MOVING ROADS FORWARD

Niagara Region

Niagara Escarpment Crossing Comprehensive Environmental Assessment Proposed Terms of Reference

Appendix M Visual Impact Assessment Work Plan

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1 Introduction

This document outlines the proposed work plan that will be carried out during the Niagara Escarpment Crossing Environmental Assessment (EA) to generate a more detailed description and understanding of the environment and how that information will be used to assess the effects of the alternatives and proposed project on the environment from a visual impact perspective. This work plan forms **Appendix M** to the proposed Niagara Escarpment Crossing Comprehensive EA Terms of Reference (ToR) and should be read in conjunction with it.

The ToR presently provides a preliminary description of the environment to gain a general understanding of the potential effects that should be examined in the Niagara Escarpment Crossing EA based on the range of alternatives to the project currently anticipated. This description reflects all components included within the Ontario *Environmental Assessment Act* (*EA Act*) definition of the environment: natural, social, built, economic, and cultural.

Several investigative studies are proposed as part of the Niagara Escarpment Crossing EA to expand on this preliminary description, including, but not limited to the following:

- Air Quality
- Agricultural
- Archaeology
- Built Heritage and Cultural Heritage Landscapes
- Contaminated Property
- Groundwater
- Land Use
- Natural Heritage
- Noise and Vibration
- Surface Water
- Visual Impact

The details associated with the Visual Impact Assessment (VIA) are provided in this document while details of the other investigative studies are provided as separate work plans. In addition to the investigative studies, the proposed ToR includes three other work plans: Traffic, Operations and Safety, Transportation Planning and Engineering, and Financial all of which are included as separate appendices.

2 Establishment of Visual Conditions

2.1 Confirmation of the Preliminary Study Area

The preliminary study area provided in the ToR will be utilized as a starting point for establishing existing and future environmental conditions (**Figure 2-1)**. This preliminary study area will be finalized during preparation of the Niagara Escarpment Crossing EA when more detailed information has been obtained, the alternatives to the project have been confirmed, and the potential environmental effects are better understood.

