

8 POTENTIAL ENVIRONMENTAL IMPACTS, PROPOSED MITIGATION, AND COMMITMENTS TO FUTURE WORK

This section focuses on the direct and indirect environmental effects associated with the Study. It also describes the proposed mitigation measures that will be implemented to minimize the effects. Mitigation includes planning decisions, design features, construction requirements and construction constraints.

The key to ensuring effective environmental quality control and risk management during the Study is the development and proactive implementation of an approach that:

- ▶ Identifies the environmental sensitivities;
- ▶ Presents the environmental protection measures in a way that can be translated into contractual requirements and for which compliance can be verified; and
- ▶ Includes a monitoring program that verifies that the environmental protection measures are being implemented and are effective.

The mitigation measures are outlined in **Table 8-4** and will be refined as the preliminary design is developed and re-assessed in the future detailed design phase. Specific environmental controls based on these detailed mitigation measures will then be included in the contract documents to address specific environmental and operational concerns during the preparation of the contract documents in the detail design phase.

8.1 NATURAL ENVIRONMENT

8.1.1 VEGETATION

Potential Direct Impacts

Impacts related to the highway improvement and drainage works are largely anticipated to be temporary and limited to localized disturbance of cultural habitats and ditches within the existing right-of-way (ROW). Pavement rehabilitation and drainage impacts are considered nominal, and vegetation in these areas is currently subject to high levels of disturbance from existing highway and municipal operations and maintenance activities.

Realignment of existing roads is proposed at several locations, including ramps within the Freeman Interchange, at the Fairview Street and Plains Road East interchange and at the interchange of QEW and Brant Street. In areas where there is a proposed realignment, the corridor will cross a variety of cultural communities that have resulted from human modification of the landscape, as well as a few drainage features. The proposed realignments are mostly within the existing ROW with some minor intrusions into adjacent cultural habitats. In addition, the potential carpool lot near the Plains Road / Fairview Street Intersection will remove approximately 0.4 ha of mowed lawn comprised of meadow (CUM1-1) species with scattered planted and early successional trees, such as Norway Maple (*Acer platanoides*), Black Walnut, White Mulberry, White Ash, Russian Olive and Manitoba Maple.

In general, upland vegetation associations are most common and comprise the majority of the study area. These communities are widespread in the general landscape and are typical and expected for the area. They have been influenced by past activities and are situated in a landscape that has been fragmented and influenced by urban activities, industrial development, railway and hydro corridors, residential development and the local road network. With the exception of a small portion (approximately 650 m²) of vegetation Unit 9A (FOD1; **see Appendix C**), all vegetation communities described in the existing conditions section as occurring within the ROW of the realignment are cultural in nature, i.e., CUM, CUT, or CUW, or have existing high levels of disturbance. While the edge of Unit 9A is the most sensitive of the vegetation proposed for removal / disturbance, the community is already quite narrow and disturbed from previous anthropogenic sources (i.e. historical agriculture, roadwork, and commercial development). Significant impacts to the feature are not anticipated. Realignment areas near large wetland features and less common vegetation communities were avoided to the extent possible.

Wetland communities within the proposed realignments are comprised of common vegetation associations that are abundant throughout the study area and surrounding landscape generally (e.g. MAS2-1, MAM2-2, MAMM1-12, and SWT).

No vascular plant SCC recorded during field work are within the areas of proposed works.

There is one Life Science ANSI within the study area. Sassafras Woods ANSI will be protected by a minimum of 10 m buffer from the woodland dripline. No PSWs, or other designated features are present within the study area; therefore, there will be no direct impacts to designated natural areas.

Potential Indirect Impacts

The following indirect effects to vegetation that is retained beyond the work zone can potentially occur as noted below:

- ▶ Release of construction-generated sediment to adjacent vegetation areas;
- ▶ Vegetation clearing / damage beyond the working area;
- ▶ Increased potential for introduction of non-native species;
- ▶ Spills of contaminants, fuels and other materials that may reach natural or semi-natural areas;
- ▶ Damage of ROW vegetation from tree felling and/or grubbing in vegetation Unit 9C; and
- ▶ Changes in drainage patterns (groundwater and/or surface runoff flow) that can affect dependent vegetation / wetland areas located either up gradient or down gradient of the ROW.

These potential effects can be addressed through diligent application of standard mitigation measures prior to and throughout construction. Examples include use of protective fencing (such as paige wire-backed silt fencing or equivalent) adjacent to significant features/habitats, implementation of proper tree felling and grubbing techniques, implementation of various sediment and erosion controls for working areas adjacent to the tributaries and any wetlands, and careful grading design to maintain surface and groundwater flow patterns.

Mitigation Measures

Mitigation measures to minimize effects to the local vegetation communities and their associated wildlife habitat functions include:

- ▶ The Contractor shall conduct vegetation removal and protection measures in accordance with Ontario Provincial Standard Specification (OPSS), such as OPSS.PROV 201 (clearing) and OPSS.PROV 801 (tree protection).
- ▶ Re-stabilize and re-vegetate exposed surfaces as soon as possible following disturbance.
- ▶ Per OPSS 805, maintain all temporary erosion and sediment control measures in an effective, functioning, stable condition. This will require routine inspections, including after storm events, and repair as required. Erosion and sediment control measures should remain in place until all site restoration activities are completed and disturbed areas are no longer susceptible to erosion and sedimentation.
- ▶ Clearly delineate ROW vegetation clearing zones and vegetation retention zones and protect vegetation that does not require removal for construction (e.g., using silt fencing or other temporary fencing) on both the Contract drawings and in the field with the Contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in vegetation retention zones.

- ▶ Appropriate vegetation clearing techniques will be used (e.g., felling trees away from retained natural areas and watercourses).
- ▶ Cut and grubbed material shall be disposed of through chipping or other appropriate means.
- ▶ Avoid all unnecessary traffic, dumping and storage of materials over tree root zones adjacent to natural / semi-natural areas.
- ▶ Dust control shall be completed using water, not chemical suppressants, and in accordance with MTO's general conditions.
- ▶ Re-stabilize and re-vegetate exposed surfaces as soon as possible following disturbance. It is recommended that all disturbed habitats be re-vegetated with a native seed mix, such as the Old Field Mix detailed in OPSS.PROV 804.
- ▶ Conduct equipment maintenance and refueling at the designated and properly contained maintenance areas in the works yard or at commercial garages located well away from the river banks and wetlands and outside retained vegetation areas. The Contractor will have a Spills Prevention Plan and required materials on site at all times in accordance with OPSS.PROV 100.
- ▶ Waste management shall be completed in accordance with OPSS 180.
- ▶ Implement environmental inspection during construction to ensure that all mitigation measures are implemented properly, maintained and repaired and remedial measures are initiated in a timely manner where warranted
- ▶ The Contractor shall not be permitted to reuse or dispose of any excess materials (including earth) outside of designated area.
- ▶ Invasive and Noxious Vegetation that is removed shall be handled and disposed of in such a manner as to prohibit its spread (i.e. burning, burying with approx. 1 m of fill, or disposal of off-site at a waste facility equipped to handle it). For detailed recommendations on preventing spread, the Contractor shall follow the Ontario Invasive Plant Council's Clean Equipment Protocol for Industry document (Holloran et al, 2013) to prevent the spread of invasive species along the road corridor within and between construction projects. Available at <https://www.ontarioinvasiveplants.ca/resources/technical-documents/>
- ▶ An updated Landscape Plan will be prepared at Detail Design to compensate for any tree removals.
- ▶ The Preliminary Landscape Plan in **Exhibit 8-2** provides enough coverage to offset vegetation losses, and will include general landscaping recommendations as well as recommendations for the use of native species (including species that are suitable for Monarch and Mottled Duskywing habitat).

8.1.2 WILDLIFE AND WILDLIFE HABITAT

Potential Direct Impacts

Wildlife habitat impacts are generally similar to those described for vegetation (i.e., minimal removals or temporary loss of tolerant, early successional habitat that is expected to quickly regenerate post-construction). Impacts to wildlife are expected to be minimal given that the works will not encroach or directly impact natural habitats beyond the highway ROW. However, as outlined above in Section 8.1.1, there will be some direct vegetation removals and/or temporary disturbance in the culturally influenced habitats within the highway ROW and surrounding the bridges where works are proposed; therefore, the potential wildlife habitat associated with this vegetation will also be removed or temporarily disturbed. These cultural vegetation communities provide habitat that generally supports common, disturbance-tolerant wildlife species.

Many of the culverts and bridges in the study area provide potential habitat for nesting migratory birds. Migratory birds may also nest within trees or other vegetation within the highway ROW and work areas. Migratory bird nesting was confirmed on four (4) structures within the study area during the 2017 field surveys as follows:

- ▶ Indian Creek Culvert at North Shore Boulevard East – 1 Barn Swallow nest;
- ▶ 407 ETR to QEW / Fairview Street ramp structure, over North Service Road – 6 Cliff Swallow nests;
- ▶ 407 ETR to Highway 403 ramp, over North Service Road – 1 Cliff Swallow nests;
- ▶ CN Railway Overhead, QEW Niagara-bound structure – 4 American Robin nests.

American Robin, Barn Swallow and Cliff Swallow nests are protected under the Migratory Birds Convention Act (MBCA). Barn Swallow is also a protected SAR. Migratory birds or Barn Swallow may also nest on other structures within the study area during future years. Therefore, potential impacts would include disturbance to nesting activity or possibly loss of any nests present in the year of construction, depending on timing and nature of the bridge works and vegetation removals.

No sensitive wildlife habitats, such as reptile hibernacula or turtle overwintering / nesting habitat, were confirmed within the proposed work areas. However, there is potential for various wildlife (e.g., turtles, snakes, small mammals, etc.) to wander through the proposed work areas during construction, given proximity of suitable habitat features beyond the ROW, and turtles may attempt to nest along the road shoulders or recently graded soil areas in proximity to watercourse or wetland features. Potential impacts to wildlife SAR and/or their habitats are further outlined below.

Species at Risk

As outlined in **Section 4.1.7**, 37 SAR have been identified as occurring or having potential to occur within the study area based on the 2017 field surveys and the background information review. Of these, only five (5) SAR are reasonably expected to occur within the footprint of the proposed highway works, and thus to be potentially impacted, as outlined below:

- ▶ **Barn Swallow** – (Threatened) - Although no culvert-specific works are proposed for the one culvert where nesting was confirmed (Indian Creek Culvert at North Shore Boulevard East), and no Barn Swallow nests or evidence were observed on the bridges where rehabilitation or replacement works are proposed, it is possible that this species might nest on structures where works are proposed during future years. Therefore, potential impacts would include disturbance to nesting activity or possibly loss of any nests present in the year of construction, depending on timing and nature of the structure works. No impacts to individuals foraging over fields and wetlands are anticipated as the works are largely confined to the ROW and foraging habitat is abundant within the local landscape.
- ▶ **Monarch** (Special Concern) - The proposed works may temporarily displace a limited amount of potential breeding habitat (i.e., road side vegetated areas with Milkweed); however, the works are not anticipated to permanently impact availability of breeding habitat or candidate SWH for Migratory Butterfly Stopover Areas, as only minor removals of cultural communities will occur and vegetation within the ROW is anticipated to regenerate quickly following disturbance. Furthermore, these cultural habitats are abundant within the local landscape. No impacts to adults foraging within the ROW is anticipated as they can leave the area of disturbance; however, there is potential for loss of larvae if Milkweed is removed during the breeding season. Vegetation within the ROW is anticipated to regenerate quickly following disturbance
- ▶ **Mottled Duskywing** – (Endangered) - The proposed works may temporarily disturb a limited amount of potential breeding habitat (i.e., road side vegetated areas with New Jersey Tea); however, the works are not anticipated to permanently impact availability of breeding habitat, as no removals are proposed beyond the ROW at the west study limits where New Jersey Tea was noted. Furthermore, no impacts to adults foraging within the ROW is anticipated as they can leave the area of disturbance.

- ▶ **Northern Map Turtle** (Special Concern) - The lakeshore and Indian Creek at the south project limits provide suitable habitat for this species. Although these aquatic features will not be directly impacted by the proposed works, there is potential for this species to wander through the construction zone from these adjacent aquatic features. Although no ideal turtle nesting habitat occurs within the study area, this species may attempt to nest along gravel road shoulders or open disturbed areas in proximity to Indian Creek and the lakeshore. Therefore, no impacts to hibernating turtles are anticipated as no in-water works are proposed; however, there is some potential for harm to Map Turtles if they wander through the site during the active season.
- ▶ **Snapping Turtle** (Special Concern) – The lakeshore and several of the watercourses and pond features within the study area provide suitable habitat for this species. Although none of these features will be directly impacted by the proposed works, there is potential for this species to wander through the construction zone from these adjacent aquatic features. Although no ideal turtle nesting habitat occurs within the study area, this species may attempt to nest along gravel road shoulders or open disturbed areas adjacent to waterbodies within the study area. Therefore, no impacts to hibernating turtles are anticipated as no in-water works are proposed; however, there is some potential for harm to Snapping Turtles if they wander through the site during the active season.

None of the other SAR plant or wildlife species known to occur within the study area is expected to occur within the currently proposed footprint for the improvements within the study area. Habitat for these remaining SAR occurs within the grassland, woodland and wetland communities beyond the highway ROW. These habitats will not be impacted by the proposed works.

This assessment will need to be re-evaluated at the Detail Design phase. Any changes to the Recommended Plan which result in impacts to the habitats beyond the identified footprint may result in SAR being impacted by the works. Furthermore, by the time construction begins, there may be changes in provincial legislative requirements for the protection of SAR (i.e. the Endangered Species Act), the conservation status of species (new species added, others delisted), changes in environmental conditions or habitat suitability, changes in environmental priorities and changes (likely improvements) in mitigation technology. At that future time, decisions concerning SAR habitat protection, mitigation, and permitting requirements will be made in consultation with agency staff using best available Detail Design information.

