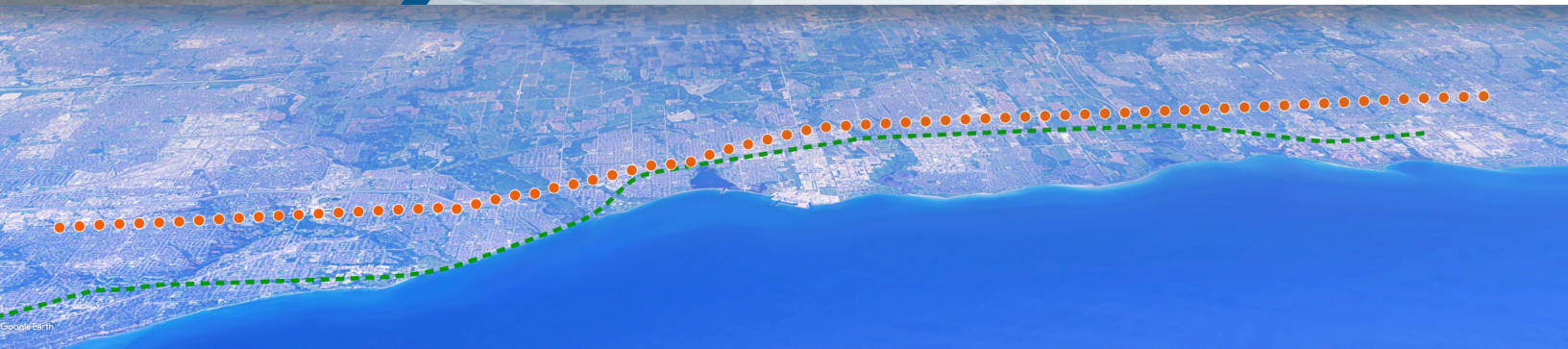




Durham-Scarborough Bus Rapid Transit Project

**Environmental Project Report
- Executive Summary**





Metrolinx acknowledges that it operates on the lands of Indigenous Peoples, including the Anishinaabe, the Haudenosaunee and the Wendat peoples, and that these lands are covered by Treaty.

In particular, we wish to recognize that the proposed work and project study area of the Durham-Scarborough BRT is situated on the treaty territory of the Williams Treaties First Nations, and the Mississaugas of the Credit First Nation, and we acknowledge that the lands are covered by the Gunshot Treaty 1788, the Williams Treaty 1923, and the Williams Treaty Settlement of 2018.*

Metrolinx has a responsibility to recognize and value the rights of Indigenous Nations and Peoples and conduct business in a manner that is built on the foundation of trust, respect and collaboration. Metrolinx is committed to building meaningful relationships with Indigenous Nations and working towards meaningful reconciliation with the original caretakers of this land. We wish to thank Indigenous Nations for their contributions to these reports.

** Notwithstanding the foregoing, nothing in this acknowledgement shall be interpreted so as to indicate Metrolinx's position on any Treaty territory or right.*

Executive Summary

ES.1 Project Overview

The Durham-Scarborough Bus Rapid Transit (DSBRT) corridor is a crucial transportation corridor connecting people through Durham Region and Scarborough in Toronto. The corridor has varied traffic patterns, land use conditions and physical constraints. Rapid growth in the past decade has increased travel demand across the Toronto-Durham boundary and, as growth continues into the foreseeable future, the resulting increase in demand for travel along the study corridor will require a higher capacity form of transit to link communities and employment on both sides of the Toronto-Durham boundary.

Studies and investment to date in the DSBRT corridor represent important first steps towards a robust and continuous rapid transit corridor. The DSBRT corridor was finalized through the Durham-Scarborough Bus Rapid Transit Study Initial Business Case (IBC) (Metrolinx 2018) with consideration of recent changes to transit planning including:

- Eglinton East Light Rail Transit (EELRT);
- Scarborough Subway Extension (SSE);
- Lakeshore East GO Expansion;
- New priority transit corridors in Durham Region and Scarborough as identified in the Durham Transportation Master Plan (2017) and Metrolinx 2041 RTP for the Greater Toronto and Hamilton Area (GTHA); and
- Planning studies for University of Toronto Scarborough Campus (UTSC) and Scarborough Centre transit facilities.

The DSBRT forms a key part of the 2041 Regional Frequent Rapid Transit Network (FRTN) that will ensure:

- Frequent 15-minute headway or better service, all day, seven days a week;
- Reliable service due to separation from traffic and the addition of signal priority measures;
- High speeds due to wider spacing of stops; and,
- Efficient transfers between routes, enabling a traveller to get anywhere in the GTHA easily and reliably without looking at a schedule.

ES.1.1 Study Area

The study area includes the DSBRT corridor will travel between Scarborough Centre and Downtown Oshawa along Ellesmere Road in Toronto; Kingston Road in Toronto/Pickering/Ajax; Dundas Street in Whitby; and King and Bond Streets in Oshawa. **FIGURE ES.1** illustrates the DSBRT corridor.



FIGURE ES.1. DURHAM-SCARBOROUGH BUS RAPID TRANSIT CORRIDOR

ES.1.2 Transit Project Assessment Process (TPAP)

This study was conducted on behalf of Metrolinx in accordance with the Transit Project Assessment Process (TPAP), as required by *Ontario Regulation 231/08: Transit Projects and Metrolinx Undertakings (O. Reg. 231/08)*. The TPAP is a proponent-driven, self-assessment process and does not require that a transit project be approved by the Minister of the Environment, Conservation and Parks (Minister) before proceeding (MECP 2014). As per the regulation, the six-month TPAP is broken down into three distinct phases:

- The up to **120-day** consultation and Final EPR preparation period;
- The **30-day** public, stakeholder, regulatory agencies, and Indigenous Nations review period; and,
- The **35-day** Minister review period.

ES.2 Project Description

The DSBRT will travel between Scarborough Centre and Downtown Oshawa along Ellesmere Road in Toronto, Kingston Road in Toronto, Pickering, and Ajax, continuing along Dundas Street in Whitby, and King and Bond Streets in Oshawa. The proposed

corridor will require roadway modifications to accommodate the dedicated transit lanes as shown in **Appendix A**.

A design vision for rapid transit stops and shelters was developed in consultation with Metrolinx, Durham Region Transit (DRT) and the Toronto Transit Commission (TTC). The design vision includes the following features:

- **Design Excellence:** all elements to deliver a consistent elevated level of design and function appropriate for high-order transportation;
- **Sustainable:** resilient, easy to maintain with high quality materials;
- **Safe:** uncluttered, clear sightlines and intuitive to use;
- **Accessible:** supportive of all types of active mobility and universal accessibility; and,
- **Placemaking:** an uplifting passenger experience that establishes a positive connection to the surrounding urban context.

In total, three shelter concepts were developed for the BRT stop design as shown in **Figure ES.2**.

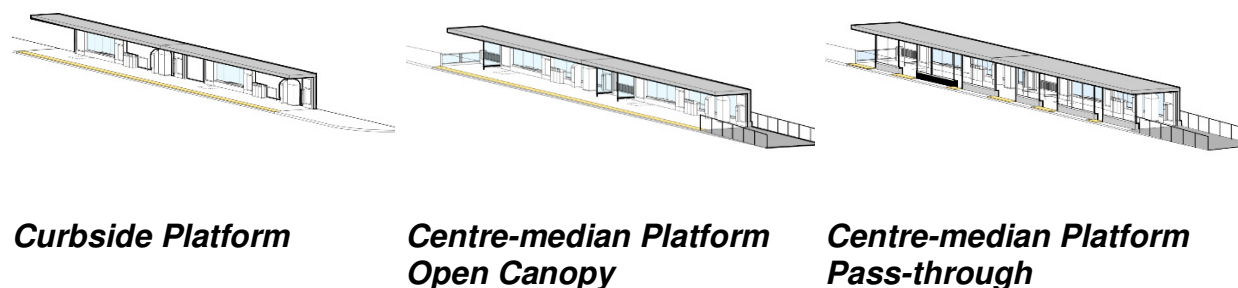


FIGURE ES.2. SHELTER CONCEPTS FOR THE BRT STOP DESIGN

All elements of the BRT design will meet current accessibility standards. The BRT stop design fosters a safe and secure environment by embedding principles from the Crime Prevention Through Environmental Design (CPTED) design approach. Cultural heritage can be integrated through BRT stop elements. The shelter concepts are transparent to minimize impacts to the viewscape. Opportunities to celebrate local heritage will be further explored in detail design, in consultation with the public and municipal staff.

ES.2.1 Preliminary Design

The DSBRT will travel at-grade following existing streets. Approximately 34 km will operate in dedicated transit lanes, and approximately 2 km will operate in mixed traffic conditions. On-street bus turnaround routes will include an additional 2 km of mixed traffic conditions. On-street bus turnaround routes will include an additional 2 km of mixed traffic conditions.

The DSBRT will travel along Ellesmere Road from east of McCowan Road to Kingston Road, then along Kingston Road (Highway 2) from Ellesmere Road over the Rouge River into Durham Region. The DSBRT will continue along Kingston Road, Dundas Street and eastbound on King Street, to Simcoe Street in Downtown Oshawa, and westbound on Bond Street, from King Street to Simcoe Street in Downtown Oshawa.

The preliminary design and design criteria are provided in **Appendix A** of this Environmental Project Report.

ES.2.2 Project Implementation

Construction is planned to occur in phases. Areas with existing congestion is proposed to be prioritized. The existing curbside BRT lanes through Pickering and Ajax in the Durham Region will be adopted to minimize additional construction costs. Construction timing also depends on progress on available funding, property acquisition, permits and approvals. The tentative implementation strategy is shown in six phases in **FIGURE ES.3**, which will be further assessed through the Preliminary Design Business Case.



FIGURE ES.3. DRAFT IMPLEMENTATION STRATEGY

ES.3 Existing Conditions

The existing conditions within the Study Area in the context of the built, natural, socio-economic, and cultural environments were used to establish a baseline to compare and evaluate the potential impacts of the Project. A summary of the existing conditions is provided as below. For further details please see **Chapter 3** of this report.

ES.3.1 Traffic and Transportation

Existing Road Network

The DSBRT corridor is classified as major or minor arterial road with posted speed limit ranging from 50 km/h to 60 km/h within the Study Area.

Existing Traffic

Most intersections in the DSBRT corridor operate at Level of service (LOS) D or better, with exception of the Salem Road and Lake Ridge Road intersections which both operate at overall LOS E in the p.m. peak hour.

Existing Transit Network

There are existing local and transit express transit stops on the corridor served by Toronto Transit Commission (TTC), Durham Region Transit (DRT), and GO Transit bus routes. North-south transit routes at arterial intersections provide connections to and from GO train stations south of the Project.

Existing Active Transportation Network

In the City of Toronto, existing cycling facilities are provided on Ellesmere Road from Dormington Drive to Orton Park Road. There are generally sidewalks on both sides of Ellesmere Road west of Morningside Avenue. East of Morningside Avenue, sidewalk is provided intermittently on one or both sides of Ellesmere Road. Along Kingston Road, sidewalks are also intermittent. There are existing on-road bike lanes on Kingston Road at the intersection of Sheppard Avenue. Some streets that cross the DSBRT have existing on-road bike lanes or multi-use paths.

In Durham Region, existing cycling facilities are provided intermittently in Pickering and Ajax where Kingston Road was widened to provide curbside bus lanes. There are generally sidewalks on both sides of Kingston Road, Dundas Street, King Street and Bond Street.

ES.3.2 Natural Environment

Existing Watercourses/Hydrological Features

A total of 24 watercourses cross the DSBRT corridor. The Project includes two crossings of Oshawa Creek; one at King Street and one at Bond Street, for a total of 25 watercourse crossings.

Existing Aquatic Environment

Of the 24 watercourses, four are located within the City of Toronto (Crossings 1-4); seven are located within the City of Pickering (Crossings 5-11); three are located within the Town of Ajax (Crossings 12-14); six are located within the Town of Whitby (Crossings 15-20); and three are located within the City of Oshawa (Crossings 21-23).

The watercourses are located within 10 watersheds: Highland Creek; Rouge River; Petticoat Creek, Frenchman's Bay (Amberlea, Dunbarton and Pine Creeks); Duffins Creek, Carruthers Creek, Lynde Creek; Pringle Creek; Corbett Creek; and, Oshawa Creek. The first six watersheds are under the jurisdiction of the Toronto and Region Conservation Authority (TRCA) and the remaining four are under the jurisdiction of Central Lake Ontario Conservation Authority (CLOCA). Seven of the crossings have coldwater/coolwater thermal regimes while the rest have warmwater thermal regimes.

Existing Terrestrial Environment

A total of 29 ecosites/vegetation types were identified within the Study Area. The range of vegetation communities present within the Study Area include several deciduous and mixed forest types.

Existing Wildlife

There are many natural heritage features located within the Study Area, mainly associated with the watercourses and valleylands. Outside of the valleylands, the landscape is highly disturbed and supports limited natural heritage features (largely composed of manicured lands), resulting in the presence of a low to moderate diversity of wildlife species generally considered urban or tolerant of anthropogenic features and disturbance.

Existing Significant Wildlife Habitat

Although no Significant Wildlife Habitat was documented as per the Provincial Policy Statement, many portions of the Study Area provide important local and regional animal movement corridors, notably all creeks and associated valley and riparian areas.

Existing Species at Risk

A total of 17 species at risk (SAR) have been recorded in the vicinity of the Study Area by secondary source data, including data obtained from Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) Natural Heritage Information Centre (NHIC), Department of Fisheries and Oceans (DFO), TRCA and CLOCA. These 16 species include three aquatic SAR, two plant SAR, and 12 wildlife SAR.

Existing Significant Natural Heritage Features

Designated natural areas include areas identified for protection by the MNDMNRF, TRCA, CLOCA and upper and lower tier municipalities. There are three Provincially Significant Wetlands (PSWs) located within the vicinity of the Study Area. Unevaluated wetlands include wetlands that have not been evaluated using the Ontario Wetland Evaluation System (OWES) and are not identified as provincially significant. Within the vicinity of the Study Area, there are seven unevaluated wetlands. There are three Areas of Natural and Scientific Interest (ANSIs) located in the vicinity of the Study Area. According to the TRCA (2019b) and City of Toronto (2019b), there are five Environmentally Significant Areas (ESAs) located within the Study Area.

ES.3.3 Landforms/Physiography, Soils, Geology, and Groundwater

The entire Study Area is located within the South Slope and the Iroquois Plain physiographic regions. Bedrock consists of shale, limestone, dolostone and siltstone of the Georgian Bay Formation from the Upper Ordovician period (Ontario Geological Survey 1991). Quaternary geology consists of deposits from the Pleistocene Epoch.

Shallow groundwater or indications of shallow groundwater were encountered within the Study Area. The Study Area is highly urbanized with most properties connected to municipal drinking water systems that are supplied from Lake Ontario.

ES.3.4 Tree Inventory

A total of 7,926 trees consisting of 86 species were inventoried within the Study Area. The majority of the trees within the Study Area are planted amenity trees in road ROWs, front and rear yards of residences.

ES.3.5 Cultural Environment

A total of 235 Built Heritage Resources (BHRs) and Cultural Heritage Landscapes (CHLs) have been identified within the Study Area. Six cemeteries were identified in the Study Area.

According to the Ontario Archaeological Sites Database (OASD), 77 previously registered archaeological sites are located within one kilometre of the Study Area. A total of 12 sites are within 50 metres of the Study Area.

ES.3.6 Socio-Economic Environment and Land Use

The community resources along the Project include 79 schools, plus numerous libraries, parks, cemeteries and community centres. A total of 4,285 existing business establishments were inventoried within the Study Area.

In the City of Toronto Official Plan, the Scarborough Centre is identified as an Urban Growth Centre mandated by the Province in *A Place to Grow: Growth Plan for the Greater Golden Horsehoe*. Downtown Pickering and Downtown Oshawa are also designated as Urban Growth Centres by the Province. In the Durham Region Official Plan (DROP), Kingston Road, Dundas Street, and King Street are identified as a Regional Corridor and a Transit Spine, which are intended to promote public transit ridership through well designed, mixed-use development of higher densities.

ES.3.7 Infrastructure

Existing infrastructure beyond the roadway includes utilities, municipal services, structures, culverts, two rail crossings, and two highway interchanges. Existing infrastructure was identified through survey of the entire corridor and sub-surface utility engineering at select locations.

A total of 29 crossing structures were assessed for hydraulic performance against criteria listed in guidelines published by Ministry of Transportation (MTO), Conservation Authorities, and local Municipalities. Existing issues were identified and considered in the development of the preliminary design.

Existing storm sewer systems are present within the DSBRT corridor. Runoff from Ellesmere Road and Kingston Road are collected by the existing catchbasins, conveyed, and eventually discharged to the watercourses. Roadside ditches are present from Galea Drive to Lake Ridge Road. Stormwater management facilities were identified along the corridor based on preliminary review of the topography of the study area and aerial imagery.

ES.3.8 Air Quality

Eleven (11) air contaminants of concern in three (3) categories were selected as ambient air quality criteria for the evaluation. In summary, with the exception of NO₂, PM_{2.5}, Benzene and Benzo(a)pyrene, all model-predicted concentrations of PM₁₀, SO₂, and CO for all averaging periods for existing conditions are well below applicable ambient air quality criteria (AAQCs) even with the addition of background concentrations at the modelled receptors.

ES.3.9 Noise and Vibration

Existing Noise Sensitive Areas (NSAs) were identified using aerial photography and confirmed through site visits. There are several existing noise barriers throughout the corridor. Noise impacts were assessed in outdoor living areas (OLAs) of a noise sensitive land-use including private homes, townhouses, apartment buildings with OLAs, hospitals and nursing homes. Baseline noise and vibration levels were established and verified through 24-hr measurement at 39 representative sensitive receptor locations. Noise assessment criteria followed MTO and Durham Region protocols.

ES.4 Potential Impacts, Mitigation Measures, and Monitoring

The impacts of the preliminary design have been assessed by discipline-specific environmental studies to identify the footprint, construction and operation/maintenance impacts associated with the implementation of the DSBRT.

The impact assessment considered:

- Impacts identified through the completion of technical studies;
- All applicable federal and provincial regulatory requirements for the assessment of environmental effects;

- Issues raised by external agencies, the public, property owners, Indigenous Nations, and other persons of interest during consultation and participation activities conducted to date; and,
- Engineering design and programs for mitigation and monitoring.

The following tables (**TABLE ES.1 TO TABLE ES.9**) present a summary of the potential impacts and proposed mitigation and monitoring measures. Further details are provided in **Chapter 4** of this report. If the proposed works change following the EPR, the proponent will be required to assess any change to the impacts.

