extensive. In addition, 41 appeals were received. One of the appellants in this regard was the Halton Federation of Agriculture ('HFRA'). However, Minutes of Settlement were entered into, with the result being a number of significant changes to both the natural heritage and agricultural policy frameworks, since there is considerable overlap between these two systems.

The product of the R.O.P.A 38 process and the later discussions with the HFRA and others was an Agricultural System that was comprised of two components, which were:

- The Agricultural Area, which is divided into Prime Agricultural Area and Outside of Prime Agricultural Area; and,
- Parts of the Natural Heritage System that are generally outside of Key Features.

The Agricultural Area is a designation in the R.O.P. and it is applied to lands below the Escarpment Brow that are not subject to the Niagara Escarpment Plan, within the Niagara Escarpment Plan Area and in the Protected Countryside Area of the Greenbelt Plan. Below the Escarpment Brow, the Agricultural Area designation generally applies to all lands outside of the Key Features of the R.N.H.S. In this area, it is noted that there is some overlap with the R.N.H.S. (outside of Key Features) and with the Protected Countryside designation in the Greenbelt Plan.

The second component of the Agricultural System are those parts of the R.N.H.S. outside of Key Features, as well as individual Key Features that are only a significant earth science area of natural and scientific interest. The Region deliberately established this category in the R.O.P. to recognize that the greatly expanded R.N.H.S.

now applies to lands that are currently an agricultural use. It is noted that the policy framework continues to permit agricultural uses in these areas.

Key Features

The R.O.P. and the Greenbelt Plan identify and protect many of the same features, however additional features are protected by the Greenbelt Plan. A summary table of features is provided in Table 1, followed by a brief discussion.

Table 1. Comparison of Natural Heritage Features in the Greenbelt Plan and the Halton R.O.P.

List of Features	Greenbelt Plan	R.O.P.	
	Key Natural Heritage Features (Policy 3.2.4)	Key Features in the Regional Natural Heritage System (Policy 115.3(1))	Additional Key Features where R.N.H.S. overlaps with the Greenbelt Natural Heritage System (Policy 139.3.3)
Significant habitat of endangered species	✓	✓	
Significant habitat of threatened species	✓	✓	
Significant habitat of special concern species	✓		✓
Fish habitat	✓	✓	
Wetlands	✓	Significant wetlands	
Life Science Areas of Natural and Scientific Interest (A.N.S.I.s)	✓	Significant Areas of Natural and Scientific Interest	
Significant valleylands	✓	✓	
Significant woodlands	✓	✓	
Significant wildlife habitat	✓	✓	

List of Features	Greenbelt Plan	R.O.P.	
	Key Natural Heritage Features (Policy 3.2.4)	Key Features in the Regional Natural Heritage System (Policy 115.3(1))	Additional Key Features where R.N.H.S. overlaps with the Greenbelt Natural Heritage System (Policy 139.3.3)
Sand barrens, savannahs and tallgrass prairies	✓		✓
Alvars	✓		✓
<i>Key hydrologic features</i>			
Permanent and intermittent streams	✓		✓
Lakes (and their littoral zones)	✓		✓
Seepage areas and springs	✓		✓
Wetlands	✓	✓ (Includes all wetlands other than significant wetlands as identified above)	

While many of the features in the R.N.H.S. and the Greenbelt Natural Heritage System are the same, the R.N.H.S. includes these added components in the R.N.H.S. as per Section 115.3 of the R.O.P.:

- Enhancements to the Key Features including Centres for Biodiversity,
- Linkages,
- Buffers,
- Watercourses that are within a Conservation Authority Regulation Limit or that provide a linkage to a wetland or a significant woodland, and
- Wetlands other than those considered significant under Section 115.3(1) b).

The addition of the above features to the R.N.H.S. goes above the minimum standards established by the P.P.S. In addition, a buffer of 30 metres was added to edges of the R.N.H.S. on the mapping, even though the buffer is not established through policy. The

pre-identification of a 30-metre buffer also goes beyond the minimum standards established by the P.P.S.

The R.O.P. sets out the process in Section 116.1 by which adjustments can be made to the R.N.H.S. This policy states:

“The boundaries of the Regional Natural Heritage System may be refined, with additions, deletions and/or boundary adjustments, through:

- A Sub-watershed Study accepted by the Region and undertaken in the context of an Area-Specific Plan;
- An individual Environmental Impact Assessment accepted by the Region, as required by this Plan; or
- Similar studies based on terms of reference accepted by the Region. Once approved through an approval process under the Planning Act, these refinements are in effect on the date of such approval. The Region will maintain mapping showing such refinements and incorporate them as part of the Region’s statutory review of its Official Plan. “

The R.O.P. has also established, through Section 118(2) that a systems-based approach should be applied to implement the R.N.H.S., as set out below:

“118(2) Apply a systems-based approach to implementing the Regional Natural Heritage System by:

- a) Prohibiting development and site alteration within significant wetlands, significant coastal wetlands, significant habitat of endangered and threatened species and fish habitat except in accordance with Provincial and Federal legislation or regulations;
- b) Not permitting the alteration of any components of the Regional Natural Heritage System unless it has been demonstrated that there will be no negative impacts on the natural features and areas or their ecological functions; in applying this policy, agricultural operations are considered as compatible and complementary uses in those parts of the Regional Natural Heritage System under the Agricultural System and are supported and promoted in accordance with policies of this Plan;
- c) Refining the boundaries of the Regional Natural Heritage System in accordance with Section 116.1; and
- d) Introducing such refinements at an early stage of the development or site alteration application process and in the broadest available context so that there is greater flexibility to enhance the ecological functions of all components of the system and hence improve the long-term sustainability of the system as a whole.”

Permitted Uses in the R.N.H.S.

The R.O.P. establishes a list of permitted uses for the R.N.H.S. outside of Key Features. Given that the R.O.P. considers agriculture as a compatible use in the R.N.H.S. (outside of Key Features), many of the permitted uses are the same as those permitted in the Agricultural Area. On the other hand, the R.O.P. generally prohibits development in Key Features, many of which have been newly identified by the R.O.P.

Implementation

The R.O.P. directs area municipalities to recognize the R.N.H.S. in their local OPs and include policies and maps to implement the R.O.P. policies. The R.O.P. also directs municipalities to protect Key Features when undertaking area-specific plans, Zoning By-law amendments and studies related to development and/or site alteration.

The R.O.P. provides detailed policies on when and for what type of development requires the completion of an Environmental Impact Assessment (E.I.A.). The terms 'development' and 'site alteration' are the key definitions that are used to trigger an E.I.A. when being proposed within or adjacent to the R.N.H.S.

Section 118(3) sets out scenarios where an E.I.A. is not required. As such, an E.I.A. is required unless:

- "a) The proponent can demonstrate to the satisfaction of the Region that the proposal is minor in scale and/or nature and does not warrant an E.I.A.,
- b) It is a use conforming to the Local Official Plan and permitted by Local Zoning By-laws;
- c) It is a use requiring only an amendment to the Local Zoning By-law and is exempt from this requirement by the Local Official Plan; or
- d) Exempt or modified by specific policies of this Plan."

Section 118(3.1) of the R.O.P. sets out the criteria for the requirement of an E.I.A. for proposed development site alteration. A breakdown of this policy is provided in Table 2. It has since been determined that this particular section is confusing and requires revision.

Table 2. Halton R.O.P. criteria for the requirement of an E.I.A. for proposed development.

Building Type	Modifier/Condition	E.I.A. Required	Notes
Agricultural Buildings (>1,000 square metres)	Located wholly or partially inside the R.N.H.S. or within 30 metres of the boundary of the R.N.H.S.	Yes	Extremely unlikely that agricultural building of this size will be erected.

Building Type	Modifier/Condition	E.I.A. Required	Notes
Agricultural Buildings (<1,000 square metres)	Located wholly or partially inside a significant Earth Science A.N.S.I. or within 30 metres of a significant Earth Science A.N.S.I.	Yes	Are not aware of any significant Earth Science A.N.S.I. in Halton Hills outside of N.E.P. and Greenbelt Plan Area - if in N.E.P., Development Permit would be required
Single detached dwellings on existing lots and their incidental uses			
Agricultural Buildings (<1,000 square metres)	Located wholly or partially inside a Woodland or within 30 metres of a Woodland where proposed buildings and structures are in a farm building cluster and where tree removal in the woodlands is proposed	Yes	Only applies to agricultural properties because of farm building cluster reference
Single detached dwellings on existing lots and their incidental use			
Agricultural Buildings (<1,000 square metres)	Located wholly or partially inside a Woodland or within 30 metres of a Woodland where proposed buildings and structures are in a farm building cluster and where no tree removal in the woodlands is proposed	No	Only applies to agricultural properties because of farm building cluster reference
Single detached dwellings on existing lots and their incidental use			
Agricultural Buildings (<1,000 square metres)	Located wholly or partially inside the R.N.H.S. or within 30 metres of the boundary of the R.N.H.S. if the proposed buildings or structures are not in a farm building cluster	Yes	Only applies to agricultural properties because of farm building cluster reference
Single detached dwellings on existing lots and their incidental use			

Building Type	Modifier/Condition	E.I.A. Required	Notes
Agricultural Buildings (<1,000 square metres)	Located wholly or partially inside any Key Feature except an Earth Science A.N.S.I. or Woodland or within 30 metres of any Key Feature <u>except an</u> Earth Science A.N.S.I. or Woodland	No	Of no practical effect since only other mapped Key Features are significant Wetlands, where development and site alteration not permitted
Single detached dwellings on existing lots and their incidental use			
All other developments or site alterations (includes public works)	Located wholly or partially inside or within 120 metres of the R.N.H.S.	Yes	Does not apply to agricultural buildings or single detached dwellings

R.N.H.S. and the Agricultural System

In many areas of the Region, there is overlap between the Agricultural System and the R.N.H.S. Despite areas of overlap, the R.O.P. considers agricultural operations as compatible and complementary uses in those parts of the R.N.H.S. and provides policy language that supports and promotes agricultural operations in these areas. Notwithstanding this policy language, the implication of the mapping is that the policy protections for natural heritage take precedence over the use of land for agricultural purposes. It is for this reason that the Region will be re-considering this approach as part of the current review of the Official Plan.

7.1.2 City of Hamilton Official Plan

The City of Hamilton Official Plan was updated in 2013 and it contains a number of policies on natural heritage that are based on a systems wide approach. It is noted, however that the Official Plan recognizes that there may be differences in the approach to various issues between rural and urban areas, as such two distinct plans were written: Rural Official Plan and Urban Official Plan.

With respect to Provincial Plans, the Hamilton Official Plan recognizes the existence of the Niagara Escarpment Plan and indicates in Section C.1.1.1 that all development within the Niagara Escarpment Plan area shall meet the requirements of the Official Plan and the Niagara Escarpment Plan and Section 3.3 of the Greenbelt Plan. The Official Plan goes on to state that where there is a discrepancy between the Official Plan and the Niagara Escarpment Plan, the most restrictive policies will prevail.

A similar policy also applies to the Greenbelt Plan area. However, the Official Plan also specifically identifies what policies are more restrictive than the Greenbelt Plan and these policy areas are as follows:

- Residential lot creation;
- Secondary uses;
- Surplus farm dwellings;
- Amendments required for resource based commercial and resource-based industrial uses and institutional and recreational uses; and
- Infrastructure.

Section C.2.0 deals with the natural heritage system and it says the following about its scope and extent:

"A large portion of the City has been identified as part of the Natural Heritage System of the Protected Countryside in the Greenbelt Plan. The Greenbelt Plan seeks to ensure that natural areas are managed as an integrated system so as to enhance key features of that system, as well as to support environmental objectives contained in the Niagara Escarpment Plan. Beyond provincial plan boundaries, the City has identified locally and provincially significant natural areas that warrant similar consideration.

The Natural Heritage System identified on Schedule B – Natural Heritage System, of this Plan consists of the Greenbelt Natural Heritage System, the Greenbelt Protected Countryside, and Core Areas within and outside of the Greenbelt Plan Area. Together, provincial and local planning objectives for the Natural Heritage System focus on protecting and restoring these features and natural functions as a permanent environmental resource for the community.

The Natural Heritage System consists of Core Areas, Linkages, and the matrix of lands between them which may be suitable for restoration. The systems approach involves delineating a Natural Heritage System which includes Core Areas, as well as supportive features (Linkages) that maintain the ecological functionality and connectivity of the natural system. Connecting natural areas allows wildlife and plants to move between habitat patches. These connections are important for maintaining biodiversity, and the long-term health and viability of natural systems. Protection and restoration of impaired or degraded habitat and habitats in diminishing supply, such as meadows, is vital for a fully functional Natural Heritage System. Using the systems approach, the City shall look at the restoration potential of natural areas adjacent to Core Areas, not just the habitat that currently exists. The systems approach also involves setting targets for the amount of habitat Hamilton needs for a healthy, functioning ecosystem. Looking beyond what exists to consider what could or should exist moves habitat protection towards a fully sustainable natural heritage system."

Section C.2.1.1 contains the following basic policy goals:

- 2.1.1 - Protect and enhance biodiversity and ecological functions.
- 2.1.2 - Achieve a healthy, functional ecosystem.

- 2.1.3 - Conserve the natural beauty and distinctive character of Hamilton's landscape.
- 2.1.4 - Maintain and enhance the contribution made by the Natural Heritage System to the quality of life of Hamilton's residents.
- 2.1.5 - Restore and enhance connections, quality and amount of natural habitat.
- 2.1.6 - Provide opportunities for recreational and tourism uses where they do not impact natural heritage features.
- 2.1.7 - Monitor and periodically assess the condition of Hamilton's natural environment.

Section C.2.2 of the Official Plan contains the general policies applying to the natural heritage system. These policies indicate that by virtue of being included within the natural heritage system, the City is not obligated to purchase such lands. The policies also do not prohibit the continuation of existing or the establishment of new agricultural uses, agriculture-related and secondary uses within or adjacent to the natural heritage system.

Section C.2.2.3 deals with the boundaries of core areas and linkages and states the following:

"The boundaries of Core Areas are shown on Schedule B – Natural Heritage System and key natural heritage features, key hydrologic features and any associated vegetation protection zones, provincially significant and local natural areas are shown on Schedules B-1 to B-8 – Detailed Natural Heritage Features. Minor refinements to such boundaries may occur through Environmental Impact Statements, watershed studies or other appropriate studies accepted by the City without an amendment to this Plan. Major changes to boundaries, the removal or addition of Core Areas identified on Schedule B – Natural Heritage System, and Schedules B-1 to B-8 – Detailed Natural Heritage Features require an amendment to this Plan".

The above policy distinguishes between major and minor policy refinements.

Section C.2.2.4 indicates that the policies applying to the natural heritage system will apply to core areas that are not currently identified on the schedules. This section also indicates that additional core areas may be mapped and identified, or core area boundaries refined under a number of circumstances and may require an amendment to the Official Plan. These circumstances include individual environmental impact statements; watershed or subwatershed studies, and natural area inventories, environmental assessments are other similar studies.

The above means that minor refinements to core area boundaries can be considered but that new core areas may need to be supported by an Amendment to the Official Plan.

Section C.2.2.6 indicates that the City may establish its own technical criteria for certain key natural heritage features and key hydrologic features and related vegetation protection zone. It is further indicated in Section C.2.2.7 that the technical criteria established and used by the City shall be updated and amended to reflect provincial direction as required.

It is further indicated that following the approval of the Greenbelt Plan significant woodland criteria, the City will amend the Official Plan accordingly. This policy was included within the Official Plan in recognition of the possibility that different criteria may be applied to lands not subject to the Greenbelt Plan.

Section C.2.3 deals and Section C.2.3.1 indicates that core areas include key natural features and key hydrologic features and any associated vegetation protection zones. Other core areas include locally and provincially significant natural areas that have been identified within and outside the Greenbelt Plan area. If new core areas are identified, an amendment to the Official Plan is required.

Section C.2.4 contains policies on the core areas within the Greenbelt Plan area and they essentially are the same as in the Greenbelt Plan, in terms of permitted uses and development. Section C.2.5 contains policies on core areas outside of the Greenbelt Plan area. The policies in this section reflect the minimum standards of the Provincial Policy Statement. It is clear that a deliberate effort was made to establish two policy frameworks - with one applying to the Greenbelt Plan area and one that does not. For example, in terms of where development and site alteration is permitted and prohibited, it is not permitted in significant woodlands within the Greenbelt N.H.S. but it is permitted on lands that are only subject to the Provincial Policy Statement, subject to the demonstration of no negative impact.

Notwithstanding the above, the vegetation protection zone policies are consistently applied across the City.

Section C.2.7 deals with linkages and even though these linkages are not shown on Schedule B, the Official Plan encourages the connection of core areas through the identification of linkages in environmental impact statements. In this regard linkages include:

- a) Woodland linkages (e.g. small woodlots);
- b) Other natural vegetation types (e.g. meadows, old field, thickets); or
- c) Streams and watercourses that connect Core Areas

The remainder of the natural heritage section contains a number of basic policies on watershed planning, remedial action plans, the protection of trees and woodlands and regulatory natural heritage system management tools.

7.1.3 Region of Waterloo Official Plan

The Region of Waterloo Official Plan was updated in 2009. It was not until 2015 that the Official Plan was approved at the Ontario Municipal Board. The R.O.P. is organized into the following sections:

- Chapter 1 - introduces the main purpose of the Official Plan.
- Chapter 2 - provides the policy framework for shaping the Region's communities.
- Chapter 3 - focuses on liveability.
- Chapter 4 - includes policies that are intended to support the business community.
- Chapter 5 - deals with infrastructure
- Chapter 6 - deals with the Countryside
- Chapter 7 - deals with the Greenlands Network
- Chapter 8 - establishes the source water protection policy framework
- Chapter 9 - deals with mineral aggregate resources
- Chapter 10 includes policies on implementation.

The introductory section of Chapter 7 establishes the context for the Greenlands network in the selected paragraphs below:

"The Greenlands Network is defined as environmental features and the linkages among them. The Greenlands Network, and the ecological functions it provides, contributes to maintaining the environmental health of Waterloo Region and the Grand River watershed. This Plan contains policies to maintain, enhance or, wherever feasible, restore the Greenlands Network. Such action is necessary to counteract the negative effects of fragmentation which can result in a loss of ecological integrity and the degradation of natural biodiversity. Such action is also necessary to maintain biological and geological diversity, viable populations of native species and ecosystems, and make possible adaptation in response to actual or expected effects of climate change

The Greenlands Network is a layered approach to environmental protection comprised of Landscape Level Systems, Core Environmental Features and Supporting Environmental Features. Each layer contains policies that provide appropriate protection to areas of environmental significance. Landscape Level Systems are recognized within the Greenlands Network as macro-scale environmental features or as concentrations of high-quality Core and Supporting Environmental Features. Policies relating to Landscape Level Systems focus on protecting and enhancing the ecological integrity and functions of these landscapes."

Below is a description of the difference between high quality Core and Supporting Environmental Features:

"Core Environmental Features form key habitat for native flora and fauna and represent the most significant elements of the regional landscape in terms of maintaining play an important role in maintaining elements of the Greenlands Network not meeting the criteria for recognition as being regionally significant. Linkages between Core and Supporting Environmental Features permit the movement of native flora and fauna and help to maintain, enhance or restore the ecological function of the Greenlands Network".

The objectives below establish the basis for policies that follow:

7.1 Maintain, enhance or wherever feasible restore environmental features and the ecological and hydrological functions of the Greenlands Network including the Grand River and its tributaries and the landscape level linkages among environmental features.

7.2 Use watershed studies, community plans and development applications as opportunities not merely to maintain, but also to enhance and restore the Greenlands Network.

7.3 Regulate development within hazardous lands and hazardous sites to prevent or minimize hazards to life and property.

7.4 Develop partnerships, programs and policies to maintain, enhance and restore the ecological functions of the Greenlands Network, including the Grand River and its tributaries.

7.5 Increase forest cover in appropriate locations to achieve an overall target of 30 per cent or more of the region's total land area.

7.6 Promote informed stewardship of the Greenlands Network."

A more detailed description of the components of the Greenlands Network is contained in Section 7.A.1:

"The Greenlands Network comprises Landscape Level Systems, Core Environmental Features, Fish Habitat, Supporting Environmental Features and the linkages among these elements, and lands designated within the Provincial Greenbelt Plan as Natural Heritage System."

Section 7.A.2 then requires that Landscape Level Systems and Core Environmental Features be designated and zoned by the area municipalities. Section 7.A.3 then encourages area municipalities to identify and designate supporting environmental features in their Official Plans. Section 7.A.4 indicates that the Region will prepare and update a Regional Greenlands Network Implementation Guideline to guide the implementation of the policies in this Chapter. Section 7.A.5 then indicates that the Region will develop and maintain a Regional Implementation Guideline entitled

Technical Appendix for Landscape Level Systems and Core Environmental Features that provide additional technical information and more precise mapping relating to each element of the network.

With respect to boundary interpretations, Section 7.A. 7 indicates that boundary interpretations not consistent with the Technical Appendix for Landscape Level Systems and Core Environmental Features must be approved by Regional Council, in consultation with the Province, Area Municipalities, the Grand River Conservation Authority and other stakeholders. It is not clear how Regional Council would deal this with in the absence of an Amendment request. Section 7.A.8 then indicates that boundary interpretations not generally in conformity with the Greenlands Network as shown on Map 4 will require an amendment to this Plan. As a consequence of the above, there appears to be more flexibility with respect to the boundaries of individual components of the Greenlands Network.

Section 7.B deals with Landscape Level Systems, which include:

- (a) Environmentally Sensitive Landscapes;
- (b) Significant Valleys;
- (c) Regional Recharge Areas; and
- (d) Provincial Greenbelt Natural Heritage System

These areas are 'designated' as shown on Map 4. With respect to Environmentally Sensitive Landscapes that in our experience is unique to an upper tier Official Plan in Ontario, four are identified on Map 4. To qualify for designation as an Environmentally Sensitive Landscape, an area will:

- (a) Fulfill all of the following:
 - i) Be a geographically and ecologically definable landscape;
 - ii) Contain natural features that are contiguous, linked or sufficiently close to allow for movement of flora or fauna through the area;
 - iii) Not be bisected by major highways; and
 - iv) Be located primarily outside areas designated for fully serviced urban development and/or established Rural Settlement Areas; and
- (b) Contain any two of the following designated natural features:
 - i) Significant Habitat of Endangered or Threatened Species;
 - ii) Environmentally Sensitive Policy Area;
 - iii) Provincially Significant Wetland;
 - iv) Regionally significant Earth Science Area of Natural and Scientific Interest;
 - v) Significant Valleys; or
 - vi) Significant Woodlands; and
- (c) Contain any two of the following associated natural features:
 -) Rivers, major stream valleys, floodplains and associated hazard lands;

- ii) Woodlands greater than four hectares in extent;
 - iii) Forest interior habitat;
 - iv) Other wetlands;
 - v) Significant landforms such as moraines, kettle lakes, kames, eskers and drumlins;
 - vi) Significant wildlife habitat such as: winter habitat for deer or wild turkeys; colonial bird nesting areas; raptor roosting, feeding and nesting areas; hibernacula or herpetofauna breeding areas; and significant migratory stop over areas; or
 - vii) Specialized habitats such as but not limited to: savannas; tallgrass prairies; rare woodland types; cliffs; alvars; sand barrens; marl seeps; bogs; and fens; and
- (d) Sustain any two of the following ecological functions:
- i) Provide significant groundwater storage, recharge or discharge;
 - ii) Sustain a fishery resource;
 - iii) Provide diverse natural habitats;
 - iv) Provide habitat for provincially or regionally significant species; or
 - v) Serve as a linkage.

Section 7.B.6 indicates that the expansion to the Urban Area, Township Urban Areas, lands designated to permit urban and recreational development within the Blair Village Special District as designated in the City of Cambridge Official Plan, Rural Settlement Areas and Rural Employment Areas as identified in Area Municipal official plans are not permitted within or into Environmentally Sensitive Landscapes. While some uses are permitted within these areas, what is notable is that the Official Plan contains a lengthy list of the 27 specific uses that are prohibited in Environmentally Sensitive Landscapes.

Significant Valleys are designated as shown on Map 4 and are subject to Section 7.B.20. This designation identifies valleys of the Grand River, Conestogo River, Nith River and Speed River, which are together nationally recognized as a Canadian Heritage River. Significant Valleys comprise the entire river channel within the Region and run up to the point where the slope of the valley begins to grade into the surrounding upland.

Regional Recharge Areas are designated as shown on Maps 4 and 6g and are subject to Section 7.B.22. This designation, which includes portions of the Waterloo Moraine, identifies a large environmental feature where considerable deposits of sand and gravel allow for the infiltration of large quantities of rainfall and snowmelt deep into the ground. This important hydrologic function sustains some of the richest sources of groundwater in the Grand River watershed.

Section 7.C deals with Core Environmental Features, which are also shown on Map 4. This 'designation' includes:

- (a) Significant Habitat of Endangered or Threatened Species;

- (b) Provincially Significant Wetlands;
- (c) Environmentally Sensitive Policy Areas;
- (d) Significant Woodlands;
- (e) Environmentally Significant Valley Features; or
- (f) Significant Areas of Natural and Scientific Interest.

It is noted that the legend on Map 4 is slightly different than the above, in that it also includes Regional forests and forests greater than 4 hectares, which is assumed to be significant woodland. Section 7.C.5 deals with Environmentally Sensitive Policy Areas, which are considered to be significant natural areas that comprise:

- (a) At least two of the following criteria:
 - i) Comprise ecological communities deemed unusual, of outstanding quality or particularly representative regionally, provincially or nationally;
 - ii) Contain critical habitats which are uncommon or remnants of once extensive habitats such as old growth forest, forest interior habitat, Carolinian forest, prairie-savanna, alvars, cliffs, bogs, fens, marl meadows, and cold water streams;
 - iii) Provide a large area of natural habitat of at least 20 hectares which affords habitat to species intolerant of human intrusion; or
 - iv) Provide habitat for organisms native to the region recognized as regionally, provincially or nationally *significant*; or
- (b) Fulfill one of the criteria in Policy 7.C.5 (a) and any two of the following:
 - i) Contain an unusual diversity of native life forms due to varied topography, microclimates, soils and/or drainage regimes;
 - ii) Perform a vital *ecological function* such as maintaining the hydrological balance over a widespread area by acting as a natural water storage, discharge or recharge area;
 - iii) Provide a linking system of relatively undisturbed forest or other natural habitat for the movement of wildlife over a considerable distance;
 - iv) Serve as major migratory stop-over or significant over-wintering habitat; or
 - v) Contain landforms deemed unusual or particularly representative at the regional scale.

Section 7.C.7 deals with Environmentally Significant Valley Features and as with some of the other features above, there is an extensive list of criteria that set out what comprises such a feature. In this regard, Environmentally Significant Valley Features are natural features within a Significant Valley that consist of:

- (a) At least one of the following:
 - i) River channel; or

ii) Environmentally Significant Discharge Areas or Environmentally Significant Recharge Areas; or

(b) Both of the following ecological features:

- i) Habitat of regionally significant species of flora or fauna;
- ii) Natural area, such as a woodland of one to four hectares in extent, floodplain meadow or wetland, which consists primarily of native species; or;

(c) Any one of Policy 7.C.7 (b) above plus any one of the following Earth Science features:

- i) River terrace;
- ii) Esker;
- iii) Cliff or steep slopes;
- iv) Oxbow;
- v) Confluence with significant watercourse draining a watershed greater than five square kilometers;
- vi) Regionally significant Earth Science Area of Natural and Scientific Interest; or
- vii) Fossil bed.

A number of policies then follow that deal with development and site alteration with Core Environmental Features. These policies are consistent with the Provincial Policy Statement. With respect to buffers, Section 7.C.11 establishes a minimum buffer of 10 metres from the edge of a Core Environmental Feature.

Section 7.E deals with Supporting Environmental Features, which are those environmental features not meeting the criteria for recognition as being regionally significant. Supporting Environmental Features play an important role in maintaining the ecological functions provided by the Greenlands Network and will be maintained, enhanced or, wherever feasible, restored. These features are not shown on Map 4.

Section 7.F deals with watershed planning and indicates that the Region will take the lead on the preparation of these studies. Section 7.G contains policies on Environmental Impact Statements. It is indicated in this section that the Region will take the lead on determining when such an Environmental Impact statement is required and will also take the lead on the determination of the scope of the report. Section 7.H contains policies on natural hazards that are consistent with the Provincial Policy Statement. Section 7.I contains a number of policies dealing with environmental stewardship, managing woodland resources and land stewardship.

7.2 Comparison of Natural Environment Mapping

Note: a more comprehensive discussion is provided in the Mapping Discussion Paper (prepared as part of the Natural Environment Work Program – under a separate cover).

Across the municipalities reviewed, natural environment mapping has some key similarities and notable differences. It is important to note that Halton and Waterloo are upper tier municipalities whereas Hamilton is a single-tier municipality; this distinction influences the approaches taken. Approaches to natural environment mapping were compared on the following key areas:

- Mapped features and Official Plan schedules
- Source data & verification
- Treatment: overlay vs. designation
- Approach to mapping updates
- Alternative access to natural environment mapping

A high-level overview is provided here; for a detailed review of their approach to natural environment mapping, please refer to the Mapping Discussion Paper (NSE 2019).

7.2.1 Mapped Features and Official Plan Schedules

Mapped features refers to those features for which the municipality has specific mapping associated with the feature type. How or if features are mapped on Official Plan maps / schedules is considered independent from internally held mapping data.

Through the review process, consistencies could be identified across the reviewed municipalities with respect to mapping of features:

- The following features were consistently mapped:
 - Life Science Areas of Natural and Scientific Interest (A.N.S.I.s)
 - Significant Woodlands
 - Significant Wetlands
 - Watercourses
 - Lake, Littoral Zones and / or Shorelines (not applicable to Waterloo Region)
- The following features were consistently **not** mapped:
 - Significant Wildlife Habitat
 - Habitat for Endangered and Threatened Species
 - Fish Habitat

For those features that did not have a consistent approach, differences across municipalities may be attributable to what features comprise the natural heritage system, data availability or in some cases (e.g. linkages, buffers, etc.) represent a difference in their approach to the representation or implementation of some components of the natural heritage system. The following natural heritage features are

not consistently mapped across the reviewed municipalities (note: the superscript indicates the municipality in which the feature is mapped, where 1= Region of Waterloo, 2 = Region of Halton, and 3 = City of Hamilton):

- Significant Valleylands¹
- Alvars & Prairie Habitats³
- 'Other' Wetlands^{2,3}
- Linkages^{2,3}
- Buffers / Vegetation Protection Zones^{2,3}
- Enhancement Areas²
- Municipality-Specific Designations:
 - Environmentally Sensitive Areas [E.S.A.]³
 - Environmentally Sensitive Protection Areas [E.S.P.A.]¹
 - Environmentally Sensitive Landscape [E.S.L.]¹

With respect to what is shown on Official Plan mapping / schedules, both the upper tier municipalities reviewed show only a consolidated natural heritage system. Hamilton shows a consolidated system and maps some individual feature types on a series of maps following the composite natural heritage system map. All three municipalities show the provincial plan areas that applied at the time of their preparation (i.e., Greenbelt Plan Natural Heritage System, Niagara Escarpment Plan Area, where applicable) as overlays. With respect to municipal natural heritage systems, a brief summary is provided below.

Region of Waterloo

Official plan maps (Map 4) show the following:

- Greenbelt Plan Natural Heritage System
- Composite Greenlands Network (Core Environmental Features)
- Landscape Level Systems as individual components:
 - Significant Valleys (large rivers only – Grand, Nith, Speed)
 - Environmentally Sensitive Landscape

Major rivers (i.e. Grand, Speed and Nith and a few larger tributaries) are shown on the Official Plan maps, but watercourses are generally **not** mapped. Buffers, linkages and enhancement areas are also not mapped on Official Plan mapping.

Region of Halton

Official plan maps (Maps 1A and 1G) show the following:

- Greenbelt Plan Natural Heritage System
- Niagara Escarpment Plan Area and associated designations
- Consolidated Regional Natural Heritage System (Key Features)
- Consolidated Enhancement Areas, Linkages and Buffers

Watercourses are not mapped (major or minor).

City of Hamilton

Official Plan maps include a Natural Heritage System overview (Schedule B) showing Core Areas, Watercourses and Linkages and a sub-set of Maps (B1-B8) that map individual feature types.

- Core Areas
 - Life Science Areas of Natural and Scientific Interest (A.N.S.I.s)
 - Significant Woodlands
 - Alvar & Prairie Habitats (rural only)
 - Wetlands
 - Lakes & Littoral Zones
 - Environmental Sensitive Areas
 - Earth Science A.N.S.I.
- Watercourses
- Linkages
- Vegetation Protection Zones (i.e. Buffers)

7.2.2 Source Data & Verification

Some datasets are managed by external agencies (e.g. M.N.R.F., Conservation Authorities) and are therefore relatively consistent across all three municipalities (e.g. Provincially Significant Wetlands). Other datasets were generated using common datasets (e.g. from Land Information Ontario), but are modified based on criteria for the identification or delineation of the feature in accordance with their Official Plan policies (e.g. Significant Woodlands). Most municipalities also have access to different feature mapping that has been generated in-house or has been provided by or prepared in conjunction with the area municipalities or partnered Conservation Authorities. As a result of this, there is a broad range of data used across municipalities except for those datasets managed by the province.

Data verification (e.g. ground-truthing) is variable across features types and across the jurisdiction of each municipality (e.g. urban vs. rural). All municipalities confirmed that some features have been field verified but could not readily quantify the proportion of what had been ground-truthed; this information may be available within feature attribute data but was not readily available to the review.

7.2.3 Treatment: Overlay vs. Designation

With respect to the treatment of the Natural Heritage System with respect to planning implementation and OP mapping varies across the municipalities reviewed. A brief summary is provided below.

Region of Waterloo

The Natural Heritage System (referred to as the Greenlands Network) is recognized as a designation under the R.O.P. policies; however, it is effectively mapped on the R.O.P.

schedules as an overlay – i.e. the N.H.S. is not mapped as mutually exclusive to other land uses and is not shown on land use schedule(s). This approach acknowledges and seeks to address several key considerations with respect to mapping:

- Not all components of the Greenlands Network are mapped (e.g., Significant Wildlife Habitat);
- Additional features that constitute components of the Greenlands Network per the OP policies may be identified that are not currently mapped (e.g., designation as a Provincially Significant Wetland); and
- Feature boundaries may require refinement or confirmation through detailed study.

Region of Halton

Halton has a blended approach. Below the Escarpment Brow, the N.H.S. is a designated land use (i.e. it is mapped as mutually exclusive to other land uses). Within the Niagara Escarpment Plan Area and the Greenbelt Plan Area, the N.H.S. is treated as an overlay to recognize how the policies of the Region's Official Plan would apply with respect to identification of features, but defer, as appropriate to the policies of the Provincial Plans in these areas.

City of Hamilton

The City of Hamilton's N.H.S. is treated as an overlay in both their Official Plans (Urban and Rural). However, the N.H.S. is included in the Open Space designation, which in effect maps the areas identified as part of the N.H.S. as a designation, where the components of the N.H.S. are 4 ha or greater (City of Hamilton Urban Official Plan, Policy 3.3.2). As a single tier municipality, they will ultimately be responsible for the designation and zoning of the natural heritage system and this is accomplished through subsequent planning stages.

7.2.4 Approach to Mapping Updates

None of the municipalities we reviewed have a consistent approach to mapping updates. In all cases, some mapping updates are tied to the schedule of updates from the manager of that data (e.g. M.N.R.F., Conservation Authority); however, checking for updates to these mapping sources is the responsibility of the municipality. For datasets managed internally, updates are done periodically, but on no set schedule. Updates are generally based on notification of changes to a dataset (e.g. Significant Wetlands) or through the completion of studies (e.g. subwatershed studies, secondary plans, environmental impact studies, etc.) where mapping data is provided.

7.2.5 Alternative Access to Natural Environment Mapping

All three municipalities reviewed have online mapping tools, however not all provide access to natural heritage system mapping through these portals. Waterloo has an online portal through which the consolidated Natural Heritage System can be viewed, however constraints on the map do not allow users to 'zoom in' to a property-scale.

Additionally, the portal is no longer supported and does not function on most current internet browsers and is not well known or used.

As with the other two municipalities, the City of Hamilton maintains an online mapping portal to provide access to information for its residents, however, the portal does not include natural heritage mapping (consolidated or individual features).

8.0 Climate Change

8.1 Introduction

In addition to habitat loss, invasive species, pollution, and over exploitation of resources, climate change is recognized as one of the most significant threats to natural environment systems, including biodiversity and ecological functions. Climate change is expected to result in increased variability in extreme local weather events (e.g., heavy rains and prolonged droughts) that will affect natural features, ecological functions and natural processes. In a 2007 study by Columbo et. al., it was projected for Niagara Region that there will be an increase in average annual temperatures of 3-4 °C, a slight increase in annual precipitation (although decrease in summer precipitation of 10% between) 2011 and 2040. A more recent report by the Climate Atlas of Canada (2018) has projected St. Catharines, Niagara Falls and Welland will experience an increase in average annual temperature of 2.1°C by 2021-2050 and 4.1°C by 2051-2080 under a high emission scenario. The data also suggests average precipitation will increase in Niagara, with summer precipitation increasing between 2021-2050, and decreasing by 2051-2080 under a high emission scenario.

Climate change creates additional stress on ecosystems that are already impacted from fragmentation, invasive species, pollution, and increasing human pressure (e.g., creation of ad-hoc trails, trampling of vegetation, noise and light pollution). As a result of increased average temperatures and changes in current precipitation patterns (increase in winter, decrease in summer) that is modelled for Niagara Region, the following impacts to the natural environment system are possible (as cited from Penney 2012):

- Increased insect and disease outbreaks in trees and other vegetation (including agricultural crops)
 - Warmer winter temperatures will limit the amount of insect and disease die-off that occurs in the deep cold of winter
- Increased stress for woodlands due to summer heat and reduced rainfall, making them more vulnerable to fire
- Increase evaporation and evapotranspiration (i.e., the transfer of water from soil to the atmosphere through uptake by plants) leading to lower water tables
 - Decline in wetlands due to lower water levels, with impacts on wetland plants, marsh-nesting birds, amphibians and fish
 - Faster drying of vernal pools impacting obligate species, such as frogs and salamanders
- Threats to fish from higher water temperatures, declining water levels in rivers and lakes, reduced flows in some rivers, and reduced levels of dissolved oxygen in summer
- Expansion of some warm water fish and invasive aquatic species such as sea lamprey and zebra mussels

- More outbreaks of Type E botulism causing mass die-offs of mudpuppy salamanders and fish-eating birds in the Great Lakes
- More outbreaks of toxic blue-green algae in the Great Lakes and especially in Lake Erie

Wildlife inhabiting natural features have a range of optimal environmental conditions under which they persist. For example, vegetation contained in forested wetlands (swamps) and slough forests rely on flooded or saturated soils in the early part of the year, which typically dry up by mid-late summer. The conditions in these swamps and slough forests typically provide a high diversity of habitat types (e.g., vernal pools for breeding amphibians, ridges for upland vegetation and ground nesting birds, etc.) resulting in a high biodiversity. The vegetation and wildlife species that have adapted to these conditions rely on the somewhat predictable climate and environmental conditions. With the modelled effects of climate change in Niagara Region it is expected these swamps and slough forests will be threatened by more rapid drying of the vernal pools and lowering of the water table as a result of increased evapotranspiration. As with the example noted here, other natural environment features will be affected by climate change.

8.1.1 Climate Change and Ecosystem Services

The Millennium Ecosystem Assessment (2005) defines ‘ecosystem services’ as “the benefits people derive from ecosystems”, such as food, wood and other raw materials, pollination of crops, prevention of soil erosion, flood attenuation, habitat for wildlife, and water purification, as well as a vast array of cultural services, like recreation and a sense of place. The natural environment systems that provide these important ecosystem services are being threatened by climate change. The natural environment system is vulnerable to changes in the environment and is expected to be affected by climate change, however, the extent of the impact of climate change on natural features and ecological functions is uncertain. As part of a forward-thinking plan, municipalities need to consider the potential impacts of climate change as part of natural environment planning in order to better protect the natural environment system and reduce economic costs (e.g., flood damage, effect of drought on crops, etc.).

8.2 Climate Change and Natural Environment Planning

The Growth Plan clearly recognizes the threat of climate change on the natural environment, as noted in Section 4.1 (underlining added for emphasis):

“The G.G.H. contains a broad array of important hydrologic and natural heritage features and areas, a vibrant and diverse agricultural land base, irreplaceable cultural heritage resources, and valuable renewable and non-renewable resources. These lands, features and resources are essential for the long-term quality of life, economic prosperity, environmental health, and ecological integrity of the region. They collectively provide essential ecosystem services, including

water storage and filtration, cleaner air and habitats, and support pollinators, carbon storage, adaptation and resilience to climate change.”

The Growth Plan further states:

“The water resource systems, Natural Heritage System, and Agricultural System for the G.G.H. also play an important role in addressing climate change and building resilience.”

Section 4.2.10 specifically addresses Climate Change through the following relevant policies:

“1. Upper- and single-tier municipalities will develop policies in their official plans to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, aligned with the Ontario Climate Change Strategy, 2015 and the Climate Change Action Plan, 2016 that will include:

- e) recognizing the importance of watershed planning for the protection of the quality and quantity of water and the identification and protection of hydrologic features and areas;
- f) protecting the Natural Heritage System and water resource systems;”

Policy direction at the federal, provincial and local level can contribute to preparing for and mitigating the effects of climate change. For municipalities, a variety of policy tools can be leveraged to manage or reduce exposure to climate risks or mitigate impacts; these tools include official planning documents, regulatory and zoning tools, voluntary or incentive programs, and education and communication tools. For natural environment planning, that could mean acknowledging the important role natural features and functions play in reducing the exposure to risk and mitigating impacts from climate change. To go further, policies could consider providing an increased level of protection to those natural features and functions that reduce risk and mitigate impacts, such as floodplains and wetlands (both provide storage functions during storm events), naturally vegetated shorelines and riparian areas, as well as encourage or require vegetating riparian areas.

8.2.1 Valuing Ecosystem Services

When considering the costs of extreme storm events experience in southern Ontario, there is an economic argument to protecting and enhancing those natural features that provide ecosystem services, such as flood attenuation. According to Insurance Bureau of Canada, the 2013 flooding following heavy rainfall in Toronto area caused \$940 million of insured damages (Insurance Bureau of Canada 2017). One way to acknowledge the value of the ecosystem services provided by the natural environment system is to economically account for natural assets in the municipal financial planning and asset management programs. Natural assets such as aquifers, wetlands, forests, watercourses, riparian areas and shorelines provide municipalities with vital services exceeding the benefit of engineered assets. Some municipalities have undertaken such an approach to valuing ecosystem services through the Municipal Natural Assets Initiative (MNAI), including the Region of Peel, Town of Oakville, and City of Oshawa.

The goal of valuing ecosystem services is to recognize the economic benefit of the natural environment in order to allocate resources to ensure the resilience and sustainability of the natural environment system.

8.2.2 Building Resiliency

Healthy, diverse and connected natural systems are found to exhibit resilience. An ecosystem is said to be resilient when it has the ability to recover from disturbance and maintain its normal ecological functions, including wildlife habitat functions, and patterns of nutrient, water, and chemical cycling. A resilient natural environment system can provide an important role in a climate change context for several reasons:

- A healthy, diverse, and connected natural system has a greater ability to adjust to changes in the environment resulting from climate change.
- Protection of a water resource system will buffer the impacts of extreme weather events and drought
- Forests and wetlands act as carbon banks (they store carbon which would otherwise become GHG emissions) and are important mitigation tools
- Naturally vegetated areas (e.g., woodlands) can reduce energy demands and the urban heat island effect (whereby the urban area, with the dominance of pavement and roof-tops, is warmer than the surrounding, more natural, landscapes) and moderate microclimate conditions.

As mentioned previously, in addition to climate change the natural features and functions are under stress by a number of factors, largely human induced (e.g., fragmentation, reduction in size of features, changes in hydrologic regimes, introduction of invasive species, pollution, etc.). The cumulative stress resulting from these threats has left many natural features in a state of declining health and reduced ecological integrity. As with other municipal assets (e.g., storm water system, roads, other infrastructure) requiring maintenance in order to function as intended, investment in the maintenance of natural environment features can help to ensure a resilient ecosystem and the benefits of ecosystem services are provided for long-term.

8.2.3 Municipal Planning Tools

Municipal OP policies regarding climate change acknowledge the need to and encourage the reduction of greenhouse gas emissions, a large contributor to the cause of climate change. The link between climate change and the need for protection or enhancement of the natural environment system is generally absent from municipal OPs. That said, there are other tools, such as climate action 'strategies' or 'initiatives' municipalities are preparing, such as the Town of Oakville's 'Climate Change Strategy - Technical Report (September 2014 Version 1.1 Updated January 2015)'. The Town of Oakville, through this Strategy, have identified the threats of climate change to the Town, including the natural environment system, and recognize the important role the natural environment plays in mitigating risks associated with climate change. This Strategy also includes adaptive actions that could be implemented to address threats, such as:

- “Protect and enhance wetlands and groundwater recharge areas in north Oakville.
- Develop invasive species strategy in collaboration with key agencies (Conservation Halton).
- Develop an overall Biodiversity Strategy
- To address the likely northern migration of wildlife with warming conditions, identification and enhancement of wildlife corridors and habitat to allow for adequate movement of species.
- Continuation and enhancement of effective monitoring and data collection for Oakville’s creeks and waterways
- Ensuring there is adequate species diversity throughout the urban forest
- Continue to be proactive regarding invasive species identification and eradication.
- Continue to partner with external agencies and levels of government to track migration patterns, presence and best management practices associated with eradication.
- Monitor invasive and non-native pests to the south due to the anticipated northerly migration
- Identify and map publicly owned lands for restoration priority.”

Municipal planning can be an effective tool to protect and increase the resiliency of the natural environment system, in turn, ensuring the resiliency of the ecosystem services supporting the municipality. Implementation tools and management approaches to achieve resiliency in the natural environment system could include:

- Coordinating natural environment planning and protection of features and functions with Niagara’s Climate Change Framework
 - Recognize role of watershed planning in adapting to climate change
- Considering policies in the R.O.P. that prohibit development in natural areas and hazard lands that promote ecological services that address climate change mitigation and adaptation (e.g., carbon sequestration and storm water retention and infiltration, while reducing economic, health and safety costs and risks).
- Zoning and planning tools to reduce exposure to different hazard types or protect important natural environment features (e.g., floodplains, riparian areas, shorelines, etc.)
- Ensuring planting plans (e.g., boulevard planting, parks, new development, etc.) include a diversity of native species (and exclude non-invasive species).
- Reducing the stress on natural environment features by:
 - Ensuring no changes in the hydrologic regime resulting from changes in surrounding land use
 - Ensuring an adequate buffer to mitigate impacts from changes in surrounding land use
 - Managing invasive species through a municipal-led invasive species management program

- Only allowing compatible uses (e.g., sanctioned and managed trails) in natural features
- Ensuring the connectivity (i.e., linkages) between features is maintained or enhanced
 - Allows movement of wildlife between features to adjust to changes in local environmental conditions
- Requiring sub-watershed and watershed planning to explicitly consider potential climate change scenarios (e.g., updated floodplain modelling recognizing more extreme storm events)

Additionally, stewardship, education and community outreach programs can be developed and promoted, such as programs to encourage residents or businesses to enhance existing natural environment features and functions (e.g., tree planting programs, riparian planting programs, easements, etc.).

8.3 Relevance to the New Niagara Official Plan

The Region is currently undertaking the development of a climate change planning framework as part of the new N.O.P. As part of the considerations in the climate change framework, the role the natural environment system plays in mitigating impacts associated with climate change should be highlighted through the goals and objectives of the climate change framework. Furthermore, policies, By-laws, guidelines and other implementation tools should be developed in the climate change planning framework to support the protection and enhancement of natural environment features and functions that provide important ecosystem services including adaptation and resilience to climate change.

With respect to the natural environment policies, the important contribution of the natural environment system to mitigating impacts of climate change should be reflected in the level of protection afforded to the system, in particular those components of the system that can directly mitigate impacts resulting from extreme weather events (e.g., wetlands and floodplains to attenuate flooding impacts). Furthermore, the value of enhancement areas and linkages in increasing the resiliency of the natural environment system to the impacts of climate change should be recognized through the level of protection afforded to these components of the system. In addition, the impact of climate change on the form and function of natural features should be considered when designing the mapping of the natural environment system; i.e., ensure adequate connectivity and identification of ecologically appropriate enhancement areas).

As noted above the following should be considered when developing policies and mapping for the natural environment system:

- Coordinating natural environment planning and protection of features and functions with Niagara's Climate Change Framework

- Policies in the N.O.P. that prohibit development in natural areas and hazard lands that promote ecological services that address climate change mitigation and adaptation
- Zoning and planning tools to reduce exposure to different hazard types or protect important natural environment features
- Ensuring planting plans include a diversity of native species (and exclude non-native invasive species)
- Include policies and guidelines that prevent cumulative impacts on natural environment features by:
 - Maintaining water balance to features
 - Buffers account for impacts from change in land use and climate change
 - Preparing and implementing an invasive species management plan
 - Only allowing compatible uses in natural features, buffers, linkages and enhancement areas
- Ensuring the connectivity (i.e., linkages) between features is maintained or enhanced
- Requiring sub-watershed and watershed planning to explicitly consider potential climate change scenarios (e.g., updated floodplain modelling recognizing more extreme storm events)
- Policies to support stewardship, education and community outreach programs related to natural environment enhancement and climate change initiatives.

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9.0 Invasive Species

9.1 Background

Invasive species are widely considered to be the second greatest threat to biodiversity after habitat loss (Erlach, 1998; Wilson, 1992). Invasive species are considered non-native species (but can also be native species) that displace some or most of the native components of a community (White et al., 1993) and negatively impact the function of the ecosystem, including ecosystem services. The impacts of invasive species on ecosystem services have increased awareness about the need to prevent introductions and control established populations.

As with climate change, invasive species threaten the ecosystem services we rely on. A study contracted by the Ministry of Natural Resources in 2009 found the valuation of ecosystem services of representative vegetation cover types in Ontario (e.g., agriculture, forest, open water, wetlands, beach, unvalued terrestrial, aquatic) to be over \$84 billion (Spatial Informatics Group, 2009). This valuation is calculated as direct economic provisioning of ecosystem services. That is to say, it does not evaluate cultural and social values associated with natural systems that are important to residents and visitors of the Niagara Region.

In addition to the cost to ecosystem services, there is a direct economic cost resulting from managing the impact of invasive species. The Ontario Invasive Species Strategic Plan (Ministry of Natural Resources, 2012) provides the first two examples of costs resulting from invasive species impacts:

- \$37 million to cut and replace ash trees affected by Emerald Ash Borer (*Agrilus planipennis*) (EAB) in the City of Toronto over five years
- \$30 million spent up to 2012 by the Canadian Food Inspection Agency (CFIA) to cut ash trees to slow the spread of EAB

As another example, the City of Mississauga had allocated \$51 million over 10 years in 2013 (City of Mississauga, 2013) to replace ash trees and treat those affected by EAB.

Once invasive species have become established, economic costs associated with managing invasive species varies greatly depending on:

- The species,
- Extent of population, and
- Mechanism used to manage the species.

For example, the cost of controlling invasive *Phragmites* (*Phragmites australis* subsp. *australis*) has been cited by the Ministry of Natural Resources and Forestry (M.N.R.F.) as between \$865 and \$1,112 per hectare (Bolton and Brooks, 2010). The ecological cost of not controlling invasive *Phragmites* (i.e., the 'do nothing' approach) results in:

- A sharp decrease in native plant cover,
- Loss of species richness and biodiversity,
- Alterations of energy availability as a result of dense shading to the understory,
- Changes in nutrient and water cycling,
- Alteration of disturbance regimes and return intervals, and
- Effect on micro-climate (Charles and Dukes, 2007).

Additional impacts include:

- Road hazards,
- Fire hazards,
- Effects on agriculture (loss of economic gains),
- Impact on aesthetics (lake view), and
- Recreational activities (angling, boating, swimming) (Ministry of Natural Resources, 2011).

Urban/suburban wetlands provide ecosystem services amounting to \$161,420 per hectare per year (Ministry of Natural Resources, 2009). Invasive *Phragmites* often invades these wetlands inevitably reducing the value of the ecosystem services provided by these wetlands.