Potential Indirect Impacts

Construction activities can have indirect effects on area wildlife and habitat. Physical disturbance, noise, vegetation clearing and wildlife access to construction areas can all affect wildlife to varying degrees depending on intensity, season and duration of works. Good construction practices, contractor

education sessions, and implementation of specific wildlife mitigation measures can reduce these impact risks to acceptable levels.

Mitigation Measures

The mitigation measures outlined in **Section 8.1.1** are designed to minimize effects to vegetation and protect adjacent vegetation areas, which in turn protect the associated wildlife habitat functions. However, it is also necessary to ensure the protection of breeding birds, as well as SAR or other wildlife that may nest or otherwise use areas where construction is proposed. Employing the strategies outlined in these sections will minimize direct impacts to wildlife habitat features and protect from indirect effects during and following construction.

Migratory Birds

Nesting migratory birds are protected under the Migratory Birds Convention Act, 1994 (MBCA). No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of bird species protected under the MBCA and / or Regulations under that Act. In order to protect nesting migratory birds, in accordance with the MBCA, the following are mitigation measures:

- ▶ In accordance with OC – Migratory Bird Protection, apply timing constraints to avoid all vegetation clearing (including grubbing and removal of trees/shrubs/grasses) during the breeding bird season (approximately April 1 to August 31). Include Timing Constraint for Clearing within the contract documents.
- ▶ In accordance with OC – Migratory Bird Protection, the Contractor shall not destroy the active nests (nests with eggs or young birds), or wound or kill birds, of species protected under the Migratory Birds Convention Act, 1994 and/or Regulations under that Act. When active nests are encountered, the Contract Administrator will be contacted.
- ▶ If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA (1994) all activities will stop cease immediately and the Contract Administrator will be notified.
- ▶ Install Bird Nesting Preventative Measures on all structures where migratory bird nesting has been confirmed (specific locations to be confirmed at Detail Design phase).

Timing constraints and mitigations to reduce the risk of harming migratory birds should be reviewed at Detail Design to ensure compliance with Environment Canada’s guidelines and the MBCA at that time.

Species at Risk

Based on the site-specific conditions, five (5) SAR have reasonable potential to be encountered within the proposed footprint of the highway rehabilitation and improvement works, and therefore are at some risk of harm (i.e., Barn Swallow, Monarch, Mottled Duskywing, Northern Map Turtle and Snapping Turtle), as discussed herein. Only Endangered and Threatened species have legal protection under the provincial ESA; therefore, of the five (5) SAR with potential to be encountered, only two (2) species are protected under the ESA: Barn Swallow (Threatened) and Mottled Duskywing (Endangered). To protect these species and any other SAR generally, all relevant SAR handling and agency notification protocols will be adhered to:

- ▶ Adhere to mitigation measures outlined above for MBCA compliance to avoid impacts to SAR bird species potentially nesting in the work area or vicinity (i.e. Barn Swallow).
- ▶ If Barn Swallows build a nest on a structure where works will occur, construction must cease until the young have fully fledged or the nest is no longer active (to be determined by an Avian Biologist). Barn Swallow nesting was confirmed in the study area during the 2017 field surveys (one nest was confirmed in the Indian Creek Culvert at North Shore Boulevard East). No culvert works are currently proposed at this location; however, it is possible that Barn Swallow could nest on some of the other structures during the year of construction.
- ▶ For structures where no works are proposed but where active Barn Swallow nesting is confirmed during the year of construction, avoid clearing or works within 30 m of the structure during the migratory bird nesting window (i.e. April 1 – August 31), where possible. If this is not feasible, works within 5 m of a structure with an active Barn Swallow nest should be completed by hand or very small equipment and as quickly and efficiently as possible to minimize disturbance. If the birds flush from the nest or appear disturbed by the works, the work must be postponed until nesting is finished and the young have fledged.
- ▶ For the protection of Mottled Duskywing and Monarch, planting of Milkweed and New Jersey Tea is not recommended for areas within the ROW as research has shown this may result in increased butterfly road mortalities; instead, habitat restoration efforts should be focused on areas away from high traffic roads / highways. Furthermore, the Landscape Plan should include recommendations for the use of native plant species suitable for Monarch and Mottled Duskywing breeding.

- ▶ Erect temporary exclusion fencing prior to May 15 to prevent SAR turtles (and other wildlife) from entering the construction or grading zones located adjacent to waterbodies and watercourses. It should be feasible to combine the exclusion fencing with silt fencing requirements, flaring out the ends of the fencing to redirect wildlife away from the construction zones / roads and back towards the habitat side of the fence. Fencing should meet the MNRF Best Practices guidelines for Reptile and Amphibian fencing
- ▶ Prior to starting works each day, the Contractor will examine the length of exclusion fence to repair any damages and remove any SAR turtles (or other wildlife) that may have entered the construction zone or become trapped inside the fencing. The Contractor will also examine the work zone and any equipment parked overnight in the area to ensure no SAR turtles (or other wildlife) have entered the construction zone. SAR turtles and other wildlife should be placed back on the habitat side of the fence.
- ▶ Currently, no in-water works are proposed as part of the highway and improvement works. However, if at Detail Design it is determined that in-water works are required, timing constraints must be implemented at all permanent aquatic features in order to protect SAR turtles during the turtle hibernation period (i.e. no in-water works shall occur from September 1 to April 30) unless exclusion measures (ex. coffer dam) have been installed around the aquatic construction zone prior to September 1, in order to isolate the work area and prevent turtles from entering.
- ▶ Currently, there are no proposed removals within forested habitats beyond the ROW. However, if at Detail Design it is determined that removals of forest habitats beyond the ROW are required, timing constraints must be implemented to avoid tree removals during the bat breeding period (i.e. no tree removals shall occur from April 1 to September 30) in order to protect Endangered bats.
- ▶ In the event that an Endangered or Threatened species or possible Endangered or Threatened species is found in the construction area, all activities that could potentially harm the animal will cease immediately and the animal will be given time to move away on its own. In the event that the animal does not move from the construction zone or is injured the Contract Administrator will be notified. The Contract Administrator and MTO’s Environmental Planner will then be contacted to develop mitigation options, as these animals are protected under the ESA (2007).

- ▶ Contractor Awareness and Encounter protocols will be implemented within the documents and specifications to identify the potential for SAR to be encountered during construction and the procedures to be followed in the event of an encounter. If a SAR is encountered the Contract Administrator will be notified.

Other Wildlife

The following additional measures are recommended for the protection of wildlife in general:

- ▶ Any wildlife incidentally encountered during construction will not be knowingly harmed and will be allowed to move away on its own. In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified.
- ▶ All disturbed areas will be restored to pre-construction conditions, where possible.

Detail Design Considerations

Currently the proposed works for the Recommended Plan include ramp realignments, bridge rehabilitation or replacement, and widening of the highway into the existing ROW. Highway 403 is not being realigned or reprofiled within the project limits, therefore there is currently no opportunity to install new dedicated wildlife crossings to mitigate road mortality impacts (as discussed in **Section 4.1.5**). The City of Burlington's Prosperity Corridor (refer to **Exhibit 3-1**) also includes planning for redevelopment along the Highway 403 west corridor, a wildlife crossing along this section would only serve to direct wildlife into areas along Highway 403 that will be constrained by development on all sides. Based on the current design of the Recommended Plan, the following road ecology mitigation measures should be investigated further at Detail Design:

- ▶ Identify any existing deficiencies/gaps in existing fencing along the freeways.
- ▶ Consider opportunities to fill-in, replace or enhance existing fencing if any issues are found.
- ▶ If replacing culverts, consider the need to provide potential wildlife-friendly culvert crossings below Highway 403 where technically feasible.

At the Detail Design phase, the latest road ecology principles and designs should be implemented to reduce impacts to wildlife.

8.1.3 FISH AND FISH HABITAT

Potential Impacts to Fish and Fish Habitat

The proposed works that are most likely to impact fish and fish habitat are related to bridge works and drainage improvements; specifically, work on culverts (rehabilitations, extensions, clean-outs, removals or replacements) that convey watercourses, especially those identified as supporting direct fish habitat. In general, potential impacts that are most likely to affect fish and fish habitat include:

- ▶ Potential sedimentation and erosion associated with the excavation, removal and/or placement of materials in or adjacent to watercourses;
- ▶ Release of deleterious substances such as sediment, fuel, oil and lubricants to watercourses;
- ▶ Removal of riparian vegetation;
- ▶ Destruction of aquatic habitat through increased structure footprints in watercourses;
- ▶ Alteration of fish habitat through placement of substrates or rock protection within the bankfull channel; and
- ▶ Harm to or death of fish during construction.

For watercourses that provide indirect fish habitat, the majority of these impacts can be mitigated with the proper implementation of the mitigation measures outlined below, such that serious harm to fish and fish habitat can usually be avoided.

As the recommended works are preliminary and may change in the future, if during Detailed Design any watercourses within the study area are identified as requiring work below the high-watermark (e.g. structure maintenance, replacement, etc.) the proposed works should be taken through the impact assessment process in accordance with the 2016 Pilot Protocol. This step-wise assessment process involves comparing the proposed works against a series of criteria to determine whether the works are anticipated to cause serious harm to fish and fish habitat. If the proposed works cannot meet the criteria in one assessment step, then the assessment progresses to the next step until it can be determined whether the proposed works can be mitigated such that serious harm to fish and fish habitat will be avoided.

The results of the impact assessment process will determine the need for a Request for Review (RfR) of the proposed works by DFO. If there is potential for serious harm to fish or fish habitat, DFO will determine whether an Authorization under The Fisheries Act (1985) is required. Section 35(1) of the Act states: “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.” The Act interprets ‘serious harm to fish’ as “the death of fish or any permanent alteration to, or destruction of, fish habitat”. Each watercourse crossing in the study either supports, or is a Commercial, Recreation or Aboriginal Fishery. Habitat impact assessments will be required at the Detailed Design stage of the Study for any watercourse crossings in the study area requiring work below the high-water mark in order to determine fish passage design requirements and if serious harm may result from the proposed works. Measures to avoid causing harm to fish and fish habitat can be found in the 2016 Pilot Protocol and on DFO’s Self-assessment website and should be incorporated into the planning, design and construction phases of the Study.

Species at Risk

Based on a review of the preferred habitat characteristics, their population distribution mapping, known records of occurrence from MNRF (including the NHIC database) and DFO, and the preliminary proposed works, adverse impacts to the four aquatic SAR and their associated habitats are unlikely to occur as a result of the Study.

Mitigation Measures

The following standard mitigation measures are recommended to be implemented during construction to protect fish and fish habitat throughout the study area.

General Construction Best Practices

- ▶ Any temporarily stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g. within silt fencing) in areas separated at least 30 m from all watercourses and drainage features in accordance with Ontario Provincial Standard Specification (OPSS) 180. All construction materials, excess materials and debris should be removed and appropriately disposed of following construction.
- ▶ All construction-related activities will be controlled to prevent entry of any petroleum products, debris or other potential contaminants / deleterious substances, in addition to sediment as outlined above, to any watercourse.

- ▶ The Contract Administrator’s team should include an Environmental Inspector experienced in working around watercourses, who will be responsible for ensuring the erosion and sediment control measures are functioning effectively, being maintained and that all of the other general mitigation measures are being implemented as intended. The Environmental Inspector will also ensure all environmental mitigation and design measures are properly installed / constructed and maintained. Appropriate contingency and response plans will be in place and implemented if required.
- ▶ If the Contractor wishes to alter any of the mitigation plans as outlined in the Contract Document, then the associated approval agency will need to be made aware of and approve the changes prior to construction.

Erosion and Sediment Control Measures

- ▶ The Contractor will follow the erosion and sediment control measures identified in the contract (OPSS 805) and prevent / control potential for erosion and sediment caused by their construction methods and operations so as to meet all legislative requirements, to prevent entry of sediments into any watercourse or drainage features (ditches) within the study area, and to prevent damage to features and property inside or outside of the ROW.

Shoreline / Bank / Vegetation / Stabilization

- ▶ The construction access, work areas and associated requirements for removal of riparian vegetation should be minimized to the extent required for the construction activities, and these areas then delineated in the field using properly installed protective silt fencing. All temporarily disturbed areas will be re-stabilized following construction using appropriate means as outlined in OPSS 182.

Operation and Machinery

- ▶ All construction-related activities should be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourses.
- ▶ No equipment should be allowed to ford or otherwise enter any watercourse except as specified in the contract or unless authorized by the appropriate environmental agencies / permits.

Site Specific Mitigation Measures

The following site-specific mitigation measures should also be implemented for works within watercourses that support direct fish use within the study area:

- ▶ Based on species assemblage observed by the Project Team ecologists in the field and via background information, a coolwater thermal classification was identified for the watercourse crossings within the study area that directly support a CRA fishery. A permissible in-water construction timing window from July 16th to March 14th of any given year (i.e., no in-water works between March 15th and July 15th of any given year) will apply to the works at each of these crossings, as outlined in OPSS 182. This timing window includes the installation and removal of any in-water isolation measures. Note that this timing window is preliminary and should be confirmed with MNRF during Detailed Design and refined as necessary.
- ▶ All efforts should be made to remove / relocate any fish stranded within any isolation measures (i.e., behind cofferdams) and transferred to suitable habitat downstream of the construction areas prior to in-water works, in accordance with OPSS 182. Any fish salvage will need to be conducted under a License to Collect Fish for Scientific Purposes acquired from the MNRF.
- ▶ In-stream sediment controls (i.e., cofferdams) should be installed and removed according to OPSS 805, unless otherwise specified.
- ▶ Any pipes / hoses conveying water in any watercourse during construction should be screened to prevent entrainment of fish following the guidelines in DFO's measure to avoid causing harm to fish and fish habitat website
- ▶ If dewatering is required, sediment laden discharge water should be pumped into a vegetated areas > 30 m from a watercourse or into a settling basin or (similar measure) to prevent the entry of deleterious substances into the watercourses.