TABLE ES.1. SUMMARY OF POTENTIAL TRANSPORTATION IMPACTS, MITIGATION MEASURES AND MONITORING

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------------|--|--|--|
| During Detail Design | | | |
| Traffic | <ul style="list-style-type: none">Changes to left-turn traffic patterns; andChanges to truck routes / haul routes. | <ul style="list-style-type: none">Develop signal timing plans that provide protected-only (fully-protected) left-turn signal phasing at all signalized intersections;Complete a haul route analysis to confirm that heavy single unit trucks are not subject to detour routes through residential areas, that turning radius is adequate for safe operation on detour routes, and that heavy single unit trucks can safely and easily access loading and unloading facilities;Develop a Signage and Wayfinding Action Plan which directs vehicle and pedestrian traffic through the Study Area during construction by identifying appropriate locations and types of signage required.Consider signal timing changes or additional turn lane storage in the detail design for Ellesmere Road at Markham Road, and Kingston Road from Altona Road to west of Elizabeth Street. | N/A |
| During Construction | | | |
| Traffic | <ul style="list-style-type: none">Changes to traffic capacity during construction. | Complement a Traffic Staging and Management Plan in coordination with regions/municipalities. Within the City of Toronto, this plan is to meet City requirements for a Traffic and Transit Management Plan (TTMP) and an Access Management Plan (AMP). An updated Traffic Impact Assessment (TIA) may be required depending on the project implementation timeline. | Monitor traffic volumes and adjust signal timings as necessary before, during and after construction |
| Active Transportation Network | <ul style="list-style-type: none">Pedestrian and cycling infrastructure may be closed during construction for an extended period, potentially resulting in pedestrian and cycling infrastructure gaps; andSafety concerns when using pedestrian and cycling infrastructure such as bike lanes and sidewalks due to reduced lanes and parked construction equipment. | Determine if cycling infrastructure is safe to use during construction. If it is considered potentially unsafe, that facilities will be temporarily closed and cyclists will be re-routed, where possible, until the infrastructure is safe to use | N/A |
| During Operation | | | |
| Traffic | <ul style="list-style-type: none">Changes to intersection traffic capacity during operation. | <p>Consider signal timing changes along Ellesmere Road from Morningside Avenue to Kingston Road, and along Kingston Road from Ellesmere Road to Raspberry Road:</p> <ul style="list-style-type: none">Longer traffic signal cycle length;Protected/permissive northbound and southbound left turn phases; andAdaptive signal timing. | On-going monitoring of traffic flow and adjustments to signal timing accordingly as necessary. |

TABLE ES.2. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: NATURAL ENVIRONMENT