9.2 Invasive Species in Niagara Region

9.2.1 Terrestrial Invasive Flora

Terrestrial invasive flora of most concern, including Garlic Mustard (*Alliaria petiolata*), European Buckthorn (*Rhamnus cathartica*), Common Reed and Dog-strangling Vine (*Vincetoxicum rossicum*, *V. nigrum*), are prevalent in portions of certain natural areas within the Region, and pose a threat to native biodiversity. For example, in addition to the impact of buckthorn outcompeting native vegetation as a result of heavy shading and allelopathic effects (i.e., chemicals exuded from the roots that suppress the germination and growth of other vegetation), the fruit and leaves of European buckthorn release a metabolite that has been found to negatively affect embryonic development of Western Chorus Frog (*Pseudacris triseriata*) and contribute to declines in populations through depressed hatching success and poor larval survival (Sacerdote and King, 2014).

9.2.2 Terrestrial Invasive Fauna

Invasive terrestrial fauna including EAB, Gypsy Moth (*Lymantria dispar* v. *dispar*), Beech Bark Disease, are impacting the Region's natural areas, thereby altering the vegetation structure and ecosystem dynamics in a way that benefits the establishment and spread of non-native invasive plant species. This is currently occurring in the understory of woodlands where ash trees are dying due to infestation with EAB. EAB is an introduced beetle from Asia that was first discovered in Ontario in 2002. Adults deposit eggs under the bark of ash trees. The larvae feed on the phloem of the tree, essentially girdling the tree and preventing the flow of food and water to the branches

resulting in whole tree mortality. Where the understory has an established population of non-native invasive plants, such as Buckthorn and Garlic Mustard, the opening of the canopy following the death of ash trees will result in rapid growth of invasive species and opportunities for their spread thereby outcompeting regenerating native species, such as oaks and maples. With ash trees making up a large portion (in some cases 100%) of the canopy in woodlands in Niagara Region, this will have a major impact on the potential for those woodlands to regenerate and exhibit characteristics and ecological functions of a forest, such as supporting forest-dependent wildlife species.

Aquatic Invasive Species

In addition to terrestrial invasive species, aquatic invasive species are also a concern in Niagara Region with the Great Lakes to the north and south, and the Welland Canal and Niagara River to the east. Similar to terrestrial plants, aquatic invasive plants spread rapidly and outcompete native vegetation, and also have a tendency to alter water quality by increasing the amount of organic biomass that decays in the water which reduces the oxygen content in smaller water bodies. Aquatic invasive fish species have contributed to the decline and disappearance of some native aquatic species and the collapse of some local fisheries. Aquatic invasive fish species negatively impact native populations of fish and their habitat through:

- predation, parasitism or competition (for food or space)
- degradation or destruction of ecosystems and fish habitat (e.g., digging up vegetation and increasing the turbidity in the water)

For example, the Round Goby (*Neogobius melanostomus*), a small, bottom-dwelling invasive fish native to the Black and Caspian seas in eastern Europe, has had serious impacts on native species as a result of the round goby's aggressive habits and rapid spread, for example:

- "The fish compete with and prey on native bottom-dwelling fish such as mottled sculpin (*Cottus bairdii*) and logperch (*Percina caprodes*).
- Round goby also threatens several species at risk in the Great Lakes Basin, including the northern madtom (*Noturus stigmosus*), the eastern sand darter (*Ammocrypta pellucida*), and several species of freshwater mussels.
- Round goby has reduced populations of sport fish by eating their eggs and young and competing for food sources.
- Researchers believe the round goby is linked to outbreaks of botulism type E in Great Lakes fish and fish-eating birds. The disease is caused by a toxin that may be passed from zebra mussels, to goby, to birds, resulting in large die-offs of fish and birds" (Ontario Invasive Species Awareness Program, 2012).

Some of the aquatic invasive species of most concern in the Region include:

- Eurasian Water Milfoil
- European Frog-bit

- Yellow Iris
- Round Goby
- Zebra and Quagga Mussels
- Rusty Crayfish
- Golden Mussel
- Asian Clam
- Sea Lamprey

There have also been a few rare captures of individual Bighead Carp and Grass Carp, both members of the 'Asian carp' group, in the Canadian waters of the Great Lakes (Department of Fisheries and Oceans, 2019). Members of the Asian carp group also include Silver Carp and Black Carp. Three specimens of Bighead Carp were captured in western Lake Erie in 2002/2003 and were believed to be intentionally released. Twenty-three Grass Carp were captured between 2012 and 2016 in the tributaries of Lake Huron, Lake Ontario and Lake Erie. Asian carps, in particular the Silver Carp and Bighead Carp are known to outcompete native fish species in part due to their voracious appetite and high reproductive ability. If Asian carp become established in the Great Lakes, the economic impact on the industries that rely on native fish populations are expected to be detrimentally impacted.

9.3 Invasive Species Legislation

The province released the Invasive Species Act, 2015 (S. O. 2015, c. 22 –Bill 37) which came into force on November 3, 2016.

“The Act provides the power to make regulations prescribing invasive species and classifying them as either prohibited or restricted. A prohibited invasive species is subject to all of the prohibitions in section 7 of the Act unless there are exceptions provided in the regulation. A restricted invasive species is subject only to the prohibitions in subsection 8(1), but may be subject to further restrictions, conditions, prohibitions and measures under the Act if the regulations so provide.” (Ministry of Natural Resources and Forestry, 2016)

The Act identifies invasive Phragmites, Dog Strangling Vine (*Vincetoxicum rossicum* v. *nigrum*) and Japanese Knotweed (*Fallopia japonica*) as restricted species under the Invasive Species Act, 2015.

The Province has also developed the Weed Control Act (R.S.O. 1990, c. W.5). The focus of this Act is to reduce infestations of noxious weeds that negatively impact agriculture and horticulture. Through the Weed Control Act, a noxious weed schedule is established which regulates the destruction, transport, and deposit of these species. The Act also enables regulations to prescribe eradication and prevention measures (e.g., Giant Hogweed (*Heracleum mantegazzianum*)). Landowners whose property contains noxious weeds and weed seeds that negatively affect agricultural lands are responsible for weed control and associated costs.

9.4 Role of Municipalities in Managing Invasive Species

Municipalities play an important role in the management of invasive species on municipal lands and can provide planning tools to support management of invasive species. In addition, municipalities can play a major role in:

- The detection of new introductions,
- The management of new and established invasive species, and
- The control of noxious vegetation that poses a human health risk.

9.4.1 Invasive Species Policies in Municipal Official Plans

Official Plan documents can include policies and guidance to support the management of invasive (or non-native) species and reduce the impact to the natural environment. The direction provided for in OP policies varies across municipalities, from no mention of invasive species, to a broader set of policies regarding invasive species. For example, neither the Halton R.O.P. (2018 consolidated version) nor the York R.O.P. have any policies regarding invasive species. The City of Hamilton mentions invasive species once, in policy 2.5.13:

“All plantings within vegetation protection zones shall use only non-invasive plant species native to Hamilton. The City may require that applicants for development or site alteration develop a restoration or management plan for the vegetation protection zone as a condition of approval.”

Section 2.5.3 of the Peel R.O.P. (2016 consolidated version) provides objectives and policies regarding ‘Invasive Species Management’, as follows:

“A major issue facing natural heritage management within the region is the threat of non-native species invading woodlands, wetlands and other natural areas. If left unmanaged, invasive species pose a risk to the ecological integrity of the Region’s natural areas through the displacement of native species and the subsequent alteration to the genetic diversity and structure of local native species populations.”

The objective of the invasive species management policy is “to minimize the impacts of invasive species through the proper management and control of non-native invasive species to promote native species plantings in the region” (policy 2.5.3.1).

Section 2.5.3.2 notes: “It is the policy of Regional Council to:

- 2.5.3.2.1 Acknowledge and support the role of the area municipalities, conservation authorities, provincial agencies and conservation organizations in carrying out invasive species management.

- 2.5.3.2.2 Support and encourage the area municipalities in consultation with the conservation authorities to develop policies and programs that require or promote measures to eliminate and/or manage non-native invasive species and discourage the use of non-native invasive species plantings in new developments adjacent to the Greenlands System.
- 2.5.3.2.3 Encourage the use of native species plantings at Regional and municipal facilities and along transportation and utility corridors, and wherever feasible and appropriate include native species plantings along Regional roads and on properties owned by the Region.”

The City of Guelph’s OP (2018 consolidated version) includes policies for invasive species in section 4.1.7.1, as follows:

1. Management and control of non-indigenous and invasive species will be undertaken on City owned and managed properties.
2. Plantings on municipal properties shall be indigenous species where feasible and appropriate, except where harsh environmental conditions would limit their survival.
3. Management and control of non-indigenous, invasive species is encouraged on lands owned by other public agencies and utilities.
4. Plans prepared in conjunction with development and site alteration applications will require indigenous plants, trees and shrubs except where harsh environmental conditions would limit their survival.
5. Indigenous species will be encouraged on private lands and particularly on those adjacent to the Natural Heritage System.

9.4.2 Other planning Tools for Managing Invasive Species

At the municipal-level, local bylaws and permitting requirements can aid in managing the introduction and spread of invasive species. Tools available at the municipal-level include by-laws under various sections of the Municipal Act. For example, the City of Mississauga By-law Number 0267-2003 prescribes standards for maintenance of nuisance weeds (e.g., European Buckthorn and Garlic Mustard) on private lands: “Every owner of land shall destroy and remove all nuisance weeds and weed seeds on their lands”. Although rarely enforced, nuisance weed By-laws are another tool that can be used by municipalities to manage invasive species.

9.4.3 Early Detection – Rapid Response

Niagara Region, being situated between two Great Lakes and providing an important transportation corridor between the United States and Canada, is vulnerable to the introduction of new invasive species. A key focus for the Region and area municipalities should be early detection and rapid response (EDRR), which is the “early detection of, and rapid response to, invasive plants and insects to increase the

possibility of controlling and potentially eradicating these species before they become established, or spread further across the landscape” (Early Detection and Rapid Response Network Ontario, 2015). This requires a coordinated monitoring and reporting program to ensure any new introductions are identified and controlled immediately. For example, the City of Mississauga has been undertaking an annual Natural Area Survey (NAS) for the past 16 years, covering a quarter of the City each year where after four years all designated natural areas in the City are surveyed. The NAS includes dedicated surveys for birds, amphibians, plants (native and invasive species), all while recording changes in vegetation community composition (i.e., refining E.L.C. boundaries) and documenting issues associated with anthropogenic impacts (e.g., dumping, encroachment, ad-hoc trails, etc.). The results of the surveys are summarized in fact sheets and any urgent management actions, such as the need for early treatment of invasive species (e.g., Giant Hogweed) are reported to the City.

9.4.4 Invasive Species Plan

The most effective way to manage the spread of invasive species is prevention (Anderson et al., 2013; Invasive Species Research Institute, 2013), which is emphasized as a priority of the Ontario Invasive Species Strategic Plan (Ministry of Natural Resources, 2012). Even with the most careful prevention strategies, invasive species can still become established; at which point, a management strategy is required. Many lower-tier municipalities and public agencies are undertaking invasive species management action; however, this is most often done on a case-by-case basis. Ad-hoc management of invasive species, either by individual landowners, or on a site-by-site basis, is not a long-term solution to the management of invasive species, which are not confined by property lines or jurisdictional boundaries. Due to the wide-spread prevalence of invasive species in the Region and their ability to continue to spread and further reduce the natural environment, including ecosystem services, a coordinated invasive species management plan will be required. A management plan for invasive species in Niagara Region should be a long-term plan and include:

- identifying priority invasive species (terrestrial and aquatic)
- roles and responsibilities
- priority areas/sites for invasive management
- have a strategic approach to ensure efficient use of resources
- include a monitoring plan
- identify opportunities to partner engagement, and community education and outreach.

Examples of other public agencies that have developed an invasive species management plan or strategy include:

- City of Mississauga Invasive Species Management Plan and Implementation Strategy (in progress)
- City of London - London Invasive Plant Management Strategy (2017)
- Credit Valley Conservation - An Invasive Species Strategy (2009)

9.5 Relevance to the New Niagara Official Plan

The Region may consider including policies in the new N.O.P. that support the management of invasive species including:

- supporting management initiatives on public and private land
- limiting the use of invasive species on public land (i.e., some non-native species may be appropriate for highly disturbed sites where mortality of native plants is high and there is no risk of spread of invasive plants)
- restricting the use of plantings for new developments approved through the planning process.

The Region may also consider the development of an Invasive Species Plan to be coordinated and implemented with the area municipalities, the N.P.C.A., other interested agencies, and landowners.

10.0 Natural Hazards

Natural hazards are features of the landscape and physical environmental processes that have the potential to impact public safety and infrastructure. These include natural hazards identified in the Provincial Policy Statement (P.P.S.). The P.P.S. requires the consideration of public health and safety from natural hazards. In this regard, natural hazards such as dynamic beach, erosion, flooding are addressed through Section 3.1 of the P.P.S. Some key terms defined in the P.P.S. include hazardous lands and hazardous sites (definitions provide in **Appendix 1**). Hazardous lands in the Great Lakes-St. Lawrence river system can include the shorelines of both large and small inland lakes, and along rivers and streams. Hazardous sites are unsafe for development due to naturally occurring hazards, which could include unstable soils or unstable bedrock. In addition to the above, the P.P.S. has included policies related to “hazardous forest types for wildland fire” within Section 3.1.

The following sections review natural hazards as they related to the regulation of natural hazards and considerations for natural environment planning.

10.1 Conservation Authorities Act

The *Conservation Authorities Act* (1990, updated in 2017) identifies the following natural hazards subject to regulation (according to Section 28(5) of the Act):

- a) Adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beach hazards;
- b) River or stream valleys;
- c) Hazardous lands;
- d) Wetlands; or
- e) Other areas where, in the opinion of the Minister, development should be prohibited or regulated or should require the permission of the authority.

The *Conservation Authorities Act* defines hazardous lands as "land that could be unsafe for development because of naturally occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock."

It is noted that Section 28 in its entirety is proposed to be replaced; however, the natural hazards that are dealt with by Conservation Authorities will remain generally the same.

The management of natural hazards in Ontario involves four main components:

1. Prevention: restricting the development of new development in areas identified as being the site of natural hazards.
2. Protection: protecting existing development from natural hazards by acquiring land and using structural and non-structural protection measures.

3. Emergency Response: Warning the public about the dangers related to natural hazards, such as flooding events.
4. Coordination: coordinating the actions of municipalities and other agencies on natural hazard management, planning and development.

10.1.1 Natural Hazard Regulation

Where Conservation Authorities have been established the responsibility for managing natural hazards has been delegated to them; otherwise the Ministry of Natural Resources and Forestry is responsible for natural hazard management in Ontario. The Province continues to provide the overall direction, guidance and technical standards with respect to natural hazard assessment and management through Provincial policy and other guidance documents.

Natural hazards are regulated by Conservation Authorities, in coordination with upper and lower tier municipal partners. In Niagara Region, the Niagara Peninsula Conservation Authority (N.P.C.A.) jurisdiction covers the vast majority of the Region, with a small area in the western portion of Grimsby falling under the jurisdiction of the Hamilton Conservation Authority. For simplicity and considering the relative cover of the N.P.C.A. jurisdiction in Niagara Region, the N.P.C.A. regulations and policies will be discussed.

Ontario Regulation 155/06 outlines the role, responsibility and regulative power of the N.P.C.A. With respect to natural hazards, Ontario Regulation 155/06 states that development is prohibited in or on the areas within the jurisdiction of the N.P.C.A. that are or may be:

- a) Adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beaches;
- b) River or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse;
- c) Hazardous lands;
- d) Wetlands; or
- e) Other areas where development could interfere with the hydrologic function of a wetland, including areas up to 120 metres of all provincially significant wetlands and wetlands greater than 2 hectares in size, and areas within 30 metres of wetlands less than 2 hectares in size.

The limit of the N.P.C.A.'s jurisdiction is established based on an "Approximated Regulation Lands" limit as shown on maps filed at their head office. It should be noted that the text in N.P.C.A.'s Regulation 155/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses takes precedence over the regulation limit mapping. Not all regulated features will appear on the mapping. The mapping is intended to be used as a screening tool to identify lands potentially within N.P.C.A. regulated areas. The N.P.C.A. reserves the right to make the final determination as to which lands fall within the N.P.C.A. regulation zone.

The Regulation limit is determined based on hazardous lands (e.g., erosion, unstable slopes, shorelines and areas susceptible to flooding) or important environmental features (e.g., wetlands) and associated allowances. These limits are updated from time to time based on provincial, municipal and N.P.C.A. databases, field verification, and technical studies undertaken during planning or permitting processes. The approximated regulation land mapping is most regularly updated when a technical study (e.g., flood plain mapping, shoreline management plan and associated hazard mapping) are completed. Some limits of mapped regulated features do get updated through operational review of plan and permit files; the N.P.C.A. is working towards improving their process to integrate more recent datasets on a more regular basis.

Conservation Authorities issue permits in regulated areas only. If a permit is not obtained, a use, building or structure that may otherwise be permitted by zoning is not permitted. The N.P.C.A. may provide a permit for development within the regulation limit, provided it has been demonstrated that the development will not impact flooding, erosion, dynamic beaches, pollution or the conservation of land.

10.2 Natural Hazards - Wildland Fires

Section 3.1.8 of the P.P.S. states the following:

"Development shall generally be directed to areas outside of lands that are unsafe for development due to the presence of hazardous forest types for wildland fire.

Development may however be permitted in lands with hazardous forest types for wildland fire where the risk is mitigated in accordance with wildland fire assessment and mitigation standards."

It is noted that development in the context of the above policy means a change in land use that requires a Planning Act approval.

The M.N.R.F. has prepared a document "Wildland Fire Risk Assessment and Mitigation Reference Manual in support of the P.P.S. 2014" (M.N.R.F. 2016) to assist municipalities in developing policies where there may be a risk of wildland fire. The purpose of the manual is to:

- Outline how wildland fire, a natural hazard, can be addressed in the municipal land use planning process in a manner that achieves consistency with the P.P.S. 2014, including policy 3.1.8;
- Provide background information regarding hazardous forest types for wildland fire and the risks they pose;
- Identify "wildland fire assessment and mitigation standards" as referred to and defined in the P.P.S. 2014;

- Provide techniques for implementing wildland fire policies through municipal planning policies and processes including official plans, zoning by-laws and site-specific applications, as well as other municipal planning tools; and
- Recognize that land use planning is a critical part of the province's framework for managing emergencies.

The manual also recommends that Official Plans:

- Promote appropriate land use patterns (e.g., directing development away from lands that are unsafe due to the presence of hazardous forest types for wildland fire);
- Promote the avoidance of uses and activities that may represent an unacceptable risk to public health and safety;
- Identify areas of known and potential hazardous forest types for wildland fire in a manner that corresponds to level of confidence in the information source;
- Provide a clear and reasonable mechanism for assessing at the development application stage whether hazardous forest types for wildland fire are present; and
- Provide a clear and reasonable mechanism for determining at the development application stage environmentally appropriate measures to mitigate the risk from high or extreme, to bring it to moderate or low.

The manual goes on to recommend a number of other strategies and practices that need to be considered. In order for these policies to be appropriately implemented, accurate mapping is required. Once this mapping is available, the manual does not recommend that the information be shown on an operative schedule. Instead, the following approaches could be used either alone or in combination:

- Show relevant information on an appendix map, to be updated as new information becomes available.
- Prepare and maintain information or screening maps to be referenced in the official plan but not form part of the Official Plan. These could be used by municipal planning staff when reviewing planning applications.

It should be noted that the Province has produced a province-wide generalized wildland fire hazard dataset titled "Fire—Potential Hazardous Forest Types for Wildland Fire." "The dataset is an amalgamation of the most current Forest Resource Inventory and LandSat data, which has been converted to fuel type categories established by the Canadian Forest Fire Behavior Prediction system" (O.M.N.R.F. 2017). The dataset represents a "coarse scale assessment of areas with the greatest potential for risks associated with high to extreme wildland fire. The map represents a snapshot in time, and may not account for changes in the forest. The dataset does not represent a complete assessment of wildland fire hazards. Assessment of risk and determination of mitigation measures can be done with confidence only on a site-specific basis. Lands not identified through this mapping as having high to extreme wildland fire hazards (i.e., being associated with the risk of high to extreme wildland fire) still require some level of

site assessment, as described above” (O.M.N.R.F. 2017). The manual is clear that municipalities are not required to use the M.N.R.F.’s mapping as an assessment tool; rather it can form part of the assessment to determine the forest type and risk level as part of the “Planning Act application decision.” The manual recommends that “municipalities undertake a broad-level/municipal-wide wildland fire assessment” following the FireSmart wildland fire hazard assessment process for community wildland fire planning as described in Chapter 2 of the manual (O.M.N.R.F. 2017).

In terms of best practices in a southern Ontario context, there are none at this time. Policies on wildland fires have been included in a number of northern Ontario Official Plans (e.g., Muskoka). However, the type and extent of forests in the northern municipalities are different than Niagara and do not necessarily provide for a relevant comparison to inform the new N.O.P. policies.

10.3 Roles and Responsibilities Related to Natural Hazards

10.3.1 Conservation Authority

The role of the Conservation Authority is to enforce the regulation laid out in the Conservation Authorities Act and provided in the conservation authority specific regulation. The N.P.C.A. developed the N.P.C.A. Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act (2018). “This document provides the principles, objectives, and policies for the administration of the N.P.C.A.’s mandate under Ontario Regulation 155/06, as well as its delegated roles and responsibilities within the planning and approvals process. The document is intended as a guide for decision-making for N.P.C.A. staff, landowners, developers, municipal planners and residents” (N.P.C.A. 2018, p. 1).

As previously noted, the Regulation limit is determined based on hazardous lands, and significant environmental features, and associated allowances. This limit includes all features and hazards identified by the regulation, regardless of whether they have been formally mapped. This means that a large responsibility of the Conservation Authority is to continuously refine, and update regulation mapping with new information.

To support the identification of natural hazards (and regulation mapping), high level mapping is typically completed through watershed and/or subwatershed studies. However, many of the hazard areas identified prior to higher level modelling studies were prepared based on local knowledge, topographic information and air photo interpretation.

Watershed and subwatershed studies have historically been led by Conservation Authorities, with support from outside consultants, the Region and area municipalities. At this level of study, natural hazards are typically identified in the following ways:

- Review of Provincial mapping/ databases (e.g. soil and bedrock mapping);
- Large scale computer modelling (e.g. flooding extents or shoreline impacts);

- Scoped field assessments or mapping carried out by Conservation Authority forces.

In addition to the characterization of natural hazards, Conservation Authorities are also responsible for providing public protection against imminent dangers (where possible) related to these hazards. Public protection may be provided through the following methods:

- Water control and flood warning programs;
- Maintenance of major dams and flood control channels;
- Monitoring of weather and flood conditions (a shared responsibility with other governments/agencies); and,
- Flood warning messages sent to emergency management officials and the media.

10.3.2 Role of Municipal Governments

The P.P.S. directs development away from natural hazards where there is an unacceptable risk to public health, safety and property, and to restrict development that could create new hazards or aggravate existing hazards. As such, municipalities are responsible for ensuring through their Official Plans that development is directed away from hazards to the extent deemed necessary; i.e., while the majority of development is prohibited in natural hazards, there are some exceptions as provided for in the P.P.S. Single-tier, upper tier and lower tier municipalities have the same responsibilities, although the level of mapping detail provided on natural hazards is typically greater in lower tier Official Plans.

As a foundation for future development within a watershed, the Region and municipalities are responsible for managing and protecting adjacent land uses from any natural hazards. To do so, planning policies must contribute to the refinement of natural hazard characterization at a regional/municipal level. Examples are listed below, and further description is provided in subsequent sections:

- Regional Official Plans;
- Local Official Plans;
- Secondary Plans;
- District Plans;
- Subdivision Plans;
- Zoning By-Laws; and
- Site Plans.

The refinement of natural hazard characterization is typically done in close consultation with the Conservation Authority. When new information about hazards is established, it is the Conservation Authority's responsibility to review the information against

previously completed studies and integrate this new information into their records for future use.

Municipalities also reinforce the role of the Conservation Authority through their Official Plans. This is achieved by restricting development, alteration, and the placing/removing of fill in natural hazard areas without the approval of the Conservation Authority. Where Secondary Plans or District Plans are prepared, these plans also typically contain detailed information on the location of natural hazards.

Where detailed and accurate information on a natural hazard is available, natural hazard areas are sometimes included in zoning by-laws as well. However, the boundaries of natural hazards shown on a zoning by-law schedule cannot be modified easily without going through a further planning process. As a result, there should be a high degree of confidence in the mapping before it should be included in zoning by-laws.

In addition to the above and as part of the development application process, municipalities typically require the applicant to document natural hazards on the site, the potential impact to these hazards, the potential impact from these hazard and proposed methods to overcome these impacts. In addition, any requirements or approvals of the Conservation Authority must be documented and implemented through the development application process. Municipalities also play an important role in securing open space setbacks to better provide protection against natural hazards. Typically, the need and requirements for the setbacks are determined in consultation with the Conservation Authority.

Municipalities may require the conveyance of hazard lands through the development process as a condition of an approval given under the Planning Act. Where public ownership cannot be achieved through conveyance, municipalities may secure the long-term protection of hazard lands through other means including easement agreements, land exchanges, long-term leases and encourage the establishment of private land trusts.

10.4 Best Management Practices for Identification of Natural Hazards

To determine precise natural hazard Regulation Limits, site specific studies must be undertaken to determine their full extent. Due to the highly variable and specific nature of areas of unstable soils, unstable bedrock, flooding and shoreline hazards, it can be difficult to provide detailed characterization as part of large-scale studies. Assessments included in watershed/subwatershed studies tend to only include high level, “generic” mapping for the entire watershed and provide insufficient detail for site scale planning.

In order to provide a detailed characterization of natural hazards, best management practices have been developed by various government agencies. A summary of best management practices for each of the natural hazard categories is included in Table 3.

Table 3. Summary of best management practices to identify natural hazards

Natural Hazard	Best Management Practices/ Guidance Documentation
Flooding	<ul style="list-style-type: none"> • M.N.R., 2002. Technical Guide – River & Stream Systems: Flooding Hazard Limit. • MOECC, 2017. Guide for Consideration of Climate Change in Environmental Assessment • Stream Corridors Project Management Team, 2001. Adaptive Management of Stream Corridors in Ontario
Shoreline	<ul style="list-style-type: none"> • M.N.R., 2001. Technical Guide for Great Lakes St. Lawrence River Shorelines, Flooding, Erosion and Dynamic Beaches • M.N.R., 1996. Technical Guide for Large Inland Lakes, Flooding, Erosion and Dynamic Beaches. • M.N.R., 1996. Technical Guide for Hazardous Sites. • M.N.R., 1996c. Technical Guide for Large Inland Lakes.
Erosion	<ul style="list-style-type: none"> • M.N.R., 2002. Technical Guide – River & Stream Systems: Erosion Hazard Limit. • Prent, M. & J. Parish, 2001. Belt Width Delineation Procedures.
Unstable Soils	<ul style="list-style-type: none"> • M.N.R., 1998. Geotechnical Principles for Stable Slope • M.N.R., 1996. Technical Guide for Hazardous Sites.
Unstable Bedrock (karst)	<ul style="list-style-type: none"> • M.N.R., 1996. Technical Guide for Hazardous Sites.
Wildland Fire	<ul style="list-style-type: none"> • None available; Wildland Fire Risk Assessment and Mitigation Reference Manual (M.N.R.F. 2016) provides general guidance

10.4.1 Natural Hazards as part of the Natural Environment System

Natural environment system planning includes the identification and protection of the natural heritage system and water resources system. The components of the natural environment systems as defined in provincial plans do not specifically include natural hazards (i.e., 'hazardous lands' and 'hazardous sites' such as flooding hazard, erosion hazard or dynamic beach hazard limits). However, the definition of 'natural heritage system' in the P.P.S. notes that N.H.S. "means a system made up of natural heritage features and areas [defined term] and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, ...". The definition of 'natural heritage system' in the P.P.S. also notes that in addition to the N.H.S. being "a system made up of natural heritage features and areas, and linkages", the system 'can' include

“areas that support hydrologic functions”. Although ‘hazards’ implies they have been identified due to the risk posed to human health and safety as well as to the risk posed to buildings, the features that make up the hazards have inherent functions as part of a natural environment system. As such, the underlined sections of the definition of N.H.S. could include natural hazards that:

- ‘provide connectivity’
- ‘support natural processes’
- ‘support hydrologic functions’
- maintain ‘natural functions’.

Therefore, natural hazards that could be considered as part of the N.H.S. include:

- floodplains, a ‘floodway’ or the ‘flooding hazard’ – along watercourses these areas could be used to identify linkages and ‘provide connectivity’ between other components of the N.H.S. (e.g., woodlands and wetlands).
- ‘Defined portions of the flooding hazard along’ the Niagara River
- ‘dynamic beach hazards’ along the Lake Ontario and Erie shorelines – where in a natural state, these shoreline areas provide ecological functions for the terrestrial-aquatic interface
- ‘erosion hazards’ – where in a natural state, these areas could also provide a linkage function between other components of the N.H.S.
- ‘hazardous sites’ – these could include areas of karst topography that are important for groundwater recharge (i.e., support hydrologic functions)

Comparative Examples

Halton Region

The Regional Natural Heritage System in Halton Region includes “the shoreline along Lake Ontario and Burlington Bay” (2018 consolidated version). In addition, the mapping exercise to develop the Regional N.H.S. used the floodplain mapping to inform the identification of linkages where a watercourse connected other components of the N.H.S. However, even in the absence of floodplain mapping, the policies of the Halton Official Plan include floodplains as part of the Regional Natural Heritage System. If these are determined through detailed planning processes such as Secondary Plans, the floodplains are included within local Official Plans by way of amendment.

In providing implementation tools to protect shorelines as part of the Regional N.H.S., section 118 (14)c states it is the policy of the Region to “encourage the Local Municipality to incorporate in their Zoning By-laws setback requirements for development along the shoreline of Lake Ontario and Burlington Bay”.

Waterloo Region

Waterloo Region OP includes Landscape Level Systems identified within the Greenlands Network (akin to an N.H.S.) that includes ‘Environmentally Sensitive Landscapes’. This designated component of the Greenlands Network as a number of

criteria that must be met, one of which may include ‘floodplains and associated hazard lands’. Notwithstanding that on their own ‘floodplains and associated hazard lands’ are not a component of the Greenlands Network, their role in identifying Environmentally Sensitive Landscapes recognizes the ecological/hydrological function and contribution of floodplains and hazard lands to the Greenlands System.

York Region

The York Region Official Plan identifies components of the Greenlands System (akin to an N.H.S.) which includes the shoreline of Lake Simcoe. Many watercourses and their associated floodplains (which are typically not mapped) are included within the Greenlands System. It should be noted that the Lake Simcoe Protection Plan (2009) protects the Lake Simcoe shoreline, including the requirement for a 30 m V.P.Z. for new development.

Region of Peel

Similar to other regions abutting the shoreline of Lake Ontario, shorelines have been included as an ‘element’ of the Greenlands System in Peel Region. Shorelines are also recognized as having a linkage function as part of the ‘natural corridor’ component of the Greenlands System. Many watercourses and their associated floodplains (which are typically not mapped) are also included within the Greenlands System.

10.4.2 Natural Hazards as part of the Water Resource System

The water resources system refers to key hydrologic features, key hydrologic areas, and their functions and also to the interconnected hydrological and ecological linkages and functions between groundwater and surface water components. With respect to water resource systems, policy 2.2.1 c) notes, “Planning authorities shall protect, improve or restore the quality and quantity of water by:” ... “identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed”. Natural hazards are either directly linked, or indirectly linked, to the water resources system in a similar manner as with the N.H.S. Specifically, the Water Resource System components include:

- Shoreline areas which are necessary for the ecological and hydrological integrity of the watershed
- Recharge/discharge areas
- Associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.

Therefore, similar considerations to including natural hazards as part of the Water Resource System would apply. Specific relationships between features and functions of the water resources system and natural hazards are described in Table 4.

Table 4. Relationship between water resource system and natural hazards.

Water Resources System	Relationship to Natural Hazards
Groundwater and Landforms: <ul style="list-style-type: none"> • Recharge areas (aquifer, permeable soils, etc.) • Water table • Discharge areas (seepage) • Karst 	Soils and bedrock play a role in the storage and flow of groundwater. Soil/bedrock mapping that is done to support the understanding of groundwater features should be coordinated with the delineation of unstable soils and unstable bedrock. Karst topography would support groundwater recharge areas in the W.R.S.
Surface Water and Shorelines: <ul style="list-style-type: none"> • Seepage areas • Springs • Watercourses (permanent, intermittent, ephemeral, headwater); • Watercourses: rivers, creeks, streams, drains • Open bodies of water (ponds, reservoirs and their littoral) • Inland lakes and Great Lakes, and their littoral zones 	Surface water features such as watercourses and lakes are directly linked to the establishment of natural hazards, including flooding, shoreline hazards and erosion. The limit of the natural hazards is often associated with the limit of the surface water features. Therefore, any mapping or analyses that is done to support the understanding of surface water features should be coordinated with the mapping of related natural hazards.

While the M.N.R.F. (2002) has identified general guidance for the delineation of natural hazards, study is needed to define the actual hazard limits and therefore is at a more detailed scale than typical for Regional Planning. As a linked component of the water resource system, high level mapping and identification of potential natural hazards may be considered for inclusion in the Region's Water Resource System. That is, based on available information from other sources, areas of known, or potential, hazards could be mapped (e.g., karst, shorelines). In other cases, high level delineation of riverine erosion hazards, or unstable slopes, can be mapped using GIS analyses, and guidance provided in M.N.R. (2002).

10.4.3 Sources for Natural Hazard Info/mapping

Several sources exist that support the characterization and mapping of natural hazards including:

- Land Information Ontario (LIO) – primary, secondary, tertiary, and quaternary watersheds, elevation models, lidar information;
- Ontario Flow Assessment Tool (OFAT) – create watershed maps, characterize the watershed, estimate stream flows;
- M.N.R.F. Arc Hydro Quaternary Watersheds
- Conservation authority watershed and subwatershed mapping, publications, and GIS files;

- Source protection assessment reports and Water Budgets prepared as part of source protection planning;
- Existing watershed plans, subwatershed plans, water and wastewater masterplans, stormwater master plans, environmental impact studies, sustainability plans, etc.;
- Ontario Geological Survey; and
- Provincial mapping – ministry of energy, northern development and mines, surficial geology mapping, bedrock geology mapping, etc.

10.5 Relevance to the New Niagara Official Plan

Given the above discussion, natural hazards may be considered for inclusion as part of the natural environment system where the hazards provide connectivity between other components of the natural environment system, support natural processes, support hydrologic functions, or maintain natural functions.

However, there may be limited ability to include natural hazards within the new Niagara Official Plan mapping, primarily because the boundaries of natural hazards can often only be determined on a case-by-case basis. That said, some municipalities do include lands below the stable top of bank within a Hazard Lands designation, use floodplains to identify linkages, and generally map the shoreline of lakes.

In order to ensure that the N.O.P. is consistent with the P.P.S. and its policies on natural hazards, the N.O.P. does have to specifically prohibit development and site alteration in accordance with Section 3.1.1, 3.1.2, and 3.1.4 to 3.1.7. Each of the terms defined in these sections also need to be defined in the R.O.P. This policy framework also needs to be implemented in local Official Plans as well.

Further considerations include the following:

- The new Niagara Official Plan will need to provide policies for the regulation of natural hazards that are consistent with provincial direction and support Niagara Peninsula Conservation Authority's role in regulating natural hazards
- The N.O.P. will need to include Water Resource System mapping that includes at a minimum shoreline areas, and may include high level identification of other potential natural hazard areas.
- The N.O.P. may provide additional clarification regarding the responsibility of lower tier municipalities to require natural hazard assessment and delineation as part of a development application.
- The extent and location of Natural Hazards may be defined and identified in municipal Zoning By-laws in consultation with the Conservation Authority (and any other applicable agencies). When more detailed mapping becomes available, the Municipality would be responsible for amending the Zoning By-law.
- The N.O.P. could include direction for the coordination and update of natural hazard mapping within the Region, based on any technical studies completed.

- The Region will need to include policies consistent with policy 3.1.8 of the 2014 P.P.S. related to wildland fires
- Region should determine the merits of undertaking a municipal-wide wildland fire assessment as per the Wildland Fire Risk Assessment and Mitigation Reference Manual
- The Region should determine if there is a need to develop a dataset that provides a more accurate representation of wildland fire hazards than the coarse province-wide generalized wildland fire hazard dataset
- Consider how implementation of wildland fire policies should be achieved through zoning by-laws and site-specific applications, as well as other municipal planning tools (e.g., guidelines)

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11.0 Offsetting

11.1 Preamble

There is a recent and controversial history related to the concept of offsetting in Niagara. As a result of this, during early consultation on the Natural Environment Work Program there were many questions on the topic. Stakeholders requested more information about the concept, and clarification on its application in land use planning in Ontario. To that end, it was identified as a topic for specific inclusion in this Background Study. The following discussion is not intended to take a position on offsetting and related concepts, rather it is intended to provide a review of the topic to better inform the Region, its partners, stakeholders, and the public.

11.2 Introduction

Offsetting, conservation offsetting, ecological offsetting, and biodiversity offsetting are all terms used to describe the positive actions that are taken to address the partial or whole loss of environmental features or ecological functions resulting from site alteration with the goal of achieving an equal or greater gain in natural feature area and/or ecological function. Typically, an action that replaces a portion or entirety of a feature and its ecological functions without gain or loss is analogous to “no net loss”, while achieving an enhancement or gain in area and/or ecological function is analogous to “net gain”.

Offsetting differs from other forms of replacement or compensation in that it is predetermined and approved through a site-specific study. While replacement or compensation for individual trees is commonly required as part of municipal tree by laws (whether through a permitting process or a result of an infraction), the requirement to offset impacts to a feature or ecological function as an approach to achieve no net loss or a net gain has until recently not been an accepted approach in Ontario municipal planning. Although there has been increased debate regarding the risks and potential benefits to including offsetting as an approach to address impacts as part of the planning process it is not a recognized approach in municipal planning – currently, the P.P.S. and Provincial Plans do not address offsetting.

11.2.1 A Note on the P.P.S. and the Test of ‘No Negative Impact’

The P.P.S. provides direction for the ‘wise use and management of resources’ including a requirement that “natural features and areas shall be protected for the long term” (policy 2.1.1). While development is not permitted in significant wetlands (including significant coastal wetlands), it may be considered in other natural features/areas in Niagara Region (significant woodlands, significant valleylands, significant wildlife habitat, significant A.N.S.I.s) and on adjacent lands, where it has been demonstrated that there will be ‘no negative impacts’ on the natural features or their ecological functions. Negative impacts are defined in the P.P.S. as:

- “b) in regard to policy 2.2, degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development or site alteration activities;
- c) in regard to fish habitat, any permanent alteration to, or destruction of fish habitat, except where, in conjunction with the appropriate authorities, it has been authorized under the Fisheries Act; and
- d) in regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities.”

Meeting the test of no ‘negative impact’ recognizes that development may occur within a feature resulting in impacts, so long as those impacts are not considered ‘negative impacts’ as defined by the P.P.S. The determination of no negative impact requires a fulsome examination and science-based approach to evaluating potential impacts and determining if mitigation can avoid ‘negative impacts’. If the test of no negative impact can be met through avoidance and mitigation, the development conforms to the policy requiring the demonstration of no negative impact.

Section 13.2 (p 119) of the Natural Heritage Reference Manual (M.N.R.F. 2010) provides some guidance on the interpretation of “negative impact” as follows:

“The P.P.S. definition for “negative impacts” does not state that all impacts are negative, nor does it preclude the use of mitigation to prevent, modify or alleviate the impacts to the significant natural heritage feature or area. For example, demonstration of no negative impacts on a significant woodland through mitigation measures may be contemplated, provided that factors such as the successional status and replaceability of the woodland components and functions within a reasonable time frame (e.g., 20 years) are considered”.

Although the Natural Heritage Reference Manual provides an example where replacing a component and associated functions of a woodland can be considered a form of mitigation, this approach is generally not applied to mature or complex features due to the difficulty in replacing the features (e.g., trees, associated plant species, soil ecosystem, moisture regime, etc.) and ecological functions (e.g., wildlife habitat, nutrient and water cycling) in a reasonable timeframe, and with a high level of certainty that the feature and functions can actually be replaced.

11.3 Literature Review of Provincial Documents and Best Practices for Offsetting

Offsetting may represent an opportunity to increase natural area cover (if a net-gain is required) when partial or entire removal of a feature is deemed necessary as part of an

approved development application or an Environmental Assessment; however, there are serious concerns that existing protections may be undermined as a result of:

- poorly written policies or regulations;
- incorrect interpretation; and/or
- lack of enforcement of the policies or regulations

This may result in either further reduction in area or loss of functions that could not be replicated (at least in the foreseeable future as a result of the lag time for more complex ecosystems to develop). For example, the United States has been permitting wetland offsetting for over 30 years, yet it has not been demonstrated that the goal of achieving no net loss has been successful overall (Gardner 2003). It has been reported that the lack of success is in part due to weak performance standards, insufficient monitoring, and a lack of enforcement and long-term maintenance (Gardner 2003).

The following provides an overview of documents from the Province of Ontario and other best practice documents related to offsetting. The three provincial documents reviewed focus on wetlands; however, the concepts and considerations are applicable to offsetting in general.

11.3.1 Provincial Documents

A Wetland Conservation Strategy for Ontario 2017–2030' (2017)

As part of the Provinces 'A Wetland Conservation Strategy for Ontario 2017–2030' (2017) an offsetting approach was proposed, the intent of which was to prevent the net loss of wetlands in Ontario. This approach is being considered by the Province as one of the mechanisms that can be applied to compensate for the removal of wetlands to permit development, through "the intentional restoration or creation of new wetlands." However, the Wetland Conservation Strategy document makes it clear that this offsetting approach is not intended to reduce protections that are included in the P.P.S. that prohibit development and site alteration in Provincially significant wetlands.

This strategy, produced by the Province, includes a section titled "Action 2: Creating No Net Loss Policy for Ontario's Wetlands". The purpose of this section is to explain what is meant by offsetting, introduce the rationale for a 'no net loss policy for wetlands' and propose a set of considerations for the development of these policies. This section notes that:

"This type of policy is typically set within a mitigation hierarchy and involves the hierarchical progression of alternatives, including avoidance of impacts, minimization or mitigation of unavoidable impacts and offsetting of impacts that cannot be avoided. The Ontario government remains committed to offsetting only being used as a last resort."

The following key considerations have been provided for the development of the no net loss policy for wetlands:

- Providing provincial oversight to improve conservation outcomes, while not reducing protection for those wetlands already protected by existing policy (e.g., provincially significant wetlands, coastal wetlands protected by the P.P.S., 2014).
- Understanding the types of land or resource use that would be subject to a wetland offsetting policy. This includes consideration of local and regional issues affecting wetlands, the variety of existing land use planning frameworks in the province, other permitting requirements and the need for compliance.
- Defining wetland functions and identifying the types of wetlands and functions that can or cannot be offset. Some sites, features and habitats will be ineligible for offsetting based on their status (i.e., provincially significant wetlands, coastal wetlands protected by the P.P.S., 2014), their vulnerability, or their irreplaceability (i.e., bogs and fens).
- Understanding and establishing equivalence or greater in offsetting, in particular, replacement of both area and function of the wetland.
- Determining/identifying the location of the wetland offset, including its proximity to the negative impact and its landscape context (e.g., within a subwatershed/watershed), and selecting a site where restoration success is optimized and will result in an improvement in ecosystem services.
- Confirming that wetland losses in the south should not be offset by gains in the north.
- Determining the duration of wetland offsets. This may be based on the duration of the negative impacts of the development project or require wetlands to be secured in perpetuity.
- Developing appropriate policy mechanisms for implementation.
- Identifying clear roles and responsibilities for implementation.
- Reviewing long-term results of wetland offsetting and restoration projects as well as the lessons learned from other jurisdictions.
- Establishing monitoring requirements to ensure that wetland functions are restored.

Considerations for the Development of a Wetland Offsetting Policy for Ontario: A Report of the Wetland Conservation Strategy Advisory Panel (2018)

This report was prepared by the Wetland Conservation Strategy Advisory Panel (The Panel) to inform the development of a wetland offsetting policy as a component of a mitigation sequence in Ontario. This report includes more than 30 recommendations for the development of a wetland offsetting policy, with an emphasis on prevention: “that offsetting should only be considered when the requirements for avoidance, minimization and mitigation have been met”.

This report acknowledges that approvals for activities that result in wetland impacts fall under a variety of statutes, regulations and policies; however, it was strongly recommended that the mitigation sequence, including the offsetting policy should be embedded across a wider range of legislation, regulations, and policy. The intent is to

broaden the application of, and adherence to the mitigation sequence and ensure the ability to impose meaningful restrictions and sanctions.

The recommendations acknowledge the need for the development of detailed technical guidance on specific elements of implementation, including:

- roles and responsibilities
- wetland evaluation
- offset ratios
- the size and location of offsets.

Consistent with 'A Wetland Conservation Strategy for Ontario', this report acknowledges that there are limits to offsetting: "that some wetlands should not be eligible for offsets because of their vulnerability and/or irreplaceability". It is recommended that the wetland offsetting policy and any associated regulations should clearly articulate these limits and be supported by technical guidance for implementation. Furthermore, it is acknowledged that location is an important consideration in offsetting: "Wetlands are far more abundant, and often have different hydrological and ecological characteristics in northern Ontario than in southern Ontario. For that reason, wetland losses in the south should not be offset by gains in the north, and vice versa."

In regard to policy considerations, it is noted that a variety of activities, approved under a number of different statutes and other policy instruments, can result in impacts to wetlands, including but not limited to linear infrastructure, urban development, agriculture, and water level manipulations. This report recommends that policies include the requirement to offset wetland loss and implement the full mitigation sequence. Implementation mechanisms to support offsetting could be considered, such as conservation banking that provides for the opportunity to have an offset in place before an impact occurs. This report acknowledges the concerns associated with time lags, the difficulty of demonstrating net gain, and challenges associated with program tracking and information management.

Navigating the Swamp: Lessons on Wetland Offsetting for Ontario (2017)

This report produced by Ontario Nature (Poulton and Bell 2017) reviews the issue of wetland offsetting as it follows from the Ontario governments proposed wetland offsetting policy. Although not strictly prepared as a best practices document, this report provides a review of the successes and failures of wetland offsetting by reviewing relevant laws and policies in the United States and Canada, including Alberta, New Brunswick, Nova Scotia, Quebec, Saskatchewan, British Columbia, and Newfoundland and Labrador. Further, the lessons learned from the United States, where offsetting has been practiced for over 30 years, are reviewed in this report.

A set of 22 recommendations are provided as they related to the Provinces proposed wetland offsetting policy. A selection of these recommendations is briefly summarized under the following headings:

- Governance: administration, oversight, enforcement and evaluation
 - Clear roles and responsibilities of Province
 - Clear and measurable performance standards
 - Need sufficient funds and resources to oversee offsetting program
 - Independent review/audit of wetland offsetting program
- Indigenous Peoples
 - Consistent and respectful of treaty rights
 - Engagement, consultation and consent
- Types of land use to be covered by offsetting policy
 - Wetland offsetting policies should apply to all key drivers of wetland loss, including infrastructure and drainage works
 - Work with the agricultural communities recognizing their role in wetland stewardship and protection
- Limits to offsetting
 - Ensure Provincially Significant Wetlands and Significant Coastal Wetlands remain protected to the fullest extent possible
 - Recognize the irreplaceability of some types of wetlands (e.g., complex ecology, cultural significance to Indigenous peoples)
- Policy goal: net gain
 - The goal should be a net gain (rather than no net loss) of extent, quality of habitat, ecological function and Indigenous cultural values
- Replacement (multiplier) ratios
 - Replacement ratios should be based on achieving a net gain, exceeding the corresponding losses (size, function, Indigenous cultural values), accounting for uncertainty, and recognizing time lags.
- Establishing equivalence
 - Take into account quantity (area), quality (functions, biodiversity), contribution to the wider landscape, and social and economic values
- Mitigation sequence
 - Offsetting should be the last step within a clear mitigation sequence
 - Thresholds should be established for avoidance and mitigation, with all alternatives considered before moving to offsetting
 - Include Indigenous consultation and consider Indigenous Traditional Knowledge as part of decision making
- Location of offsets
 - Consider landscape context, conservation outcomes, Indigenous cultural values, potential for long-term success and viability
- Duration of offsets
 - Replacement feature should be in place and functioning before the impact occurs, and the replacement feature should last in perpetuity without the need for continued intervention and management
- Wetland protection or averted loss
 - for an action to count as an offset, the gains must be additional to those that would have occurred if there had not been an offset

- Conservation Banking
 - Province should provide direction on wetland banking, within input from Indigenous communities, municipalities and stakeholders

11.3.2 International Documents

I.U.C.N. 2016 Policy on Biodiversity Offsets (2016)

The International Union for Conservation of Nature (I.U.C.N.) prepared a document titled, 'I.U.C.N. Policy on Biodiversity Offsets' to "provide a framework to guide the design, implementation and governance of biodiversity offset schemes and projects. The policy provides guidance as to where offsets are, and are not, an appropriate conservation tool to ensure that, when offset schemes are used, they lead to positive conservation outcomes compared to business as usual and, thus, minimize the risk of negative conservation outcomes" (I.U.C.N. 2016).

The I.U.C.N. policy statement provides the I.U.C.N.'s position on biodiversity offsetting:

"Under the specific conditions outlined in this policy, it is I.U.C.N.'s position that biodiversity offsets can contribute to positive conservation outcomes. However, biodiversity offsets are only appropriate for projects which have rigorously applied the mitigation hierarchy (avoid, minimise, restore/rehabilitate and offset; see section 6) and when a full set of alternatives to the project have been considered.

The I.U.C.N. policy provides the following fundamental principles in regard to the mitigation hierarchy:

1. Be applied as early as possible in the project life cycle, to inform potential development decisions.
2. Explicitly consider the project within a broader landscape or seascape context.
3. Identify and respect nationally and internationally recognized "no-go" areas.
4. Thoroughly examine lower impact alternatives in the project design, including not proceeding with the project at all, recognising that not all impacts can be offset to achieve No Net Loss.
5. Give priority to avoiding any damage to biodiversity.
6. Take full account of direct, indirect and cumulative impacts, geographically and over time.
7. Clearly distinguish impact avoidance, minimisation and on-site restoration measures from offsets.
8. Design offsets to achieve at least no net loss and preferably a net gain of biodiversity.
9. Ensure any biodiversity offsets used as part of the mitigation hierarchy secure additional conservation outcomes that would not have happened otherwise.
10. Use approaches that are science-based, transparent, participatory, and address the effects of the project and mitigation actions on livelihoods.

11. Follow a Rights-based Approach, as defined by I.U.C.N. resolution WCC-2012-Res-099.
12. Identify and put in place the legal, institutional and financial measures needed to ensure long-term governance of all mitigation actions (including any biodiversity offsets).
13. Apply a rigorous monitoring, evaluation and enforcement system that includes independent verification of all mitigation actions.
14. Apply the Precautionary principle throughout all stages of the mitigation hierarchy.
15. Apply the Ecosystem approach in all stages of the mitigation hierarchy.

Biodiversity Offsets: A User Guide (2016)

The World Bank Group prepared a user guide to biodiversity offsetting in 2016 to provide guidance for when and how to prepare and implement biodiversity offsetting for large-scale, private and public sector development projects. This document recognizes the importance of the mitigation hierarchy when considering using offsetting. Core principles of offsetting are reviewed, including:

- additionality – achieving a net gain
- equivalence - same functions must be provided in replacement feature
- permanence – feature to persist in perpetuity (i.e., not subject to future removal)

This guide also recognizes the limits to what can be offset. Generally, complex and more mature features (e.g., fen, bog, slough forest in the Niagara context) are irreplaceable, especially when considering the timeframe that is required to replace the ecological functions (e.g., soil biotic and abiotic interactions, and wildlife habitat).

11.4 Examples of Offsetting/Compensation Approaches in Ontario

Requiring compensation for impacts is not a new practice in the planning framework in Ontario. Some municipalities require, through tree by-laws for example, the compensation for tree removal (e.g. 3:1 compensation ratio in the City of Guelph, Bylaw #2010-19058). However, the approach to the removal or loss of portions or entire features by permitting compensation or offsetting has not been regularly applied in Ontario planning. Currently, the P.P.S. and Provincial Plans do not address offsetting, and offsetting is not permitted to be used to meet the test of 'no negative impacts' as required by the P.P.S.