Detail Design Considerations

Planning and design considerations can be incorporated early into the Detailed Design stage of the Study in order to streamline the impact assessment process and improve fish habitat within the study area. Specific recommendations include:

- ▶ Depending on the length of time between the finalization of the Preliminary Design / EA and the initiation of Detailed Design, the study area should be reviewed to determine potential changes in the landscape or newly listed SAR that may warrant additional surveys to update currently documented existing conditions;

- ▶ Any bridge replacements over watercourses should consider replacement with clear-span bridges;
- ▶ If any culverts are to be replaced or extended, consider open foot culverts, or embedding replacement culverts within natural substrates to transition the new culverts smoothly with the upstream and downstream reaches to help minimize the potential formation of barriers to fish movement through the crossings;
- ▶ Any culverts that are to be replaced should be sized to accommodate the full bankfull width of the respective channels to improve fish passage through the highway corridor. Spanning the bankfull width of the channels will also help to minimize erosion and scour issues;
- ▶ Any existing barriers to fish movement (i.e., perched culverts, debris jams) through the existing crossing structures could be addressed through either removal or other means (i.e., rocky riffles for perched culverts) in order to reconnect upstream and downstream watercourse reaches;
- ▶ Update the impact assessment based on the Detailed Design and update / refine the mitigation measures presented in above; and
- ▶ Incorporate design considerations and mitigation measures identified in MTO's Best Management Practices Manual for Fisheries (Draft, June 2016) as well as the measures to avoid causing harm to fish and fish habitat on the DFO website into the planning and design of any works with the potential to directly impact fish and fish habitat in the study area. These resources identify procedures on how to undertake routine activities in a manner that avoids impacts to fish and fish habitat. Incorporating these best management practices and measures early in the design process will help ensure that further review of the proposed works under the Fisheries Act can be avoided.

8.1.4 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be implemented during all phases of construction, clean-up, and restoration to prevent sediment-laden runoff from entering any watercourse, private property or other sensitive areas directly from the construction zone. General measures such as erosion control blanket, silt fence barriers, rock flow checks and quickly treating exposed earth surfaces with stabilizing cover material (seed and mulch, sod, etc.) are governed by special provisions (i.e. Ontario Provincial Standard Specification (OPSS) 805), which will be specified and refined in relation to the site conditions and construction requirements during the detail design phase. An Erosion and Sediment Control Overview Risk Assessment was completed during preliminary design and an Erosion and Sedimentation Control Plan will be developed during the subsequent detail design phase.

Mitigation Measures

- ▶ The Contractor should use dust control strategies to minimize wind-blown dust. Special care is recommended to minimize disturbance to private properties, including but not limited to tree protection, protecting any buildings or structures, driveways, lawns, gardens, buried utilities and using safety fencing to isolate the work area.
- ▶ All erosion and sediment control measures are to be inspected and maintained by the Contractor to ensure they are functioning as intended throughout the construction period and until such time that construction is complete and disturbed areas have been stabilized.
- ▶ All erosion and sediment control measures that are failing must be repaired / replaced by the Contractor as soon as possible as identified in OPSS 182 and OPSS 805.
- ▶ All erosion and sediment control measures that are non-biodegradable should be removed from the site when work is complete and the site is stabilized.
- ▶ Provided that the Contractor's Best Management Practices (BMP) for erosion and sediment control are maintained and meet or exceed the requirements in the Ontario Provincial Standard Specifications (OPSS) listed and described above, this project can be completed with lower risk of environmental damage, with respect to erosion and sediment control (ESC).

8.1.5 MANAGEMENT OF EXCESS MATERIALS

Surplus materials will be generated during construction, such as old pavement, guardrail materials, and concrete. These materials will be sorted and either reused if feasible, recycled, or disposed of at an approved landfill facility in accordance with OPSS 180.

Standard mitigation will be used for dust control during construction.

8.1.6 GROUNDWATER / PERMIT TO TAKE WATER (PTTW)

Based on the background information reviewed and inspection of the study area, several areas of potential concern were identified that may be associated with construction activities for the Study. Any adverse impacts may be more significant where Provincially-Significant Wetlands (PSW) were identified or where geological formations have high permeability (i.e., sands and gravels or fractures/dissolution areas in bedrock).

Below are areas which are expected to exhibit high sensitivity to surface activities:

- ▶ Areas with high permeability;

- ▶ Two groundwater seepage areas present in the study area;
- ▶ Presence of a PSW adjacent to the western portion of the study area;
- ▶ Presence of three ANSIs within the western portion of the study area;
- ▶ Areas where the MECP water well records indicate a well with a static water level less than 3 mbgs located within 50 m of the QEW and Highway 403; and
- ▶ Any private wells located within 50 m of the QEW and Highway 403.

Based on the visual reconnaissance completed for the study area in August 2017, it appears that the community within the Hidden Valley, located north of Highway 403 and west of Waterdown Road, relies on private wells for water supply.

Any adverse water well impacts resulting from road construction activities are expected to be greatest for well users with the following conditions:

- ▶ In areas where construction work is being performed below the shallow water table. Groundwater seeping into the excavation has the potential to impact groundwater resources as groundwater will have supply to local wells.
- ▶ Road construction activities have the potential to adversely impact the shallow aquifer through disturbing contaminated soils, or handling and management practices (e.g. spills of fuel, lubricants etc.), thus introducing contaminants that could enter the groundwater system and impact nearby water wells; and
- ▶ Road construction activities have the potential to physically impact water wells due to vibration and shock.

During any phase of the roadway/bridge/culvert construction activities, due care should be exercised to avoid fuel, lubricant and fluid spills. Spill and contamination prevention practices should be implemented to avoid potential environmental hazards and cleanups. Where practical, activities such as refueling should not be undertaken in areas with high susceptibility to groundwater contamination, shown in **Exhibit 8-1**. Small spills and leaks during construction activities have the potential to affect areas of shallow groundwater, in high permeability soils and highly fractured bedrock.

Road salting within the study area does and will occur during the winter season. Therefore, it is expected that concentrations of sodium and chloride are high in the runoff along roadside drainage ditches, which most likely impact quality of surface water and groundwater. MTO employs and recognized the importance of salt best management practices and has developed a Salt Management Plan in accordance with Environment Canada's Code of Practices for the Environmental Management of Road Salts (Environment Canada, 2014).

The majority of the study area has been marked as having a medium groundwater susceptibility (shown in **Exhibit 8-1**), since shallow to exposed bedrock is present in the study area. These areas include majority of the study area south of Highway 403 and the surrounding vicinity of each water body/creek within the study area.

Areas that have two or more features related to groundwater discharge at the surface, areas designated as "areas of significant groundwater recharge", areas with sand and/or gravel or alluvial deposits, the PSW and/or areas with wells with static water levels less than 3 mbgs within 50 m or less to the right-of-way within the study area, were marked as areas of higher groundwater susceptibility to contamination (shown in red on Figure 4). These high susceptibility areas include the small community using shallow, private water wells on Hidden Valley Road, the sand and gravel deposits in the south west and south portion of the study area, and the PSWs and ANSI areas in the west portion of the study area.

Additionally, special care should be taken when working near watercourses. Open sections of surface water in the watercourses are generally highly susceptible to construction impacts including the various open creeks and beach front within the study area, while areas within enclosed surface water flow/intermittent flow have a medium surface water susceptibility to construction activities (See **Exhibit 8-1**).

Mitigation Measures

The Ontario Water Resources Act states that the diversion of surface water or the extraction of groundwater in excess of 50,000 litres per day requires an EASR/PTTW to be obtained from the MECP, with some exceptions. Construction activities for the Study may result in water takings (e.g., bridge work, ditching, trenching).

The Study will be required to be assessed during Detail Design when detailed construction information becomes available, to address the potential impacts of any construction period dewatering on groundwater and surface water resources. An EASR/PTTW may be required for some sections of the Study due to presence of permeable soils and groundwater sensitivity, shallow water table, groundwater discharge areas, presence of wetlands and unserved areas. If it is determined during Detail Design

that an EASR/PTTW is required for water control, wetlands and areas with the groundwater discharge or shallow water levels (**Exhibit 8-1**) should be evaluated in detail in a report supporting an EASR/PTTW application. All groundwater studies for an EASR/PTTW will be conducted in accordance with the MECP guidelines.

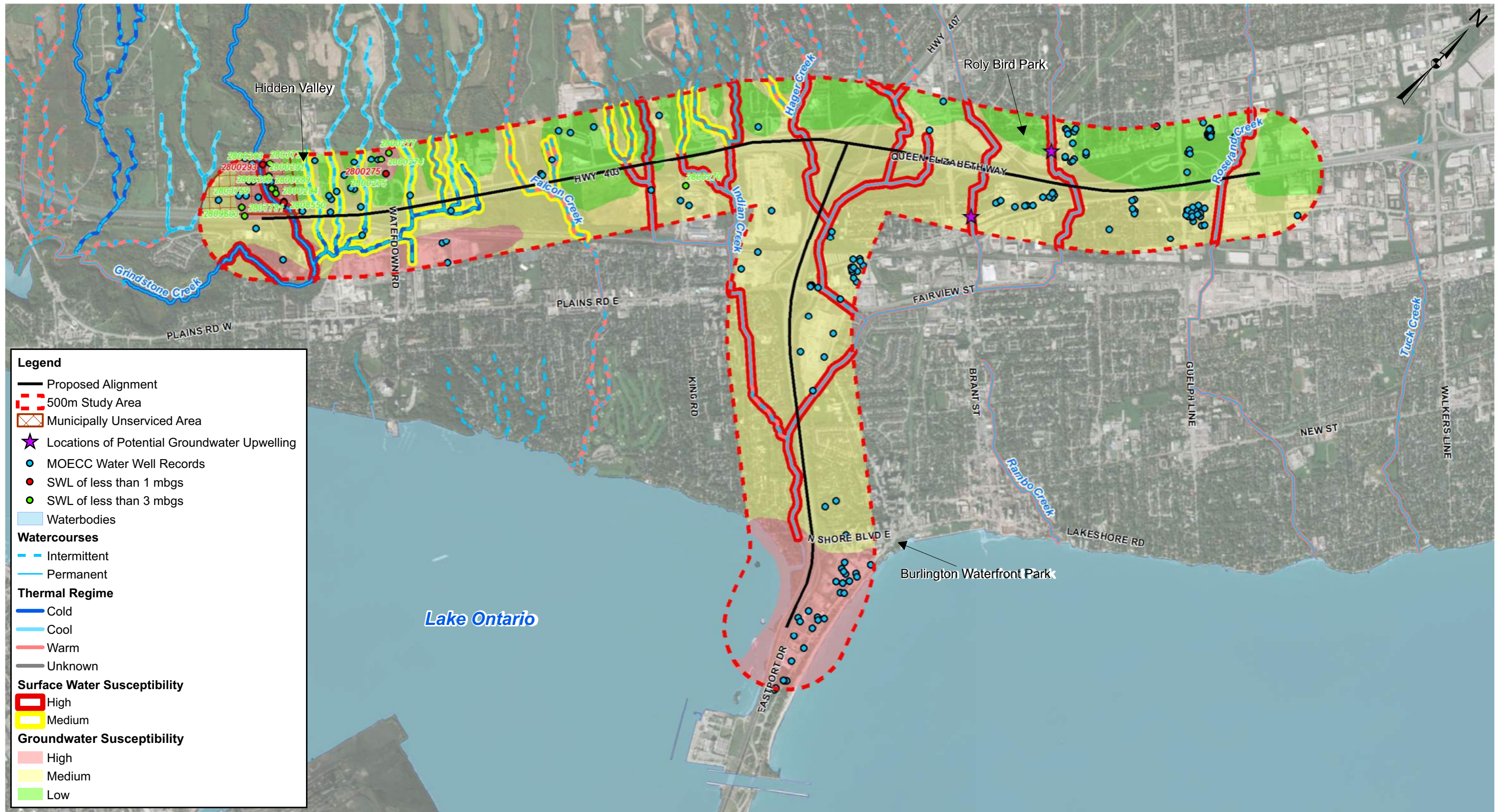
Domestic dug and drilled wells were observed to be present along Hidden Valley Road; there were no hydrants in this area. It was interpreted that residents of Hidden Valley Road rely on groundwater for water supply purposes. The rest of the study area is interpreted to be municipally serviced.

Based on the current scope of work (i.e., widening of Highway 403 into the median) in the west section of the study area, water wells are not anticipated to be impacted by construction. Should the design change, a hydrogeologist should review / revise recommendations regarding impacts of the Study to water wells along Hidden Valley Road.

8.1.7 DRAINAGE AND STORMWATER MANAGEMENT

A Drainage and Stormwater Management Plan was prepared for the Recommended Plan as summarized in **Section 7.5**. The stormwater management (SWM) strategy was developed for the study area based on hydrologic impact assessment completed at each drainage outlet and identified potential upstream/downstream impacts. The SWM strategy also considered the environmental sensitivity of the recipient drainage system, and maintenance. The proposed SWM strategy consists of grassed swales, enhanced ditches, a new Freeman interchange SWM (Dry) Pond and six (6) linear detention area facilities.

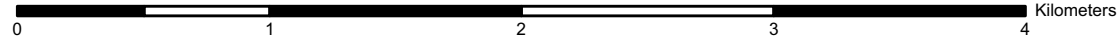
It is understood that there is high potential for development in and around the study area, and that significant land use changes could occur prior to the construction of highway improvements. Therefore, SWM recommendations will need to be reviewed in subsequent design phases in consideration of the land use and drainage conditions at that time.



