

**Bass Pro Mills Drive, from Highway 400 to Weston Road Municipal Class
Environmental Assessment**

Environmental Study Report



Prepared for:
City of Vaughan

Prepared by:
Stantec Consulting Ltd.


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BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Sign-Off Sheet

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Prepared by 
(signature)

Jenn Robinson

Reviewed by 
(signature)

Diana Addley

Approved by 
(signature)

Peter Cholewa, P.Eng.



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Executive Summary

Background

The City of Vaughan undertook a Municipal Class Environmental Assessment (MCEA) study for the proposed extension of Bass Pro Mills Drive, from Highway 400 westerly to Weston Road. The extension was proposed by the Vaughan Mills Centre Secondary Plan (VMCSP, 2014) to provide a new major collector roadway that unites neighbourhoods from Weston Road to Jane Street, redistributes east-west traffic and alleviates congestion on Rutherford Road. The proposed extension of Bass Pro Mills Drive is envisaged to support future development within the study area, including the employment and intensification plans that have been developed as part of the VMCSP.

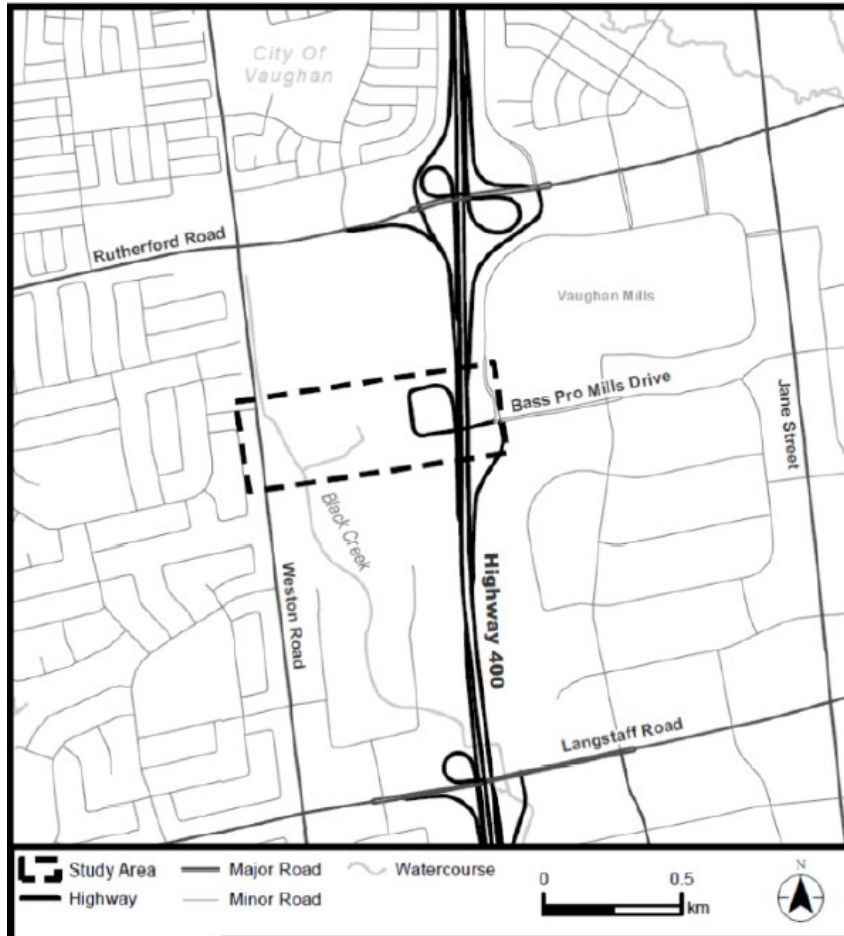
The VMCSP recommends that the roadway extension is a major collector roadway which includes four travel lanes and a cycling lane on each side of the roadway. The VMCSP was adopted by the Municipal and Regional Council in 2014 but is currently subject to appeals at the Ontario Land Tribunal relevant to the lands bordered by Weston Road, Rutherford Road, Jane Street and Bass Pro Mills Drive, including the proposed extension.

Based on the existing and future conditions within and surrounding the study area, it was identified that the existing road network provides very limited access to multi-use pathways and/or cycling facilities, and there is significant east-west traffic on Rutherford Road to the north. By establishing a new east-west roadway, congestion along Rutherford Road could be alleviated and an alternative route of travel for pedestrians and cyclists could be provided. Additionally, construction of a new east-west roadway could provide another route connection for York Region Transit and help support and service future development planned for the area.

The study area is indicated with the dashed line in the figure below. The primary study area for traffic analysis is generally bound by Weston Road to the west, Jane Street to the east, Langstaff Road to the south, Rutherford Road to the north, and includes Highway 400, as well as all ramps at the Rutherford Road and Langstaff Road interchanges.



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This study was conducted in accordance with the MCEA process for Schedule 'C' projects as outlined in the Municipal Engineers Association (MEA) MCEA guidelines (October 2000, as amended in 2007, 2011 and 2015). As a Schedule 'C' project, the study proceeded under the full planning and documentation process, fulfilling all four phases of the MCEA process.