The following provides three examples of where an offsetting/compensation approach is used in Ontario: two from Conservation Authorities and one from a municipality.

11.4.1 Lake Simcoe Region Conservation Authority - Ecological Offsetting Plan

Recently, the Lake Simcoe Region Conservation Authority has developed an ‘Ecological Offsetting Plan’ (2017) that provides guidance for compensation where development proposals will result in the loss of wetland and/or woodland natural heritage features, having first followed a mitigation hierarchy. This Ecological Offsetting Plan also provides guidance for replacement ratios, exceptions, and limitations to offsetting. Prior to the approval of a development application that proposes compensation for the loss of a wetland or woodland, several conditions must be satisfied through an approved study (e.g. Environmental Impact Study, Natural Heritage Evaluation):

- Demonstrate conformity with applicable provincial, regional and local plans, including the Oak Ridges Moraine Conservation Plan, Greenbelt Plan, Lake Simcoe Protection Plan, and Official Plans
- Satisfy the “no negative impact test” for the loss of natural heritage feature to ensure consistency with the Provincial Policy Statement (P.P.S.)
- Assess the impacts to natural heritage features such as wetlands, woodlands, and watercourses, as well as their associated vegetation protection zones
- Demonstrate that the mitigation hierarchy steps of avoiding, minimizing and mitigating have been followed and that compensation is the only viable option to address impacts to natural heritage features
- Include a preliminary Ecological Offsetting Strategy (E.O.S.) that describes, in concept, how the loss of natural heritage feature will be compensated for. This would include identifying the feature to be removed, location where it will be replaced and general principles for feature creation

11.4.2 Toronto and Region Conservation Authority - Guideline for Determining Ecosystem Compensation

The Toronto and Region Conservation Authority (T.R.C.A.) has recently developed the ‘Guideline for Determining Ecosystem Compensation’ in 2018 to be used as a tool to help ensure that the “critical ecosystem functions and services lost through development and infrastructure are restored back on the landscape for the betterment of communities” (T.R.C.A. 2018). This guideline was prepared as the T.R.C.A. recognized that impacts to natural features, in specific circumstances where avoidance and mitigation were not feasible, was permitted through the planning and development process, as stated in Section 7.4.2 of The Living City Policies:

“...if a natural feature itself cannot be protected, T.R.C.A. may recommend compensation. However, compensation is a management tool that should only be used as a “last resort”, being an option only where federal, provincial and municipal requirements do not protect the feature, and only after all other options for protecting the feature have been evaluated.

T.R.C.A. will always advocate first for the protection of natural features and the full natural system. However, when the planning or environmental assessment approval processes permit losses to the natural system, compensation can be a mechanism for replicating ecosystem services.”

Further, policy 7.4.2.1 in The Living City Policies document states:

“It is the policy of T.R.C.A.:

- c) To recommend that when development or infrastructure cannot fully protect a natural feature or any other component of the Natural System, compensation for lost ecosystem services be provided.
- d) To recommend that the decision to pursue compensation referred to in policy 7.4.2.1 (c) be subject to:
 - i. the Natural System not being protected by any other applicable federal, provincial, or municipal requirement(s);
 - ii. all other efforts to protect the Natural System being exhausted first;
 - iii. it taking place in consultation with the municipality and the landowner;
 - iv. it taking place at the appropriate level of the planning and development process for maximizing options for enhancement to the Natural System, e.g. M.E.S.P, Environmental Assessment.”

Further direction is provided for in the Living City Policies, as follows:

“Compensation should:

- Only be considered once the protection hierarchy has been applied – avoid/minimize/mitigate first;
- Where feasible, take place in proximity to where the loss occurs;
- Be informed by current knowledge of T.R.C.A.’s ecosystems and watershed strategies and any applicable municipal strategies;
- Strive for no loss of ecosystem services;
- Be carried out in a transparent and timely manner;
- Be based on an adaptive management approach incorporating monitoring and evaluation, where appropriate.”

The T.R.C.A. compensation guidelines provide direction through the following sections:

- Introduction
 - Purpose and scope of the guidelines
 - Role of municipalities, T.R.C.A., and proponents in compensation planning
 - Applicability of the guideline
 - Principles of the guideline
- Components of a compensation project
 - Replicating ecosystem structure

- Reviews compensation ratios based on size, age and lag time for replacement
- Replicating the land base
 - Reviews compensation as cash-in-lieu
 - Land base and municipal infrastructure projects
- Application of compensation
 - Agreements
 - Public agencies as proponents
 - Implementation of the compensation project
 - Considerations for location and siting
 - Considerations for monitoring and maintenance
 - Documenting the compensation project
- T.R.C.A. Strategic Restoration Implementation
- Appendices
 - Restoration Typicals
 - Calculating Basal Area
 - Individual Tree Replacement Table
 - Compensation Examples

11.4.3 City of Markham Official Plan (2013) – Policy 2.1.3.17

The City of Markham policy 3.1.2.17 states that it is the policy of Council to “increase the quantity and quality of woodlands in Markham by protecting and enhancing”:

- a) Significant woodlands...
- b) Other woodlands and their vegetation protection zones by:
 - i. Prohibiting development, redevelopment and site alteration on woodlands and their vegetation protection zones except where all of the following requirements are met:
 - The woodlands are not connected to the Greenway System;
 - There is a significant net gain in woodland cover demonstrated through a woodland compensation plan [underline added for emphasis] as described in Section 3.1.2.18;
 - Impact to the woodlands is unavoidable;
 - The woodland is determined through an environmental impact study, natural heritage evaluation or equivalent to be a cultural or regenerating woodland and not suitable for restoration and rehabilitation;”

Section 3.1.2.18 goes on to state “that a woodland compensation plan shall address woodland restoration in the following areas:

- a) Natural Heritage Network Enhancement Lands; and
- b) Areas adjacent to existing key natural heritage features and key hydrological features.

Woodland compensation will no be accepted in areas that already meet the definition of woodland or within key natural heritage features or key hydrologic features or their vegetation protection zones.”

Currently the City of Markham does not have a Compensation Protocol, however it is noted in Section 3.1.1.4 of the Official Plan that it is the policy of Council to “prepare a Natural Heritage Compensation Protocol to address compensation for the removal of natural heritage and hydrologic features identified for removal in appropriate studies”.

11.5 Niagara Peninsula Conservation Authority Policy Document

The current N.P.C.A. Policy Document ‘Policies for the Administration of Ontario Regulation 155/06 and the Planning Act’ (September 2018) addresses offsetting and compensation as it relates to wetlands in the watershed through policies 8.2.2.7 and 8.2.2.8 which state:

8.2.2.7 Wetland Reconfiguration and Compensation Context

At the time of drafting the policies of this Document, the Province of Ontario was undertaking a review of its wetland policy framework. The N.P.C.A. will continue to monitor the provincial policy framework for wetlands and update the policies of this section based on guidance provided by the Province. Note that N.P.C.A.’s existing policy framework for wetlands includes policy guidance for the reconfiguration of non-provincially significant wetlands (see Policy 8.2.2.8 for details).

8.2.2.8 Wetland Reconfiguration and Compensation for Non-Provincially Significant Wetlands

Where no reasonable alternative exists to locate a proposed development, site alteration or other activity outside of a non-provincially significant wetland (or adjacent land), the N.P.C.A. may require that an area of wetland be created to offset the disturbance that is greater than (in area and function) the area of wetland and adjacent land being disturbed. Any required wetland creation should be located in proximity to the area disturbed (at a minimum within the same watershed) or in an area to be determined by the Authority. All wetlands created under this policy will be added to the N.P.C.A. regulated area and identified on appropriate screening maps. The Authority may permit the reconfiguration of wetland boundaries provided:

- a) The wetland has been evaluated in accordance with OWES Protocol and approved by the M.N.R.F.;
- b) The wetland (as evaluated in (a) above) is not a Provincially Significant Wetland under the OWES Protocol to the satisfaction of the M.N.R.F.;
- c) The reconfigured wetland and proposed development will not have a negative impact on any species of concern, significant habitat types or species at risk;
- d) The reconfigured wetland and proposed development will not have a negative impact on the hydrological or ecological function of the wetland;

- e) A restoration plan for the reconfigured wetland is provided for review and approval;
- f) A multi-year monitoring program is required (minimum five years) to ensure the long-term establishment of the reconfigured wetland;
- g) A security deposit in an amount approved by the N.P.C.A. to establish the reconfigured wetland and ensure its establishment;
- h) An E.I.S. is provided for review and approval to demonstrate conformity with Section 8.2.2.8;
- i) The applicant is required to enter into a restoration agreement with the N.P.C.A. that will be registered on the title of the property containing the reconfigured wetland that will provide the necessary details to implement Section 8.2.2.8; and
- j) Additional information, such as an E.I.S., hydrologic study, restoration plan and or other studies as required depending on site-specific characteristics.

It should be noted that it is understood that these policies are currently under review by the N.P.C.A. Board and Staff.

11.6 Summary of Findings

Based on the above review, the following is a summary of the key findings:

- Offsetting is generally defined as the positive actions that are taken to address the partial or whole loss of environmental features or ecological functions resulting from site alteration with the goal of achieving an equal (i.e., no net loss) or greater gain (i.e., net gain) in area of natural feature and/or ecological function
- Currently, the P.P.S. and Provincial plans do not address offsetting
- Offsetting is not considered an approach to be used to meet the test of 'no negative impacts'
- Concerns remain about the use of offsetting due to poorly written policies, incorrect interpretation/application, and/or lack of enforcement of policies or regulations. Furthermore, offsetting has not proven to be successful in the United States at achieving the goal of 'no net loss' as a result of:
 - Weak performance standards
 - Insufficient monitoring
 - Lack of enforcement and long-term maintenance
- Following a mitigation hierarchy is critical when deciding if offsetting is appropriate: a mitigation hierarchy involves the hierarchical progression of alternatives, including avoidance of impacts, minimization or mitigation of unavoidable impacts and offsetting of impacts that cannot be avoided, where offsetting is considered a last resort
- Not all features can or should be considered for offsetting. The more complex a feature, there is a higher risk of not achieving a no-net loss or even net gain. The irreplaceability of some types of features should be acknowledged.
- Key findings from the review of background information include:

- Need for strong policies, governance, oversight, monitoring and enforcement
- consultation is critical to information decisions on offsetting
- recognize limits to offsetting
- goal should be net gain rather than no net loss with consideration of size, ecological function and replacement ratios
- mitigation hierarchy
- Several conservation authorities in Ontario have policies and guidelines which contemplate compensation/offsetting. In general, they were developed in response to the development approvals system, particularly for impacts identified through an Environmental Assessment or Environmental Impact Study, which in some cases allow impacts to natural features.
- The current N.P.C.A. policy document in some cases does permit a compensation approach for wetlands which are not considered to be 'provincially-significant'. It is however understood that this policy is currently under review by the N.P.C.A. Board and Staff.

11.7 Relevance to the New Niagara Official Plan

While there is guidance for using offsetting as a planning tool to ensure a net gain (or at least no net loss) is achieved, there remain challenges and concerns with demonstrating success of offsetting and the extent to which offsetting should be considered an appropriate tool in municipal environmental planning. Currently, the P.P.S. and Provincial plans do not address offsetting. As it relates to development, where permitted within a feature, there is a requirement to demonstrate no negative impact (which does not consider the approach of offsetting); beyond that, there currently are no requirements for offsetting or compensation resulting from the removal of part or whole of a feature. In addition, where essential infrastructure is approved through an Environmental Assessment, policies and regulations do not require compensation for the removal of natural environment features. If offsetting is contemplated as an appropriate approach to achieve the goals and objectives for the natural environment through the Official Plan, it is critical that it be applied only after following the mitigation hierarchy and evaluating all alternatives; policies regarding offsetting must clearly articulate when and where offsetting can be considered, with guidance based on best practices and lessons learned from other public agencies to ensure the goals and objectives for natural environment protection are achieved.

12.0 Woodlands

12.1 Definition of Woodlands

The 2014 P.P.S. definition of woodland is as follows:

Woodland means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels. Woodlands may be delineated according to the Forestry Act definition or the Province's Ecological Land Classification system definition for "forest".

The current Niagara Region Official Plan (2014 consolidated version) includes a similar definition as the first part of the P.P.S., and distinguishes 'natural woodlands' from planted and managed stands of trees, as follows:

Woodland means a treed area that provides environmental and economic benefits to both the private landowner and the general public such as erosion prevention, hydrologic and nutrient cycling, provision of clean air and long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities and the sustainable harvest of woodland products. [The following sentence differs from the definition of woodland in the P.P.S.] It does not include a cultivated fruit or nut orchard or a plantation used for the purpose of producing Christmas trees.

The last sentence is also used verbatim in the City of Hamilton's Official Plan (2013). The last sentence in this definition recognizes that some treed areas are planted and managed as an economic resource rather than for their environmental benefits (although they do provide them) and the management of these treed orchards and plantations should not be restricted from normal management practices. It should be recognized however, that unmanaged plantations, including abandoned Christmas tree farms, will begin to naturalize and provide increased ecological functions. Where these plantations are no longer managed with thinning or harvesting according to conventional silvicultural practices, these woodlands will naturalize and may be considered as a natural environment feature worthy of inclusion in the natural environment system. This has been recognized in the definition of "plantation" in the Oak Ridges Moraine Conservation Plan Technical Paper 7 – Identification and Protection of Significant Woodlands (M.M.A.H. 2007) and as follows from the City of Guelph's Official Plan (2018 consolidated version):

“Plantations means where tree cover is greater than 60% and dominated by canopy trees that have been planted:

- i) managed for production of fruits, nuts, Christmas trees or nursery stock; or
- ii) managed for tree products with an average rotation of less than 20 years (e.g. hybrid willow or poplar); or
- iii) established and continuously managed for the sole purpose of tree removal at rotation, as demonstrated with documentation acceptable to the planning authority or the M.N.R., without a forest restoration objective.”

Therefore, those plantations or orchards that are no longer managed as described in the definition for plantations, would be considered a woodland.

The *Forest Act* definition of woodlands is as follows:

“means “land with at least, (a) 1,000 trees, of any size, per hectare, (b) 750 trees, measuring over five centimetres in diameter, per hectare, (c) 500 trees, measuring over 12 centimetres in diameter, per hectare, or (d) 250 trees, measuring over 20 centimetres in diameter, per hectare, but does not include a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees.”

Ecological Land Classification (E.L.C.) for Southern Ontario (Lee et. al. 1998) defines woodlands based on the absolute cover of trees, where woodlands are defined as treed areas that have an absolute cover between 35% and 60% and forests have an absolute cover of at least 60%. The classification of forest in E.L.C. is comparable to the definition of woodland from the Forestry Act, which is based on tree density and size. Treed areas meeting the tree size and density criteria for woodlands would have an absolute cover of trees over 60%. In instances where it is not possible to measure the sizes and count the numbers of trees per hectare (e.g., orthoimage interpretation) absolute tree cover is considered an appropriate approach. This is consistent with the Oak Ridges Moraine Conservation Plan Technical Paper 7 – Identification and Protection of Significant Woodlands (OMAH 2002) and the Greenbelt Plan Technical Definitions and Criteria for Key Natural Heritage Features (OM.N.R. 2012), both which consider woodlands to have an absolute cover of at least 60%.

12.1.1 Other woodlands

Some municipal OPs differentiate between significant woodlands and ‘other’ woodlands as not to discount the role of non-significant woodlands in providing an ecological function. The Region of York OP (2016 consolidated version) includes a category of other woodlands referred to as ‘Cultural and Regenerating Woodlands’, which are defined as:

“For the purpose of policy 2.2.48, woodlands where the ecological functions of the site are substantially compromised as a result of prior land use activity and would be difficult to restore and/or manage as a native woodland in an urban

setting. An environmental impact study should assess these ecological functions with consideration of the following:

- the woodland is regenerating, typically with a dominant proportion of woody species being invasive and non-native (e.g., Norway Maple, Manitoba Maple, Siberian Elm, Scots Pine, European Buckthorn, White Mulberry, Tree-of-heaven, Apple, White Poplar, etc.)
- the area was not treed approximately 20 to 25 years ago as determined through air photo interpretation or other suitable technique
- soils may be degraded, for example, soil may be compacted, the topsoil removed, or there may be substantial erosion from over-use and/or the woodland may be regenerating on fill
- there is limited ability to maintain or restore self-sustaining ecological functions typical of native woodlands

Woodlands (including plantations) established and/or managed for the purpose of restoring a native tree community are excluded from cultural and regenerating woodlands (e.g. naturalization or restoration projects)."

Where woodlands area identified as Cultural and Regenerating Woodlands, policy 2.2.49 provides guidance for allowing development in part or whole of the feature, provided a compensation plan is prepared to the satisfaction of the Region, conservation authority and local municipality, and that the compensation plan demonstrates a net gain in woodland area is achieved.

The City of Guelph's OP (2018 consolidated version) notes in policy 4.1.1.4 that the N.H.S. consists of Significant Natural Areas (including Ecological Linkages), Natural Areas, and Wildlife Crossings. Natural Areas including 'cultural woodlands', which are defined as follows:

"a woodland with tree cover between 35% and 60% originating from, or maintained by, anthropogenic, influences and culturally based disturbances (e.g., planting or agriculture, clearing, recreation, grazing or mowing); often having a large proportion of introduced (i.e., non-indigenous) species (as per the Ecological land Classification System for southern Ontario) and with shrubs, grasses, and/or herbaceous ground cover. These may be second or third growth woodlands that occur on land that has been significantly altered by human disturbance where the original forest was completely or mostly removed at various points in time (e.g., from agriculture, grazing, gravel extraction) and may include a small proportion of planted trees but has undergone natural succession to the point where tree cover is between 35% and 60%, with grass and herbaceous ground covers, and possibly shrubs as well."

According to policy 4.1.4.3, cultural woodlands "are generally considered of less ecological value than those categorized Significant Woodlands, however the City recognizes the environmental benefits and services they provide." Development is

generally discouraged in cultural woodlands, but where development is approved, a 'vegetation compensation plan' is required.

12.2 Significant Woodlands

The 2014 P.P.S. definition of significant woodland is:

an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources.

The criteria established by the province for the identification of significant woodlands is provided in the Natural Heritage Reference Manual (OM.N.R. 2010, Second Edition). The criteria are based on woodland size criteria, ecological functions (i.e., woodland interior, proximity to other woodlands or other habitats, linkages, water protection, woodland diversity), uncommon characteristics, and economic and social functional values. The criteria for identification of significant woodlands can also include additional considerations associated with physiography and distribution across the landscape of the Region. Considerations have been presented for developing criteria to identify significant woodlands with rationale.

The criteria for the identification of Significant Woodlands varies across southern Ontario depending on the prevailing Provincial Plan and technical criteria provided for that area. For example, within the Greenbelt Plan N.H.S., the identification of key natural heritage features (e.g., significant woodlands) is based on criteria provided by the Province. These criteria are contained in the Greenbelt Technical Paper 'Technical Definitions and Criteria for Key Natural Heritage Features in the N.H.S. of the Protected Countryside Area'. Beyond the N.H.S. within the Protected Countryside, Policy 3.2.5.3 of the Greenbelt Plan indicates that these features are to be defined and subject to the policies of the P.P.S. Within the Growth Plan Natural Heritage System, criteria have yet to be provided by the province for the identification of significant features (e.g., woodlands). The province has suggested that in the interim, municipalities are to use the best available information for identifying significant woodlands in the system (e.g., the Greenbelt Technical Paper).

12.2.1 Considerations for Criteria to Identify Significant Woodlands

Land Use Designation

Pressures on and potential impacts to woodlands vary based on the surrounding land use(s). In a municipal planning context, these considerations could influence size-based criteria, but could also influence ecological function criteria for the identification of what is 'significant' in different landscape contexts.

A woodland in a rural or agricultural land use matrix may experience one or many of the following uses / pressures:

- Often discontinuous features, but generally permeable surrounding landscape matrix
- Harvesting (selective, high or low intensity)
- Edge impacts and / or removals for expansion of agricultural practices and development
- Trail building and use (low to moderate use frequency)
- Introduction of invasive species

Woodlands in a rural settlement or urban context may see increases in some of the above, or new pressures / uses:

- Discontinuous to isolated features and generally low permeability or impermeable surrounding landscape matrix
- Complete or partial removal or fragmentation to facilitate development and/or infrastructure
- Trail building and use (moderate to high use frequency)
- Dumping / fill / trash (broad range of materials – yard waste through to furniture, hazardous waste, etc.)
- Domestic animals (disruption and/or killing of wildlife)
- Light impacts
- Noise impacts

Where woodlands in rural and agricultural landscapes display impacts associated with human activity, those located in near-urban and urban settings see substantially greater pressures on their form and function. As such, some municipalities (e.g. City of Hamilton) have developed criteria specific to their urban and rural areas to reflect the land use needs (e.g. agriculture) and pressures (e.g. trails) in identifying significant woodlands.

Land-use type may influence one or more of the following:

- Size-based criteria
- Ecological functions criteria (e.g. species diversity, etc.)
- Connectivity / linkage criteria

Woodland Size

The Natural Heritage Resource Manual (N.H.R.M.; M.N.R.F. 2010) provides guidance for the identification of a size criterion for significant woodlands based on the existing land base covered by woodlands. Upon review of woodland data layers (Land Information Ontario dataset and Regional woodland dataset) approximately 17.7 % of the Region is treed. The N.H.R.M. size-based criterion for municipalities where woodland cover is about 15 - 30% of the land cover, recommends woodlands 20 ha in

size or larger should be considered significant. This basic approach to size significance does not consider the following:

- relative distribution by land use or municipality
- physiographic areas (e.g., above or below the Niagara Escarpment),
- size statistics (such as average size or the relative distribution or skew of woodland size) of existing woodland cover

To address this, an analysis can be undertaken to develop a set / range of multi-factor size thresholds based on distinct land use / geographic areas. The assessment could break down woodlands by size and examine key characteristics based on land use (i.e., urban, rural settlement, agricultural and rural). The City of Hamilton has taken this approach and applied a different threshold for size based on forest cover within a mapped “planning unit” (Table 5).

Table 5. Size thresholds for significant woodlands in the City of Hamilton based on forest cover within a planning unit.

Forest Cover (by planning unit)	Minimum patch size for significance
< 5 %	1 ha
5-10 %	2 ha
11-15 %	4 ha
16-20 %	10 ha
21-30 %	15 ha

Currently, Niagara Region’s Official Plan includes a set of size thresholds to identify significant woodlands, which is identical the Region of Halton’s criteria noted in their Official Plan (2018 consolidated version):

- In size, be equal to or greater than:
 - 2hectares, if located within or overlapping Urban Area Boundaries;
 - 4 hectares, if located outside Urban Areas and north of the Niagara Escarpment;
 - 10 hectares, if located outside Urban Areas and south of the Escarpment;

This set of criteria is also consistent with the criteria established for significant woodlands in the Greenbelt Plan N.H.S. for municipalities in the “south area” (as mapped in the Greenbelt Plan technical paper (OM.N.R. 2012)).

These criteria contained in the Natural Heritage Reference Manual provide minimum thresholds. Municipalities can go above and beyond the minimum thresholds (i.e. P.P.S. Policy 4.9) that are contained in the N.H.R.M. in a manner that protect woodlands for the local context, unless doing so would create a conflict with any policy in the P.P.S.

Some municipalities have adopted a single set of criteria that apply across their jurisdiction while others have developed tiered criteria to reflect different pressures, such as urban vs. rural land use areas. Other municipalities also differentiate significant woodlands based on geography, such as in Halton Region where size criteria are different below and above the Niagara Escarpment.

Niagara Region contains portions of the N.H.S. of the Growth Plan and Greenbelt Plan and includes a broad range of land uses including significant agricultural areas, rural areas and settlement areas / urban centers. Developing an approach for identifying significant woodlands in Niagara Region may reflect these factors, including:

- Land use (urban vs. rural)
- Total and relative cover of woodlands
- Ecological function and uncommon characteristics
- Economic and social functional values
- Geography (e.g., above or below the escarpment)

Ecological Function

Per the Natural Heritage Resource Manual, ecological functions for the identification of significant woodlands include the following:

- Woodland Shape
- Woodland interior
- Proximity to other woodlands or other habitats (includes linkage function)
- Water protection
- Woodland diversity
- Uncommon characteristics

Woodland Shape

Woodland shape can influence the form and function of a woodland. Woodlands with a lower edge to interior ratio are less likely to be impacted by edge effects, and therefore more likely to have interior habitat and support area-sensitive species and/or woodland dependent species. Those with a high edge to interior ratio will have a higher proportion of edge species or edge-adapted species. It may also indicate susceptibility to invasive species and other factors that influence woodland form and function (e.g., more direct wind and sun exposure).

The Greenbelt Plan technical paper on identification of significant woodlands includes criteria, one of which stipulates “a significant woodland must have an average minimum width of 40 metres measured to crown edges where the criterion size threshold is 0.5 to 4 hectares” (OM.N.R. 2012). This, in effect provides guidance, at least in the Greenbelt N.H.S., for a minimum requirement to demonstrate an ability to support forest-species (i.e., those species that require forest, rather than edge habitats). The City of Hamilton’s Official Plan (2018 consolidated version) also states, “woodlands shall meet a minimum average width of 40 metres”.

Woodland Interior

Woodland interior habitat is considered those areas of woodland that occur >100m from the edge of the woodland. The N.H.R.M. (M.N.R.F. 2010) provides criteria for identifying significant interior habitat areas.

Proximity to Other Significant Features

Proximity to other significant features acts as a proxy for identifying potential interconnectedness / interrelationships / interactions that support or enhance existing ecological functions among features. Interactions may include:

- Hydrological connectivity (recharge or discharge / input or outlet / source support or receiver)
- Direct and indirect inputs (e.g. allochthonous inputs to watercourses, nutrients, etc.)
- Complex habitat needs (e.g. overwintering raptors that require meadow/field and forest complexes)
- Physiological / lifecycle needs (e.g. stopover habitat near Lake Ontario – birds, butterflies)

Maintaining these interactions may be critical in achieving a resilient system and maintaining biodiversity within the natural environment system.

Due to the important functions of some woodlands in proximity to Lake Ontario, particularly as they pertain to Significant Wildlife Habitat, consideration can also be given to distribution and representation of woodlands within 5km of the Lake Ontario and Lake Erie shorelines. For example, a smaller woodland threshold may be applied to woodlands within 5 km of the Great Lakes that may provide important stopover habitat or stepping stone functions for migrating wildlife (O.M.N.R.F. 2015).

Niagara Region's current Official Plan recognizes proximity in the criteria for significant woodlands in Policy 7.B.1.5, as follows:

- “e) Overlap or contain one or more of the other significant natural heritage features listed in Policies 7.B.1.3 or 7.B.1.4; or
- f) Abut or be crossed by a watercourse or water body and be 2 or more hectares in area.”

The Natural Heritage Reference Manual (OM.N.R. 2010) recommends woodlands can be considered significant if “located within a specified distance (e.g., 30 m) of a significant natural feature or fish habitat likely receiving ecological benefit from the woodland and the entire woodland meets the minimum area threshold.”

Water Protection

Retaining natural cover in areas of groundwater sensitivity (recharge or discharge) may assist in protecting water quality and / or quantity for natural features and functions.

Consideration for proximity to identified areas of groundwater sensitivity can be considered. A minimum size threshold should be identified associated with this potential criterion.

The Natural Heritage Reference Manual (OM.N.R. 2010) provides the following recommendation regarding identifying significant woodlands that play a role in water protection:

“Woodlands should be considered significant if they are located within a sensitive or threatened watershed or a specified distance (e.g., 50 m or top of valley bank if greater) of a sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse or fish habitat and meet minimum area thresholds (e.g., 0.5–10 ha, depending on circumstance)”.

With the requirement from Provincial policy to identify of a water resource system, proximity of woodlands to some components of the water resource system can be considered for criteria developed to identify significant woodlands. Use of this criterion requires that the location of significant or sensitive groundwater features/areas are identified/mapped.

Woodland Diversity

Woodland diversity may be associated with community and species composition and/or landform. Where the woodland type is underrepresented in a geographical area (e.g., watershed, Region or Eco-region) or diversity of species unusually high, it may warrant consideration as being significant. Per the N.H.R.M., it is recommended that landform and composition diversity must be demonstrated. As with other criteria, a minimum size threshold should be established for this criterion. Also, use of this criterion generally requires information obtained through site-level field studies.

Uncommon Characteristics

Special consideration should be given to woodlands that demonstrate uncommon characteristics in the planning area in which they occur. This ensures that specialized habitats or uncommon populations of species are captured through the assessment process. Per the N.H.R.M., uncommon characteristics may include:

- Uncommon community type or species composition
- Locally rare or uncommon species
- Species with a high Coefficient of Conservatism¹ (i.e., 8, 9 or 10)

Use of this criterion requires information generally obtained through site-level field studies. As with other criteria, a minimum size threshold should be established for this criterion.

¹ A numerical value of 1-10, assigned to native flora that indicates the degree of tolerance to disturbance, and degree of fidelity to a specific habitat. The higher the value, the more restricted the species range of tolerance to disturbance and higher fidelity to a habitat type.

It should be noted that the N.H.R.M. lists other uncommon characteristics, including Habitat for Species of Conservation Concern (species with provincial ranking of S1, S2, or S3) and old growth or large tree size. Both of these vegetation characteristics predate the Ontario Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (O.M.N.R.F. 2015) which considers these as types of Significant Wildlife Habitat (S.W.H.). Therefore, consideration of these vegetation characteristics are included in the category of S.W.H., rather than Significant Woodland.

12.3 Additional Considerations for Identifying Woodlands

12.3.1 Changes in Woodland Form and Function

The ecological integrity of woodlands in southern Ontario, particularly those in urban settings, are subject to a number of threats/stressors, such as:

- Climate change: potential to result in changes in temperatures, extreme weather events, changes in hydrology due to changes in precipitation and/or transpiration/evapotranspiration
- Invasive species, pests and diseases: outcompete or displace native wildlife thereby reducing the biodiversity and ecological function of a natural feature; tree pests (e.g., Emerald Ash Borer, Hemlock Woolly Adelgid) and diseases (Beech Bark disease) can result in the loss of some species of trees from a woodland community
- Edge effects: woodland edges, compared with the woodland interior, is exposed to increased light and wind (resulting in changes in microclimate and soil moisture), higher prevalence of predatory animals (e.g., cats, racoons, coyotes, etc.), increased noise and light pollution from adjacent developed areas, and typically a higher number and abundance of non-native (including invasive) plants
- Anthropogenic impacts: partial removal of woodlands, encroachment, dumping, unauthorized removal of vegetation, ad-hoc trails, unauthorized camp sites and BMX jumps.

As a result of these threats/stresses, the form and function of woodland could change impacting the characterization of the features as a 'woodland' based on current conventional definitions and criteria (e.g., density of trees/ha and possibly size). For example, woodlands in southern Ontario dominated by ash trees are undergoing a major transformation as a result of Emerald Ash Borer (*Agrilus planipennis*), an invasive insect, that infests ash (*Fraxinus* spp.) trees causing their death. With the loss of ash trees from a woodland where the dominant species in the canopy is ash, this can result in the complete change in community structure and function whereby the woodland no longer exhibits the characteristics (i.e., tree density) or functions (e.g., habitat for forest dependent wildlife species) of a woodland. For those woodlands that have been identified as woodlands based on the conventional set of criteria (e.g., density of trees/ha), following the loss of the treed canopy these woodlands may no longer meet the definition of woodland, particularly when the sub-canopy or understory (i.e., the

regenerating woody layer or woody species succeeding into the canopy) is dominated by shrub species, such as invasive European Buckthorn (*Rhamnus cathartica*). For those woodlands that met the criteria as significant woodland, regardless of how large of a feature it is or the contribution of the feature to the natural environment system, these features would no longer qualify as woodlands. The consequence of the change of status from “woodland” to a feature that is not afforded protection under conventional natural environment policies (e.g., cultural woodland or cultural thicket) would reduce the certainty that the natural cover in Niagara would be maintained or enhanced. Furthermore, any targets set for forest cover in the Region would be difficult to achieve.

The Greenbelt Plan Technical Paper (OM.N.R., 2012) provides some guidance on identifying significant woodlands, noting that “woodlands experience changes such as harvesting, blowdown or other tree mortality are still considered woodlands. Such changes are considered temporary whereby the forest still retains its long-term ecological value.” However, exclusions may be considered “...for communities which are dominated by non-native tree species such as buckthorn (*Rhamnus species*) or Norway maple (*Acer plantanoides*) regardless of cause (e.g., emerald ash borer infestation) which may threaten good forestry practices and environmental management. Such exceptions may be considered where native tree species cover less than 10% of the ground and are represented by less than 100 stems of any size per hectare.” The exclusion considered by the Greenbelt Plan Technical Paper may result in the change of the status of Significant Woodland where an ash-dominated canopy dies, leaving a buckthorn-dominated thicket. Although it is unlikely the Greenbelt Plan Technical Paper anticipated the current state of change in woodland form and function resulting from EAB, the change in status from significant would remove the protection afforded to the feature and potentially result in a reduction in the area of woodland cover (since these features are no longer protected), redundancy, resilience, connectivity and overall size of a N.H.S.

12.3.2 Approaches of Other Municipalities

Generally, there is recognition that change from either anthropogenic influences or natural events are likely, and that monitoring is required to detect, and preferably measure, the change. Municipalities can address changes in the natural environment through policies that require or encourage monitoring features within a natural environment system, particularly when it is associated with a development application that may impact feature. What is not as well addressed is how to respond to change, especially when it involves degradation that changes the status or characterization of a feature.

City of Kitchener

The City of Kitchener provides a policy objective in Section 4.2.4: “To support the ongoing monitoring and management of Kitchener’s Natural Heritage System” with supporting monitoring policies which include developing a monitoring plan and defining roles and responsibilities for pre-, during- and post-construction monitoring to determine and address the impact of development on features and the N.H.S. (Section 7.C.3.7 h).

In addition, the City of Kitchener adopts the same long-term thinking and approach to impacted woodlands such that “significant woodlands which have undergone change such as harvesting, blowdown or other tree mortality are still considered significant woodlands as such changes are considered temporary whereby the woodland still retains its long-term ecological value”.

City of Guelph

The City of Guelph provides a policy objective which acknowledges the connection between ecological monitoring to determine change in features and sustainability: Section 6A.1, includes “To support the ongoing monitoring and management of the City’s N.H.S. to ensure its long-term sustainability and resilience in relation to the impacts and stresses associated with being in an urban context, as well as other factors, such as climate change.” Further, in Section 6A.6.5 a number of ecological monitoring policies have been identified, which include:

- “A city-wide environmental monitoring program will be developed and implemented to assess the effectiveness of the policies, decisions and programs in meeting the objectives of the N.H.S. and the Urban Forest.
- Opportunities for collaborating with the Grand River Conservation Authority (G.R.C.A.) and the Ministry of Natural Resources and Forestry (M.N.R.F.) will be incorporated into the environmental monitoring program (e.g., fisheries, threatened species)
- Short-term, site-specific monitoring may be required as a condition of the planning approval process and the results will be integrated into the City-wide monitoring program, where applicable.”

The City of Guelph goes further in policy 4.1.2.11, stating:

“Development or site alteration within the Natural Heritage System without prior approval by the City, which result in reduction in the extent of natural heritage features and areas or their associated ecological functions, will not be recognized as a new existing condition. Restoration of the disturbed area shall be required to the satisfaction of the City. If the unapproved development or site alteration is carried out in conjunction with a development application, restoration will be required prior to or as a condition of approval of any permitted development.”

Region of Peel

The Region of Peel recognizes that Natural Areas and Corridors contain important ecological features, forms and/or functions which play a crucial role in supporting the integrity of Core Areas and that any changes, modifications or losses to the features or functions could have an immediate or cumulative impact on ecosystem integrity. In Section 2.2.4.1, the Region of Peel has provided policy for Regional Council to:

- Consider the role of monitoring programs in watershed and subwatershed plans

- Work jointly with neighbouring municipalities, conservation authorities, and other provincial agencies to determine planning and monitoring information requirements for inclusion in watershed and subwatershed plans;
- Work jointly with the conservation authorities, the area municipalities and, where applicable, the Niagara Escarpment Commission to integrate subwatershed planning and monitoring information on a regional and *watershed* basis, in order to assess the cumulative effects of land use changes and the implementation of subwatershed plans; and
- Integrate ground and surface water quality and/or quantity monitoring conducted by Regional departments with watershed and subwatershed plans and other environmental monitoring, including the analysis of cumulative effects.

Like the City of Guelph, Section 2.3.2.7 of Peel's OP states:

"Ensure that the Core Areas of the Greenlands System in Peel, as described in Policy 2.3.2.2 and 2.3.2.3 and as further detailed in the area municipal official plans and related planning documents, are not damaged or destroyed. In the event that portions of the Core Area are damaged or destroyed, there shall be no adjustment to the boundary or redesignation of these areas in the area municipal official plans and the Region will required replacement or rehabilitation of the ecological features, functions and/or landforms. Regional Council will support area municipalities in applying this policy to other environmental features that are protected in an approved area official plan."

12.3.3 Summary of Other Considerations to Identify Woodlands

Niagara Region may consider the following points relevant for policy and definition development to acknowledge changes in landscape ecology and key features, particularly woodlands within the natural environment system:

- Natural heritage features and landscapes are subject to a variety of natural and anthropogenic impacts and stressors. Opportunities to mitigate influences of landscape change through regional monitoring programs and adaptive management considerations should be explored.
- There is a risk that under conventional definitions and natural environment policies a feature may lose the status as a significant feature (e.g., Significant Woodland) due to anthropogenic or natural causes, and therefore no longer be afforded policy protection— this in turn may compromise the goal of increasing the certainty that the biological diversity and ecological functions of the natural environment system will be preserved and enhanced for the long-term.
- A change in the status of a key feature or supporting function should not necessarily be used as a basis or justification for changing boundaries of land use designations as defined by the policies, definitions and criteria set out in the Niagara N.O.P. Such changes could be considered temporary, as the feature and/or its function could be managed or restored such that it retains its ecological value.

- A key decision to make is whether there needs to be policies that explicitly retain the area and/or status of a feature following changes, or at least require an evaluation to determine whether the feature should continue to be recognized as a component of the natural environment system after the change in feature designation/status

12.4 Targets for Woodland Area

Consideration should also be given to identifying a target for woodland cover in the Region. The vision and objectives of the natural environment policies for the new N.O.P. can include woodland area targets. For example, one of the objectives in Niagara Region's existing Regional Official Plan (2014 consolidated version) under Policy 7.A.1.1 is to "support efforts to achieve"... "30% of the land area in the Region in forest cover or wetland, with a least 10% of each subwatershed in wetland". The Region's Tree By-law (No. 30-2008) does note that one of the purposes of the by-law is to "achieve the goal of 30% forest cover in Niagara Region". Consideration should be given to incorporating a similar target in the new N.O.P.

A guideline for woodland cover targets is provided in Environment Canada's *How Much Habitat is Enough?* (Environment Canada 2013), which notes:

"30% forest cover at the watershed scale is the minimum forest cover threshold. This equates to a high-risk approach that may only support less than one half of the potential species richness, and marginally healthy aquatic systems;

40% forest cover at the watershed scale equates to a medium-risk approach that is likely to support more than one half of the potential species richness, and moderately healthy aquatic systems;

50% forest cover or more at the watershed scale equates to a low-risk approach that is likely to support most of the potential species, and healthy aquatic systems."

By setting targets for woodland cover, this will inform what criteria for woodland size may be proposed. That is, if woodland cover in Niagara Region is currently below the target, smaller woodlands in Niagara Region may be considered significant if it allows for protecting remaining woodlands in an effort to ensure woodland cover does not decrease and the target is more achievable. The target for woodland cover should be informed by existing woodland cover in order to determine what target is achievable. For example, if the current woodland cover in a highly urbanized municipality was 20%, there is likely little opportunity to increase woodland cover, especially to meet the minimum suggested target of 30% from Environment Canada's *How Much Habitat is Enough?*.

For example, in York Region's Official Plan (April 2016 consolidated version) policy 2.2.43 notes that it is the policy of Council "to increase woodland cover to a minimum of

25 per cent of the Region's total land area" (York Region 2016). The York Region Greening Strategy, initially produced in 2001 and updated in 2012, includes reforestation efforts to help support the 25 per cent target. It also funds hands-on environmental projects, land protection and preservation activities and a variety of tree planting projects, including programs for residential tree planting. York Region has implemented tree planting programs through partnerships and land acquisition where 1.3 million trees and shrubs were planted as part of the Region's Greening Strategy between 2001 and 2015, both in urban and rural landscapes (i.e., not all trees planted contributed to 'woodland' cover).

12.5 Best Practices for Mapping Woodlands

12.5.1 Intended Use of Woodland Dataset

Mapping of woodlands in OP schedules and maps includes datasets that have been prepared following a number of approaches depending on the scale in which they were produced and the intended purpose of the dataset. For example, the Province has prepared woodland mapping (Land Information Ontario dataset titled 'Wooded Area', revised in 2012) at a scale of 1:5000. This dataset is often used as the base mapping layer from which a municipality refines and develops mapping for their own purposes. Woodland datasets are also often updated with information obtained during field studies (i.e., ground truthed) whether by a public agency (e.g., Natural Area Inventory) or by a private landowner as part of a study to inform land use planning (e.g., development, monitoring or management). The level of ground truthing can include the following:

- a simple 'windshield survey' to confirm the presence of a feature;
- site reconnaissance survey to characterize the feature and digitally map the extent of the feature with orthoimage interpretation;
- a feature staking exercise whereby the limits of the feature are staked (often with a public agency) and surveyed by a professional land surveyor;
- a combination of the above depending on permitted access and the need for precise feature boundaries.

12.5.2 Need for Accuracy

The level of accuracy of a woodland dataset depends on the needs of the intended user. Where the intended use of the woodland dataset is to approximate the location and extent of features and undertake a high-level screening (e.g., for planning review) a medium scale (e.g., 1:10,000 – 1:100,000) produced dataset is generally sufficient. Where a high level of accuracy is needed to inform decisions regarding land use planning, such as determining developable area or inform growth projects from a land base perspective, woodland mapping dataset should be produced at a large scale (i.e., 1:2000 or less). The dataset could include a combination of ground truthing (e.g., windshield survey or site reconnaissance) in select locations to confirm the accuracy and quality of the dataset, and orthoimage interpretation, particularly where access is not granted or where the geographical scale is large (e.g., Region-wide scale). Finally,

for making planning decisions regarding the extent of features to inform development limits, ground truthing is required including staking and surveying of features.

12.5.3 Comparative Example of Regional Woodland Mapping

As an example of mapping woodlands in an upper-tier municipality, York Region updates their woodland dataset approximately every four years to account for changes in woodland cover (e.g., natural changes such as successful or expansion, or removal of woodlands, or parts thereof, resulting from approved development applications) in an effort to maintain an accurate woodland dataset that informs their policy target of increasing woodland cover to 25%, as identified in the R.O.P. (2016 consolidated version).

Assessment and revision of woodland cover boundaries is completed by comparing previous woodland boundaries (e.g., 2013 dataset based on 2012 orthoimagery) to newer orthoimagery (e.g., 2015) with 15 cm resolution. The review and revision of the woodland cover data layer set is completed using ESRI ArcGIS Suite of tools, in particular ArcMap. Digitizing to modify existing boundaries or creation of new boundaries is completed at the 1:2000 scale. However, where vegetation units/features are more difficult to interpret at this scale, a larger scale is used to attempt to more closely identify features. Furthermore, a subset of areas were selected for field verification of previously identified woodlands and potential woodlands based on initial screening of orthoimagery; this allows for the interpreter to verify woodland extent and type and calibrate orthoimage interpretation. Additional quality control is built into the analysis to ensure a high level of accuracy in orthoimage interpretation.

The York Region definition for woodland is taken from the Forestry Act, which is based on size and number of stems per hectare. Since determining stem density through orthoimage interpretation is not possible, canopy cover was used as a surrogate. This approach is described in **Section 12.1** above.

It should be noted that the York R.O.P. (policy 2.1.7.) allows for refinement of feature boundaries “through approved planning applications supported by appropriate technical studies including Subwatershed studies, master environmental servicing plans or environmental impact studies. These refinements will be incorporated into this Plan through periodic updates by the Region and will not require an amendment to this Plan.”

This is reiterated in policy 2.2.3. Policy 2.2.23 adds the following regarding refinements:

“However, where there is a boundary refinement to a wetland, Life Science Area of Natural and Scientific Interest, Earth Science Area of Natural or Scientific Interest, or significant habitat of endangered or threatened species, confirmation will be required from the Province prior to any development or site alteration occurring in these areas. In regard to changes to Environmentally Significant Areas, approval will be required from the appropriate conservation authority.

12.6 Relationship with Municipal Tree By-laws

Increasing attention has been paid to the removal of trees and decline of woodlands in southern Ontario. As population pressure and economic demand for land and wood products increases, the extent and quality of woodlands are threatened. In addition to this threat comes concern for the impact upon wildlife, water resources, and other ecosystem services provided by trees and woodlands. As a tool to implement the policies of the R.O.P. related to trees and woodlands, tree or woodland by-laws can regulate the removal of trees and/or woodlands, provided that they are aligned with the Official Plan. Tree conservation by-laws help to ensure at least a minimum level of control over tree removal, including forestry practices, on private woodlands.

The two pieces of legislation that provide for direction to municipalities to regulate tree removal are the Forestry Act (1990) and the Municipal Act (2001). Upper tier municipalities are able to pass tree conservation by-laws under the Forestry Act or the Municipal Act. Any municipality having a population greater than 10,000 can pass a tree conservation by-law under the Municipal Act.

The by-law enacted by the Region has the ability to restrict and regulate the destruction of trees by cutting, burning or other means in woodlands. The Region has a minimum size of woodlands under which the by-law would apply. Below that size a lower-tier municipality, through their by-law, can prohibit the destruction or injury of trees or any class of trees in the area specified under the by-law. The by-law can be applied to either the entire municipality or specifically designated areas of the municipality, or specific trees.

Niagara Region's Tree and Forest Conservation Bylaw (30-2008) was initially developed in 1981. The most recent update to the bylaw occurred in 2008 in response to changes to the Municipal Act, a request for amendments to the bylaw from the Township of West Lincoln, as well as to facilitate the transfer of responsibilities for enforcement of the bylaw to the N.P.C.A. The Regional Tree and Forest Conservation By-law No. 30-2008 "regulates the destruction of trees in woodlands by cutting, burning or other means to conserve and improve woodlands in Niagara" in order to ensure tree removal is carried out in accordance with Good Forestry Practices. The By-law applies to:

Woodlands that are 1.0 hectare or more in size;

- Woodlands having an area of less than 1.0 hectare upon delegation of such authority to the Region by a local municipality in Niagara; and
- Heritage and Significant Community trees identified and designated by the Council of a local municipality, but only upon delegation of such authority to the Region.

The following area municipalities have delegated authority to the Region to administer the Regional By-law on woodlands less than 1 hectare in size:

- Grimsby
- Niagara-on-the-Lake
- Niagara Falls
- West Lincoln

The By-law prohibits the clearing of woodland except under certain specified circumstances. A permit is generally required for the removal of trees within woodlands, although the By-law does contain certain exemptions.

As mentioned previously, the by-law is intended to be a tool to implement the policy direction provided for in the official plan. Through the development of the N.O.P. policies, considerations should be given for how the implementation of the policies should be carried forward into the Regional Tree and Forest Conservation By-law. For example, if policies and definitions pertaining to woodlands are updated, these changes should be carried forward into the tree by-law. This may be the case where a woodland undergoes a change in species composition or density (resulting from natural or anthropogenic impacts) thereby no longer meeting the definition of woodland, but the feature still remains a component of the natural environment system and is provided protection in policy. The tree by-law will need to recognize that a change in status does not necessarily exempt tree removal in this feature from the tree by-law.

It should be noted that the Region has recently initiated a process to update the Tree and Forest Conservation Bylaw (30-2008). The update will consider legislative changes, alignment between the bylaw and the new N.O.P., best management practices and operational needs.

12.7 Relevance to the New Niagara Official Plan

The following points review considerations for the Region for defining woodlands, producing criteria for significant woodlands, considerations for other woodlands or changes to woodlands, targets for woodland cover, and mapping of significant woodlands:

- Consider how the different criteria for determining significance in the Greenbelt technical paper and the Natural Heritage Reference Manual are to be applied in Niagara
- Determine whether the Greenbelt technical paper criteria or the N.H.R.M. criteria should be applied to lands that are not subject the Greenbelt Plan and which are within the Growth Plan N.H.S.
- Review and update the Region's target for woodland cover based on current woodland cover (by geographic area, urban vs. rural, etc.), and in consideration of guidance for setting targets for woodland cover in the Region.
- Consider having a target and set of objectives for woodland cover (and possibly natural heritage system cover) that provides the foundation/basis and direction

from council for the long-term protection of woodland cover and the size of the natural environment system as a whole.

- Develop and implement a Region-wide strategy for land protection, preservation activities and tree planting that support achieving the Region's targets for woodland cover.
- Consider developing a set of criteria for significant woodlands based on the following factors:
 - Land use (urban vs. rural)
 - Total and relative cover of woodlands
 - Ecological function and uncommon characteristics
 - Economic and social functional values
 - Proximity to other significant natural features (e.g., watercourses, wetlands, Great Lakes, etc.)
 - Geography (e.g., above or below the escarpment)
 - Overlap with components of the water resource system (e.g., significant groundwater recharge area, vulnerable aquifer, etc.)
- Determine whether different criteria should be applied within settlement areas, or whether it should be the role of the local municipality to determine significance in this limited circumstance
- Consider definitions, criteria and policies that recognize natural and anthropogenic changes in woodland composition and structure whereby the woodland does not lose its status as significant and therefore the protection it is afforded; or, consider another category whereby the woodland is identified as another component of the natural heritage system (e.g., restoration or enhancement area) that remains a part of the natural environment system and is afforded appropriate protection in policy.
- Consider making a more direct link between the Tree By-law and the N.O.P. policies, specifically related to Significant Woodlands and features no longer meeting the definition of woodland, by not permitting the removal of trees that would alter the status of the woodland as significant or negatively impact the feature.
- Consider having a category of 'other' woodlands to ensure either woodland cover targets are maintained, or a net gain can be achieved
- Consider implementing a process to regularly update the Region's woodland dataset, to improve accuracy of mapping and to monitor the target of woodland cover using a combination of ground truthing and orthoimage interpretation.

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13.0 Fish Habitat

13.1 Defining Fish Habitat

Fish habitat, as defined by the Federal *Fisheries Act*, means “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes” (Fisheries Act, R.S.C., 1985, c. F-14). This definition has been adopted across Provincial Plans, including:

- Provincial Policy Statement (2014)
- Greenbelt Plan (2017)
- Growth Plan for the Greater Golden Horseshoe (2017)
- Niagara Escarpment Plan (2017).

It should be noted that this definition does not stipulate that the watercourse or waterbody have fish residing in it (i.e. be direct fish habitat) to be considered fish habitat under the Fisheries Act or in accordance with those plans that have adopted the definition.