Legend

- Proposed Alignment
- - - 500m Study Area
- ▭ Municipally Unserved Area
- ★ Locations of Potential Groundwater Upwelling
- MOECC Water Well Records
- SWL of less than 1 mbgs
- SWL of less than 3 mbgs
- Waterbodies
- Watercourses**
- - - Intermittent
- Permanent
- Thermal Regime**
- Cold
- Cool
- Warm
- Unknown
- Surface Water Susceptibility**
- ▭ High
- ▭ Medium
- Groundwater Susceptibility**
- ▭ High
- ▭ Medium
- ▭ Low

REFERENCE
 Imagery © 2018 Microsoft Corporation and its data suppliers
<http://www.bing.com/maps>
 Projection: UTM Zone 17N Datum: NAD 83



Scale: As Shown



QEW AND HIGHWAY 403 (FREEMAN) INTERCHANGE
 TRANSPORTATION ENVIRONMENTAL STUDY REPORT
 MTO Project # 2016-E-0005

Exhibit 8-1
Groundwater Susceptibility Map



8.1.8 DESIGNATED SUBSTANCE AND HAZARDOUS MATERIALS

A Designated Substances and Hazardous Materials Survey (DSS) was conducted for twenty (20) bridge structures within the study area. The King Road Underpass and Waterdown Road Underpass were not included within the scope as designated substance reports were already available for these structures. These reports concluded asbestos containing materials (ACM) were found at the Waterdown Road Bridge and proper handling and disposal of this material will be required. Lead-based paint was present at King Road and Waterdown Road structures. The survey the project team completed was conducted to satisfy the technical requirements for “Contaminated Property Identification and Management” as part of the MTO *Environmental Reference for Highway Design* along with the Environmental Guide for Contaminated Property Identification and Management.

The following hazardous materials were identified:

- ▶ **Arsenic:** Samples obtained from guiderail posts indicated concentrations of arsenic at QEW Ramp to Fairview Street.
 - Standard demolition dust control measures should be implemented where practical to ensure airborne dusts were controlled as per the Occupational Health and Safety Act (OHSA).
- ▶ **Asbestos:** Samples obtained from structures indicated trace asbestos at the Fairview Street Overpass. Drawings from structures at North Shore Boulevard and Eastport Drive also indicated that embedded electrical straight joints at junction boxes are asbestos cement type II adapters.
 - Materials that support the suspicion of ACM encountered during bridge rehabilitation work should be sampled at that time to confirm the presence or absence of designated substances and determine appropriate management options.
 - In accordance with Ontario Regulation 490/09 all necessary measures and procedures should be taken to ensure the time-weighted average exposure of a worker to any form of airborne asbestos does not exceed 0.1 fibres per cubic centimeter of air, averaged over an 8-hour work period.
- ▶ **Lead:** Samples obtained from the north abutment wall from QEW Ramp to Fairview Street, Fairview Street Overpass and North Shore Boulevard indicated lead-based paint.
 - If future construction activities affect the integrity of materials containing lead, standard demolition dust control measures should be implemented where practical to ensure airborne dusts are controlled as per the Ministry of Labour’s (MOL) Guideline for Lead on Construction Projects.

- ▶ **Silica:** Silica is present in concrete and mortar.
 - Standard dust control measures should be implemented where practical to ensure airborne dusts are controlled during construction activities as per the Guideline for Silica on Construction Projects (MOL, September 2004, as amended)
- ▶ No Benzene, Vinyl Chloride, coke Oven Emissions, Ethylene Oxide, Acrylonitrile and Isocyanates or Mercury were identified.

Materials that become exposed during construction activities (i.e. insulation, electrical wiring, asphalt, cables and piping), that support the suspicion of asbestos, polychlorinated biphenyls (PCB), or other designated substances should be sampled at that time to confirm the presence or absence in support of appropriate management options.

The disposal of Designated Substances is regulated under the Ontario Environmental Protection Act, specifically, R.R.O. 1990, Regulation 347, General – Waste Management (most recently amended by O. Reg. 334/13). The regulation details the minimum requirements for the appropriate transport and disposal of wastes. In addition, all other waste generated during construction activities must be handled in accordance with the applicable regulations.

A Phase I and II Environmental Site Assessment was completed in 2012 to assess the location of 1144-1150 Plains Road East, which is the location of the carpool site in this study.

Remediation may not be required at this time; however, any excess soils to be removed from the Site during construction should be considered as part of a remedial action plan. Any contractors working on-site should be made aware of these contaminants of concern prior to conducting any excavation work at the Site. Additional testing may be required prior to removal of any soil off-site. A risk review could also be conducted to verify any contaminants of concern remaining at the site would not have any negative effects to the natural environmental or public use of the future MTO re-development lands. If remediation of the Site becomes the preferred action plan, remediation of metal, petroleum, VOC and PAHs impacted soil can be addressed by one or more of the following strategies: dig and haul, bioremediation (ex-situ/in-situ), injection solutions and risk assessment. These options will be discussed further in Detail Design.

8.1.9 AIR QUALITY

An air quality assessment was conducted to determine the potential air quality impacts associated with the proposed improvements to the QEW within the study limits. The main objective of the study was to assess the local and regional air quality impacts due to the proposed improvements and capacity expansions. To meet these objectives, the following scenarios were considered:

- ▶ **2015 Existing (NB)** - Assess the existing air quality conditions at representative receptors. Predicted contaminant concentrations from the existing highway were combined with hourly measured ambient concentrations to determine the combined impact.
- ▶ **2041 Future No Build (FNB)** - Assess the future air quality conditions without the implementation of the Recommended Plan. Predicted contaminant concentrations for the future traffic volumes with existing highway were combined with hourly measured ambient concentrations to determine the combined impact.
- ▶ **2041 Future Build (FB)** - Assess the future air quality conditions with the implementation of the Recommended Plan. Predicted contaminant concentrations for the future traffic volumes with proposed highway changes were combined with hourly measured ambient concentrations to determine the combined impact.

The assessment was performed using U.S. EPA approved vehicle emission and air dispersion models to predict worst-case impacts at representative sensitive receptor locations. Thirty-four sensitive receptors were evaluated to represent worst-case impacts surrounding the study area. The majority of the identified receptors represent residential properties. Joseph Brant Hospital (R1) and École élémentaire Renaissance (elementary school, R9) were also included as sensitive receptors.

During construction of the highway, dust was the primary contaminant of concern. A large portion of highway particulate matter emissions comes from dust on the pavement which is re-suspended by vehicles travelling on the highway. In addition to the contaminants of interest assessed in the local air quality assessment, greenhouse gas (GHG) emissions were predicted from the Study. Potential impacts were assessed by calculating the relative change in total emissions between the 2015 Existing and 2041 Future No-Build and Future Build scenarios, as well as a comparison of the total emissions to the 2030 provincial and Canada-wide GHG targets. The contribution of the GHG emission from the Study is small in comparison to provincial and national targets.

Other contaminants including NO_x and VOC's may be emitted from equipment used during construction activities, however due to the temporary nature of construction activities, there are no air quality criteria specific to construction activities. Mitigation techniques for reducing emissions during construction include material wetting use of wind barriers and limiting exposed areas which may be a source of dust and equipment washing. These best management practices were implemented during construction of the highway to reduce any potential air quality impacts.

For the local air quality assessment, 10 pollutants were assessed for the recommended plan (i.e. Ultimate Condition). Of the 10 pollutants assessed, all concentrations were below their respective guidelines, with the exception of 24-hour PM₁₀, 24-hour TSP, and annual PM_{2.5} and benzene. It is noted that the overall background concentrations (i.e. originating from all sources; not just the highway) of

these two contaminants currently exceed guidelines. Frequency Analysis determined that there were 6 and 2 additional days on which exceedances of PM₁₀ or TSP occurred, respectively, in 2041 Future Build scenarios in comparison to the 2041 Future No Build scenario. For both PM₁₀ and TSP, exceedances of the guideline occurred less than 2% of the time. The increase in particulate matter is considered small and thus no mitigation measures are required.

For the regional air quality / GHG assessment, total GHG emissions in the study area were predicted and compared to the provincial, sector and Canada-wide targets. Overall, the contributions from the project account for less than 0.031% of the province target and sector target. The increase in ground-level ozone and fine particulate matter was small. Therefore, no mitigation measures are required.

8.2 SOCIO-ECONOMIC ENVIRONMENT

8.2.1 LANDSCAPE

The Preliminary Landscape Concept is presented in **Exhibit 8-2**. These concepts include seeding and shrub plantings, street tree and aesthetic plantings. This design will be further refined at the Detailed Design stage, compensating for impacted areas and restoring any disturbed ecological communities.

Removal of vegetation will be limited to that required for construction, and re-stabilization and re-vegetation will be completed as soon as possible. A Tree Protection Zone (TPZ) will also be established through the installation of barriers for tree protection so that trees not designated for removal are not injured and are protected from flooding and sediment deposits from construction operations.

Visual buffering and screening mitigation measures were requested at the interchange of North Shore Boulevard and the QEW where the existing noise barrier ends. A row of conifer trees is proposed in this area to screen the residential neighbourhood to the southwest from the QEW. Additional or other measures may be proposed through Detailed Design to achieve similar screening.

Additional buffering and screening is not anticipated to be required at this time, as minimal to no woodlots or deciduous trees which currently buffer residential / other sensitive land uses from the highways are anticipated to be impacted by this work.

Monitoring proposed during the construction phase for landscape includes:

- ▶ Tree protection;
- ▶ Erosion and sediment control;

- ▶ Management of construction access, delivery and removal of materials;
- ▶ Maintenance of wildlife protection features according to recommendations from the terrestrial report; and
- ▶ Management of active recreation routes where detours have been implemented.

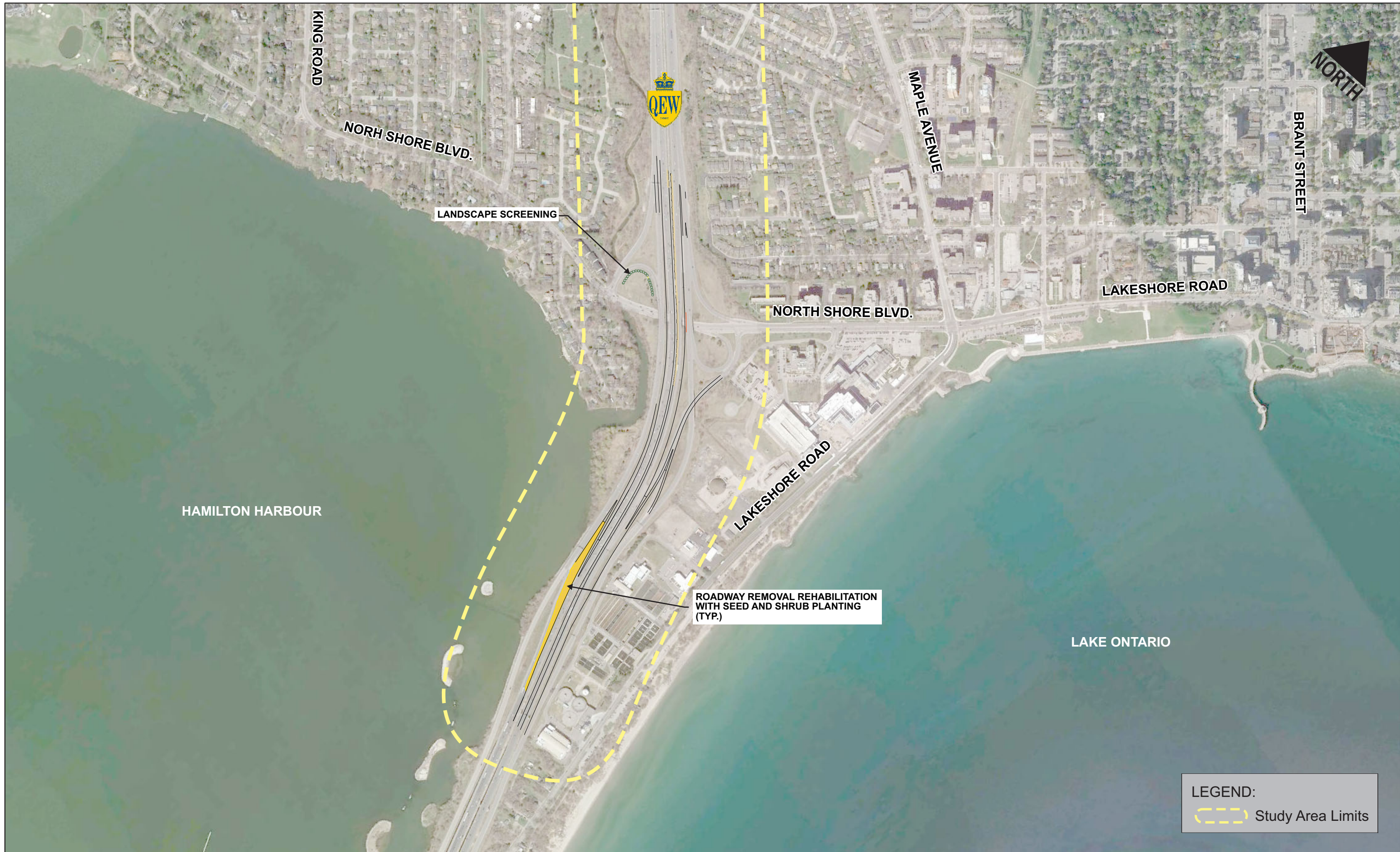
Mitigation Measures

Mitigation Measures recommended to protect existing landscape during the construction stage of the Study include:

- ▶ Limit vegetation clearing beyond the ROW and limit the size of the construction area and material staging to only what is needed.
- ▶ Keep the size of zones designated for brushing as small as possible, limiting them to the removal of only what is necessary for establishing clear sight lines. Areas where brushing is required typically contain shrubs such as Sumac and Red Osier Dogwood.
- ▶ Locate construction access and staging areas in less sensitive areas and facilitate the regeneration of construction access and staging areas through active restoration plans.
- ▶ Clearly delineate ROW vegetation clearing zones and vegetation retention zones and protect vegetation that does not require removal for construction (e.g., using silt fencing or other temporary fencing) on both the Contract drawings and in the field with the Contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in vegetation retention zones.
- ▶ Carefully clear vegetation and trees designated for removal in accordance with OPSS 201.
- ▶ Invasive and Noxious Vegetation that is removed shall be handled and disposed of in such a manner as to prohibit its spread (i.e. burning, burying with approx. 1 m of fill, or disposal of off-site at a waste facility equipped to handle it).
- ▶ The Landscape Plan will be further refined at the Detailed Design stage, compensating for impacted areas and restoring any disturbed ecological communities.
- ▶ No grade changes shall occur within the Tree Protection Zone.
- ▶ Trees to be preserved shall not have any rigging cables or hardware of any sort attached or wrapped around them.
- ▶ In the event that it is necessary during construction to remove limbs, portions of trees or excavate in root zones of trees that are designated for preservation, all operations should be executed

carefully and in accordance with proper arboricultural techniques and under the guidance of a Certified Arborist.