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|---|---|---|
| During Detail Design | | | |
| Watercourses and Hydrological Features | <p>Volumes of runoff and local peak flows will increase as a result of the introduction of new impervious areas.</p> <p>Potential for water quality impacts in the form of increased erosion and contaminant (e.g., oils, road salt) input.</p> | <p>Conduct a detailed assessment of storm and surface drainage and watercourses to inform the detail design See Section 4.7 for the proposed drainage/stormwater management measures. Update the preliminary Drainage/Stormwater Management Plan in consultation with regulatory agencies (including TRCA/CLOCA) to manage storm and surface drainage/runoff and build upon the drainage/stormwater management mitigation measures/practices. Where feasible, the plan for the management of stormwater will adhere to the TRCA's The Living City Policies (TRCA 2014), at least within the TRCA's jurisdiction. Low impact development (LID) measures will be incorporated to the extent possible where stormwater management is required along the DSBRT to achieve stormwater management as per TRCA and CLOCA stormwater management criteria.</p> <p>Runoff generated by the new DSBRT lanes will be collected and treated using approved stormwater management practices employing a treatment-train approach including source, conveyance and end-of-pipe measures, where feasible (see Section 4.7). Stormwater management mitigation design will consider the environmental setting into which the drainage system will be placed. Salt vulnerable areas will be identified and the potential for salt impacted drainage in these areas must be assessed.</p> <p>Initiate TRCA's Voluntary Project Review (VPR) process. Submit design drawings, following TRCA submission requirements. Design project components within TRCA's regulated area in accordance with TRCA's guidelines. Prepare and submit an interim site protection plan to TRCA if proposed works are phased over multiple construction seasons.</p> | N/A |
| | <p>Work/impacts are proposed at 20 of the 24 watercourse crossings (including culvert extensions, structure widenings, and structure replacements). No in-water work is proposed at five watercourse crossings including Highland Creek (Crossing 1), Tributary of Highland Creek (Crossing 2), Rouge River (Crossing 4), Goodman Creek (Crossing 22), and Oshawa Creek – King Street Bridge). Overall drainage volume will increase at all crossings due to the increased impervious surface area associated with the widened DSBRT corridor and associated runoff directed to the receiving watercourses and hydrologic features.</p> | <p>Impacts to watercourses have been minimized to the extent possible by design refinements.</p> <p>General mitigation of effects to watercourses and hydrologic features related to drainage and stormwater management are discussed in Section 4.7.</p> <p>Mitigation that will be applied to effects caused by construction and operations are presented in 4.2.2.2 and 4.2.2.3 (and under Construction and Operation Impacts below) and in Section 4.2.3 (related to aquatic environment).</p> | N/A |
| | <p>Impacts to navigable waters under the CNWA.</p> | <p>All works on unscheduled waterways that were not opted-out are to be treated as 'legacy' works and must therefore be considered the same as any work on a scheduled waterway. An application must always be submitted for works proposed at these waterways and approval must be received prior to undertaking any activities. As a result, prior to the commencement of any work and during the detail design phase, for all proposed works on the waterways within the Study Area, the proponent will be required to either submit a voluntary application and receive an Approval document or undertake the owner-led Public Resolution Process with no Transport Canada involvement. The proponent will make a determination during detail design regarding how to proceed and consultation with Transport Canada will take place as required. CNWA provisions will also be reviewed during the detail design phase and the proponent will be required to adhere to the current legislation and obtain/submit any required permits/approvals under the CNWA prior to construction, if required.</p> | N/A |
| Aquatic Environment | <p>The footprint of the DSBRT corridor (and associated culvert/structure modifications) will result in a number of permanent changes to the aquatic environment at</p> | <p>Impacts to the aquatic environment (fish and fish habitat) have been minimized to the extent possible by design refinements. Table 4.2 presents the proposed works, impacts/net</p> | <p>Environmental Monitoring and Contingency Plan to include monitoring during</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|--|
| | <p>20 watercourse crossings within the study limits (see Table 4.2), all of which constitute fish habitat (directly or indirectly).</p> <p>Effects to aquatic habitat from the DSBRT corridor will mainly involve the alteration of habitat through enclosure within/under culverts/ bridges, almost exclusively due to extensions of existing culverts and bridge widenings/replacements. There may also be affects due to channel realignments (Crossing 15), the construction of retaining walls (Crossing 5) and extensions of in-water bridge piers (Crossing 12). The area of aquatic habitat that may potentially be altered through the proposed works and further details on impacts are presented in Table 4.2. At five crossings (1, 2, 4, 22 and 23 - King Street bridge), no in-water work is proposed and no effects to the aquatic habitat are expected to occur.</p> | <p>environmental effects of those works on the aquatic environment and site-specific mitigation at each watercourse separated by municipality.</p> <p>Fish and wildlife friendly culvert and bridge design will continue to be considered as part of this project during the detail design phase, where feasible. No new barriers to fish passage will be created from works associated with this project. Consider fish and wildlife friendly culvert and bridge design as part of the Project. Opportunities to improve fish passage via culvert works will be considered further during the detail design phase, where feasible. DSBRT structure/culvert modifications have been designed to maintain and promote wildlife passage across the landscape. Where sheet flow occurs in culverts, the installation of flow deflectors can help deepen flows and capture sediment to form low flow channels that can pass fish.</p> <p>At Crossing 19 (Pringle Creek), there are baffles secured to the concrete bottom of the culvert currently. There is also a concrete “ramp” at the upstream end of the culvert over which water spills as an extremely shallow sheet which forms a barrier during low flow conditions. Eliminating this ramp would be beneficial to restoring fish passage within this watercourse.</p> <p>For mitigation regarding direct effects on the aquatic environment, measures to be taken (to be reviewed during the detail design phase), generally include minimizing the design to keep necessary bridge widenings and culvert extensions as short as possible, employing retaining walls to reduce encroachment into riparian areas and confining work to as small an area as possible.</p> <p>Consultation with DFO during detail design will be necessary to determine whether a HADD of fish habitat will occur at locations where works are proposed below the high water line (i.e., within the bank, full width of the channel) in fish habitat, and to confirm the process at that time to determine next steps. Requests for review forms should be submitted to DFO for all crossings where culvert or bridge works are proposed (all crossings except Crossings 1, 2, and 22). A <i>Fisheries Act</i> Authorization will be secured during detail design, if required. Secure any required Fish Collector’s permits for salvage during the detail design phase as required.</p> | <p>construction and post-construction activities specific to watercourses and aquatic habitat.</p> |
| Terrestrial Environment | <p>Displacement of/disturbance to vegetation and vegetation communities including a loss of 44.61 ha of vegetation communities (see Table 4.3 for details).</p> <p>Majority of impacts to anthropogenically influenced lands with the loss of 32.09 ha and to cultural vegetation communities with the loss of 11.46 ha.</p> | <p>Displacement of/disturbance to vegetation and vegetation communities has been avoided/minimized to the extent possible. However, some impacts to vegetation/vegetation communities are unavoidable in order to meet Metrolinx design standards and to accommodate the proposed widening and geometry associated with the DSBRT.</p> <p>Commence consultation with CLOCA and TRCA early in detail design to develop the vegetation compensation strategy in parallel with design refinements to minimize impacts. Delineate natural heritage feature limits and ELC vegetation communities at a detail design level to inform impacts both temporary and permanent and development of restoration and compensation strategies.</p> <p>No impacts to vulnerable community types. All of the vegetation communities identified within the Study Area are considered to be widespread and common in Ontario and secure globally.</p> | <p>N/A</p> |
| | <p>Removal of 0.92 ha of wetland communities (small portions of meadow marsh, shallow marsh, thicket swamp and deciduous swamp habitat) and 0.14 ha of forest edge communities (deciduous and mixed forest).</p> <p>Potential impacts to federally owned land associated with the Rouge National Urban Park.</p> <p>Negative impacts along forest borders and potentially within the forest interior associated with the removal of forest vegetation along existing forest edges or the removal of a portion of a forested feature that results</p> | <p><u>Mitigation/Compensation Associated with Vegetation Community Impacts – Environmental Policy Guideline/Documents</u></p> <p>Further review during detail design of the noted environmental policy guidelines/documents, as well as agency consultation (with TRCA, CLOCA, MECP, MNDMNR, Parks Canada, etc.), will be undertaken to ensure compensation, mitigation compliance and agreement in association with vegetation impacts. The following principles/standards outlined in the environmental policy documents will be adhered to:</p> <ul style="list-style-type: none">• Where avoidance of the natural system is not possible, impacts will be minimized to the extent possible including impacts associated with access, construction, operations and maintenance;• Compensation is recommended when avoidance of the natural system is not possible; | <p>Preparation of an Environmental Monitoring and Contingency Plan during detail design where infrastructure is permitted within valley or stream corridors, wetlands, woodlands, and/or hazardous lands or sites (also to address potential emergencies during construction).</p> <p>Ensure adherence to compensation agreements/requirements (to be secured during detail design) including implementation monitoring and subsequent monitoring of planted material/compensation</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|--|
| | <p>in the exposure of a new forest edge. Direct and indirect impacts as a result of newly exposed edges include:</p> <ul style="list-style-type: none">• exposure of the retained vegetation to the effects of increased light, wind, and sun which results in decreased soil moisture;• exposure to salt spray;• reduced establishment of shade tolerant plant species and an overall reduction in plant species richness and abundance;• increased invasion/spread of aggressive non-native plant species;• loss of native seedbank;• decreased presence of interior habitat;• exposure of “edge” trees to windthrow;• changes in wildlife diversity and abundances;• destabilization of landforms composed of unconsolidated material and/or soil compaction; and• changes to hydrology. | <ul style="list-style-type: none">• Compensation through ecological restoration such as the creation or enhancement of habitat will be undertaken, planning of which will be carried out early in the detail design phase to maximize options for restoration to the natural system;• Compensation will be based on habitat type (ELC) impacted, size or area (ha) of impact, and its function;• Where the creation of habitat is identified, it will be located outside of the identified natural system from where impacts occur and connected to or contiguous with this system, to the extent possible. Undertake compensation through ecological restoration such as the creation or enhancement of habitat, and habitat and carry out the planning early to maximize options for restoration to the natural system. Compensation for communities other than forest and wetland communities (i.e., CUW, CUT and CUM) will be considered/discussed during the detail design phase;• Compensation of habitat is preferred as close to the original location and within the same watershed, to the extent possible. Compensation will be implemented coincident with the timing of natural heritage removals on a subwatershed scale (i.e., Creek by Creek) to ensure no net loss of ecological value over the period of project implementation where possible;• Compensation will serve to improve the size, connectivity, and shape of the local ecosystem and the larger natural heritage system, which will include expanding woodlots, hedgerows, wetlands and meadows to buffer and connect important natural features;• Compensation may have specific requirements that need to be incorporated in the design and implementation of works (i.e., use by particular species, transplanting plant material (where feasible), invasive species management, promoting biodiversity, maintaining or restoring Carolinian vegetation communities, etc.);• Replacement of trees at a ratio representative of their ecosystem function and service, as determined by the individual tree approach, where access to contiguous habitat outside of the ROW excludes determining mean basal area for a feature; and• Factors to be considered when establishing agreements for compensation include documenting baseline conditions and impacts, specific vegetation objectives or targets for both preferred and incompatible species (i.e., non-native and/or invasive/hazardous species), considerations for location, siting (i.e., topography, soil conditions, vegetation compatibility, compatibility with adjacent land uses, etc.) and timing, detailed planting plans, implementation monitoring and subsequent monitoring of planted material, etc. <p>When all other compensation efforts are not feasible, cash-in-lieu compensation measure for impacts associated with conservation authority or municipal lands will be considered by Metrolinx/the proponent and respective regulatory agencies. Funds will be used only for tree compensation as part of vegetation compensation to improve components of the natural heritage system, adhering to restoration principles outlined, to the extent possible. Cash-in-lieu compensation must be submitted prior to permit issuance.</p> <p>Metrolinx, as a Crown agency of the Province of Ontario, is generally not subject to the legal requirements of the <i>Conservation Authorities Act</i> and the conservation authorities permitting processes. However, Metrolinx/the proponent will work closely with conservation authorities to achieve conformance to their respective requirements (including TRCA’s Living City Policies). During the detail design phase, engagement with TRCA and CLOCA will continue including consultation/negotiation processes and submitting design information, where appropriate, without formally entering into the permitting process.</p> <p>Impacts to federally owned lands associated with the Rouge National Urban Park are not anticipated. If during detail designs impacts are identified that are not avoidable, the Rouge National Urban Park Management Plan (Parks Canada 2019) will guide planning and implementation, as required. Consultation with Parks Canada to continue during detail design and cumulative effects will be identified and mitigated.</p> | <p>planting areas (including transplanting plant material (where feasible), invasive species management, promoting biodiversity, maintaining/restoring Carolinian vegetation communities).</p> <p>Monitoring of compensation planting areas will include contingencies to mitigate for plant mortality, species incompatibility with site conditions, invasive species presence, etc.</p> <p>Adaptive management will be considered during monitoring.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <p>Apply compliance with all above noted principles/standards to the final vegetation community impact areas which may be refined during the detail design phase.</p> <p>All works will be undertaken in accordance with the Ontario Regulation 166/06, TRCA's Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.</p> <p><u>Vegetation Community Offsets/Compensation</u></p> <p>Undertake design refinements during detail design to further minimize impacts to forest and wetland communities to the extent possible. Ensure tree protection hoarding plans are submitted and approved prior to permit issuance. Provide a summary of vegetation removals within each watershed if required for compensation purposes.</p> <p>Offset/compensate for the removal of wetland and forest communities through restoration, through habitat creation and/or the enhancement of nearby vegetation communities, to the extent possible.</p> <p>Disturbed lands that are suitable for restoration post-construction will be restored.</p> <p>Where suitable habitat to restore wetland is less than calculated removals, the restoration of forest habitat in lieu of wetland, will be considered in discussion with agency staff.</p> <p>Where lands are identified for forest and wetland offsetting, no fill placement will be undertaken and plantings will be installed into natural, good quality soils.</p> <p>If, during construction, additional forest or wetland habitat is impacted, additional offsetting will be undertaken.</p> <p>Discussion with municipal and agency staff (including TRCA, CLOCA, MECP, MNDMNRF and Parks Canada, as required) will be undertaken during detail design, and in compliance with relevant environmental policy (as noted above), to identify suitable sites for offsetting to compensate for habitat loss as part of implementing the project.</p> <p>Restoration of suitable forest and/or wetland habitat will be undertaken at a compensation ratio to be determined through further discussion with regulatory agencies (e.g., TRCA, CLOCA, MECP, MNDMNRF, Parks Canada, etc.), as part of implementing this project.</p> <p>Compensation will be undertaken following applicable Tree By-laws and Ecological Restoration with replacement at a 1:1 ratio on an individual tree basis (Metrolinx 2020), and will be in accordance with applicable environmental policies and the standards of respective agencies and municipalities (see Section 4.4.3 and Appendix D for preliminary calculations).</p> <p>Site suitability of lands where habitat restoration and/or enhancement could be undertaken, typically within or adjacent to the ROW, will consider the following:</p> <ul style="list-style-type: none">• site conditions for specific habitat function;• habitat for species protected under the Ontario ESA 2007, if confirmed that the DSBRT corridor will impact existing SAR habitat and where mitigation or a permit is required;• ensuring that compensation occurs as close to the location of vegetation removals as possible and typically within the same watershed/sub-watershed;• ensuring that compensation is prioritized on lands adjacent to existing forest to increase contiguous habitat;• ensuring that restoration/enhancement is undertaken outside of existing natural features;• ensuring provision of buffering capacity to protect existing vegetation communities;• increasing species diversity;• supporting/increasing habitat connectivity; and,• improving habitat conditions to facilitate the movement of wildlife. | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <p>The City of Toronto requires replacement ratios by tree category as follows as per the City of Toronto By-laws:</p> <ul style="list-style-type: none">• Private tree located on the Project Site: 3:1;• Private tree located on property adjacent to the Project Site or on the boundary of the Project Site and adjacent property: 3:1;• Park tree: 3:1;• RNFP tree: healthy tree >10 cm: 3:1; healthy tree <10 cm: 1:1; poor condition tree: 1:1; tree injury: 1:1; hedge removal: 1 tree per 5 m of hedge removed; and,• City tree: 3:1. <p>Review environmental policies/guidelines and continue agency consultation during detail design (as noted above) to ensure compliance and agreement regarding compensation for habitat loss.</p> <ul style="list-style-type: none">• Discussions with respective municipal and regulatory staff will be undertaken to determine if compensation for the DSBRT corridor can be tracked as part of cumulative losses with other infrastructure projects. In this regard, compensation may be explored through existing municipally owned lands and existing ecological restoration programs;• Compensating for land loss of habitat on a 1:1 ratio within the same ecosystem, to the extent possible, while adhering to the baseline compensation of individual trees at a 1:1 ratio. Offsetting habitat loss must be on lands in close proximity to removals and where feasible to extend contiguous habitat within natural heritage systems to maintain/extend connectivity. Calculating compensation should also take into account vegetation type using the Ecological Land Classification system; and• Where compensation is undertaken, reporting components will include a description of impacted ecosystems, a description of any proposed compensation locations, a proposed work plan, detail design drawings, a construction phasing plan, monitoring plan, etc. <p>Discuss the option to provide cash-in-lieu when suitable restoration sites cannot be identified and ensure adherence to criteria set out in the respective environmental policy guideline documents as well as municipal by-laws. Cash-in-lieu compensation must be submitted prior to permit issuance.</p> <p><u>Wetland Community Impacts</u></p> <p>Post-construction, new wetland areas will be created as a result of changes in drainage related to the construction of the DSBRT corridor which will help mitigate for removals of similar wetland types.</p> <p>Consider implementation of edge management including high-density plantings of robust, native wetland plant species (see discussion below) to mitigate impacts related to invasive species establishment/encroachment further into wetlands, and to increase local diversity.</p> <p>Ensure the removal of dumped garbage and the treatment of invasive species such as common reed.</p> <p><u>Forest Edge Management</u></p> <p>Consider/implement forest edge management (where forest edge management is recommended) in accordance with the TRCA Forest Edge Management Plan Guidelines (2004) at impacted forest communities during detail design.</p> <p>Implement forest management techniques where new edges are exposed to enhance edges and mitigate the associated impacts to forest communities. Mitigation measures will include, but are not limited to, the following:</p> | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <ul style="list-style-type: none">Undertake planting of appropriate native trees, shrubs and ground flora as soon as possible following vegetation removals. Plant species used within the buffer will be somewhat similar to those in the adjacent habitat and be non-invasive in nature;Plant woody stock at high densities along new edges to increase buffering capacity over time;Design grading within areas where edges will be newly created to meet existing grades a minimum of 3 m away from the tree drip-line, to the extent possible;Minimize compaction of soils on lands immediately adjacent to the newly exposed forest edge to the extent possible. Decompaction efforts and methodology will be site specific. Where decompaction is required, it will extend to a minimum depth of approximately 25 cm;Maintain drainage patterns adjacent to newly created edges to avoid changes in soil moisture, to the extent possible (especially around wetland areas and forest communities with substrates that maintain increased moisture capacity);Install suitable tree protection fencing and regularly maintain fencing along any newly exposed forest edges;Immediately mitigate the spread/invasion of aggressive plant species. Include filter fabric along all tree protection fencing to enhance protection from the spread of invasive, aggressive plant species;Ensure the contractor provides a warranty on planted material to ensure that the newly planted material survives and fulfils the intended function; andEnsure restoration plantings are not undertaken in fill but in areas with suitable soil conditions for sustained vegetation growth and health. Where these conditions cannot be met, soil amendments primarily incorporating/mixing suitable soils into the top 0.3 to 1.0 m of fill will be considered. <p><u>Planting Plans</u></p> <p>Develop a detailed landscape planting plan (including landscape composition planting layout drawings) during detail design prior to construction and once areas identified for restoration have been determined in consultation with the respective agencies. Submit restoration plans and replanting plans (along with erosion control fencing plans) prior to permit issuance.</p> <p>Undertake the planting of forest and wetland habitat with the appropriate native and non-invasive and locally appropriate plant species that will be presented on site-specific plans to be developed by an experienced landscape architect/ecologist.</p> <p><u>General Environmental Protection/Mitigation Measures</u></p> <p>Review the additional environmental protection/mitigation measures outlined below during detail design to minimize and mitigate footprint-related impacts associated with the construction of the DSBRT corridor and identify any additional mitigation measures through a further review of policies and/or agency discussion during detail design.</p> <ul style="list-style-type: none">Efforts to minimize encroachment, displacement of, and disturbance to vegetation/vegetation communities will be undertaken, to the extent possible. Avoidance of wetlands and forest will be prioritized to the extent possible;Incorporate current BMPs to inform, avoid and mitigate impacts throughout the Study Area, including within regulated areas, designated natural areas, federal lands, etc.;Maintain existing topography to the extent possible to minimize grade changes to adjacent natural areas;Prohibit the placement of fill within hazardous lands, watercourses, wetlands and other areas to mitigate interference with the hydrological function of a wetland, or in areas where | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <p>compensation planting may be undertaken to mitigate interference with the growth of planted tree and shrub stock;</p> <ul style="list-style-type: none">• Ensure impacts to natural habitat associated with the Rouge National Urban Park demonstrates a net ecological gain. Undertake discussion with Parks Canada staff prior to construction as necessary to discuss vegetation impacts of park lands and for approval. During detail design, further review of the Rouge National Urban Park Management Plan (2019) will be undertaken to ensure compliance with key strategies;• If required, incorporate SAR planning into planting areas, to the extent possible;• Plant removal and maintenance will comply with the requirements of the MBCA. Thus, disturbance, clearing or disruption (i.e., maintenance, etc.) of vegetation where birds may be nesting will be completed outside of the migratory bird nesting timing window of April 1 to August 31;• Where mowing of vegetation is required, pollinator habitat will be considered, where feasible, by avoiding late summer mowing in areas with suitable pollinator plant species that may also negatively impact pollinator larvae on host plants, such as milkweed;• Implement appropriate erosion and sediment controls and best management practices to mitigate construction impacts including the installation of a cover crop, erosion control blanket, etc.;• Minimize encroachment into areas where vegetation is to be retained by installing suitable protective fencing;• Flush cut tree stumps and minimize grubbing, to the extent possible;• Explore opportunities to pre-stress shrubs and certain tree species along forest edges, by cutting to encourage suckering and minimize negative impacts to newly exposed edges, until such a time when these areas are stabilized with permanent plantings and preferred seed mixes post-construction;• The application of a nurse crop with a preferred seed mix is recommended. Suitable nurse crop species include Virginia wild rye, Canada wild rye, common oat, and buckwheat. Due to its potential to interfere with the establishment of preferred species, annual rye is not recommended for use; and• Preferred seed mixes for restoration projects are outlined in the Metrolinx Vegetation Guideline (2020) with species' selection including native species in compliance with multiple conservation authority jurisdictions. Plant species will also be native to the City of Toronto and Durham Region. Seed mixes will be applied at the specified rate of 22-25 kg/ha or adjusted as necessary to suit application method and site conditions. | |
| | Potential for establishment of non-native and invasive plant species. | <p>Implement mitigation measures to help control non-native and invasive plant species that become established, as well as prevent the establishment of new non-native and invasive plant species. Measures will include, at a minimum, the following:</p> <ul style="list-style-type: none">• Consideration of relevant regulations where feasible including the federal <i>Plant Protection Act</i> and <i>Seeds Act</i> and the provincial <i>Invasive Species Act</i> and <i>Weed Control Act</i> with restrictions on spreading four species including black dog-strangling vine, dog-strangling vine, Japanese knotweed, European common reed. Emerging or established populations observed will be effectively treated especially in areas identified for compensation or mitigation;• Managing dense patches of common buckthorn, garlic mustard, Canada thistle, and Russian or Autumn olive;• Overall and where feasible, consideration for the management of invasive species will include the existing species composition, the nature of the invasive species, potential impacts of spread, type of control including the use and type of herbicide, etc.; | Monitoring of compensation planting areas will include contingencies to mitigate for invasive species presence/management. |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <ul style="list-style-type: none">• Application of treatment/mitigation methods will vary depending on site conditions and will consider indirect and direct impacts and incorporate up to date best management practices;• Invasive species treatment may include several treatment applications over time;• Herbicide treatments will be applied at the optimal time by licensed, experienced personnel. Herbicide treatment will be used in conjunction with cutting or mowing to also mitigate spread by seed. Invasive species management is particularly important where habitat creation and/or enhancement is undertaken to support restoration trajectories/objectives;• Minimize the exposure of bare soil and, where bare soil persists, these areas will be planted with a non-invasive annual cover crop for an interim period, while preferred species become established; and• Prohibit the use of non-native and invasive ornamental plants for landscaping (e.g., Norway maple, purple loosestrife, Japanese knotweed, Japanese honeysuckle, etc.). | |
| Wildlife | Displacement of/disturbance to wildlife/wildlife habitat. Limited negative effects are anticipated as wildlife habitats identified within the Study Area consist almost entirely of previously modified/ disturbed wildlife habitat with low habitat diversity and limited habitat potential. | Minimize impacts to the habitats affected by the DSBRT corridor in the vicinity of the watercourses/valleylands/ natural areas and to designated natural areas to maintain opportunity for wildlife movement through these features. No extension of the road platform is proposed in the vicinity of the Rouge River/Little Rouge Creek valleyland which will maintain opportunity for wildlife movement through this feature. | N/A |
| | Barrier effects on wildlife passage. The Openness Ratio (OR) assessment completed at the 11 watercourse crossings (9 watercourses) that offer the highest quality wildlife habitat/connectivity potential determined that the OR for the culverts/structures reviewed will largely result in a slight to modest decrease in OR value; however, the suitability of the culverts/structures to safely convey the four wildlife groupings (large mammals, mid-sized mammals, small mammals and herpetofauna) will remain largely unchanged. | No new barriers to wildlife passage are expected to occur as a result of the DSBRT corridor. All major corridors associated with valleylands will be maintained to facilitate wildlife passage. DSBRT structure/culvert modifications have been designed to maintain and promote wildlife passage across the landscape. Consider fish and wildlife friendly culvert and bridge design as part of the Project. Wildlife passage corridors are provided via the bridge structures/larger culverts at several watercourse/valley crossings within the Study Area. Re-calculate the OR for each of the culverts/structures during detail design (once proposed culvert/structure sizes are confirmed) to determine whether target animal groups can use the culverts/structures for passage. Where feasible, the culvert/structure size must reflect an approximate OR to facilitate animal movement. Conduct an assessment of light penetration into the crossing structures will be conducted to determine if adequate vegetation growth and establishment as cover will occur. Where feasible, consider enhancement of crossing sites (see below) where crossing structure sizing is constrained by existing sizing, or other technical limitations, | N/A |
| | Wildlife/vehicle conflicts. | No additional conflicts are expected to occur (as natural habitat corridors/crossing structures will be maintained), and the structures will allow for the continued use of these wildlife corridors for all species of wildlife. | N/A |
| | Impacts to wildlife passage. | Implement wildlife passage recommendations where feasible where existing crossing structures are significantly modified, to enhance the functionality of crossing structures. Planting at wildlife crossing structures: salvage all existing natural vegetation surrounding all crossing locations to the extent possible. Where vegetation has been removed or is found to be absent, in the immediate vicinity of crossings, plant low stature vegetation (e.g., grasses and small shrubs) where feasible. Space shrubs apart from one another by approximately 3-5 m, as to not cause a visual obstruction of the wildlife crossing structure. Internal Cover at Wildlife Crossing Structures: conduct an assessment of light penetration into the crossing structures during detail design to determine if adequate vegetation growth and establishment as cover will occur – as reptiles, amphibians and small mammals prefer low stature vegetation or other forms of shelter within crossing structures. Use other natural forms of cover such as stumps, logs (preferably hollowed), and rock piles to provide shelter and moist | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | <p>microclimates for wildlife. Place a mix of stumps, logs and rock piles within each of the identified crossing structures. Ensure cover objects are present at intervals of approximately every 10 m, within enclosed areas. Construct rock piles out of rip-rap or other similar sized material, but these will be no larger than 0.5 m height x 1 m wide, to avoid impediment of wildlife movement through the structure. Orient logs placed within the crossing structure lengthwise within the structure wall so as to not impede wildlife movement.</p> <p>Substrate Materials within Wildlife Crossing Structures: use natural substrates to encourage wildlife to utilize crossing structures. Ensure ground cover is continuous with the substrates found outside and adjacent to the structural entrances thereby encouraging animals to pass through the structure. Ensure substrates covering the ground within and surrounding the crossing structures contain a mix of soil and small granular materials, matching what is found on lands surrounding the crossing structures (locally excavated soils is recommended).</p> <p>Wildlife Barrier/Funnel Fencing: construct wildlife barrier/funnel fencing at the crossing of Petticoat Creek, West Duffins Creek, Duffins Creek, Carruthers Creek (within Ajax), Lynde Creek, Pringle Creek, Tributary of Corbett Creek (within Whitby), Corbett Creek, and Oshawa Creek (within Oshawa) to improve their effectiveness at safely moving wildlife across the landscape. Undertake further analysis at a site-specific level during detail design prior to construction to determine fencing requirements and to further explore fencing type required (e.g. small animal fencing vs. large animal fencing). Construct wildlife barrier/funnel fencing to tie-into crossing structures (identified above) and extend to the edge of natural areas associated with crossings (or to the extent feasible).</p> | |