Problem and Opportunity Statement

The purpose of this study is to assess the need to extend Bass Pro Mills Drive, from Highway 400 to Weston Road, as recommended in the Vaughan Mills Centre Secondary Plan to:

- provide a new east-west multi-modal connection between Highway 400 and Weston Road, including a new route connection for York Region Transit (YRT);
- help distribute east-west traffic and alleviate congestion along Rutherford Road to the north;
- support future growth and development within the plan area; and,
- develop a safe and comfortable environment for active transportation users



Existing Conditions

The existing Bass Pro Mills Drive terminates at the Highway 400 southbound on-ramp located immediately west of the highway crossing. The existing portion of the roadway consists of two vehicular lanes in each direction (east and west), a sidewalk on the north side of the roadway, and a posted speed limit of 50 km/hr. To establish a better understanding of existing study area conditions, a number of technical and environmental studies were undertaken, as described herein.

A Traffic Impact Assessment was completed as part of this study to evaluate the transportation related impacts associated with the proposed development on the existing study area intersections and boundary road network. The existing traffic conditions indicated that the area is predominantly car-oriented, and the study area intersections do not provide significant cycling or multi-use paths, however the provision of sidewalks are generally abundant. Based on a microsimulation model, the future baseline out to 2031 and 2041 scenarios showed significant deterioration in major performance metrics within the study area, when compared to the existing conditions.

Natural heritage investigations were conducted to identify constraints and sensitivities and determine the general connectivity of natural features within the study area. A number of field investigations were conducted from the municipal right-of-way (in the absence of permission-to-enter private property) to characterize vegetation communities and complete a wildlife and aquatic habitat assessment. Drainage and groundwater characteristics were also identified and analyzed to determine the flow and connectivity within the study area.

A Stage 1 Archaeological Assessment and Cultural Heritage Overview were completed to determine archeological potential and identify built heritage resources and cultural heritage landscapes within the study area. In the absence of permission-to-enter private property, the site visit for the Stage 1 Archaeological Assessment was completed from the municipal right-of-way.

Noise and Air Quality Assessments were also completed as part of this study to assess the existing conditions within the study area, as well as the potential impacts from the proposed roadway extension on nearby sensitive receptors.

Other studies undertaken include a Climate Change Assessment, Contamination Overview Study, Crossing Assessment, Fluvial Geomorphological Assessment, Geotechnical and Hydrogeological Assessment, and a Socio-Economic Environment review.

Identification and Evaluation of Alternative Solutions

A series of alternative solutions were identified through a screening process to determine which solution could best meet the objectives as defined by the Problem and Opportunity Statement for this study. The alternatives were then subjected to a detailed



comparative evaluation focusing on the ability of each alternative to address the problems and opportunities, as well as the recommendations set forth in the VMCSPP. Opportunities to incorporate mitigation measures to offset potential adverse impacts were also considered within the evaluation.

The alternative solutions that were identified and evaluated were:

- Alternative 1: Do Nothing
- Alternative 2: Improve Transit, Employ Travel Demand Management Measures
- Alternative 3: Intersection and/or Operational Improvements
- Alternative 4: Improve Existing East-West Roadways in the Area
- Alternative 5: Extend Bass Pro Mills Drive to Weston Road

Based on the results of the evaluation, **Alternative 5**: extend Bass Pro Mills Drive from Highway 400 westerly to Weston Road, was recommended.

Identification and Evaluation of Alternative Design Concepts

A staged approach was used to identify and evaluate alternative design concepts, which represent alternative ways of carrying out the preferred solution. The purpose of this approach was to eliminate alternatives that were considered to be significantly disadvantaged relative to other alternatives in order to streamline and simplify the decision-making process. The evaluation process included the following three stages:

Stage 1: Identification and Evaluation of Alternative Cross-Sections

Stage 2: Identification and Evaluation of Alternative Alignments

Stage 3: Identification of Recommended Design

The detailed evaluation of the alternative cross-sections and alternative alignments was completed using a reasoned argument approach that took into account the technical feasibility of each alternative, as well as their potential to impact the transportation, natural, cultural and socio-economic environments.

Stage 1: Identification and Evaluation of Alternative Cross-Sections

The alternative cross-sections that were identified and evaluated were:

Alternative Cross-Section 1

Alternative Cross-Section 1 consists of a 30 m right-of-way, with a 2.0 m wide sidewalk, 0.2m buffer and 1.8 m wide cycling path on either side of the roadway. While there is no formal separation between pedestrians and cyclists, cyclists are separated from vehicular traffic by a 3.0 m boulevard, which would facilitate streetlighting, utilities, and



streetscaping opportunities. The roadway has a 1m buffer to the boulevard and four lanes, two 3.5m outer lanes and two 3.3m inner lanes.

Alternative Cross-Section 2

Alternative Cross-Section 2 consists of a 31 m wide right-of way, with a 2.0 m wide sidewalk and 1.8 m wide cycling path on either side of the roadway. A 2.5 m wide boulevard is provided as part of this option and offers a 1.2 m landscape buffer between the sidewalk and cycling path. Cyclists and pedestrians are also separated from vehicles by the 2.5 m boulevard, which would also facilitate streetlighting, utilities, and streetscaping. The roadway has a 1m buffer to the boulevard and four lanes, two 3.5m outer lanes and two 3.3m inner lanes.