8.2.2 NOISE

Noise Analysis

A detailed noise analysis which followed MTO Environmental Guide for Noise (October 2006) (the Guide) was undertaken to assess the long-term need for noise mitigation throughout the study area. In order to determine noise impacts, a comparison was made between the predicted future noise levels with the proposed undertaking in place (10 years after construction) and the predicted future noise levels associated with the “do nothing” alternative at the same date for the Outdoor Living Area (OLA). Year 2041 traffic projections have been used in assessing the future traffic volumes.

For areas where the predicted future noise levels associated with the proposed improvements exceed the criteria established in the Guide, noise mitigation measures (for example, noise barriers) were modelled. The predicted noise levels and the effectiveness of noise barriers were determined using TNM Version 2.5 (TNM 2.5), which is an MTO approved computer model.

Per the Guide, where increases in noise levels are predicted for any noise sensitive areas (NSAs), mitigation efforts are to be applied as follows:

Table 8-1: Summary of Mitigation Efforts under the MTO Environmental Guide for Noise

Change in Noise Level Above Ambient / Projected Noise Level with Proposed Improvements	Mitigation Effort Required
<5 dBA change & <65 dBA	<ul style="list-style-type: none"> None
≥5 dBA change OR ≥65 dBA	<ul style="list-style-type: none"> Investigate noise control measures within right-of-way (ROW) Introduce noise control measures within ROW and mitigate to ambient if technically, economically and administratively feasible Noise control measures, where introduced, shall achieve a minimum of 5 dBA attenuation averaged over first row receptors

The determination of whether or not mitigation is provided is based on a review of technical, economic and administrative feasibility:

- ▶ Technical Feasibility – Review the constructability of the noise mitigation (i.e. design of wall, roadside safety, shadow effect, topography, achieve a 5 dBA reduction, ability to provide a continuous barrier, etc.);
- ▶ Economic Feasibility – Carry out a cost/benefit assessment of the noise mitigation (i.e., determine cost per benefited receiver); and,
- ▶ Administrative Feasibility – Determine the ability to locate the noise mitigation on lands within public ownership (i.e., provincial or municipal right-of-way).

The determination of the provision of mitigation is based on the analysis of the predicted noise level at the Outdoor Living Area (OLA), which is typically the rear yard, and may include shielding from the building, where applicable.

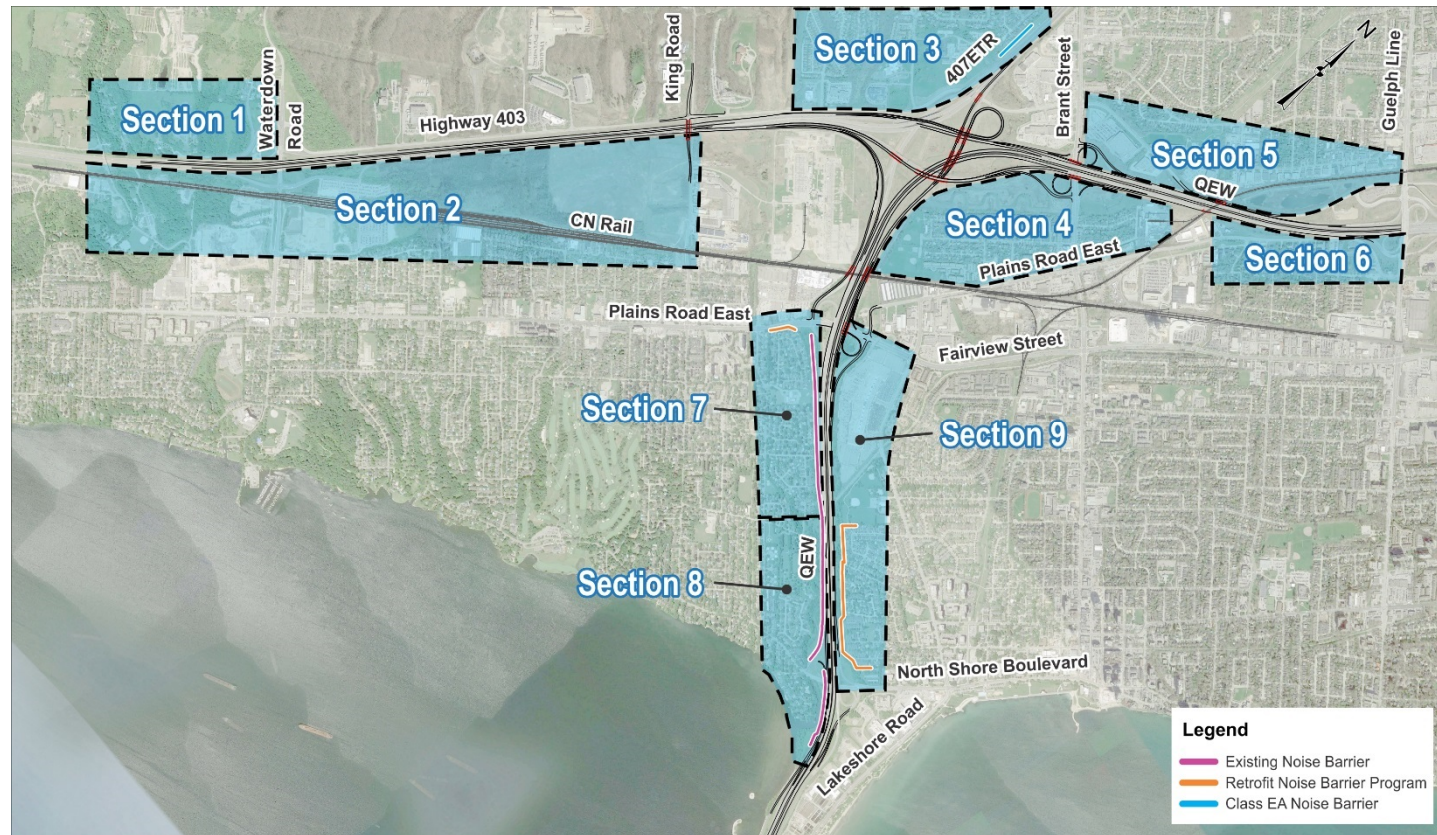
A noise barrier may be a noise wall, a noise berm, or a combination of both. The barrier is used to alter the path between the noise source and the receiver. Noise barriers typically have a maximum height of 5 m and a minimum 5 dBA reduction must be achieved in order for a noise wall to be warranted based on MTO policy. The further away a receptor (i.e. house) is from a barrier, the less effective the barrier becomes. Noise barriers must meet safety and structural standards, and must be installed in accordance with MTO Road Side Safety Policy, to avoid the barrier itself becoming a roadside hazard.

Noise levels are predicted in decibels in the A-weighted dBA scale, which best approximates the human perception of sound over a specified time period. An increase of two to three decibels is considered to be just perceptible to the average person. It should be noted that a three (3) dBA increase in noise equates to a doubling of traffic volumes.

Noise Results

Further details of the noise levels at all receptor locations, reviewed noise barrier locations and assessment results are provided in the full noise report in **Appendix N**. The findings of the noise assessment can be summarized below in reference with **Exhibit 8-3**.

Exhibit 8-3: Noise Result Locations



Section 1

- ▶ For the majority of this area, future noise levels are predicted to be below 65 dBA and are not predicted to increase by at least 5 dBA in the outdoor living area. Therefore, noise mitigation is not warranted based on MTO policy.
- ▶ A few receivers are predicted to experience future noise levels equal to or greater than 65 dBA in their outdoor living areas with the proposed highway improvements. Options for noise mitigation that would provide a minimum reduction of 5 dBA were assessed at these locations, however the cost did not satisfy the economic feasibility requirement under the Guide.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 2

- ▶ Future noise levels are predicted to be below 65 dBA in the OLA and are not predicted to increase by at least 5 dBA in the outdoor living areas of all receivers.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 3

- ▶ Existing berms and noise barriers along the 407 ETR provide mitigation of highway noise in this area.
- ▶ Future noise levels are predicted to be below 65 dBA and are not predicted to increase by at least 5 dBA in the outdoor living areas of all receivers.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 4

- ▶ For the majority of this area, future noise levels are predicted to be below 65 dBA in the OLA and are not predicted to increase by at least 5 dBA in the outdoor living area. Therefore, additional noise mitigation is not warranted.
- ▶ A few receivers are predicted to experience future noise levels equal to or greater than 65 dBA in their outdoor living areas with the proposed highway improvements. Options for noise mitigation were assessed at these locations, however these would not reduce noise levels by at least 5 dBA. This is a minimum requirement under the Guide.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 5

- ▶ For the majority of this area, future noise levels are predicted to be below 65 dBA in the OLA and are not predicted to increase by at least 5 dBA in the outdoor living area. Therefore, additional noise mitigation is not warranted.
- ▶ A few receivers are predicted to experience future noise levels equal to or greater than 65 dBA in their outdoor living areas with the proposed highway improvements. Options for noise mitigation were assessed at these locations, however these would not reduce noise levels by at least 5 dBA. This is a minimum requirement under the Guide.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 6

- ▶ An existing berm along the south side of the QEW between the CN Railway underpass and Clela Street provides mitigation of highway noise in this area.
- ▶ Future noise levels are predicted to be below 65 dBA in the OLA and are not predicted to increase by at least 5 dBA in the outdoor living area and therefore additional noise mitigation is not warranted.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 7

- ▶ Existing noise barriers provide mitigation of highway noise in this area.
- ▶ Future noise levels are predicted to be equal to or greater than 65 dBA in the outdoor living area of some receivers, but are not predicted to increase by at least 5 dBA.
- ▶ Improvements to the noise barriers were reviewed with the proposed highway improvements implemented, but these would not reduce noise levels by at least 5 dBA. This is a minimum requirement under the Guide.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Section 8

- ▶ Existing noise barriers provide mitigation of highway noise in this area.
- ▶ Future noise levels are predicted to be equal to or greater than 65 dBA in the outdoor living area of some receivers, but are not predicted to increase by at least 5 dBA.
- ▶ Improvements to the noise barriers were reviewed with the proposed highway improvements implemented, but these would not reduce noise levels by at least 5 dBA. This is a minimum requirement under the Guide.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.
- ▶ MTO has investigated the existing noise barrier in the vicinity of North Shore Blvd, which is an older noise barrier design with a height of 3 m:
 - As part of MTO's highway asset renewal, this noise barrier will be considered for replacement due to the limited remaining service life of the structure.
 - This infrastructure renewal is separate from the Class EA process. The noise barrier will be investigated for replacement when provincial infrastructure funding permits. The replacement noise barrier will be brought up to current MTO standards.

Section 9

- ▶ Existing noise barriers provide mitigation of highway noise in this area.
- ▶ Future noise levels are predicted to be below 65 dBA and are not predicted to increase by at least 5 dBA in the outdoor living areas of all receivers. Therefore, additional noise mitigation is not warranted.
- ▶ Noise mitigation is not warranted for this area based on MTO policy under the Guide.

Construction Noise

With respect to the noise impacts that may result during the construction the following should be adhered to.

- ▶ The Contractor will be required to keep the idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities.

8.2.3 CLIMATE CHANGE

From a Greenhouse Gas (GHG) perspective on climate change, the contaminants of concern from motor vehicle emissions are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These GHGs can be further classified according to their Global Warming Potential. The Global Warming Potential is a multiplier developed for each GHG, which allows comparison of the ability of each GHG to trap heat in the atmosphere, relative to carbon dioxide. Using these multipliers, total GHG emissions can be classified as CO₂ equivalent emissions. For this air quality assessment, the MOVES model was used to determine total CO₂ equivalent emission rates for the posted speed and heavy-duty vehicle percentage in the study area. As noted in **Section 8.1.9**, the total GHG emissions in the study area represent 0.031% of the provincial target and 0.009% of the Canada-wide target. The contribution of the GHG emission from the project is small in comparison to these provincial and national targets.

Though traffic volumes are expected to increase in the future, emission rates are also predicted to go down due to improvements in technology. Therefore, total emissions, including greenhouse gas emissions, are expected to be similar between the existing and proposed configurations. The addition of HOV lanes also offers the potential to increase vehicle occupancy and persons carried through the corridor, increasing efficiency and thus reducing the number of vehicles and greenhouse gas emissions. The proposed LED lighting will be an upgrade as noted in **Section 7.8**, replacing the existing High Pressure Sodium (HPS) luminaires. LED lighting is an energy efficient lighting system.

According to the provincial engineering memorandum (PEM) "Implementation of the Ministry's Climate Change Consideration in the Design of Highway Drainage Infrastructure" (#2016-14, October 28, 2016), highway drainage infrastructure should be designed to accommodate future rainfall values for the year corresponding to the end of the Design Service Life (typically 75 years) of the structure, in respect to conveyance, erosion, scour, stormwater management and fish passage. Therefore, all new drainage infrastructure (culverts, storm sewers, ditches, etc) will be designed considering climate change impacts in the detail design phase.