| Species at Risk and Plant Species of Concern/Regionally Rare Plant Species | <p>Potential disturbance to/ displacement of rare, threatened or endangered aquatic, plant and wildlife SAR and SAR habitat, and plant species of concern/regionally rare plant species.</p> <p>Plant SAR: a total of 81 of the 125 Kentucky coffee-trees will require removal. No direct impacts are anticipated to the four Butternut trees located within the Study Area. However, works will occur within the 50 m habitat protection zone of all four Butternuts.</p> | <p>Minimize impacts to vegetation/vegetation communities, wildlife/wildlife habitat and significant natural heritage features to the extent possible to minimize impacts to SAR/SAR habitat and removals of plant species of concern/regionally rare plant species.</p> <p>Further correspondence will take place with MECP, DFO, Environment and Climate Change Canada and Parks Canada during the detail design phase prior to construction, as required, to discuss the SAR (and SAR habitat) that have been identified or have the potential to be located in the vicinity of the Study Area (in particular Redside Dace, American Eel, Butternut, Bobolink, Barn Swallow, Bank Swallow, Eastern Meadowlark and SAR bat species), any potential impacts of the proposed work on these federally/provincially designated species and their habitat, and appropriate protection/mitigation/monitoring/compensation measures. A determination of whether a proposed development will contravene subsection 10(1) of the Ontario ESA 2007 and/or the Canada SARA 2002 is required prior to the undertaking.</p> <p>Review/confirm the requirements for permitting under the Ontario ESA (Ontario Regulation 242/08, etc.) and Canada SARA with MECP, DFO, Environment and Climate Change Canada and Parks Canada as necessary to determine whether mitigation or overall benefit are required.</p> <p>Undertake further targeted field investigations prior to construction as required for SAR during the appropriate season using specified specific standardized protocols (to establish their presence or absence, and, thus, the appropriate steps for protection and permitting).</p> <p><u>Plant SAR and Plant SAR Habitat</u></p> <p>Kentucky Coffee-Tree (regulated as 'Threatened' under the Ontario ESA and the Canada SARA (Schedule 1)): MECP has advised that streetscape Kentucky coffee-trees are likely cultivars and do not require Ontario ESA authorizations (MECP, 2019). None of the Kentucky coffee-trees identified are located on federal lands and, therefore, permitting under the Canada SARA will not be required. As a result, no further action is required under the Ontario ESA or Canada SARA for Kentucky Coffee-Tree.</p> <p>Butternut (regulated as 'Endangered' under the Ontario ESA and the Canada SARA (Schedule 1)): since works will occur within the 50 m habitat protection zone of the four Butternuts located within the Study Area, a detailed Butternut survey must undertaken prior to construction during detail design within 50 m of the proposed limits of disturbance during the appropriate window (i.e., leaf on) to determine if any additional Butternut trees are present and thus appropriate</p> | Monitoring for SAR to take place as required (based on any Ontario ESA/Canada SARA permit requirements/agreements). |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | <p>Aquatic SAR: no impacts anticipated to Eastern Pondmussel/Eastern Pondmussel habitat (at Rouge River Crossing 4). Potential impacts to Redside Dace/Redside Dace habitat at Carruther's Creek (Crossing 14) as a result of the culvert extension at this location. Potential impacts to American Eel/American Eel habitat at Oshawa Creek (Crossing 23 – Bond Street and King Street crossings) as a result of the bridge replacements at these locations.</p> <p>Wildlife SAR: potential impacts to Bobolink, Barn Swallow, Bank Swallow, Eastern Meadowlark and SAR bat species and their habitat. No impacts anticipated (and no requirement for follow up targeted field surveys or permitting under the Ontario ESA/Canada SARA) for the following wildlife species and their habitat: Golden Eagle, Chimney Swift, Common Nighthawk, Peregrine Falcon, Bald Eagle, Least Bittern, Red-necked Phalarope, and Snapping Turtle.</p> | <p>steps for protection, mitigation or permitting under the Ontario ESA. A Butternut Health Assessment must also be undertaken for each of the four Butternuts identified as well as any additional Butternut trees identified by an MNDMNR designated Butternut Health Assessor. Since the grading limits lie within the 50 m habitat project zone (of the four identified Butternuts), consultation with MECP will take place during the detail design phase to determine if mitigation or permitting under the Ontario ESA is required. Where Butternut trees are identified to be retained, fencing will be used to delineate where encroachment must not occur. During detail design, if SAR planting is identified as a requirement and planting in suitable areas adjacent to the ROW or in compensation areas is acceptable, planting, tending, monitoring and reporting of SAR planting will be adhered to as per criteria/conditions under the Ontario ESA 2007. None of the four Butternuts identified are located on federal land (i.e., Rouge National Urban Park) and, therefore, the Canada SARA does not apply and consultation with federal agencies/permitting under the Canada SARA will not be required.</p> <p><u>Plant Species of Concern and Regionally Rare Plant Species</u></p> <p>Where warranted (i.e., trees < 3 cm dbh, etc.), during detail design, efforts will be made to locate/identify plant species of concern/regionally rare plants that will be impacted by the DSBRT corridor. Where removal of these plant species cannot be avoided, these plant species will be salvaged through transplanting into nearby vegetation communities with suitable habitat characteristics that will afford ongoing protection, where feasible.</p> <p><u>Aquatic SAR and Aquatic SAR Habitat</u></p> <p>Redside Dace (regulated as 'Endangered' under the Ontario ESA and the Canada SARA) at Crossings 12, 14 and 18): Consultation with MECP and DFO during detail design will be necessary to determine the permitting requirements that will need to be addressed under the Ontario ESA at that time.</p> <p>American Eel at Oshawa Creek, Crossing 23 (regulated as 'Endangered' under the Ontario ESA and 'Threatened' federally by COSEWIC), also possibly at Crossings 4, 12, 13, 14, 16, and 18: Although American Eel is listed federally as 'Threatened' by COSEWIC, it has 'No Status' under the federal Canada SARA and therefore is not regulated federally. Recent experience with this species indicates that it will not require permitting under the Ontario ESA 2007 due to its general habitat requirements and transient behaviour. However, its presence in Oshawa Creek will automatically trigger a review by DFO under the <i>Fisheries Act</i> for any works occurring within the high water mark of the Oshawa Creek and for the other crossings mentioned above. Consultation with MECP during detail design will be necessary to address the potential need for permitting requirements under the Ontario ESA.</p> <p><u>Wildlife SAR and Wildlife SAR Habitat</u></p> <p>Bobolink (regulated as 'Threatened' under the Ontario ESA and Canada SARA): During detail design, the requirement for follow up targeted field surveys (undertaken during the appropriate season using MNDMNR/MECP protocols) and potential permitting under the Ontario ESA and Canada SARA will be assessed for this species.</p> <p>Barn Swallow (regulated as 'Threatened' under the Ontario ESA, not a regulated species under the Canada SARA): During detail design, the requirement for follow up targeted field surveys (undertaken during the appropriate season using MNDMNR/MECP protocols) and potential permitting under the Ontario ESA will be assessed for this species. No requirement for permitting under the Canada SARA is anticipated as this species is not regulated under this act.</p> <p>Bank Swallow (regulated as 'Threatened' under the Ontario ESA, not regulated under the Canada SARA): During detail design, the requirement for follow up targeted field surveys (undertaken during the appropriate season using MNDMNR/MECP protocols) and potential permitting under the Ontario ESA will be assessed for this species. No requirement for permitting under the Canada SARA is anticipated as this species is not regulated under this act.</p> <p>Eastern Meadowlark (regulated 'Threatened' under the Ontario ESA and Canada SARA): During detail design, the requirement for follow up targeted field surveys (undertaken during the</p> | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
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| | | appropriate season using MNDMNR/MECP protocols) and potential permitting under the Ontario ESA and Canada SARA will be assessed for this species. Endangered Bats: During detail design, the requirement for follow up targeted field surveys for bats (including acoustic surveys) and potential permitting for SAR bats under the Ontario ESA will be assessed for these species. | |
| Significant Natural Heritage Features | <p>Impacts to 6.80 ha of designated natural areas including:</p> <p>TRCA: Toronto – Highland Creek Swamp Life Science ANSI, Highland Forest/ Morningside Park Forest and Highland Creek West ESA and Morningside Park Forest ESA. Pickering – Petticoat Creek Forest ESA, Unevaluated Wetland associated with Crossing 15. Ajax – Tributary of Lynde Creek. Whitby – Lynde Creek Coastal Wetland Complex PSW.</p> <p>CLOCA: Natural Heritage System (Ajax/Whitby/Oshawa).</p> <p>Impacts to 8.13 ha of natural areas within TRCA's Regulation Area (natural areas) and 5.04 ha of natural areas within CLOCA's Regulation Area.</p> <p>Impacts to cultural, forest, wetland and manicured areas within the Greenbelt Plan Area (5.12 ha of 'Protected Countryside' Designation in Ajax and Whitby, and 2.25 ha of 'Urban River Valleys' Designation associated with four watercourses including West Duffins Creek (Crossing 12 in Ajax), Carruthers Creek (Crossing 14 in Ajax), Lynde Creek (Crossing 18 in Whitby) and Oshawa Creek (Crossing 23 in Oshawa)).</p> <p>Impacts to Carolinian Core Natural Areas (loss of 0.83 ha) and Carolinian Existing and Potential Areas (loss of 0.92 ha) associated with the impacts to vegetation communities within the Highland Creek Swamp Life Science ANSI and the Highland Forest/ Morningside Park Forest and Highland Creek West ESA (City of Toronto)/ Morningside Park Forest ESA (TRCA) in the City of Toronto.</p> <p>Impacts to a very small portion of the Rouge National Urban Park (0.08 ha) in the City of Toronto and Pickering, where the park is adjacent to Altona Road east of the Rouge River.</p> <p>Impacts to the Rouge River/Little Rouge Creek and the numerous designated natural areas located in the Rouge River/Little Rouge Creek valleylands have been avoided as work will not extend past the existing roadway footprint in this area.</p> | <p>Avoid/protect vegetation communities located within designated natural areas, plan policy areas and regulation areas to mitigate impacts to the extent possible.</p> <p>Where impacts cannot be avoided, implement the environmental protection/mitigation measures presented throughout this report (in particular throughout Section 4.2.4) including vegetation community offsets/compensation for habitat loss, forest and wetland edge management, riparian habitat and valleyland management, invasive species management and planting plans.</p> <p>Mitigation within impacted Carolinian Conservation Areas must include increasing biodiversity of Carolinian species and habitat where suitable, in particular where such species are rare or occasional within the impacted area (to be determined during detail design).</p> <p>Mitigate/compensate for impacts within Carolinian Core, Existing and Potential Areas, and within the Rouge National Urban Park as outlined in Section 4.2.4 (to be further defined during detail design).</p> <p>Implement the environmental protection/mitigation measures outlined in this report (in particular for Terrestrial Environment (Section 4.2.4), Wildlife (Section 4.2.5) and SAR (Section 4.2.7)) to help maintain/enhance impacted designated natural areas, natural areas within TRCA's and CLOCA's regulation limits, and plan policy areas associated with the Greenbelt Plan Areas, Rouge National Urban Park Management Plan Areas and Carolinian Canada Natural Core Areas/Existing and Potential Areas, and to support connections between Natural Heritage Systems and the local, regional and broader natural heritage systems of southern Ontario.</p> <p>Consider/conform with environmental policy guidelines/documents/plans outlined in Section 4.2.4.1 to protect ecological form and function and provide compensation/mitigation to significant natural heritage features, to the extent possible.</p> <p>Where the grading limits/DSBRT footprint correlates with key natural heritage or hydrological features and Natural Heritage Systems across the City of Toronto, Durham Region and respective municipalities within the Region, impacts associated with infrastructure must conform with municipal policy to the extent possible where impacts cannot be avoided. Undertake retention and enhancement of these features where feasible, and adhere to relevant municipal environmental policy and by-laws, to the extent possible (to be further defined during detail design).</p> <p>Complete any design refinements necessary during the detail design phase prior to construction to delineate the designated natural areas, plan policy areas, and regulations areas, and the construction areas within them, and to address the appropriate guidelines/policies/plans noted above as well as the Greenbelt Plan (2017). Review for any changes per outcome of the Province's consultation on growing the size of the Greenbelt (see ERO 019-3136 on the Environmental Registry), which may result in the addition, expansion and further protection of Urban River Valleys.</p> <p>Consult further during detail design with municipal and agency staff (including TRCA, CLOCA, MECP, MNDMNR, Parks Canada, etc.) as required to ensure compensation and mitigation compliance and agreement for habitat loss within the forest/wetland communities/significant natural heritage features and to identify any additional required mitigation measures to ensure impacts to these areas are minimized to the extent possible.</p> | <p>Preparation of an Environmental Monitoring and Contingency Plan during detail design where infrastructure is permitted within valley or stream corridors, wetlands, woodlands, and/or hazardous lands or sites (to address potential emergencies during construction).</p> <p>Ensure adherence to compensation agreements/requirements (to be secured during detail design) including implementation monitoring and subsequent monitoring of planted material/ compensation planting areas (including transplanting plant material (where feasible), invasive species management, promoting biodiversity, maintaining/restoring Carolinian vegetation communities).</p> <p>Monitoring of compensation planting areas will include contingencies to mitigate for plant mortality, species incompatibility with site conditions, invasive species presence, etc.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|---|--|--|
| During Construction | | | |
| Watercourses and Hydrological Features | Impacts to watercourses and hydrologic features due to the exposure of soils (erosion and sedimentation) from grading and vegetation removals, drainage improvements, culvert/structure modifications, excavations, stockpiling, vehicle refueling and maintenance and other construction-related activities. | An Erosion and Sedimentation Control Plan (including an erosion monitoring and sediment report program) will be developed during detail design prior to construction including measures to monitor and maintain erosion and sedimentation control during construction to ensure their effectiveness. See Section 4.2.2.2 for the proposed erosion and sedimentation control measures and the guidelines to be followed to ensure effective erosion and sedimentation control during construction. | Site monitoring during construction as per the Erosion and Sedimentation Control Plan. |
| | Potential for impacts to water quality from spills or other materials/equipment entering the water during construction. | <p>The following additional general environmental protection measures will be employed to reduce the potential effects on watercourses/hydrologic features during construction:</p> <ul style="list-style-type: none">• Work areas will be delineated with construction fencing to minimize the area of disturbance;• Appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourses;• Surface water that comes in contact with exposed soils will be treated using stormwater detention ponds, basins, traps and bags;• Where cofferdams are to be employed, unwatering effluent will be treated prior to discharge to receiving watercourses;• Cofferdams will be constructed using pea gravel bags or equivalent to isolate the work area and maintain flow; and,• Disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation. <p>See Section 4.2.2.1 and Section 4.2.2.2 for general mitigation measures regarding spills. Best management practices must be implemented during construction to reduce the potential for spills or other materials/equipment from entering the water. The following measures will be employed:</p> <ul style="list-style-type: none">• All equipment maintenance and refuelling will be controlled to prevent any discharge of petroleum products. Vehicular maintenance and refuelling will be conducted at least 30 m distance from any surface drainage features to prevent the entry of petroleum, oil or lubricants (POL) to the watercourses;• Storage, stockpiling and staging areas will be delineated prior to construction and inspected during construction;• Construction material, excess material, construction debris, and empty containers will be stored at least 30 m distance from any surface drainage features to prevent their entry into the watercourses; and,• All spills that could potentially cause damage to the environment will be reported to the Spills Action Centre of the MECP. In the event of a spill, containment and clean-up will be completed quickly and effectively. A “Spill Response Plan” and the appropriate contingency materials to absorb or contain a spill will be on the site at all times; no construction machinery or vehicles will cross any watercourse at any time during construction. | N/A |
| | Impacts to downstream habitats, existing water temperatures, and impacts to water quality/quantity. | A preliminary drainage and stormwater management plan has been prepared to ensure construction and post-construction conditions maintain flow to downstream habitats, maintain existing water temperatures and ensure water quality and quantity is not impaired. The drainage and stormwater management plan will be updated as necessary during detail design in consultation with regulatory agencies (including TRCA/CLOCA). See Sections 4.7 for the proposed drainage/stormwater management measures. Where feasible, the plan for the management of stormwater will adhere to the TRCA’s The Living City Policies (TRCA 2014), at least within the TRCA’s jurisdiction. Low impact development (LID) measures will be incorporated to the extent possible where stormwater management is required along the | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|------------|
| | | <p>DSBRT to achieve stormwater management as per TRCA and CLOCA stormwater management criteria.</p> <p>Some of the general mitigation measures will include:</p> <ul style="list-style-type: none">• A stormwater management facility will be designed to detain a minimum of a 2-hour 25 mm storm event for 24 hours to address water quantity and erosion concerns. Where agencies demonstrate a need, other detention times or additional quantity sizing requirements will be considered during the detail design phase in consultation with stakeholders.• When designing best management practices, consideration will be given to measures for reducing environmental impacts to surface and groundwater, including those related to temperature and salt, where feasible.• Bridge run-off will be discharged to stormwater management facilities where feasible (preferably a pond or swale) prior to discharge to watercourses where this can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems.• Where feasible, opportunities for providing ease of containment of accidental spills will be provided during the design of stormwater management facilities.• Low impact development (LIDs) measures will be incorporated to the extent possible where stormwater management is required along the DSBRT corridor. | |
| Aquatic Environment | Construction impacts to the aquatic environment (fish and fish habitat) include the temporary disruption of site-specific habitat, changes to water quality and quantity including temporary disruption of flows, increased water temperatures, erosion and sediment inputs to the watercourses, changes to floodplain and riparian vegetation, barriers to fish passage and potential impacts to aquatic SAR. | <p>See Section 4.2.7 for mitigation measures for impacts to aquatic SAR.</p> <p>See Section 4.2.3.1 (and under Footprint Impacts above) for additional mitigation measures and the assessment of footprint impacts to the aquatic environment. Additional site-specific mitigation may be necessary to mitigate impacts to the aquatic environment during construction. The potential need for additional site-specific mitigation will be investigated during detail design through consultation with permitting agencies (e.g., TRCA, CLOCA, DFO, and MECP).</p> | N/A |
| | Impacts to the aquatic environment due to in-water work. | <p>Where feasible, structures will be constructed outside of the watercourse banks, eliminating the need for in-water works. At all locations where in-water work is proposed, cofferdams (pea gravel bags, sheet piles, etc.) will be used to isolate the work area from the watercourse to enable work to be done in-the-dry (OPSS 517 Construction Specification for Dewatering). Flow will be maintained through either damming and pumping or fluming. If possible, work will be done during the driest part of the year when the lowest flows are present. This will minimize disturbance to fish habitat at the site and downstream. To further reduce the potential for serious harm, the following environmental protection measures will be implemented:</p> <ul style="list-style-type: none">• Construction will be staged such that both water flow and traffic flow can be maintained.• All works will be performed in-the-dry by using temporary flow bypass systems and cofferdams to isolate the work areas.• No in-water work (or work on watercourse banks) will be permitted from April 1 to June 30 (July 14 where Smallmouth Bass are present) to protect spawning warmwater fish, incubating eggs and fry emergence and migratory periods of local fish populations, and from September 16 to June 30 (July 14 where Smallmouth Bass are present) to protect coldwater fish spawning, egg incubation and fry emergence and migratory periods of local fish populations (and to protect Redside Dace).• Where cofferdams are to be employed, dewatering effluent will be treated prior to discharge to receiving watercourses (OPSS 517).• Cofferdams will be constructed using pea gravel bags, sheet piling or other appropriate material to isolate the work area, and flow will be maintained at all stations.• Only clean material free of particulate matter will be placed in the watercourse (OPSS 1005 Streambed Material). | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|--|
| | | <ul style="list-style-type: none">Fish isolated by construction activities (if present) will be captured by a qualified fisheries specialist and safely released to the watercourse (OPSS 182 General Specification for Environmental Protection for Construction In and Around Waterbodies and on Waterbody Banks). | |
| | The potential for spills or other materials/equipment from entering the water and impacting the aquatic environment. | Section 4.2.2.2 discusses the best management/construction practices to be employed during construction to avoid/prevent spills or other materials/equipment from entering the water. | N/A |
| | Impacts to the aquatic environment due to the exposure of soils (erosion and sedimentation). | <p>Effective erosion and sedimentation control will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout the operational life. An Erosion and Sedimentation Control Plan (including an erosion monitoring and sediment report program) will be developed during detail design prior to construction including measures to monitor and maintain erosion and sedimentation control during construction to ensure their effectiveness. See Section 4.2.2.2 and Section 4.3.3.2 for the proposed erosion and sedimentation control measures and the guidelines to be followed to ensure effective erosion and sedimentation control during construction.</p> <p>Standard erosion and sedimentation control measures will be followed during construction in accordance with OPSS 805 (Construction Specification for Temporary Erosion and Sediment Control Measures) to minimize construction-related impacts on surface water quality and fish habitat. See Section 4.3.3.2 for the detailed discussion about the proposed erosion and sedimentation control measures and the guidelines to be followed to ensure effective erosion and sedimentation control during construction.</p> <p>The following additional OPSSs (in addition to OPSS 805) related to erosion and sedimentation control are also recommended (to be installed pre-construction, maintained during construction, and removed post-construction following soil re-stabilization) to ensure that the erosion and sedimentation control measures are implemented including:</p> <ul style="list-style-type: none">General Specification for Environmental Protection for Construction In and Around Waterbodies and on Waterbody Banks (OPSS 182) to cover the environmental protection requirements and mitigation measures that apply to construction involving work in and around waterbodies and on waterbody banks.Construction Specification for Seed and Cover (OPSS 803) to stabilize disturbed areas.Construction Specification for Topsoil (OPSS 802) and Sodding (OPSS 803) to address the requirements for stockpiling, placing and supplying topsoil and to cover the requirements for sodding.General Specification for the Management of Excess Materials (OPSS 180) to ensure material generated during maintenance of sediment control measures will be taken off-site for disposal. | Site monitoring during construction as per the Erosion and Sedimentation Control Plan. |
| | Impacts to riparian vegetation/aquatic habitat. | <p>Maintain riparian vegetation to the extent possible to help stabilize the watercourse banks, provide shading/cover for the watercourse, filter contaminants, and improve wildlife habitat and aesthetics. The proponent will be responsible for vegetation management. The following environmental protection/mitigation measures are recommended:</p> <ul style="list-style-type: none">Prior to construction, trees/shrubs to be retained will be clearly identified in the field by the installation of tree/shrub protection barrier in accordance with OPSS 801 (Construction Specification for the Protection of Trees).Trees/shrubs identified to remain, which become damaged by construction activities, will be repaired or replaced. | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|---|
| | | <ul style="list-style-type: none">In areas where riparian vegetation removal is necessary to accommodate construction, measures to protect the local fish communities will include the following: no clearing of mature trees providing a bank stabilization function; no felling of trees into the watercourse; minimize the amount of debris produced from entering the watercourse; and, only clearing the vegetation required to complete the necessary works. <p>Restoration and/or enhancement of aquatic habitat will be completed at the end of construction works at all watercourses. At a minimum, the following will be implemented as restoration/enhancement during the detail design phase of the project for all crossings where works (in-water or riparian) are proposed:</p> <ul style="list-style-type: none">Banks and riparian areas will be planted with native grasses and shrubs to provide increased shading and allochthonous inputs to the watercourse.Where restoration and enhancement will not suffice to offset/mitigate impacts, compensation will be employed.Compensation plans, if necessary, will be completed during detail design in consultation with regulatory agencies. | |
| | Impacts to downstream habitats. | See Section 4.2.2.2 for some general mitigation measures to manage stormwater which will help avoid/minimize impacts to the aquatic environment. Further details are provided in Section 4.7 . | N/A |
| Terrestrial Environment | Temporary displacement of and/or disturbance to vegetation and vegetation communities as a result of the construction of the DSBRT corridor. | <p>Minimize encroachment/impacts to vegetation communities/natural areas associated with access and staging during construction to the extent possible. Prioritize avoidance of wetlands and forest to the extent possible.</p> <p>Implement the following general construction best management practices and environmental protection/mitigation measures during construction (and review/identify any additional measures during detail design through a further review of policies/guidelines and/or agency discussion):</p> <ul style="list-style-type: none">consider erosion and sediment control measures outlined in the Erosion and Sediment Control Guide for Urban Construction (TRCA 2019a) and Silt Smart-Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for Large Urban Development Sites (Credit Valley Conservation, MNDMNR, MOE, DFO 2012);include filter fabric along all tree protection fencing and edge management fencing to enhance protection from the spread of invasive, aggressive plant species;implement methods for the short-term stabilization of soils, including but not limited to, coir fibre or a suitable alternative, as required;utilize vegetation cover to protect any exposed surfaces and inhibit the establishment of invasive species in accordance with construction specific standards (i.e., OPSS 804 Construction Specification for Seed and Cover);ensure topsoil from stockpiles is in accordance with construction specific standards (i.e., OPSS 802 Construction Specification for Topsoil);place old field seed mix and mulching or erosion control blanket, in accordance with construction specific standards, in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization;ensure tree protection is in accordance with construction specifications (i.e., OPSS 801 Construction Specification for the Protection of Trees and the City of Toronto (Urban Forestry) Tree Protection Policy and Specifications for Construction Near Trees) to minimize impacts and ensure no construction activity will occur within the tree protection zone;ensure tree protection hoarding plans are submitted and approved prior to permit issuance;undertake riparian and valleyland management of impacted edges as required as per TRCA's Forest Edge Management Plan Guidelines (2004) (see below); and, | <p>Monitoring measures to take place during transplanting of plant species to be developed during detail design, where feasible.</p> <p>Site monitoring during construction as per the Erosion and Sedimentation Control Plan.</p> <p>Preparation of an environmental monitoring and contingency plan, in accordance with TRCA/CLOCA Standards, as required to address potential emergencies during construction where valley or stream corridors, wetlands, woodlands and/or hazardous lands are impacted.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|--|
| | | <ul style="list-style-type: none">ensure efforts are made to prevent the spread of invasive plant species during construction both on and off site (see below). Sanitation of construction equipment will be undertaken in accordance with the Clean Equipment Protocol (2013) and at a minimum will include sanitation of construction vehicles and equipment prior to leaving and moving to the next site. A cleaning station will be set up, so vehicles and equipment can be inspected and cleaned regularly. <p>Areas designated for protection must be clearly shown on all construction plans and marked in the field using tree protection barriers in accordance with the Erosion and Sediment Control Guide for Urban Construction (TRCA 2019a) and OPSS 801 – Construction Specification for the Protection of Trees. The City of Toronto (Urban Forestry) Tree Protection Policy and Specifications for Construction Near Trees will also be followed.</p> <p>Avoid regionally rare species wherever possible. Where these plant species cannot be avoided, salvage through transplanting into nearby vegetation communities with suitable habitat characteristics that will afford ongoing protection, where feasible (see Section 4.2.7 for more details on rare plant species). Mitigation and monitoring measures to take place during construction will be further developed during the detail design phase.</p> | |
| | Potential for siltation of natural vegetation arising from soil erosion of exposed soils. | Ensure an Erosion and Sedimentation Control Plan is in place prior to the start of construction (see Section 4.2.2.2 and Section 4.3.3.2). | Site monitoring during construction as per the Erosion and Sedimentation Control Plan. |
| | Potential for inadvertent spread of non-native invasive plants into natural areas during construction displacing native plant species over time. | Manage the inadvertent spread of aggressive or non-native plant species appropriately. Control non-native species that have become established to prevent the establishment of new non-native plants. | Monitoring of compensation planting areas will include contingencies to mitigate for invasive species presence/management. |
| | Potential for encroachment at watercourse crossings/valleylands and into riparian habitat. | <p>Consider providing an access management plan to avoid/minimize encroachment at watercourse crossings, where feasible.</p> <p>Retain riparian habitat to the extent possible and at a minimum of 3 m to 5 m from the bank edge of any watercourse impacted during construction to ensure bank stability, mitigate erosion, and mitigate negative impacts to aquatic habitat. Install suitable tree protection fencing and erosion control fencing and ensure regular maintenance (e.g., filter fabric installed to delineate sections of vegetation to be retained to mitigate encroachment).</p> <p>Undertake restoration/enhancement of riparian habitat during construction immediately following the completion of work in riparian zones. Install suitable deep rooting graminoid, herbaceous and shrub species, with a variety of trees where suitable to prevent streambank erosion and improve riparian conditions and ensure plant species selected are native and/or non-invasive.</p> <p>For valleylands that are impacted, limit the zone of construction impacts and locate staging areas well outside of forested valleys. Install suitable tree protection fencing and erosion control fencing and ensure regular maintenance. Tree protection hoarding plans must be submitted and approved prior to permit issuance. Undertake restoration of newly impacted edges and carry out methods for the enhancement of these areas as outlined in Section 4.2.4.1 (under forest edge management). Ensure plant species selected are native and/or non-invasive.</p> <p>Ensure the contractor provides a warranty on planted materials to ensure that the newly planted material survives and fulfils the intended function. A two-year warranty applies to planted materials when part of a restoration plan for the City of Toronto.</p> <p>Manage the spread of aggressive or non-native plant species appropriately.</p> | N/A |
| Wildlife | Displacement of/disturbance to wildlife/wildlife habitat during construction. | Ensure that impacts to areas containing more sensitive wildlife habitat (e.g., natural areas/valleylands and designated natural areas) are minimized during construction to the extent possible and to maintain opportunity for wildlife movement through the natural areas/valleylands. | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|---|--|---|
| | Barrier effects on wildlife passage during construction. | Minimize construction duration and disturbance in the vicinity of existing culverts and bridges to the extent possible to reduce the potential for increase in road mortality caused by wildlife avoidance of these structures. | N/A |
| | Wildlife/vehicle conflicts during construction. | Ensure wildlife salvage occurs prior to clearing and grubbing activities associated with construction where feasible, particularly in wetland habitats, to preserve vulnerable wildlife species (e.g., herpetofauna). Obtain all applicable Wildlife Collector's permits prior to any salvage activities. | N/A |
| | Potential impacts to migratory birds during construction. | A number of bird species recorded within the Study Area are afforded protection under the MBCA. Bird species protected under the MBCA were documented across a variety of habitat types within the Study Area. To comply with the requirements of the MBCA, ensure disturbance, clearing or disruption of vegetation where birds may be nesting is completed outside the migratory bird nesting timing window of April 1 to August 31. In the event that these activities must be undertaken from April 1 to August 31, a pre-clearing nest survey must be conducted by a qualified avian biologist to identify and locate active nests of species covered by the MBCA. | N/A |
| Species at Risk and Plant Species of Concern/Regionally Rare Plant Species | Potential disturbance to/ displacement of rare, threatened or endangered aquatic, plant and wildlife SAR and SAR habitat, and plant species of concern/regionally rare plant species during construction. | See Section 4.2.7.2 for mitigation measures/commitments to future work during the detail design phase for SAR/SAR habitat and plant species of concern/regionally rare plant species. Impacts during construction will be minimized to the extent possible. Redside Dace: if it is determined during detail design that this species is present within Carruthers Creek (Crossing 14), the Redside Dace/coldwater timing window (July 1-September 15) must be adhered to rather than the warmwater window dictated by the reported thermal regime of the watercourse. Other required site-specific mitigation will be determined through agency consultation during detail design. In addition, if federally-listed aquatic SAR (i.e., Redside Dace) are present within a watercourse (to be determined during detail design), and dewatering will occur during construction, a Canada SARA permit may be necessary for the rescue of potentially stranded fish. American Eel: no additional site-specific mitigation will likely be required for this species, unless otherwise specified by MECP during detail design consultations. | Monitoring for SAR to take place as required during construction (based on any Ontario ESA/Canada SARA permit requirements/agreements). |
| Significant Natural Heritage Features | Temporary displacement of and/or disturbance to vegetation and vegetation communities associated with significant natural heritage features (designated natural areas, plan policy areas and regulation areas) as a result of construction of the DSBRT corridor. Potential for impacts to vegetation from construction in significant natural areas associated with equipment operating in areas identified for protection. | Clearly show designated natural areas, plan policy areas and regulation areas designated for protection on all construction plans and mark these areas in the field using tree protection barriers in accordance with the Erosion and Sediment Control Guide for Urban Construction (TRCA 2019a), OPSS 801 – Construction Specification for the Protection of Trees, and the City of Toronto (Urban Forestry) Tree Protection Policy and Specifications for Construction Near Trees. Minimize impacts during construction to the existing forest and wetland vegetation communities within these more sensitive significant natural heritage features to the extent possible. See Section 4.2.4 for mitigation measures/commitments to future work for vegetation and vegetation communities/natural areas during the detail design phase. Comply with mitigation protocols already established for vegetation clearing, mitigation and compensation within and/or adjacent to environmentally sensitive areas, to the extent possible. Consult with external agencies (including TRCA, CLOCA, MECP, MNDMNR, Parks Canada) and municipal staff during detail design to ensure compliance with the applicable environmental policy, guidelines and plans regarding acceptable mitigation/compensation protocols. | Preparation of an environmental monitoring and contingency plan, in accordance with TRCA/CLOCA Standards, as required to address potential emergencies during construction where valley or stream corridors, wetlands, woodlands and/or hazardous lands are impacted. |
| During Operation | | | |
| Watercourses and Hydrological Features | Water quality alterations due to roadway contaminants, mainly salt application in winter. | Mitigation for effects on water quality during operation of the DSBRT are included Section 4.7 . | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|---|---|--|
| | | For road salt, mitigation will follow Environment Canada’s <i>Code of Practice for the Environmental Management of Road Salts</i> (2004) as well as the <i>Five-year Review of Progress: Code of Practice for the Environmental Management of Road Salts</i> (2012). | |
| Aquatic Environment | Potential impacts to the aquatic environment (fish and fish habitat) from the operation of the DSBRT are generally limited to water quality alterations due to roadway contaminants, mainly salt application in winter and hot asphalt during summer. | Mitigation for effects on water quality are included in Section 4.7 and in Section 4.2.2.3 . | N/A |
| Terrestrial Environment | Impacts to vegetation/vegetation communities as a result of the operation of the DSBRT. | New wetland areas will be created post construction as a result of changes in drainage related to the construction of the DSBRT corridor and this, in part, mitigates for removals of similar wetland types. | Where vegetation offsetting is determined and restoration of forest and/or wetland is additionally undertaken, maintenance associated with any prescribed restoration monitoring and maintenance of manicured areas during the operation and maintenance phase, including removal of dumped garbage, will be on-going. |
| | Potential for non-native and invasive species to become established during the operations phase. | Implement efforts to control non-native and invasive plant species that have become established, as well as prevent the establishment of new non-native and invasive plant species (see Section 4.2.4.1 and Section 4.2.4.2). | Monitoring of compensation planting areas will include contingencies to mitigate for invasive species presence/management. |
| | Impacts of de-icing salts on plants growing adjacent to the road ROW (with typical exposure within 10 m to 30 m from the pavement edge). | Reduce the use of salt spray in lieu of an alternate, less harmful substance and ensure planting is undertaken with salt tolerant species that can withstand salt exposure where planting is undertaken close to the roadside, while planting less tolerant species further away from the roadside. Use native, salt tolerant species to provide screening where planted in high densities to aid in edge management, where newly exposed edges require protection. | N/A |
| Wildlife | Barrier effects on wildlife passage during operations/maintenance activities. | No new barriers to wildlife passage are expected to occur as a result of the operation of the DSBRT corridor. All major corridors associated with natural areas/valleylands will be maintained and where structure works will occur, crossing structures will mimic (or exceed suitability for wildlife crossing where appropriate) the existing crossings to facilitate wildlife passage. | N/A |
| | Potential disturbance to wildlife (activities and patterns) from noise, light and visual intrusion. | Disturbance to wildlife from any increase in noise, light and visual intrusion potentially caused by the operation of the DSBRT corridor is not expected to have any significant adverse effects as wildlife found within the Study Area are generally acclimatized to the presence of road infrastructure. Use reflectors to focus light beams onto the DSBRT and away from natural heritage features adjacent to the DSBRT corridor (to mitigate for the potential disturbance caused by light pollution from the proposed improvements to the transportation network). Mitigation for the potential of bird collisions with bus shelters constructed of glass will be further developed during detail design. The design will comply with Canadian Standards Association A460:19 Bird Friendly Building Design and Toronto Green Standard for Bird Control. | N/A |
| Species at Risk and Plant Species of Concern/Regionally Rare Plant Species | N/A | N/A | N/A |
| Significant Natural Heritage Features | N/A | N/A | N/A |