Alternative Cross-Section 3

Alternative Cross-Section 3 consists of a 30 m right-of-way with a 2.0 m wide sidewalk and 2.0 m wide cycling path on either side of the roadway. A 0.4 m wide paved buffer is offered between the sidewalk and cycling path. Cyclists are separated from vehicles by the 2.3 m boulevard, which would also facilitate a bio-retention swale, streetlighting, utilities, and streetscaping. The roadway has a 1m buffer to the boulevard and four lanes, two 3.5m outer lanes and two 3.3m inner lanes.

Alternative Cross-Section 4

Alternative Cross-Section 4 consists of a 30 m right-of-way with a 2.0 m wide sidewalk on either side of the roadway. Cycling facilities are provided on either side of the roadway with 2.0 m wide on street cycling lanes that are separated from vehicular traffic by a 0.9 m wide concrete buffer. A 3.4 m wide swale would be incorporated within the north side of the right-of-way, and 2.0 m wide planting/furnishing zone would be provided on the south side. The roadway has two 3.5m outer lanes and two 3.3m inner lanes.

Based on the results of the evaluation, **Alternative 3** was recommended as it was consistent with City's design standards, the vision for the community and Public Realm and Streetscape Plan study being undertaken concurrent to this study, as well as the recommendations made in the approved VM CSP. Alternative 3 is also anticipated to have moderate capital, operational and maintenance costs, and offers a safe and comfortable environment for cyclists and pedestrians.

Stage 2: Identification and Evaluation of Alternative Alignments

Based on the recommended cross-section identified through Stage 1 of the evaluation process, the study team proceeded with Stage 2 to identify alternative alignments. Two conceptual alternative alignments for the extension of Bass Pro Mills Drive were identified within the study area:



Alternative A: a relatively straight connection from the existing Bass Pro Mills Drive west to Weston Road and,

Alternative B: an 'S' curve connection from the existing Bass Pro Mills Drive west to Weston Road, intersecting at Astona Boulevard.

The alternatives were selected based on City of Vaughan Design Standards, the previously approved VM CSP, a desktop review of existing conditions and feedback received in response to public and stakeholder consultation. While consideration was given to other potential alignments, due to significant property impacts and intersection spacing, these alignments were screened out and were not carried forward in the evaluation.

The evaluation of alternative alignments identified **Alternative A**, a relatively straight connection from the existing Bass Pro Mills Drive west to Weston Road, as the recommended alignment as it posed the least impact to the technical, socio-economic, natural and cultural environments given that the majority of the land has been previously disturbed, and the alignment avoided providing a direct route to adjacent residential areas which may have resulted in increased traffic infiltration.

Stage 3: Identification of Recommended Design

Following the evaluation of the alternative cross-sections and alternative alignments, **Alternative 3A** was identified as the Technically Recommended Design, which is comprised of the road cross-section of Alternative 3 and roadway alignment of Alternative A.

Highway 400 Bridge Crossing

Constructed in 2004, the existing Highway 400 overpass is a two-span slab on a steel box girder bridge with an overall length of 91 m supported on integral abutments. The existing structure has an overall width of 20.41 m, and currently provides for two westbound lanes and two eastbound lanes; however, only the westbound direction is open to traffic for a direct connection to the Highway 400 southbound ramp.

The existing Bass Pro Mills Drive bridge overpass includes a 1.5m raised sidewalk on the north side with a 0.25m buffer, four 3.5m lanes of paved surface, a 1.2m raised median with 0.4m buffers on each side, a 1.75m flush paved shoulder on the south side, and 0.455m concrete barrier walls with railings on both sides of the bridge.

In response to the recommended design for the Bass Pro Mills Drive extension, a number of alternatives were considered to provide for four lanes of traffic (two in each direction) and accommodate Active Transportation (AT) facilities across the Bass Pro Mills Drive bridge over Highway 400. In general, alternatives included 'do nothing', modifications to the existing bridge only, widening on one or both sides of the bridge, and adding a separate AT bridge to the north or south. Alternatives were developed in



consideration of the existing General Bridge Arrangement, Ministry of Transportation Ontario (MTO) and Transportation Association of Canada (TAC) design guidelines, cost, property impacts, functionality, and safety. The bridge is located within the MTO Controlled Access Highway (CAH) limit and therefore subject to MTO consultation and requirements.

MTO Design and Contract Standards Office #2018-07 discusses incorporating cycling facilities into bridge rehabilitation projects and restricted areas within provincial highway right-of-way and recognizes that it is not always feasible to apply design guidelines that are used for design of provincial highways or new bridges and for such situations, consideration may be given to apply alternative design guidelines. The MTO policy statement allows the narrowing of such features as centre islands and shoulders. Further, the policy suggests that consideration be given to road diet and removal of lanes, if possible.

Options that did not require any widening of the bridge sub-structure, yet satisfied prevailing criteria, were more economical solutions (estimated costs of \$2M +/-) to provide adequate and safe measures for non-vehicle traffic at the bridge crossing. Solutions that entail a widening of the existing bridge or the construction of a separate AT bridge would significantly increase project costs (\$10M - \$15M) and have property impacts to achieve the study objective, without adding significant benefit to functionality or safety.

The study team also took into consideration timelines associated with MTO planning for the widening of Highway 400 to 10-lanes (with anticipated 2024-2026 construction) and the Region of York planning for the improvement of Langstaff Road and Highway 400 interchange south of Bass Pro Mills Drive, the timing of which is unknown at this time.