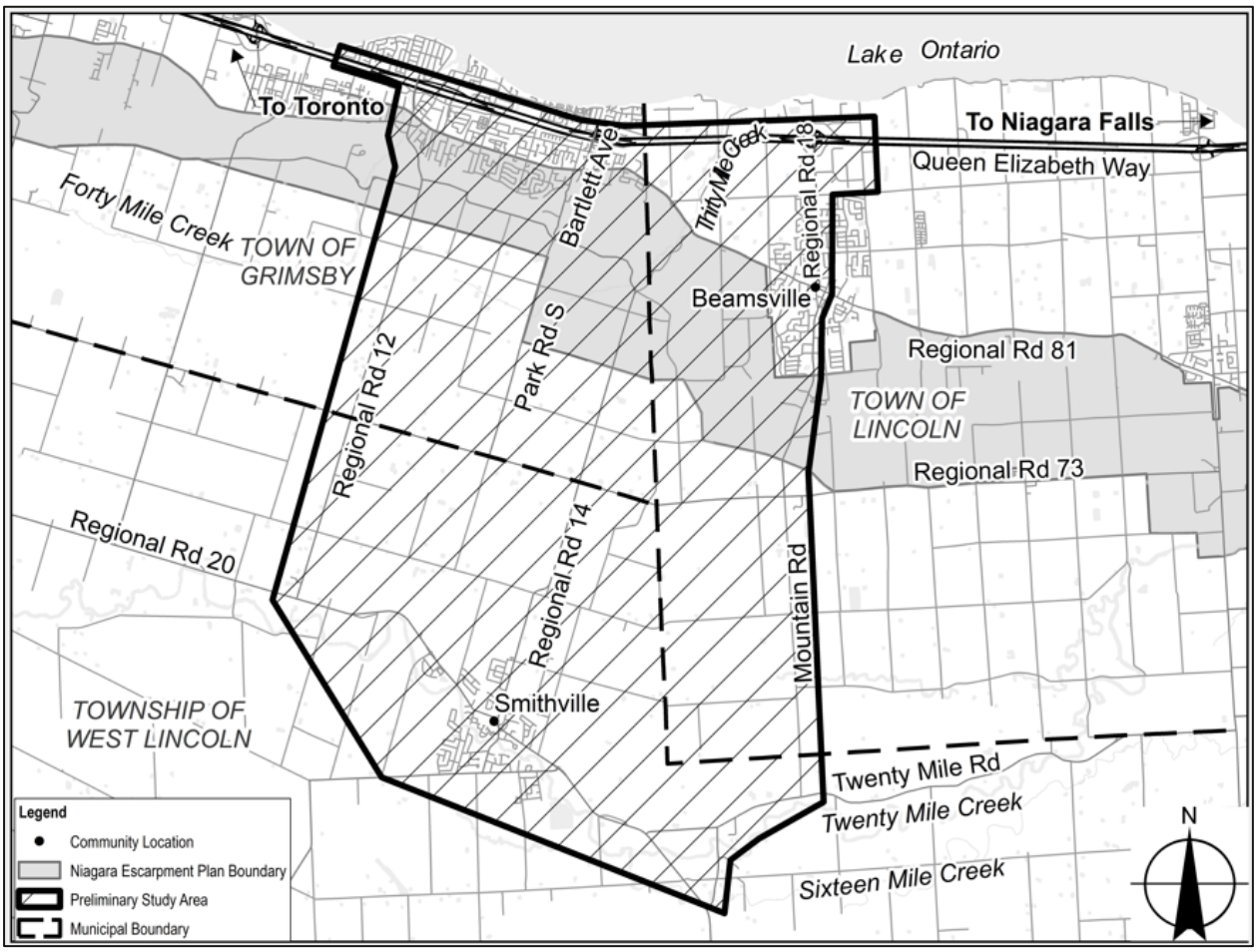

Figure 2-1 : Preliminary Study Area

2.2 Review of Available Existing Information Sources

Existing sources of available information will be collected and reviewed to determine existing and future environmental conditions, including any data gaps that need to be addressed through subsequent work (e.g., field investigations, modeling, etc.). Presently, the list of existing information sources that will be collected and reviewed as part to the proposed VIA Work Plan includes, but may not be limited to, the following:

- Niagara Region Transportation Master Plan (2016)
- Niagara Escarpment Plan (2017)
- Niagara Escarpment Commission Visual Impact Assessment Technical Criteria (November 18, 2020)
- 10m x 10m or higher resolution Digital Elevation Model (DEM) from Government of Canada's Geospatial Data: http://maps.canada.ca/czs/index-en.html
- 10m Contours: GeoGratis portal from National Resources Canada (NRCAN), Geospatial Product Index: https://ftp.maps.canada.ca/pub/nrcan_rncan/vector/index/html/geospatial_product_index_en.html
- Buildings, roads, water, wooded areas: Open Street Map Data: map data copyrighted OpenStreetMap contributors: https://www.openstreetmap.org or other approved sources that include existing built form in the preliminary study area.

In addition, documentation prepared during the Niagara Escarpment Crossing EA from the other proposed work plans (e.g., Agricultural, Land Use, etc.) will also be considered, as appropriate, along with the preceding existing information sources.

Following the collection and review of the preceding information, a Digital Visibility Map (DVM) will be prepared as part of the alternative methods of carrying out the project stage starting with an area of 2km from either side of each alternative method to aid in establishing key viewpoints. Each DVM will be produced using ArcMap 10.7.1 with Spatial Analyst and 3D Analyst extension with the above data sets. The GIS information will be exported as a .dwg file and imported into Rhino or Revit where the alternative methods will be geolocated.

2.3 Proposed Field Investigations

Field investigations are proposed to supplement and enhance available existing sources of information so that additional data is generated to assess each alternative (i.e., identifying potential environmental effects, developing appropriate impact management measures for addressing potential adverse environmental effects, and describing net effects). The need for field investigations will be based on the level of detail associated with the existing information sources collected and reviewed, accessibility of the final study area, and comments received from review agencies, Indigenous communities, and the public.

The need for an increased level of detail and collection of field data is expected as the Niagara Escarpment Crossing EA progresses. While the assessment of alternative(s) to the project can be completed based on existing source data, the assessment of alternative methods of carrying out the project will be based on more site-specific information generated through subsequent work (e.g., field investigations, modeling, etc.).