TABLE ES.3. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: LANDFORMS/PHYSIOGRAPHY, SOILS, GEOLOGY AND GROUNDWATER

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|---|--|--|
| During Detail Design | | | |
| Landforms/Physiography | Impacts to the South Slope and Iroquois Plain physiographic regions were determined to be fairly insignificant considering that the DSBRT corridor will be constructed within an area that has been previously disturbed by the original construction of roadways within the Study Area, and by past and current land use practices, settlement and development that have already significantly impacted the landform features/physiography in the Study Area. | N/A | N/A |
| | Potential for impacts to the hydrologic cycle of the watersheds within the physiographic regions located within the Study Area. | See Section 4.2.2 for the mitigation measures outlined for watercourses and hydrological features. | N/A |
| | Impacts to soils, and erosion and sedimentation within the physiographic regions. | See Section 4.2.3.2 and Section 4.3.3.2 for the mitigation measures proposed for soils (and the erosion/ sedimentation control plan). | Site monitoring during construction as per the Erosion and Sedimentation Control Plan. |
| | Impacts to the groundwater/aquifer system including contamination of high-water tables. | See Section 4.3.4 for the mitigation measures proposed for groundwater. | N/A |
| Bedrock Geology, Quaternary Geology and Soils | Impacts to geological deposits (glacial deposits, glacial lake deposits, river deposits and some organic deposits) within the Study Area including 32.60 ha within the City of Toronto, 37.82 ha within the City of Pickering, 28.92 ha within the Town of Ajax, 29.89 ha within the Town of Whitby, and 11.74 ha in the City of Oshawa. | The loss of these geological deposits as a result of the DSBRT corridor is unavoidable and required to meet Metrolinx design standards and to accommodate the proposed widening and geometry associated with the DSBRT. | N/A |
| | <p>Impacts to (displacement/ loss of) existing soils within the Study Area due to excavation activities.</p> <p>Generation of excess soils (which may be stained, odorous, containing debris or found to be contaminated) that cannot be reused along the DSBRT corridor and will require management as waste.</p> <p>Potential for excess soil management and disposal (including transportation) to have implications for greenhouse gas emissions.</p> <p>Disposal of excess soils within the 'Greenbelt Area'.</p> <p>Placement of fill in environmentally sensitive areas.</p> | <p>Impacts to the terrain located within the Study Area have been minimized to the extent possible as the DSBRT infrastructure will be located where the existing municipal roads and existing settlement area have already altered the terrain.</p> <p>Define final soil profiles during the detail design phase prior to construction activities.</p> <p>Meet regulatory requirements in place at the time of detail design and excess materials management guidelines and specifications (i.e., O. Reg. 406/19 – On-Site and Excess Soil Management, OPSS 180 – General Specification for the Management of Excess Materials, Management of Excess Soil – A Guide for Best Management Practices (MECP 2014), the Excess Soil Management Policy Framework (MECP 2016), and TRCA/CLOCA guidelines) to develop an Excess Materials Management Plan during detail design to manage excess/contaminated soils.</p> <p>Encourage the local reuse of excess soil which can reduce emissions by reducing the distance excess soil is transported for reuse or disposal.</p> <p>Avoid the disposal of excess soil within the 'Greenbelt Area' and manage in accordance with the 'Protected Countryside' policies in the Greenbelt Plan (MMAH</p> | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|--|--|
| | Soil conditions and soil/earth slope stability within the Study Area varies locally. | <p>2017), and 'A Culture of Conservation' policies contained in the Growth Plan (MMAH 2019). Adhere to Section 3.4.2 of the Greenbelt Plan and Section 4.2.9 of the Growth Plan as follows:</p> <ul style="list-style-type: none">• Municipalities must develop excess soil reuse strategies as part of planning for growth and development; AND• Municipal planning policies and relevant development proposals must incorporate best practices for the management of excess soil generated and fill received during development or site alteration, including <i>infrastructure</i> development, to ensure that:<ul style="list-style-type: none">○ any excess soil is reused on-site or locally to the maximum extent possible and, where feasible, excess soil reuse planning is undertaken concurrently with development planning and design;○ appropriate sites for excess soil storage and processing are permitted close to areas where proposed development is concentrated or areas of potential soil reuse; and,○ fill quality received and fill placement at a site will not cause an adverse effect with regard to the current or proposed use of the property or the natural environment, and is compatible with adjacent land uses. <p>Ensure that any fill placed in environmentally sensitive areas meets Table 1 standards as per the On-Site and Excess Soil Management Regulation (O. Reg. 406/19) under the <i>Environmental Protection Act</i>. Any soil placed on cropland or pasture must meet the definition of topsoil as per the <i>Municipal Act</i>.</p> <p>It is recommended that site-specific investigations (including boreholes/test pits and visual inspection – in combination with further geotechnical investigations) be undertaken during the detail design phase in the vicinity of areas of soil disturbance as necessary to obtain soils characteristics data.</p> | |
| Groundwater | Water well interference | Additional inspection/verification of the individual water well records (and a desktop review) will be required to verify the list of wells and a map of their locations. Any further evaluations would likely require mail surveys/field verification activities in order to ensure impacts to these water wells are mitigated. | N/A |
| During Construction | | | |
| Landforms/Physiography | N/A | N/A | N/A |
| Bedrock Geology, Quaternary Geology and Soils | Short-term or temporary disturbance to existing soils within the Study Area during construction activities which may result in erosion of, and sedimentation to, sensitive receiving watercourses. | <p>Develop an Erosion and Sedimentation Control Plan (including an erosion monitoring and sediment report program) during detail design prior to construction including measures to monitor and maintain erosion and sedimentation control during construction to ensure their effectiveness.</p> <p>Follow standard erosion and sedimentation control measures during construction in accordance with OPSS 805 (Construction Specification for Temporary Erosion and Sediment Control Measures) to minimize construction-related impacts on surface water quality and fish habitat.</p> <p>Identify site-specific erosion and sedimentation control measures to be implemented prior to construction, maintained during construction and removed after construction (once soils have stabilized) prior to construction following a number of different guidelines including TRCA's Erosion and Sediment Control Guide for Urban</p> | Site monitoring during construction as per the Erosion and Sedimentation Control Plan. |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|--|---|
| | | <p>Construction (2019a) and Silt Smart - Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for Large Urban Development Sites (Credit Valley Conservation, MNDMNR, MOE, DFO 2012).</p> <p>Erosion and sedimentation control measures will include the following to greatly reduce the potential for soil erosion and impairment of surface water quality and fish habitat:</p> <ul style="list-style-type: none">• placing flow checks at regular intervals in ditches down-gradient from areas of soil disturbance in rural sections;• stabilizing/reinforcing ditches based on ditch slope down-gradient from areas of soil disturbance in rural sections;• managing surface water at the construction site to prevent contact with exposed soils and/or treating surface water that comes in contact with exposed soils using stormwater detention ponds, basins, traps and bags;• protecting inlets to catch basins and maintenance holes in urban sections;• placing silt fence along stream margins in areas of soil disturbance;• limiting the extent and duration that soils are exposed to the elements to the minimum area and time necessary to perform the work;• applying old field seed and mulch, tackifier and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,• monitoring and maintenance of erosion and sedimentation control measures during construction to ensure their effectiveness. <p>The potential impacts of the proposed construction works on soil stability/earth slopes should be assessed along with the more detailed soils data prior to construction and appropriate mitigation measures to maintain soil and earth slope stability should be identified and incorporated into the design.</p> | |
| | Potential for disturbance to/disposal of contaminated waste and/or excess soils during construction. | <p>See Section 4.3.3.1 for mitigation measures to manage excess/contaminated soil.</p> <p>In addition, surface water will be managed at the construction site to prevent contact with exposed soil and/or surface water that comes in contact with exposed soils will be treated using stormwater detention ponds, basins, traps and bags.</p> | N/A |
| Groundwater | Construction Dewatering | <ul style="list-style-type: none">• 94 water wells were identified within the construction footprint of the DSBRT project that may require abandonment before or during construction in accordance with O. Reg. 903 (as amended); and• A Water Taking and Discharge Plan will be developed during the detail design phase to document potential impacts and mitigation associated with construction dewatering activities. The dewatering volumes, zones of influences and discharge plans, impact assessment will be completed during detail design phase. | <ul style="list-style-type: none">• Volumes of groundwater discharge must be continuously monitored at discharge locations and a total daily volume be recorded to ensure compliance of the PTTW maximum flow rate. |
| During Operation | | | |
| Landforms/Physiography | N/A | N/A | N/A |
| Bedrock Geology, Quaternary Geology and Soils | N/A | N/A | N/A |
| Groundwater | N/A | N/A | N/A |

TABLE ES.4. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: TREE INVENTORY

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|---|
| During Detail Design | | | |
| Tree Resources | <p>Removal of 3,278 trees as a result of the DSBRT corridor footprint including 1,357 in Toronto, 1,070 in Pickering, 321 in Ajax, 389 in Whitby and 141 in Oshawa.</p> <p>4,030 roadside trees to be retained and not impacted including 2,535 in Toronto, 438 in Pickering, 622 in Ajax, 171 in Whitby and 264 in Oshawa.</p> <p>A total of 244 trees require removal within a designated natural area/significant natural heritage feature.</p> | <p>Minimize the footprint of the DSBRT to the extent possible to ensure that the maximum number of trees have been retained.</p> <p>Review impacts to trees during detail design to reflect any refinements to the detail design and to consider site-specific mitigation measures such as refinement of/exceptions to design criteria, the use of retaining walls and clear zone barriers for tree protection and other site-specific measures to be implemented on a case-by-case basis.</p> <p>Undertake a gap analysis (in accordance with municipal and TRCA/CLOCA requirements) during the detail design phase prior to construction should refinements and changes to the geometry of the preferred design alternative/DSBRT footprint occur to ensure that all trees are surveyed and impacts to trees within the Study Area are adequately addressed. Survey the trees at the intersection of Thickson Road and Dundas Street East.</p> <p>Provide compensation for the removal of roadside trees within the Study Area in accordance with the Metrolinx Vegetation Guideline (2020), TRCA Guideline for Determining Ecosystem Compensation (TRCA 2018) and the TRCA Forest Edge Management Plan Guidelines (2004). Refinements to compensation requirements will be undertaken during detail design at such time when tree removal permits have been approved by municipal agencies. Compensation must be submitted to municipal staff prior to permit issuance. Utilize the ecological compensation approach (Metrolinx Vegetation Guideline 2020) for those trees to be removed that are located on Metrolinx property. Compensate for the remainder of the By-law regulated trees located on private or city-owned property based on the requirements of applicable By-laws. All private property ownership data (including names, addresses and emails) for trees on private property that are proposed to be removed/impacted will be provided to the municipalities by the proponent at the time of permit application during the detail design phase.</p> <p>Compensation for tree removals within a designated natural area: compensation requirements based on ecological compensation approach using individual tree method: 2,274 trees. Compensation requirements based on By-law approach for trees within designated natural areas: 496 trees.</p> <p>Compensation for tree removals outside designated natural areas: 5,259 trees. Update the compensation analysis for roadside trees during detail design when tree removal permits have been approved by municipal agencies.</p> <p>Within TRCA's jurisdiction, consider compensation for trees in accordance with TRCA's Guideline for Determining Ecosystem Compensation (2018). See Section 4.2.4.1 for details regarding compensation for the loss of forest/wetland communities. Reporting components will include a description of impacted ecosystems, a description of any proposed compensation locations, a proposed work plan, detail design drawings, construction phasing plan,</p> | <p>Undertake any required post-planting monitoring (by a qualified arborist) and/or maintenance/ establishment program to monitor the health of the replacement/transplanted trees and provide recommendations for mitigation such as watering, pruning or fertilizing.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|------------|
| | | <p>monitoring plan, etc., should compensation be undertaken. When suitable restoration sites cannot be identified, the option to provide cash-in-lieu will be discussed, and will adhere to criteria set out in the <i>Guideline for Determining Ecosystem Compensation and Appendices</i> (TRCA 2018). Cash-in-lieu compensation must be submitted prior to permit issuance.</p> <p>See Section 4.2.4.1 for mitigation measures for the loss of forest vegetation/vegetation communities and forest edge management recommendations.</p> <p>Adhere to City of Toronto compensation ratios for the removal of trees within the City of Toronto and the City’s additional requirements (see Section 4.4.3). Consult with private property owners before any tree removals and or tree impacts/injuries occur on private property. Removal of any By-law protected ash trees will require a permit from the City of Toronto. Removal of any By-law protected ash trees infested with EAB will require a permit exemption from the City of Toronto.</p> <p>Adhere to the Town of Whitby’s compensation requirements for the removal of trees within the Town of Whitby (see Section 4.4.3).</p> <p>Consult further with lower and upper tier municipalities and regulatory agencies, such as TRCA, CLOCA, MECP, and Parks Canada during detail design to discuss tree compensation and restoration plans. Refinements to compensation requirements will be undertaken at such time when tree removal permits have been approved by municipal agencies. Compensation (as well as all restoration/replanting plans) must be submitted to municipal staff prior to permit issuance. Tree protection hoarding must be installed and approved prior to permit issuance. Submit restoration plans and replanting plans (along with erosion control fencing plans) prior to permit issuance.</p> <p>Consult with Parks Canada during detail design if impacts to trees will occur within the Rouge National Urban Park beyond the existing road ROW.</p> <p>Consult with the Study Area municipalities during detail design to reconfirm the requirements for tree removal permits associated with the municipal tree protection By-laws. Where required, tree removal permits will be obtained from the Study Area municipalities prior to the start of construction. Permits related to municipal tree protection by-laws and other applicable tree removal permits will be obtained from municipalities as required during the detail design phase, and as outlined in Metrolinx’s Vegetation Guideline (2020), TRCA’s Guideline for Determining Ecosystem Compensation (2018), TRCA’s Forest Edge Management Plan Guidelines (2004) and the upper and lower tier municipal tree protection by-laws.</p> <p>Provide municipal agencies with the ability to perform on-site inspections in regard to tree planting, transplantation and tree protection during implementation of the project, as required.</p> <p>Ensure a Landscape Architect prepares planting plans during detail design for the tree plantings proposed as part of the compensation required in</p> | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|----------------------------|--|---|--|
| | | <p>accordance with municipal standards for landscaping/tree requirements and in consideration of below ground infrastructure when developing the planting plans. Restoration plans and replanting plans (along with erosion control fencing plans) must be submitted prior to permit issuance. Consider the limitations associated with tree planting in the vicinity of City of Toronto water infrastructure (and in the vicinity of the infrastructure of the other Study Area municipalities) during detail design when the locations of the buried infrastructure and the DSBRT infrastructure are better known.</p> <p>Provide municipal staff with the opportunity to comment on tree planting specifications, species selection and planting locations during the development of the planting plans. Ensure the proponent provides a warranty on planted materials to ensure that the newly planted material survives and fulfils the intended function. A two-year warranty applies to planted materials when part of a restoration plan for the City of Toronto. See Section 4.2.4.1 for further details on the plantings plans to be prepared during detail design.</p> <p>Consider opportunities to transplant trees identified for removal within the Study Area during the detail design phase, where feasible. Where feasible, transplant trees that measure less than or equal to 10 cm DBH and are in good health that have been identified for removal.</p> <p>Where feasible, undertake transplanting in accordance with best management practices and in accordance with American National Standard (ANSI) A300 (Part 6) – Transplanting.</p> <p>Undertake efforts during detail design to preserve those trees that are located on properties listed on Heritage Registers and are considered part of a cultural heritage landscape. The retention and protection of heritage trees must be made a priority. Retain trees located on heritage properties to the extent possible.</p> | |
| | Impacts to Kentucky coffee-tree and indirect impacts to Butternut. | See Section 4.2.7.1 for mitigation measures for plant SAR including the detailed Butternut survey and Butternut Health Assessment to be completed during detail design. | Monitoring for SAR to take place as required (based on any Ontario ESA/Canada SARA permit requirements/agreements). |
| During Construction | | | |
| Tree Resources | Impacts/injury to 618 trees during construction of the DSBRT corridor including 270 in Toronto, 135 in Pickering, 98 in Ajax, 40 in Whitby and 75 in Oshawa. | <p>Minimize impacts to all retained trees during construction by implementing the following tree protection measures to ensure no impacts occur to trees designated for retention including those trees identified as impacted/injured:</p> <ul style="list-style-type: none">• Designate a TPZ to restrict construction related machinery and activities from damaging trees identified for protection, and to ensure the protection of trees (roots, trunks, branches) adjacent to construction works;• Clearly defined the delineation of the disturbance limits within work areas on drawings and on site prior to construction;• Ensure the Site Supervisor is familiar with the City of Toronto's Tree Protection Policy and Specification for Construction near Trees (2016) and other such policies for municipalities within the Study Area and is cognizant of the purpose and function of TPZs;• Ensure the proponent supplies and installs tree protection barriers around each tree designated for protection prior to the start of any work; | <p>All work undertaken within the minimum TPZ of a tree will be supervised by an ISA certified Arborist who will document the works that were completed, and direct workers as required. The mitigation measures outlined in Section 4.4.4 (including horizontal hoarding, canopy pruning and root pruning) will be implemented for works undertaken within the minimum TPZ. Proof of installed tree protection hoarding must be submitted for approval prior to permit issuance.</p> <p>Consult a qualified Arborist or City Forester to determine if additional mitigation measures must be employed should any additional, incidental or accidental tree injuries occur during construction.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|--|
| | | <ul style="list-style-type: none">• Ensure tree protection fencing for all trees outside of the City of Toronto RNFP boundary is comprised of orange plastic web snow fencing on a wood frame;• Ensure tree protection fencing for trees located in the City of Toronto Ravine and Natural Feature Protection Area is comprised of plywood hoarding and is installed in the recommended locations. Proof of installed tree protection hoarding must be submitted for approval prior to permit issuance;• Prohibit the operation of heavy machinery within the TPZ (including overhead swinging of machine arms);• Do not store construction materials, equipment, soil, construction waste or debris within the TPZ or dripline of the trees identified for protection;• Ensure no movement or parking of vehicles, placement of equipment or pedestrian traffic within the TPZ;• Ensure no signs or objects are displayed or affixed to any trees protected by the City;• Prohibit the disposal of any liquids within the TPZ; and• Ensure tree clearing is undertaken in compliance with the MBCA to avoid the destruction or disturbance of bird species using the available habitat in the Study Area. If tree clearing cannot take place within the timing window, a nesting bird survey must be undertaken by a qualified Avian Biologist within 24 hours before any vegetation clearing. | |
| | Potential for the spread of invasive plant species during construction both on and off site. | <p>Ensure efforts are made to prevent the spread of invasive plant species during construction both on and off site.</p> <p>Undertaken sanitation of construction equipment in accordance with the Clean Equipment Protocol (Ontario Invasive Species Plant Council 2013) and, at a minimum, include sanitation of construction vehicles and equipment prior to leaving and moving to the next site.</p> <p>Set up a cleaning station to ensure vehicles and equipment can be inspected and cleaned regularly. See Section 4.2.4.1 for additional invasive species management measures.</p> <p>Ensure precautions are taken with the removal of ash wood during construction as Emerald Ash Borer (EAB) is widespread throughout the Study Area. Ensure the removal of ash trees from the Study Area is in compliance with the requirements of CFIA Phytosanitary Requirements to Prevent the Introduction Into and Spread Within Canada of the Emerald Ash Borer (D-03-08). Where feasible, ash trees will not be removed from the site during the high-risk season considered to be April 1 to September 30 of any given year.</p> | Monitoring of planting will include contingencies to mitigate for invasive species presence/ management. |
| During Operation | | | |
| Tree Resources | Impacts to roadside trees due to salt spray during operation of the DSBRT corridor. | See Section 4.2.4.3 for mitigation measures to protect trees from salt spray. | N/A |