Following the evaluation of alternatives and considering feedback from MTO, the public and other stakeholders, the recommended alternative is to avoid a widening of the Bass Pro Mills Drive structure over Highway 400 by modifying the existing bridge.

Preferred Design

The preferred design includes an extension of the existing Bass Pro Mills Drive roadway with a generally straight connection to Weston Road with a 30 m right-of-way to accommodate four lanes of vehicular travel (two lanes in each direction), with 3.3 m wide inside lanes and 3.5 m wide outside (curb) lanes. The preferred design will also include a 2.0 m wide sidewalk and 2.0 m wide cycling path on either side of the roadway, a 200 mm wide paved buffer between the sidewalk and cycling path and a 2.5 m boulevard with an intermittent bio-retention swale (adjustments were made to the dimensions for the boulevard and buffer between the cycle track and sidewalk). The preferred design will accommodate space for utilities, and alternating streetlighting and streetscaping along the boulevards. The preferred design includes a new signalized intersection at Weston Road, storm water measures to control water quantity and



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quality, including an equalizer culvert sized to accommodate wildlife crossings, and a new culvert crossing of the Black Creek tributary at the existing crossing location. The ultimate location for the Black Creek tributary will be subject to outcomes of the ongoing appeals process of the VMCSPP. This study reviewed alternative locations for the ultimate creek crossing and all were found to be feasible.

The preferred design for the Highway 400 bridge crossing is to modify the existing structure to provide a 1.8 m wide sidewalk on each side of the roadway, a 500 mm shoulder clearance, four vehicle lanes at 3.5 m wide each (two in each direction), and a raised 1.2 m centre median. These design modifications are based on a 60 km/hour design speed. The bridge will connect to existing sidewalks along the existing Bass Pro Mills Drive on the east side of the bridge.

Additionally, it is recommended that signage be posted approaching either side of the bridge advising cyclists to dismount before crossing the structure and that design criteria be further reviewed during detail design in consultation with MTO.

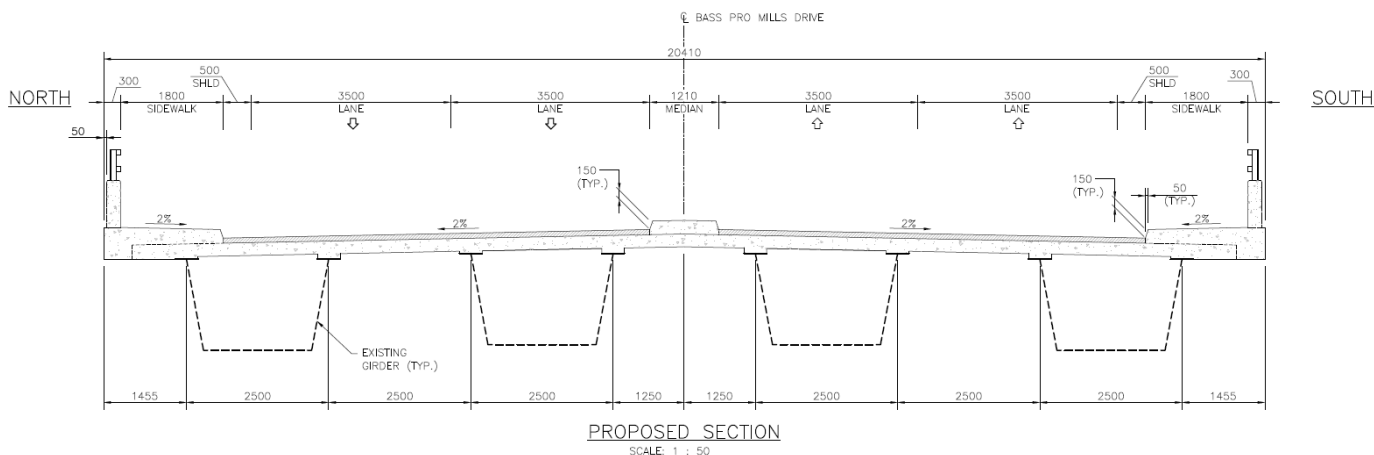
Preferred Design Cross-Section taken from the Vaughan Mills Centre Public Realm and Streetscape Master Plan Study, consistent with the recommendations of this EA



1. Planned ROW: 30.0 m
2. Pavement Width: 13.6 m
3. Lane Width: 3.5 m curb lanes / 3.3. m travel lanes
4. Overall Boulevard Widths: 8.2 m
5. Clear Sidewalk Width: 2.0 m
6. Cycle Facilities: 2.0 m
7. Curb Extensions: None
8. Green Infrastructure (GI): street trees in open planters; passive irrigation underground storage; bio-retention planters



Preferred Design Cross-Section for the Highway 400 Bridge Crossing as noted in the Environmental Study Report



The feasibility of extending the active transportation facilities being proposed as part of the preferred design from east of the Highway 400 bridge easterly to Jane Street was examined as part of this study. The proposed facilities could be accommodated within the existing Bass Pro Mills Drive right-of-way, with some activities required including the relocation of existing streetlights, fire hydrants, and boulevard trees and some modifications at intersections. The preliminary cost estimate for this work is Million.