13.2 Proposed Changes to the Fisheries Act

The Fisheries Act (the Act) was last amended in 2012. At that time changes were made to what fisheries were protected and processes around review processes for projects. On February 6, 2018, the Department of Fisheries and Oceans (D.F.O.) Canada proposed changes to the Act (Bill C-68). At the time of report preparation Bill C-68 had passed its third reading in the House of Commons and is with the Senate Committee. Key proposed amendments to the act include:

- **Protection of Fish and Fish Habitat**
 - Protection for all fish and fish habitats
 - Restoring prohibitions against Harmful Alteration, Disruption and Destruction of Habitat (H.A.D.D.)
 - Restoring prohibition against killing fish by means other than fishing
 - Public registry postings for project decisions
- **Project Guidance**
 - Identify ‘Designated Projects’ that will always require ministerial permits (high potential to harm fish and fish habitat)
 - Develop ‘Codes of Practice’ for small projects with (low potential to harm fish and fish habitat)
- **Traditional Knowledge and Rights of Indigenous People**
 - Incorporation of Indigenous traditional knowledge into habitat decisions
 - Require consideration of adverse effects on the rights of Indigenous peoples of Canada in decisions under the Fisheries Act

- Enable agreements with Indigenous governing bodies to carry out the purposes of the Act

The above is a brief, high-level summary of key changes that have potential to directly affect Niagara; it is not a comprehensive list of proposed changes to the Act. With respect to implications for municipal planning and projects, key changes to the Act include:

- **Return of H.A.D.D.** as the method for assessing potential harm to fish and fish habitat of a proposed project / work, although amendments to the process and implementation of H.A.D.D. may be different than pre-2012 changes to the Act.
- **Return to protection of all fish and fish habitat.** Currently, only fish and fish habitat associated with commercial, recreational or aboriginal fisheries are protected under the Act (2012 changes to the Act). The 2018 amendments will return protection to all fish and fish habitat.
- **Moving away from project-by-project reviews** and introduction of:
 - **‘Codes of Practice’** for small, common projects that have low potential for HADD / serious harm (documentation / approach unknown at this time)
 - **‘Designated Projects’** that will always require federal authorization, for project types known to have high potential for H.A.D.D. / serious harm

We note that there may be some projects that are not covered by ‘Codes of Practice’ and are not ‘Designated Projects’. The approach to dealing with these projects is unknown at this time. It is anticipated that these will retain a review process similar to former or current process. Many development and infrastructure (except small projects potentially) may fall in this middle category as the scope and scale of potential impact can vary substantially within these project types.

- **Public Registry postings** of project decisions will allow municipalities and proponents to see what requirements and outcomes surround decisions. This is anticipated to have some benefit for proponents in understanding potential requirements, ideas for compensation, etc.
- Enhanced consideration for and role for **Indigenous peoples** through study processes and potentially associated with regulation.
- Changes speak to improved ability to enforce provisions under the Act and to pursue offences outside of court proceedings (via *alternative measures agreements*). It is unclear how this would be enacted or what effect will be felt at a municipal scale; however, additional oversight and potential actions against offences may assist municipalities in their objective to protect fish habitat and address compliance.

There are many other proposed changes to the Fisheries Act beyond those discussed here. Numerous changes focus on inshore commercial licenses, protection for

cetaceans (including whales), marine refuges, etc., and as such are not anticipated to have a direct impact on the Region's planning policies and identification of Fish Habitat.

13.3 Responsibility for Protection of Fish Habitat

The protection of fish and fish habitat is a responsibility of the federal government. This is achieved through D.F.O. and its partners via the Fisheries Act (the Act). Through the Fisheries Protection Policy Statement, the D.F.O. outlines how D.F.O. and its regulatory partners will apply the Fisheries Protection Provisions of the Fisheries Act, guide the development of regulations, standards, directives and provide guidance to proponents of projects on the application of the Fisheries Act.

As a D.F.O. partner, the M.N.R.F. is responsible for administering and enforcing the Ontario Fishery Regulations under the Fisheries Act. This includes allocation and licensing of fisheries resources, fisheries management (e.g. angling activities control and stocking), fisheries management planning, fish and fish habitat information management, and fish habitat rehabilitation. The M.N.R.F. works with D.F.O. to help achieve the requirements of the Fisheries Act through agreements and protocols.

The M.N.R.F. is also responsible for administering the Endangered Species Act (E.S.A. 2008), which includes fish. Compliance with the E.S.A. is separate from compliance with the Fisheries Act and one or both may require authorization / permitting for a given project where Species at Risk fish are involved.

Prior to the 2012 amendments to the Act, D.F.O. had Memoranda of Understanding (MOU) with 36 individual Conservation Authorities (CA); with the introduction of those amendments, all CA MOUs were cancelled. In 2014, a new MOU was signed between D.F.O. and Conservation Ontario as a replacement of the former individuals C.A. M.O.U.s. Through the 2014 M.O.U., C.A.'s were recognized as partners with respective responsibilities for regulatory reviews and approvals and for the protection of aquatic resources. C.A.'s responsibilities include ensuring watershed stakeholders are aware of the Fisheries Act, Species at Risk Act and other relevant regulatory and policy frameworks. It also allowed D.F.O. to draw upon the knowledge and expertise of the CA's for offsetting plans as well as providing advice to planning and development proponents.

Ultimately, D.F.O. is responsible for the protection of fish and fish habitat via the Fisheries Act; coordination and relationships between D.F.O. and its provincial (M.N.R.F.) and local partners (C.A.'s) are used to leverage knowledge and resources and implementation of specific components of the Act.

Municipalities are responsible for the identification and protection fish habitat through their official plan policies to ensure conformity with applicable plans and legislation. This may extend to mapping fish habitat if / where feasible and appropriate. By working with the appropriate authorities that have direct responsibility with respect to the

identification and protection of fish and fish habitat (C.A.'s, M.N.R.F. and / or D.F.O., as appropriate), the Region can meet their responsibilities in this regard.

13.4 Considerations for the Identification and Classification of Fish Habitat

13.4.1 Federal Direction for Identification of Fish Habitat

The Fisheries Act (currently in-force) does not provide specific direction or methods for the identification, or classification of fish habitat.

13.4.2 Provincial Direction for Identification of Fish Habitat

A habitat classification system for fish habitat was introduced in the 1997-1999 Natural Heritage Reference Manual (N.H.R.M.) by the M.N.R. A guidance document and mapping were provided to the Region by the M.N.R.F. entitled: 'Niagara Region Municipality: Fish Habitat Types with Management Rationale' (M.N.R. 2000). This document was updated in 2010, and again in 2016. Habitat Types as defined in by the M.N.R.'s guidance document as follows:

"Sensitive habitats were identified as protected type 1 and areas needing improvement as type 2. A third type (i.e. type 3) included fish habitat where no fisheries management actions are warranted at the present time (for example active shipping channels, man made hydroreservoirs, buried watercourses and habitats not linked to downstream type 1 or 2 habitats)."

Mapping associated with this document identified some watercourses and waterbodies in the Region as Type 1, 2 or 3 habitats; not all watercourses and waterbodies were mapped and classified. The original mapping has not changed since it was received in 2000.

The rationale document includes a table of Regional tributaries, streams and rivers with an assigned Type and management rationale for each watercourse. The watercourse / waterbody Type was not based on existing conditions or a direct indication of the presence of fish. Rather, they were applied based on the potential of the habitat to support a preferred 'potential' fish community once the degraded conditions of the waterbody (resulting from past and present land-uses) are improved and restored. The theory behind this approach is captured in the rationale document:

"The management rationale goes beyond describing existing conditions of a watercourse because in the vast majority of watercourses in Niagara, the existing conditions have been degraded by the past and present land use. If we continue to protect the existing conditions of a watercourse, we will continue to perpetuate the degradation of our environment."

Based on the rationale above, the M.N.R.F.s classification system is associated with their responsibilities for fisheries management planning, fish and fish habitat information

management, and fish habitat rehabilitation. They are not intended as a means of implementing levels of protection for existing conditions. Discussions between the local M.N.R.F. office in 2016 and the Region, indicated that the provided mapping and rational document are meant to identify watercourses of provincial interest not municipal-level direction with respect to identification or protection of fish habitat.

We also note that the updated 2010 N.H.R.M. does not reference fish habitat 'types' in the same manner as the earlier edition of the N.H.R.M. While the 2010 N.H.R.M. acknowledges that classification approaches may be used and can vary from region to region based on the characteristics of the area, they are not required for the identification of fish habitat. One exception to this could be the consideration given to differences in habitat sensitivities between warmwater and coldwater habitats with respect to vegetated buffers; however, this is not associated with the identification of fish habitat in general. Adjacent Lands for the assessment of potential impacts to fish habitat is a consistent distance of 120m with no consideration for differences in type or classification of habitat.

13.4.3 Regional Direction for Identification of Fish Habitat

Fish habitat is recognized as a component of the Core Natural Heritage System in the existing Regional Official Plan. Current R.O.P. policy identifies protection requirements based on categorization of fish habitat into 'types': Type 1 is defined as 'critical', Type 2 as 'important' and Type 3 as 'marginal' fish habitat. Type-based policies were introduced in the Regional Policy Plan Amendment (R.P.P.A.) 187 to bring Regional policies into alignment with the 1997 P.P.S. Through this amendment, the definition of Fish Habitat was aligned with the Fisheries Act definition but was expanded to include that Fish Habitat was also "as identified by the Provincial Ministry of Natural Resources". It is understood that the intent of this additional statement was to acknowledge guidance documentation and mapping for identification of fish habitat that was provided by the M.N.R. to the Region in 2000.

Currently, M.N.R.F. mapping is used by the Region as means to determine presence of fish habitat on subject properties (screening) and the provincial habitat types are used to assign land use planning protection levels. Type 1 is provided a higher level of land use planning protection; type 2 and 3 habitats are given the same level of protection.

As noted above, the provincial habitat Types pertain to restoration potential to achieve fisheries management objectives and for the rehabilitation of fish habitat and are not specifically associated with presence of fish or current habitat conditions or functions. It should also be noted that the definition of fish habitat includes both direct and indirect habitat for fish and that the M.N.R.F.s mapping focuses only on those features of provincial interest. For these reasons, the Region should consider if the use of the current fish habitat dataset for mapping in the new N.O.P. is appropriate.

13.4.4 Municipal Comparison

Through the review of comparator municipalities, we observe the following key points with respect to fish habitat:

- All three municipalities (Region of Waterloo, Region of Halton, City of Hamilton) include Fish Habitat as a component of the N.H.S. and address its identification through policy.
- None of the three municipalities map **fish habitat**:
 - The City of Hamilton maps watercourses, but not fish habitat.
 - The Region of Waterloo maps major rivers only, and not fish habitat.
 - Region of Halton does not map any watercourses or fish habitat.Effectively, this means that while fish habitat is recognized as part of the municipal N.H.S., it is not mapped in their O.P. maps / schedules. Incorporation of fish habitat in N.H.S. mapping is achieved through more detailed land use planning studies (e.g. subwatershed studies, secondary plans, area specific plans, etc.);
- None of the three use similar categories to Niagara (i.e. Type 1, 2, 3);
- The City of Hamilton includes consideration for habitat type based on thermal classification (warmwater and coldwater) and requires buffers from each side of the watercourse of 15 m and 30 m respectively.

The consistency of not mapping fish habitat speaks to the challenges associated with identifying fish habitat and subsequently mapping fish habitat as part of the N.H.S.

13.4.5 Considerations for Updated Policies and Mapping

Through the development of the new N.O.P., there is no obligation to continue use of the local M.N.R. mapping or methodology. Preliminary alternatives identified by the M.N.R.F. and N.P.C.A. through discussion with the Region include:

- Identification of fish habitat through an analysis of the ecological and hydrological function of the watercourse.
- Warmwater, coolwater or coldwater streams and associated setbacks for each.

Opportunities exist to include consideration for M.N.R.F. restoration/management-based habitat types, where they can be incorporated as an assessment overlay or as a review criterion for assessment proposed development / activities as means to guide mitigation and potential enhancement activities.

With respect to policy, language could include consideration for instances where habitat mapping is, or is not available such as (modified from the Greenbelt Plan Technical Paper (M.N.R.F. 2012)):

- Where made available, detailed fish habitat mapping and information provided by M.N.R., Department of Fisheries and Oceans Canada (D.F.O.) and/or

conservation authorities should be used to inform the presence of fish habitat and aid in determining an appropriate level of protection; or

- Where detailed fish habitat mapping is not available, all waterbodies, including permanent or intermittent streams, headwaters, seasonally flooded areas, municipal or agricultural surface drains, lakes and ponds (excluding human-made off-line ponds [e.g. S.W.M. ponds]), should initially be considered fish habitat unless and until it is demonstrated to the satisfaction of the regulatory authority that the feature(s) do not meet the definition of *Fish Habitat* (per the Fisheries Act).

With respect to mapping of Fish Habitat within the Official Plan, there are several challenges that should be considered in the decision to map or not map fish habitat:

- **Scale:** Mapping **watercourses** and to a lesser degree waterbodies at a regional scale may not show relevant levels of detail or becomes distracting when mapping all watercourses (upper reaches through to major rivers). As **fish habitat** mapping is generally associated with mapping watercourses and waterbodies.
- **Accuracy:** With respect to **watercourses**, realignments are not always reflected in mapping, it may be missing upper reaches, and often little or no Headwater Drainage Feature mapping (if appropriate to map at Regional level, etc.) is available (note: the Region and N.P.C.A. have recently developed watercourse mapping at a 1:2000 scale, referred to as the Contemporary Mapping of Watercourse dataset). With respect to **fish habitat** datasets accuracy is much lower – detailed assessments are required to identify where a watercourse stops supporting **direct** fish habitat and a determination for where **indirect** habitat starts and ends again requires both detailed information and consultation with relevant agencies.
- **Data Availability:** The above is further complicated by the availability of **fish habitat** data. Often obtained through site-specific studies, these data may not be in a readily available or usable format.

As noted in the municipal comparison (**Section 13.4.4**), fish habitat is often not directly mapped in Official Plans. Using watercourses as a proxy and preliminary screening tool may be appropriate, or not mapping any watercourses and addressing fish habitat through policy may be preferred. The presence and mapping of municipal drains and who administers their maintenance, etc. may be a factor in the direction selected by the Region.

Niagara-on-the-Lake (N.O.T.L.) is considering the implication of mapping fish habitat and if mapping fish habitat is appropriate given the drainage features associated with the agricultural system. The O.M.A.F.R.A. identified municipal drainage system classification has been integrated into the Contemporary Mapping of Watercourses (C.M.W.) dataset (produced jointly by the Region and N.P.C.A.). The C.M.W. mapping identifies some agricultural drains as fish habitat (as identified in the 2000 M.N.R.

mapping). As a result, early draft N.O.T.L. schedules developed as part of the update to the N.O.T.L. O.P. identified some agricultural drains as fish habitat; this has led to concern regarding the management of agricultural drains. The approach to mapping fish habitat is currently under review by N.O.T.L. as part of their O.P. review.

Agricultural Drains as Fish Habitat

Niagara Region has a large number of municipal and agricultural drains, some of which provide habitat for fish. Although some may have originated as natural watercourses, most are on the landscape as a result of agricultural tile drainage, drainage of wetlands and /or subsequent diversion of water to facilitate agriculture (e.g., irrigation channels sourced from pumping of water). While they serve a specific constructed purpose, and require maintenance, they also provide habitat for fish. D.F.O. prepared a guidance document for maintaining and repairing municipal drains for Ontario (March 2017) which speaks to the function of drains as fish habitat, avoiding contraventions of the Fisheries Act, how drain maintenance is addressed through the current D.F.O. review process, classification of drains, and considerations for aquatic SAR. It is recommended that the Region take this document into consideration in developing policies related to municipal drains and fish habitat. We note that with the coming changes to the Fisheries Act, the components of this document that pertain to drain works and D.F.O. review are likely to change (e.g., through the introduction of a 'Code of Practice' related to drain maintenance). Special considerations for agricultural drains, as provided by the Act, are anticipated to continue to generally apply or be reinforced; however, it is likely the Act will extend the protections to all fish with the proposed amendments.

With respect to developing policies where fish habitat is identified in agricultural drains, the Region should consider the following:

- Compliance with the in-force Fisheries Act at the time of policy development and in consideration of the proposed amendments to the plan;
- Compliance with provincial policy and provincial plans (e.g. P.P.S., N.E.P.), legislation (e.g. E.S.A.) and guidelines;
- Alignment with existing D.F.O. guidance document(s) and processes;
- Consideration for Species at Risk;
- Alignment with the Region's selected direction with respect to classify or not classify fish habitat under policies of the new N.O.P.

We note that with the proposed amendments to the Act, sections and direction in the 2017 D.F.O. drain maintenance guidance document may have limited applicability (e.g. replacement of the project-review process with a 'Code of Practice' document for drain maintenance activities, etc.) or have increased applicability as a result of the extension of protections for all fish and fish habitat from the current focus on commercial, recreational and aboriginal fisheries.

14.0 Linkages and Enhancement Areas

Section 2.1.2 of the 2014 P.P.S. sets the context for which linkages play a role in natural environment identification and protection, as follows (bold added for emphasis):

“The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, **recognizing linkages** between and among natural heritage features in areas, surface water features and ground water features.”

The Growth Plan also provides direction for identifying linkages, as well as noting that the municipalities “...will apply appropriate policies to maintain, restore, or **enhance** the diversity and **connectivity** of the system and the long-term ecological or hydrologic functions of the features...” (Growth Plan, policy 4.2.2.2). As part of the Growth Plan N.H.S., linkages have been identified based on the following considerations:

- Natural features (e.g. water courses, valleylands, woodland/wetland patches) and rural/agricultural lands without barriers that connect core features
- Connectivity/permeability (i.e., linkages were not identified where bisected by major roads)
- Length (no minimum)
- Width \geq 500 m (i.e., added minimum 250 m on each side of watercourses that met the criteria established for the identification of the Growth Plan N.H.S.)

Mapping of the Growth Plan N.H.S. includes a number of linkages that had not been previously identified in the Region. These linkages are intended to connect the core areas identified in the Growth Plan N.H.S.

In the context of N.H.S. planning, linkage means an area intended to provide connectivity supporting a range of community and ecosystem processes enabling plants and animals to move between natural heritage features over multiple generations. Linkages are preferably associated with the presence of existing natural areas and functions and they are to be established where they will provide an important contribution to the long-term sustainability of the overall N.H.S.

Enhancements means ecologically supporting areas adjacent to natural heritage features and/or measures internal to the natural heritage features that increase the ecological resilience and function of an individual natural heritage feature or groups of natural heritage features. Enhancement areas can include lands that may be without obvious natural heritage features and include areas such as agricultural land and successional habitat (e.g. meadows, thickets, etc.). Enhancement areas contribute to the N.H.S. by protecting and restoring critical ecological functions such as, ecological connectivity among natural area patches, surface water catchment areas for wetlands,

minimum core area thresholds and improved core area shape that reduce edge effect and enlarge interior habitat.

Often, algorithms are developed through a GIS-based system that help to identify the most appropriate locations for linkages and enhancement areas based on the shape of key natural heritage features and/or proximity to other features. This approach has been applied to develop the mapping for the Growth Plan N.H.S.

14.1 Best Practices Review

The Natural Heritage Reference Manual reviews considerations for identifying ecologically functional linkages:

- The ecological function that a linkage is intended to perform
- The length and width (generally, a wider linkage is better than a narrow one and width should increase relative to length), composition, orientation and configuration depending on the needs of the target species
- Generally, linkages are identified and designed to meet the known movement requirements of the more demanding species (e.g., species prone to predation or averse to openings, or species that move very slowly)
- Where natural cover is not continuous through a linkage, smaller patches of natural cover that are closely spaces can serve as stepping stones for species movement and provide the linkage function
- Avoid, where possible, identifying a linkage where a physical barrier may adversely impact the ecological function of the linkage (e.g. major roads or urban areas).
- Redundancy in linkages would ensure the system retains its overall connectivity and ecological integrity for the long-term.

“Geographic scale is a strong consideration in the identification of linkages. Linkages that are designed to function at the landscape scale may be greater in width (several hundred metres or more) and more generalized relative to connections at the local or site scale. Examples of these differences in scale are found in the provincial land use plan N.H.S.s developed for the Oak Ridges Moraine and Central Pickering (see section 15 to access an electronic copy). The Oak Ridges Moraine N.H.S. is at a larger scale and generally contains 2-kilometre wide linkages while the Central Pickering Development Plan corridors are at a smaller scale, a minimum of 100 metres wide” (Ontario Ministry of Natural Resources, 2010).

Section A.2.3.5 of the Natural Heritage Reference Manual recommends local corridors have a minimum width of 50 to 200 metres while regional corridors have a minimum width of 300 to 400 metres (OM.N.R. 2010).

There may be substantial flexibility in the location and/or adjustment of linkage boundaries in some cases. For all linkages, the location must be based on providing

ecologically functional connections that maintain a consistent width (i.e., “bottlenecks” or narrowing of the N.H.S. will adversely impact the ecological function provided by a linkage and should therefore be avoided). However, in some cases, particularly where a natural feature is not the linkage, an entire linkage could be shifted one way or another provided the ecological function is maintained. In cases where a linkage is centered on a feature, it is important that the feature continue to be included within the linkage, and this may in turn limit the degree of flexibility in moving the linkage. Where a linkage is associated with a watercourse, it may be possible to move the watercourse feature and the associated linkage function, to a new location within the landscape where permitted by policy and Conservation Authority regulations. For example, in Halton Region as part of a Subwatershed Study, where a watercourse that is now evaluated as a headwater drainage feature (H.D.F.) that can be modified or relocated according to acceptable protocols (i.e., Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation. 2014), the linkage must be maintained but can be moved as part of the H.D.F. relocation.

It is important to note that “the identification of linkages in agricultural areas would indicate an intention for both interests to be accommodated in the working landscape, for example, through good farming practices and stewardship, and not an intention to restrict existing agricultural uses through land use controls” (OM.N.R. 2010, Natural Heritage Reference Manual. Section 3.4.5., p. 34).

Environment Canada’s publication *How much habitat is enough?* (2013) provides a strategic framework and guidelines for protecting and enhancing wetland, riparian, forest and grassland habitats. It is intended to serve as a starting point for the development of natural heritage systems (N.H.S.). The framework acknowledges the need for a systematic approach that “*better captures the complexity of life and the multiple and often known linkages that allow species to flourish.*” (Environment Canada, 2013). Moreover, is the recommendation to look beyond the boundaries of specific planning units, such as municipal boundaries, and to take into account surviving habitat corridors and to promote linkages across the landscape.

Guidelines identified in Environment Canada’s (2013) report related to linkages and enhancement considerations include the following:

- Linkages and corridors designed to facilitate species movement between forested habitats should be a minimum of 50 to 100 metres in width. Corridors designed to accommodate habitat for specialist species need to meet the habitat requirements of those target species and account for the effects of the intervening lands
- Wooded corridors 50 metres in width can facilitate movement for common generalist species (Environment Canada, 2013)
- Stream corridors 75 to 175 metres in width have been supported for breeding bird species and 10 to 30 metres have been found to be sufficient to support habitat for 90% of streamside plant species (Spackman and Hughes, 1995)

- For effective restoration (or enhancement), consider local site conditions, use local sources to propagate new vegetation, and wherever possible refer to historic locations or conditions for wetlands (however this could apply to other habitat types as well)
- Restore and create native grassland patches to their historic extent and type at a county, municipal and /or watershed level, taking into consideration past, present and current conditions

14.2 Approaches of Other Municipalities

14.2.1 Halton Region

The Halton Region Official Plan (June 19, 2018) defines Linkage and Enhancements as:

Enhancement to the Key Feature (Section 229.1.1) means ecologically supporting areas adjacent to *Key Features* and/or measures internal to the *Key Features* that increase the ecological resilience and function of individual *Key Features* or groups of *Key Features*.

Linkage (Section 255) means an area intended to provide connectivity supporting a range of community and ecosystem processes enabling plants and animals to move between *Key Features* over multiple generations. Linkages are preferably associated with the presence of existing natural areas and functions and they are to be established where they will provide an important contribution to the long-term sustainability of the Regional Natural Heritage System. They are not meant to interfere with normal farm practice. The extent and location of the linkages can be assessed in the context of both the scale of the proposed development or site alteration, and the ecological functions they contribute to the Regional Natural Heritage System.

Enhancements and Linkage Areas are protected as components of the Regional N.H.S. according to Policy 118. (2) b), by “Not permitting the alteration of any components of the Regional Natural Heritage System unless it has been demonstrated that there will be no negative impacts on the natural features and areas or their ecological functions; in applying this policy, agricultural operations are considered as compatible and complementary uses in those parts of the Regional Natural Heritage System under the Agricultural System and are supported and promoted in accordance with policies of this Plan.”

14.2.2 York Region Official Plan

York Region was one of the first municipalities to adopt a systems-based approach into N.H.S. policy in the 1990s. Its Regional Greenlands System preserves and enhances natural features within a connected natural heritage system. The function and vision of the Greenlands System is the protection of natural heritage features in a system of cores connected by corridors and linkages. The connections follow recognizable

landscape features such as valleys and watercourses. Policies are written that provide limited development within the Regional Greenlands. It includes the Oak Ridges Moraine (O.R.M.) Conservation Plan 2017 Natural Core Area and Natural Linkage Area designations, the Natural Heritage System (N.H.S.) within the Protected Countryside of the Greenbelt Plan 2017, key natural heritage features, key hydrologic features and functions, and the lands necessary to maintain these features within a system. Furthermore, the R.O.P. acknowledges that the N.H.S. as it exists today is fragmented, and therefore provides strategic areas for enhancement and restoration, with the intention of strengthening the core areas to ensure that foundations of the system are strong. Development and site alteration are prohibited within the Greenlands System. Proposed developments and/or site alterations are to be accompanied by an Environmental Impact Study (E.I.S.) on lands located within 120 metres of the Greenlands System. In addition, the Greenlands System Vision is illustrated on Map 2 of the Regional Official Plan where it has conceptually identified with broad arrows, the general location of corridors within and beyond the Region that serve to perform major linkage functions on a regional scale.

14.2.3 The City of Hamilton Official Plan (2013)

The City's N.H.S. consists of Core Areas as well as supportive features or linkages that maintain the ecological functionality and connectivity of the natural system. Linkages are defined as "natural areas within the landscape that ecologically connect Core Areas," yet there is no delineation, identification, or criteria of linkages in the Official Plan. Policy 2.7 notes that "Linkages be protected, restored, and enhanced to sustain the Natural Heritage System wherever possible." The sub-sections of Policy 2.7 provide further guidance for the identification and protection of linkages. Policy 2.7.5 requires that "where new development or site alteration is proposed within a Linkage in the Natural Heritage System as identified in Schedule B – Natural Heritage System, the applicant shall prepare a Linkage Assessment", either as a stand-alone report or part of an E.I.S. In November 2013, the City released a Draft Linkage Assessment Guidelines document that provides direction for evaluating how and to what extent development can occur within an identified Linkage.

14.2.4 City of Guelph Official Plan

In the City of Guelph's Official Plan (O.P.), the Natural Heritage System is comprised of a combination of Significant Natural Areas (including Ecological Linkages, Restoration Areas and Minimum Buffers), Natural Areas, Restoration Areas and Wildlife Crossings. Ecological Linkages are mapped on the O.P. schedules and are 100 metres in width except where existing narrower linkages have been approved or identified. Ecological Linkage are defined as "areas identified based on the principles of conservation biology that connect Significant Natural Areas and/or protected Habitat for Significant Species and along which wildlife can forage, genetic interchange can occur, and populations can move from one habitat to another in response to life cycle requirements. Ecological Linkages provide or enhance connectivity where it is otherwise lacking, ensuring a systems-based approach, and supporting natural connections between Significant Natural Areas and/or protected Habitat for Significant Species. Ecological Linkages can

also include those areas currently performing, or with the potential to perform linkage functions through restoration measures. Although linkages help to maintain and improve the Natural Heritage System and related ecological functions, they can also serve as habitat in their own right.”

According to policy 4.1.2, “development and site alteration shall not be permitted within the Natural Heritage System, including minimum or established buffers.” The following exceptions are permitted:

- essential infrastructure (limited to the extent possible)
- legally existing uses, buildings or structures
- passive recreational activities
- low impact scientific and educational activities
- fish and wildlife management
- forest management
- habitat conservation, and restoration activities.

In addition to the General Permitted Uses of Section 4.1.2, the following additional uses may be permitted in Ecological Linkages subject to the requirements of 4.1.2.7 and 4.1.2.8, where it has been demonstrated through an E.I.S. or E.A., to the satisfaction of the City, in consultation with the Grand River Conservation Authority (G.R.C.A.) and/or Ministry of Natural Resources and Forestry (M.N.R.F.) where appropriate, with consideration for the M.N.R.F.’s technical guidance that there will be no negative impacts to the function of the linkage:

- essential linear infrastructure and their normal maintenance
- flood and erosion control facilities and their normal maintenance
- water supply wells, underground water supply storage and associated small scale structures (e.g., pumping facility).

Additional guidance and policy pertaining to Ecological Linkages is provided in Policy 4.1.3.9., subsections 8 to 13 of Guelph’s O.P. These policies provide the opportunity to further study linkages and propose an alternate location or width according to the direction provided in these policies.

Restoration Areas are identified on Schedule 4 of the O.P., and are “generally located on public lands, and identify potential areas where restoration may be directed.” Restoration areas can include:

- Existing and new stormwater management areas abutting the N.H.S.;
- Areas within City parkland (including portions of the Eastview Community Park) and G.R.C.A. lands which are not intended for active uses; or
- Isolated gaps within the N.H.S.

The latter two restoration areas could also be considered “enhancement areas” in their role and function within the N.H.S. Policies prohibit development and site alteration

within Restoration Areas except for the uses permitted by the General Permitted Uses of Section 4.1.2.

14.3 Relevance to the New Niagara Official Plan

Linkages and enhancement areas are regarded as necessary components of a robust N.H.S., as such have been identified in N.H.S.s by many municipalities in their O.P. However, linkages and enhancement areas are not consistently designated in the same way across municipal O.P.s, and there is a lack of criteria for the identification and delineation of these components of the N.H.S. Often, the identification of linkages and enhancements will vary depending on the level of urbanization and extent of natural features and will also vary between rural and urban areas. Consideration should be given for providing criteria and guidance for the identification of linkages and enhancement areas if refinements are permitted, either in the O.P. definitions or E.I.S. guidelines.

There is consistency across municipal O.P.s providing for flexibility in the policies that allow for assessment, realignment/reconfiguration, and even types of development that may be permitted in linkages and enhancement areas. When considering modifications to the extent and location of linkages and enhancements, it is critical that the function of these components must be maintained following any form of development. For example, certain forms of infrastructure (e.g., stormwater management ponds) may be permitted within linkage and enhancement areas so long as the function of the enhancement and linkage is not compromised. This can be determined by evaluating if the modification meets the test of 'no negative impact'.

The Growth Plan N.H.S. identified for Niagara Region does include regional linkages (i.e., wide linkages >500 m) between core areas within the Growth Plan N.H.S. Recognizing the requirement to represent the Growth Plan N.H.S. as an overlay, which includes regional linkages, the Region should consider if/how/where local linkages (e.g., 50 to 200 metres wide as recommended by the Natural Heritage Reference Manual) will be identified in order to achieve the goals and objectives for the Region's N.H.S.

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15.0 Setbacks, Buffers, Vegetation Protection Zones and Riparian Vegetation

15.1 Setbacks, Buffers and Vegetation Protection Zones

In the context of N.H.S. planning, it is generally accepted that changes in land use, such as new development adjacent to a natural feature should be setback from the feature. A setback is strictly a measured distance from the edge of an identified natural feature. The purpose of the setback is to separate two different land uses to minimize impacts to the natural feature, avoid conflicts, protect property and individuals from natural hazards, and allow access/maintenance. The width/distance of the setback can be determined based on a geotechnical assessment and hazard delineation, ecological buffer zone, rights-of-way and access. Although often used as a synonym for buffer, this term is generally intended as a land use planning term (e.g., a zoning term) used to describe the minimum required distance between any structure or lot line and a feature. Setbacks can include ecological buffers, but do not necessarily serve the same purpose as ecological buffers.

An ecological buffer (or simply 'buffer') means an area of land located adjacent to a natural heritage feature and usually bordering lands that are subject to development or site alteration. Whereas a setback has a range of purposes, the purpose of a buffer is strictly intended to protect the feature and ecological functions of the N.H.S. by mitigating impacts of a proposed development, change in adjacent land use, or site alteration. Where new development is proposed, the extent of the buffer and activities that may be permitted within it should be based on the sensitivity and significance of the natural heritage feature and their contribution to the long term ecological functions of the overall N.H.S. as determined through some sort of ecologically and/or hydrologically-based study (e.g., Subwatershed Study, Environmental Impact Study, or other similar study) that examines a sufficiently large area.

The Greenbelt Plan and Growth Plan use the term vegetation protection zone (V.P.Z.), rather than buffer, which is defined as "a vegetated buffer area surrounding a key natural heritage feature or key hydrologic feature".

Policy 3.2.5.4 of the Greenbelt Plan states that:

"In the case of wetlands, seepage areas and springs, fish habitat, permanent and intermittent streams, lakes, and significant woodlands, the minimum vegetation protection zone shall be a minimum [underline added for emphasis] of 30 metres wide measured from the outside boundary of the key natural heritage feature or key hydrologic feature."

Policy 3.2.5.5 of the Greenbelt Plan states that:

"A proposal for new development or site alteration within 120 metres of a key natural heritage feature within the Natural Heritage System or a key hydrologic feature

anywhere within the Protected Countryside requires a natural heritage evaluation and hydrological evaluation, which identify a vegetation protection zone which:

- a) Is of sufficient width to protect the key natural heritage feature or key hydrologic feature and its functions from the impacts of the proposed change and associated activities that may occur before, during and after construction and, where possible, restore or enhance the feature and/or its function; and
- b) Is established to achieve and be maintained as natural self-sustaining vegetation.”

The policies pertaining to V.P.Z.s within the Growth Plan are consistent with the Greenbelt Plan. The Greenbelt Plan and Growth plan require a minimum 30 m V.P.Z. from key features to which there are few exceptions. The minimum buffer widths are to be applied from the edge of the feature being protected. It should be noted that in some cases more detailed studies may recommend a buffer width greater than the minimum 30 m buffer width defined in order to protect natural heritage features (e.g. Provincially Significant Wetlands, significant wildlife habitat) and critical function zones.

Buffers are typically vegetated (and in the case of V.P.Z.s shall be vegetated), whether through planting or natural regeneration; as such, they become ‘natural’ and provide habitat for wildlife. The vegetation within buffers or V.P.Z.s enhance the function of the buffer to mitigate impacts to the feature. While naturally vegetated buffers will provide habitat for wildlife and potentially enhance the functions of the feature, they should not (according to their intended purpose) be identified or managed as part of the feature; rather, they should be treated and managed for the function they were intended to fulfil, which is to provide protection from impacts resulting from changes in adjacent land use. It should be noted that Growth Plan policy 4.2.4.4.c exempts agricultural uses “from the requirement of establishing a condition of natural self-sustaining vegetation if the land is, and will continue to be, used for agricultural purposes; and ii. will pursue best management practices to protect and restore key natural heritage features, key hydrologic features, and their functions.” Policy 3.2.5.7 of the Greenbelt Plan also provides the same exemption regarding the V.P.Z.

15.1.1 Special Considerations for Vegetation Protection Zones

According to policies 3.2.5.7 and 3.2.5.8 of the Greenbelt Plan (2017), the agricultural community is exempt from Policy 3.2.5.4 and 3.2.5.5 (stated above) within the Niagara Peninsula tender Fruit and Grape Area (which covers the Town of Niagara on the Lake almost entirely), whereby:

“New buildings or structures for agricultural, agriculture-related and on-farm diversified uses are permitted [emphasis added] within 30 metres of permanent and intermittent streams, where:

- a) The permanent or intermittent stream also functions as an agricultural swale, roadside ditch or municipal drain as determined through provincially approved mapping;

- b) A minimum 15 metre vegetation protection zone is established between the building or structure and the permanent or intermittent stream; however, this vegetation protection zone is not required to be maintained as natural self-sustaining vegetation if the land is and will continue to be used for agricultural purposes;
- c) There is no alternative location for the building or structure on the property without impacting lands that are in specialty crop production;
- d) A new individual on-site sewage system will not be located within 30 metres of the stream; and
- e) Agricultural, agriculture-related and on-farm diversified uses shall pursue best management practices to protect or restore key hydrologic features and functions.”

Additionally, it is acknowledged in the Greenbelt Plan that infrastructure serving the agricultural sector, such as agricultural irrigation systems, may need certain elements to be located within the V.P.Z. of a key natural heritage feature or key hydrologic feature. For these instances, elements of the infrastructure are allowed to be established within the feature itself or its associated V.P.Z. However, all reasonable efforts shall be made to keep such infrastructure out of key natural heritage features, key hydrologic features and their associated vegetation protection zones to the extent possible.

15.1.2 Comparator Municipal Approaches to Buffers

Upper-tier municipalities vary in their approach to prescribing buffers. Halton Region does not prescribe buffers; however, buffers are mapped as part of the Regional N.H.S. outside of urban areas and are treated as a component of the N.H.S., thereby being afforded protection as per the N.H.S. policies in Halton’s R.O.P. The Region of Waterloo provides for the following, as noted in Policy 7.C.11 (Waterloo Official Plan 2015):

“The location, width, composition and use of buffers will be in accordance with the approved Environmental Impact Statement, with buffers being a minimum of 10 metres as measured from the outside boundary of the Core Environmental Feature and established and maintained as appropriate self-sustaining native vegetation.”

The York R.O.P. (2016 consolidated version) provides the following direction in policy 2.2.47, regarding V.P.Z.s for woodlands:

“That a vegetation protection zone be required for significant woodlands. The width of the vegetation protection zone shall be determined through an environmental impact study but shall be no less than 30 metres from the dripline of significant woodlands within the Oak Ridges Moraine, the Greenbelt and the Lake Simcoe watershed as detailed in policies 2.2.15, 2.2.16 and 2.2.18 of this Plan, and no less than 10 metres from the dripline of significant woodlands outside of those plan areas.”

Other municipalities prescribe minimum buffers from key features that vary in width depending on the significance and sensitivity of the feature and the location of the feature (e.g., urban vs. rural areas). For example, in the rural area of the City of Hamilton the following buffers are prescribed:

- 30 m from each side of watercourses, wetlands, lakes, fish habitat, significant woodlands (drip line), Life Science A.N.S.I.s
- 15 m from other woodlands (drip line) and top of bank of significant valleylands

Whereas in the urban area in the City of Hamilton the following buffers are prescribed:

- 30 m from coldwater watercourse, critical habitat, P.S.W.s
- 15 m from warmwater watercourses, unevaluated and locally significant wetlands, significant woodlands (dripline), Life Science A.N.S.I.s
- 10 m from other woodlands (dripline)

It should be noted that although these buffers are identified as minimums in the City of Hamilton's OP, the policies do provide flexibility for site specific applications to recommend a greater or lesser buffer where supported by an approved ecological study.

Whether or not official plans specify minimum buffer widths, they generally include a requirement for appropriate ecological studies (E.I.S., E.I.A., subwatershed studies, etc.) to be completed and approved to determine the final width of buffers. In the majority of cases where a municipality has identified minimum buffers in their official plan, these buffer widths are used in development planning applications and are not applied to existing uses. The considerations and direction for determining an appropriate buffer width can be found in some environmental impact assessment/study guidelines. For example, the Region of Waterloo Greenlands Network Implementation Guideline (2016) provides guidelines for determining buffers around environmental features based on the following three principles:

- Protection of environmental features from adverse environmental impacts originating on contiguous lands approved for development or site alteration;
- Transition between new development or site alteration and environmental features; and
- Opportunities for net ecological enhancement or wherever feasible, restoration of the ecological functions of the Core Environmental Feature.

The Region of Waterloo's Greenlands Network Implementation Guideline goes further to provide considerations in the design (e.g., width and function) of buffers.

Region of Halton Buffer Width Refinement Framework

The Region of Halton has recently prepared a comprehensive Framework for Regional Natural Heritage System Buffer Width Refinements for Area-Specific Planning (Halton 2017). The purpose of the Buffer Refinement Framework is to "... provide assistance in

identifying refinements to the buffer component of the Regional Natural Heritage System (R.N.H.S.) in the context of developing and implementing an Area-Specific Plan, in accordance with R.O.P. policies.” An Area-Specific Plan is defined as “a Local Official Plan Amendment applying to a specific geographic area such as a secondary plan or a Regional Official Plan Amendment applying to a specific geographic area” (Halton R.O.P., policy 216.2). As such, the Buffer Refinement Framework relates specifically to a set of development applications that would trigger an O.P.A., and not necessarily other development applications where an Environmental Impact Assessment is required (e.g., severance, building permit, zoning amendment, etc.).

The document title is noteworthy in the use of “refinement” as opposed to “determination”. This inherently reflects the Region’s position on buffers. As noted in the purpose from the ‘Overview’, buffers are part of the Regional N.H.S. and are included in the R.N.H.S. on Map 1G. It is taken for granted that the buffers are as mapped on Map 1G, and that they are refined from that, as opposed to be determined. Thus, changes to buffer widths constitute a refinement to the R.N.H.S. and require meeting tests as outlined further in the R.O.P.

The framework provides a detailed methodology that includes a three-part assessment for determining buffer width that consists of:

1. The sensitivity and significance of ecological features and functions protected;
2. The potential negative impacts on ecological features and functions arising from adjacent land use; and
3. The management and uses within the buffer which may mitigate and/or exacerbate potential negative impacts on ecological features and functions.

Based on the outcome of the assessment the “base buffer” of 30 m (currently mapped as part of the Regional N.H.S.) may remain the same, be reduced by five to ten metres in certain situations or be increased in width as determined through more detailed studies.

General Note on Prescribing Buffers

For the most part, ecological studies recommend the minimum buffer as prescribed through policy, regardless of the sensitivity or significance of the feature and the potential for negative impacts resulting from a change in land use on adjacent lands. We know of only one example where an ecological study undertaken in support of a development recommended increasing the minimum buffers (a specific instance where a woodland buffer was increased from the minimum 10 m to 20 m based on ecological sensitivities). Applying an objective approach to determine ecologically appropriate buffers based on the sensitivity and significance of features and the potential for changes in adjacent land use should be applied. An appropriate tool to ensure this occurs is to provide a guidance document that is required to be followed, which can be specified through Environmental Impact Study guidelines.

15.1.3 Review of Buffer Guidance Documents

A comprehensive literature review was recently prepared for Credit Valley Conservation in the report 'Ecological Buffer Guideline Review' (Beacon, 2014). The literature review provides an assessment of the effectiveness of varying buffer widths for various ecological features and functions. The review provides an eight-step evaluation methodology to determine buffer width for urban planning that considers intrinsic conditions (i.e., vegetative structure, soils, slope and hydrology) and extrinsic conditions (i.e., nature and extent of land use impacts), as well as sensitivities of the protected natural feature and functions, and buffer design and management options that may improve buffer effectiveness. Two important key findings from the review recognize the importance of buffers for mitigating disturbances and increasing certainty of N.H.S. functions:

1. There is affirmation that buffers are an appropriate mitigation tool: "... there is substantial empirical evidence that vegetative buffers can and do perform a number of functions that help protect various types of natural features and mitigate the impacts of human disturbances or changes in land use in the adjacent lands." (Beacon, 2014 p. 83), albeit this is qualified by noting that there are gaps in the science.
2. There are very few studies that provide guidance on buffer widths for some aspects of upland woodlands (which is probably the most common feature affected by development). The review took an innovative approach to presenting the ranges of appropriate buffer widths organized by the "Risk of Not Achieving the Desired Buffer Function" (Beacon, 2014 Table 7, p. 88 – Figure 1 of this report). Not surprisingly, the risk declined as buffer widths increased. This approach fits speaks to "increasing the certainty" that biodiversity and ecological function will be preserved. Based on the Beacon framework, providing a wide buffer reduces the risk of not achieving the desired function and thus increases the certainty that biodiversity and ecological function are preserved.

Natural Heritage Feature Category	Buffer Function Category	< 5 m	5 – 10 m	11 – 20 m	21 – 30 m	31 – 40 m	41 – 50 m	51 – 60 m	61 – 70 m	71 – 80 m	81 – 90 m	91 – 100 m	101 – 110 m	111 – 120 m	> 120 m
WATERCOURSES and WATER BODIES															
	A. Water Quantity	data indicate that this is not mitigated by site specific buffer													
	B. Water Quality														
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
WETLANDS															
	A. Water Quantity	data indicate that this is not mitigated by site specific buffer													
	B. Water Quality														
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
UPLAND WOODLANDS and FORESTS															
	A. Water Quantity	insufficient data													
	B. Water Quality	insufficient data													
	C. Screening of Human Disturbance / Changes in Land Use														
	D. Hazard Mitigation Zone	should be based on consideration of hazards, but may overlap with buffers													
	E. Core Habitat Protection														
MEADOWS															
	A. Water Quantity	insufficient data													
	B. Water Quality	insufficient data													
	C. Screening of Human Disturbance / Changes in Land Use	insufficient data													
	D. Hazard Mitigation Zone	insufficient data													
	E. Core Habitat Protection*														

*data available for area-sensitive grassland birds only

Note 1: In all cases the buffer is to be applied from the Critical Function Zone limit, not strictly the feature boundary.

Note 2: Supporting literature is identified in Appendix A.

Key: Risk of Not Achieving the Desired Buffer Function

HIGH

MODERATE

LOW

Figure 1. Table 7 from the Ecological Buffer Guideline Review (Beacon Environmental Ltd., 2012).

15.2 Riparian Vegetation

Riparian areas are located next to streams, lakes or wetlands and when vegetated, they enhance and protect aquatic resources and promote connectivity between features within the natural environment system. Vegetated riparian areas prevent bank erosion, where soil from bank erosion becomes sediment in the waterway which damages aquatic habitat, degrades drinking water quality, and fills wetlands, lakes and reservoirs. The benefits of riparian vegetation include:

Benefits for Aquatic Resources

- stabilize eroding banks;
- filter sediment from agricultural land runoff;
- filter nutrients, pesticides, and animal waste from agricultural land runoff;
- provide shade, shelter, and food for fish and other aquatic organisms;
- improve stream temperatures by partially blocking direct solar radiation through shading by vegetation and mitigating impacts of run-off;

Benefits for Terrestrial Resources

- wildlife habitat;
- economic products (e.g., lumber and veneer, fiber, hay, nuts, fruit and berries);
- visually diversify a cropland landscape; and
- protect cropland from flood damage.

Vegetated riparian areas reduce the frequency of having to clean out sediment, which ultimately saves time, energy and cost to clean drains, maintain tile outlets and irrigation ditches. Natural overhanging vegetation provides shade that cools the watercourse, improving habitat for fish and wildlife, while reducing algae and undesirable vegetation. Riparian vegetation along watercourses and ditches beside cropland can also serve to reduce crop damage from waterfowl (Ontario Farm Environmental Coalition, Agriculture and Agri-Food Canada and Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs 2013).

Riparian vegetation can also assist in supplying a diversity of cover and food for wildlife, stepping stone habitat, and improve linkage function. Connected stretches of well vegetated riparian areas become wildlife corridors, greatly improving habitat for larger animals. In recognition of the important role riparian vegetation plans as part of the natural environment system, policy 7.A.1.1 of the existing R.O.P. states the following:

“The Region shall support efforts to achieve the following targets through the development and implementation of watershed and environmental planning studies and through voluntary landowner stewardship and restoration:

- b) A 30-metre-wide naturally vegetated buffer along 70% of the length of the first to third order streams in Niagara. Agricultural uses may continue within this buffer and are encouraged to employ best management practices to protect water resources and natural heritage.”

15.3 Relevance to the New Niagara Official Plan

- The new N.O.P. will need to provide a definition of V.P.Z., and policies for the protection and implementation of exemptions (e.g., agriculture) and minimum required V.P.Z.s that is consistent with the Greenbelt and the Growth Plan. The Region may consider including requirements for buffers and even prescribe minimum buffers as part of the natural environment system.

- The N.O.P. must ensure that policies related to buffers to V.P.Z.s refer to and are consistent with the Greenbelt Plan policies 3.2.5.7 and 3.2.5.8 (M.M.A.H. 2017), which notes that the agricultural community is exempt from Policy 3.2.5.4 and 3.2.5.5 within the Niagara Peninsula tender Fruit and Grape Area.
- The Region may consider developing a guidance document for determination of buffers as part of site-specific studies (e.g., subwatershed plan, secondary plan, Environmental Impact Study). There are several examples from comparator municipalities which the Region may be able to draw from.

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16.0 Contemporary Mapping of Watercourses Project

16.1 Introduction

The Contemporary Mapping of Watercourses (C.M.W.) project was undertaken as a joint Niagara Region and Niagara Peninsula Conservation Authority (N.P.C.A.) large scale mapping project. The goal of the project was to comprehensively assess Niagara's watercourses from an environmental risk and management perspective of surface water resources. In order to improve the mapping accuracy and application of mapping information to inform management decisions, the Region and N.P.C.A. developed a spatial dataset for use in a Geographic Information Systems (GIS) environment.

It was recognized that the medium to small scale mapping (i.e., 1:10,000 – 1:250,000) developed by and available from the Province did not provide the level of accuracy required for many of the needs of the Region and N.P.C.A. Typically, mapping at a scale of 1:2000 is preferred. Management needs include water resource and watershed featured identification, typical water management applications dealing with water quality and quantity issues, hydrologic and hydraulic studies, and the implementation of regulations and policies associated with surface water features, natural heritage and watershed planning. Therefore, the main objective of the C.M.W. project was to create a 1:2000 scale spatial dataset including an inventory and characterization of surface water features in Niagara Region.

16.2 Background

The Niagara Region's Niagara Water Strategy (NWS) program (2003-2015) was implemented to address the protection, restoration and management of water resources across the Niagara watershed through a series of "actions". The NWS program's 'Going Forward 2012-2014' report, identified a key action to address the need for more contemporary mapping of watercourses. The C.M.W. project was in response to that identified action.

Regional Council was introduced to the project through an information report and presentation in July of 2013 (ICP 78-2013). The project was also highlighted and presented to the Regional Planning Committee in report P.D.S. 21-2016. Each of the 12 municipalities were engaged through individual meetings (2013-2015) where the C.M.W. project was presented and discussed.

16.3 Technical Overview

In June 2012, the N.P.C.A. piloted a methodology in co-operation with the Water Resources Information Program (WRIP) of the Ministry of Natural Resources (M.N.R.). The focus of the N.P.C.A.'s pilot project was the application of SWOOP 2010 imagery and the derivative 1m contour supporting 'Digital Terrain Model' (DTM) from the City of

Hamilton to the update of existing integrated large-scale hydrology data using the Hamilton International Airport lands as a study area. The C.M.W. project was the technical foray into applying that piloted process in an official capacity beyond research and development.

In 2012, the N.W.S. retained a consultant to update the existing 1-meter contour mapping of the Niagara Region to refine the D.T.M. in order to improve detection of hydrologic features. Using the updated D.T.M., the C.M.W. project produced the following:

- The 'hydrologic network' was formed by updating an existing large-scale surface network using orthoimagery, D.T.M. breaklines, and Digital Elevation Models (D.E.M.) to assess and update each feature in the existing data. Waterbody flowlines and subsurface connections, such as culverts were also manually digitized, where necessary, to create a continuous network.
- A technical analysis was undertaken to record characterizations of segments via a series of attributes. The attributes used for the project were in part based on a guidance document published by W.R.I.P. in 2011, "Data Capture Specifications for Hydrographic Features", and modified definitions to reflect the significant features within the Niagara Region.

Tools used to assist in the characterization process included, D.E.M.s historical and recent aerial photos, existing spatial datasets tagged with environmental indicators, and local knowledge from stakeholders and some members of the public. Furthermore, select ground truthing was undertaken to confirm characterizations such as flow direction and culvert location.

The C.M.W. dataset represents the location of watercourses, waterbodies, and any subsurface features that support the integrity of a connective water flow "network" for the Niagara Region. In addition, some non-hydrological accessory segments (ex. lock gates, retaining walls) have been identified.

The spatial linework of the dataset represents accuracy within 0.5 metres at the time of the D.T.M. capture. Flow direction was imbedded into the segments; however, misdirection may exist on segments where a D.E.M. did not capture discernable changes in elevation along the waterline (e.g., minor features such as roadside ditch flow, where a segment could travel either opposing direction to connect to adjacent drainage features). Interpretative certainty is documented in the Flow Capture field.

The C.M.W. dataset contains feature characterization imbedded into attribute fields. Examples of fields and their characterizations are provided in Table 6.

Appendix 6 identifies the data fields, descriptions, and characterization options contained in the C.M.W. dataset, as well as additional comments on each attribute type.

Table 6. Attribute information contained within the C.M.W. dataset.

Field	Label		
Feature Type	Bridge/Overpass	Pipe/Inlet/Outlet/Outfall	Waterbody - Seasonal
	Retaining Wall	Pond – Agricultural	Waterbody – River
	Agricultural Drainage	Pond – Other	Waterbody – Liquid Waste
	Conduit	Pond – Stormwater	Wharf/Pier/Dock
	Culvert	Stream/Creek	Slough
	Ditch – Agricultural	Swale	Waterbody - Marina
	Ditch – Other	Canal	Rural Drainage
	Ditch – Roadside	Lock Gate	
	Headwater	Reservoir	Dam
	Island	Lake	Weir
	Open Storm Channel	Waterbody – Great Lakes	Artificial Headland/Jetty/Groyne
Flow type	Surface Water	Virtual Segment	
	Suspected Virtual	Virtual Segment Great Lake	
	Virtual Connector		
Channel type	Natural	Constructed open	
		Constructed closed	
Permanency	ephemeral	Permanent or Intermittent	
	Intermittent	Permanent	
	Intermittent or ephemeral		
Fish Habitat	Other	Type 2 – Important	
	Type 1 – Critical	Type 3 – Marginal	
Drain ID	OMAFRA designated municipal drain ID		

16.4 Applications of C.M.W. dataset

Throughout the development of the C.M.W. dataset, numerous components have been identified as a valuable tool/resource for various applications (see Table 7 for examples).