TABLE ES.5. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: CULTURAL ENVIRONMENT

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|--|--|
| During Detail Design | | | |
| Built Heritage Resources and Cultural Heritage Landscapes | Direct impact to TO-001, TO-004, TO-011, TO-012, TO-013, PK-003, PK-018, AJ-003, AJ-007, AJ-008, AJ-009, AJ-014, AJ-015, AJ-016, AJ-017, AJ-020, AJ-021, AJ-037,AJ-038, AJ-040, AJ-043, WI-002, WI-013, WI-021, WI-046, WI-048, WI-050, WI-051, WI-053, WI-055, WI-063, WI-064, WI-065, OS-006, OS-058, OS-077. | <p>During design, the recommendations of all HIAs and the Cultural Heritage Report will be followed and adhered to during design and construction, including but not limited to strategies to protect heritage attributes.</p> <p>Should it be determined that there is no other technically feasible option to avoid direct impact, it is recommended that a CHER be undertaken, where not already completed, to determine if a directly impacted potential BHR has CHVI. If the directly impacted potential BHR is determined to have CHVI, an HIA is required to determine appropriate site-specific mitigation measures. The recommendations of the HIA shall be followed and adhered to during design and construction, including but not limited to strategies to protect heritage attributes.</p> <p>Consultation with municipal heritage staff, MHSTCI and local heritage advisory committees will be undertaken as appropriate to determine if proposed infrastructure will be subject to specific policies within heritage conservation districts or conservation areas (parks).</p> <p>A Heritage Impact Assessment (HIA) will be undertaken by a qualified person for the following properties: TO-004, TO-012, TO-013, PK-014, PK-018, AJ-003, AJ-007, AJ-009, AJ-014, AJ-015, AJ-016, AJ-017, AJ-018, AJ-020, AJ-021, AJ-037, AJ-038, AJ-040, AJ-043, AJ-059, WI-021,WI-046, WI-051, WI-063, WI-064, WI-065, and OS-006. The HIAs will be completed in consultation with municipal heritage staff and the MHSTCI as early as possible during detail design.</p> | N/A |
| Archaeological Resources | Parts of the Study Area exhibit archaeological potential in Segments 1, 2, 3, 4, and 5. | These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed construction activities. Indigenous Nations will be invited to participate in future archaeological assessment studies. | Construction Monitoring during archaeological fieldwork must follow the methods and requirements outlined in the 2011 S&G as well as take into account recommendations arising from the Indigenous engagement process. |
| | <p>The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment.</p> <p>Post Cemetery is located within the Study Area in Pickering. Archeoworks (P029-836-2012) Stage 4 excavation did not confirm the cemetery boundaries nor fully mitigate the Disciples Church Site (AIGs-449) within the DSBRT footprint. The following combined recommendations for the Post Cemetery property, including AIGs-449, made in the P029-836-2012 Stage 4 report still apply.</p> | <p>All required archaeological assessments (e.g., Stage 2 AA, and Stage 3, if recommended in the Stage 2AA) will be completed as early as possible during detail design and well in advance of any ground disturbing activities.</p> <p>Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.</p> <ul style="list-style-type: none">The resumption of any form of archaeological fieldwork — i.e., Stage 4 excavation; Stage 4 avoidance and protection (if applicable); construction monitoring — must take into account recommendations arising from the Indigenous engagement process.Block Excavation: The portion of the site which falls within the construction impact zone (i.e., north of the grading limit) must be entirely excavated by hand in one-metre-square units. The Stage 4 excavation will follow the methods and requirements outlined in the 2011 S&G's Sections 4.2.1 (general Stage 4 excavation requirements), 4.2.2 (general hand excavation requirements) and 4.2.9 (specific hand excavation requirements for undisturbed sites), as well as Table 4.1 (determination of hand excavation extent).Feature Excavation: Once the site area has been fully hand-excavated at least 10 cm into the subsoil, the exposed subsoil must be cleaned by shovel or trowel, and the resulting subsoil surface examined for cultural features. All identified cultural features must be mapped using transit and tape and recorded relative to the grid established during the Stage 3. Features must only be excavated and fully documented after complete exposure, except where not possible (e.g., presence of project limits). The excavation and documentation of features must follow the feature excavation-related methods and | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|------------|
| | | <p>requirements outlined in the 2011 S&G's Sections 4.2.1, #7-11 (general Stage 4 requirements); Section 4.2.2, #5-7 (general hand excavation requirements); and if applicable, Section 4.2.9, #5-6 (specific hand excavation requirements for undisturbed sites).</p> <ul style="list-style-type: none">• Features 1, 2 and 3: The portions of these features which lie within the project area limits are to be excavated and documented in accordance with the 2011 S&G's Sections 4.2.1, #7-11 (general Stage 4 excavation requirements); Section 4.2.2, #5-7 (general hand excavation requirements); and if applicable, Section 4.2.9, #5-6 (specific hand excavation requirements for undisturbed sites), in order to determine the nature of these features, and whether or not they are associated with graves containing human remains:<ul style="list-style-type: none">• In the event that none of these features is associated with graves containing human remains, there are no further archaeological concerns within these areas.• If evidence of burials associated with this cemetery are encountered, all work must cease and MHSTCI and the Bereavement Authority of Ontario (BAO) will need to be contacted for direction on next steps.• In the event that partial excavation is unable to determine whether or not any features are graves, permission to extend hand excavation of one-metre units further into the cemetery beyond the limit of grading must be acquired in order to allow further exposure, excavation and confirmation of the nature of the feature.• Partial exposure of features: Any feature that cannot be completely exposed due to the presence of project limits may be partially excavated. Exposed feature profiles resulting from partial excavation must be shored up and protected with geo-textile. The placement of fill in such areas must be monitored by a licensed archaeologist, and a report documenting the monitoring be subsequently filed with the MHSTCI.• The balance of the Disciples Church Site (AIGs-449) outside the project area limits must be avoided during grading and soil disturbing activities, in accordance with Section 4.1.1 of the 2011 S&G. The following measures are required: erect a temporary barrier along the project area boundary, issue "no go" instructions to all personnel during construction, and the "no go" area should be explicitly marked with instructions on all development plans. Inspection and monitoring of the area during soil disturbing activities by a licensed archaeologist is required. Following the completion of development activities, a separate Stage 4 avoidance and protection report must be completed and submitted to the MHSTCI.• Cemetery Investigation Construction Monitoring: The narrow swath of land following the east margin of Post Cemetery, between the existing cemetery fence and the current Brock Road (Durham Regional Road 1) right-of-way limit, has not been subjected to a Stage 3 investigation, given the presence of active utilities in this area. Despite the presence of extensive disturbance, this area must be subjected to archaeological monitoring by a licensed archaeologist in order to conclusively determine the absence of archaeological and/or human remains. A construction monitoring report must be completed and submitted to the MHSTCI.<ul style="list-style-type: none">• A Cemetery Investigation Authorization should be obtained prior to the construction monitoring.• A licensed archaeologist will be present on site for the duration of any additional impacts within the Study Area adjacent to the cemetery property to monitor for the presence of burial shafts outside the known limits of the cemetery. Any archaeological resources identified in this manner must be subject to the appropriate mitigations.• If evidence of burials associated with this cemetery are encountered, all work must cease and MHSTCI and the BAO will need to be contacted for direction on next steps. Should human remains be found outside of the confirmed boundaries of a cemetery, the Coroner and Police must be notified immediately. If the human remains are not determined to be of forensic interest the matter must then be | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|------------|
| | | <p>reported to the <i>Registrar, Funeral, Burial and Cremation Services Act, 2002</i>, Ministry of Government and Consumer Services.</p> <ul style="list-style-type: none">These lands do not retain near-surface archaeological potential due to previous disturbances, and thus do not require Stage 2 survey prior to any construction monitoring. | |
| | Part of the Study Area is adjacent to the Pioneer Memorial Garden Cemetery in Oshawa. Based on information from the cemetery operator about the uncertainty of grave locations along the northern cemetery limits on Bond Street West, there is potential for unmarked burials associated with the cemetery within the Study Area. | <ul style="list-style-type: none">A Cemetery Investigation Authorization should be obtained prior to the construction monitoring.Stage 3 Cemetery Investigation should be conducted on any lands impacted by the project between the paved road edge and the retaining wall, to confirm the presence or absence of unmarked graves outside the current fenced limits. Mechanical topsoil removal is not feasible thus it is recommended that the portion of the Study Area within lands between the paved road edge and the retaining all be subject to a program of archaeological construction monitoring if these lands are to be impacted by construction.A licensed archaeologist will be present on site for the duration of any additional impacts within the Study Area adjacent to the cemetery property to monitor for the presence of burial shafts outside the known limits of the cemetery. Any archaeological resources identified in this manner must be subject to the appropriate mitigations.If evidence of burials associated with this cemetery are encountered, all work must cease and MHSTCI and the BAO will need to be contacted for direction on next steps. Should human remains be found outside of the confirmed boundaries of a cemetery, the Coroner and Police must be notified immediately. If the human remains are not determined to be of forensic interest the matter must then be reported to the <i>Registrar, Funeral, Burial and Cremation Services Act, 2002</i>, Ministry of Government and Consumer Services.These lands do not retain near-surface archaeological potential due to previous disturbances, and thus do not require Stage 2 survey prior to any construction monitoring. | |
| | The Garden Site abuts the Study Area and is considered to have Cultural Heritage Value or Interest and to require Stage 4 Mitigation of | <ul style="list-style-type: none">Stage 4 will commence with additional Stage 3 units excavated: around units 460N-295E, 460N-290E, 485N-295E; and along the 295E line at 465N-290E, 470N-295E, 475N, 295E, 285N-295E. | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|--|--|
| | Impacts as per recommendations made during Stage 3 under P059-0985-2021. | <ul style="list-style-type: none">Unit excavation will consist of the hand excavation of 1 metre x 1 metre units dug by hand, 5 centimetres into subsoil. All soils will be screened through 6mm wire mesh to facilitate artifact recovery with all artifacts retained by provenience.Should cultural features be identified, the feature fill will not be excavated, the exposed plan of the feature will be recorded, geotextile fabric will be placed over the unit floor and the unit will be backfilled. The extent of the site will be determined following Standard 1 of the S&Gs, Section 3.2.3.Stage 4 mechanical topsoil removal to look for cultural features will focus on the core of the Garden Site, identified as Locus 3, and will be conducted and monitored by a licensed archaeologist using a tracked Gradall or excavator with a smooth edge bucket. Mechanical topsoil removal will continue to a minimum of 10 metres beyond all identified cultural features. Mechanical topsoil removal will be supplemented by hand ‘shovel shining’ if soil conditions warrant (As per the MHSTCI Stage FAQ dated March 2016). Identified cultural features will be fully exposed in plan view via hand using shovels or trowels.Units 470N-300E, 480N-295E, identified as containing potential features—will be investigated to determine whether features are present.All features will be recorded using a D-GPS accurate to 10 centimetres. Features will be sectioned, and hand excavated with soils being screened through 6 millimetre mesh screen. Features will then be appropriately recorded in plan view via a scaled drawing and photographs.Soil samples for flotation will be collected by stratum for all identified privies and root cellars as required by the 2011 Standards and Guidelines. | |
| | Potential project impacts to the riverbeds. | The marine archaeological potential of Petticoat Creek, Duffins Creek, Carruthers Creek, Lynde Creek, and Pringle Creek within the Study area are to be evaluated by following the MHSTCI Criteria For Evaluating Marine Archaeological Potential checklist if project impacts to the riverbeds are proposed. | |
| During Construction | | | |
| Built Heritage Resources and Cultural Heritage Landscapes | <p>Potential indirect impacts on known or potential properties of CHVI resulting from construction activities</p> <p>In addition to the specific properties listed below, a number of sites could be impacted by construction.</p> | <p>During design, the recommendations of all HIAs and the Cultural Heritage Report will be followed and adhered to during design and construction, including but not limited to strategies to protect heritage attributes.</p> <p>Selection of construction staging and laydown areas will follow Metrolinx’s selection procedures which include avoiding heritage attributes wherever possible or effectively mitigating impacts where not possible.</p> | Baseline vibration monitoring should be undertaken in advance of construction. Should this advance monitoring assessment conclude that the structure(s) on this property will be subject to vibration impacts: (1) plan construction activities to avoid adverse vibration impacts; and where potential adverse vibration impacts cannot be avoided (2) a qualified engineer should include this property in the condition assessment of structures within the vibration zone of influence for this project. |
| Archaeological Resources | N/A | N/A | N/A |
| During Operation | | | |
| Built Heritage Resources and Cultural Heritage Landscapes | N/A | N/A | N/A |
| Archaeological Resources | N/A | N/A | N/A |

TABLE ES.6. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: SOCIO-ECONOMIC AND LAND USE