Preliminary Cost Estimate

With the exclusion of engineering design, contract administration, property, and utility relocation costs, the preliminary cost estimate associated with implementing the preferred design is **\$10,193,625**.

Consultation

Consultation is an integral component to the MCEA process. An extensive consultation plan was implemented to encourage agencies, Indigenous communities, the public and other stakeholders to provide valuable feedback throughout all stages of the study. Consultation activities associated with this study are summarized below:

- Posting key study milestones on the City’s study website (Vaughan.ca/BassProMillsEA), including Notice of Commencement, Public Information Centre (PIC) 1 and PIC 2 and associated summary reports, and Notice of Study Completion.
- Publishing of notices in local newspapers (Vaughan Citizen and Thornhill Liberal newspapers).
- Direct mailing and Canada Post Mail-Drop of notices to relevant review agencies, utilities, Indigenous communities, impacted property owners, stakeholders and the general public.



- Holding Stakeholder Group meetings with local landowners groups, ratepayers association, developers, property owners and members of the public who expressed an interest in the project to share study updates and encourage valuable feedback.
- Holding Technical Advisory Committee meetings with subject matter experts from various City departments, representatives from the Toronto and Region Conservation Authority, York Region and Ministry of Transportation Ontario.
- Holding property owner meetings with landowners who may be impacted as a result of the preferred design to discuss the potential impacts specific to their properties/entrances.
- Holding two online PICs to present and obtain input from the general public, agencies, Indigenous communities and other stakeholders.
- Placement of this ESR on the public record and distribution of the Notice of Study Completion.

Impacts, Mitigation Commitments and Monitoring

The potential impacts, proposed mitigation measures and monitoring were determined based on a detailed inventory of the study area environments. The study reviewed commitments to be carried forward into the detail design and implementation phase of the MCEA process (Phase 5). The various environmental sensitivities and areas of concerns related to the preferred design are listed below:

- Individual Trees
- Terrestrial Environment
- Fish/Fish Habitat
- Fluvial Geomorphology
- Archaeology
- Air Quality
- Construction Noise
- Vibration
- Contamination
- Subsurface Conditions
- Excess Soil Management
- Erosion and Sediment Control
- Stormwater/Drainage
- Groundwater
- Utilities
- Property

Permits and approvals to be sought during the detail design phase are identified within the ESR. These commitments have been developed in consideration of the input received from the public, York Region, Toronto and Region Conservation Authority,



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Ministry of Transportation Ontario, the Ministry of the Environment, Conservation and Parks, and other stakeholders.

Timing of Improvements

Timing of improvements is to be confirmed during Detailed Design. Construction timing is anticipated to follow the timing outlined in the City's current (2022) Capital Plan. This plan is reviewed and approved by Council annually and is subject to change.



Abbreviations

AA	Archaeological Assessment
AAQC	Ambient Air Quality Criteria
AODA	Accessibility for Ontarians with Disabilities Act
ANSI	Areas of Natural and Scientific Interest
CAH	Controlled Access Highway
CAAQS	Canadian Ambient Air Quality Standards
CCRA	Climate Change Resiliency Assessment
CHOM	Cultural Heritage Overview Memorandum
CHVI	Cultural Heritage Value or Interest
City	City of Vaughan
COI	Contaminants of Interest
COS	Contamination Overview Study
CTC	Credit Valley-Toronto and Region-Central Lake Ontario
CVC	Credit Valley Conservation
dB	Decibel
dBA	Decibel A-Weighted
DFO	Fisheries and Oceans Canada
DNAPL	Dense Non-Aqueous Phase Liquid
EASR	Environmental Activity and Sector Registry
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Assessment
ELC	Ecological Land Classification
GHG	Greenhouse Gas
GPGGH	Growth Plan for the Greater Golden Horseshoe
HDF	Headwater Drainage Feature
HVA	Highly Vulnerable Aquifer
LID	Low Impact Development



**BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS
ENVIRONMENTAL ASSESSMENT**

LIO	Land Information Ontario
MECP	Ministry of the Environment, Conservation and Parks
MHSTCI	Ministry of Housing, Sport, Tourism and Culture Industries
MNRF	Ministry of Natural Resources and Forestry
MTO	Ministry of Transportation Ontario
MUP	Multiuse Pathway
NSA	Noise Sensitive Area
OGS	Ontario Geological Survey
OLA	Outdoor Living Areas
OWES	Ontario Wetland Evaluation System
PIC	Public Information Centre
PPS	Provincial Policy Statement
PTTW	Permit to Take Water
ROW	Right of Way
SAR	Species at Risk
SG	Stakeholder Group
SOCC	Species of Conservation Concern
SPP	Source Protection Plan
SWM	Stormwater Management
TAC	Technical Advisory Committee
TIA	Traffic Impact Assessment
TRCA	Toronto and Region Conservation Authority
UST	Underground Storage Tank
VMCSP	Vaughan Mills Centre Secondary Plan
WWBRE	Wetland Water Balance Risk Evaluation
YRT	York Region Transit
YROP	York Region Official Plan