Table 7. Examples of applications of C.M.W. dataset to planning decisions.

Application	Value/Benefit
Feature Review	<ul style="list-style-type: none"> Spatially precise and updated locations of water features in relation to public/private properties, or natural/other features
Regulation Screening	<ul style="list-style-type: none"> Agency regulatory reviews, especially valuable when considering development and any associated buffers or restrictions
Spill Tracking	<ul style="list-style-type: none"> Imbedded flow direction markers of the dataset allow for upstream and downstream spill tracing to determine origin and impact of environmental hazards.
Feature Inventories	<ul style="list-style-type: none"> Subset datasets for locally specific features inventory (e.g., municipal culverts)
Data Consolidation	<ul style="list-style-type: none"> Condensing environmental indicators into one dataset
Official Plan Mapping	<ul style="list-style-type: none"> Municipal Drains, identifying components of the Regional Natural Environment Systems
Stormwater Management	<ul style="list-style-type: none"> Considerations of how the natural system connects with wastewater infrastructure including input areas and contributions to system
Watershed/ Subwatershed Plans	<ul style="list-style-type: none"> Watershed characterization and identification of the Water Resources System
Application of Provincial Policy	<ul style="list-style-type: none"> E.g., Greenbelt Policy 3.2.5.8
Archeological Assessment Screen	<ul style="list-style-type: none"> Differentiation of features as natural or artificial aid in determination of archeological potential

16.4.1 Use of Dataset for Mapping Natural Environment Systems

The C.M.W. dataset has characterized features that could be used to map components of the N.H.S. and W.R.S. as identified in Provincial Plans. Table 8 identifies the various components of the N.H.S. and W.R.S. from the Provincial Plans for which the feature/attribute type is identified within the C.M.W. dataset. The Mapping Discussion Paper (prepared under separate cover) has reviewed the suitability of each of the

attributes for mapping the components of the N.H.S. and W.R.S. The following attributes/features have been identified for consideration in mapping components selected as part of the N.H.S. and W.R.S.:

- Permanent streams and intermittent streams
- Inland lakes
- Headwaters
- Rivers
- Stream channels
- Fish habitat (pending further review)
- Municipal and constructed drains
- Agricultural drains

Table 8. Components of the N.H.S. and W.R.S. from the Provincial Plans for which the feature/attribute type is identified within the C.M.W. dataset.

Feature/Area	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017
Natural Heritage System			
Fish habitat	X	X	X
Permanent and intermittent streams			X
Lakes (and their littoral zones)*			X
Water Resource System			
Headwaters	X		
Rivers	X		
Stream channels	X		
Inland lakes	X		
Permanent streams		X	X
Intermittent streams		X	X
Inland lakes and their littoral zones		X	X

* note: littoral zones are not included in the attributes of the C.M.W. dataset.

16.5 Limitations for Use of C.M.W. in Official Plan Mapping

Like many GIS-based datasets, the C.M.W. dataset was primarily a desktop exercise incorporating locations of feature from models and orthoimage interpretation. Due to the scale at which the dataset was produced (1:2000) the level of accuracy should be relatively high regarding the locations of features. However, field verification for certain attributes may be required if mapped as part of the N.H.S. For example, the fish habitat markers imbedded in the dataset was done by visually inferring from the existing previously described fish habitat datasets. Although the C.M.W. provides a greater level

of accuracy regarding watercourse location, the process of inferring fish habitat into the dataset produced visual differences between the spatial linework of the datasets. This was often apparent where fish habitat no longer could be identified due to the absence of a water feature. Up to this point, there has been no mechanism to recognize or update the fish habitat data layer based on site visits for development review. The C.M.W. dataset provides a good preliminary base for fish habitat identification, however, all datasets are lacking updated information and verification of habitat existence. Further discussion is provided in the Fish Habitat section of this report.

16.6 Relevance to the New Niagara Official Plan

The C.M.W. dataset represents the most accurate large-scale hydrologic GIS-based mapping available for water feature identification in the Niagara Region. The following attributes/features should be considered for use in mapping components selected as part of the N.H.S. and W.R.S.:

- Permanent streams and intermittent streams
- Inland lakes
- Headwaters
- Rivers
- Stream channels
- Fish habitat (pending further review)
- Municipal and constructed drains
- Agricultural drains

It should be recognized that the C.M.W. dataset was primarily a desktop exercise and field verification may be required if mapped as part of the N.H.S. or W.R.S.; this will in part depend on how the Region intends to map the N.H.S. or W.R.S. – whether as an overlay or designation. If it is a designation, a higher level of certainty regarding the accuracy of features will be required and field verification would be recommended. However, if policies are developed that allow for refinement of features based on approved studies where ground-truthing and field verification results in modifications to the location/extent of features and it is recognized that an Official Plan Amendment would not be required where modifications are proposed, the level of accuracy of mapping is not as high a concern - in this case, field verification of the mapped components in the C.M.W. dataset would not be required as part of producing the mapping of the N.H.S. or W.R.S.

17.0 Natural Environment Planning in Niagara Region

17.1 Introduction

The first Regional Official Plan ('R.O.P.') was prepared in the early 1970s. Later in the 1970's the urban area boundaries were reviewed and the Agricultural and Rural Areas section and the Environmental Areas section were revised in 1976 and 1977. A major review of the R.O.P. was carried out in the early 1990's and the Province approved the updated policies in December 1994. Since that time the R.O.P. has been amended as necessary in response to Provincial initiatives and individual applications; however, the basic format of the R.O.P. has remained the same as when it was first created in the 1970's.

Chapter 2 of the existing R.O.P. is entitled 'Growing the Economy'. Within this chapter are a number of strategic objectives, one of which deals with the natural environment as set out below:

- 2.4 To preserve and enhance the ecological processes and life-support systems essential for sustaining human well-being and the health of the natural environment.
 - a) Importance of water quality (e.g., as a source of drinking water, and for fishery habitat).
 - b) Public facilities to protect water quality.
 - c) Air quality improvements by good urban design, reduced commuting, and linking residential and employment areas.
 - d) Contributions of natural areas (e.g., wetlands).

To some extent, the strategic objective above is the basis for the policies in the exiting R.O.P.

17.2 Details of Chapter 7 – Natural Environment

Chapter 7 of the existing R.O.P. deals with the natural environment. The basis of the policy framework is the maintaining of a healthy landscape throughout Niagara while giving particular attention to natural features of special significance within the broader landscape. It is also indicated that the core natural heritage system is an essential component of this healthy landscape. It is also indicated in Figure 7-1 of that the Region and the area municipalities each have specific roles to play in terms of implementing the policy framework.

In this regard, it is indicated that the Region is responsible through the R.O.P. for establishing the framework for planning and development review in a manner that is consistent with Provincial policies and plans. In addition, it is the role of the Region to implement provincial policies through its delegated responsibilities for planning and development review, review and approve Regional and local Official Plan Amendments and review and comment on planning and development applications. With respect to

area municipalities, it is their role to develop and adopt local Official Plans and secondary plans containing more detailed environmental policies in conformity with Provincial and Regional policies and plans and to review and approve zoning bylaw amendments and other development applications with input from the Region and the Conservation Authority.

In terms of the structure of Chapter 7, 7A explains the healthy landscape approach, 7B identifies the core natural heritage system and 7C sets the measures to implement the preceding policies. It is also indicated that natural system identified by the Greenbelt Plan is an important component of the broader healthy landscape in Niagara. It is also noted that policies applying specifically to the Greenbelt Area do not apply within the Niagara Escarpment Plan area.

Chapter 7A begins with a series of objectives for a healthy landscape. Many of these objectives are broad and principled. These objectives are followed by a series of policies and in this regard policy 7.A.2 is reproduced below.

“Development should maintain, enhance or restore ecosystem health and integrity. First priority is to be given to avoiding negative environmental impacts. If negative impacts cannot be avoided, then mitigation measures shall be required.”

It is noted that the above policy will need to be updated to reflect current Provincial policy, which does not establish a priority to avoiding negative environmental impacts. Instead Provincial policy requires that there be no negative impacts and if this cannot be demonstrated development and site alteration is not permitted.

Chapter 7.A.1 deals with natural vegetation and wildlife and it is within this section that two targets are established. The first target is that 30% of the land area in the Region should be in forest cover or wetland with at least 10% of each sub-watershed in wetland. The second target is that there should be a 30-metre-wide naturally vegetative buffer along 70% of the length of the first to third order streams in Niagara.

Chapter 7.A.2 deals with water resources and Policy 7.A.2.1 below sets out the Region's approach:

“Development and site alteration shall only be permitted if it will not have negative impacts, including cross-jurisdictional and cross-watershed impacts, on:

- a) The quantity and quality of surface and ground water;
- b) The functions of ground water recharge and discharge areas, aquifers and headwaters;
- c) The natural hydrologic characteristics of watercourses such as base flow;
- d) Surface or ground water resources adversely impacting on natural features or ecological functions of the Core Natural Heritage System or its components;
- e) Natural drainage systems, stream forms and shorelines; and

f) Flooding or erosion.”

The three policies below also speak to the need to protect certain hydrologic features:

Policy 7.A.2.2 - Development and site alteration shall be restricted in the vicinity of vulnerable surface and ground water features of importance to municipal water supplies so that the safety and quality of municipal drinking water will be protected or improved.

Policy 7.A.2.3 - As watershed and ground water studies identify surface and ground water features, hydrologic functions and natural heritage features and areas necessary for the ecological and hydrologic integrity of Niagara's watersheds, the Region shall consider appropriate amendments to this Plan.

Policy 7.A.2.9 - Development and site alteration shall not have significant adverse impacts on ground water quality or quantity. In areas where development and site alteration could significantly affect ground water quality or quantity the Region shall require further review of potential impacts.

Chapter 7.A.3 deals with air quality and climate change and indicates that the region shall develop and implement a plan to reduce greenhouse gas emissions from Regional operations by at least 20% below 1994 levels and emissions from the community as a whole by at least 6% below 1994 levels by 2014. However, the policies also recognize that some climate change may be unavoidable and that the Region will need to develop and implement plans to adapt to potential impacts.

Chapter 7.A.4 deals with landforms, geology and soils. One of the policies in this section deals with Earth Science Areas of Natural and Scientific Interest as per below:

Development and site alteration may be permitted within an Earth Science Area of Natural and Scientific Interest (A.N.S.I.) shown on Schedule C if it has been demonstrated that there will be no significant negative impacts on the earth science features for which the area was identified or on ecological functions related to the A.N.S.I.

The above policy goes beyond the minimum standards established by the P.P.S. which indicates that development and site alteration is not permitted within **significant** Areas of Natural and Scientific Interest, whereas the above policy includes all Area of Natural and Scientific Interest.

Chapter 7.A.5 deals with shorelines. The policies within this section encourage landowners to maintain shorelines and establish some criteria that need to be satisfied when major development is proposed. There is also a prohibition in policy on development and site alteration in the Dune areas along the Lake Erie shoreline. In this regard the policies require the demonstration of no significant negative impacts on the natural features and ecological functions of the dunes or on adjacent property.

Chapter 7.A.6 deals with natural hazards and many of the policies within this section are generally consistent with the policy framework established in the P.P.S. In this regard, development and site alteration is prohibited within certain natural hazards as required. There are also a number of detailed policies in the section on valleylands and the need for setbacks from the stable top of the valley slope.

Chapter 7.B deals with the Core Natural Heritage System. The opening paragraph sets out what this is:

The Core Natural Heritage System contains environmental features and functions of special importance to the character of the Niagara community and to its ecological health and integrity. The Core Natural Areas within the System are significant in the context of the surrounding landscape because of their size, location, outstanding quality or ecological functions. They contribute to the health of the broader landscape, protecting water resources, providing wildlife habitat, reducing air pollution and combating climate change. Some contain features of provincial or even national significance, such as threatened or endangered species.

The following is also indicated with respect to how the Greenbelt Plan fits into the Core Natural Heritage System:

“In this Chapter of the Official Plan the Greenbelt Natural Heritage and Water Resources Systems are treated as components of the broader Regional Core Natural Heritage System. The Provincial Greenbelt Natural Heritage System is shown on the Core Natural Heritage Map included in this Plan. The key natural heritage features within the Greenbelt Natural Heritage System are identified as Environmental Protection Areas or Fish Habitat on the Schedule.”

The schedule referred to above is Schedule C. On the basis of the above it is clear that the Greenbelt Natural Heritage System is a component of the broader Regional Core Natural Heritage system as opposed to being two separate systems. Key hydrologic features have not been shown on Schedule C but would include those features identified as fish habitat. In terms of what is shown on Schedule C, below is a list of its components:

- Environmental Protection Area;
- Environmental Conservation Area;
- Greenbelt Plan boundary;
- Greenbelt Natural Heritage System;
- Niagara Escarpment Plan Area;
- Earth Science A.N.S.I.;
- Fish habitat;
- Municipal drain; and
- Potential natural heritage corridor.

Below is an extract of Schedule C showing the above components.

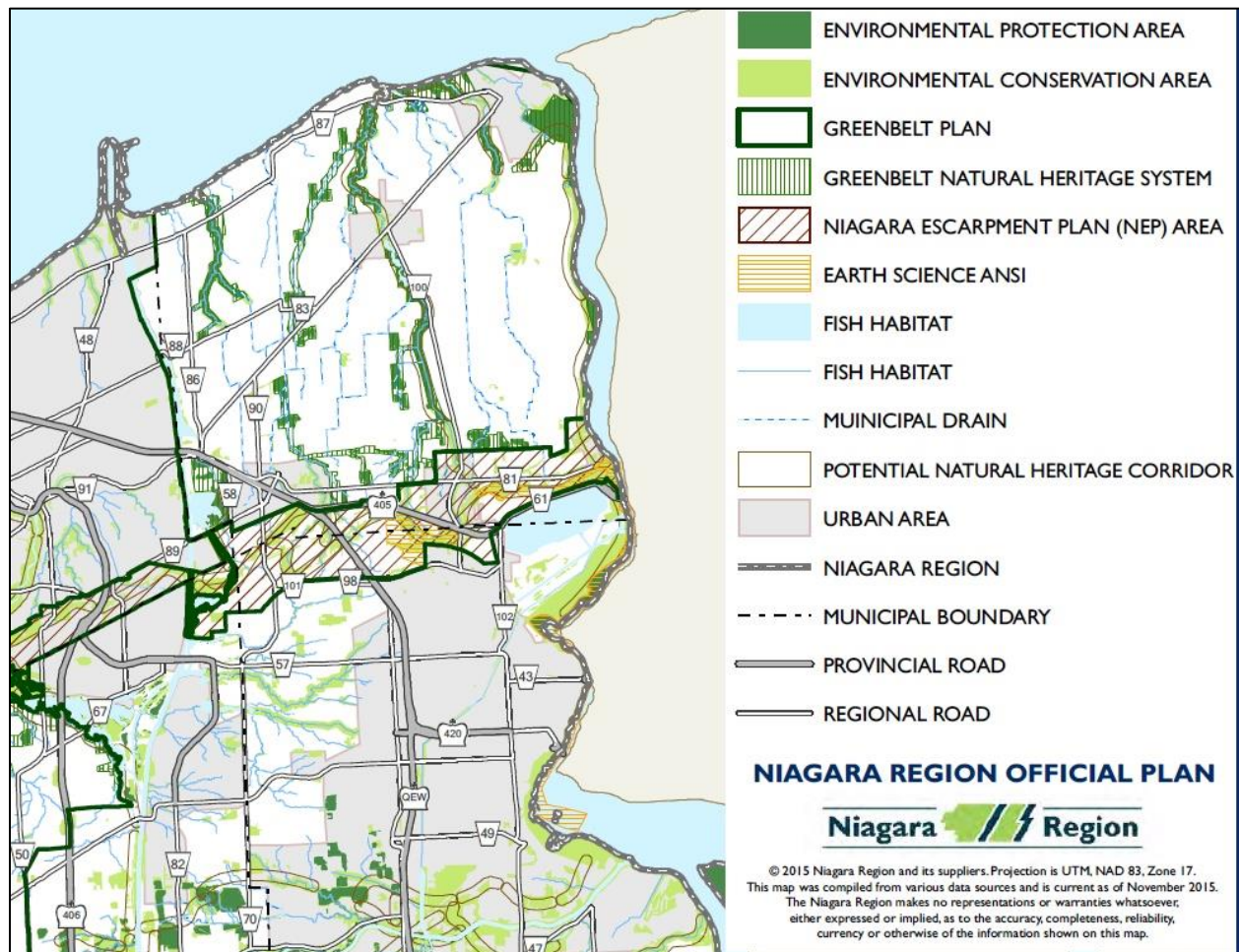


Figure 2. Extract from Schedule C of the Niagara Region Official Plan (2014 consolidated version).

Policy 7.B.1.1 establish what the Core Natural Heritage System consists of:

- Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;
- Potential Natural Heritage Corridors connecting the Core Natural Areas;
- The Greenbelt Natural Heritage and Water Resources Systems; and
- Fish Habitat.

Policy 7.B.1.1 further indicates how the mapping presented on Schedule C should be used and considered:

“The System generally is shown on Schedule C, which provides an overall indication of provincially and regionally significant natural features and provides the framework for natural heritage planning and development review in Niagara. The Niagara Region Planning and Development Services Department should be

contacted for more detailed information. Natural heritage features may be further defined through future studies. Additional Natural Heritage features of local significance may be identified by area municipalities in their planning documents.”

Policy 7.B.1.3 indicates what is included with an Environmental Protection Areas shown on Schedule C:

“Environmental Protection Areas include provincially significant wetlands; provincially significant Life Science Areas of Natural and Scientific Interest (A.N.S.I.s); and significant habitat of endangered and threatened species. In addition, within the Greenbelt Natural Heritage System, Environmental Protection Areas also include wetlands; significant valleylands; significant woodlands; significant wildlife habitat; habitat of species of concern; publicly owned conservation lands; savannahs and tallgrass prairies; and alvars.”

A key distinction being made with respect to the mapping is that Environmental Protection Areas within the Greenbelt Natural Heritage include wetlands; significant valleylands; significant woodlands; significant wildlife habitat; habitat of species of concern; publicly owned conservation lands; savannahs and tallgrass prairies; and alvars, while the mapping applying to the lands outside of the Greenbelt Plan area only include Provincially significant wetlands and Provincially significant Life Science Areas of Natural and Scientific Interest (A.N.S.I.s).

Woodlands outside of the Greenbelt Plan area are included within Environmental Conservation areas as described in Policy 7.B.1.4 below:

“Environmental Conservation Areas include significant woodlands; significant wildlife habitat; significant habitat of species of concern; regionally significant Life Science A.N.S.I.s; other evaluated wetlands; significant valleylands; savannahs and tallgrass prairies; and alvars; and publicly owned conservation lands.”

Policy 7.B.1.5 then identifies what the criteria are to determine whether a woodland is significant and the criteria dealing with size are listed below:

- “In size, be equal to or greater than:
- i. 2 hectares, if located within or overlapping Urban Area Boundaries;
 - ii. 4 hectares, if located outside Urban Areas and north of the Niagara Escarpment;
 - iii. 10 hectares, if located outside Urban Areas and south of the Escarpment;”

Policy 7.B.1.6 below deals with key hydrologic features and indicates where such features are identified through watershed or other studies, an amendment to the R.O.P. would be required to show those features on a schedule.

“Key hydrologic features include permanent and intermittent streams, lakes and their littoral zones, seepage areas, springs and wetlands. When key hydrologic

features are identified through watershed or other studies the Region will consider an amendment to this Plan to show those features on a Schedule. In the interim, within the Greenbelt Area, if potentially permitted development is proposed in an area within the Unique Agricultural Areas where key hydrologic features have not been identified, the applicant may be required to identify the hydrologic features on the site of the proposed development as well as within 120 meters of the site boundary.”

It is not clear why an amendment to the R.O.P. would be needed for key hydrologic features, when it is not explicitly required for other key natural heritage features. However, significant modifications to boundaries would require an amendment as set out in Policy 7.B.1.7 below, which deals with the boundaries of Core Natural Areas, Potential Natural Heritage Corridors and fish habitat as shown on Schedule C:

“The boundaries of Core Natural Areas, Potential Natural Heritage Corridors and Fish Habitat are shown on Schedule C. They may be defined more precisely through Watershed or Environmental Planning Studies, Environmental Impact Studies, or other studies prepared to the satisfaction of the Region and may be mapped in more detail in local official plans and zoning by-laws. Significant modifications, such as a change in the classification of a Core Natural Area, or a significant change in the spatial extent or boundaries of a feature, require an amendment to this Plan unless otherwise provided for in this Plan. Only minor boundary adjustments to Environmental Protection Areas will be permitted without Amendment to this Plan. In considering both refinements and significant modifications to the mapping or classification of features shown on Schedule C the Region shall consult with:

- a) The Ministry of Natural Resources respecting changes to Environmental Protection Areas other than in the Greenbelt Natural Heritage System, where consultation shall only be required respecting those Environmental Protection Areas identified as Provincially Significant Wetlands or Provincially Significant Life Science Areas of Natural and Scientific Interest; or
- b) The Ministry of Natural Resources and the Department of Fisheries and Oceans or its designate respecting changes to Fish Habitat.

Within the Greenbelt Area mapping of Core Natural Heritage System components may only be refined at the time that a local official plan initially is brought into conformity with the Provincial Greenbelt Plan.”

Policy 7.B.1.8 below deals with a circumstance where new features are identified through a planning process:

“Where, through the review of a planning application, it is found that there are important environmental features or functions that have not been adequately evaluated, the applicant shall have an evaluation prepared by a qualified biologist in consultation with the Region, the local municipality and, where appropriate, the Ministry of Natural Resources and the Niagara Peninsula Conservation Authority.

If the evaluation finds one or more natural heritage features meeting the criteria for identification as Core Natural Heritage System components the appropriate Core Natural Heritage System policies shall apply.”

The above policy suggests that the natural heritage policies would apply in a circumstance where such a feature is discovered through the review of an application. However, Policy 7.B.1.9 below then suggests that an amendment would be required in such a circumstance:

“If a feature meeting the criteria for identification as a Core Natural Heritage System component is identified through an evaluation under Policy 7.B.1.8 or through other studies, it shall be considered for inclusion in the Core Natural Heritage System through an amendment to this Plan. Where such a feature is identified on lands involved in an on-going planning application the appropriate Core Natural Heritage System policies shall apply.”

Policy 7.B.1.11 permits development within Environmental Conservation Areas and on adjacent lands (as shown on Table 7.1) if the following is demonstrated:

“If it has been demonstrated that, over the long term, there will be no significant negative impact on the Core Natural Heritage System component or adjacent lands and the proposed development or site alteration is not prohibited by other Policies in this Plan. The proponent shall be required to prepare an Environmental Impact Study (E.I.S.) in accordance with Policies 7.B.2.1 to 7.B.2.5.”

It is noted that the above policy adds the word 'significant' before 'negative impact', which modifies the meaning of 'negative impact'.

In recognition of the limitations of the mapping showing potential natural heritage corridors, Policy 7.B.1.13 below indicates the following:

“Where development or site alteration is proposed in or near a Potential Natural Heritage Corridor the Corridor shall be considered in the development review process. Development should be located, designed and constructed to maintain and, where possible, enhance the ecological functions of the Corridor in linking Core Natural Areas or an alternative corridor should be developed. The Potential Natural Heritage Corridors are illustrated conceptually on Schedule C. The Region shall undertake a study to further define Corridors within the Core Natural Heritage System.”

The remainder of the policies in this Chapter deals with the creation of new lots in or adjacent to the Core Natural Heritage System, new or expanding infrastructure and new and expanding agricultural uses. In addition, a number of Greenbelt policies on development and site alteration and mineral aggregate resources have been generally copied word-for-word.

17.3 Relevance to the New Niagara Official Plan

The following points derived from the review of the Region's current natural environment policies in the official plan should be carried forward for consideration when preparing the new natural environment policies and mapping for the N.O.P.:

- The Region will need to continue to provide the framework for planning and development review in a manner that is consistent with Provincial plans and policies.
- It will continue to be the role of the Region to implement provincial policies through its delegated responsibilities for planning and development review, review and approve Regional and local Official Plan Amendments and review and comment on planning and development applications.
- The Region will need to decide how development review related to applications that may affect the Region's natural environment system will be undertaken and whether they will require Regional approval or if area municipalities will take full responsibility for development review at the local level.
- The Region's policies related to meeting the objectives for a healthy landscape will need to be updated to reflect current Provincial policy, which does not establish a priority to avoiding negative environmental impacts. Instead Provincial policy requires that there be no negative impacts and if this cannot be demonstrated development and site alteration is not permitted.
- The Region should revisit the targets for the natural environment system, for example woodland and wetland cover. The targets should be based on existing and desired natural cover, informed by best practices documents (e.g., Environment Canada's How Much Habitat is Enough?), and designed to meet the objectives for the natural environment system.
- Policies related to climate change are currently insufficient. Climate change related policies will need to be expanded to provide more clear direction on how the Region will adapt to and mitigate for the impacts of climate change, including through protection of the natural environment system.
- The distinction between Environmental Protection Areas and Environmental Conservation Areas allows for a clear set of policies dealing with the group of features contained within those categories. If moving forward with these two categories which relates to the level of protection afforded to the features in the categories, they will need to be updated in recognition of the policies related to key natural heritage and key hydrologic features in the Growth plan N.H.S.
- The Region will need to provide more clarity under which cases an official plan amendment may be required when a refinement to mapping a feature identified within the natural environment system is proposed.
- The use of the word 'significant' before 'negative impact' should not be included in updated policies, as it modifies the meaning and potential interpretation of the definition of 'negative impact'.

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18.0 Moving Forward: A Framework for Natural Environment Policies for the New Regional Official Plan

18.1 Introduction

The R.O.P. policy framework that is currently in place was initially developed in the 1970s and then refined and updated as required, with the most recent changes reflecting the 2005 Greenbelt Plan. The establishment of two designations in the R.O.P. (Environmental Protection and Environmental Conservation), with one designation including the most significant features (or those with the greatest protection) and the other designation containing less significant features (or features where exception to their protection are provided) was very commonplace in Ontario between the 1970's and the 2000's. It is recognized that in the case of Niagara, there was also an effort made to identify potential natural heritage corridors.

Given the significant changes that have been made to Provincial policy most notably in 2017 with a new Growth Plan and updated Greenbelt and Niagara Escarpment Plans, it is clear that there is a need for a very different approach in the new N.O.P. with that approach being based on the establishment of a N.H.S. and Water Resource System (W.R.S.), which become the main organizing element of a policy framework. This would be a significant departure from the current policy framework in the R.O.P. This is also supported by the 2014 P.P.S., which requires that an N.H.S. be established by planning authorities in Official Plans. In implementing the N.H.S. and W.R.S., there is also an expectation in provincial plans and policies that Official Plans will contain policies that are designed to protect the integrity of those systems and the individual component features. In addition to the above, the Growth Plan and the Greenbelt Plan contain considerable detail on the type of development permitted within and adjacent to key features and this will need to be implemented in the R.O.P. as well. It should be noted that the level of detail in these provincial planning documents is much more pronounced than in the existing R.O.P.

In the case of Niagara, there is a need to consider how provincial plans and policies will be implemented in a circumstance where there is both an upper-tier Official Plan and a series of lower-tier Official Plans that apply to the same geography. The purpose of this section is to review a number of considerations to advance the discussion on this topic.

18.2 Considerations

In a circumstance where there is both an upper tier and a series of lower-tier Official Plans, below are some considerations on the development of a natural heritage and water resource (herein referred to as natural environment) policy framework in an upper-tier Official Plan:

1. The requirements of the Province with respect to the contents of an upper-tier Official Plan as it relates to natural environment systems mapping and policies;
2. The desire for an upper-tier Official Plan to be strategic or prescriptive as a first principle and the need and desire for local context to play a role in decision-making;
3. The vision of the upper-tier municipality itself, with respect to natural environment systems;
4. The nature of the staff resources and expertise available at the upper tier and lower-tier levels to implement a natural environment policy framework.

It is also noted that to some extent, decisions on an updated R.O.P. policy framework on the natural environment depends on the other decisions to be made on the overall approach and philosophy that will underpin the new N.O.P. Given the broad nature of this ultimate decision, this is beyond the scope of this background paper.

The sections below discuss the above considerations.

18.3 Requirements of the Province

18.3.1 Provincial Policy Statement

The Provincial Policy Statement ('P.P.S.') indicates the following with respect to Official Plans in general in Section 4.7:

“The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.

Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.

Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.

In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.”

There is clear direction as per the above to keep Official Plan up-to-date. There is also reference in the above to cross boundary issues, which is dealt with as well by Section 1.2.4 d) of the P.P.S., which states the following:

“Where planning is conducted by an upper-tier municipality, the upper-tier municipality in consultation with the lower-tier municipalities shall: identify and

provide policy direction for the lower-tier municipalities on matters that cross municipal boundaries.”

Section 1.2.1 of the P.P.S. provides some insight into what those matters that cross municipal boundaries may be:

“A coordinated, integrated and comprehensive approach should be used when dealing with planning matters within municipalities, across lower, single and/or upper-tier municipal boundaries, and with other orders of government, agencies and boards including:

- a) Managing and/or promoting growth and development;
- b) Economic development strategies;
- c) Managing natural heritage, water, agricultural, mineral, and cultural heritage and archaeological resources;
- d) Infrastructure, electricity generation facilities and transmission and distribution systems, multimodal transportation systems, public service facilities and waste management systems;
- e) Ecosystem, shoreline, watershed, and Great Lakes related issues;
- f) Natural and human-made hazards;
- g) Population, housing and employment projections, based on regional market areas; and
- h) Addressing housing needs in accordance with provincial policy statements such as the Ontario Housing Policy Statement”

As per the above, there is an expectation in the P.P.S. that upper-tier Official Plans 'identify and provide policy direction for the lower-tier municipalities on' managing natural heritage and water resources and ecosystem, shoreline, watershed, and Great Lakes related issues. In addition, there is a general expectation that Official Plans 'provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas'.

On the basis of the above, while there is a requirement for an upper-tier Official Plan to provide guidance to area municipalities on natural heritage and water resources, there is no direction on which Official Plan should contain the detail required to adequately implement Provincial interests. However, and notwithstanding the above, there is a need for at least the lower-tier Official Plan to implement the prohibitions on development and site alteration in certain natural heritage features as per Sections 2.1.4 and 2.1.5. In many jurisdictions, both the upper-tier and lower-tier Official Plans contain this type of policy.

It is noted that Section 2.1.3 requires that N.H.S.s be identified. While there is no specific requirement in the P.P.S. that such a system be identified in an upper-tier Official Plan, it is common practice for upper-tier municipalities to establish and map N.H.S.s in their Official Plans.

In addition, there is also a requirement in the P.P.S. for 'planning authorities' to do certain things, with a 'planning authority' being either an upper tier, single tier or lower tier municipality. With respect to water resources in particular, Section 2.2.1 of the P.P.S. requires that planning authorities 'protect, improve or restore the quality and quantity of water' by doing certain things. In this regard, there is a specific requirement for a planning authority to:

1. **Use the watershed as the ecologically meaningful scale for integrated and long-term planning**, and given that watersheds typically extend beyond local municipal boundaries, this implies that there is a need for an upper-tier policy framework and oversight when it comes to watershed planning;
2. **Identify water resource systems**, which consist of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which imply that these areas need to be mapped in an upper-tier Official Plan, if information is available;
3. **Maintain linkages and related functions** among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which implies that there is a need for an upper-tier policy framework on linkages and possibly mapping showing linkages; and,
4. **Implement necessary restrictions on development and site alteration** to protect all municipal drinking water supplies and designated vulnerable areas; and protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions, which implies that there is a need for an upper tier Official Plan to map these features, where known, and include policies that establish restrictions on development within and adjacent to these features.

To a very large extent, the requirement for all planning authorities to take action to 'protect, improve or restore the quality and quantity of water' stemmed from the Walkerton tragedy in 2000, which led to the enactment of the Safe Drinking Water Act, 2002, Nutrient Management Act, 2002, and Clean Water Act, 2006 and updated policies on water resources in the 2005 Provincial Policy Statement (which have for the most part been carried forward into the 2014 P.P.S.).

18.3.2 Growth Plan

The Growth Plan is a statement of provincial policy directing growth-related planning decisions over the next 30 years. The intent of the Growth Plan is to significantly reduce urban sprawl and land consumption while making more efficient use of existing infrastructure. The Growth Plan requires that municipalities look to new ways to accommodate growth **that breaks from the past**, in terms of how communities are designed, and how land uses are mixed, all in an effort to improve quality of life, health and general well-being. There is considerable reliance placed in the Growth Plan on the implementation of its policies by upper-tier municipalities and the updated Growth

Plan (2017) contains considerable direction on protecting what is valuable, which includes the natural environment and agricultural land.

Similar to Section 1.2.4 d) of the P.P.S., Section 5.2.3.2 f) of the Growth Plan states the following:

“Upper-tier municipalities, in consultation with lower-tier municipalities, will, through a municipal comprehensive review, provide policy direction to implement this Plan, including: addressing matters that cross municipal boundaries.”

The difference between the P.P.S. policy and the Growth Plan policy is that the Growth Plan policy requires that these matters that cross municipal boundaries be addressed through a municipal comprehensive review, which is defined as a new Official Plan, or an Official Plan Amendment, initiated by an upper-or single-tier municipality under section 26 of the Planning Act that comprehensively applies the policies and schedules of Growth Plan. It is noted as per the above that there is a requirement to 'comprehensively apply the policies' of the Growth Plan through such a process, which Niagara Region is currently engaged.

Section 5.2.3.1 of the Growth Plan provides additional direction to upper-tier municipalities as follows:

“Upper- and single-tier municipalities will undertake integrated planning to manage forecasted growth to the horizon of this Plan, which will:

- a) Establish a hierarchy of settlement areas, and of areas within settlement areas, in accordance with policy 2.2.1.2;
- b) Be supported by planning for infrastructure and public service facilities by considering the full life cycle costs of these assets and developing options to pay for these costs over the long-term;
- c) Provide direction for an urban form that will optimize infrastructure, particularly along transit and transportation corridors, to support the achievement of complete communities through a more compact built form;
- d) Support the environmental and agricultural protection and conservation objectives of this Plan; and
- e) Be implemented through a municipal comprehensive review and, where applicable, include direction to lower-tier municipalities.”

It is also noted in other sections of the Growth Plan that it is the sole responsibility of the upper- or single-tier planning authority to apply Growth Plan forecasts (Section 5.2.4.2), establish targets (Section 5.2.5.2), develop an employment strategy (Section 2.2.5.5), designate employment areas in single- and upper tier Official Plans (Section 2.2.5.6) and develop a housing strategy (Section 2.2.6.1).

Sub-section d) above speaks to the requirement to support the environmental and agricultural protection and conservation objectives of this Plan, which implies that the **objectives** are to be implemented in some way. It is also noted in sub-section e) that

direction to lower tier municipalities can also be provided through this process. Notwithstanding the above, Section 4.2.10.1 provides more detail on the responsibilities of single- and upper-tier municipalities:

“Upper- and single-tier municipalities will develop policies in their official plans to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, aligned with the Ontario Climate Change Strategy, 2015 and the Climate Change Action Plan, 2016 that will include:

- a) Supporting the achievement of complete communities as well as the minimum intensification and density targets in this Plan;
- b) Reducing dependence on the automobile and supporting existing and planned transit and active transportation;
- c) Assessing infrastructure risks and vulnerabilities and identifying actions and investments to address these challenges;
- d) Undertaking stormwater management planning in a manner that assesses the impacts of extreme weather events and incorporates appropriate green infrastructure and low impact development;
- e) Recognizing the importance of watershed planning for the protection of the quality and quantity of water and the identification and protection of hydrologic features and areas;
- f) Protecting the Natural Heritage System and water resource systems;
- g) Promoting local food, food security, and soil health, and protecting the agricultural land base;
- h) Providing direction that supports a culture of conservation in accordance with the policies in subsection 4.2.9; and
- i) Any additional policies to reduce greenhouse gas emissions and build resilience, as appropriate, provided they do not conflict with this Plan.”

Sub-section d) above requires that upper-tier municipalities undertake 'stormwater management planning', which implies that policies on this topic are required in an upper-tier Official Plan, with these policies recognizing the importance of watershed planning as set out in sub-section e) (which is similar to Section 2.2.1 of the P.P.S.). Sub-section f) then requires that the upper-tier municipality protect natural heritage and water resource systems, which implies that they should be identified in an upper-tier Official Plan and that there should be policies in the upper-tier Official Plan that protects these systems.

With respect to the N.H.S., Section 4.2.2.2 states the following:

“Municipalities will incorporate the Natural Heritage System as an overlay in official plans, and will apply appropriate policies to maintain, restore, or enhance the diversity and connectivity of the system and the long-term ecological or hydrologic functions of the features and areas as set out in the policies in this subsection and the policies in subsections 4.2.3 and 4.2.4.”

It is noted that the above policy does not specify what type of municipality is required to identify the N.H.S. as an overlay in their Official Plan - however, incorporating the

N.H.S. as an overlay in both upper tier and lower tier Official Plans allows for consistency of approach. It is noted that at a minimum, Section 4.2.10.1 requires that single- and upper-tier municipalities protect this system. A similar policy requirement also applies to the agricultural system as well. Section 4.2.2.5 also references single- and upper tier municipalities:

In implementing the Natural Heritage System, upper- and single-tier municipalities may, through a municipal comprehensive review, refine provincial mapping with greater precision in a manner that is consistent with this Plan.

The above means that only single- and upper-tier municipalities can modify the boundaries of the natural heritage system established by the Province.

It should be acknowledged that the “Technical Report on Criteria, Rationale and Methods” developed for the Growth Plan N.H.S. notes scale is important, and that given the Growth Plan N.H.S., “... is on a broad, regional scale [regional meaning the Greater Golden Horseshoe], it is focussed on identifying larger core areas and broad linkages. The [Provincial] mapping was not intended to identify all areas and connect features that may be important to consider at a local or smaller scale, however locally identified NHS mapping or other regional NHS mapping would be complementary and connect to the regional NHS for the Growth Plan” (O.M.N.R.F. 2018). Thus, there is an expectation that regional and/or area municipalities natural heritage systems would be complimentary to and build on the Provincial N.H.S. and incorporate natural heritage features and functions of local importance.

In this regard, it is important to consider Policy 4.2.2.6 that states the following:

Beyond the Natural Heritage System for the Growth Plan, including within settlement areas, the municipality:

- a) will continue to protect any other natural heritage features and areas in a manner that is consistent with the PPS; and
- b) may continue to protect any other natural heritage system or identify new systems in a manner that is consistent with the P.P.S.

This implies that there is some discretion by the municipality for how, in what form and where the N.H.S. will identified outside of the Growth Plan N.H.S., so long as it is consistent with the P.P.S.

With respect to the W.R.S., Section 4.2.1.1 states the following:

“Municipalities, partnering with conservation authorities as appropriate, will ensure that watershed planning is undertaken to support a comprehensive, integrated, and long-term approach to the protection, enhancement, or restoration of the quality and quantity of water within a watershed.”

The above section is similar to Section 2.2.1 of the P.P.S. and applies to all municipalities.

Section 4.2.1.2 then states the following:

“Water resource systems will be identified, informed by watershed planning and other available information, and the appropriate designations and policies will be applied in official plans to provide for the long-term protection of key hydrologic features, key hydrologic areas, and their functions.”

The above implies that W.R.S.s are to be identified in all Official Plans and that designations and policies will be required. This policy direction is also consistent with Section 2.2.1 of the P.P.S.

Section 4.2.1.3 then deals with two matters that are a Niagara Region responsibility:

“Decisions on allocation of growth and planning for water, wastewater, and stormwater infrastructure will be informed by applicable watershed planning. Planning for designated greenfield areas will be informed by a subwatershed plan or equivalent.”

The above ties decisions on water and wastewater planning (which is a Regional responsibility) to the preparation of watershed plans.

In possible recognition of the absence of watershed plans in many jurisdictions, Section 5.2.8.1 provides some direction:

“Where the policies of this Plan require the completion of specific types of master plans, assessments, studies, or other plans, including the equivalent, before a decision can be made, including in respect of matters in process, the policy direction in this Plan may be implemented based on, collectively, existing, enhanced, or new assessments, studies, and plans, provided that these achieve or exceed the same objectives.”

18.3.3 Greenbelt Plan

The Greenbelt Plan contains extensive natural heritage system policies and identifies the spatial extent of the Greenbelt N.H.S.; however, like the Growth Plan, it does not map a W.R.S. While many of the policies in the Greenbelt Plan on the natural environment are similar to those in the Growth Plan, there are some notable differences, as set out in **Section 3.0** of this report.

With respect to implementation, Section 5.3 of the Greenbelt Plan states the following with respect to the N.H.S.:

“Official plans shall contain policies that reflect the requirements of this Plan together with a map(s) showing the boundaries of the Greenbelt Area, the Protected Countryside, the Natural Heritage System and the agricultural land

base. Municipalities shall provide a map showing known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones identified in this Plan. The identification of the Natural Heritage System boundary will form the basis for applying the policies of section 3.2.”

The above clearly requires that all Official Plans show the boundary of the Greenbelt Area, the Protected Countryside and the Greenbelt N.H.S. The section goes further to require the preparation of a map showing 'known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones'. Given the use of the word 'map', there appears to be some discretion on the type of map produced and whether it is included as a schedule or an appendix to an upper-tier or lower tier Official Plan (or both).

Sections 3.2.3.1, 3.2.3.2 and 3.2.3.3 are similar to Section 2.2.1 of the P.P.S. and Sections 4.2.1.1 and 4.2.1.2 of the Growth Plan:

3.2.3.1 – “All planning authorities shall provide for a comprehensive, integrated and long-term approach for the protection, improvement or restoration of the quality and quantity of water. Such an approach shall consider all hydrologic features, areas and functions and include a systems approach to the inter-relationships between and/or among key hydrologic features and key hydrologic areas.”

3.2.3.2 – “Watersheds are the most meaningful scale for hydrological planning. Municipalities, partnering with conservation authorities as appropriate, shall ensure that watershed planning is undertaken to support a comprehensive, integrated and long-term approach to the protection, enhancement or restoration of the quality and quantity of water within a watershed.”

3.2.3.3 – “Water Resource Systems shall be identified, informed by watershed planning and other available information, and the appropriate designations and policies shall be applied in official plans to provide for the long-term protection of key hydrologic features, key hydrologic areas and their functions.”

As noted above, there is also a requirement to identify the W.R.S. Section 5.3 of the Greenbelt Plan states the following with respect to components of the W.R.S.:

“Municipalities should also include a map of wellhead protection areas together with associated policies for these areas within their official plans as appropriate and in accordance with any provincial directives on source water protection.

Building on watershed planning, key hydrologic areas shall be identified and the appropriate designations and policies will be applied in official plans to provide for their long-term protection.”

On the basis of the above, there is also a requirement to map wellhead protection areas and key hydrologic areas in all Official Plans.

18.3.4 Summary of Requirements

Based on the above review, there is a need for the new N.O.P. at a minimum to:

1. Identify an N.H.S. in some manner on lands not subject to the Growth Plan N.H.S. (Section 2.1.3 of the P.P.S.);
2. Establish an upper-tier policy framework on watershed planning (Section 2.2.1 a) of the P.P.S.);
3. Identify a W.R.S., which consist of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas (Section 2.2.1 c) of the P.P.S.);
4. Include a policy framework on linkages (Section 2.2.1 d) of the P.P.S.);
5. Identify designated vulnerable areas; vulnerable surface and ground water, sensitive surface water features and sensitive ground water features and include policies that establish restrictions on development (Section 2.2.1 e) of the P.P.S.);
6. Include policies on stormwater management (Section 4.2.10.1 d) of the Growth Plan);
7. Recognize the importance of watershed planning for the protection of the quality and quantity of water and the identification and protection of hydrologic features and areas (Section 4.2.10.1 e) of the Growth Plan);
8. Protect the N.H.S. and W.R.S. (Section 4.2.10.1 f) of the Growth Plan);
9. Identify the Growth Plan N.H.S. as an overlay (Section 4.2.2.2 of the Growth Plan);
10. Identify a W.R.S., which would be informed by watershed planning and other available information, and apply the appropriate designations and policies to provide for the long-term protection of key hydrologic features, key hydrologic areas, and their functions (Section 4.2.2.1 of the Growth Plan and Section 3.2.3.3 of the Greenbelt Plan);
11. Include the boundaries of the Greenbelt Area, the Greenbelt Protected Countryside and the Greenbelt N.H.S. (Section 5.3 of the Greenbelt Plan); and,
12. Include a map showing known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones identified in the Greenbelt Plan (Section 5.3 of the Greenbelt Plan).

It is noted that there are no similar requirements in the Niagara Escarpment Plan.

The above is required in the N.O.P. at a minimum. Given the requirement to map systems and certain features in an upper-tier Official Plan, it would appear logical that the same Official Plan would contain a policy framework dealing with the systems and features.

18.3.5 Additional Considerations for Implementation

With respect to implementation, Section 4.2.2.5 of the Growth Plan states the following:

“In implementing the Natural Heritage System, upper- and single-tier municipalities may, through a municipal comprehensive review, refine provincial mapping with greater precision in a manner that is consistent with this Plan.”

One of the challenges that will face the Region in the implementation of the Growth Plan originates in Section 4.2.2.6 below:

Beyond the Natural Heritage System, including within settlement areas, the municipality:

- a. Will continue to protect any other natural heritage features in a manner that is consistent with the P.P.S.; and
- b. May continue to protect any other natural heritage system or identify new systems in a manner that is consistent with the P.P.S.

The above means that different policies may apply in different parts of the Region based on whether the lands are within the N.H.S. provided for in the Growth Plan. This is because the policies above only apply to lands that are within the Growth Plan N.H.S. It is however noted that key hydrologic areas outside of the Growth Plan N.H.S. are also subject to the policies that apply to such features within the Growth Plan N.H.S. and this adds another layer of complexity to the implementation exercise.

Section 1.2.3 of the Growth Plan also indicates the following on this matter:

“The P.P.S. provides overall policy directions on matters of provincial interest related to land use and development in Ontario, and applies to the G.G.H., except where this Plan or another provincial plan provides otherwise.

Like other provincial plans, this Plan builds upon the policy foundation provided by the P.P.S. and provides additional and more specific land use planning policies to address issues facing specific geographic areas in Ontario. This Plan is to be read in conjunction with the P.P.S. The policies of this Plan take precedence over the policies of the P.P.S. to the extent of any conflict, except where the relevant legislation provides otherwise. Where the policies of this Plan address the same, similar, related, or overlapping matters as policies in the P.P.S., applying the more specific policies of this Plan satisfies the requirements of the more general policies in the P.P.S. In contrast, where matters addressed in the P.P.S. do not overlap with policies in this Plan, those P.P.S. policies must be independently satisfied.”

It is the last sentence above that essentially indicates that where a P.P.S. policy addresses a matter (such as natural heritage features and areas) outside of the Provincial N.H.S. (including the Growth Plan N.H.S., Greenbelt Plan N.H.S. and the Niagara Escarpment Plan area), the P.P.S. applies. This means that potential exists for there to be multiple area specific Provincial Plan policies throughout the Region, including those for the Growth Plan N.H.S., Greenbelt Plan N.H.S., Niagara Escarpment Plan area, and all other areas where the P.P.S. applies.

With the potential for four specific sets of policies or reference to policies in other Provincial plans, the policy framework for Niagara Region's Official Plan could be quite complicated. However, N.H.S. mapping could be established for the Region including:

1. The N.H.S. already established by the Province in the Greenbelt Plan area;
2. The N.H.S. already established by the Province in the Growth Plan area (with boundaries modified as appropriate);
3. New elements of the overall natural heritage system for lands not within the Greenbelt Plan and not within the Growth Plan N.H.S., and which could extend into settlement areas as required;
4. Identified key features and linkages within the Niagara Escarpment Plan area.

However, the policy frameworks that apply to each of the four component parts above would by design have to be different, based on the policy frameworks that are contained within the three Provincial Plans and the P.P.S. For example, development and site alteration is prohibited outright in significant woodlands within the Greenbelt and Growth Plan N.H.S., but not on lands subject to the P.P.S. where through demonstration of meeting the test of 'no negative impact' development could occur in significant woodlands. In addition, the Greenbelt Plan establishes unique exemptions for agricultural uses within Specialty Crop areas.

Another option to consider is to apply the Growth Plan policy framework to lands outside of settlement areas that would otherwise be subject to the P.P.S. This would have the effect of going beyond the minimum standards set out in the P.P.S. for areas outside of the Growth Plan N.H.S. However, this would add significant new restrictions on development that would be applied to lands that are not within the Growth Plan N.H.S.

To a very large extent, the Province has created a very complex policy framework for different geographies, with the policies for each geography being very detailed and specific. Given the requirement for Official Plans to conform to the Greenbelt and Growth Plans, these Provincial policies set a minimum standard for the new N.O.P.

18.4 Being Strategic or Prescriptive

18.4.1 Planning Act Requirements

It is the Planning Act that governs municipal decisions on land use planning matters and the role of Council in the preparation of Official Plan policy. Section 1.1 of the Act states that the purposes of the Act are:

- (a) To promote sustainable economic development in a healthy natural environment within the policy and by the means provided under this Act;
- (b) To provide for a land use planning system led by provincial policy;
- (c) To integrate matters of provincial interest in provincial and municipal planning decisions;
- (d) To provide for planning processes that are fair by making them open, accessible, timely and efficient;
- (e) To encourage co-operation and co-ordination among various interests;
- (f) To recognize the decision-making authority and accountability of municipal councils in planning.

The first three items above have a direct impact on the preparation of an Official Plan, which is a document that is decided upon by an elected Council. Item (b) clearly articulates the Provincial requirement that the 'land use planning system' in Ontario is 'led by Provincial policy'.

18.4.2 Requirement to Have an Official Plan

Niagara Region is required to have an Official Plan in accordance with Ontario Regulation 352/02. There is no similar requirement for a local municipality to have an Official Plan. Section 16(1)(a) of the Planning Act states that an Official Plan shall contain:

“Goals, objectives and policies established primarily to manage and direct physical change and the effects on the social, economic, built and natural environment of the municipality or part of it.”

Given that Niagara Region already has an Official Plan, Section 26(1) of the Planning Act requires that any Official Plan be revised as required to ensure that it **conforms with provincial plans or does not conflict with them**, as the case may be; has regard to the **matters of Provincial interest** listed in Section 2 and is consistent with **policy statements** issued under subsection 3(1). The requirements of Provincial Plans and policies are discussed in detail in **Section 3.0** of this report.

18.4.3 Discussion

Niagara Region is an upper-tier municipality that is required to have an Official Plan according to Ontario Regulation 352/02. While there is no similar requirement for a lower-tier municipality to have an Official Plan, the lower tier municipalities in the Region have Official Plans.

As a consequence of the above, a decision will need to be made whether the new N.O.P. will be strategic or prescriptive as a first principle. The determination of when the N.O.P. should be prescriptive or not, is dependent on two factors. The first is whether the Provincial Plans or policies actually require an upper tier Official Plan to specifically include policies on certain matters (as discussed previously). The second factor to consider is whether there is a need for prescriptive policies on an issue that is considered to be of Regional significance. In cases such as these, a determination is made that there is a clear need to provide consistent direction to the area municipalities on how this issue or policy area is to be dealt with and/or implemented.

As a consequence of the above, it is anticipated that the new N.O.P. will contain the following types of policies:

1. Prescriptive policies that are **required by** Provincial Plans and policies and are therefore mandatory;
2. Prescriptive policies that are intended to ensure that a particular issue is dealt with in a **consistent manner** across the Region (at the discretion of the Region);
3. Strategic goals and objectives that are **required** to be implemented by the local municipality in a manner that **reflects the local context**; and,

4. Strategic goals, objectives and policies that **encourage** (but not explicitly require) area municipalities to develop local Official Plan policies on an issue that reflects the local context.