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|--|
| During Detail Design | | | |
| Community Resources | N/A | N/A | N/A |
| Local Businesses | N/A | N/A | N/A |
| Land Use | Construction activities are expected to affect all land use types. | Implement a suite of flexible and responsive community support initiatives, including engagement, local procurement opportunities, construction mitigation and opportunities for local employment. | N/A |
| During Construction | | | |
| Community Resources | <p>The potential impacts to demographics and community resources that are anticipated during the construction phase include:</p> <ul style="list-style-type: none">• Pedestrian and cycling infrastructure may be closed during construction for an extended period, potentially resulting in pedestrian and cycling infrastructure gaps;• Safety concerns when using pedestrian and cycling infrastructure such as bike lanes and sidewalks due to reduced lanes and parked construction equipment;• Driveways, sidewalks, cycling facilities and transit stops of community resources that front onto Ellesmere Road, Kingston Road, Dundas Street, Bond Street and King Street may have access interrupted during construction;• Access to community resources may be reduced;• In the case of an emergency, emergency services such as police or fire may have difficulty accessing community resources due to reduced lanes and road closures. Infrastructure built into the streetscape, such as fire hydrants, may also be difficult to access in the construction zone during an emergency; and• Potential nuisance impacts related to dust, emissions, and noise from operating construction equipment for community resources and users of pedestrian and cycling infrastructure. | <ul style="list-style-type: none">• Determine if cycling infrastructure is safe to use during construction. If it is considered potentially unsafe, that facilities will be temporarily closed and cyclists will be re-routed, where possible, until the infrastructure is safe to use;• Determine whether the use of sidewalks and other pedestrian infrastructure is safe to use during construction. Areas that are considered unsafe will be temporarily closed. Detour routes that are considered safe and accessible will be provided where possible and in well-lit areas;• Community resources that front onto the corridor should be contacted to inform staff that access to facilities may be interrupted during project construction. Prior to project construction, the community facilities that will experience access issues will be identified;• Adjacent road closures and construction on adjacent crossings should be avoided;• Community resource operators should be notified at least two weeks in advance of any road closures that may impact them. The anticipated duration of the closure should also be specified;• A contact should be provided to accommodate questions and concerns from community resource staff regarding access to facilities during the construction period; and• Consult with staff from fire, police, ambulance, engineering, construction services, transportation services, and other applicable departments from City of Toronto, Durham Region, City of Pickering, Town of Ajax, Town of Whitby and City of Oshawa to develop an Emergency Response and Incidence Management Plan. Consultation with municipal staff will confirm that each jurisdictions rules and regulations are upheld. | <ul style="list-style-type: none">• Implement a Signage and Wayfinding Action Plan that identifies appropriate signage, alternative access points and parking arrangements will be developed to maintain access to community resources, and other businesses and institutions, during project construction. The community resources that may experience access interruptions will be a priority. |
| Local Businesses | <p>Potential impacts to each consolidated business category during construction include:</p> <ul style="list-style-type: none">• Employment Area: Arterial roads in the City of Toronto and Durham Region accommodate heavy truck traffic. Employment areas may experience temporary nuisance impacts resulting from longer than expected delivery times to and from facilities due to a reduction in traffic lanes. Truck traffic may also have difficulty turning onto roads where construction is taking place due to a reduced turning radius;• Power Retail & Malls: Most retail establishments within the Study Area are in the power retail or mall format, which are set back from the corridor. Potential nuisance impacts include delivery delays due to a reduction in traffic lanes. Some retail centre accesses may be | <p>During construction, recommended mitigation measures by consolidated business classification include:</p> <ul style="list-style-type: none">• Employment Area: Provide enough space for heavy single unit trucks to make right and left-turns onto the route/arterial where construction is taking place. This can be accomplished by providing a minimum effective turning radius for heavy single unit trucks, especially on roads that connect to Highway 401 interchanges. If appropriate radii cannot be accommodated, appropriate detour routes must be provided for heavy single unit trucks. Consult with City of Toronto, Durham Region, City of Pickering, Town of Ajax, Town of Whitby and City of Oshawa to develop a Traffic Management and Control Plan that identifies appropriate routes for heavy truck traffic that is supported by a Haul Route Analysis; | |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|---|------------|
| | <p>interrupted during construction. Access restrictions may cause further negative impacts related to reduced revenue;</p> <ul style="list-style-type: none">• Main Street Retail & Services: Main street retail may experience greater negative impacts than Power Retail & Malls during construction. Impacts may include limited access to on-street parking, reduced business visibility, reduced access to storefronts, and public perception that businesses are not operational. Revenue may be impacted due to access restrictions. Impacts will be greatest to retail storefronts that front directly onto the corridor where construction will occur will have;• Office: Offices that directly abut the corridor may experience nuisance impacts related to longer than average travel times for employees; and• Institutional: Institutional establishments fronting onto the corridor may experience nuisance impacts related to longer than average travel times to get to and from the facilities due to a reduction in travel lanes. Further potential negative impacts include reduced visibility of the institutions and reduced access to driveways and parking lots, which may also impact revenue generation depending on the type of institution being examined. | <ul style="list-style-type: none">• Power Retail & Malls: Keep entry points into malls and power retail centres along the corridor operational and unobstructed. Ahead of construction, intersections that may experience temporary closures or interruptions to operations should be identified, as well as the potential timing and duration of the interruptions. Property owners and managers of the mall and power retail facilities must be contacted and made aware of potential obstructions or closures to main entry points. Arrangements should be made with concerned property owners and managers to address potential issues due to limited access. Deliveries into these facilities may be impacted and visitors may be confused about how to access these businesses – both factors should be considered in the Traffic Management and Control Plan;• Main Street Retail & Services: Storefronts should remain visible by implementing transparent fencing in place of plywood where it is possible and safe to do so. Main street retail and services should be considered in the Signage and Wayfinding Action Plan, especially in areas that comprise concentrations of main street retail, such as Downtown Whitby and Downtown Oshawa. The Signage and Wayfinding Action Plan should determine how to best direct customers to where parking is available in the absence of on-street parking, and help identify which businesses are operational during the construction period;• Office: No mitigation or monitoring measures required; and• Institutional: The Signage and Wayfinding Action Plan must also cover institutions in Downtown Whitby and Downtown Oshawa, and other applicable areas. The Plan should communicate what facilities are operational and where to park if on-street parking is impacted. | |
| Land Use | <p>Construction activities are expected to affect all land use types, including Residential & Multi-family Residential, Centres & Mixed Use, Commercial, Industrial, Institutional, Village, Rural, Open Space & Other areas. The potential impacts are listed as below.</p> <ul style="list-style-type: none">• Emissions and dust from construction equipment and trucks;• Noise and vibration;• Detour routes through residential areas leading to negative impacts including excessive noise, emissions, truck traffic, dirt, and debris to local roads;• Access restrictions for emergency response;• Access restrictions for local residents and businesses;• Disruption to the flow of traffic;• Reduced on-street parking spaces;• Pedestrian infrastructure may be interrupted during construction;• Curbside operations, such as waste collection, loading and unloading, may be interrupted; and• The damage of trees, grass, and vegetation due to operation, placement, and storage of construction equipment on site. | <p>Mitigation measures to address potential construction related impacts are listed below.</p> <ul style="list-style-type: none">• Create and implement Dust Management Plan to identify a full list of measures to minimize the spread of dust and emissions that will be applied by the entity completing construction;• Fences and wind screens will be utilized to help minimize the spread of dust. Truckloads carrying dust-producing material will be covered;• Soil surfaces capable of producing dust will undergo wetting, covering, or paving to minimize the spread of dust;• Traffic speeds within the construction zone will be reduced to minimize the spread of dust;• Construction work schedules and procedures will adapt to changing weather conditions when negative impacts are possible, such as wetting during high speed winds;• Construction equipment and machinery will be in good working condition and undergo regular maintenance, and will comply with federal and provincial regulations. Emissions and noise will be minimized where possible;• Prohibit construction equipment and machinery from idling for extended periods of time through posting signage throughout the construction site with guidelines to minimize emissions. This can be integrated into the Signage and Wayfinding Action Plan; | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|---|---|------------|
| | | <ul style="list-style-type: none">• Comply with by-law provisions imposed by the local area municipalities and Durham Region, and permit exemptions where necessary;• Complete construction during permitted hours, generally between 6 AM and 8 PM or between sunrise and sunset.• Construction equipment will comply with noise regulations mandated by the province and local area municipalities;• Provide adequate turning radii for heavy single unit trucks to access loading and unloading facilities in the rear of buildings;• Through the Haul Route Analysis and Traffic Management and Control Plan, help establish that detour routes and haulage routes use main roads where possible; and• Road closures will be communicated prior to the road closure. | |
| During Operation | | | |
| Community Resources | <p>The potential impacts to demographics and community resources that are anticipated during the operational phase of the include:</p> <ul style="list-style-type: none">• Given the high traffic volume and speed of arterial roads, cycling facilities may be unsafe without a separated bike lane, which is why separated facilities are proposed along the majority of the corridor;• As the corridor intensifies and accommodates additional population, there will be further demand created for community resources to uphold current service levels. Demand for services should be examined by each municipality as the corridor intensifies;• As the corridor intensifies and accommodates additional population, there will be further demand for open space and parks. Demand for open space and parks should be examined by each municipality as the corridor intensifies;• It is expected that the project will have a positive impact on the existing demographics and community resources as these areas will be served by higher order transit, providing an enhanced service by reducing travel times for users and providing more frequent service; and• Enhanced transit service is expected to encourage further transit ridership and will provide time savings for existing users. In addition, enhanced transit service will be provided to access destinations served by the broader transit network. | <ul style="list-style-type: none">• The active transportation network will continue to develop to accommodate the incoming population as lands along the Durham-Scarborough BRT are redeveloped. As part of the planning approvals process, staff reviewing development applications should encourage connections to and further development of the active transportation network. This will help to expand and eliminate gaps that may exist in the surrounding network;• High traffic volumes coupled with high posted speeds in certain segments of the corridor suggest the need for separated cycling facilities to enhance safety. Physically separated cycling facilities have been included in the preliminary design in a context-sensitive manner consistent with active transportation plans in each municipality;• Staff reviewing development applications should create criteria that would trigger a full Community Services and Facilities Study. This would require applicants to submit a study as part of a complete development application. The study will identify potential impact on community resources that a development may have, and where expansions will need to occur to service the incoming population;• Given that each municipality has parkland dedication provisions in place, no mitigation and monitoring measures are required to uphold the service levels related to parkland and open space. | N/A |
| Local Businesses | <p>All business types are expected to experience positive impacts from the project. Potential operational impacts for each consolidated business category include:</p> <ul style="list-style-type: none">• Employment Area: No negative impacts are anticipated during operations. Positive impacts include enhanced transit access for employees and visitors that use transit through reduced travel times and more frequent service;• Power Retail & Malls: No negative impacts are anticipated during operations. Potential positive impacts include the encouragement of site redevelopment through enhanced transit access, which will help establish transit supportive densities and mixed-use, complete communities. Further positive impacts include enhanced transit access for employees and customers that use transit by reducing travel times and providing access to more frequent service; | <p>During operations, mitigation and monitoring measures by business classification include:</p> <ul style="list-style-type: none">• Employment Area: No mitigation or monitoring measures required;• Power Retail & Malls: No mitigation or monitoring measures required;• Main Street Retail & Services: Relocate on-street parking spaces that are to be removed by the project. Where possible spots should be maintained in close proximity to main street retail;• Office: No mitigation or monitoring measures required; and• Institutional: No mitigation or monitoring measures required. | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|---|---------------------|------------|
| | <ul style="list-style-type: none">• Main Street Retail & Services: Potential negative impacts include decreased on-street parking spaces to accommodate visitors. Positive impacts include enhanced transit access for employees and customers that use transit by reducing travel times and providing access to more frequent service, as well as an improved streetscape to help attract pedestrian traffic;• Office: Offices abutting the corridor may experience positive impacts related to enhanced transit access to support employees, and an improved streetscape to benefit the environment of these offices. On-street parking is a minimal concern for offices as many offices in the Study Area have dedicated parking lots to serve them; and• Institutional: Institutional facilities fronting onto the corridor may experience positive impacts related to enhanced transit access to support employees and users, and an improved streetscape to benefit the environment of these institutions. | | |
| Land Use | <ul style="list-style-type: none">• Positive impacts to Centres & Mixed-Use Areas.• Minimal negative impacts to Commercial uses.• No negative impacts to Residential & Multi-family Residential, Industrial, Institutional, Village, Rural, Open Space & Other uses. | N/A | N/A |

TABLE ES.7. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: STORMWATER MANAGEMENT, MUNICIPAL SERVICES AND UTILITIES

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|---|---|------------|
| During Detail Design | | | |
| Watercourse Crossings | Extension/widening of 13 existing watercourse crossing structures, including C-01, C-02, C-05, C-06, C-07, B-05, ST-01, ST-03, RC-05, RC-06, RC-10, RC-11, and RC-12. Replacement of 3 existing bridges, including B-07, B-09 and B-10. | <p>Conduct hydraulic analysis following <i>Natural Hazards Policies or the Technical Guide, River and Stream Systems; Flooding Hazard Limit</i> (2002) to ensure that all following flood hazard objectives are met:</p> <ul style="list-style-type: none">• Ensure that flood risk does not increase as a result of the proposed crossing for all design storm events up to, and including, the Regulatory event;• Safely convey the applicable design storm as per municipal, regional, and/or Ministry of Transportation guidelines considering implications of future land use on flooding;• Establish the requirements for crossing size (i.e., overtopping of the Regulatory event) while considering ingress/egress within the surrounding area in consultation with local municipal emergency managers;• TRCA's Crossing Guideline for Valley and Stream Corridors (2015) will be considered in setting stream crossing objectives for watercourses under TRCA jurisdiction during the detail design phase; and• Coordinate with TRCA to consider the proposed works related to flood control around Duffins Creek Bridge during detailed design. Assess hydraulic conditions using TRCA's 2D hydraulic model during detailed design to further refine the design and the proposed grading plan, to ensure there is no net fill volume within the floodplain and not any off-site or on-site impact to the water surface elevation and velocities of the 2-year, 5-year, 10-year, 25-year, 50-year, 100-year, and the TRCA's Regulatory design storm floodplains. | N/A |
| | 300 m of a tributary of Lynde Creek between Lake Ridge Road and Halls Road is considered for realignment. | Sizing of proposed drainage channel will be refined during detail design. | N/A |
| Floodplain Management/ Flooding Hazards | Extension/widening of 13 existing watercourse crossing structures, including C-01, C-02, C-05, C-06, C-07, B-05, ST-01, ST-03, RC-05, RC-06, RC-10, RC-11, and RC-12. Replacement of 3 existing bridges, including B-07, B-09 and B-10. | <p>For all defined watercourses (floodplains), detailed hydraulic assessment using the HEC-RAS model is to be completed to update floodline mapping to standards of TRCA and CLOCA and determined appropriate design storm and peak flow rate associated with the watercourse at the proposed crossing location based on future land use conditions.</p> <p>Proposed crossing structure to convey the appropriate peak flow rate without increasing flood elevations for the 2 to 100 year and Regional storm events will be sized.</p> <p>Flood hazard at the preferred crossing location using existing floodplain mapping and modelling is to be confirmed. Models are to be updated as necessary to reflect more detailed topographical and flow data. Notably, the hydraulic condition could be further assessed using the 2D model obtained from the TRCA during detail design to further refine the design, the proposed grading plan, and fill volume within the floodplain.</p> <p>The hydraulic analysis will be refined based on the detail design to ensure flooding objectives are met with regard to future land use changes.</p> <p>During detail design, an updated floodplain map will be submitted to TRCA upon final acceptance of the modelling and floodplain mapping.</p> <p>During detail design, TRCA will continue to be consulted to consider mitigation regarding the platform within the regulatory area.</p> | N/A |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|---|---|
| | | <p>For floodproofing stops and their electrical utilities above the Regional flood event, consider design mitigation for all stops and platforms within the TRCA and CLOCA Regulatory design storm floodplains based on the latest information from the conservation authorities.</p> <p>Early in detail design, in consultation with TRCA and Durham Region, review water surface elevation depths for the Regional and 350-year storms to confirm the feasibility of floodproofing the Notion Road stop at the current location or consider relocating the stop as necessary to avoid hazard to life during a flood.</p> | |
| Municipal storm sewer system | Alteration to the local drainage system including catchbasin and catchbasin lead relocation, alteration of overland flow route, relocation of municipal storm sewer outfall. | Stormwater sewer systems are to be designed following guidelines and standards developed by local municipalities. | N/A |
| Stormwater management | <p>Increase to impervious areas within the following corridor segment:</p> <ul style="list-style-type: none">Ellesmere Road from Grangeway Avenue to Military Trail in Scarborough;Kingston Road from Ellesmere Road to Raspberry Road in Scarborough;Kingston Road from Altona Road to Rotherglen Road in Pickering and Ajax;Dundas Street from Garden Street to Garrard Road <p>leading to increase in peak runoff flow rate, increase in annual runoff volume generated from the project site, and increase in contaminants loading discharged to the receiving waterbodies.</p> | <p>Conduct complete review of existing Toronto Water’s drainage and SWM system information to verify the wet weather flow management design criteria could be satisfied.</p> <p>Conduct an analysis of available drainage and SWM capacity for road segments where widening is needed.</p> <p>The local stormwater management guidelines are to be followed to ensure the maximum allowable discharge flow rate, annual runoff volume targets, as well as water quality control targets set out by local stormwater management guidelines and requirements of stormwater quantity and quality controls are met.</p> <p>Stormwater quality control strategies to propose site specific stormwater management measures is to be refined, where needed, following guidelines developed by MECP and Conservation Authorities.</p> <p>Stormwater management reports for review and approval by local municipalities is to be prepared as required.</p> | N/A |
| Permit to Take Water (PTTW) and Environmental Activity & Sector Registry (EASR) | Construction dewatering for the construction of foundations for structures. | The applicability of Permit to Take Water or Environmental Activity and Section Registry will be evaluated prior to construction. | N/A |
| Erosion and Sediment Control | Removal of vegetation, stripping of topsoil, and alterations to topography and drainage patterns leading to release of sediment laden runoff and dust from constructions sites to the natural environment. | <p>Temporary drainage and ESC measures adhering to guidelines developed by Conservation Authorities and local municipalities are to be designed.</p> <p>An ERA and ESC plans are to be completed following <i>Erosion and Sediment Control Guide for Urban Construction</i> (2019) developed by TRCA.</p> <p>An ESC inspection program is to be developed following TRCA’s <i>Erosion and Sediment Control Guide for Urban Construction</i> (TRCA, 2019).</p> | N/A |
| Utilities | Conflicts between existing utilities and the DSBRT design | Detailed utility relocation plans will be developed during detail design and follow all applicable standards. Coordinate the proposed utilities relocation design with the applicable municipalities, transit agencies and potentially affected private utility owners for example through Metrolinx preconstruction utilities service group. Potential utility conflicts shall be identified in consultation with each utility owner as part of detail design to develop applicable protection and/or relocation strategies prior to construction. Impacts to municipal servicing shall be consulted with the applicable municipality and required permits shall be obtained prior to construction. | N/A |
| During Construction | | | |
| Erosion and Sediment Control | Removal of vegetation, stripping of topsoil and alterations to topography and drainage patterns leading to release of sediment laden runoff and dust from constructions sites to the natural environment. | Implement and adhere to the requirements of the ESC Plan including the ESC inspection program. | The condition and functionality of ESC measures on the site are to be regularly inspected and documentation on inspection activities are to be maintained up-to-date. |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|---|--|--|------------|
| Permit to Take Water (PTTW) and Environmental Activity & Sector Registry (EASR) | Construction dewatering for extension/replacement of existing watercourse crossing structures. | Implement and adhere to the requirements of any PTTWs and/or EASR. | |
| During Operation | | | |
| Stormwater management and drainage | N/A | N/A | N/A |