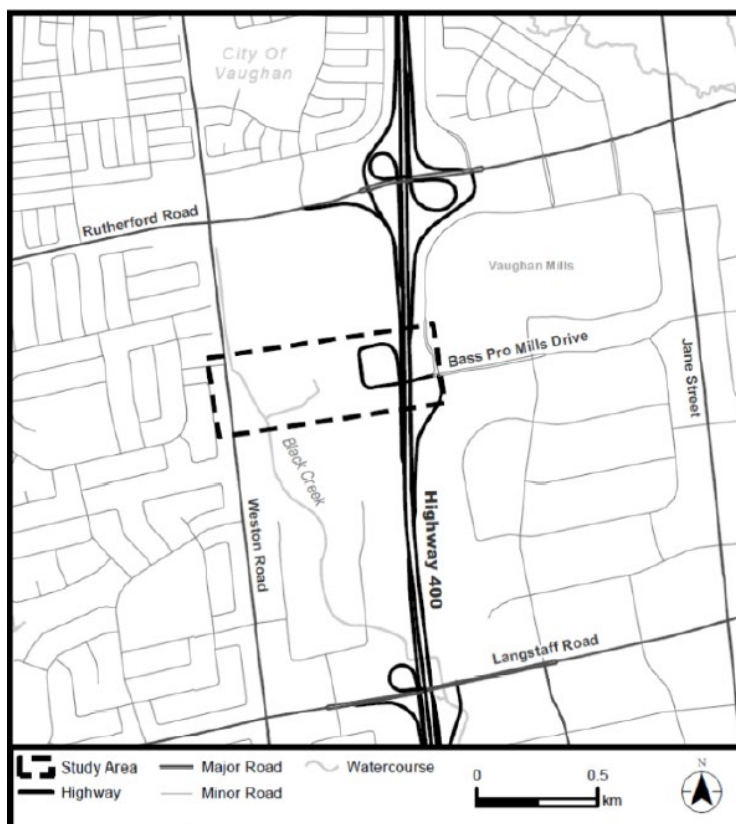
1.0 PROJECT BACKGROUND AND PURPOSE

The City of Vaughan is undertaking a Municipal Class Environmental Assessment study for the proposed extension of Bass Pro Mills Drive, from Highway 400 westerly to Weston Road. As proposed by the Vaughan Mills Centre Secondary Plan (VMCSP 2014), this extension would provide a new major collector roadway that unites neighbourhoods from Weston Road to Jane Street, redistributes east-west traffic and alleviates congestion on Rutherford Road.

This enhanced boulevard could accommodate new York Region Transit amenities, a pedestrian friendly multi-use trail, as well as on-street cycling facilities. The proposed extension of Bass Pro Mills Drive is envisaged to support future development within the study area, including the employment and intensification plans that have been developed as part of the VMCSP.

The study area, as illustrated within **Figure 1** below, is generally bounded by Weston Road to the west, Jane Street to the east, Langstaff Road to the south, Rutherford Road to the north and includes Highway 400, as well as all ramps at the Rutherford Road and Langstaff Road interchanges.

Figure 1: Study Area Map



1.1 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The Municipal Class Environmental Assessment provides a consistent method of identifying and assessing technical and environmental impacts and concerns before improvements or additions to municipal infrastructure are undertaken. Planning in this way helps to ensure that potential impacts from all municipal projects are addressed and mitigated, prior to implementation.

The MCEA document defines four schedules under which projects may be planned and the associated processes required for each. The four types of projects are referred to as schedules and projects can be classed as either Schedule A, A+, B or C, depending on the anticipated level of environmental impact, and for some projects, the anticipated construction costs. The schedule in which a project applies determines the planning and design phases that must be followed.

Schedule A projects are minor operational and/or maintenance activities and may go ahead without further assessment once Phase 1 of the Class EA process is complete (i.e., the problem is reviewed, and a solution is confirmed).

Schedule A+ projects are limited in scale, have minimal adverse environmental impacts, and require no documentation. However, the public is to be advised of the project prior to implementation.

Schedule B projects must proceed through the first two phases of the process. Proponents must identify and assess alternative solutions to the problem, inventory impacts, and select a preferred solution. They must also contact relevant agencies and affected members of the public. Provided that no significant impacts are found, and no requests are received to elevate the project to Schedule C or undertake the project as an Individual EA (Part II Order), the project may proceed to detailed design (Phase 5).

Schedule C projects require more detailed study, public consultation, and documentation, as they may have more significant impacts. Projects categorized as Schedule C must proceed through the first four phases of assessment. Schedule C projects may potentially result in adverse impact(s), and as such, a public consultation program is needed to ensure that stakeholders and local residents within the study area are provided with the opportunity to provide meaningful input.

This study was conducted in accordance with Schedule C of the MCEA document. As a Schedule C project, the study proceeded under the full planning and documentation process (please refer to **Figure 2**).