The determination of which types of policies will be prepared in accordance with the above will be a key discussion item throughout the work program to develop a new Regional Official Plan.

18.4.4 Regional Vision

At the present time, Figure 7-1 of the existing R.O.P. in Chapter 7 indicates that the Region is responsible through the R.O.P. for establishing the framework for planning and development review in a manner that is consistent with Provincial policies and plans. In addition, it is further indicated that it is the role of the Region to implement Provincial policies through its delegated responsibilities for planning and development review, review and approve Regional and local Official Plan Amendments and review and comment on planning and development applications.

With respect to area municipalities, the R.O.P. indicates that it is their role to develop and adopt local Official Plans and secondary plans containing more detailed environmental policies in conformity with Provincial and Regional policies and plans and to review and approve zoning bylaw amendments and other development applications with input from the Region and the Conservation Authority.

The above descriptions of the role of the Region and area municipalities is common to most upper-tier municipalities and to a very large extent implements the requirements of the Province as it relates to the role and function of upper tier Official Plans. A key decision for the Region to make as part of the current update process is whether the above roles will be confirmed. It is suggested however that if it is decided that these current roles will be maintained that additional clarity be provided on how this is expressed in the new N.O.P. In this regard, below is a sample policy for consideration:

The Official Plan is intended to be one of a series of policies, guidelines and regulations that direct the actions of the Region of Niagara and shapes growth and development. The Plan is intended to:

1. Establish a broad, upper-tier policy framework that provides guidance to area municipalities in the preparation of updated local Official Plans, Official Plan Amendments and zoning and community planning permit by-laws;
2. Implement the Provincial Policy Statement and Provincial Plans at the Regional level in a manner that is intended to reflect the Niagara context to the greatest extent possible while being consistent with the Provincial Policy Statement and in conformity with Provincial Plans;
3. Establish a framework for coordination and cooperation amongst the area municipalities and the Region on planning and development issues that cross municipal boundaries;

4. Recognizes the diversity that exists amongst the area municipalities and builds on the strengths of Niagara Region as a whole and each of its component parts;
5. Provide the strategic direction required to realize common goals and objectives; and,
6. Recognize the importance of the land use planning responsibilities that are vested with the area municipalities.

18.4.5 Resources of Upper-Tier and Lower-Tier Municipalities

To some extent the level of detail on natural environment identified in the new N.O.P. will be a function of the resources available at the upper and/or lower-tier level to implement the policy framework. The determination of whether the upper-tier or lower-tier Official Plan should contain detailed policies on natural heritage and water resources is somewhat dependent on:

- Whether the systems and features are required to be mapped and protected by an upper-tier Official Plan;
- Which level of government is the approval authority for applications;
- Who is responsible for the mapping of key features;
- The resources and expertise available to undertake mapping updates; and
- Which level of government has the resources to review natural heritage evaluations (or environmental impact studies) and make informed decisions/recommendations on impacts and key feature boundaries.

With respect to the third point, and in terms of who should have the responsibility for making refinements and deletions, there are two options to consider.

The first option assumes that the Region is the ultimate authority and the last word on the making of changes to boundaries of key features or the deletion of key features. In order for this authority to be clear, the policies of the new N.O.P. would specifically indicate that any refinements or deletions are acceptable, subject to Regional approval. This means that, while many Planning Act decisions are made locally, the Region would have a significant role. If this option were selected, it would follow that the N.O.P. would designate key features on an operative schedule. This approach is currently implemented in Halton Region.

The second option is for the Region to provide expertise and commentary but allow for area municipalities to make the actual decision on refinements and deletions. In this case, the mapping of key features would be shown as an overlay or as a constraint to development in the new N.O.P.

Another factor to ultimately consider is how key features are to be dealt with in local zoning by-laws. Given the very specific language used in the Growth Plan and to some extent the Greenbelt Plan, there is a need to clearly prohibit development in certain key features and establish some type of Planning Act process to trigger required natural heritage evaluations. One of the challenges to consider as well is that while Official

Plan mapping can be easily modified without going through a formal amendment process, the same cannot be said for zoning by-laws.

18.5 Relevance to the New Niagara Official Plan

The following points derived from the review of the Region's current natural environment policies in the official plan should be carried forward for consideration when preparing the new natural environment policies and mapping for the N.O.P.:

- There is a need for a very different approach in the new R.O.P. based on the establishment of a natural heritage system and water resource system, which become the main organizing element of a policy framework.
- The development of the natural environment policy framework should follow from a clear vision, goals and objectives
- The Region should use the watershed as the ecologically meaningful scale for integrated and long-term planning.
- The N.O.P. could recognize the importance of watershed planning for the protection of the quality and quantity of water and the identification and protection of hydrologic features and areas.
- The natural environment schedules shall include the Growth Plan N.H.S. as an overlay.
- The Region's N.H.S. should build on the Provincial N.H.S. and incorporate natural heritage features and functions of local importance.
- The policy framework shall identify the natural heritage system and water resource system and have policies related to:
 - Maintaining linkages and related functions
 - Implementing necessary restrictions on development and site alteration
- The N.O.P. policies should identify and provide policy direction for area municipalities on managing natural heritage and water resources and ecosystem, shoreline, watershed, and Great Lakes related issues.
- The Region shall comprehensively apply the policies and schedules of the Growth Plan as contained therein.
- The N.O.P. must include schedule that shows the boundary of the Greenbelt Area, the Protected Countryside and the Greenbelt N.H.S. including known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones.
- The N.O.P. may have a different set of policies for the natural heritage system beyond the Growth Plan and Greenbelt Plan N.H.S.s that must be consistent with the P.P.S.; however the policies of the Growth Plan N.H.S. apply to key hydrologic areas outside of the Growth Plan N.H.S. and should be reflected in the N.O.P. policy framework.
- Due to the complexity and specific wording of the Growth Plan, Greenbelt Plan and Niagara Escarpment Plan policies, the Region may consider separate

sections to address policies related to these Provincial Plans and the remainder of the Region.

- With the potential for four specific sets of policies or reference to policies in other Provincial plans, the Region may consider the following approach to N.H.S. mapping:
 - Adopt the N.H.S. already established by the Province in the Greenbelt Plan area and Growth Plan N.H.S.;
 - Identify features and areas that comprise the N.H.S. for lands not within the Greenbelt Plan and Growth Plan N.H.S., and which could extend into settlement areas as required;
 - Identified key features and linkages within the Niagara Escarpment Plan area.
- It is anticipated that the new N.O.P. will contain the following types of policies:
 - Prescriptive policies that are required by Provincial Plans and policies and are therefore mandatory;
 - Prescriptive policies that are intended to ensure that a particular issue is dealt with in a consistent manner across the Region (at the discretion of the Region);
 - Strategic goals and objectives that are required to be implemented by the local municipality in a manner that reflects the local context; and,
 - Strategic goals, objectives and policies that encourage (but not explicitly require) area municipalities to develop local Official Plan policies on an issue that reflects the local context.

The determination of which types of policies will be prepared in accordance with the above will be a key discussion item throughout the work program to develop a new Regional Official Plan.

- A key decision for the Region to make as part of the current update process is how the policy framework will identify the role of the Region and area municipalities regarding local Official Plan Amendments.
- The determination of whether the upper tier or lower-tier Official Plan should contain detailed policies on natural heritage and water resources should be based on the following:
 - Whether the systems and features are required to be mapped and protected by an upper-tier Official Plan;
 - Which level of government is the approval authority for applications;
 - Who is responsible for the mapping of key features;
 - The resources and expertise available to undertake mapping updates; and
 - Which level of government has the resources to review natural heritage evaluations (or environmental impact studies) and make informed decisions/recommendations on impacts and key feature boundaries

- The policy framework should clearly indicate if the natural environment system (or components therein) would be treated as a designation or an overlay. If the former, the Region would be the ultimate authority on planning decisions related to boundary refinements of key features or the deletion of features; if the later, the Region could provide expertise and commentary on applications that may affect the natural environment system but defer planning decisions to area municipalities.
- The policy framework should consider how key features within the Growth Plan N.H.S. are to be dealt with in local zoning by-laws given the need to clearly prohibit development in certain features and ensure implementation of the Growth Plan policies.

19.0 Preliminary Criteria to Evaluate Natural Environment Planning Options

The preceding sections provide background information which will be considered in the development of options for natural environment system mapping and policies. Options can vary greatly depending on the goals, objectives and vision for the natural environment system and in consideration of the discussion presented through this report. An evaluation of the options against a set of consistent criteria will assist the Region in identifying the preferred option. The criteria used in the evaluation should represent the core objectives of the natural environment system, consideration for balanced land use planning, cost (time and resources), implementation etc., to ensure a comprehensive assessment that considers the natural environment system itself and how it will interact with broader land use planning objectives. Each criterion should be clearly defined and have established measures to ensure consistent application and interpretation.

Preliminary criteria are presented below (Table 9); they outline key evaluation themes and provide comments regarding the intent of the criteria and/or what additional information or refinement is required prior to use. Refinements to the preliminary criteria or identification of alternative criteria should be considered as options are developed.

Preliminary criteria were developed based on consultation with the Technical Advisory Group (T.A.G.) and with input from stakeholders and the public during the first major point of engagement.

Table 9: Preliminary Criteria for the Evaluation of Natural Environment Policy and Mapping Options

Preliminary Criteria	Comments
Consistent	
Conformity with Provincial Plans	This is an assessment of if each option conforms to the minimum requirements of relevant provincial plans (P.P.S., Greenbelt Plan, Growth Plan, Niagara Escarpment Plan). It could additionally include a measure around exceeding provincial minimum requirements.
Policy and mapping address legislative requirements	This is an assessment of how well each option performs at achieving compliance with relevant laws and legislation with respect to the natural environment system (e.g. E.S.A., Planning Act)
Achieves the Vision, Goals and Objectives of the new N.O.P. with consideration of Regional Council's strategic priorities	This would likely become several criteria based on the applicable components of the vision, goals and objectives of the new N.O.P. that apply to the natural environment system.

Preliminary Criteria	Comments
Balanced	
Provides flexibility to achieve balanced land use planning or provides clear direction with respect to how balanced land use planning will be achieved	This criterion will need to be refined based on the interest of the Region to develop policies that support a complex system with flexibility (e.g. case-by-base assessment), and how and where that flexibility will occur / be implemented or to develop policies for a more prescriptive and simplified approach that limits flexibility in their interpretation and implementation.
Considers stakeholder needs and interests	This criterion will need to be refined to include a specific list of stakeholders / areas that should be specifically measured (e.g., agricultural land use concessions or considerations)
Defensible	
Policies follow a systems-based approach	As the name implies, the natural environment system (comprised of the natural heritage system and the water resource system) is a system. As such, the policies, and any flexibility or assessment built into them, needs to consider the relationship of the features and any proposed land uses within the context of the collective system. Specifically, the natural environment system policies should have regard for the system as a whole, not just features, and be considered when including flexibility in their application.
Policies follow a science-based approach	A scientifically defensible approach to N.H.S. and W.R.S. planning should be used to develop the systems and policies. This criterion goes beyond that high-level thinking and looks at the criteria by which features are identified (e.g. policy criteria), how impacts are assessed, etc. The policy and mapping options should be developed using a science-based approach to ensure they are defensible and rigorous.
Effective	
The policies can be effectively implemented.	This criterion asks that the evaluation consider how (e.g. through what processes and using what tools) the policies will be implemented. Can they be implemented effectively through existing (or new) tools and processes?

Preliminary Criteria	Comments
Ensure protection of the natural environment system.	The objectives natural environment system policies are generally to ensure the long-term protection and function of the natural heritage and water resource systems in Niagara. As such, options must be measured against their ability to achieve this objective. The assessment may include running scenarios and/or assessing what percent of existing cover would be captured to compare against targets.
Directing development to desired locations that support the objectives of the Province with respect to the location of growth and development.	This criterion looks at whether the natural environment policies support development in desired locations (e.g. infill / intensification, etc.) where appropriate. An additional consideration may be ensuring they align with policies that specifically address this objective to ensure they are compatible and do not contradict one another (e.g. urban-specific policy considerations, etc.)
Time and Resourcing	
Anticipated timeline for approval.	This criterion may be difficult to measure. The intent is to bring into consideration the anticipated duration of the approval process that could result from different options and weigh them as part of the time and resource requirements associated with the option.
Anticipated timeline to develop implementation tools (e.g., mapping, screening tools, E.I.S. guidelines, offsetting guidelines, etc.).	Options may include different implementation tools. Consideration should be given to the anticipated timeline required to develop those tools as part of a cost-benefit assessment.
Anticipated costs to develop implementation tools (e.g., mapping, screening tools, E.I.S. guidelines, offsetting guidelines, etc.).	As an extension to the preceding criterion, this specifically considers anticipated expenditures associated with developing implementation tools. This may include internal costs to the Region, consulting fees, etc.

These preliminary criteria should be refined after policy and mapping options have been developed. These may include:

- Refined focus of language to target specific considerations.
- Refined descriptions based on the options being evaluated.
- Development of specific measures and / or targets against which to compare options.

- Policy and mapping criteria may be separated but based on similar themes.
- Must be applicable, consistent and measurable across all options to ensure that the evaluation process is equitable and transparent to the Region and its stakeholders.

Of key importance in refining and developing the evaluation criteria is that they reflect the vision, goals and objectives for the natural environment system and the new N.O.P. These guide the N.O.P. and land use planning in the Region; as such, the natural environment system must also be in alignment with these overarching principles.

19.1 Considerations for Options Development

There are a broad range of factors that can be combined to create dozens of options; this can quickly become a task beyond what can reasonably be considered through the N.O.P. process. To address this, it is recommended that some parameters be identified to generate a set number of options (e.g. up to 3) that have distinct and measurable differences in key areas. By ensuring that differences are measurable across these, a range of potential outcomes can be adequately evaluated through an efficient process.

Through the evaluation process, each option would be assessed across the full set of criteria to assess how they perform in these areas. Following this initial assessment, preferred components of each option can then be identified, and a revised option can be developed to achieve the desired outcome. In developing these parameters, and therefore in developing the options, we recommend the following be considered:

- Desire to have:
 - A complex, flexible system;
 - A more simple, prescriptive system; or
 - Options for both.
- Interest and support for meeting minimum provincial requirements or going beyond in developing the natural environment system.
- Land-use specific policy considerations:
 - Consistent across all land-use designations; or
 - One or more distinct policy-groups for urban, rural, and/or agricultural.
- Treatment of the N.H.S. and W.R.S. (both the Provincial and Regional) as designated land-uses or as land-use overlays.
- Treatment of Buffers, Enhancement Areas and Linkages as:
 - Part of the N.H.S. / W.R.S.
 - Supplementary/other components

By clearly developing a set of parameters, you can identify the most preferred options in each evaluation theme. By then combining these in a subsequent option (or small number of refined options), the evaluation process will be able to assess a broad range of potential outcomes through an effective and efficient process.

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Appendix 1: Definitions of relevant natural environment terms and concepts

Appendix 1: Definitions of relevant natural environment terms and concepts from the provincial plans and the existing Regional Official Plan (R.O.P.).

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
ADJACENT LANDS	ADJACENT LANDS: means b) for the purposes of policy 2.1.8, those lands contiguous to a specific <i>natural heritage feature or area</i> where it is likely that <i>development or site alteration</i> would have a <i>negative impact</i> on the feature or area. The extent of the <i>adjacent lands</i> may be recommended by the Province or based on municipal approaches which achieve the same objectives;	No definition	No definition	No definition	Related ADJACENT: means for the purposes of Cultural Heritage, those properties immediately abutting built heritage resources or a locally identified Cultural Heritage Landscape.
AGRICULTURAL USES	AGRICULTURAL USES: means the growing of crops, including nursery, biomass, and horticultural crops; raising livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry; maple syrup production; and associated on-farm buildings and structures, including but not limited to livestock facilities, manure storages, value-retaining facilities, and accommodation for full-time farm labour when the size and nature of the operation requires additional employment.	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	AGRICULTURAL USES: means the growing of crops, including nursery and horticultural crops; raising of livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry, maple syrup production; and associated on-farm buildings and structures, including accommodation for full-time farm labour when the size and nature of the operation requires additional employment. Agricultural uses include value retention uses required to make a commodity saleable (i.e. Corn dryer, washing, sorting, packing, and packaging).
AGRICULTURE-RELATED USES	AGRICULTURE-RELATED USES: means those farm-related commercial and farm-related industrial uses that are directly related to farm operations in the area, and support agriculture, benefit from being in close proximity to farm operations and provide direct products and/or services to farm operations as a primary activity.	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	AGRICULTURE-RELATED USES: means those farm-related commercial and farm-related industrial uses that are small-scale and directly related to the farm operation and are required in close proximity to the farm operation.
ALVARS	No definition	Same as Greenbelt Plan 2017	ALVARS Means naturally open areas of thin or no soil over essentially flat limestone, dolostone, or marble rock, supporting	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
			a sparse vegetation cover of mostly shrubs and herbs.		
AREAS OF NATURAL AND SCIENTIFIC INTEREST (A.N.S.I.)	AREAS OF NATURAL AND SCIENTIFIC INTEREST (A.N.S.I.): means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.	Same as Greenbelt Plan 2017	LIFE SCIENCE AREAS OF NATURAL AND SCIENTIFIC INTEREST (A.N.S.I.) Means an area that has been identified as having life science values related to protection, scientific study, or education; and further identified by the Ministry of Natural Resources and Forestry using evaluation procedures established by that Ministry, as amended from time to time.	AREAS OF NATURAL AND SCIENTIFIC INTEREST (A.N.S.I.): Areas of land and water containing natural landscapes or features which have been identified as having values related to natural heritage protection, scientific study, or education.	LIFE SCIENCE AREAS OF NATURAL AND SCIENTIFIC INTEREST are areas of land and water identified by the Ministry of Natural Resources as containing significant representative segments of Ontario's biodiversity and natural landscapes including specific types of forests, valleys, prairies and wetlands, their native plants and animals, and their supporting environments. EARTH SCIENCE AREAS OF NATURAL AND SCIENTIFIC INTEREST are areas identified by the Ministry of Natural Resources as containing some of the most significant representative examples of the bedrock, fossil and landform features in Ontario, and includes examples of ongoing geological processes.
BUFFER / VEGETATION PROTECTION ZONES	No definition	Same as Greenbelt Plan 2017	VEGETATION PROTECTION ZONE Means a vegetated buffer area surrounding a <i>key natural heritage feature</i> or <i>key hydrologic feature</i> .	VEGETATION PROTECTION ZONE: A vegetated buffer area surrounding a key natural heritage feature or key hydrologic feature within which only those land uses permitted within the feature itself are permitted.	BUFFER: means a naturally vegetated protective zone adjacent to a natural area serving to cushion and protect the natural area from the impacts of human activities on adjacent lands. VEGETATION PROTECTION ZONE: means a vegetated buffer area surrounding a natural heritage feature or hydrologic feature within which only those land uses permitted within the feature itself are permitted.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
COASTAL WETLAND	COASTAL WETLAND: means a) any <i>wetland</i> that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Marys, Detroit, Niagara and St. Lawrence Rivers; or b) any other <i>wetland</i> that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 kilometers upstream of the 1:100 year floodline (plus wave run-up) of the large waterbody to which the tributary is connected.	No definition	No definition	No definition	No definition
COMPREHENSIVE REHABILITATION	COMPREHENSIVE REHABILITATION: means the rehabilitation of land from which <i>mineral aggregate resources</i> have been extracted that is coordinated and complimentary, to the extent possible, with the rehabilitation of other sites in an area where there is a high concentration of <i>mineral aggregate operations</i> .	No definition	No definition	Same as P.P.S. 2014	No definition
CONNECTIVITY	Not a defined term, but a conceptualization of meaning of “linkage” from the definition of <i>Natural Heritage System</i> : linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems	No definition, but same conceptualization of linkage embedded into Natural Heritage System as P.P.S. 2014	CONNECTIVITY Means the degree to which <i>key natural heritage features</i> or <i>key hydrologic features</i> are connected to one another by links such as plant and animal movement corridors, hydrologic and nutrient cycling, genetic transfer and energy flow through food webs.	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
CONSERVATION	No definition	No definition	No definition	CONSERVE OR CONSERVATION: a) In an ecological context, means the wise management of the environment in a way that will maintain, restore, enhance and protect its quality and quantity for sustained benefit to humans and the environment. ...	CONSERVED: means the identification, protection, use and/or management of cultural heritage and archaeological resources in such a way that their heritage values, attributes and integrity are retained. This may be determined through a Conservation Plan or heritage impact assessment as approved by the local municipality.
DESIGNATED VULNERABLE AREA:	DESIGNATED VULNERABLE AREA: means areas defined as vulnerable, in accordance with provincial standards, by virtue of their importance as a drinking water source. [See definition of vulnerable below]	No definition	No definition	No definition	No definition
DEVELOPMENT:	DEVELOPMENT: means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act, but does not include: a) activities that create or maintain infrastructure authorized under an environmental assessment process; b) works subject to the Drainage Act; or c) for the purposes of policy 2.1.4(a), underground or surface mining of minerals or advanced exploration on mining lands in significant areas of mineral potential in Ecoregion 5E, where advanced exploration has the same meaning as under the Mining Act. Instead, those matters shall be subject to policy 2.1.45(a). [small changes to policies referenced]	DEVELOPMENT The creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the Planning Act, but does not include: a) activities that create or maintain infrastructure authorized under an environmental assessment process; or b) works subject to the Drainage Act. (Based on P.P.S., 2014 and modified for this Plan)	DEVELOPMENT Means the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the <i>Planning Act</i> , but does not include: a) activities that create or maintain <i>infrastructure</i> authorized under an environmental assessment process; or b) works subject to the <i>Drainage Act</i> (Based on P.P.S., 2014 and modified for this Plan). MAJOR DEVELOPMENT Means development consisting of: a. the creation of four or more lots; b. the construction of a building or buildings with a ground floor area of 500 m ² or more; or c. the establishment of a major recreational use.	No definition The <i>Niagara Escarpment Planning and Development Act, R.S.O. 1990</i> , defines development as: "includes a change in the use of any land, building or structure"	DEVELOPMENT: means the creation of a new lot, a change in land use, or the construction of a building or structure, requiring approval under the Planning Act. It includes the construction of new, or significant expansion of existing, public utilities or infrastructure but does not include works subject to the Drainage Act.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
ECOLOGICAL FUNCTION	ECOLOGICAL FUNCTION: means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio- economic interactions.	Same as P.P.S. 2014	ECOLOGICAL FUNCTION Means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes, including <i>hydrologic functions</i> and biological, physical, chemical and socio-economic interactions.	No definition	ECOLOGICAL FUNCTIONS means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes, including hydrologic functions and biological, physical, chemical and socio-economic interactions.
ECOLOGICAL INTEGRITY	No definition	Same as Greenbelt 2017	ECOLOGICAL INTEGRITY Which includes hydrological integrity, means the condition of ecosystems in which: a) the structure, composition and function of the ecosystems are unimpaired by the stresses from human activity; b) natural ecological processes are intact and self-sustaining, and c) the ecosystems evolve naturally.	No definition	ECOLOGICAL INTEGRITY , which includes hydrologic integrity, means the condition of ecosystems in which: (1) the structure, composition and function of the ecosystems are unimpaired by stresses from human activity; (2) natural ecological processes are intact and self-sustaining, and (3) the ecosystems evolve naturally.
ECOLOGICAL RESTORATION	No definition	No definition	No definition	No definition	ECOLOGICAL RESTORATION means the return of a species, population or ecosystem to its state prior to disturbance.
ECOLOGICAL VALUE	No definition	Same as Greenbelt 2017	ECOLOGICAL VALUE Means the value of vegetation in maintaining the health of the <i>key natural heritage feature</i> or <i>key hydrologic feature</i> and the related ecological features and <i>ecological functions</i> , as measured by factors such as the diversity of species, the diversity of habitats, and the suitability and amount of habitats that are available for rare, threatened and endangered species.	No definition	No definition
ECOSYSTEM	No definition	No definition	No definition	No definition	ECOSYSTEM means a dynamic complex of plants, animals and micro-organisms and their non-living environment interacting as a functional unit. The term ecosystem can describe small scale units, such

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
					as drops of water, as well as large scale units, such as the biosphere.
ENDANGERED SPECIES	ENDANGERED SPECIES: means a species that is listed or categorized as an “Endangered Species” on the Ontario Ministry of Natural Resources’ official Species at Risk list, as updated and amended from time to time.	No definition	ENDANGERED SPECIES Means a species that is classified as an “endangered species in Ontario Regulation 230/08 (Species at Risk in Ontario List) made under the <i>Endangered Species Act, 2007</i> , as it may be amended from time to time.	ENDANGERED SPECIES: A species that is classified as an endangered species in Ontario Regulation 230/08 (Species at Risk in Ontario List) made under the Endangered Species Act, 2007.	ENDANGERED SPECIES means a species that is listed or categorized as an "Endangered Species" on the Ontario Ministry of Natural Resources official species at risk list or that is designated as Endangered by the Committee on the Status of Wildlife in Canada (COSEWIC), as updated and amended from time to time.
EROSION HAZARD	EROSION HAZARD: means the loss of land, due to human or natural processes, that poses a threat to life and property. The <i>erosion hazard</i> limit is determined using considerations that include the 100 year erosion rate (the average annual rate of recession extended over a one hundred year time span), an allowance for slope stability, and an erosion/erosion access allowance.	No definition	No definition	Same as P.P.S. 2014	No definition
FISH HABITAT	FISH HABITAT: as defined in the Fisheries Act, means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which <i>fish</i> depend directly or indirectly in order to carry out their life processes.	Same as P.P.S. 2014	Same as P.P.S. 2014	FISH HABITAT: The spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend, directly or indirectly, in order to carry out their life processes (<i>Fisheries Act</i> , R.S.C., 1985, c. F-14).	FISH HABITAT means the spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes and is as identified by the Provincial Ministry of Natural Resources.
FISHERIES MANAGEMENT	No definition	No definition	No definition	FISHERIES MANAGEMENT: The management of fish habitat and fish populations for the purpose of sustaining and improving the quality and quantity of fish.	No definition
FLOOD PLAIN	FLOOD PLAIN: for river, stream and small inland lake systems, means the area, usually low lands adjoining a watercourse, which has been or may be subject to flooding hazards.	No definition	No definition	No definition Related FLOODING HAZARD: The inundation, under the conditions specified below, of areas adjacent to a shoreline or a river or stream	FLOOD PLAIN (for river and stream systems) means the area, usually low lands adjoining a watercourse, which has been or may be inundated in the event of a flood.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
				<p>system and not ordinarily covered by water:</p> <p>a) along the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes, the flooding hazard limit is based on the one hundred year flood level plus an allowance for wave uprush and other water-related hazards;</p> <p>b) along river, stream and small inland lake systems, the flooding hazard limit is the greater of:</p> <p>i. the flood resulting from the rainfall actually experienced during a major storm such as the Hurricane Hazel storm (1954) or the Timmins storm (1961), transposed over a specific watershed and combined with the local conditions, where evidence suggests that the storm event could have potentially occurred over watersheds in the general area;</p> <p>ii. the one hundred year flood; and</p> <p>iii. a flood which is greater than i) or ii) which was actually experienced in a particular watershed or portion thereof as a result of ice jams and which has been approved as the standard for that specific area by the Minister of Natural Resources and Forestry;</p> <p>except where the use of the one hundred year flood or the actually experienced event has been approved by the Ministry of Natural Resources and Forestry as the standard for a specific watershed (where the past history of flooding supports the lowering of the standard) (Provincial Policy Statement, 2014).</p>	

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
FOREST MANAGEMENT	No definition	No definition	No definition	FOREST MANAGEMENT: The sustainable management of forests to produce wood and wood products, provide outdoor recreation, protect, restore or enhance environmental conditions for wildlife, and protect water supplies.	No definition
GREEN INFRASTRUCTURE:	GREEN INFRASTRUCTURE: means natural and human- made elements that provide ecological and hydrological functions and processes. <i>Green infrastructure</i> can include components such as natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.	Same as P.P.S. 2014 Related: LOW IMPACT DEVELOPMENT Same as Greenbelt Plan 2017	Same as P.P.S. 2014 Related: LOW IMPACT DEVELOPMENT Means an approach to stormwater management that seeks to manage rain and other precipitation as close as possible to where it falls to mitigate the impacts of increased runoff and stormwater pollution. It includes a set of site design strategies and distributed, small-scale structural practices to mimic the natural hydrology to the greatest extent possible through infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. <i>Low impact development</i> can include: bio-swales, permeable pavement, rain gardens, green roofs and exfiltration systems. <i>Low impact development</i> often employs vegetation and soil in its design, however, that does not always have to be the case.	Same as P.P.S. 2014 Related: LOW IMPACT DEVELOPMENT Same as Greenbelt Plan 2017	No definition
GROUND WATER FEATURE	GROUND WATER FEATURE means water-related features in the earth's subsurface, including recharge/discharge areas, water tables, aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeologic investigations.	Same as P.P.S. 2014	No definition	No definition	GROUND WATER FEATURES means water-related features in the earth's subsurface, including recharge/discharge areas, water tables, aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeologic investigations.
HABITAT OF ENDANGERED SPECIES	HABITAT OF ENDANGERED SPECIES AND THREATENED SPECIES: means	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	HABITAT OF ENDANGERED AND THREATENED SPECIES means land that,

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
AND THREATENED SPECIES	<p>a) with respect to a species listed on the Species at Risk in Ontario List as an endangered or threatened species for which a regulation made under clause 55(1)(a) of the <i>Endangered Species Act, 2007</i> is in force, the area prescribed by that regulation as the habitat of the species; or</p> <p>b) with respect to any other species listed on the Species at Risk in Ontario List as an endangered or threatened species, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding, as approved by the Ontario Ministry of Natural Resources; and places in the areas described in clause (a) or (b), whichever is applicable, that are used by members of the species as dens, nests, hibernacula or other residences.</p>				<p>a) is an area where individuals of an endangered species or a threatened species live or have the potential to live and find adequate amounts of food, water, shelter, and space needed to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species, and</p> <p>b) has been further identified, by the Ministry of Natural Resources or by any other person, according to evaluation procedures established by the Ministry of Natural Resources, as amended from time to time.</p>
HAZARDOUS FOREST TYPES FOR WILDLAND FIRE	HAZARDOUS FOREST TYPES FOR WILDLAND FIRE: means forest types assessed as being associated with the risk of high to extreme wildland fire using risk assessment tools established by the Ontario Ministry of Natural Resources, as amended from time to time.	No definition	No definition	No definition	No definition
HAZARDOUS LANDS	HAZARDOUS LANDS: means property or lands that could be unsafe for development due to naturally occurring processes. Along the shorelines of the <i>Great Lakes - St. Lawrence River System</i> , this means the land, including that covered by water, between the international boundary, where applicable, and the furthest landward	Same as P.P.S. 2014	Same as P.P.S. 2014	No definition	<p>HAZARDOUS LANDS means lands that could be unsafe for development due to naturally occurring processes and includes:</p> <p>a) Along rivers, streams and small lakes, the land, including that covered by water, to the furthest landward extent of the flooding or erosion hazard limits.</p>

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	limit of the <i>flooding hazard, erosion hazard or dynamic beach hazard</i> limits. Along the shorelines of <i>large inland lakes</i> , this means the land, including that covered by water, between a defined offshore distance or depth and the furthest landward limit of the <i>flooding hazard, erosion hazard or dynamic beach hazard</i> limits. Along <i>river, stream and small inland lake systems</i> , this means the land, including that covered by water, to the furthest landward limit of the <i>flooding hazard or erosion hazard</i> limits.				b) Along the shorelines of Lake Erie, Lake Ontario and the Niagara River, the land, including that covered by water, to the furthest landward limit of the flooding hazard, the erosion hazard or the dynamic beach hazard limits.
HIGHLY VULNERABLE AQUIFER	No definition	Same as the Greenbelt Plan	HIGHLY VULNERABLE AQUIFER Means aquifers, including lands above the aquifers, on which external sources have or are likely to have a significant adverse effect.	No definition	No definition
HYDROLOGIC FUNCTION	HYDROLOGIC FUNCTION means the functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things.	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	No definition
KEY HYDROLOGIC AREAS	No definition	KEY HYDROLOGIC AREAS <i>Significant groundwater recharge areas, highly vulnerable aquifers, and significant surface water contribution areas</i> that are necessary for the ecological and hydrologic integrity of a <i>watershed</i> .	KEY HYDROLOGIC AREAS Means a <i>key hydrologic area</i> as described in section 3.2.4. S 3.2.4: <i>Key hydrologic areas</i> include: <i>Significant groundwater recharge areas;</i> <i>Highly vulnerable aquifers;</i> and <i>Significant surface water contribution areas</i>	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
KEY HYDROLOGIC FEATURES	No definition	KEY HYDROLOGIC FEATURES Permanent streams, <i>intermittent streams</i> , inland lakes and their littoral zones, <i>seepage areas and springs</i> , and <i>wetlands</i> .	KEY HYDROLOGIC FEATURES Means a <i>key hydrologic feature</i> as described in section 3.2.5. S 3.2.5: <i>Key hydrologic features include: Permanent and intermittent streams; Lakes (and their littoral zones); Seepage areas and springs; and Wetlands.</i>	Defined within text of policy 2.6.1 Key hydrologic features within the meaning of this Plan: <i>permanent and intermittent streams lakes (and their littoral zones) seepage areas and springs wetlands</i>	No definition
KEY NATURAL HERITAGE FEATURES	No definition	KEY NATURAL HERITAGE FEATURES <i>Habitat of endangered species and threatened species; fish habitat; wetlands; life science areas of natural and scientific interest (A.N.S.I.s), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.</i>	KEY NATURAL HERITAGE FEATURES Means a <i>key natural heritage feature</i> as described in section 3.2.5. S 3.2.5: Key natural heritage features include: <i>Habitat of endangered species and threatened species; Fish habitat; Wetlands; Life science areas of natural and scientific interest (A.N.S.I.s); Significant valleylands; Significant woodlands; Significant wildlife habitat (including habitat of special concern species); Sand barrens, savannahs and tallgrass prairies; and Alvars.</i>	Defined within text of policy 2.7.1 Key natural heritage features within the meaning of this Plan: <i>Wetlands Habitat of endangered species and threatened species Fish habitat Life Science Areas of Natural and Scientific Interest Earth Science Areas of Natural and Scientific Interest Significant valleylands Significant woodlands Significant wildlife habitat Habitat of special concern species in Escarpment Natural and Escarpment Protection areas</i>	No definition
NATURAL ENVIRONMENT	No definition	No definition	No definition	NATURAL ENVIRONMENT: The air, land and water or any combination or part thereof.	No definition
NATURAL HERITAGE CORRIDORS/ LINKAGES	No definition	Related The main functions of linkages are to facilitate the movement of organisms between otherwise isolated habitat patches thereby increasing gene flow within populations, promoting	No definition	No definition	NATURAL HERITAGE CORRIDORS mean natural and open space linkages between Core Natural Areas. They include naturally vegetated stream corridors, valleylands, shorelines, woodlands;

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
		recolonization of habitat patches and increasing species persistence and diversity (Tewksbury et al. 2002). In addition to providing connectivity between habitat patches, linkages can provide habitat in their own right, support healthy functioning ecosystems, and can provide several benefits to humans (open spaces for recreation, limits on urban sprawl, and ecosystem services) (Hilty et al. 2006).			wetlands; and other natural vegetation communities.
NATURAL HERITAGE FEATURES AND AREAS	NATURAL HERITAGE FEATURES AND AREAS: means features and areas, including <i>significant wetlands</i> , <i>significant coastal wetlands</i> , other <i>coastal wetlands</i> in Ecoregions 5E, 6E and 7E, <i>fish habitat</i> , <i>significant woodlands</i> and <i>significant valleylands</i> in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River), <i>habitat of endangered species and threatened species</i> , <i>significant wildlife habitat</i> , and <i>significant areas of natural and scientific interest</i> , which are important for their environmental and social values as a legacy of the natural landscapes of an area.	Same as P.P.S. 2014	No definition	No definition	No definition
NATURAL HERITAGE SYSTEM	NATURAL HERITAGE SYSTEM: means a system made up of <i>natural heritage features and areas</i> , † and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include <i>natural heritage features and areas</i> , federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the	NATURAL HERITAGE SYSTEM The system mapped and issued by the Province in accordance with this Plan, comprised of <i>natural heritage features and areas</i> , and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. The system can include <i>key natural heritage features</i> , <i>key hydrologic features</i> , federal and provincial parks and conservation	Definition within text (3.2.1) The Natural Heritage System includes core areas and linkage areas of the Protected Countryside with the highest concentration of the most sensitive and/or significant natural features and functions. Policies in section 3.2.2 reference: <i>key natural heritage features</i> and <i>key hydrologic features</i>	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying <i>natural heritage systems</i> , but municipal approaches that achieve or exceed the same objective may also be used.	reserves, other <i>natural heritage features and areas</i> , lands that have been restored or have the potential to be restored to a natural state, associated areas that support <i>hydrologic functions</i> , and working landscapes that enable <i>ecological functions</i> to continue. (Based on P.P.S., 2014 and modified for this Plan)			
NATURAL SELF-SUSTAINING VEGETATION	No definition	Same as Greenbelt Plan 2017	NATURAL SELF-SUSTAINING VEGETATION Means vegetation dominated by native plant species that can grow and persist without direct human management, protection, or tending.	Same as Greenbelt Plan 2017	Same as Greenbelt Plan 2017
NEGATIVE IMPACTS	NEGATIVE IMPACTS: means a) in regard to policy 1.6.6.4 and 1.6.6.5, degradation to the <i>quality and quantity of water, sensitive surface water features and sensitive ground water features</i> , and their related <i>hydrologic functions</i> , due to single, multiple or successive <i>development</i> . <i>Negative impacts</i> should be assessed through environmental studies including hydrogeological or water quality impact assessments, in accordance with provincial standards; b) in regard to policy 2.2, degradation to the <i>quality and quantity of water, sensitive surface water features and sensitive ground water features</i> , and their related <i>hydrologic functions</i> , due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities; c) in regard to <i>fish habitat</i> , any permanent alteration to, or destruction of <i>fish habitat</i> , except where, in conjunction with the	NEGATIVE IMPACT a) In regard to water, degradation to the quality or quantity of surface or groundwater, <i>key hydrologic features</i> or vulnerable areas and their related <i>hydrologic functions</i> due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities; b) In regard to <i>fish habitat</i> , any permanent alteration to, or destruction of <i>fish habitat</i> , except where, in conjunction with the appropriate authorities, it has been authorized under the Fisheries Act; and c) In regard to other <i>natural heritage features and areas</i> , degradation that threatens the health and integrity of the natural features or <i>ecological functions</i> for which an area is identified due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities. (Based on the P.P.S., 2014 and modified for this Plan)	NEGATIVE IMPACT(S) Means: a) in regard to water, degradation to the quality or quantity of surface or groundwater, <i>key hydrologic features</i> or vulnerable areas and their related <i>hydrologic functions</i> , due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities; b) in regard to <i>fish habitat</i> , any permanent alteration to, or destruction of <i>fish habitat</i> , except where, in conjunction with the appropriate authorities, it has been authorized under the Fisheries Act; and c) in regard to other <i>natural heritage features and areas</i> , degradation that threatens the health and integrity of the natural features or <i>ecological functions</i> for which an area is identified due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities.	Same as the Growth Plan, plus: d) in regard to scenic resources, a degradation to the natural scenery and scenic quality due to single, multiple or successive development; and e) in regard to cultural heritage resources, degradation or destruction of built heritage resources, cultural heritage landscapes, archaeological resources, including a visual impact, when heritage attributes include the visual setting of a cultural heritage resource and other features of significant cultural heritage value or interest, including heritage and archaeological sites of critical importance to Aboriginal peoples.	Related SIGNIFICANT NEGATIVE IMPACT means: a) in regard to the Core Natural Heritage System, degradation that threatens the health and integrity of the natural features or ecological functions of the Core Natural Heritage System Component due to single, multiple or successive development or site alteration activities. b) in regard to Earth Science Areas of Natural and Scientific Interest (A.N.S.I.s), degradation that, due to single, multiple or successive development or site alteration activities, threatens the integrity of the geological features, landforms or processes for which the A.N.S.I. was identified and their associated educational and interpretive functions.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	appropriate authorities, it has been authorized under the <i>Fisheries Act</i> , and d) in regard to other <i>natural heritage features and areas</i> , degradation that threatens the health and integrity of the natural features or <i>ecological functions</i> for which an area is identified due to single, multiple or successive <i>development</i> or <i>site alteration</i> activities.				
ON-FARM DIVERSIFIED USES	ON-FARM DIVERSIFIED USES: means uses that are secondary to the principal agricultural use of the property, and are limited in area. <i>On-farm diversified uses</i> include, but are not limited to, home occupations, home industries, <i>agri-tourism uses</i> , and uses that produce value-added agricultural products.	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	No definition
PLANNED CORRIDORS	PLANNED CORRIDORS: means corridors or future corridors which are required to meet projected needs, and are identified through <i>provincial plans</i> , preferred alignment(s) determined through the <i>Environmental Assessment Act</i> process, or identified through planning studies where the Ontario Ministry of Transportation is actively pursuing the identification of a corridor. Approaches for the protection of <i>planned corridors</i> may be recommended in guidelines developed by the Province.	PLANNED CORRIDORS Corridors or future corridors which are required to meet projected needs, and are identified through this Plan, preferred alignment(s) determined through the Environmental Assessment Act process, or identified through planning studies where the Ministry of Transportation, Ministry of Energy, Metrolinx, or Independent Electricity System Operator (IESO) or any successor to those Ministries or entities, is actively pursuing the identification of a corridor. Approaches for the protection of	No definition	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
		planned corridors may be recommended in guidelines developed by the Province. (Based on P.P.S. 2014 and modified for this Plan)			
PROGRESSIVE REHABILITATION	No definition	No definition	No definition	PROGRESSIVE REHABILITATION: Rehabilitation done sequentially in accordance with the <i>Aggregate Resources Act</i> , its regulations, the site plans and the conditions of the license or permit during the period that aggregate is being excavated.	No definition
PROVINCIAL AND FEDERAL REQUIREMENTS	PROVINCIAL AND FEDERAL REQUIREMENTS: means a) in regard to policy 1.6.11.2, legislation, and regulations, policies and standards administered by the federal or provincial governments for the purpose of protecting the environment from potential impacts associated with energy systems and ensuring that the necessary approvals are obtained; b) in regard to policy 2.1, legislation and policies administered by the federal or provincial governments for the purpose of fisheries protection (including <i>fish</i> and <i>fish habitat</i>), and related, scientifically established standards such as water quality criteria for protecting lake trout populations; and c) in regard to policy 2.1.7, legislation and policies administered by the provincial government or federal government, where applicable, for the purpose of protecting species at risk and their habitat.	No definition	No definition	No definition	No definition
QUALITY AND QUANTITY OF WATER	QUALITY AND QUANTITY OF WATER is measured by indicators associated with <i>hydrologic function</i> such as minimum base flow, depth to water table, aquifer pressure, oxygen	Same as P.P.S. 2014	No definition	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	levels, suspended solids, temperature, bacteria, nutrients and hazardous contaminants, and hydrologic regime.				
RIPARIAN	No definition	No definition	No definition	No definition	RIPARIAN means of or relating to or located on the banks of a river or stream. The riparian zone is an area of streamside vegetation including the stream bank and adjoining floodplain, which is distinguishable from upland areas in terms of vegetation, soils and topography.
RIVER, STREAM AND SMALL INLAND LAKE SYSTEMS	RIVER, STREAM AND SMALL INLAND LAKE SYSTEMS: means all watercourses, rivers, streams, and small inland lakes or waterbodies that have a measurable or predictable response to a single runoff event.	INTERMITTENT STREAMS Same as Greenbelt Plan 2017	INTERMITTENT STREAMS Means stream-related watercourses that contain water or are dry at times of the year that are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year. LAKE Means any inland body of standing water, usually fresh water, larger than a pool or pond or a body of water filling a depression in the earth's surface. PERMANENT STREAM Means a stream that continually flows in an average year.	INTERMITTENT STREAM: A stream-related watercourse that contains water or is dry at times of the year that are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year. LAKE: Any inland body of standing water, usually fresh water, larger than a pool or pond, or a body of water filling a depression in the earth's surface. PERMANENT STREAM: A stream that continually flows in an average year. STREAM OR WATERCOURSE is a feature having defined bed and banks, through which water flows at least part of the year.	Related SURFACE WATER FEATURES means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.
RURAL AREAS	RURAL AREAS: means a system of lands within municipalities that may include rural <i>settlement areas</i> , <i>rural lands</i> , <i>prime agricultural areas</i> , natural heritage features and areas, and resource areas.	No definition	No definition	No definition	RURAL AREAS means those areas outside of the Urban Areas Boundaries which have limited or no capability for agriculture and approximately shown on Schedule of this Official Plan as Rural.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
RURAL LANDS	RURAL LANDS: means lands which are located outside <i>settlement areas</i> and which are outside <i>prime agricultural areas</i> .	Same as P.P.S. 2014	RURAL LANDS Means lands which are located outside <i>settlement areas</i> and which are outside <i>prime agricultural areas</i> (Based on P.P.S. 2014)	No definition	No definition
SAND BARRENS	No definition	Same as Greenbelt Plan 2017	SAND BARRENS Means land (not including land that is being used for agricultural purposes or no longer exhibits sand barrens characteristics) that: a. has sparse or patchy vegetation that is dominated by plants that are: i. adapted to severe drought and low nutrient levels; and ii. maintained by severe environmental limitations such as drought, low nutrient levels and periodic disturbances such as fire; b. has less than 25 per cent tree cover; c. has sandy soils (other than shorelines) exposed by natural erosion, depositional process or both; and d. has been further identified, by the Ministry of Natural Resources and Forestry or by any other person, according to evaluation procedures established by the Ministry of Natural Resources and Forestry, as amended from time to time.	No definition	No definition
SAVANNAH	No definition	Same as Greenbelt Plan 2017	SAVANNAH Means land (not including land that is being used for agricultural purposes or no longer exhibits savannah characteristics) that: a. has vegetation with a significant component of non-woody plants, including tallgrass prairie species that are maintained by seasonal drought, periodic disturbances such as fire, or both; b. has from 25 per cent to 60 per cent tree cover;	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
			c. has mineral soils; and d. has been further identified, by the Ministry of Natural Resources and Forestry or by any other person, according to evaluation procedures established by the Ministry of Natural Resources and Forestry, as amended from time to time.		
SEEPAGE AREAS AND SPRINGS	No definition	Same as Greenbelt Plan 2017	SEEPAGE AREAS AND SPRINGS Means sites of emergence of groundwater where the water table is present at the ground surface.	Same as Greenbelt Plan 2017	No definition
SENSITIVE	SENSITIVE in regard to <i>surface water features</i> and <i>ground water features</i> , means areas that are particularly susceptible to impacts from activities or events including, but not limited to, water withdrawals, and additions of pollutants.	No definition	No definition	No definition	No definition
SIGNIFICANT	SIGNIFICANT: means a) in regard to <i>wetlands, coastal wetlands</i> and <i>areas of natural and scientific interest</i> , an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time; c) in regard to <i>woodlands</i> , an area which is ecologically important in terms of features such as species composition, age of trees and stand	No definition [see significant features definitions below]	SIGNIFICANT Means: a) in regard to <i>wetlands</i> and <i>life science areas of natural and scientific interest</i> , an area identified as provincially significant using evaluation procedures established by the Ministry of Natural Resources and Forestry, as amended from time to time; b) in regard to <i>woodlands</i> , an area which is ecologically important in terms of features such as species composition, age of trees and stand	SIGNIFICANT: a) in regard to <i>wetlands</i> and <i>areas of natural and scientific interest</i> , an area identified as provincially significant by the Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time; b) in regard to <i>woodlands</i> , an area that is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to	SIGNIFICANT means: a) in regard to wetlands and Areas of Natural and Scientific Interest, an area identified as significant by the Ministry of Natural Resources using evaluation procedures established by the Ministry, as amended from time to time. b) in regard to the habitat of threatened and endangered species, the habitat, as approved by the Ministry of Natural Resources, that is necessary for the maintenance, survival and/or recovery of the

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	<p>history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources;</p> <p>d) in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or <i>natural heritage system</i>;</p> <p>e) in regard to <i>mineral</i> potential, an area identified as provincially significant through evaluation procedures developed by the Province, as amended from time to time, such as the Provincially Significant Mineral Potential Index; and</p> <p>e) in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest for the important contribution they make to our understanding of the history of a place, an event, or a people. Criteria for determining significance for the resources identified in sections (c)-(e) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used.</p> <p>While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.</p>		<p>history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. The Province (Ministry of Natural Resources and Forestry) identifies criteria relating to the forgoing;</p> <p>c) in regard to other features and areas in section 3.2.4-5 of this Plan, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of the Natural Heritage System. The Province (Ministry of Natural Resources and Forestry) identifies criteria relating to the forgoing; and</p> <p>While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.</p>	<p>its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ministry of Natural Resources and Forestry:</p> <p>c) in regard to other features and areas, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. These are to be identified using criteria established by the Ministry of Natural Resources and Forestry; and</p> <p>d) in regard to cultural heritage and archaeology, resources that have been determined to have <i>cultural heritage value or interest</i> for the important contribution they make to our understanding of the history of a place, an event, or a people. Criteria for determining significance for the resources identified in section d) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used.</p> <p>While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.</p>	<p>naturally occurring or reintroduced populations of endangered or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species for all or any part(s) of its life cycle.</p> <p>c) in regard to other natural heritage features and areas, ecologically important in terms of features, functions, representation or amount, and contributing to the quality, diversity, ecological health and integrity of the Core Natural Heritage System.</p> <p>d) in regard to a change in the spatial extent of a Core Natural Heritage Component an increase or decrease of over 20% in the area within an Environmental Conservation Area or in the length or area of a surface water feature shown as Fish Habitat.</p> <p>e) in regard to cultural heritage and archaeology, resources that are valued for the important contribution they make to our understanding of the history of a place, an event or a person/ people.</p>