TABLE ES.8. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: AIR QUALITY

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|--|---|---|
| During Detail Design | | | |
| Air Quality | No impacts anticipated | N/A | N/A |
| During Construction | | | |
| Temporary Air Quality Deterioration in the Vicinity of the Project's Construction Site | Construction activities may generate dust due to material processing and tailpipe emissions from construction equipment and vehicles | <p>A Construction Phase Air Quality Management Plan (AQMP) should be developed and provide site staff with air quality mitigation measures for the Project. The ECCC publication “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” (Cheminfo Services Inc., 2005) and the MECP’s Management Approaches for Industrial Fugitive Dust Sources Technical Bulletin (MECP, 2017).should be used as the guides when developing the AQMP. Prior to initiating ambient air quality monitoring activities, the AQMP and Air Quality Monitoring Plan will be submitted to Metrolinx for approval and submitted to the MECP for review and comment. The air quality mitigation measures outlined in the AQMP should include but not limited to:</p> <ul style="list-style-type: none">• Seeding, paving, covering, wetting disturbed soil surfaces;• Using wind screens or fences;• Covering truckloads of dust-producing material;• Reducing traffic speeds especially on unpaved surfaces.• Using of vehicle wheel and body washing facilities at the exit points of the site;• Reducing aggregate/sand drop height;• Only allowing wet cutting of concrete block, concrete, and/or asphalt surfaces;• Stop work activities temporarily during high wind conditions;• Following mitigation measures provided in Environment Canada’s Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities and the Ministry of the Environment, Conservation and Parks’ Technical Bulletin Management Approaches for Industrial Fugitive Dust Sources; and• Following mitigation measures from Environment Canada’s Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (Cheminfo Services Inc., 2005). | <p>Construction air quality monitoring activities will be conducted in accordance with the AQMP and Air Quality Monitoring Plan requirements, which may include:</p> <ul style="list-style-type: none">• Establish the baseline air quality conditions at AQIA Study Area prior to the commencement of the construction activities. At a minimum, three (3) months of baseline monitoring program will be established at the AQIA Study Area;• Installing on-site meteorological and air quality (dust) monitoring station to monitor real-time conditions;• The siting of the air quality monitoring stations and meteorological tower should be chosen in accordance with “The Operations Manual for Air Quality monitoring in Ontario”(MECP 2019);• Define Trigger, Action and Threshold Dust Level and develop Actions Plan to respond to these elevated dust conditions;• Develop an Air Quality Incident, Complaint and Response Protocol; and• Report daily monitoring results, weather conditions, incidents, and mitigation activities. |
| | Tailpipes Emissions from Construction Equipment and Vehicles | <p>Prior to construction, specific construction plans will be developed for certain work zones that involve sensitive receptors where AAQC/standard exceedances are expected. The construction plans will focus on emission mitigation strategies for minimizing the air quality impacts at these specific receptor locations.</p> <p>The following air quality control mitigations for construction equipment and vehicles should be considered for this project:</p> <ul style="list-style-type: none">• Construction equipment and vehicles must be complied with Canada most stringent emissions standards;• Construction equipment and vehicles should be properly maintained and repaired to minimize exhaust emissions;• Excessive idling of vehicles and equipment (greater than five minutes) should be minimized and/or strictly adhering to following municipal by-law on idling policies;• Using alternative-fuel or electric equipment where feasible;• Using solar panel to supply electricity instead of on-site diesel generators;• Develop and implement a construction Traffic Management Plans (TMPs). Examples of traffic management techniques may include the following:<ul style="list-style-type: none">○ using traffic control officers and flaggers;○ using temporary signage and variable message displays;○ notifying the public of construction-related traffic congestion; | <p>During the demolition and construction phases, air quality monitoring will be performed by using a combination of daily handheld metering and autonomous air quality monitoring devices.</p> <p>An air quality digital web-platform dashboard, specific to the Project, should also be developed specifically for the implementation of the monitoring component of the AQMP.</p> |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|--|--|--|------------|
| | | <ul style="list-style-type: none">designating construction staging areas and worker parking areas; anddesignating construction truck routes. | |
| During Operation | | | |
| Potential Reduction of Air Quality in the vicinity of the DSBRT Corridor | Tailpipes NO ₂ Emissions from BRT and Other Vehicles | <p>Specific Operation NO₂ Mitigation Measures include:</p> <p>For BRT Vehicles</p> <ul style="list-style-type: none">Introducing electric (zero emission) or diesel-electric hybrid (low emission) transit buses in the bus fleet;Using advanced active emissions control technology system such as Selective Catalytic Reduction (SCR) in diesel-powered buses; andUsing clean diesel fuel. <p>For Other On-road Vehicles:</p> <ul style="list-style-type: none">Encourage carpooling/ridesharing, remote work, using public transportation;Diesel Retrofit – Diesel trucks with older engine replaced with a new diesel engine that meets the most current emissions criteria; andReplace older model vehicles with newer zero emission or low emission vehicles. | N/A |
| | Tailpipe PM ₁₀ and PM _{2.5} from BRT and other vehicles. | <p>Specific Operations Particulate Matter (PM₁₀ and PM_{2.5}) Mitigation Measures include:</p> <p>For BRT and Other Diesel Powered Vehicles.</p> <ul style="list-style-type: none">Conducting routine preventive maintenance of diesel engines to minimize emissions;Installing engine exhaust filters;Installing diesel oxidation catalysts; andUsing clean diesel fuel. | N/A |
| | Tailpipes Emissions from BRT and Other Vehicles | <p>General BRT Tailpipes Emissions Mitigation Measures:</p> <p>The tailpipe emissions may be reduced by best management practices, which include:</p> <ul style="list-style-type: none">Switching from diesel to alternative fuels such as natural gas or dimethyl ether;Blending of biological-based fuels i.e., biodiesel or hydrogenation-derived renewable diesel with conventional petroleum-based diesel;Upgrading transit buses from conventional internal combustion engine technology to hybrid or electric technology can improve fuel economy or eliminate tailpipe emissions altogether; andConducting regular engine maintenance and inspection as well as minimizing bus idling time; <p>TTC Board approved the TTC's Green Bus Technology Plan in 2017. Some sub-programs in the plan that are relevant to this Project include:</p> <ul style="list-style-type: none">Clean diesel bus procurement;HEV bus procurement;eBus procurements;Electrification infrastructure; andAssociated business transformation program. <p>Mitigation Measures for Other On-road Vehicles include:</p> <ul style="list-style-type: none">Encouraging carpooling/ridesharing, remote work and using public transportation;Using electric, hybrid and alternative-fuel vehicles;Replacing older model vehicles with newer zero emission or low emission vehicles;Minimizing vehicle idling time; andConducting regular engine maintenance and inspection. | N/A |

TABLE ES.9. SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND MONITORING: NOISE AND VIBRATION

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|---|---|---|
| During Detail Design | | | |
| Noise | N/A | N/A | N/A |
| Vibration | N/A | N/A | N/A |
| During Construction | | | |
| Noise | <ul style="list-style-type: none">39 locations (i.e., noise sensitive receivers) could potentially be impacted by construction noise; andThe severity of construction noise at the identified locations of concerns are mainly dependent on:<ul style="list-style-type: none">The number and type of equipment being simultaneously used.The duration construction equipment will be utilized during the day (i.e., usage factor).To be conservative, the current report assumes all relevant construction equipment are working simultaneously and are fully utilized (i.e., usage factor of 1) during the construction period. | <p>The implementation of the following measures will help to mitigate potential noise impacts during construction:</p> <ul style="list-style-type: none">A Noise and Vibration Management Plan (NVMP) to be prepared prior to construction. NVMP will include specific mitigation measures related to laydown areas (once they are determined);Temporary noise mitigation measures shall be investigated and necessary noise mitigation measures in the form of physical noise barriers, mufflers on equipment, etc. shall be implemented if monitoring results show noise levels during construction activities exceed the criteria;Limit construction work to the time periods allowed by the municipalities' noise by-laws as summarized in Section 3.9.1.1;Should there be a need to complete work outside of the hours allowed in the applicable noise by-laws, the Contractor is to seek any required exemptions and permits directly from the applicable jurisdiction, in advance of any work performed outside of the allowable time periods. If an exemption cannot be obtained, then construction will proceed in accordance with the requirements of the noise by-laws;The Contractor is expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the Municipality for all work;Contracts shall include explicit indication that all construction equipment used on the project is to meet the sound level criteria from NPC-115 and NPC-118 and be well maintained and operating with effective muffling devices that are in good working order;The separation distance between construction staging areas and nearby sensitive receivers is to be maximized to the extent possible to reduce noise impacts;Any temporary roads for construction vehicle access are to be well maintained and free of potholes and ruts to avoid excessive noise from heavy vehicles travelling on uneven surfaces; andShould any complaints be reported from the public due to construction noise, the Owner will be notified, and the incident will be investigated. A complaints protocol is to be established for receiving, investigating and addressing construction noise complaints from the public, including a plan for how the public is to be notified of their options for logging a complaint. | <p>The implementation of the following measures will help to monitor potential noise impacts during construction:</p> <ul style="list-style-type: none">Noise level monitoring shall be undertaken at identified Representative Noise Sensitive Receivers to appropriately identify and mitigate any exceedances for noise levels to comply with construction noise criteria set in TABLE 3.36;Noise levels shall be monitored to verify mitigation measures(s) effectiveness, if any;In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives; andA noise complaint will trigger an investigation to verify whether the noise mitigation has been implemented, including verification of construction equipment sound levels per NPC-115 and NPC-118. |
| Vibration | <ul style="list-style-type: none">Seven (7) buildings as listed in TABLE 4.32 could potentially be impacted (i.e., possible structural damage) by the construction vibration (i.e., during bridge and culvert work).The construction vibration could cause annoyance and trigger complaint from the communities. | <p>The implementation of the following measures will help to mitigate potential vibration impacts during construction:</p> <ul style="list-style-type: none">A Noise and Vibration Management Plan (NVMP) during Detail Design is to be prepared prior to construction. NVMP will include specific mitigation measures related to laydown areas (once they are determined);For work that is to occur outside of regular hours, the Contractor will be responsible for identifying the implications of the vibration generated, and to make construction work plans available for review and coordinate with appropriate municipalities/region and MTO as required near MTO right-of-way;Construction equipment with potential to cause off-site vibrations should be operated as far away from vibration-sensitive sites as possible; | <p>The implementation of the following measures will help to monitor potential vibration impacts during construction:</p> <ul style="list-style-type: none">Pre-construction consultation with property owners;Pre-construction measurement of the background vibration within the ZOI according to the applicable By-laws (e.g., City of Toronto By-law No. 514-2008 (City of Toronto, 2008));Contractor shall be responsible for pre-construction inspection (e.g., photography |

| Environmental Component | Potential Impacts (Design/Construction/Operation) | Mitigation Measures | Monitoring |
|-------------------------|--|--|---|
| | | <ul style="list-style-type: none">Where possible, activities that have potential to cause off-site vibrations should be phased such that as few as possible are occurring simultaneously;Update Zone of Influence mapping and predictions based upon refined site staging, equipment, construction areas, and building locations prior to the commencement of construction;Contractor shall be responsible for any damage caused by construction vibration;Operate construction equipment on lower vibration settings, where possible;Construction activities that have potential to cause off-site vibration during the night-time hours should be avoided; andA complaints protocol is to be established for this Project for receiving, investigating and addressing construction vibration complaints received from the public. | <p>of building foundation) of the impacted buildings inside the ZOI according to the applicable By-laws;</p> <ul style="list-style-type: none">A monitoring program to measure vibration during construction activities (close to the affected buildings) shall be developed and implemented to appropriately identify and mitigate any exceedances and be in compliance with City of Toronto By-law No. 514-2008, and applicable vibration criteria listed in TABLE 3.41 to identify the need for mitigation measures if required; andMonitoring will be undertaken to verify mitigation measure(s) effectiveness. |
| During Operation | | | |
| Noise | Future operational noise | Review and confirm design for noise barriers identified to be constructed within ROW of the 17 identified PORs. | <ul style="list-style-type: none">The effectiveness of the proposed noise barriers in reducing sound levels below the assessment criteria has been confirmed via the CadnaA modelling. The mitigation effectiveness could also be confirmed via field measurements. |
| Vibration | No impacts are anticipated due to the nature of BRT (rubber-tired transit) projects. | N/A | N/A |

ES.5 Climate Change and Sustainability Considerations

Metrolinx contributes to Ontario's goal of reducing overall GHG emissions by promoting increased use of public transportation. In addition to the benefits inherent to public transit, *Metrolinx Sustainability Strategy* (2018) aims to integrate sustainability goals into all aspects of how Metrolinx plans, builds, and operates a sustainable transportation system. MECP's *Considering Climate Change in the Environmental Assessment Process* (October 2017) sets out expectations for considering climate change in environmental assessments.

Climate change and related extreme weather events are of concern to many segments of society and sectors of the economy. Two approaches for considering and addressing climate change (MECP 2017) in project planning – mitigation (**Section 5.2**) and adaptation (**Section 5.3**) – have been documented in **Chapter 5** of this report to assess potential future climate change implications for the Project and enhance resiliency.

ES.6 Consultation

ES.6.1 Consultation Overview

An extensive communication and consultation program was undertaken to inform the community and seek feedback on various aspects of the study, as documented in **Chapter 6** of this report. A Consultation and Engagement Strategy was developed at the Project's outset to guide consultation and engagement for the Project. The focus of consultation during the Pre-Planning Activities was to identify stakeholders, provide information on the Project and collect information on preliminary concerns. **Appendix K1** provides the project mailing list and Government Review Team (GRT) list.

In total, the consultation program included four formal rounds of communication and consultation – three as part of pre-planning activities and one during TPAP. There were in-person and online tools and activities to make it easy for the community to get involved and provide feedback.

ES.6.2 Pre-Planning Activities Consultation

Public Communication and Consultation

Public meetings during the pre-planning activities were held between June 2019 and September 2021. In-person events were held in City of Toronto and in each of the Durham Region municipalities: City of Pickering, Town of Ajax, Town of Whitby, and City of Oshawa. Notices for all Public Information Centres were mailed to property owners and published in local newspapers. Additional notification was provided through social media, websites, Metrolinx newsletters, postcard unaddressed mail-outs, and the project email list. Elected officials were briefed at key points during the project or as requested.

The first Public Information Centre was held in June 2019 and September 2019. The purpose of this meeting was to introduce the Project to the public and obtain feedback on the proposed scope of planned technical studies and the “pinch point” locations, which are constrained areas along the corridor.

The second Public Information Centre was held in November 2019. The purpose of this meeting was to receive input on the technically preferred options to implement the Bus Rapid Transit system in constrained areas or “pinch points”, specifically Downtown Oshawa, Downtown Whitby, Pickering Village (in Ajax), and Ellesmere Road east of Military Trail (in Toronto).

The third Public Information Centre was held virtually due to COVID-19 between November 2020 to January 2021. The purpose of this meeting was to receive input on the preliminary design and results of the technical studies, including potential impacts and proposed mitigation measures. Following this event, additional public meetings hosted between March 2021 to September 2021 with a focus on local design issues in Whitby, Oshawa, and Scarborough to further understand and respond to the community’s concerns at specific locations.

All public meetings allowed the public to ask questions, submit feedback and share ideas with the project team through multiple channels in a manner most convenient to them. The public was also invited to sign-up for the Project mailing list and request hardcopies of Public Information Centre materials.

Technical Advisory Group

The Technical Advisory Group (TAG) was formed in June 2019 to provide information and insights into issues, opportunities and solutions that exist within the study area. Representatives from federal, provincial, and regional agencies and ministries with approvals and/or a direct technical interest in the Project were invited to attend. A total of three meetings were held between June 2019 and October 2020.

Municipal Advisory Group

The Municipal Technical Advisory Group (MTAG) was formed in June 2019 to provide information and insights into issues, opportunities and solutions that exist within the study area. Representatives from municipal agencies and ministries with approvals and/or a direct technical interest in the Project were invited to attend. A total of 5 meetings have been held between June 2019 and October 2021. Additional individual sessions were held with each of the local municipalities to provide an overview of the design and discuss local issues and concerns.

Stakeholder Advisory Group

The Stakeholder Advisory Group (SAG) was formed in June 2019 to engage and consult community stakeholders in identifying and discussing opportunities, concern, needs, and issues related to the project. In total, 38 organizations representing a broad

range of stakeholder interest (community/neighborhood, business, institutions, professional interests, and transit-oriented groups) were invited to take part in the SAG.

A total of five meetings have been held with the SAG between June 2019 and October 2021. The meetings were used to discuss the development opportunities, preferred design alternatives at pinch point locations, concern for existing residents and opportunities to improve, potential impacts and mitigation measures.

Review Agencies

Government Review agencies meetings were held mainly with MTO throughout the pre-planning activities to provide potential design options and seek advice, comments and questions related to the DSBRT design at MTO jurisdiction areas. A total of five meetings were held between June 2019 and October 2021.

Indigenous Nations Engagement

Engagement with Indigenous Nations was led by Metrolinx's Indigenous Relations Office (IRO) as part of Metrolinx's commitment to building positive and meaningful relationships with Indigenous Peoples. The following Indigenous Nations were identified in consultation with the MECP, as having treaty rights within the Study Area or interest in the Project, and were engaged and notified of Project milestones throughout the Pre-Planning Activities and TPAP:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island
- Chippewas of Rama First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Huron-Wendat Nation
- Kawartha Nishnawbe First Nation
- Mississaugas of the Credit First Nation
- Mississaugas of Scugog Island First Nation

Metrolinx is committed to continued engagement with Indigenous Nations during future phases of the Project, specifically regarding any future studies and fieldwork related to natural heritage, cultural heritage, and archaeology.

Other Stakeholders and Advisory Committee Meetings

The Project Team also met with individual stakeholders on an as-needed basis throughout the duration of the Project. Over 80 meetings were held with different individual stakeholders. Meetings were typically held to review specific details and the feedback received was used to refine the preliminary design.

The Project Team also met with many of the local municipal advisory committees with mandates related to the Project, including cultural heritage, transit, accessibility, and

economic development. The purpose of this consultation was to provide information and spread awareness of the Project and obtain feedback from the committee members. There were a total of 18 meetings or presentations with Advisory Committees between October 2020 and March 2021.

ES.6.3 Consultation during the Transit Project Assessment Process

Notice of Commencement and Public Information Centre #4

The TPAP for DSBRT commenced on October 14, 2021 with the publication of the Notice of Commencement and Public Information Centre #4. The Notice was sent to the Director and Regional Director of the MECP's Environmental Assessment Branch in accordance with O. Reg. 231/08. The Notice was distributed to all stakeholders, including the general public, property owners (within 30 meters of the Project corridor), TAG, SAG, MTAG, GRT members and Indigenous Nations, informing them of the start of the TPAP. This was communicated using a combination of media channels including email, direct mail to property owners within 30 m, postcards to all addresses within 500 m, and publications in five newspapers. The Notice outlined the Project, next steps as per O. Reg. 231/08 including the up to 120-day TPAP consultation period, and the process for participation.

The Notice also invited all interested parties to participate in Public Information Centre #4 held between October 14 and November 11, 2021. Materials were posted to the Project website for public review and comment. Three live events were held on October 21, 26 and 28. The events were recorded for the public to review asynchronously.

As with the preliminary planning period of the TPAP, Project Team continued to maintain communication through phone and email with all stakeholders. The DSBRT website (www.metrolinxengage.com/DSBRT) continued to be a central location for hosting up-to-date project information and materials.

Distribution of the Draft Environmental Project Report

The draft Environmental Project Report (EPR) was first circulated to the Government Review Team (GRT) in May 2021. Comments were received and revisions made. The revised draft EPR including all technical supporting studies was circulated for review and comment to TAG, MTAG, and GRT members in November 2021. These groups were provided up to four weeks to provide feedback on this EPR.

Early review of the draft EPR from these key groups ensured their feedback could be meaningfully sought and considered prior to finalizing the documents in the preparation for the official 30-day review period mandated by O. Reg. 231/08. The Project Team reviewed all comments and provide responses, some of which involved revision to the EPR.

Individual Meetings with Key Stakeholders

The Project Team held individual meetings with TAG, SAG & MTAG members and other key stakeholders and interested parties during the TPAP consultation period. During these meetings, the Project Team provided updates on the study progress, refinements to the preliminary design, and answered questions or concerns raised by the stakeholders.

Individual Meetings with Government Review Agencies

The Project Team had individual meetings with MTO, Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI), and the MECP during the TPAP period. The purpose of these meetings was to provide an update on the preliminary design, traffic operations at MTO interface areas, and response to comments or questions from Ministry staff.

Other Public Meetings

Community meetings were held during the TPAP consultation period with Woburn Community members and residents of Mornelle Court, Scarborough and pop-up sessions were held in Ajax and Whitby. The purpose of these meetings and engagement sessions were to discuss the purpose and planning of DSBRT project, listen to residents' concerns related to design and safety.

Notice of Completion and 30-Day Review Period

In accordance with *O. Reg. 231/08*, the Notice of EPR Completion was first issued on January 20, 2022, within the 120-day period since the Notice of Commencement. The Notice was sent to the Director and Regional Director of the MECP's Environmental Assessment Branch in accordance with *O. Reg. 231/08*. The Notice was distributed to all stakeholders, including the general public, property owners (within 30 meters of the Project corridor), TAG, SAG, MTAG, GRT members and Indigenous Nations. The Notice was issued using a combination of media channels including email, direct mail to property owners within 30 m, and publications in five newspapers (two separate days).

The Notice informed agencies, Indigenous Nations, and stakeholders how to access and review the EPR from January 21 to February 22, 2022 on the Project website (www.metrolinxengage.com/dsbprt). The Notice also outlined the Project and next steps as per *O. Reg. 231/08* including the objections process.

ES.6.4 Commitment to Ongoing Engagement

Metrolinx is committed to continued engagement with agencies, Indigenous Nations, and stakeholders including property owners and community members beyond the TPAP, during detail design and construction of the Project. Examples are provided in **Chapter 6** of this report.

ES.7 Permits and Approvals

In addition to meeting the requirements of *O. Reg. 231/08*, several federal, provincial, and municipal permits, approvals, and authorizations are required prior to implementation of the Project.

A preliminary list of the permits, approvals, and authorizations that are anticipated to be required is presented in Chapter 7 of this report. Prior to construction, during the detail design phase, the proponent will continue consultation with the City of Toronto, Durham Region, City of Pickering, Town of Ajax, Town of Whitby, and City of Oshawa as well as with Indigenous Nations and relevant Stakeholder agencies (i.e. TRCA, CLOCA, MECP, MNDMNRF, MHSTCI, MTO, Parks Canada, DFO, Transport Canada, Environment and Climate Change Canada) as necessary to review, confirm and secure all required permits, approvals, and authorizations for the implementation of the DSBRT.

ES.8 Commitments to Future Work

Chapter 8 of this report provides a summary of the commitments outlined in different sections of this report. The commitments include future consultation with MECP, Indigenous Nations, regulatory agencies, municipalities, applicable stakeholders, and property owners. The table is organized by environmental component, documenting the commitment and the timeframe.

The Environmental Mitigation and Monitoring Plan (EMMP) will be developed to ensure that the commitments and mitigation are completed throughout the detail design, construction, and operation phases of the Project, and that such mitigation is effective.