8.3 CULTURAL ENVIRONMENT

8.3.1 ARCHAEOLOGICAL RESOURCES

As noted in **Section 4.3.1**, Stage 1 and 2 Archaeological Assessments were carried out to identify and assess the known and potential archaeological resources within the study limits. The study area was deemed to be disturbed and did not yield any archaeological materials, therefore no further archaeological assessment is required in the study area. Should plans change to include areas outside of the current study area, additional archaeological assessment will be required.

If archaeological materials are encountered during construction, they may constitute a new site and are therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the material must cease work immediately and a provincially licensed consultant archaeologist must assess the material's cultural heritage value or interest in accordance with Section 48 (1) of the Ontario Heritage Act.

8.3.2 BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

A review and evaluation was undertaken to determine the potential adverse impacts of the Recommended Plan to built heritage resources and cultural heritage landscapes. An overview of the built heritage resources within the study area is provided in **Section 4.3.2** and the location of identified cultural heritage landscapes located within the study limits are identified in **Table 4-2**. These locations will not be directly impacted by the Study.

Under the Ontario Heritage Bridge Guidelines, the review concluded that the bridges within the study area have minimal contextual or historic values, therefore, a Cultural Heritage Evaluation Report (CHER) for the structures to be rehabilitated or replaced is not required.

8.4 TECHNICAL CONSIDERATIONS

8.4.1 CONSTRUCTION STAGING

A preliminary construction staging plan has been developed as part of this study and is further detailed in **Section 7.11**. While the plan has been developed with the aim to minimize traffic impacts during construction, traffic disruption and closures are anticipated. **Table 8-1** summarizes the closures required and their mitigation measures include advisory signage and/or detours, further detailed in **Section 7.11**.

A final construction staging plan will be developed during the Detail Design phase, during which MTO will further consult with key stakeholders (inc. City of Burlington, Halton Region and 407 ETR) to further quantify the impacts of the construction staging and confirm mitigation measures.

Table 8-2: Construction Staging Impacts - Summary of Anticipated Closures

Location	Highway / Ramp	Improvement & Phase	Duration
Brant Street Interchange	Westbound on-ramp from northbound Brant Street (loop ramp)	Brant Street Overpasses Rehabilitation - Immediate	~ 1 construction season
Fairview Street / Plains Road East Interchange	Northbound on-ramp from eastbound Fairview Street (loop ramp)	Fairview Street Overpass Rehabilitation - Immediate	~ 2 construction seasons Ramp re-opened over winter
QEW and Highway 403 Interchange (Freeman)	Niagara-bound QEW Toronto-bound QEW	Highway 403 eastbound to QEW eastbound ramp replacement - Interim	Overnight closures
	407 ETR to QEW southbound / Fairview Street	Highway 403 eastbound to QEW eastbound ramp replacement - Interim	Overnight closures
	407 ETR to QEW southbound / Fairview Street	New structure construction for QEW northbound to Highway 403 westbound on-ramp realignment - Interim	Overnight closures
QEW and Highway 403 Interchange (Freeman)	Niagara-bound QEW Toronto-bound QEW	Structure construction for new QEW northbound to Highway 403 westbound / 407 ETR ramps - Ultimate	Overnight closures
	407 ETR to QEW southbound / Fairview Street	407 ETR to QEW southbound / Fairview Street Ramp replacement	~1 - 2 construction seasons

Overall, all transportation (motorists, cyclists and pedestrians) may experience delays and disruption during construction. Advisory signage of detours and advance signing of construction zones is recommended. The final construction staging plan confirmed in Detail Design will also consider measures to minimize temporary impacts on local transit routes and bus stops on municipal roadways within the construction area.

8.4.2 EMERGENCY VEHICLE RESPONSE

Temporary impacts to the QEW, Highway 403, local roadways and interchanges during construction may affect emergency service routes. Emergency services will be further consulted in the Detail Design phase to discuss potential impacts and communication protocols. The Burlington detachment of the Ontario Provincial Police (OPP) and the Joseph Brant Hospital is located adjacent and east of the North Shore Boulevard Interchange. While the construction staging of the QEW improvements may impact routes/travel times, connectivity to the provincial network will not be altered by the proposed improvements.

8.4.3 ILLUMINATION

As part of the recommended plan, there will be improvements to the existing highway illumination within the study area and these are further detailed in **Section 7.8**. Along the QEW mainline, the existing High Mast Lighting is proposed to be replaced with Conventional lighting (light poles) with LEDs as it can be more economical and also has the benefit of mitigating light trespass. **Table 8-3** summarizes the illumination improvements within the study area.

Table 8-3: Summary of Illumination Improvements

Section	Existing	Proposed	Comments
Highway 403 Mainline (Waterdown Road to King Road)	Not illuminated	Full LED Conventional Lighting	LED Conventional lighting added
Highway 403 Mainline (King Road to Freeman Interchange)	Full Illumination with High Mast Lighting	Full LED conventional Lighting	Full LED lighting system replacement
Waterdown Road Interchange	Partial Conventional Lighting	Full LED Conventional Lighting	

Section	Existing	Proposed	Comments
QEW Interchanges (Freeman Interchange and Arterial Roads)	Full Illumination that either contain High Mast Lighting or Conventional Lighting	Full LED High Mast Lighting	
QEW Mainline (North Shore Boulevard to Freeman Interchange, and Freeman Interchange to Guelph Line)	Full Illumination that either contain HML or Conventional Lighting	Full LED Conventional Lighting	

8.4.4 PROPERTIES AND ACCESS

For most of the study area, the improvements will be accommodated within the existing MTO right-of-way. Property is required to accommodate the Ultimate Improvements (Technically Preferred Alternative) and is further detailed in **Section 7.10**, and in the preliminary design plates included in **Appendix A**. The study aimed to minimize property requirements were possible and as a result, grading modifications and toe/retaining walls are proposed at several locations.

The realignment of Plains Road East will result in modifications and regrading of the driveway of the commercial property in the northeast quadrant of the Fairview Street / Plains Road East and QEW interchange.

The replacement of the King Road Underpass at Highway 403 will result in an elevation raise of King Road, south of the freeway. Modifications and regrading will be required to the driveways and parking lot of the commercial property in the northeast quadrant of the King Road / Hydro Lane intersection. The Hydro One access road for tower maintenance, adjacent the commercial property, will also require regrading.

Temporary access to properties and Temporary Limited Interests (TLIs) may be required to accommodate certain construction activities, for example to build retaining walls and the regrading of driveways / parking lots. Temporary requirements cannot be accurately determined at the preliminary design stage, and thus will be developed and confirmed during the Detail Design phase.

Access to properties will be maintained at all times during construction but may be temporarily impacted during certain activities. Impacts to accesses will be confirmed in Detail Design.

8.4.5 UTILITIES

The existing utilities within the study area are summarized in **Section 4.4.9**. A preliminary utility composite plan has been identified by this study and is further detailed in **Section 7.9** and **Appendix G**.

Consultation with impacted local utility providers will be continued during Detail Design to confirm the location/type of utility, the potential project impact, and mitigation and/or utility relocation.

Impacts to Hydro One infrastructure within the study area due to the proposed improvements is detailed in Section 7.9.

8.5 SUMMARY OF IDENTIFIED CONCERNS AND PROPOSED MITIGATION

Table 8-4 summarizes the identified concerns and the proposed mitigation measures, based on the identified environmental sensitivities and the proposed preliminary design plan. The proposed improvements identified by this study may be subject to minor refinements during Detail Design and other subsequent planning and design phases. Any potential refinements, however, are not anticipated to be significant changes nor increase the impacts to the identified concerns.

Table 8-4: Summary of Identified Concerns and Proposed Mitigation

LEGEND	
MTO: Ministry of Transportation	MHSTCI: Ministry of Heritage, Sport, Tourism and Culture Industries
MNRF: Ministry of Natural Resources and Forestry	MUN: City of Burlington, Halton Region
MECP: Ministry of the Environment, Conservation and Parks	CH: Conservation Halton
DFO: Department of Fisheries and Oceans, Canada	ES: Emergency Service Providers
UTIL: Utilities	

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
Vegetation (See Section 8.1.1 for further details)		
<ul style="list-style-type: none"> The impacts to vegetation associated with the anticipated highway rehabilitation and improvement works are localized to small areas of disturbance / removals at or immediately adjacent to the road and bridge work areas. Currently the proposed project footprint is largely contained within the existing highway ROW with some minor intrusions into immediately adjacent cultural communities. There is also potential for some limited indirect impacts to adjacent habitats. There is one Life Science ANSI within the study area. Sassafras Woods ANSI will be protected by a minimum of 10 m buffer from the woodland dripline. No PSWs, or other designated features are present within the study area; therefore, there will be no direct impacts to designated natural areas. 	<p>MTO MECP MNRF CH</p>	<ul style="list-style-type: none"> The Contractor shall conduct vegetation removal and protection measures in accordance with Ontario Provincial Standard Specification (OPSS), such as OPSS.PROV 201 (clearing) and OPSS.PROV 801 (tree protection). Re-stabilize and re-vegetate exposed surfaces as soon as possible following disturbance. Per OPSS 805, maintain all temporary erosion and sediment control measures in an effective, functioning, stable condition. This will require routine inspections, including after storm events, and repair as required. Erosion and sediment control measures should remain in place until all site restoration activities are completed and disturbed areas are no longer susceptible to erosion and sedimentation. Clearly delineate ROW vegetation clearing zones and vegetation retention zones and protect vegetation that does not require removal for construction (e.g., using silt fencing or other temporary fencing) on both the Contract drawings and in the field with the Contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in vegetation retention zones. Appropriate vegetation clearing techniques will be used (e.g., felling trees away from retained natural areas and watercourses).

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<ul style="list-style-type: none"> • Cut and grubbed material shall be disposed of through chipping or other appropriate means. • Avoid all unnecessary traffic, dumping and storage of materials over tree root zones adjacent to natural / semi-natural areas. • Dust control shall be completed using water, not chemical suppressants, and in accordance with MTO's general conditions. • Re-stabilize and re-vegetate exposed surfaces as soon as possible following disturbance. It is recommended that all disturbed habitats be re-vegetated with a native seed mix, such as the Old Field Mix detailed in OPSS.PROV 804. • Conduct equipment maintenance and refueling at the designated and properly contained maintenance areas in the works yard or at commercial garages located well away from the river banks and wetlands and outside retained vegetation areas. The Contractor will have a Spills Prevention Plan and required materials on site at all times in accordance with OPSS.PROV 100. • Waste management shall be completed in accordance with OPSS 180. • Implement environmental inspection during construction to ensure that all mitigation measures are implemented properly, maintained and repaired and remedial measures are initiated in a timely manner where warranted • The Contractor shall not be permitted to reuse or dispose of any excess materials (including earth) outside of designated area. • Invasive and Noxious Vegetation that is removed shall be handled and disposed of in such a manner as to prohibit it's spread (i.e. burning, burying with approx. 1 m of fill, or disposal of off-site at a waste facility equipped to handle it). For detailed recommendations on preventing spread, the Contractor shall follow the Ontario Invasive Plant Council's Clean Equipment Protocol for Industry document (Holloran et al, 2013) to prevent the spread of invasive species along the road corridor within and between construction projects. Available at https://www.ontarioinvasiveplants.ca/resources/technical-documents/ • An updated Landscape Plan will be prepared at Detail Design to compensate for any tree removals. • The Preliminary Landscape Plan in Exhibit 8-2 provides enough coverage to offset vegetation losses, and will include general landscaping recommendations as well as recommendations for the use of native species (including species that are suitable for Monarch and Mottled Duskywing habitat).

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
Wildlife and Wildlife Habitat (See Section 8.1.2 for further details)		
<ul style="list-style-type: none"> The impacts to wildlife and wildlife habitat associated with the anticipated highway rehabilitation and improvement works are localized to small areas of disturbance / removals at or immediately adjacent to the road and bridge work areas. Currently the proposed project footprint is largely contained within the existing highway ROW with some minor intrusions into immediately adjacent cultural communities. There is also potential for some limited indirect impacts to adjacent habitats. Five (5) SAR have reasonable potential to be encountered within the proposed footprint of the highway rehabilitation and improvement works, and therefore are at some risk of harm (i.e., Barn Swallow, Monarch, Mottled Duskywing, Northern Map Turtle and Snapping Turtle). Only Endangered and Threatened species have legal protection under the provincial ESA; therefore, of the five (5) SAR with potential to be encountered, only two (2) species are protected under the ESA: Barn Swallow (Threatened) and Mottled Duskywing (Endangered). 	<p>MTO MECP MNRF CH</p>	<ul style="list-style-type: none"> Any wildlife incidentally encountered during construction will not be knowingly harmed and will be allowed to move away on its own. In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. All disturbed areas will be restored to pre-construction conditions, where possible. In accordance with OC – Migratory Bird Protection, apply timing constraints to avoid all vegetation clearing (including grubbing and removal of trees/shrubs/grasses) during the breeding bird season (approximately April 1 to August 31). Include Timing Constraint for Clearing within the contract documents. In accordance with OC – Migratory Bird Protection, the Contractor shall not destroy the active nests (nests with eggs or young birds), or wound or kill birds, of species protected under the Migratory Birds Convention Act, 1994 and/or Regulations under that Act. When active nests are encountered, the Contract Administrator will be contacted. If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA (1994) all activities will stop immediately and the Contract Administrator will be notified. Install Bird Nesting Preventative Measures on all structures where migratory bird nesting has been confirmed (specific locations to be confirmed at Detail Design phase). Adhere to mitigation measures outlined above for MBCA compliance to avoid impacts to SAR bird species potentially nesting in the work area or vicinity (i.e. Barn Swallow). If Barn Swallows build a nest on a structure where works will occur, construction must cease until the young have fully fledged or the nest is no longer active (to be determined by an Avian Biologist). Barn Swallow nesting was confirmed in the study area during the 2017 field surveys (one nest was confirmed in the Indian Creek Culvert at North Shore Boulevard East). No culvert works are currently proposed at this location; however, it is possible that Barn Swallow could nest on some of the other structures during the year of construction. For structures where no works are proposed but where active Barn Swallow nesting is confirmed during the year of construction, avoid clearing or works within 30 m of the structure during the migratory bird nesting window (i.e. April 1 – August 31), where possible. If this is not feasible, works within 5 m of a structure with an active Barn Swallow nest should be completed by hand or very small equipment and as quickly and efficiently