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
SIGNIFICANT GROUNDWATER RECHARGE AREA	No definition	Same as Greenbelt Plan 2017	SIGNIFICANT GROUNDWATER RECHARGE AREA Means a <i>significant groundwater recharge area</i> identified: a) as a <i>significant groundwater recharge area</i> by any public body for the purposes of implementing the P.P.S.; b) as a <i>significant groundwater recharge area</i> in the assessment report required under the <i>Clean Water Act, 2006</i> ; or c) as an <i>ecologically significant groundwater recharge area</i> delineated in a <i>subwatershed plan</i> or equivalent in accordance with provincial guidelines. Ecologically significant groundwater recharge areas are areas of land that are responsible for replenishing groundwater systems that directly support sensitive areas like coldwater streams and wetlands.	No definition	No definition Related GROUND WATER RECHARGE AREA means an area from which there is significant addition of water to the ground water system resulting from natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and wetland or from human intervention, such as the use of stormwater management systems.
SIGNIFICANT SURFACE WATER CONTRIBUTION AREAS	No definition	Same as Greenbelt Plan 2017	SIGNIFICANT SURFACE WATER CONTRIBUTION AREAS Means areas, generally associated with headwater catchments, that contribute to baseflow volumes which are significant to the overall surface water flow volumes within a watershed.	No definition	No definition
SIGNIFICANT WETLAND	From definition of SIGNIFICANT above: a) in regard to <i>wetlands, coastal wetlands</i> and <i>areas of natural and scientific interest</i> , an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;	SIGNIFICANT WETLAND A wetland that has been identified as provincially significant by the Province. (Based on P.P.S., 2014 and modified for this Plan)	Same as P.P.S. 2014	Same as P.P.S. 2014	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
SIGNIFICANT WILDLIFE HABITAT	No definition	SIGNIFICANT WILDLIFE HABITAT <i>A wildlife habitat</i> that is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or <i>natural heritage system</i> . These are to be identified using criteria established by the Province. (Based on P.P.S., 2014 and modified for this Plan)	No definition	No definition	Related WILDLIFE HABITAT means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.
SIGNIFICANT WOODLAND	From definition of SIGNIFICANT above: c) in regard to <i>woodlands</i> , an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources;	SIGNIFICANT WOODLAND <i>A woodland</i> which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Province. (Based on P.P.S., 2014 and modified for this Plan)	From definition of SIGNIFICANT above: b) in regard to <i>woodlands</i> , an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. The Province (Ministry of Natural Resources and Forestry) identifies criteria relating to the forgoing	From definition of SIGNIFICANT above: b) in regard to <i>woodlands</i> , an area that is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ministry of Natural Resources and Forestry:	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
SIGNIFICANT VALLEYLANDS	No definition	SIGNIFICANT VALLEYLAND A <i>valleyland</i> which is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or <i>natural heritage system</i> . These are to be identified using criteria established by the Province. (Based on P.P.S., 2014 and modified for this Plan)	No definition	No definition	No definition
SITE ALTERATION	SITE ALTERATION means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site. For the purposes of policy 2.1.4(a), site alteration does not include underground or surface mining of <i>minerals</i> or advanced exploration on mining lands in significant <i>areas of mineral potential</i> in Ecoregion 5E, where advanced exploration has the same meaning as in the <i>Mining Act</i> . Instead, those matters shall be subject to policy 2.1.5(a).	Same as Greenbelt Plan 2017	SITE ALTERATION Means activities, such as, grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of site (P.P.S., 2014).	No definition	SITE ALTERATION means the removal of topsoil and activities such as filling, grading and excavation that would change the landform, grade of the land and natural vegetative characteristics of the land, but does not include the reconstruction, repair or maintenance of a drain approved under the Drainage Act.
STORMWATER MANAGEMENT PLAN	No definition	STORMWATER MANAGEMENT PLAN A plan that provides direction to avoid or minimize and mitigate stormwater volume, contaminant loads, and impacts on receiving water courses to: maintain groundwater quality and flow and stream baseflow; protect water quality; minimize the disruption of pre-existing (natural) drainage patterns wherever possible; prevent increases in stream channel erosion; prevent any increase in flood risk;	No definition	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
		and protect aquatic species and their habitat.			
STORMWATER MASTER PLAN	No definition	STORMWATER MASTER PLAN A long-range plan that assesses existing and planned stormwater facilities and systems and outlines stormwater infrastructure requirements for new and existing development within a settlement area. Stormwater master plans are informed by watershed planning and are completed in accordance with the Municipal Class Environmental Assessment.	No definition	No definition	No definition
SUBWATERSHED PLAN	No definition	Same as Greenbelt Plan 2017	SUBWATERSHED PLAN Means a plan that reflects and refines the goals, objectives, targets and assessments of <i>watershed planning</i> for smaller drainage areas, is tailored to subwatershed needs and addresses local issues. <i>A subwatershed plan</i> should: consider existing development and evaluate impacts of any potential or proposed land uses and development; identify hydrologic features, areas, linkages and functions; identify natural features, areas and related <i>hydrologic functions</i> ; and provide for protecting, improving or restoring the quality and quantity of water within a subwatershed. <i>A subwatershed plan</i> is based on pre-development monitoring and evaluation; is integrated with natural heritage protection; and identifies specific criteria, objectives, actions, thresholds, targets and best management practices for development, for water and wastewater servicing, for stormwater management, for managing and minimizing impacts related to severe weather events, and to support	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
			ecological needs.		
SURFACE WATER FEATURES	SURFACE WATER FEATURES means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.	Same as P.P.S. 2014	No definition	No definition	SURFACE WATER FEATURES means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.
TALLGRASS PRAIRIES	No definition	Same as Greenbelt Plan 2017	TALLGRASS PRAIRIES Means land (not including land that is being used for agricultural purposes or no longer exhibits <i>tallgrass prairie</i> characteristics) that: a. has vegetation dominated by non-woody plants, including tallgrass prairie species that are maintained by seasonal drought, periodic disturbances such as fire, or both; b. has less than 25 per cent tree cover; c. has mineral soils; and d. has been further identified, by the Minister of Natural Resources and Forestry or by any other person, according to evaluation procedures established by the Ministry of Natural Resources and Forestry, as amended from time to time.	No definition	No definition
THREATENED SPECIES	THREATENED SPECIES: means a species that is listed or categorized as a "Threatened Species" on the Ontario Ministry of Natural Resources' official Species at Risk list, as updated and amended from time to time.	No definition	THREATENED SPECIES Means a species that is classified as a <i>threatened species</i> in Ontario Regulation 230/08 (Species at Risk in Ontario List) made under the <i>Endangered Species Act, 2007</i> , as it may be amended from time to time.	Same as Greenbelt Plan 2017	THREATENED SPECIES means any species that is listed or categorized as a "Threatened Species" on the Ontario Ministry of Natural Resources official Species at Risk list or that is designated as Threatened by the Committee on the Status of Wildlife in Canada (COSEWIC) as updated from time to time.
VALLEYLANDS:	VALLEYLANDS: means a natural area that occurs in a valley or other landform depression that has water	Same as P.P.S. 2014	Same as P.P.S. 2014	Same as P.P.S. 2014	VALLEYLAND means a natural area that occurs in a valley or other landform depression that has water

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	flowing through or standing for some period of the year.				flowing through or standing for some period of the year.
VULNERABLE	VULNERABLE means surface and/or ground water that can be easily changed or impacted.	No definition	Same as P.P.S. 2014	No definition	VULNERABLE SURFACE AND GROUND WATER FEATURES means surface and ground water features that can be easily changed or impacted by activities or events, either by virtue of their vicinity to such activities or events or by permissive pathways between such activities and the surface and/or ground water.
WATERSHED	WATERSHED means an area that is drained by a river and its tributaries.	WATERSHED An area that is drained by a lake or river and its tributaries.	No definition	No definition	WATERSHED means an area that is drained by a river and its tributaries.
WATERSHED MANAGEMENT	No definition	No definition	No definition	WATERSHED MANAGEMENT The analysis, protection, development, operation and maintenance of the land, vegetation and water resources of a drainage basin.	No definition
WATER RESOURCE SYSTEM	Definition within text (2.2.1) ... Water resource systems consisting of <i>ground water features, hydrologic functions, natural heritage features and areas, and surface water features</i> including shoreline areas, which are necessary for the ecological and hydrological integrity of the <i>watershed</i> .	WATER RESOURCE SYSTEM A system consisting of <i>ground water features</i> and areas and <i>surface water features</i> (including shoreline areas), and <i>hydrologic functions</i> , which provide the water resources necessary to sustain healthy aquatic and terrestrial ecosystems and human water consumption. The <i>water resource system</i> will comprise <i>key hydrologic features</i> and <i>key hydrologic areas</i> . (based on P.P.S. 2014)	Definition within text (3.2.1) The Water Resource System is made up of both ground and surface water features and areas and their associated functions, which provide the water resources necessary to sustain healthy aquatic and terrestrial ecosystems and human water consumption.	No definition	No definition
WATERSHED PLANNING	No definition	Same as Greenbelt Plan 2017	WATERSHED PLANNING Means planning that provides a framework for establishing goals, objectives and direction for the protection of water resources, the management of human activities, land, water, aquatic life and resources within a watershed and for the assessment of cumulative, cross-	No definition	No definition

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
			<p>jurisdictional and cross-watershed impacts.</p> <p><i>Watershed planning</i> typically includes: watershed characterization, a water budget and conservation plan; nutrient loading assessments; consideration of climate change impacts and severe weather events; land and water use management objectives and strategies; scenario modelling to evaluate the impacts of forecasted growth and servicing options, and mitigation measures; an environmental monitoring plan; requirements for the use of environmental best management practices, programs, and performance measures; criteria for evaluating the protection of quality and quantity of water; the identification and protection of hydrologic features, areas and functions and the inter-relationships between or among them; and targets for the protection and restoration of riparian areas.</p> <p>Watershed planning is undertaken at many scales, and considers cross-jurisdictional and cross-watershed impacts. The level of analysis and specificity generally increases for smaller geographic areas such as subwatersheds and tributaries.</p>		
WETLANDS	<p>WETLANDS: means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.</p>	Same as Greenbelt Plan 2017	<p>WETLANDS</p> <p>Means seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water-tolerant plants. The four major types of <i>wetlands</i> are swamps, marshes, bogs and fens.</p>	<p>WETLAND</p> <p>Same as P.P.S. 2014</p>	<p>WETLANDS means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens. Periodically soaked</p>

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	Periodically soaked or wetlands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition.		Periodically soaked or wetlands being used for agricultural purposes which no longer exhibit <i>wetland</i> characteristics are not considered to be <i>wetlands</i> for the purposes of this definition. <i>Wetlands</i> are further identified, by the Ministry of Natural Resources and Forestry or by any other person, according to evaluation procedures established by the Ministry of Natural Resources and Forestry, as amended from time to time.		or wetlands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be wetlands for the purposes of this definition.
WILDLIFE HABITAT	WILDLIFE HABITAT: means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.	Same as P.P.S. 2014	Small Revision - Same as P.P.S. 2014	Same as P.P.S. 2014	WILDLIFE HABITAT means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.
WILDLIFE MANAGEMENT	No definition	No definition	No definition	WILDLIFE MANAGEMENT: The management of wildlife habitats for the purposes of sustaining the quantity and quality of wildlife.	No definition
WOODLANDS	WOODLANDS: means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. <i>Woodlands</i> include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial	Same as P.P.S. 2014	WOODLANDS: means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. <i>Woodlands</i> include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial	Same as P.P.S. 2014	WOODLAND means a treed area that provides environmental and economic benefits to both the private landowner and the general public such as erosion prevention, hydrologic and nutrient cycling, provision of clean air and long term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities and the sustainable harvest of woodland products. It does not include a cultivated fruit or nut orchard or a plantation used for the purpose of producing Christmas trees.

TERM/ CONCEPT	P.P.S. 2014	Growth Plan 2017	Greenbelt Plan 2017	Niagara Escarpment Plan 2017	Existing R.O.P.
	levels. <i>Woodlands</i> may be delineated according to the Forestry Act definition or the Province's Ecological Land Classification system definition for "forest."		levels. <i>Woodlands</i> may be delineated according to the Forestry Act definition or the Province's Ecological Land Classification		

Appendix 2: Technical review of policies in the Provincial Policy Statement and their applicability to Niagara Region

Appendix 2: Technical review of Policies in the Provincial Policy Statement and their applicability to Niagara Region.

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
2.0	Ontario's long-term prosperity, environmental health, and social well-being depend on conserving biodiversity, protecting the health of the Great Lakes, and protecting natural heritage, water, agricultural, mineral and cultural heritage and archaeological resources for their economic, environmental and social benefits. Accordingly: [Section 2.1 follows from the word "accordingly"]	This 'lead-in' to Section 2.0 clearly articulates that the wise use and management of resources is important to the Province. The use of the word 'accordingly' at the end of this lead-in section means that all of the remaining policies in this section are intended to support the preamble.
2.1.1	Natural features and areas shall be protected for the long term.	The use of the word 'shall' in this section means that these areas are intended to be protected for the long term to support the overall policy thrust in this section of the P.P.S. as articulated in the introduction to Section 2.0 of the P.P.S.
2.1.2	The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features	This section introduces the concept of natural heritage system (N.H.S.) planning with natural heritage system being a defined term. This section also indicates that the minimum standard respecting the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, is that they be maintained or restored. Improvements are then desired. It is noted that this policy is an 'encouragement' policy as a result of the word 'should' instead of 'shall'.

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
2.1.3	Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.	<p>This policy requires that N.H.S.s be identified in Official Plans. However, the policy recognizes that other factors need to be balanced depending on the geography.</p> <p>The need to establish a natural heritage system is now a requirement of the 2014 P.P.S. as per this section, which indicates that “<i>natural heritage systems <u>shall be identified</u>... recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas and prime agricultural areas.</i>”</p> <p>The definition of natural heritage system in the P.P.S. was also significantly expanded in the 2014 version of the P.P.S. Below are the additions to the definition in bold:</p> <p><i>“Natural heritage system: means a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that</i></p>

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
		<p><i>enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be used.</i></p> <p>The definition of natural heritage system in the 2014 P.P.S. expands upon the nature of the features and functions that need to be considered in developing such a system and it recognizes that municipal approaches that achieve or exceed the same objective may also be used.</p>
2.1.4	<p>Development and site alteration shall not be permitted in:</p> <ul style="list-style-type: none"> a) Significant wetlands in Ecoregions 5E, 6E and 7E1; and b) Significant coastal wetlands. 	<p>This policy establishes an absolute prohibition since there is no test to meet to vary the policy as there is in Section 2.1.5 below. Niagara Region is in Ecoregion 7E-3 and 7E-5, therefore policy 2.1.4 a) applies.</p>
2.1.5	<p>Development and site alteration shall not be permitted in:</p> <ul style="list-style-type: none"> a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E1; b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River); c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River); d) Significant wildlife habitat; 	<p>This policy indicates that development and site alteration shall not be permitted in the features identified unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. The use of the word 'shall' in this policy means that it is also mandatory.</p> <p>The definition of 'negative impact' is to be considered along with this policy. The relevant component of the 'negative impact' definition from the P.P.S. is as follows:</p>

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
	<p>e) Significant areas of natural and scientific interest; and f) Coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)</p> <p>unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.</p>	<p>"in regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities".</p> <p>However, the policy also goes further and states that the ecological function of the adjacent lands has to be evaluated, which means that the ecological function must be clearly established first, before determining whether the 'negative impact' test can be met. Ecological function is defined as <i>"means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions."</i></p>
2.1.6	<p>Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.</p>	<p>Fish habitat is defined in the P.P.S. as follows: "as defined in the <i>Fisheries Act</i>, means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which <i>fish</i> depend directly or indirectly in order to carry out their life processes."</p> <p>The words 'provincial and federal requirements' as they relate to this policy is also defined by the P.P.S.</p>

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
		<p>as follows:</p> <p>"in regard to policy 2.1.6, legislation and policies administered by the federal or provincial governments for the purpose of fisheries protection (including fish and fish habitat), and related, scientifically established standards such as water quality criteria for protecting lake trout populations;"</p>
2.1.7	<p>Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.</p>	<p>The words 'provincial and federal requirements' as they relate to this policy is also defined by the P.P.S. as follows:</p> <p>"in regard to policy 2.1.7, legislation and policies administered by the provincial government or federal government, where applicable, for the purpose of protecting species at risk and their habitat."</p>
2.1.8	<p>Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.</p>	<p>This policy also prohibits development and site alteration on adjacent lands unless the 'no negative impact' test can be met.</p> <p>The P.P.S. defines adjacent lands as follows: "for the purposes of policy 2.1.8, those lands contiguous to a specific <i>natural heritage feature or area</i> where it is likely that <i>development or site alteration</i> would have a <i>negative impact</i> on the feature or area. The extent of the <i>adjacent lands</i> may be recommended by the Province or based on municipal approaches which</p>

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
		achieve the same objectives;"
2.1.9	Nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue.	Recognizing that agricultural uses and activities can coincide with natural heritage features and areas, this policy permits existing agricultural uses to continue.
2.3.2	Planning authorities shall designate prime agricultural areas and specialty crop areas in accordance with guidelines developed by the Province, as amended from time to time.	This section requires that planning authorities designate prime agricultural areas in their Official Plans. While the term 'designate' implies that the creation of a mutually exclusive land use designation is required, other approaches that achieve the same objective could be considered; however, the requirement to 'designate' was added to the current version of the P.P.S. This policy will be a consideration when determining how to identify the N.H.S. in the N.O.P. .
4.4	This Provincial Policy Statement shall be read in its entirety and all relevant policies are to be applied to each situation.	This section is self-explanatory.
4.8	Zoning and development permit by-laws are important for implementation of this Provincial Policy Statement. Planning authorities shall keep their zoning and development permit by-laws up-to-date with their official plans and this Provincial Policy Statement.	This section states that in addition to having up to date Official Plans, there is also a need for up to date zoning and development permit bylaws as well. This section is particularly relevant in Niagara Region, where many of the policies in the existing Regional Official Plan (as discussed later) are now out-of-date and need to be updated.

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
4.7	<p>The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans. Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.</p> <p>Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.</p>	<p>This section notes that reliance is placed on the implementation of the P.P.S. in an Official Plan.</p>
4.9	<p>The policies of this Provincial Policy Statement represent minimum standards. This Provincial Policy Statement does not prevent planning authorities and decision-makers from going beyond the minimum standards established in specific policies, unless doing so would conflict with any policy of this Provincial Policy Statement.</p>	<p>This section indicates that a planning authority may be more restrictive than the P.P.S., provided the more restrictive policy does not conflict with any other policy in the P.P.S.</p> <p>Determining whether it is appropriate to go beyond the minimum standards is dependent on the whether the P.P.S. policy is mandatory (i.e., through the use of the word 'shall') and the local context.</p>

Section No.	Applicable Provincial Policy (P.P.S. - 2014)	Commentary
4.11	<p>In addition to land use approvals under the Planning Act, infrastructure may also require approval under other legislation and regulations. An environmental assessment process may be applied to new infrastructure and modifications to existing infrastructure under applicable legislation.</p> <p>There may be circumstances where land use approvals under the Planning Act may be integrated with approvals under other legislation, for example, integrating the planning processes and approvals under the Environmental Assessment Act and the Planning Act, provided the intent and requirements of both Acts are met.</p>	<p>This section recognizes that other legislation exists that has an impact on planning matters.</p>
4.12	<p>Provincial plans shall be read in conjunction with this Provincial Policy Statement and take precedence over policies in this Provincial Policy Statement to the extent of any conflict, except where legislation establishing provincial plans provides otherwise. Examples of these are plans created under the Niagara Escarpment Planning and Development Act, the Ontario Planning and Development Act, 1994, the Oak Ridges Moraine Conservation Act, 2001, the Greenbelt Act, 2005 and the Places to Grow Act, 2005.</p>	<p>This section indicates that other Provincial plans also need to be taken into account in making a decision on a planning matter. However, determining the extent of a conflict that exists between policies and plans can only be determined on a case-by-case basis.</p>

Appendix 3: Technical review of policies in the Growth Plan and their applicability to Niagara Region

Appendix 3. Technical review of policies in the Growth Plan and their applicability to Niagara Region.

Section No.	Policy	Commentary
2.2.1.3 d)	Upper- and single-tier municipalities will undertake integrated planning to manage forecasted growth to the horizon of this Plan, which will: d) Support the environmental and agricultural protection and conservation objectives of this Plan;	This policy makes it clear that there is an expectation that upper and single-tier municipalities will establish land use policies that support the environmental objectives of the Growth Plan.
2.2.8.3 e) and f)	Where the need for a settlement area boundary expansion has been justified in accordance with policy 2.2.8.2, the feasibility of the proposed expansion will be determined and the most appropriate location for the proposed expansion will be identified based on the following: e) Watershed planning or equivalent has demonstrated that the proposed expansion, including the associated servicing, would not negatively impact the water resource system, including the quality and quantity of water; f) key hydrologic areas and the Natural Heritage System should be avoided where possible;	<p>This section indicates that in considering a settlement area expansion in the future, watershed planning or its equivalent is required. However, the determination of what would satisfy the test of equivalency has not been established.</p> <p>In addition, this policy indicates that key hydrologic areas and the N.H.S. should be avoided where possible. This means that settlement areas can expand into key hydrologic areas and the N.H.S. It should be noted that the N.H.S. referenced in this policy is the Growth Plan N.H.S.</p>
2.2.9.6	New multiple lots or units for residential development will be directed to settlement areas, but may be allowed on rural lands in site-specific locations with approved zoning or designation in an official plan that permitted this type of development as of June 16, 2006.	<p>This section permits limited opportunities for new residential development on rural lands provided the lands were zoned or designated for the use as of June 16, 2006. However, it is noted that this section indicates that such development 'may be allowed' which implies that a choice can be made.</p> <p>This also means that other policies such as those that deal with natural heritage and which are more specific in terms of permissions and prohibitions</p>

Section No.	Policy	Commentary
		would take precedence over a permissive policy such as this one.
4.1 (selected paragraphs)	The G.G.H. contains a broad array of important hydrologic and natural heritage features and areas, a vibrant and diverse agricultural land base, irreplaceable cultural heritage resources, and valuable renewable and non-renewable resources. These lands, features and resources are essential for the long-term quality of life, economic prosperity, environmental health, and ecological integrity of the region. They collectively provide essential ecosystem services, including water storage and filtration, cleaner air and habitats, and support pollinators, carbon storage, adaptation and resilience to climate change.	This section establishes the context for what is valuable according to the Growth Plan. In addition to important hydrologic and natural heritage features and areas, a vibrant and diverse agricultural land base is considered to be an important component of the vision for the Greater Golden Horseshoe.
4.1 (selected paragraphs – continued)	These valuable assets must be wisely protected and managed as part of planning for future growth. This is of particular importance in the fast-growing G.G.H., which supports some of the most diverse vegetation and wildlife in Canada, including the Niagara Escarpment (a UNESCO World Biosphere Reserve) and the Oak Ridges Moraine – two of Ontario's most significant landforms – as well as the Rouge National Urban Park. There are existing legislation and policies in place to identify and protect these features, areas, and sites, including the Ontario Heritage Act, statements of provincial policy such as the P.P.S., and provincial plans such as the Greenbelt, Oak Ridges Moraine	This section also recognizes that there are a number of valuable assets within the Greater Golden Horseshoe including for example the Niagara Escarpment. The section also recognizes that there are other statements of provincial policy such as the P.P.S. and the Greenbelt Plan and Niagara Escarpment Plan that are designed to protect these valuable natural assets.

Section No.	Policy	Commentary
	Conservation, Niagara Escarpment, and Lake Simcoe Protection Plans	
4.1 (selected paragraphs – continued)	<p>This Plan requires the identification of water resource systems and the protection of key hydrologic features and key hydrologic areas, similar to the level of protection provided in the Greenbelt. This provides a consistent framework for water protection across the G.G.H., and builds on existing plans and policies, including the Lake Simcoe Protection Plan and source protection plans developed under the Clean Water Act, 2006. Recognizing that watersheds are the most important scale for protecting the quality and quantity of water, municipalities are required to undertake watershed planning to inform the protection of water resource systems and decisions related to planning for growth.</p> <p>This Plan also provides for the identification and protection of a Natural Heritage System for the G.G.H. outside of the Greenbelt Area and settlement areas, and applies protections similar to those in the Greenbelt Plan to provide consistent and long-term protection throughout the G.G.H.</p>	This section also set up the policy framework later in the Growth Plan that requires the identification of a water resource system and N.H.S. in a manner that is similar to the level of protection provided in the Greenbelt Plan.
4.1 (selected paragraphs – continued)	The G.G.H. is home to some of Canada's most important and productive farmland, which is a finite, non-renewable resource. The region's fertile soil, favourable climate, and access to water make it	This section also recognizes that important and productive farmland is a finite non-renewable resource. Lastly, this section provides the basis for the identification and protection of an agricultural system in the Greater Golden Horseshoe.

Section No.	Policy	Commentary
	<p>significant both on a national and international scale.</p> <p>This Plan provides for the identification and protection of the Agricultural System in the G.G.H. The Agricultural System includes a continuous and productive land base, comprised of prime agricultural areas, including specialty crop areas, and rural lands, as well as a complementary agri-food network that together enable the agri-food sector to thrive. Many farms within the Agricultural System also contain important natural heritage and hydrologic features, and farmers play a vital role in their stewardship. Protecting the Agricultural System will support the viability of the agricultural sector as the Region grows.</p>	
4.2.1.1	Municipalities, partnering with conservation authorities as appropriate, will ensure that watershed planning is undertaken to support a comprehensive, integrated, and long-term approach to the protection, enhancement, or restoration of the quality and quantity of water within a watershed.	This policy supports the preparation of watershed plans in consultation with conservation authorities.
4.2.1.2	Water resource systems will be identified, informed by watershed planning and other available information, and the appropriate designations and policies will be applied in official plans to provide for the long-term protection of key hydrologic features, key hydrologic areas, and their functions.	This section requires that water resource systems be identified with these systems informed by watershed planning and other available information. It is noted that this section indicates that appropriate designations and policies will be applied in Official Plans, which implies that

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		<p>elements of the water resource system will be mapped as designations.</p> <p>There are two elements of the water resource system as defined by the Growth Plan: Key Hydrologic Features and Key Hydrologic Areas (further defined in the Growth Plan and provided in Appendix 1 of this technical report).</p> <p>The components of the water resource system are extensive and, in many cases, have not been mapped. In recognition of this, Section 4.2.1.2 also indicates that the spatial extent of a water resource system will be informed by watershed plans and other available information, which means that only those features that are known to exist should be identified in an Official Plan.</p> <p>While the Growth Plan provides direction on what the elements of a water resource system are, a Provincial map identifying the location of the water resource system has not been provided.</p>
4.2.2.1	The Province will map a Natural Heritage System for the G.G.H. to support a comprehensive, integrated, and long-term approach to planning for the protection of the region's natural heritage and biodiversity. The Natural Heritage System mapping will exclude lands within settlement area boundaries that were approved and in effect as of July 1, 2017.	The Province released a map of the N.H.S. in February 2018. The policies of the Growth plan pertain only to the N.H.S. identified within the Growth Plan area (i.e., only the Greenbelt Plan policies apply to the Greenbelt N.H.S., the Oak Ridges Moraine Conservation Plan policies apply to the Oak Ridges Moraine N.H.S., etc.). The Growth Plan N.H.S. also does not extend into

Section No.	Policy	Commentary
		settlement areas. However, as noted later in this table, the recent iteration of the Growth Plan also includes policies on key hydrologic features that may not be included within the natural heritage system mapped by the Province.
4.2.2.1 (related definitions)	Same as above.	<p>Based on the definition of 'natural heritage system' (see definitions in Appendix 1) the N.H.S. <u>shall</u> include 'natural heritage features and areas, and linkages'.</p> <p>Consistent with the P.P.S., the definition of 'natural heritage system' in the Growth Plan indicates that the N.H.S. <u>can</u> include:</p> <ul style="list-style-type: none"> • Key natural heritage features • Key hydrologic features • Federal and provincial parks and conservation reserves • Other natural heritage features and areas • Lands that have been restored or have the potential to be restored to a natural state • Associated areas that support hydrologic functions • Working landscapes that enable ecological functions to continue. <p>It should be noted that the 2017 Growth Plan definition for 'natural heritage system' has replaced the term 'natural heritage feature and</p>

Section No.	Policy	Commentary
		<p>area' in the previous Growth Plan with 'key natural heritage features'.</p> <p>The definition for 'key natural heritage features' is provided Appendix 1.</p> <p>The additional items included as 'key natural heritage features' (beyond those identified in the 'natural heritage features and areas' definition) are:</p> <ul style="list-style-type: none"> • Non-significant wetlands; and • Life science areas of natural and scientific interest <p>The implication of the above is that there is some discretion as to whether the additional features listed are included in the N.H.S. One of the more significant choices to make in this regard is whether non-significant wetlands should be treated the same from a policy perspective as Provincially significant wetlands, where development and site alteration is prohibited outright. Notwithstanding the above, the Growth Plan does consider all wetlands to be key hydrologic features, where development is prohibited in any event.</p>
4.2.2.2	Municipalities will incorporate the Natural Heritage System as an overlay in official plans, and will apply appropriate policies to maintain, restore, or enhance the diversity and connectivity of the system and the	It is noted that there is no distinction between upper and single tier municipalities in this section, which means that all official plans are required to include the N.H.S. as an overlay.

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	long-term ecological or hydrologic functions of the features and areas as set out in the policies in this subsection and the policies in subsections 4.2.3 and 4.2.4.	
4.2.2.3 a)	<p>Within the Natural Heritage System:</p> <p>a) New development or site alteration will demonstrate that:</p> <ul style="list-style-type: none"> i. There are no negative impacts on key natural heritage features or key hydrologic features or their functions; ii. Connectivity along the system and between key natural heritage features and key hydrologic features located within 240 metres of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the landscape; iii. The removal of other natural features not identified as key natural heritage features and key hydrologic features is avoided, where possible. Such features should be incorporated into the planning and design of the proposed use wherever possible; iv. Except for uses described in and governed by the policies in subsection 4.2.8, the disturbed area, including any buildings and structures, will not exceed 25 per cent of the total developable area, and the impervious surface will not exceed 10 per cent of the total developable area; 	<p>This policy establishes a general prohibition on development and site alteration within key natural heritage features and key hydrologic features that are included within the N.H.S. mapped by the Province. In addition, this policy requires that connectivity be maintained or where possible enhanced and that the removal of other natural features not identified as a key feature is avoided where possible.</p> <p>This policy also establishes a maximum disturbed area of 25% and maximum 10% of impervious surfaces within the 'total developable area'. Golf courses have a specific restriction of a maximum 40% of the total developable area. The restriction of developable area, and particularly impervious surfaces, recognizes the important role of adjacent lands in permitting infiltration of surface water to support natural features (e.g., wetlands) and recharge to groundwater resources. This policy does not apply to mineral aggregate resources, which are dealt with by Section 4.2.8.</p> <p>Lastly, this policy establishes a minimum standard of 30% for the percentage of the total developable area that will remain or be returned to 'natural</p>

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	<ul style="list-style-type: none"> v. With respect to golf courses, the disturbed area will not exceed 40 per cent of the total developable area; and vi. At least 30 per cent of the total developable area will remain or be returned to natural self-sustaining vegetation, except where specified in accordance with the policies in subsection 4.2.8; 	self-sustaining vegetation' (defined in Appendix 1), with this policy again not applying to mineral aggregate resource operations.
4.2.2.3 b)	The full range of existing and new agricultural uses, agriculture-related uses, on-farm diversified uses, and normal farm practices are permitted. However, new buildings or structures for agricultural uses, agriculture-related uses, or on-farm diversified uses are not subject to policy 4.2.2.3 a), but are subject to the policies in subsections 4.2.3 and 4.2.4.	<p>Section 4.2.2.3 a) as per the above establishes a number of policies that are designed to control the scale and location of uses within the Growth Plan N.H.S.</p> <p>Section 4.2.2.3 b) then exempts existing and new agricultural uses, agriculture-related uses, on-farm diversified uses from these policies and refers the reader to other policies that specifically deal with development within key features (section 4.2.3) and adjacent to key features (section 4.2.4).</p>
4.2.2.4	The natural heritage systems identified in official plans that are approved and in effect as of July 1, 2017 will continue to be protected in accordance with the relevant official plan until the Natural Heritage System has been issued.	This policy indicates that in the interim the N.H.S. identified in Official Plans in effect as of July 1, 2017 will continue to be protected in accordance with the Official Plan until the N.H.S. has been issued. This mapping was released in February 2018 and is now in the process of being implemented.

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4.2.2.5	In implementing the Natural Heritage System, upper- and single-tier municipalities may, through a municipal comprehensive review, refine provincial mapping with greater precision in a manner that is consistent with this Plan.	<p>The implication of this section is that a municipal comprehensive review is not required if an upper-tier or a single-tier municipality decides to incorporate the Growth Plan N.H.S. without modification. Once included in an Official Plan, the boundaries of the Growth Plan N.H.S. cannot be modified.</p> <p>While there is a Growth Plan requirement to identify the N.H.S. as an overlay (Section 4.2.2.2), there is no similar Growth Plan requirement to map key natural heritage features in an Official Plan.</p> <p>In terms of what 'consistent with this Plan' means, the M.N.R.F. 'Technical Report on Criteria, Rationale and Methods' identifies four examples of refinements that would be consistent with the Growth Plan as follows:</p> <ul style="list-style-type: none"> • Minor, technical adjustments (e.g., to account for distortion from map projections, discrepancies based on map scales); • Addition of natural features continuous with the boundary of the provincially mapped N.H.S. When natural features are added, the boundary of the N.H.S. will be extended to include a 30 metre vegetation protection zone beyond the edge of the feature consistent with the methods used for provincial mapping; • Removal of small portions of the provincial

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		<p>N.H.S. where there is built-up impervious development or infrastructure (that would act as barriers) that was not identified and stamped out of the provincial mapping;</p> <ul style="list-style-type: none"> Removal of small, isolated portions of the N.H.S. that protrude from the Greenbelt Plan boundary or settlement areas provided these areas have no natural features <i>and</i> are not connected to the larger provincial N.H.S.
4.2.2.6	<p>Beyond the Natural Heritage System, including within settlement areas, the municipality:</p> <ol style="list-style-type: none"> Will continue to protect any other natural heritage features in a manner that is consistent with the P.P.S.; and May continue to protect any other natural heritage system or identify new systems in a manner that is consistent with the P.P.S. 	<p>This policy indicates that beyond the Growth Plan N.H.S., the P.P.S. continues to apply in other areas, including within its settlement areas. However, the policy goes further and indicates that municipalities may continue to protect any other natural heritage system or identify a new system in the manner that is consistent with the P.P.S. With the adoption of the Growth Plan N.H.S. in the Region, which includes core areas and linkages, the nature of the N.H.S. beyond the Growth Plan N.H.S. could at a minimum be features-based only thereby meeting the P.P.S. requirement to identify an N.H.S. in the Region.</p> <p>In addition, key hydrologic features that are outside of the Growth Plan N.H.S. are also subject to the restrictive policies that apply to key natural heritage features and key hydrologic features in the Growth Plan N.H.S.</p>
4.2.2.7	If a settlement area is expanded into the Natural Heritage System in accordance with the policies in	This section indicates that the Growth Plan N.H.S. will no longer apply if the lands within the N.H.S.

Section No.	Policy	Commentary
	<p>subsection 2.2.8, the portion that is within the revised settlement area boundary will:</p> <ul style="list-style-type: none"> a) Be designated in official plans; b) No longer be subject to policy 4.2.2.3; and c) Continue to be protected in a manner that ensures that the connectivity between, and diversity and functions of, the natural heritage features and areas will be maintained, restored, or enhanced. 	<p>are to be utilized for a settlement area expansion. However, the policy does indicate that the portion of the system that is affected should continue to be protected in a manner that maintains the connectivity between and diversity and function of the natural heritage features and areas.</p>
4.2.3.1	<p>Outside of settlement areas, development or site alteration is not permitted in key natural heritage features that are part of the Natural Heritage System or in key hydrologic features, except for:</p> <ul style="list-style-type: none"> a) Forest, fish, and wildlife management; b) Conservation and flood or erosion control projects, but only if they have been demonstrated to be necessary in the public interest and after all alternatives have been considered; c) Activities that create or maintain infrastructure authorized under an environmental assessment process; d) Mineral aggregate operations and wayside pits and quarries; e) Expansions to existing buildings and structures, accessory structures and uses, and conversions of legally existing uses which bring the use more into conformity with this Plan, subject to demonstration that the use does not expand into the key hydrologic feature or key natural 	<p>This section begins by indicating that only a limited number of land uses and activities are permitted. This policy only applies to lands that are in key natural heritage features that are within the N.H.S. and in key hydrologic features that are both within and outside of the N.H.S.</p> <p>Sub-section e) deals with all other types of buildings not dealt with in sub-section f) and the conversion of other legally existing uses. In this regard, there will be a need for a process to determine how the 'unless there is no alternative test' can be satisfied on a case-by-case basis.</p> <p>Sub-section f) deals specifically with expansions or alterations to existing buildings and structures for agricultural uses, agriculture-related uses, on-farm diversified uses and expansions to existing residential dwellings.</p>

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	<p>heritage feature or vegetative protection zone unless there is no other alternative, in which case any expansion will be limited in scope and kept within close geographical proximity to the existing structure;</p> <p>f) Expansions or alterations to existing buildings and structures for agricultural uses, agriculture-related uses, on-farm diversified uses and expansions to existing residential dwellings if it is demonstrated that: i. there is no alternative, and the expansion or alteration in the feature is minimized and, in the vegetation protection zone, is directed away from the feature to the maximum extent possible; and ii. The impact of the expansion or alteration on the feature and its functions is minimized and mitigated to the maximum extent possible; and</p> <p>g) Small-scale structures for recreational uses, including boardwalks, footbridges, fences, docks, and picnic facilities, if measures are taken to minimize the number of such structures and their negative impacts.</p>	<p>The criteria listed in sub-section f) imply that a process is required to determine how the policy could be satisfied on a case-by-case basis. This is because there is a need to demonstrate that there is 'no alternative', the expansion into the feature is 'minimized' and the development is 'directed away from the feature to the maximum extent possible'. Impacts are also expected to be minimized and mitigated to the extent possible, which assumes that some impact can be considered. All of the above can only be assessed if there was a planning process in place to trigger the consideration of the above.</p>
4.2.3.2	<p>Outside of settlement areas, proposals for large-scale development proceeding by way of plan of subdivision, vacant land plan of condominium or site plan may be permitted within a key hydrologic area where it is demonstrated that the hydrologic functions, including the quality and quantity of water, of these areas will be protected and, where possible, enhanced or restored through:</p>	<p>This policy only deals with proposals within a key hydrologic area. It is noted that the policy at a minimum requires that the hydrologic functions including the quality and quantity of water will be protected.</p>

Section No.	Policy	Commentary
	<ul style="list-style-type: none"> a) The identification of planning, design, and construction practices and techniques; b) Meeting other criteria and direction set out in the applicable watershed planning or subwatershed plans; and c) Meeting any applicable provincial standards, guidelines, and procedures 	
4.2.4.1	<p>Outside settlement areas, a proposal for new development or site alteration within 120 metres of a key natural heritage feature within the Natural Heritage System or a key hydrologic feature will require a natural heritage evaluation or hydrologic evaluation that identifies a vegetation protection zone, which:</p> <ul style="list-style-type: none"> a) Is of sufficient width to protect the key natural heritage feature or key hydrologic feature and its functions from the impacts of the proposed change; b) Is established to achieve and be maintained as natural self-sustaining vegetation; and c) For key hydrologic features, fish habitat, and significant woodlands, is no less than 30 metres measured from the outside boundary of the key natural heritage feature or key hydrologic feature. 	<p>This policy applies to lands that are in key natural heritage features that are within the N.H.S. and in key hydrologic features that are both within and outside of the N.H.S. This section indicates that an evaluation will be required to determine the width of a vegetation protection zone ('V.P.Z.').</p> <p>However, the minimum width of such a V.P.Z. is 30 metres for key hydrologic features, fish habitat and significant woodlands. All other key natural heritage features and key hydrologic features will require a V.P.Z. to be determined through a natural heritage evaluation or hydrologic evaluation.</p> <p>While new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses are exempt from preparing an evaluation in accordance with Section 4.2.4.4, new single detached dwellings would not be exempt. This means that there will be a need to establish a planning process that establishes a trigger for the evaluation of proposals to develop</p>

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		new single detached dwellings adjacent to key features. This is because of the reference to 'buildings' in the policy and the exemption of certain buildings from the policy, meaning that other buildings not exempted are subject to the policy.
4.2.4.2	Evaluations undertaken in accordance with policy 4.2.4.1 will identify any additional restrictions to be applied before, during, and after development to protect the hydrologic functions and ecological functions of the feature.	This policy essentially requires that necessary conditions for development be established before development occurs.
4.2.4.3	Development or site alteration is not permitted in the vegetation protection zone, with the exception of that described in policy 4.2.3.1 or shoreline development as permitted in accordance with policy 4.2.4.5.	This policy states that only development provided for in Section 4.2.3.1 is permitted within a V.P.Z. It is noted that shoreline development is also permitted in accordance with Section 4.2.4.5.
4.2.4.4	Notwithstanding policies 4.2.4.1, 4.2.4.2 and 4.2.4.3: a) A natural heritage or hydrologic evaluation will not be required for a proposal for development or site alteration on a site where the only key natural heritage feature is the habitat of endangered species and threatened species; b) New buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses will not be required to undertake a natural heritage or hydrologic evaluation if a minimum 30 metre vegetation	This policy specifically exempts new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses from the policies that require a natural heritage and hydrological evaluation within 120 metres of a key natural feature and key hydrologic feature, provided a minimum 30 metre vegetation protection zone (V.P.Z.) is provided. Given that these buildings and structures would most likely be permitted as-of-right in the zoning by-law, it would not be possible to require the 30 metre V.P.Z. through a building permit process.

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	<p>protection zone is provided from a key natural heritage feature or key hydrologic feature; and</p> <p>c) Uses permitted in accordance with policy 4.2.4.4 b): i. are exempt from the requirement of establishing a condition of natural self-sustaining vegetation if the land is, and will continue to be, used for agricultural purposes; and ii. Will pursue best management practices to protect and restore key natural heritage features, key hydrologic features, and their functions.</p>	<p>On order to achieve the V.P.Z., a Planning Act process would be required, such as the lifting of a Holding provision, which was used by many municipalities to implement similar policies in the Oak Ridges Moraine Conservation Plan.</p> <p>The policies further exempt new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses from providing natural self-sustaining vegetation within a V.P.Z., provided the lands are, and will continue to be used for agricultural purposes. The effect of this second component of the policy is to exempt these buildings and structures from the V.P.Z. requirement as long as the lands are used for agriculture. What happens when the lands are not in agricultural use is not clear, in terms of the ability of the municipality to them require a V.P.Z.</p> <p>While new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses are exempt from the evaluation requirement, the development of any other type of building within 120 metres of a key feature, including a single detached dwelling on an existing lot of record is required to be supported by an evaluation that identifies what the width of the V.P.Z. should be.</p> <p>In this case, the minimum width of such a V.P.Z. is 30 metres for key hydrologic features, fish</p>

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		habitat and significant woodlands as per Section 4.2.4.1. The minimum width of a V.P.Z. adjacent to other key features would be determined through the required evaluation. Given this policy, a Planning Act process is required to provide the mechanism for determining the appropriate width of the V.P.Z.
4.2.4.5	Outside of settlement areas, in developed shoreline areas of inland lakes that are designated or zoned for concentrations of development as of July 1, 2017, infill development, redevelopment and resort development is permitted, subject to municipal and agency planning and regulatory requirements, if the development will: <ul style="list-style-type: none"> a) Be integrated with existing or proposed parks and trails, and will not constrain ongoing or planned stewardship and remediation efforts; b) Restore, to the maximum extent possible, the ecological features and functions in developed shoreline areas; and c) In the case of redevelopment and resort development (remainder of policy not reproduced): 	This policy applies to inland lakes and includes Lake Ontario as set out in Section 4.1.3 of the Greenbelt Plan.
4.2.6.1	The Province will identify an Agricultural System for the G.G.H.	This section simply indicates that the Province will identify an agricultural system. In February 2018, the Province identified such agricultural system.
4.2.6.2	Prime agricultural areas, including specialty crop areas, will be designated in accordance with	This section requires all municipalities to designate prime agricultural areas in accordance with Provincial mapping and to protect these

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	mapping identified by the Province and these areas will be protected for long-term use for agriculture.	lands for long-term use for agriculture. It is noted that the policy references the protection of prime agricultural areas for the long term, not permanently. It is noted that later policies allow for the refinement of the agricultural system before it is implemented in Official Plans.
4.2.6.4	The geographic continuity of the agricultural land base and the functional and economic connections to the agri-food network will be maintained and enhanced.	This policy supports the geographic continuity of the agricultural land base and the protection of large contiguous areas of prime agricultural land. This policy should be factored into the development of the N.H.S.; particularly of the impact of the N.H.S. is to fragment agricultural areas.
4.2.6.5	The retention of existing lots of record for agricultural uses is encouraged, and the use of these lots for non-agricultural uses is discouraged.	This policy supports the retention of existing lots to provide as many options as possible for a range of agricultural uses in the future.
4.2.6.8	The prime agricultural areas identified in official plans that are approved and in effect as of July 1, 2017 will continue to be protected in accordance with the official plan until provincial mapping of the Agricultural System has been issued.	This policy indicates that prime agricultural areas that were identified in Official Plans on July 1, 2017 will continue to be protected until new Provincial mapping is implemented. This new mapping was released in February 2018 and this mapping supersedes the current R.O.P. Many stakeholders about the arbitrary nature of this policy have raised a number of significant concerns, and the potential exists (as of March 2019) for this approach to be modified by the Province.

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4.2.6.9	In implementing the Agricultural System, upper- and single-tier municipalities may, through a municipal comprehensive review, refine or augment provincial mapping in a manner that is consistent with this Plan and any implementation procedures issued by the Province.	This policy permits the refinement of the agricultural system through a Municipal Comprehensive Review in a manner that is consistent with the Growth Plan.

Appendix 4: Technical review of policies in the Greenbelt Plan and their applicability to Niagara Region

Appendix 4. Technical review of policies in the Greenbelt Plan and their applicability to Niagara Region.

Section No.	Policy	Commentary
1.4.1	<p>General</p> <p>This Plan informs decision-making to permanently protect the agricultural land base and the ecological and hydrological features, areas and functions occurring on this landscape. Although primarily implemented through Ontario's land use planning system, including official plans, this Plan is not solely a land use plan. Certain policies of this Plan contemplate implementation by both the Province and municipalities through other related tools, regulations, policies and guidelines.</p>	<p>This introductory section sets the stage for the permanent protection of the agricultural land base and the ecological and hydrological features, areas and functions occurring on this landscape.</p> <p>The Greenbelt Plan also informs decisions made under other Acts, such as the Aggregate Resources Act and the Environmental Assessment Act. It also informs decisions made by all levels of government to acquire land. As a result, the Greenbelt Plan is not solely a land use plan.</p>
1.4.1	<p>Relationship with the Provincial Policy Statement</p> <p>The P.P.S. provides overall policy direction on matters of provincial interest related to land use and development in Ontario and applies to the Greenbelt, except where this Plan or another provincial plan provides otherwise.</p> <p>Like other provincial plans, this Plan builds upon the policy foundation provided by the P.P.S. and provides additional and more specific land use planning policies to address issues facing specific geographic areas in Ontario.</p> <p>This Plan is to be read in conjunction with the P.P.S. The policies of this Plan take precedence over the</p>	<p>This section attempts to establish how the Greenbelt Plan will work with and not conflict with the Provincial Policy Statement.</p> <p>In this regard, it is clearly stated that the Greenbelt Plan is intended to build upon the policy foundation provided by the P.P.S. In addition, the Greenbelt Plan is intended to take precedence over the policies of the P.P.S. to the extent of any conflict, except where the relevant legislation provides otherwise.</p> <p>In circumstances where both the P.P.S. and the Greenbelt Plan deal with the same matter, the Greenbelt Plan is intended to take precedence.</p>

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	<p>policies of the P.P.S. to the extent of any conflict, except where the relevant legislation provides otherwise.</p> <p>Where the policies of this Plan address the same, similar, related or overlapping matters as policies in the P.P.S., applying the more specific policies of this Plan satisfies the requirements of the more general policies in the P.P.S. In contrast, where matters addressed in the P.P.S. do not overlap with policies in this Plan, those P.P.S. policies must be independently satisfied.</p>	<p>However, there is still a requirement to ensure consistency with the P.P.S. where P.P.S. policies do not overlap with the policies in the Greenbelt Plan.</p> <p>All of the above means that both the Greenbelt Plan and the P.P.S. may need to be independently satisfied depending on the land use change being applied for through a Planning Act process.</p>
1.4.1	<p>Relationship with Other Provincial Plans, Legislation and Regulation</p> <p>This Plan must also be read in conjunction with other provincial plans, related planning mechanisms, regulations and standards of conservation authorities, other agencies and the federal government. This includes the Growth Plan, the O.R.M.C.P. and the N.E.P. as well as the Parkway Belt West Plan and the Central Pickering Development Plan. Other plans, including the Lake Simcoe Protection Plan under the Lake Simcoe Protection Act, 2008 and some source protection plans under the Clean Water Act, 2006; upper-, lower- and single-tier official plans; zoning by-laws; Minister's zoning orders under the Planning Act as well as other pertinent legislation (e.g. the federal Rouge Urban Park Act) and regulations (e.g. those under the Endangered Species Act, 2007 and</p>	<p>This section builds upon the section above and deals with other Provincial plans, legislation and regulation. Of interest is the statement that where another Provincial, Federal or agency plan, regulation or standard is more restrictive than the Greenbelt Plan, the more restrictive provision shall prevail. Again, this can only be determined on a case-by-case and context specific basis.</p> <p>This section also indicates that the Greenbelt Plan takes precedence over the Growth Plan in circumstances where the policies of the Growth Plan address the same, similar, related or overlapping matter unless the Greenbelt Plan specifically provides otherwise.</p>

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	<p>Conservation Authorities Act) also apply within the Greenbelt.</p> <p>Within the Greenbelt Area, there may be other provincial, federal or agency plans, regulations or standards that also apply.</p> <p>An application, matter or proceeding related to these plans, regulations or standards shall conform with the Greenbelt Plan. However, where the plans, regulations or standards are more restrictive than this Plan, the more restrictive provision shall prevail.</p> <p>With respect to the Growth Plan specifically, the policies of that Plan that address the same, similar, related or overlapping matters as this Plan do not apply within the Greenbelt Area, except where the policies of this Plan provide otherwise.</p> <p>In contrast, where matters addressed in the Growth Plan do not overlap with policies in this Plan, those Growth Plan policies must be independently satisfied.</p>	
2.2	<p>The requirements of the N.E.P., established under the Niagara Escarpment Planning and Development Act, continue to apply and the Protected Countryside policies do not apply, with the exception of section 3.3.</p>	<p>This section essentially states that the Niagara Escarpment Plan applies to lands within the Niagara Escarpment Plan area and that the Greenbelt Plan does not apply, with the exception of Section 3.3. This section deals with parkland, open space and trails.</p>

Section No.	Policy	Commentary
3.1.1 (selected paras)	<p>The Protected Countryside contains an Agricultural System that provides a continuous, productive and permanent agricultural land base and a complementary agri-food network that together enable the agri-food sector to thrive. Many of the farms within this system also contain important natural heritage features, including areas that support pollinators, and hydrologic features. The stewardship of these farms facilitates both environmental benefits and agricultural protection.</p> <p>The agricultural land base is therefore integral to the long-term sustainability of the Natural Heritage System within the Protected Countryside. It is through evolving agricultural and environmental approaches and practices that this relationship can continue and improve.</p>	<p>This section establishes the basis for an agricultural system within the Protected Countryside. Of note in this section is the recognition that many of the farms in the agricultural system also contain 'important' natural heritage features.</p>
3.1.6	<p>The Agricultural System is connected both functionally and economically to the agricultural land base and agri-food sector across municipal boundaries and beyond the boundaries of the Greenbelt. Agriculture is the predominant land use in the Greenbelt and is an important economic factor in the quality of life for communities in and beyond the Greenbelt.</p> <p>To strengthen the connections between the Agricultural Systems of the Greenbelt and the rest of the G.G.H., municipalities, farming organizations and other agencies and levels of government are encouraged to collaborate with each other to support the Agricultural System. As</p>	<p>This section recognizes that the agricultural system extends beyond the Greenbelt and that agriculture is the predominant land use in the Greenbelt. This section also encourages municipalities to consider the implications of development outside of the Greenbelt on the agricultural system that extends into the Greenbelt Plan area. Of particular note in this policy is the need to strengthen N.H.S.s as well.</p>

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	<p>well, consideration should be given to activities and changes in land use, both within and in proximity to the Greenbelt, and how they relate to the broader agricultural system and economy of southern Ontario. Municipalities should plan appropriately to ensure both functional and economic connections are maintained and strengthened in conjunction with natural heritage systems, water resources, growth management and infrastructure to maximize synergies and support a viable agri-food sector.</p>	
<p>3.2.1 (selected paras)</p>	<p>The Protected Countryside contains a Natural System that provides a continuous and permanent land base necessary to support human and ecological health in the Greenbelt and beyond. The Natural System policies protect areas of natural heritage, hydrologic and/or landform features, which are often functionally inter-related and which collectively provide essential ecosystem services, including water storage and filtration, cleaner air, habitat, support for pollinators, carbon storage and resilience to climate change. The Natural System policies contribute to conserving Ontario's biodiversity and maintaining the ecological integrity of the Greenbelt.</p> <p>The Natural System is made up of a Natural Heritage System and a Water Resource System that often coincide given ecological linkages between terrestrial and water-based functions.</p>	<p>This section is the lead-in to the policy framework dealing with the natural system, which has two components - N.H.S. and water resource system. Components of these systems are discussed in later sections.</p>

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	<p>The Natural Heritage System includes core areas and linkage areas of the Protected Countryside with the highest concentration of the most sensitive and/or significant natural features and functions. These areas need to be managed as a connected and integrated natural heritage system, given the functional inter-relationships between them and the fact that this system builds upon the natural systems contained in the N.E.P. and the O.R.M.C.P. (see Schedule 4) and will connect with the Natural Heritage System that will be issued pursuant to the Growth Plan. Together, these systems will comprise and function as a connected natural heritage system.</p> <p>The Water Resource System is made up of both ground and surface water features and areas and their associated functions, which provide the water resources necessary to sustain healthy aquatic and terrestrial ecosystems and human water consumption. The O.R.M.C.P. and N.E.P. include very significant elements of and are fundamental to the Water Resource System. The areas to which these plans apply contain primary recharge, headwater and discharge areas, together with major drinking water aquifers, within the Greenbelt.</p>	
3.2.2.1	The full range of existing and new agricultural, agriculture-related and on-farm diversified uses and normal farm practices are permitted subject to the policies of section 3.2.2.2.	See Section 3.2.2.2 below.