The following field investigation is currently proposed as part of the VIA Work Plan:

- A “windshield-level” survey for verifying each DVM will be undertaken during the leaf-off period. A windshield survey is conducted from a vehicle and provides a visual overview of the landscape and features being considered.

Documentation

The results of reviewing available existing information sources and the proposed field investigations will be documented in Part A (visual baseline conditions) of the planned Visual Impact Assessment document.

2.4 Alternatives To the Project

Following confirmation of the preliminary list of alternatives to the project, they will be assessed and comparatively evaluated leading to a recommended alternative(s) to the project. The recommended alternative(s) will be presented to review agencies, Indigenous Communities, and the public for a defined period to receive comments, following which a preferred alternative(s) will be identified. The assessment of the alternatives to the project (through the application of evaluation criteria) will be based on available existing information sources documented as part of baseline conditions (e.g., Baseline Conditions Reports).

2.4.1 Preliminary Criteria and Indicators

The preliminary evaluation criteria and indicators that will be used for assessing the alternatives to the project from a visual impact perspective include, but may not be limited to, those set out in **Table 2-1**. The preliminary evaluation criteria and indicators will be finalized based on comments received during the Niagara Escarpment Crossing EA and documented in the EA Report.

Table 2-1: Preliminary Criteria and Indicators for Assessing the Alternatives To the Project

Category	Criterion	Indicator
Social Environment	- Effect on the visual quality of the landscape and scenic resources from the alternative	- Offers scenic potential and/or protects key landscape features
Social Environment	- Effect on adjacent dwellers sensitive to views of the alternative	- Approximate number of sensitive viewer groups potentially affected
Social Environment	- Effect on passive recreation (e.g., trails, hiking, etc.) potential of scenic/natural adjacent sites	- Approximate number of sites with scenic/natural features potentially affected

2.5 Alternative Methods of Carrying Out the Project

Following the identification of the preferred alternative(s) to the project, alternative methods of carrying out the project will be generated, possibly screened, assessed, and comparatively evaluated leading to a recommended method(s). The recommended method(s) will be presented to review agencies, Indigenous communities, and the public for a defined period to receive comments, following which a preferred method(s) will be identified.

The generation and possible screening of the alternative methods will be based on available existing information sources contained in the Baseline Conditions Reports. The assessment of the alternative methods of carrying out the project (through the application of evaluation criteria) will be based more on the information provided through subsequent work (e.g., field investigations, modelling, etc.) contained in the Baseline Conditions Reports, as appropriate.

2.5.1 Preliminary Criteria and Indicators

The preliminary evaluation criteria and indicators that will be used for assessing the alternative methods of carrying out the project from a visual impact perspective include, but may not be limited to, those set out in **Table 2-2**. The preliminary evaluation criteria and indicators will be finalized based on comments received during the Niagara Escarpment Crossing EA and documented in the EA Report.

Table 2-2: Preliminary Criteria and Indicators for Assessing the Alternative Methods of Carrying Out the Project

Category	Criterion	Indicator
Social Environment	- Effect on the visual landscape and scenic resources from facility	- Extent of scenic value captured by the proposed alignment - Extent of landscape features removed
Social Environment	- Effect on adjacent dwellers sensitive to views of the facility	- Number of sensitive viewer groups exposed to the proposed alignment - Extent of existing vegetation/visual buffer retained - Extent of visually intrusive structure/retaining walls
Social Environment	- Effect on passive recreation potential of scenic/natural adjacent sites	- Number of sites with scenic/natural features impacted

3 Impact Assessment of the Proposed Project

Once selected, the preferred method(s) of carrying out the project (i.e., proposed project) will be further developed at a preliminary design level of detail so that the potential environmental effects can be identified with more certainty, more site-specific impact management measures (i.e., avoidance, mitigation, and compensation measures) can be developed for application, net environmental effects can be identified with more certainty, appropriate monitoring requirements can be clearly defined, and specific approval/permitting requirements for constructing the proposed project can be identified.