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<p>as possible to minimize disturbance. If the birds flush from the nest or appear disturbed by the works, the work must be postponed until nesting is finished and the young have fledged.</p> <ul style="list-style-type: none"> • For the protection of Mottled Duskywing and Monarch, planting of Milkweed and New Jersey Tea is not recommended for areas within the ROW as research has shown this may result in increased butterfly road mortalities; instead, habitat restoration efforts should be focused on areas away from high traffic roads / highways. Furthermore, the Landscape Plan should include recommendations for the use of native plant species suitable for Monarch and Mottled Duskywing breeding. • Erect temporary exclusion fencing prior to May 15 to prevent SAR turtles (and other wildlife) from entering the construction or grading zones located adjacent to waterbodies and watercourses. It should be feasible to combine the exclusion fencing with silt fencing requirements, flaring out the ends of the fencing to redirect wildlife away from the construction zones / roads and back towards the habitat side of the fence. Fencing should meet the MNRF Best Practices guidelines for Reptile and Amphibian fencing • Prior to starting works each day, the Contractor will examine the length of exclusion fence to repair any damages and remove any SAR turtles (or other wildlife) that may have entered the construction zone or become trapped inside the fencing. The Contractor will also examine the work zone and any equipment parked overnight in the area to ensure no SAR turtles (or other wildlife) have entered the construction zone. SAR turtles and other wildlife should be placed back on the habitat side of the fence. Refer to the MNRF SAR Handling Manual on how to safely handle SAR • Currently, no in-water works are proposed as part of the highway and improvement works. However, if at Detail Design it is determined that in-water works are required, timing constraints must be implemented at all permanent aquatic features in order to protect SAR turtles during the turtle hibernation period (i.e. no in-water works shall occur from September 1 to April 30) unless exclusion measures (ex. coffer dam) have been installed around the aquatic construction zone prior to September 1, in order to isolate work area and prevent turtles from entering. • Currently, there are no proposed removals within forested habitats beyond the ROW. However, if at Detail Design it is determined that removals of forest habitats beyond the ROW are required, timing constraints must be implemented to avoid tree removals during the bat breeding period (i.e. no tree removals shall occur from April 1 to September 30) in order to protect Endangered bats. • In the event that an Endangered or Threatened species or possible Endangered or Threatened species is found in the construction area, all activities that could potentially harm the animal will cease immediately and the animal will be given time to move away on its own. In the event that the animal does not move from the

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<p>construction zone or is injured the Contract Administrator will be notified. The Contract Administrator and MTO's Environmental Planner will then be contacted to develop mitigation options, as these animals are protected under the ESA (2007).</p> <ul style="list-style-type: none"> Contractor Awareness and Encounter protocols will be implemented within the documents and specifications to identify the potential for SAR to be encountered during construction and the procedures to be followed in the event of an encounter. If a SAR is encountered the Contract Administrator will be notified. The following road ecology mitigation measures shall be investigated further at Detail Design: <ul style="list-style-type: none"> Identify any existing deficiencies/gaps in existing fencing along the freeways. Consider opportunities to fill-in, replace or enhance existing fencing if any issues are found. If replacing culverts, consider the feasibility of providing potential wildlife-friendly culvert crossings below Highway 403.
Fish and Fish Habitat (See Section 8.1.3 for further details)		
<ul style="list-style-type: none"> The proposed works that are most likely to impact fish and fish habitat are related to bridge works and drainage improvements; specifically, work on bridges over watercourses and culverts (rehabilitations, extensions, clean-outs, removals or replacements) that convey watercourses, especially those identified as supporting direct fish habitat. In general, potential impacts that are most likely to affect fish and fish habitat include: Potential sedimentation and erosion associated with the excavation, removal and/or placement of materials in or adjacent to watercourses; Release of deleterious substances such as sediment, fuel, oil and lubricants to watercourses; Removal of riparian vegetation; Destruction of aquatic habitat through increased structure footprints in watercourses; Alteration of fish habitat through placement of substrates or rock protection within the bankfull channel; and 	<p>MTO MNRF DFO CH</p>	<p>General Construction Best Practices</p> <ul style="list-style-type: none"> Any temporarily stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g. within silt fencing) in areas separated at least 30 m from all watercourses and drainage features in accordance with Ontario Provincial Standard Specification (OPSS) 180. All construction materials, excess materials and debris should be removed and appropriately disposed of following construction. All construction-related activities will be controlled to prevent entry of any petroleum products, debris or other potential contaminants / deleterious substances, in addition to sediment as outlined above, to any watercourse. The Contract Administrator's team should include an Environmental Inspector experienced in working around watercourses, who will be responsible for ensuring the erosion and sediment control measures are functioning effectively, being maintained and that all of the other general mitigation measures are being implemented as intended. The Environmental Inspector will also ensure all environmental mitigation and design measures are properly installed / constructed and maintained. Appropriate contingency and response plans will be in place and implemented if required. If the Contractor wishes to alter any of the mitigation plans as outlined in the Contract Document, then the associated approval agency will need to be made aware of and approve the changes prior to construction. <p>Sediment and Erosion Control Measures</p>

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
<ul style="list-style-type: none"> Harm to or death of fish during construction. 		<ul style="list-style-type: none"> The Contractor will follow the erosion and sediment control measures identified in the contract (OPSS 805) and prevent / control potential for erosion and sediment caused by their construction methods and operations so as to meet all legislative requirements, to prevent entry of sediments into any watercourse or drainage features (ditches) within the study area, and to prevent damage to features and property inside or outside of the ROW. <p>Shoreline / Bank / Vegetation / Stabilization</p> <ul style="list-style-type: none"> The construction access, work areas and associated requirements for removal of riparian vegetation should be minimized to the extent required for the construction activities, and these areas then delineated in the field using properly installed protective silt fencing. All temporarily disturbed areas will be re-stabilized following construction using appropriate means as outlined in OPSS 182. <p>Operation and Machinery</p> <ul style="list-style-type: none"> All construction-related activities should be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourses. No equipment should be allowed to ford or otherwise enter any watercourse except as specified in the contract or unless authorized by the appropriate environmental agencies / permits. <p>Site Specific Mitigation Measures</p> <ul style="list-style-type: none"> Based on species assemblage observed by the Project Team ecologists in the field and via background information, a coolwater thermal classification was identified for the watercourse crossings within the study area that directly support a CRA fishery. A permissible in-water construction timing window from July 16th to March 14th of any given year (i.e., no in-water works between March 15th and July 15th of any given year) will apply to the works at each of these crossings, as outlined in OPSS 182. This timing window includes the installation and removal of any in-water isolation measures. Note that this timing window is preliminary and should be confirmed with MNRF during Detailed Design and refined as necessary. All efforts should be made to remove / relocate any fish stranded within any isolation measures (i.e., behind cofferdams) and transferred to suitable habitat downstream of the construction areas prior to in-water works, in accordance with OPSS 182. Any fish salvage will need to be conducted under a License to Collect Fish for Scientific Purposes acquired from the MNRF. In-stream sediment controls (i.e., cofferdams) should be installed and removed according to OPSS 805, unless otherwise specified.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<ul style="list-style-type: none"> Any pipes / hoses conveying water in any watercourse during construction should be screened to prevent entrainment of fish following the guidelines in DFO's measure to avoid causing harm to fish and fish habitat website If dewatering is required, sediment laden discharge water should be pumped into a vegetated areas > 30 m from a watercourse or into a settling basin or (similar measure) to prevent the entry of deleterious substances into the watercourses. <p>Detail Design Recommendations</p> <ul style="list-style-type: none"> Depending on the length of time between the finalization of the Preliminary Design / EA and the initiation of Detailed Design, the study area should be reviewed to determine potential changes in the landscape or newly listed SAR that may warrant additional surveys to update currently documented existing conditions; Any bridge replacements over watercourses should consider replacement with clear-span bridges; If any culverts are to be replaced or extended, consider open foot culverts, or embedding replacement culverts within natural substrates to transition the new culverts smoothly with the upstream and downstream reaches to help minimize the potential formation of barriers to fish movement through the crossings; Any culverts that are to be replaced should be sized to accommodate the full bankfull width of the respective channels to improve fish passage through the highway corridor. Spanning the bankfull width of the channels will also help to minimize erosion and scour issues; Any existing barriers to fish movement (i.e., perched culverts, debris jams) through the existing crossing structures could be addressed through either removal or other means (i.e., rocky riffles for perched culverts) in order to reconnect upstream and downstream watercourse reaches; Update the impact assessment based on the Detailed Design and update / refine the mitigation measures presented in above; and Incorporate design considerations and mitigation measures identified in MTO's Best Management Practices Manual for Fisheries (Draft, June 2016) as well as the measures to avoid causing harm to fish and fish habitat on the DFO website into the planning and design of any works with the potential to directly impact fish and fish habitat in the study area. These resources identify procedures on how to undertake routine activities in a manner that avoids impacts to fish and fish habitat. Incorporating these best management practices and measures early in the design process will help ensure that further review of the proposed works under the Fisheries Act can be avoided.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
Erosion and Sediment Control (See Section 8.1.4 for further details)		
<ul style="list-style-type: none"> Construction, clean-up and restoration may result in sediment-laden runoff entering watercourses, private property or other sensitive areas. 	<p>MTO MECP MNRF</p>	<ul style="list-style-type: none"> The Contractor should use dust control strategies to minimize wind-blown dust. Special care is recommended to minimize disturbance to private properties, including but not limited to tree protection, protecting any buildings or structures, driveways, lawns, gardens, buried utilities and using safety fencing to isolate the work area. All erosion and sediment control measures are to be inspected and maintained by the Contractor to ensure they are functioning as intended throughout the construction period and until such time that construction is complete and disturbed areas have been stabilized. All erosion and sediment control measures that are failing must be repaired / replaced by the Contractor as soon as possible as identified in OPSS 182 and OPSS 805. All erosion and sediment control measures that are non-biodegradable should be removed from the site when work is complete and the site is stabilized. Provided that the Contractor's Best Management Practices (BMP) for erosion and sediment control are maintained and meet or exceed the requirements in the Ontario Provincial Standard Specifications (OPSS) listed and described above, this project can be completed with lower risk of environmental damage, with respect to erosion and sediment control (ESC).
Management of Excess Material (See Section 8.1.5 for further details)		
<ul style="list-style-type: none"> Excess materials may be encountered during construction and require proper management/disposal. Property contamination may be encountered during construction and require proper management/disposal. 	<p>MTO MECP</p>	<ul style="list-style-type: none"> Excess materials generated during construction will be managed by the Contractor in accordance with OPSS 180. All construction materials, excess materials and debris will be removed and appropriately disposed of following construction. Mitigation measures during construction typically include: <ul style="list-style-type: none"> Ensure proper containment, filtering and proper release away from sensitive features of sediment from all construction-generated dewatering discharge. All construction-related activities will be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances to any watercourses. No storage, maintenance or re-fueling of equipment will be conducted near any watercourses. All materials necessary for containment will be readily available on the site. MECP, as well as other appropriate agencies will be immediately notified of any spills, including silt / sediment releases.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<ul style="list-style-type: none"> - No equipment shall ford or otherwise enter any watercourse except as specified in the future Contract or unless authorized by the appropriate environmental agency / permit. • Remediation may not be required at this time for the carpool lot at Plains Road / Fairview Street; however, any excess soils to be removed from the Site during construction should be considered as part of a remedial action plan. Any contractors working on-site should be made aware of these contaminants of concern prior to conducting any excavation work at the Site. Additional testing may be required prior to removal of any soil off-site. A risk review could also be conducted to verify any contaminants of concern remaining at the site would not have any negative effects to the natural environmental or public use of the future MTO re-development lands. If remediation of the Site becomes the preferred action plan, remediation of metal, petroleum, VOC and PAHs impacted soil can be addressed by one or more of the following strategies: dig and haul, bioremediation (ex-situ/in-situ), injection solutions and risk assessment. These options will be discussed further in Detail Design.
Groundwater (See Section 8.1.6 for further details)		
<ul style="list-style-type: none"> • Potential impacts on the groundwater quantity and quality. 	<p>MTO MECP</p>	<ul style="list-style-type: none"> • The project will be required to be assessed during Detail Design when detailed construction information becomes available, to address the potential impacts of any construction period dewatering on groundwater and surface water resources. An EASR/PTTW may be required for some sections of the project due to presence of permeable soils and groundwater sensitivity, shallow water table, groundwater discharge areas, presence of wetlands and unserviced areas. If it is determined during Detail Design that an EASR/PTTW is required for water control, wetlands and areas with the groundwater discharge or shallow water levels should be evaluated in detail in a report supporting an EASR/PTTW application. • All groundwater studies for an EASR/PTTW will be conducted in accordance with the MECP guidelines.
Drainage and Surface Water (See Section 8.1.7 for further details)		
<ul style="list-style-type: none"> • Potential impacts on drainage and surface water 	<p>MTO MECP MNRF CH</p>	<ul style="list-style-type: none"> • A Drainage and Stormwater Management Plan was prepared for the Recommended Plan is summarized in Section 7.5. • A stormwater management (SWM) strategy was developed for the study area based on the result of the hydrologic impact assessment completed at each drainage outlet, identified potential upstream/downstream impacts. The SWM strategy also considered the environmental sensitivity of the recipient drainage system, and maintenance. The proposed SWM strategy consists of grassed swales, enhanced ditches, a new Freeman interchange SWM (Dry) Pond and six (6) linear detention areas. • It is understood that there is high potential for development in and around the study area, and that significant land use changes could occur prior to the construction of highway improvements. Therefore, SWM