The Schedule C process includes the following five phases:

Phase 1 - Identification of the problem and/or opportunity



BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Phase 2 - Assessment and evaluation of alternative solutions

Phase 3 - Assessment and evaluation of the alternative design concepts for the preferred solution

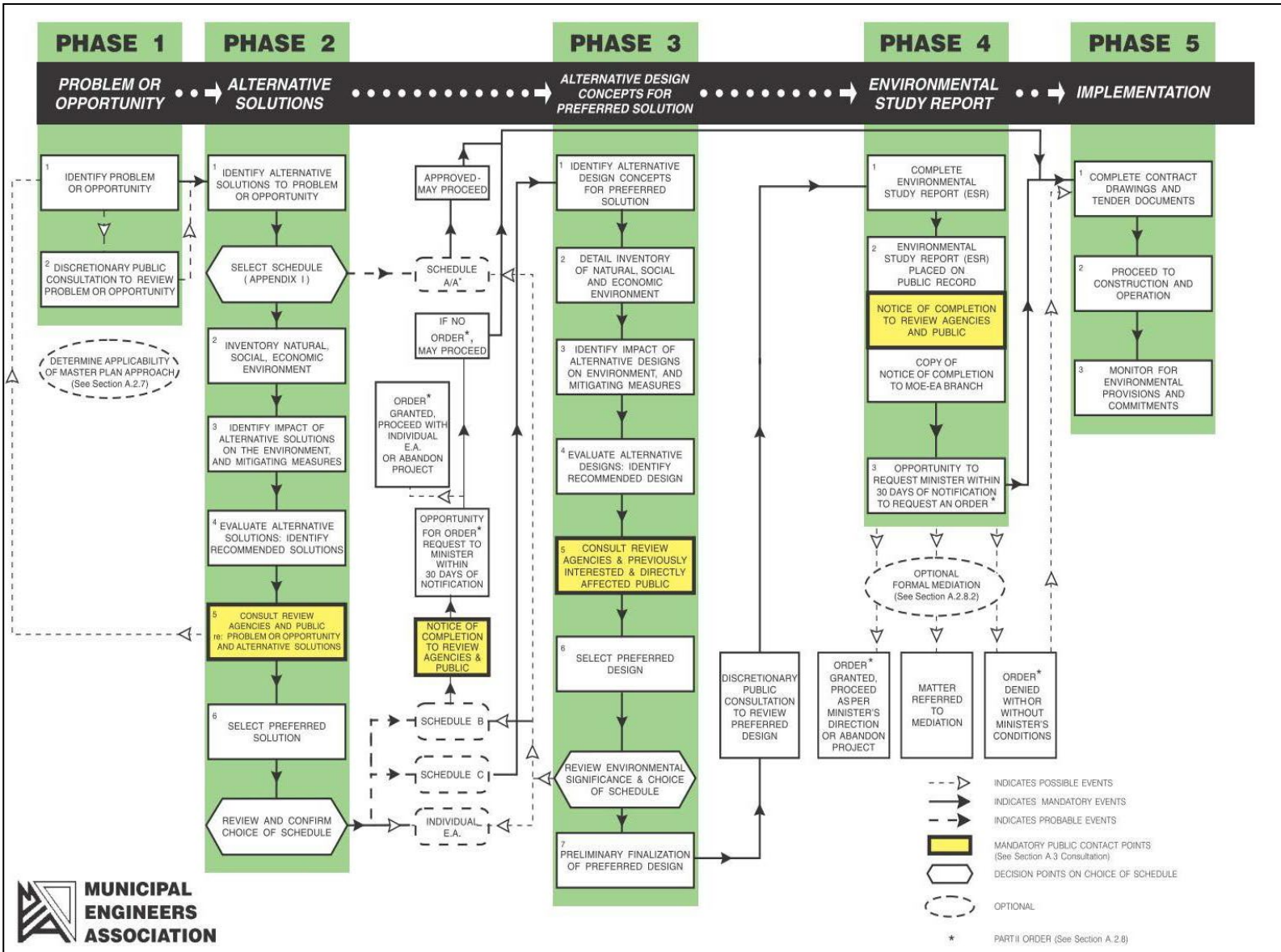
Phase 4 - Documentation in an Environmental Study Report

Phase 5 - Project Implementation

The selection of the appropriate project Schedule is dependent on the anticipated level of environmental impact, and for some projects, the anticipated construction costs. The selection of Schedule C is recommended when the costs associated with the construction of a new road or other linear paved facility is expected to exceed \$2.7 million. The proposed extension of Bass Pro Mills Drive falls into this category.