In concert with preparing the preliminary design level of detail, it may be necessary to undertake additional work (e.g., field investigations, modelling, etc.) at the impact assessment stage of the Niagara Escarpment Crossing EA. The additional work proposed as part of the VIA Work Plan could include the following subject to preparation of the EA:

- Receptor-points will be confirmed in consultation with the Niagara Escarpment Commission based on those previously identified as part of completing the DVM.
- Panoramic photographs will be taken during the leaf-off period (using a DSLR camera with a fixed 50mm lens) from pre-determined receptor-points from a height of 1.5m to 1.8m above ground level.
- A handheld GPS will confirm the location of receptor-points and the photos taken at those locations.
- The individual photographs will be merged into panoramic photos using Adobe Photoshop CS5 or CC using the Photomerge tool with ‘Repositioning’ enabled to ensure the images are not distorted.

Using the results from completing the preceding work the physical changes of the proposed project to the landscape will be demonstrated (**Section 3.1**) and assessed leading to the development of impact management measures (**Section 3.2**).

3.1 Demonstration of Proposed Physical Changes

The proposed physical changes to the landscape will be defined through a series of photo simulations or composites that illustrate existing and proposed conditions. Images and descriptions will include the preliminary design plans overlaid with photographs from key viewpoints. The photo simulations will be prepared using established

viewpoints based on geo-locations and matching virtual camera settings with those of the real-world camera in the modelling software.

In addition, the photo simulations will be prepared reflecting the previously mentioned additional work including the following:

- Data sets as noted with the DVM will be used in each of the views.
- Views will be based on the established key views in consultation with the Niagara Escarpment Commission because some views may not require simulation.
- Images that include all the data sets and the proposed project will be exported as jpegs and opened in Adobe Photoshop where they will be matched with the panoramic photos for analysis.

3.2 Assessment of Visual Impacts

The VIA is an important tool in the design process; and therefore, the photo simulations will be used to inform the design decisions to minimize any visual impacts of the proposed project on views to and from the Niagara Escarpment feature and landscape. Analysis of each viewpoint will compare the existing panoramic photo with the photo simulation that includes the proposed project. For each viewpoint, a set of existing and proposed images will be followed by an analysis referring to the following:

- Level of visibility of the proposed project.
- Impact of the viewpoint based on sensitivity of landscape character, cultural heritage, magnitude of change to scenic quality and will be assigned a value of high, medium, low or no change with an explanation of the criteria applied (see **Section 3.2.1**).
- The analysis will reference the appropriate Niagara Escarpment Plan (NEP) policies and background information that applies to the landscapes of potential impact.

3.2.1 Visibility Assessment Criteria

The VIA will assess each viewpoint area in terms of its Visual Impact Assessment criteria based on the DVM, which includes the following: landscape character sensitivity (**Table 3-1**), magnitude of landscape resource change (**Table 3-2**), and magnitude of visual resource change (**Table 3-3**).

Each criterion is discussed in greater detail as follows:

Landscape Character Sensitivity

Landscape character sensitivity is used to establish the capacity of the landscape to accommodate the proposed project. To understand the sensitivity of a landscape to change, the various characteristics/ factors that make up a particular landscape character area must be identified, and consideration given as to how these will be affected by the proposed project.

Consideration is given to the following factors:

- Physical components of landscape character, both natural and man-made (i.e. landform, land cover, enclosure, settlement pattern, and condition/quality);
- Aesthetic components of landscape character (i.e. scale, pattern, texture, movement, complexity, nature of connections with adjacent landscapes, and skyline);
- Visual sensitivity of landscape character to the proposed change; and
- Perceptual components of landscape character (the value of the landscape), which includes designated elements/features, rarity, conservation interest, cultural associations, scenic quality, amenity/recreational function, tranquility, remoteness, and wildness.
- Policies of the Niagara Escarpment Commission.