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<p>recommendations will need to be reviewed in subsequent design phases in consideration of the land use and drainage conditions at that time.</p>
Air Quality (See Section 8.1.9 for further details)		
<ul style="list-style-type: none"> An air quality assessment study was undertaken which determined that significant effects are not anticipated during operations. 	<p>MTO MECP</p>	<ul style="list-style-type: none"> Dust impacts will be mitigated by ensuring that dust control is completed in accordance with Ontario Provincial Standard Specification 100 (OPSS) during the construction phase. Where possible, apply water as a suppressant to reduce particulate emissions during construction. Re-stabilize and re-vegetate exposed soil surfaces as soon as possible using native seed mixes appropriate to the study area. Wash vehicles and equipment prior to leaving the construction site to minimize the potential release of dust off-site.
Noise (See Section 8.2.2 for further details)		
<ul style="list-style-type: none"> No noise mitigation is warranted as per MTO Noise Guide Policy Construction noise issues. 	<p>MTO MUN</p>	<ul style="list-style-type: none"> General construction measures, setbacks from NSAs, timing constraints, or specific scheduling of construction activities where required and where practical, must be included in the contract documents. The Contractor will be required to keep the idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities.
Climate Change (See Section 8.2.3 for further details)		
<ul style="list-style-type: none"> Potential impacts related to climate change 	<p>MTO MECP</p>	<ul style="list-style-type: none"> All new drainage infrastructure (culverts, storm sewers, ditches, etc) should be designed considering climate change impacts in the detail design phase. LED lighting will replace existing conventional illumination to reduce energy requirements.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
Landscape (See Section 8.2.1 for further details).		
<ul style="list-style-type: none"> Alterations to landscape character and scenic integrity. 	MTO	<ul style="list-style-type: none"> Limit vegetation clearing beyond the ROW and limit the size of the construction area and material staging to only what is needed. Keep the size of zones designated for brushing as small as possible, limiting them to the removal of only what is necessary for establishing clear sight lines. Areas where brushing is required typically contain shrubs such as Sumac and Red Osier Dogwood. Locate construction access and staging areas in less sensitive areas and facilitate the regeneration of construction access and staging areas through active restoration plans. Clearly delineate ROW vegetation clearing zones and vegetation retention zones and protect vegetation that does not require removal for construction (e.g., using silt fencing or other temporary fencing) on both the Contract drawings and in the field with the Contractor prior to clearing and grading. Equipment, materials and other construction activities will not be permitted in vegetation retention zones. Carefully clear vegetation and trees designated for removal in accordance with OPSS 201. Invasive and Noxious Vegetation that is removed shall be handled and disposed of in such a manner as to prohibit its spread (i.e. burning, burying with approx. 1 m of fill, or disposal of off-site at a waste facility equipped to handle it). The Landscape Plan will be further refined at the Detailed Design stage, compensating for impacted areas and restoring any disturbed ecological communities.
Archaeology (See Section 8.3.1 for further details)		
<ul style="list-style-type: none"> The Stage 1 and 2 archaeological assessments revealed evidence of intensive and extensive disturbance over the majority of the study corridor and no archaeological material was recovered. 	MTO MHSCI	<ul style="list-style-type: none"> Should plans change to include areas outside of the current study area, additional archaeological assessment will be required. If archaeological materials are encountered during construction, they may constitute a new site and are therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the material must cease work immediately and a provincially licensed consultant archaeologist must assess the material's cultural heritage value or interest in accordance with Section 48 (1) of the Ontario Heritage Act.
Heritage Resources (See Section 8.3.2 for further details)		
<ul style="list-style-type: none"> Potential for indirect effects caused by vibration and changing the character. 	MTO MHSTCI	<ul style="list-style-type: none"> No impacts anticipated.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
Construction Staging (See Section 8.4.1 for further details)		
<ul style="list-style-type: none"> Motorists may experience delays and disruption during construction. 	MTO MUN	<ul style="list-style-type: none"> Adequate traffic planning measures, including signage to advise motorists of traffic delays and alternate routing will be considered to reduce any inconvenience and impacts during construction. Short term, off-peak closures may be required during some operations. Alternative designs and staging strategies for the replacement of the King Road underpass at Highway 403 will be considered during Detail Design to assess whether the underpass can be replaced without a full closure of King Road, and if no other reasonable options are feasible, the City will support the King Road closure for the duration required. A final construction staging plan will be developed during the Detail Design phase, during which MTO will further consult with key stakeholders (inc. City of Burlington, Halton Region and 407 ETR) to further quantify the impacts of the construction staging and confirm mitigation measures.
Emergency Vehicle Response (See Section 8.4.2 for further details)		
<ul style="list-style-type: none"> Potential impacts to emergency services response times. 	MTO MUN ES	<ul style="list-style-type: none"> Mitigation measures to be developed in consultation with emergency service providers in the subsequent detail design phase to maintain appropriate emergency response times.
Property and Access (See Section 8.4.4 for further details)		
<ul style="list-style-type: none"> Property acquisition is required as a result of the proposed improvements. Potential for access interruptions. 	MTO MECP Property Owner	<ul style="list-style-type: none"> MTO will negotiate with individual property owners to provide fair market value for the required property. Access disruptions will be minimized during construction.
Illumination (See Section 8.4.3 for further details)		
<ul style="list-style-type: none"> Potential for light spillage onto private properties and adjacent sensitive areas. 	MTO	<ul style="list-style-type: none"> The design of future lighting will consider a balance of road safety and environmental concerns. MTO is committed to minimizing glare and spill from highway luminaries.
Utilities (See Section 8.4.5 for further details)		
<ul style="list-style-type: none"> Disruptions to utilities. Impacts to/relocation of the existing utilities. 	MTO UTL	<ul style="list-style-type: none"> Confirmation of impacts and relocation needs of the existing utilities will occur during the Detail Design phase and further consultation with the affected utility providers in the subsequent detail design phase. Confirmation of impacts and mitigation measures of the Hydro One infrastructure within the study area will also occur during the Detail Design phase and under further consultation with Hydro One.

ENVIRONMENTAL ISSUE/CONCERN	AGENCIES	PROPOSED MITIGATION
		<ul style="list-style-type: none"> Appendix K's September 30, 2020 email from Hydro One, noting the conditional approval of MTO acquiring PIN 070870014 owned by HONI, includes mitigation requirements to be referred to in the subsequent detail design phase.

9 OTHER APPROVAL REQUIREMENTS

In addition to MTO Class EA approval, there are a number of other provincial, federal, municipal and utility approvals/permits required to implement the Recommended Plan.

A number of provincial approvals / endorsements from the following ministries and government agencies will be necessary for the Recommended Plan:

- ▶ Department of Fisheries and Oceans, Canada
- ▶ Ministry of Natural Resources and Forestry
- ▶ Ministry of Heritage, Sport, Tourism, Culture and Industries
- ▶ Ministry of the Environment, Conservation and Parks
- ▶ Utility Providers

The approval requirements are documented below, which are categorized by the level of government.

9.1 FEDERAL

9.1.1 FISHERIES AND OCEANS CANADA

The Canadian Fisheries Act provides provisions for the protection of fish and fish habitat. In 2015, the Government of Canada initiated updates to the Fisheries Act, included in Bill C-68, which came into effect on August 28, 2019. Fish and fish habitat protection provisions of the Fisheries Act are detailed on the fish and fish habitat policy protection statement. Specifically, these provisions state:

Section 34.4 (1): “No person shall carry on any work, undertaking or activity, other than fishing that results in the death of fish.”, and Section 35 (1): “No person shall carry on any work, undertaking or activity that results in harmful alteration, disruption or destruction of fish habitat.”

Previously, the Fisheries Act stated “no person shall carry out any works, undertakings or activity that results in serious harm to fish, defined as the death of fish or any permanent alteration to, or destruction of, fish habitat”. As a result of the amendments to the Fisheries Act in August 2019, projects are not permitted to cause the death of fish nor the harmful alteration, disruption or destruction (HADD) of fish habitat. These prohibitions are now used in place of the ‘serious harm’ definition.

Some of the proposed works associated with the Study have the risk of adversely affecting fish habitat. A detailed fisheries assessment will be required during Detail Design following the MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings – version 3

(2016). The preliminary assessment of potential impacts to fish habitat will need to be refined based on confirmation of fish habitat, and detailed construction footprint and methods.

9.2 PROVINCIAL

9.2.1 MINISTRY OF NATURAL RESOURCES AND FORESTRY

If Species At Risk or their regulated habitat are identified as impacted during the subsequent phases of the Environmental Assessment, there is the potential that permits/approvals or registration under the Endangered Species Act (ESA) will be required. Discussions with MNR were initiated during the Preliminary Design. Responsibility for administration of the ESA has since been switched over to the MECP as of April 1, 2019. Therefore, consultation with MECP regarding ESA permitting will be required at the Detail Design phase.

9.2.2 MINISTRY OF HERITAGE, SPORT, TOURISM AND CULTURE INDUSTRIES

The Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) is the provincial regulatory agency responsible for built heritage, cultural landscapes, and archaeological resources in Ontario. Routinely, MHSTCI participates in the review of all heritage and archaeological EA documentation and thereby provides comment on whether or not provincial concerns for heritage resources have been addressed in accordance with the *Ontario Heritage Act*.

All archaeological fieldwork undertaken to satisfy the conservation requirements tied to the EA process must be conducted by a consultant archaeologist holding a valid archaeological license issued by MHSTCI under the *Ontario Heritage Act*. When no resources are identified, the assessment report is filed in the public registry. Once archaeological resources that may be disturbed by highway design investigations, construction, operation or maintenance have been identified and conserved, MHSTCI may provide written notification of concurrence with recommendations and acknowledgement if resources are identified during the archaeological assessment.

9.2.3 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

In accordance with the *Ontario Water Resources Act* (OWRA), a PTTW is required from the Ministry of the Environment, Conservation and Parks (MECP) if the diversion of surface water or the extraction of groundwater is excess of 50,000 litres per day (24 hours).

Highly vulnerable aquifers and significant groundwater recharge areas occur within the study area. The location and depths of proposed structures should be reviewed against groundwater sensitivity in Detail Design to determine if the proposed works will result water takings; thus, triggering the need for a PTTW.

9.2.4 COMPLIANCE WITH PROVINCIAL PLANS AND POLICIES

In addition to requiring the preceding approvals, the following list of provincial plans were reviewed to determine the applicable policies, and ensuring that the Recommended Plan conformed to the legislation. A total of seven (7) plans were determined to be applicable:

- ▶ The Planning Act (2004)
- ▶ Provincial Policy Statement (2014)
- ▶ Growth Plan for the Greater Golden Horseshoe (2017)
- ▶ Greenbelt Plan (2017)
- ▶ Oak Ridges Moraine Conservation Act (2001)
- ▶ The Clean Water Act (2006)

Policies provide the policy framework that will shape and manage the forecasted growth in Halton Region, and these policies were considered throughout the Class EA Study. No permits or approvals are anticipated to be required with respect to these plans and policies.

9.3 MUNICIPAL

As a provincial agency, typically MTO does not require municipal permits or approvals; however, MTO's policy is to adhere to the intent of specific municipal permit and approval requirements and submit applications for review and information.

9.4 UTILITY PROVIDERS

Discussions with potentially affected utility providers within the study corridor have been initiated. The Recommended Plan requires a number of utilities to be relocated. During subsequent design phases, formal notification and consent will be obtained from relevant authorities.

10 NEXT STEPS

Following the filing of the TESR and Environmental Clearance for utility relocation, right-of-way designation and property acquisition, MTO may proceed to the Detail Design stage as outlined in the MTO's *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Detail Design refines the work completed during Preliminary Design and further develops that work to a more detailed level. While the intent of the work approved during Preliminary Design will not change, a Design and Construction Report (DCR) and/or other document, will be prepared during Detail Design to address all issues which were outstanding at the end of Preliminary Design and identified during Detail Design.

Any minor design modifications or refinements made by the Project Team, or that stem from discussions with agencies (such as regulatory agencies and local municipalities) made during Detail Design will be documented in the DCR and/or other document. These refinements could result in environmental benefits, or impacts that may not have been anticipated during Preliminary Design and documented in this TESR.

Detail Design and Construction activities will include:

- ▶ Commencement of Detail Design public notice;
- ▶ Complete Drawings and Tender Documents;
- ▶ Cross section details;
- ▶ Resolution of all utility conflicts;
- ▶ Design and Construction Report;
- ▶ Environmental Clearance for Construction Start;
- ▶ Construction; and,
- ▶ Monitor for Environmental Provisions and commitments.

Monitoring objectives during construction include:

- ▶ Individual measures and issues such as those outlined in **Section 8.0** (e.g. erosion and sedimentation control, waste handling and materials /equipment storage); and,
- ▶ Monitoring of overall effectiveness of control measures.

The MTO has an internal process to identify and address updates to the Ontario Provincial Standard Specifications, and MTO Special Provisions and Non-Standard Special Provisions. This includes

ongoing review of unanticipated events that occur during other construction contracts and incorporation of required updates into future contract provisions. This helps to assess the effectiveness of the contract provisions to ensure that they are providing the expected control and / or protection.

On-site construction administration / inspection staff (retained by MTO) will ensure that the environmental protection measures outlined in this report are carried out. In the event that problems develop, the MTO Environmental Planner and appropriate external agency representatives will be contacted to provide additional input.

If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation will be changed or modified to reduce those impacts.