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3.2.2.2	New buildings or structures for agriculture, agriculture-related and on-farm diversified uses are not subject to the policies of section 3.2.2.3, but are subject to the policies of section 3.2.5.	This section exempts these uses from the development and site alteration policies that apply in the N.H.S. See discussion on Section 3.2.5 below.
3.2.2.3 d)	<p>New development or site alteration in the Natural Heritage System (as permitted by the policies of this Plan) shall demonstrate that:</p> <ul style="list-style-type: none"> a) There will be no negative impacts on key natural heritage features or key hydrologic features or their functions; b) Connectivity along the system and between key natural heritage features and key hydrologic features located within 240 metres of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the landscape; c) The removal of other natural features not identified as key natural heritage features and key hydrologic features should be avoided. Such features should be incorporated into the planning and design of the proposed use wherever possible; d) Except for uses described in and governed by the policies of sections 4.1.2 and 4.3.2, <ul style="list-style-type: none"> a. The disturbed area, including any buildings and structures, of the total developable area will not exceed 25 per cent (40 per cent for golf courses); and b. The impervious surface of the total developable area will not exceed 10 per 	<p>This section is the same as Section 4.2.2.3 a) of the Growth Plan. This policy establishes a general prohibition on development and site alteration within key natural heritage features and key hydrologic features. However, these features must be included within the natural heritage system, whereas in the Growth Plan N.H.S., key hydrologic features outside of the N.H.S. are also subject to the same policies that apply to key hydrologic features inside of the N.H.S. In addition, this policy requires that connectivity be maintained or where possible enhanced and that the removal of other natural features not identified as a key feature is avoided where possible.</p> <p>This policy also establishes a maximum disturbed area of 25% and maximum 10% of impervious surfaces within the 'total developable area'. Golf courses have a specific restriction of a maximum 40% of the total developable area. The restriction of developable area, and particularly impervious surfaces, recognizes the important role of adjacent lands in permitting infiltration of surface water to support natural features (e.g., wetlands) and recharge to groundwater resources. This</p>

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	cent; and e) At least 30 per cent of the total developable area will remain or be returned to natural self-sustaining vegetation, recognizing that section 4.3.2 establishes specific standards for the uses described there.	policy does not apply to mineral aggregate resources, which are dealt with by Section 4.3.2. This policy also establishes a minimum standard of 30% for the percentage of the total developable area that will remain or be returned to 'natural self-sustaining vegetation' (defined in Appendix 1), with this policy again not applying to mineral aggregate resource operations. Lastly this policy establishes a minimum standard for the percentage of the total developable area that will remain or be returned to natural self-sustaining vegetation, with this policy again not applying to mineral aggregate resource operations.
3.2.2.4	The Natural Heritage System, including the policies of section 3.2.5, does not apply within the existing boundaries of settlement areas, but does apply when considering expansions to settlement areas as permitted by the policies of this Plan. Municipalities should consider the Natural Heritage Systems connections within settlement areas when implementing municipal policies, plans and strategies.	This is similar to the Growth Plan approach.
3.2.2.5	When official plans are brought into conformity with this Plan, the boundaries of the Natural Heritage System may be refined, with greater precision, in a manner that is consistent with this Plan and the system shown on Schedule 4.	The policy approach is the same as in the Growth Plan (Section 4.2.2.5).

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3.2.2.6	Towns/Villages are not permitted to expand into the Natural Heritage System.	This section indicates that certain settlement areas in the Greenbelt Plan area are not permitted to expand into the natural heritage system. Outside of the Greenbelt Plan area, the Growth Plan does permit settlement area expansions into the Growth Plan N.H.S.
3.2.3	All planning authorities shall provide for a comprehensive, integrated and long-term approach for the protection, improvement or restoration of the quality and quantity of water. Such an approach shall consider all hydrologic features, areas and functions and include a systems approach to the inter-relationships between and/or among key hydrologic features and key hydrologic areas.	This section sets out the long-term goals for the protection, improvement or restoration of the quality and quantity of water.
3.2.3.2	Watersheds are the most meaningful scale for hydrological planning. Municipalities, partnering with conservation authorities as appropriate, shall ensure that watershed planning is undertaken to support a comprehensive, integrated and long-term approach to the protection, enhancement or restoration of the quality and quantity of water within a watershed.	This section is essentially the same as Section 4.2.1.1 of the Growth Plan.
3.2.3.3	Water Resource Systems shall be identified, informed by watershed planning and other available information, and the appropriate designations and policies shall be applied in official plans to provide for the long-term protection of key hydrologic features, key hydrologic areas and their functions.	This section is essentially the same as Section 4.2.1.2 of the Growth Plan. This section requires that water resource systems be identified with these systems informed by watershed planning and other available information. It is noted that this section indicates that appropriate designations and policies will be applied in Official

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		Plans, which implies that elements of the water resource system will be mapped as designations.
3.2.4 (Intro)	<p>Key hydrologic areas are areas which contribute to the hydrologic functions of the Water Resource System. These areas maintain ground and surface water quality and quantity by collecting, storing and filtering rainwater and overland flow, recharge aquifers and feed downstream tributaries, lakes, wetlands and discharge areas. These areas are also sensitive to contamination and feed key hydrologic features and drinking water sources.</p> <p>Key hydrologic areas include:</p> <ul style="list-style-type: none"> • Significant groundwater recharge areas; • Highly vulnerable aquifers; and • Significant surface water contribution areas. 	This section clearly identifies what key hydrologic areas are and is consistent with the Growth Plan identification of these features.
3.2.4.1	<p>Major development may be permitted where it has been demonstrated that the hydrologic functions, including groundwater and surface water quality and quantity, of these areas shall be protected and, where possible, improved or restored through:</p> <ol style="list-style-type: none"> The identification of planning, design and construction practices and techniques; Meeting other criteria and direction set out in the applicable watershed planning or subwatershed plan; and Meeting any applicable provincial standards, guidelines and procedures. 	<p>Major development is defined by the Greenbelt Plan as follows:</p> <p><i>Means development consisting of:</i></p> <ol style="list-style-type: none"> <i>The creation of four or more lots;</i> <i>The construction of a building or buildings with a ground floor area of 500 m2 or more; or</i> <i>The establishment of a major recreational use.</i> <p>A major recreational use is defined as follows:</p>

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		<p><i>Means a recreational use that requires large-scale modification of terrain, vegetation or both and usually also requires large-scale buildings or structures, including but not limited to the following: golf courses; serviced playing fields; serviced campgrounds; and ski hills.</i></p> <p>The two above definitions provide additional detail beyond what is identified in the Growth Plan on what types of development may be permitted in key hydrologic areas, but only in the Greenbelt Plan area.</p>
3.2.4.2	Section 3.2.4.1 does not apply to major development that is a new or expanding building or structure for agricultural uses, agriculture-related uses or on-farm diversified uses where the total impervious surface does not exceed 10 per cent of the lot.	Major development in the context of this section is defined as per the above and only applies if the total impervious surface does exceed 10% of the lot.
3.2.5 (Intro)	<p>Key natural heritage features include:</p> <ul style="list-style-type: none"> • Habitat of endangered species and threatened species; • Fish habitat; • Wetlands; • Life science areas of natural and scientific interest (A.N.S.I.s); • Significant valleylands; • Significant woodlands; • Significant wildlife habitat (including habitat of 	These are also consistent with the Growth Plan.

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	<p>special concern species);</p> <ul style="list-style-type: none"> • Sand barrens, savannahs and tallgrass prairies; and • Alvars. <p>Key hydrologic features include:</p> <ul style="list-style-type: none"> • Permanent and intermittent streams; • Lakes (and their littoral zones); • Seepage areas and springs; and • Wetlands. 	
3.2.5.1	<p>Development or site alteration is not permitted in key hydrologic features and key natural heritage features within the Natural Heritage System, including any associated vegetation protection zone, with the exception of:</p> <p>a) Forest, fish and wildlife management;</p> <p>b) Conservation and flood or erosion control projects, but only if they have been demonstrated to be necessary in the public interest and after all alternatives have been considered; or</p> <p>c) Infrastructure, aggregate, recreational, shoreline and existing uses, as described by and subject to the policies of section 4.</p>	<p>This section is similar to Section 4.2.3.1 of the Growth Plan and identifies what uses are permitted key hydrologic features and key natural heritage features within the N.H.S. It is noted that key hydrologic features outside of the N.H.S. are not subject to this policy.</p>
3.2.5.2	<p>Beyond the Natural Heritage System within the Protected Countryside, key hydrologic features are defined by and subject to the policies of section 3.2.5.</p>	<p>This section identifies how these features are to be defined on land outside of the N.H.S. (see below).</p>

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3.2.5.3	Beyond the Natural Heritage System within the Protected Countryside, key natural heritage features are not subject to the policies of section 3.2.5, but are to be defined pursuant to, and subject to the policies of, the P.P.S.	This section makes it clear that such features outside of the N.H.S. are subject to the P.P.S.
3.2.5.4	In the case of wetlands, seepage areas and springs, fish habitat, permanent and intermittent streams, lakes and significant woodlands, the minimum vegetation protection zone shall be a minimum of 30 metres measured from the outside boundary of the key natural heritage feature or key hydrologic feature.	This policy is the same as Section 4.2.4.1 c) of the Growth Plan.
3.2.5.5	A proposal for new development or site alteration within 120 metres of a key natural heritage feature within the Natural Heritage System or a key hydrologic feature anywhere within the Protected Countryside requires a natural heritage evaluation or a hydrological evaluation which identifies a vegetation protection zone which: a) Is of sufficient width to protect the key natural heritage feature or key hydrologic feature and its functions from the impacts of the proposed change and associated activities that may occur before, during and after construction and, where possible, restore or enhance the feature and/or its function; and b) Is established to achieve and be maintained as natural self-sustaining vegetation.	This policy is the same as Section 4.2.4.1 a) and b) of the Growth Plan.
3.2.5.6	A proposal for new development or site alteration within the Natural Heritage System is not subject to section	This policy is similar to Section 4.2.4.4 a) of the Growth Plan.

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	3.2.5.5 where the only key natural heritage feature is the habitat of endangered species and threatened species.	
3.2.5.7	Notwithstanding section 3.2.5.5, new buildings and structures for agricultural, agriculture-related or on-farm diversified uses are not required to undertake a natural heritage or hydrologic evaluation if a minimum 30 metre vegetation protection zone is provided from a key natural heritage feature or key hydrologic feature. In addition, these uses are exempt from the requirement of establishing a condition of natural self-sustaining vegetation if the land is and will continue to be used for agricultural purposes. However, agricultural, agriculture-related and on-farm diversified uses shall pursue best management practices to protect and/or restore key natural heritage features and key hydrologic features and functions.	<p>This section is the same as Sections 4.2.4.4 b) and c) of the Growth Plan.</p> <p>This policy specifically exempts new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses from the policies that require a natural heritage and hydrological evaluation within 120 metres of a key natural feature and key hydrologic feature, provided a minimum 30 metre vegetation protection zone ('V.P.Z.') is provided.</p> <p>Given that these buildings and structures would most likely be permitted as-of-right in the zoning by-law, it would not be possible to require the 30 metre V.P.Z. through a building permit process. On order to achieve the V.P.Z., a Planning Act process would be required, such as the lifting of a Holding provision, which was used by many municipalities to implement similar policies in the Oak Ridges Moraine Conservation Plan.</p> <p>The policies further exempt new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses from providing natural self-sustaining vegetation within a V.P.Z., provided the lands are, and will continue to be</p>

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		<p>used for agricultural purposes. The effect of this second component of the policy is to exempt these buildings and structures from the V.P.Z. requirement as long as the lands are used for agriculture. What happens when the lands are not in agricultural use is not clear; in terms of the ability of the municipality to them require a V.P.Z.</p> <p>While new buildings and structures for agricultural uses, agriculture-related uses, or on-farm diversified uses are exempt from the evaluation requirement, the development of any other type of building within 120 metres of a key feature, including a single detached dwelling on an existing lot of record is required to be supported by an evaluation that identifies what the width of the V.P.Z. should be.</p> <p>In this case, the minimum width of such a V.P.Z. is 30 metres for key hydrologic features, fish habitat and significant woodlands as per Section 3.2.5.4. The minimum width of a V.P.Z. adjacent to other key features would be determined through the required evaluation. Given this policy, a Planning Act process is required to provide the mechanism for determining the appropriate width of the V.P.Z.</p>
3.2.5.8	Notwithstanding sections 3.2.5.4 and 3.2.5.5, within the Niagara Peninsula Tender Fruit and Grape Area, new	This policy is unique to Niagara Region and provides specific exemptions for new buildings or

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	<p>buildings or structures for agricultural, agriculture-related and on-farm diversified uses are permitted within 30 metres of permanent and intermittent streams, where:</p> <ul style="list-style-type: none"> a) The permanent or intermittent stream also functions as an agricultural swale, roadside ditch or municipal drain as determined through provincially approved mapping; b) A minimum 15 metre vegetation protection zone is established between the building or structure and the permanent or intermittent stream; however, this vegetation protection zone is not required to be maintained as natural self-sustaining vegetation if the land is and will continue to be used for agricultural purposes; c) There is no alternative location for the building or structure on the property without impacting lands that are in specialty crop production; d) A new individual on-site sewage system will not be located within 30 metres of the stream; and e) Agricultural, agriculture-related and on-farm diversified uses shall pursue best management practices to protect or restore key hydrologic features and functions. 	<p>structures for agricultural, agriculture-related and on-farm diversified uses.</p> <p>This policy is intended to recognize this unique and important agricultural area. Particularly, the policies provide special exemptions to farming practices that rely on 'man-made' agricultural drains, recognizing these drains also provide a benefit to, and are often identified as part of, the natural environment system as 'watercourses', 'fish habitat', and possibly a 'linkage'.</p>
3.4.3.1	<p>Towns/Villages are subject to the policies of the Growth Plan and continue to be governed by official plans and related programs or initiatives and are not subject to the policies of this Plan, save for the policies of sections 3.1.5, 3.2.3, 3.2.6, 3.3 and 3.4.2.</p>	<p>This section specifically applies to Towns/Villages and it indicates that the Greenbelt Plan does not apply. For example, the policies on key natural heritage features do not apply within towns/villages. However, certain sections are</p>

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		applicable and they are Section 3.1.5 (agri-food network), Section 3.2.3 (water resource system policies), Section 3.2.6 (external connections), Section 3.3 (parkland, open space and trails) and Section 3.4.2 (general settlement area policies).
3.4.4.1	Hamlets are subject to the policies of the Growth Plan and continue to be governed by official plans and related programs or initiatives and are not subject to the policies of this Plan, save for the policies of sections 3.1.5, 3.2.3, 3.2.6, 3.3 and 3.4.2. Limited growth is permitted through infill and intensification of hamlets subject to appropriate water and sewage services.	This section specifically applies to the hamlets and it indicates that the Greenbelt Plan does not apply. However, certain sections are applicable and they are Section 3.1.5 (agri-food network), Section 3.2.3 (water resource system policies), Section 3.2.6 (external connections), Section 3.3 (parkland, open space and trails) and Section 3.4.2 (general settlement area policies). This means for example that policies on key natural heritage features do not apply within hamlets.
4.1.1.2	Proposals for non-agricultural uses must demonstrate that: a) The use is appropriate for location on rural lands; b) The type of water and sewer servicing proposed is appropriate for the type of use; c) There are no negative impacts on key natural heritage features or key hydrologic features or their functions; and d) There are no negative impacts on the biodiversity or connectivity of the Natural Heritage System.	These policies apply to proposed non-agricultural uses on rural lands only. These policies do not apply to lands within prime agricultural areas.

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4.1.2.2	<p>An application to establish or expand a major recreational use in the Natural Heritage System shall be accompanied by a vegetation enhancement plan that incorporates planning, design, landscaping and construction measures that:</p> <ul style="list-style-type: none"> a) Maintain or, where possible, enhance the amount of natural self- sustaining vegetation on the site and the connectivity between adjacent key natural heritage features or key hydrologic features; b) Wherever possible, keep intermittent stream channels and drainage swales in a free-to-grow, low-maintenance condition; c) Minimize the application and use of pesticides and fertilizers; and d) Locate new natural self-sustaining vegetation in areas that maximize the ecological functions and ecological value of the area. 	<p>Given that major recreational uses may only be permitted on rural lands (in accordance with Section 3.1.4.4) these policies set out conditions under which such uses could be considered on rural lands.</p>
4.1.2.3	<p>An application to expand or establish a major recreational use shall be accompanied by a conservation plan demonstrating how water, nutrient and biocide use shall be kept to a minimum, including through the establishment and monitoring of targets.</p>	<p>This section is self-explanatory.</p>
4.1.3	<p>The developed shoreline areas of Lake Ontario, Lake Simcoe, Lake Scugog and other inland lakes contain substantial amounts of both seasonal and permanent residential development. The developed shoreline areas</p>	<p>This policy indicates that Section 4.2.4.5 of the Growth Plan applies to developed shoreline areas of Lake Ontario.</p>

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	<p>of lakes (including their littoral zones) are particularly important and sensitive because they include key natural heritage and hydrologic features and functions, benefits to water quality and quantity, cultural heritage resources, vital human services and recreational opportunities, including trail systems. Climate change is expected to be an important consideration in shoreline management given projected declines in Great Lakes water levels.</p> <p>Policy 4.2.4.5 of the Growth Plan applies to developed shoreline areas within the Protected Countryside.</p>	
4.5	<p>For lands falling within the Protected Countryside, the following policies shall apply:</p> <ol style="list-style-type: none"> 1. All existing uses are permitted. 	<p>For the purposes of this policy, existing uses are uses legally established prior to the date that the Greenbelt Plan came into force on December 16, 2004 or were legally established before lands were added to the Greenbelt Plan after December 16, 2004.</p> <p>A similar policy framework for existing uses does not apply in the Growth Plan area, even though the Greenbelt Plan policy framework is now being applied in the Growth Plan natural heritage system.</p>
4.5	<p>For lands falling within the Protected Countryside, the following policies shall apply:</p> <ol style="list-style-type: none"> 2. Single dwellings are permitted on existing lots of record, provided they were zoned for such as of the 	<p>This policy permits single dwellings on existing lots of record provided they were zoned as such prior to December 2004. This means that if a currently vacant existing lot was not zoned to permit a dwelling in December 2004, the</p>

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	<p>date the Greenbelt Plan came into force. Municipalities are encouraged to retain existing lots of record for agricultural uses and discourage non-agricultural uses where appropriate</p>	<p>Greenbelt Plan does not permit the establishment of a dwelling on that lot.</p> <p>A similar policy framework for existing lots does not apply in the Growth Plan area, even though the Greenbelt Plan policy framework is now being applied in the Growth Plan natural heritage system.</p>
4.5	<p>For lands falling within the Protected Countryside, the following policies shall apply:</p> <p>3. Outside of the Natural Heritage System, second dwelling units are permitted within single dwellings permitted in accordance with sections 4.5.1 and 4.5.2 or within existing accessory structures on the same lot.</p>	<p>This policy indicates that second dwelling units are permitted within single dwellings only outside of the N.H.S. This policy is more restrictive than the Planning Act in that it does not permit second dwellings within semi-detached and row house dwellings.</p>
4.5	<p>For lands falling within the Protected Countryside, the following policies shall apply:</p> <p>4. Expansions to existing buildings and structures, accessory structures and uses and/or conversions of legally existing uses which bring the use more into conformity with this Plan are permitted subject to a demonstration of the following:</p> <ul style="list-style-type: none"> a) Notwithstanding section 4.2.2.2, new municipal services are not required; and b) The use does not expand into key natural heritage features or key hydrologic features or their associated vegetation protection zones, 	<p>This policy permits the expansion of any existing building and structure and accessory structures and uses anywhere in the Greenbelt Plan area provided municipal services are not required. Sub-section b) is the same as Section 4.2.3.1 e) of the Growth Plan. In this regard, there will be a need for a process to determine how the 'unless there is no alternative test' can be satisfied on a case-by-case basis.</p>

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	unless there is no other alternative, in which case any expansion shall be limited in scope and kept within close geographical proximity to the existing structure.	
4.5	<p>For lands falling within the Protected Countryside, the following policies shall apply:</p> <p>5. Expansions or alterations to existing buildings and structures for agricultural uses, agriculture-related uses or on-farm diversified uses and expansions to existing residential dwellings may be considered within key natural heritage features, key hydrologic features and their associated vegetation protection zones if it is demonstrated that:</p> <ul style="list-style-type: none"> a) There is no alternative, and the expansion or alteration in the feature is minimized and, in the vegetation protection zone, is directed away from the feature to the maximum extent possible; and b) The impact of the expansion or alteration on the feature and its functions is minimized and mitigated to the maximum extent possible. 	<p>This section is the same as Section 4.2.3.1 f) of the Growth Plan and it deals specifically with expansions or alterations to existing buildings and structures for agricultural uses, agriculture-related uses, on-farm diversified uses and expansions to existing residential dwellings.</p> <p>The criteria listed in sub-sections a) and b) imply that a process is required to determine how the policy could be satisfied on a case-by-case basis. This is because there is a need to demonstrate that there is 'no alternative', the expansion into the feature is 'minimized' and the development is 'directed away from the feature to the maximum extent possible'. Impacts are also expected to be minimized and mitigated to the extent possible, which assumes that some impact can be considered. All of the above can only be assessed if there was a planning process in place to trigger the consideration of the above.</p>
5.2.1	Where an official plan was amended prior to December 16, 2004 to specifically designate land use(s), this approval may continue to be recognized through the conformity exercise addressed in section 5.3 and any	<p>This section provides for the implementation of previous planning permissions.</p> <p>A similar policy framework for previous planning permissions does not apply in the Growth Plan</p>

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	<p>further applications required under the Planning Act or the Condominium Act, 1998 to implement the official plan approval are not required to conform with this Plan.</p> <p>Where a zoning by-law was amended prior to December 16, 2004 to specifically permit land use(s), this approval may continue to be recognized through the conformity exercise described in section 5.3, and any further applications required under the Planning Act or the Condominium Act, 1998 to implement the use permitted by the zoning by-law are not required to conform with this Plan.</p> <p>Applications to further amend the site-specific official plan or zoning by-law permissions referred to above for uses similar to or more in conformity with the provision of this Plan are also permitted. All such applications should, where possible, seek to achieve or improve conformity with this Plan.</p>	<p>area, even though the Greenbelt Plan policy framework is now being applied in the Growth Plan natural heritage system.</p>
5.3 (selected)	<p>Official plans shall contain policies that reflect the requirements of this Plan together with a map(s) showing the boundaries of the Greenbelt Area, the Protected Countryside, the Natural Heritage System and the agricultural land base. Municipalities shall provide a map showing known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones identified in this Plan. The identification of the Natural Heritage System boundary</p>	<p>This section provides additional detail on what is required to be included within an Official Plan. In this regard, planning authorities are required to provide a map showing known key natural heritage features and key hydrologic features and any associated minimum vegetation protection zones identified in this Plan. The boundaries of the N.H.S. and wellhead protection areas are also to be identified.</p>

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	<p>will form the basis for applying the policies of section 3.2.</p> <p>Municipalities should also include a map of wellhead protection areas together with associated policies for these areas within their official plans as appropriate and in accordance with any provincial directives on source water protection.</p> <p>Building on watershed planning, key hydrologic areas shall be identified and the appropriate designations and policies will be applied in official plans to provide for their long-term protection.</p> <p>Despite the policies in the Greenbelt Plan, there is nothing in this Plan that limits the ability of decision-makers on planning matters to adopt policies that are more stringent than the requirements of the Plan, unless doing so would conflict with any of the policies or objectives of the Plan.</p>	<p>There is also an expectation that key hydrologic areas will be mapped after further study.</p>
5.4.2	<p>Boundaries of the Natural Heritage System may be refined at the time of municipal conformity in accordance with the Natural Heritage System policies of section 3.2.2.5. No further refinements to the boundaries of the Natural Heritage System can occur after a municipality has made this one-time refinement.</p> <p>Boundaries of prime agricultural areas and rural lands are as established in official plans, subject to section</p>	<p>This section allows for the refinement of the boundaries at the time of a municipal comprehensive review as per the Growth Plan. However, this section goes further and indicates that boundaries of key natural heritage features and key hydrologic features and any minimum vegetation protection zones identified in this Plan are to be shown in official plans. However, this section also recognizes that these boundaries</p>

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	<p>5.3.</p> <p>Boundaries of Towns/Villages are shown on the schedules of this Plan, but for detailed delineation and the boundaries of Hamlets, which are only shown as symbols, reference must be made to official plans.</p> <p>Boundaries of key natural heritage features and key hydrologic features and any minimum vegetation protection zones identified in this Plan are to be shown in official plans. The detailed delineation of these features and zones can be undertaken by municipalities and/or conservation authorities when dealing with applications for development under the Planning Act or Condominium Act, 1998 or via a municipal zoning by-law update.</p>	<p>may only be known at the time of a development application.</p>

Appendix 5: Technical review of policies in the Niagara Escarpment Plan and their applicability to Niagara Region

Appendix 5. Technical review of policies in the Niagara Escarpment Plan and their applicability to Niagara Region.

Section No.	Policy	Commentary
	<p>How to Read a Provincial Plan</p> <p>The Provincial Policy Statement provides overall policy directions on matters of provincial interest related to land use and development in Ontario, and applies throughout the Niagara Escarpment Plan Area. Decisions made by municipalities, planning boards, the Province, or a commission or agency of the government (including the Niagara Escarpment Commission) must be consistent with the Provincial Policy Statement.</p> <p>The Niagara Escarpment Plan builds upon the policy foundation provided by the Provincial Policy Statement and provides additional land use planning policies for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment and to ensure that only such development occurs as is compatible with that natural environment. The Niagara Escarpment Plan is to be read in conjunction with the Provincial Policy Statement but shall take precedence over the policies of the Provincial Policy Statement to the extent of any conflict. Where the Niagara Escarpment Plan is silent on policies contained within the Provincial Policy Statement, the policies of the Provincial Policy Statement continue to apply, where relevant.</p> <p>Provincial plans should also be read in conjunction with other provincial plans, as defined in the Planning Act,</p>	<p>This introductory section of the N.E.P. is not part of the N.E.P., in accordance with the following section entitled 'How to read this Plan' which indicates that the N.E.P. begins with the purpose statement.</p> <p>This section clearly indicates that all planning decisions shall be consistent with the P.P.S., but that the N.E.P. takes precedence over the P.P.S. to the extent of any conflict.</p> <p>In addition, where the N.E.P. is silent on a matter, the P.P.S. applies.</p> <p>This section also indicates that other Provincial plans, most notably the Growth Plan also apply.</p>

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	<p>that may apply within the same geography. Within the Niagara Escarpment Plan Area, these include the Growth Plan for the Greater Golden Horseshoe, the Greenbelt Plan and the Parkway Belt West Plan. Other plans, including source protection plans under the Clean Water Act, 2006, may also apply within the Niagara Escarpment Plan Area. Each of these plans applies to certain defined parts of the Niagara Escarpment Plan Area and provides specific policy on certain matters.</p>	
	<p>Purpose The purpose of this Plan is to provide for the maintenance of the <i>Niagara Escarpment</i> and land in its vicinity substantially as a continuous <i>natural environment</i>, and to ensure only such development occurs as is <i>compatible</i> with that <i>natural environment</i>.</p>	<p>This purpose statement sets out the overall purpose of the N.E.P., which is to provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment. This is later implemented in Objective 5 that follows: “To ensure that all new development is compatible with the purpose of the Plan;”</p>
1.2	<p>Land Use Designations The area of the Niagara Escarpment Plan has been allocated among the following seven land use designations:</p> <ul style="list-style-type: none"> • Escarpment Natural Area • Escarpment Protection Area • Escarpment Rural Area • Minor Urban Centre • Urban Area • Escarpment Recreation Area 	<p>This section sets out the seven land use designations that apply in the N.E.P. Changes to the boundaries of all land use designations require an amendment to the N.E.P., except if public lands are being added to the Parks and Open Space System.</p>

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	<ul style="list-style-type: none"> Mineral Resource Extraction Area <p>The land use designations are shown on Maps 1 to 9 of this Plan.</p>	
1.3	<p>Escarpment Natural Area</p> <p>Escarpment features that are in a relatively natural state and associated valleylands, wetlands and woodlands that are relatively undisturbed are included within this designation. These areas may contain important cultural heritage resources, in addition to wildlife habitat, geological features and natural features that provide essential ecosystem services, including water storage, water and air filtration, biodiversity, support of pollinators, carbon storage and resilience to climate change. These are the most sensitive natural and scenic resources of the Escarpment. The policies aim to protect and enhance these natural areas.</p>	<p>This section identifies the lands that have been included in this designation and indicate that the lands so designated are the most sensitive and scenic resources of the escarpment.</p> <p>In other upper tier municipalities, such as the Region of Halton, lands within this designation have been included within a Regional N.H.S.</p>
1.3.2	<p>Criteria for Designation</p> <ol style="list-style-type: none"> 1. Escarpment slopes and Escarpment Related Landforms associated with the underlying bedrock that are in a relatively natural state. 2. Where woodlands abut the Escarpment, the designation includes the woodlands 300 metres back from the brow of the Escarpment slopes. 3. Provincially significant Areas of Natural and Scientific Interest (Life Science). 4. Significant valleylands, provincially significant wetlands and wetlands greater than 20 hectares in size. 	<p>This section simply identifies what lands are included within the designation.</p>

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1.4	Escarpment Protection Area Escarpment Protection Areas are important because of their visual prominence and their environmental significance, including increased resilience to climate change through the provision of essential ecosystem services. They are often more visually prominent than Escarpment Natural Areas. Included in this designation are Escarpment Related Landforms and natural heritage and hydrologic features that have been significantly modified by land use activities, such as agriculture or residential development, as well as lands needed to buffer Escarpment Natural Areas and natural areas of regional significance. The policies aim to protect and enhance natural and hydrologic features and the open landscape character of the Escarpment and lands in its vicinity.	<p>This section identifies the lands that have been included in this designation and indicate that the lands so designated are the more visually prominent than the lands within the Escarpment Natural Area designation. However, certain lands within this designation have been significantly altered, such as in the City of Hamilton, City of Niagara Falls and the Town of Blue Mountains.</p> <p>In other upper tier municipalities, such as the Region of Halton, lands within this designation have been included within a Regional N.H.S.</p>
1.4.2	Criteria for Designation 1. Escarpment slopes and Escarpment Related Landforms where existing land uses have significantly altered the natural environment (e.g., agricultural lands or residential development). 2. Areas in close proximity to Escarpment slopes that are visually part of the landscape unit. 3. Areas of Natural and Scientific Interest (Life Science), or environmentally sensitive or environmentally significant areas identified by municipalities or conservation authorities.	<p>This section simply identifies what lands are included within the designation.</p>
1.5	Escarpment Rural Area	<p>This section identifies the lands that have been included in this designation and indicate that the</p>

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	Escarpment Rural Areas are an essential component of the Escarpment corridor, including portions of the Escarpment and lands in its vicinity. They provide a buffer to the more ecologically sensitive areas of the Escarpment.	lands so designated provide a buffer to the more ecologically sensitive areas of the Escarpment.
1.5.2	Criteria for Designation <ol style="list-style-type: none"> 1. Minor Escarpment slopes and Escarpment Related Landforms. 2. Lands in the vicinity of the Escarpment necessary to provide an open landscape character. 3. Lands in the vicinity of the Escarpment which are of ecological importance to the Escarpment environment. 4. Lands that have potential for enhanced ecological values through natural succession processes or due to their proximity to other ecologically sensitive lands, areas or features. 	This section simply identifies what lands are included within the designation.
1.6	Minor Urban Centre This land use designation identifies those rural settlements, villages and hamlets that are distributed throughout the Niagara Escarpment Plan area.	This section is self-explanatory.
1.7	Urban Area This land use designation identifies those Urban Areas within the N.E.P.	This section is self-explanatory.
1.8	Escarpment Recreation Area This land use designation identifies those areas designated as Recreation Areas where policies apply to existing or potential recreational development.	This section is self-explanatory.

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1.9	Mineral Resource Extraction Area This land use designation identifies Mineral Resource Extraction Areas where mineral aggregate resource extraction may be permitted subject to the policies therein.	This section is self-explanatory.
2.2.1 and 2.2.2	General Development Criteria The objective is to permit reasonable enjoyment by the owners of all lots that can sustain development. <ol style="list-style-type: none"> 1. The Escarpment environment shall be protected, restored and where possible enhanced for the long term having regard to single, multiple or successive development that have occurred or are likely to occur. 2. The site shall not be prone to natural hazards, and the development will not impact the control of these natural hazards including flooding hazards, erosion hazards, or other water-related hazards and hazard events associated with unstable soil or unstable bedrock. 	<p>This general section applies to all development that is subject to the N.E.P. Where specific restrictions are identified, the Region cannot be more permissive.</p> <p>Many of the provisions in this section (most of which have not been reproduced) are subjective and are applied through a Development Permit process, which is not a Planning Act process. This is why most municipalities defer planning approvals to the N.E.C., and do not include detailed policies applying to such development in their Official Plans.</p>
2.6	The objective is to ensure that hydrologic features and functions including the quality, quantity and character of groundwater and surface water, at the local and watershed level, are protected and where possible enhanced.	This section is similar to Section 3.2.4.1 of the Greenbelt Plan, but the terminology is slightly different. For example, features and functions are permitted to be restored in the Greenbelt Plan area, but not in the N.E.P., which means that the N.E.P. is more restrictive in this regard.
2.6.1	The following are key hydrologic features within the meaning of this Plan: <ul style="list-style-type: none"> • Permanent and intermittent streams; 	These are the same as in the Greenbelt Plan and the Growth Plan.

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	<ul style="list-style-type: none"> • Lakes (and their littoral zones); • Seepage areas and springs; and • Wetlands. 	
2.6.2	<p>Development is not permitted in key hydrologic features with the exception of the following, which may be permitted subject to compliance with all other relevant policies of this Plan:</p> <ul style="list-style-type: none"> a) Accessory facilities to a single dwelling outside of a wetland on an existing lot of record, provided that the disturbance is minimal and where possible temporary; b) Forest, fisheries and wildlife management to maintain or enhance the feature; c) Conservation and flood or erosion control projects, after all alternatives have been considered; d) The Bruce Trail, and other trails, boardwalks and docks on parks and open space lands that are part of the Niagara escarpment parks and open space system; or e) Infrastructure, where the project has been deemed necessary to the public interest after all other alternatives have been considered. 	<p>This section is similar to Section 3.2.5.1 of the Greenbelt Plan. However, the permissions in sub-sections a) and d) are unique to the N.E.P.</p>
2.6.3 a)	<p>If, in the opinion of the implementing authority, a proposal for development within 120 metres of a key hydrologic feature has the potential to result in a negative impact on the feature and/or its functions, a hydrologic evaluation will be required that:</p>	<p>This policy is unique to the N.E.P.</p>

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	<p>a) Demonstrates that the development, including any alteration of the natural grade or drainage, will protect:</p> <ul style="list-style-type: none"> I. The key hydrologic feature or the hydrologic functions of that feature, II. The quality and quantity of groundwater and surface water III. Natural streams or drainage patterns; and IV. The overall water budget for the watershed, including existing and planned municipal drinking water systems. 	
2.6.3 b)	<p>If, in the opinion of the implementing authority, a proposal for development within 120 metres of a key hydrologic feature has the potential to result in a negative impact on the feature and/or its functions, a hydrologic evaluation will be required that:</p> <p>b) Identifies planning, design and construction practices that will minimize erosion, sedimentation and the introduction of nutrients or pollutants and protect, and where possible, enhance or restore the health, diversity and size of the key hydrologic feature, including:</p> <ul style="list-style-type: none"> I. Natural features should be preserved; II. Temporary vegetation and/or mulching should be used to protect critical areas exposed during development; III. Topsoil should not be removed from the site, but rather, should be stored and redistributed as a suitable base for seeding and planting; 	This policy is also unique to the N.E.P.

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	<p>IV. Sediment control devices should be installed to remove sediment from run-off due to changed soil surface conditions during and after construction; and</p> <p>V. Construction in or across a watercourse or wetland should be appropriately timed to minimize impacts on fish and wildlife habitat</p>	
2.6.3 c)	<p>If, in the opinion of the implementing authority, a proposal for development within 120 metres of a key hydrologic feature has the potential to result in a negative impact on the feature and/or its functions, a hydrologic evaluation will be required that:</p> <p>c) Determines the minimum vegetation protection zone required to protect and where possible enhance the key hydrologic feature and its functions.</p>	<p>This section is similar to Section 3.2.4.5 of the Greenbelt Plan.</p>
2.6.4	<p>A vegetation protection zone shall:</p> <p>a) Be of sufficient width to protect the key hydrologic feature and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after construction, and where possible, restore or enhance the feature and/or its function; and</p> <p>b) Be established to achieve, and be maintained as natural self-sustaining vegetation.</p>	<p>This section is also similar to Section 3.2.4.5 of the Greenbelt Plan.</p>
2.6.5	<p>In the case of permanent and intermittent streams and seepage areas and springs, the determination of the vegetation protection zone shall include, without</p>	<p>Within Section 3.2.4.4 of the Greenbelt Plan, the minimum width of a vegetation protection zone for</p>

Section No.	Policy	Commentary
	limitation, an analysis of land use, soil type and slope class.	these features is 30 metres. In the N.E.P., there is no prescribed width.
2.6.6	New buildings and structures for agricultural uses are not required to establish a condition of natural self-sustaining vegetation within a vegetation protection zone if the land is, and will continue to be, used for agricultural purposes. Despite this exemption, agricultural uses should pursue best management practices to protect and/or restore key hydrologic features and functions.	Within Section 3.2.5.7 of the Greenbelt Plan, these uses are exempt if a 30-metre wide vegetation protection zone is provided. This requirement is not included in this N.E.P. policy.
2.7	The objective is to protect and where possible enhance natural heritage features and functions, in order to maintain the diversity and connectivity of the continuous natural environment.	This policy is unique to the N.E.P. and is more of a principle than a policy.
2.7.1	The following are key natural heritage features within the meaning of this Plan: <ul style="list-style-type: none"> • Wetlands • Habitat of endangered species and threatened species • Fish habitat • Life Science Areas of Natural and Scientific Interest • Earth Science Areas of Natural and Scientific Interest • Significant valleylands • Significant woodlands • Significant wildlife habitat • Habitat of special concern species in Escarpment Natural and Escarpment Protection areas 	This list is similar to the list in the Greenbelt Plan; however, Earth Science Areas of Natural and Scientific Interest are unique to the N.E.P.

Section No.	Policy	Commentary
2.7.2	<p>Development is not permitted in key natural heritage features with the exception of the following, which may be permitted subject to compliance with all other relevant policies of this Plan:</p> <ul style="list-style-type: none"> a) Development of a single dwelling and accessory facilities outside a wetland on an existing lot of record, provided that the disturbance is minimal and where possible temporary; b) Forest, fisheries and wildlife management to maintain or enhance the feature; c) Conservation and flood or erosion control projects, after all alternatives have been considered; d) The Bruce Trail, and other trails, boardwalks and docks on parks and open space lands that are part of the parks and open space system; and e) Infrastructure, where the project has been deemed necessary to the public interest and there is no other alternative. 	<p>Sub-sections a) and d) are unique permissions in the N.E.P. The remainder is the same as the Greenbelt Plan. The permission in sub-section a) is not included within the Growth Plan.</p>
2.7.3	<p>The diversity and connectivity between key natural heritage features and key hydrologic features shall be maintained, and where possible, enhanced for the movement of native plants and animals across the landscape.</p>	<p>This policy is somewhat similar to Section 2.1.2 of the P.P.S. which states the following:</p> <p>"The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features"</p>

Section No.	Policy	Commentary
2.7.4	Development in other natural features not identified as key natural heritage features or key hydrologic features should be avoided. Such features should be incorporated into the planning and design of the proposed use wherever possible, and the impact of the development on the natural feature and its functions shall be minimized.	This policy is the same as Section 3.2.2.3 c) of the Greenbelt Plan.
2.7.5	Where policies or standards of other public bodies or levels of government exceed the policies related to key natural heritage features or key hydrologic features in this Plan, such as may occur with habitat of endangered species and threatened species under the Endangered Species Act, 2007; with natural hazards where section 28 regulations of the Conservation Authorities Act apply; or with fisheries under the Federal Fisheries Act, the most restrictive provision or standard applies.	This policy is unique to the N.E.P.
2.7.6	<p>If in the opinion of the implementing authority, a proposal for development within 120 metres of a key natural heritage feature has the potential to result in a negative impact on the feature and/or its functions, or on the connectivity between key natural heritage features and key hydrologic features, a natural heritage evaluation will be required that:</p> <ul style="list-style-type: none"> a) Demonstrates that the development, including any alteration of the natural grade or drainage, will protect the key natural heritage feature or the related functions of that feature; b) Identifies planning, design and construction practices that will minimize erosion, sedimentation and the introduction of nutrients or pollutants and 	This policy is similar to Sections 3.2.2.3 and 3.2.4.5 of the Greenbelt Plan.

Section No.	Policy	Commentary
	<p>protect and, where possible, enhance or restore the health, diversity and size of the key natural heritage feature;</p> <p>c) Determines the minimum vegetation protection zone required to protect and where possible enhance the key natural heritage feature and its functions; and</p> <p>d) Demonstrates that the connectivity between key natural heritage features and key hydrologic features located within 240 metres of each other will be maintained and where possible enhanced for the movement of native plants and animals across the landscape.</p> <p>Except with respect to a key natural heritage feature that is solely the habitat of endangered species or threatened species, which is subject to part 2.7.8 below.</p>	
2.7.7	<p>For the purposes of 2.7.6, a vegetation protection zone shall:</p> <p>a) Be of sufficient width to protect and where possible enhance the key natural heritage feature and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after, construction;</p> <p>b) Be established to achieve, and be maintained as, natural self-sustaining vegetation; and</p> <p>c) In the case of areas of natural and scientific interest (earth science and life science), include without limitation an analysis of land use, soil type and</p>	<p>This section is also similar to Section 3.2.4.5 of the Greenbelt Plan; however, sub-section c) is unique to the N.E.P.</p>

Section No.	Policy	Commentary
	slope class.	
2.7.8	<p>Development within the habitat of endangered species and threatened species:</p> <ul style="list-style-type: none"> a) Located within Escarpment Natural Areas and Escarpment Protection Areas, is not permitted, except for development referred to in Parts 2.7.2 a) b) c) d) or e) which may be permitted provided it is in compliance with the Endangered Species Act, 2007; and b) Located within Escarpment Rural Areas, Mineral Resource Extraction Areas, Urban Areas, Minor Urban Centres and Escarpment Recreation Areas, is not permitted unless it is in compliance with the Endangered Species Act, 2007. 	This section is unique to the N.E.P.
2.7.9	<p>New buildings and structures for agricultural uses are not required to establish a condition of natural self-sustaining vegetation within a vegetation protection zone if the land is, and will continue to be, used for agricultural purposes provided that where key natural heritage features are located within 240 metres of each other, and connectivity between features will be maintained. In all cases, agricultural uses should pursue best management practices to protect and/or restore key natural heritage features and functions.</p>	This section is similar to Section 3.2.5.7 of the Greenbelt Plan.

Appendix 6: Review of Data Layers Contained in the Contemporary Mapping of Watercourses Dataset

Appendix 6. Review of Data Layers Contained in the Contemporary Mapping of Watercourses Dataset.

Field Name	Field Description	Characterization Options	Comment
Flow Capture	The level of confidence of the interpretation of flow direction	Inferred Observed	This attribute supplements the spatial network by informing the user of areas in the network where flow is clearly determinable (“observed”), or logically determined from the local conditions of the DEM, orthophoto and evidence in the connecting segments (“inferred”).
Flow Type	Whether the segment represents surface water, a virtual segment through a water body, or a virtual connector	Surface Water Suspected Virtual Virtual Connector Virtual Segment Virtual Segment Great Lake	Identification of whether the feature is a surface or subsurface segment in the network is a valuable aid for understanding where flows are travelling and out-letting when they are subsurface and where it is appropriate to target policy, management efforts, or otherwise that pertain only to surface flows. The differentiation between surface and subsurface segments is not identified or characterized in watercourse data currently mapped in the Regional Official Plan. This results in for example, the appearance of a water feature travelling through a subdivision or over a driveway.
Edge Type	Whether the segment represents a flowline, shoreline or other feature	Shoreline Flow Other Shoreline/Other	This attribute differentiates segments that are representative of a watercourse, waterbody, or accessory feature segment. The threshold for polygon capture according to the WRIP Data Capture specification is 4 meters, meaning, if a water feature is more than 4 meters wide it would be captured as a double-edged polygon.
Flow Class	Differentiates whether the segment is the primary or secondary flow path, or representative of a flow gap	Primary Secondary Flow Gap	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Isolated	Identifies if the segment is part of an “offline” water feature	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Capture Confidence	Indicates interpreter’s confidence in feature placement accuracy based on ability and available detail in the source data. Digitized segments and DTM breaklines identified as “approx.” would be characterized as “approximated”	Approximated Clear	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Interpretation Source	The type of source data used for interpretation	DSM Ortho Only Ortho/DTM Ortho/Updated DTM Vector	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Source Acquisition Date	The year the source was captured	<i>Various Dates</i>	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.

Field Name	Field Description	Characterization Options	Comment
Interpreter	The organization responsible for the segment capture	N.P.C.A. Vendor	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Capture Scale	The map scale at which the segment was captured	1:1000 1:2000 Unknown	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Acquisition Technique	The technique used for interpretation and capture	2D Digitized 3D Photogrammetric Capture Unknown	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Matches2013DTM	Boolean tag for if the segment originated from a DTM breakline, which DTM it matches	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Matches2010DTM	Boolean tag for if the segment originated from a DTM breakline, which DTM it matches	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Matches2006-07DTM	Boolean tag for if the segment originated from a DTM breakline, which DTM it matches	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
Matches2002DTM	Boolean tag for if the segment originated from a DTM breakline, which DTM it matches	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
For Reinforce	Boolean tag to indicate whether segment is required for Hydro DEM reinforcement. Typically virtual sub surface segments would be marked as "true"	True False	Characterizations were populated through a straight-forward process that did not require subjective analysis. The characterization was inherent in the structure of the linework or technical origins of the data.
OHN ID	If overlap exists on feature with Ontario Hydro Network identified watercourses	<i>Various IDs</i>	The OHN (Ontario Hydro Network) is a provincially warehoused watercourse layer. It is medium scale and considerably less spatially reliable than the C.M.W. dataset. OHN ID's are numerical tags assigned to the segments within the provincial dataset. They were inferred onto the C.M.W. data set when alignment was proximal or overlapping. This tag highlights the substantial difference in scope between the Provincial watercourse data and that of this project.

Field Name	Field Description	Characterization Options		Comment
Study Area	Approximate municipality within which the segment is located	<i>Municipality Name</i>		Indicates the Municipality that the segment is located in or where segment falls into both municipalities. This may be estimated along municipal borders where the segment falls into both municipalities.
Feature Type	What “type” of water feature the segment represents	Bridge/Overpass Retaining Wall Agricultural Drainage Conduit Culvert Ditch – Agricultural Ditch – Other Ditch – Roadside Headwater Island Open Storm Channel Pipe/Inlet/Outlet/Outfall Pond – Agricultural Pond – Other Pond – Stormwater Stream/Creek Swale	Canal Lock Gate Reservoir Lake Waterbody – Great Lakes Waterbody – Liquid Waste Waterbody – River Waterbody – Seasonal Wharf/Pier/Dock Slough Waterbody - Marina Rural Drainage Artificial Headland/Jetty/Groyne Dam Weir	<p>Feature typing is one of the most informative components of the C.M.W. dataset. It allows the user to obtain subset datasets for locally specific feature inventorying (e.g., municipal culverts, agricultural ponds). It provides a level of detail about the water feature previously not available in the Niagara Region. Caution should be exercised that the C.M.W. dataset makes no attempt at classifying provincially identified wetlands. Although features within the C.M.W. database such as “slough” and “seasonal waterbody” may overlap Ministry of Natural Resources classifications, this dataset is not intended for use for policy application or identification specifically applicable to these wetlands.</p> <p>Also, Greenbelt Plan policy 3.2.5.8 (regarding Niagara Peninsula Tender Fruit and Grape Area) allows for certain uses within the vegetation protection zone. It should be noted that at the current time the C.M.W. data has not been “Provincially approved” as required through this policy, and should not be applied for use in this context.</p>
Channel Type	Defines whether the segment is a natural, constructed-open, or constructed-closed feature	Natural Constructed open Constructed closed		The classification of a waterline as ‘natural’, ‘constructed-closed’ or ‘constructed-open’ provides insight into where hydrological features in Niagara have been modified. Interpretation was completed by analyzing DEM patterns, recent and historical aerial photographs, and Google streetview where available. It should be recognized that historical photo information did not pre-date the 1930’s, therefore, parameters surrounding historical influences to a watercourse may not be captured. Also, it should be clarified that the flow path of a water feature may not have significantly changed over time, yet it may be classified as ‘constructed open’ due to the surrounding land use and/or disturbances adjacent to the shoreline edge.
Drain ID	If overlap exists on feature with Ontario Ministry of Agriculture, Food, and Rural Affairs identified municipal drains	<i>Various IDs</i>		Unique numerical IDs are assigned to Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) designated municipal drains. These IDs were inferred onto the C.M.W. data set when alignment was proximal or overlapping to the ‘Constructed Drains’ Provincial dataset. Use of the C.M.W. dataset to display municipal drains is appropriate with the understanding that some segments in the OMAFRA layer have not been updated to reflect changing land conditions (e.g., development has occurred, surface water feature not present), therefore there may be watercourses indicated in the OMAFRA layer that are not present in the C.M.W. data.
Comment	Interpreter remarks for important qualifying information not captured by other attribute elements	<i>Various</i>		These are interpretation notes made by the analyst to explain uncertainties, or why characterizations were made. They may indicate source data, municipal drain names, Niagara Region culvert ID’s, or other source information.

Field Name	Field Description	Characterization Options	Comment
Permanency	The flow regime of the segment.	Ephemeral Intermittent or Ephemeral Intermittent Permanent or Intermittent Permanent	Permanency was interpreted for each hydrological segment into one of five classes. The intermediary classifications account for flows that were less definitive in the interpretation. It is recognized that definitive flow regimes may only be ascertained through intensive field study under expected weather conditions, using a collectively agreed upon definition for ‘ephemeral, intermittent, and permanent’ flows.
Flow Direction Verify	Boolean tag to indicate whether flow direction of the segment has been confirmed through networking exercises.	True False	This boolean attribute characterization was designed to accommodate results of network modelling exercises which would seek to confirm flow direction and drainage of the overall network. This has not been completed on the data to date at the Niagara Region.
Has Tile Drain	Boolean tag indicating whether the segment exists over or proximal to an OMAFRA mapped tile drain area.	True False	OMAFRA warehouses a data layer depicting polygons where agricultural field tile drainage has been installed by a licensed agricultural tile drainage contractor. However, the confidence in the completeness as an inventory and spatial accuracy is low. Best efforts were undertaken to infer this information into the C.M.W. dataset.
Fish Habitat M.N.R.	If overlap exists on feature with Ministry of Natural Resources identified Fish Habitat	Other Type 1 – Critical Type 2 – Important Type 3 – Marginal	<p>Original digitally mapped data representing Type 1, 2, and 3 fish habitat was previously generated by the M.N.R. on a medium scale watercourse network. The N.P.C.A. inferred this data onto a medium scale (1:10,000) watercourse layer, which at that time was the N.P.C.A. operating network for regulation purposes. In many areas, there was not complete spatial alignment between the datasets, which resulted in some visual differences. Although both the N.P.C.A. and Region now use large scale (1:2000) mapping for watercourses, the fish habitat mapping did not undergo another inferring exercise to bring it onto a large scale hydrology network. The C.M.W. project has attempted to do this, however, as expected, the process resulted in some visual differences between the datasets. Often this is apparent where fish habitat no longer could exist (ex. surface development occurred, agricultural field was levelled and tiled).</p> <p>The C.M.W. data does not create or interpret fish habitat locations and thus is just an inferred representation of existing data. This should be acknowledged if this dataset is used in mapping. If used in mapping, policies allowing for refinements based on approved field studies and reporting should be considered.</p>