The methodology used to identify the landscape quality will be as follows:

- Establish baseline conditions (i.e. the character and sensitivity of the landscape, and the type and sensitivity of visual receptors). Landscape character sensitivity classification is a process of subdividing the landscape into distinct character areas with similar or shared characteristics, distinguishing them from other character areas that have different shared characteristics
- Predict the magnitude of impact that the proposed project would have, allowing for mitigation measures, upon the receptor points
- Identify key characteristics, which can help to provide an understanding of the sensitivity to change of a particular landscape character area
- Assess the significance of impact that would occur, by considering the predicted magnitude of change together with the sensitivity of the landscape or sensitivity of visual receptor respectively

Table 3-1: Landscape Character Sensitivity Level Criteria (indicative)

Category	Indicator
High	Key characteristic(s) of landscape very vulnerable and could be adversely impacted by the development; or areas of very strong positive character that are highly valued by the virtue of their scenic quality.
Moderate to High	Areas that exhibit a positive character where valued features combine to give an experience of unity, richness and harmony and create a distinctive sense of place likely to be valued at a greater than local level.
Moderate	Areas that exhibit positive character but may have some evidence of alteration to/ degradation of/ erosion of features resulting in areas of more mixed character. Can also apply to areas with evidence of degraded character that remain valued by local communities.
Low to Moderate	Areas that are relatively bland or neutral in character with few/no notable features; and/or evidence of alteration to/ degradation of/ erosion of features
Low	Key characteristic(s) of landscape very robust and will not be adversely impacted by development; or areas that have been subject to substantial alteration, degradation, or erosion of features resulting in generally negative character.

Magnitude of Landscape Resource Change

The Niagara Escarpment Plan (NEP) policy aims to maintain the remaining natural features and the open landscape character of the Escarpment and lands in its vicinity. The objective of the term ‘enhancement’ in the context of the NEP is defined as follows:

1. Maintaining and enhancing the open landscape character of Escarpment features;
2. Providing a buffer to prominent Escarpment features;
3. Maintaining natural areas of regional significance and cultural heritage features; and
4. Encouraging agriculture, forestry and recreation.

Table 3-2: Magnitude of Landscape Resource Change Criteria

Category	Indicator
Very High	Total loss or comprehensive enhancement of the landscape resource in the long term. Typically results in fundamental change.
High	Substantial loss or enhancement of the landscape resource in the medium to long term.
Medium	Partial loss/alteration or moderate enhancement of the landscape resource in the medium or short term.
Low	Slight loss/alteration or slight enhancement of the landscape resource in the short term.
Very Low	Minor loss/alteration or minor enhancement of the landscape resource

The magnitude of change is concerned with the scale and/or degree of change to the landscape resource, the nature of the effect, and its duration, including whether it is temporary or permanent. Direct resource changes on the landscape character of the final study area are brought about by the introduction of the proposed project and its effects on the key landscape characteristics (i.e. streams, wetlands, significant vegetation, agricultural fields / old fields, areas of the public domain with views to the landscape of the Escarpment, etc.).

Magnitude of Visual Resource Change

The magnitude of change in visual resource or amenity results from the scale of change in the view with respect to the loss or addition of features in the view and changes in the view composition, including proportion of the view occupied by the proposed project. Distance and duration of view must be considered. Other infrastructure features in the landscape and the backdrop to the development will all influence resource change.

Table 3-3: Magnitude of Visual Resource Change Criteria

Category	Indicator
High	Total loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements considered totally uncharacteristic when set within the attributes of the receiving landscape or view.
Medium	Partial loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic when set within the attributes of the receiving landscape/view.
Low to Very Low	Minor to very minor loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape/view.
No Change	No loss or alteration to key elements/features/characteristics of the existing landscape or view.

3.2.2 Visual Impact Management Measures

Where visual impacts of the proposed project are identified, the VIA will propose impact management measure(s) for inclusion in the preliminary design plans.

Documentation

The results of the impact assessment including any additional work will be documented in Part B (visual impact assessment) of the planned Visual Impact Assessment document.

4 Documentation

The results of implementing this visual impact assessment work plan will be documented in a single Visual Impact Assessment document composed of two parts (Parts A and B) following the requirements outlined in Section 4.0 of the Niagara Escarpment Commission Visual Impact Assessment Technical Criteria (2020). Parts A and B are defined as follows:

- **Part A - Visual Baseline Conditions** – will document the results of collecting and reviewing available existing sources of information and the proposed field investigations.
- **Part B - Visual Impact Assessment** – will document the results of the impact assessment of the proposed project including any additional investigations.

Upon completion, each part will be made available during the Niagara Escarpment Crossing EA to review agencies, Indigenous Communities, and the public for their information via the project website and upon request and will become either a reference or supporting document to the submitted EA Report. The EA Report will be based on and reflect the information contained in the single report.