Figure 2: MCEA Planning and Design Process Flow Chart



1.2 VAUGHAN MILLS CENTER SECONDARY PLAN (2014)

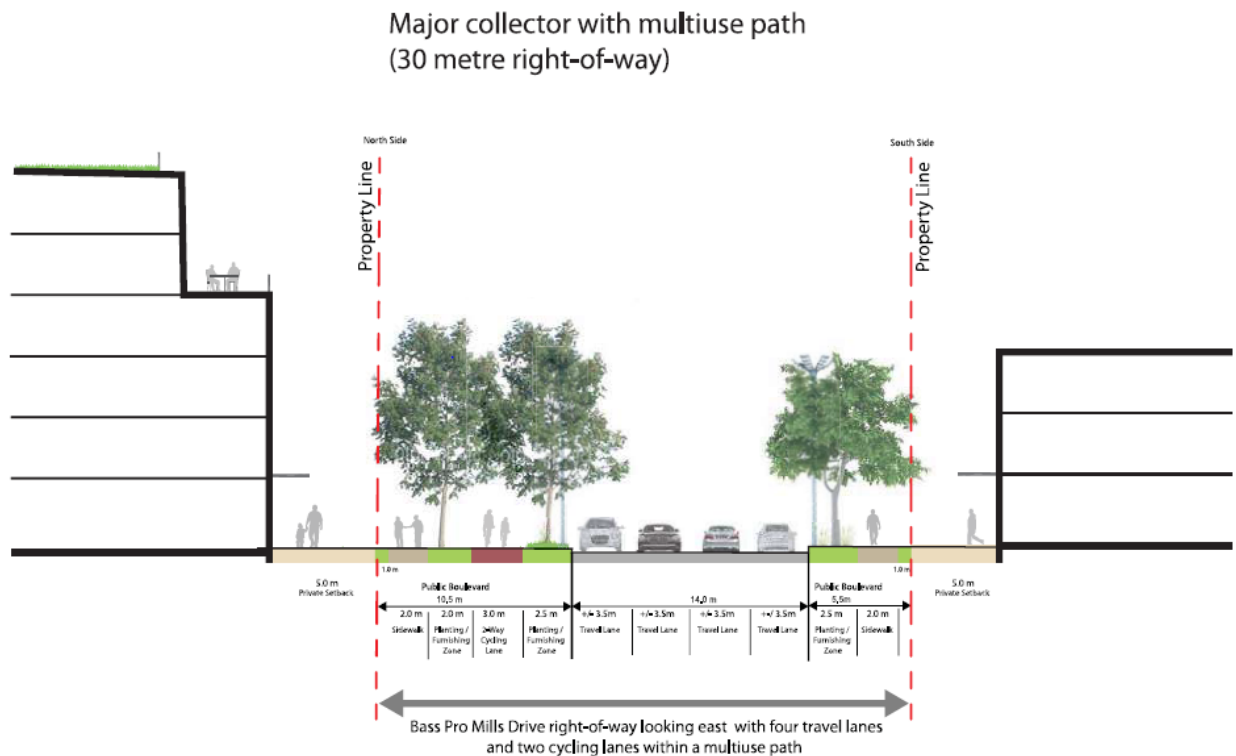
The study area is located within the heart of the Vaughan Mills Centre Secondary Planning (VMCSP, 2014) Area, which provides the land use concept, urban design principles, transportation guidelines and other area-specific policies. The VMCSP was adopted by the Municipal and Regional Council in 2014 but is currently subject to appeals at the Ontario Municipal Board relevant to the lands abutting the north end of the proposed Bass Pro Mills Drive extension area.

The study area for this MCEA study includes primarily employment uses, the Black Creek and associated Greenway Public Open Space and identifies Employment Frontage along the Bass Pro Mills Drive extension. These land use designations are intended to encourage high quality urban design and architectural treatments and provide an appropriate interface with the surrounding community. The land use, transportation, and urban design policies within the VMCSP are intended to support a connected live-work environment that encourages a shift from vehicle use to active and public modes of transportation.

The VMCSP recommends an expanded public boulevard (multi-use pathway) along the north edge for enhanced landscaping and separation from employment uses to the south. It also notes that the proposed major collector roadway includes four travel lanes and a cycling lane on each side of the roadway. **Figure 3** below illustrates a preliminary cross section of the proposed road extension.



Figure 3: Bass Pro Mills Drive Preliminary Cross-Section



Vaughan Mills Centre Secondary Plan, 2014

The VMCSPP also provides a projected population and job growth estimate associated with the development within the area. For the Vaughan Mills Centre Business District (identified in Schedule A of the VMCSPP) the estimated target for employment is 7,590 jobs. The extension of Bass Pro Mills Drive will support the employment and intensification plans for this area, alleviate traffic in existing east-west corridors and accommodate future traffic needs as a result of these additional jobs. This MCEA will build upon the recommendations within the VMCSPP to assist in guiding growth for this area up to the 2031 and 2041 planning horizons.



2.0 PROBLEMS AND OPPORTUNITIES

Based on the existing and future conditions both within and surrounding the study area, the following problems and opportunities were identified:

Problems:

- The existing road network provides very limited access to multi-use pathways and/or cycling facilities
- There is significant east-west traffic on Rutherford Road to the north

Opportunities:

- Establishment of a new east-west roadway could help alleviate congestion along Rutherford Road and provide an alternative route of travel for pedestrians/cyclists.
- Construction of a new east-west roadway could provide another route connection for York Region Transit
- The extension of the existing Bass Pro Mills Drive to Weston Road could support and service future development planned for the area.

Based on the review of the identified problems and opportunities in the study area, the following **Problem and Opportunity Statement** was developed:

The purpose of this MCEA study is to assess the need to extend Bass Pro Mills Drive, from Highway 400 to Weston Road, as recommended by the VMCSPP to:

- Provide a new east-west multi-modal connection between Highway 400 and Weston Road, including a new route connection for York Region Transit (YRT);
- Help to distribute east-west traffic and alleviate congestion along Rutherford Road to the north;
- Support future growth and development within the plan area; and
- Develop a safe and comfortable environment for active transportation users.

2.1 SOCIO-ECONOMIC REVIEW

2.1.1 Policy Context

2.1.1.1 Provincial Policy Statement, 2020

The 2014 Provincial Policy Statement (PPS) was amended on May 1, 2020 and is the guiding document that provides overall policy directions on matters of provincial interest relating to land use planning and development in Ontario. Local Official Plans are the primary mechanism for implementing the policies of the Official Plan, and in accordance



with the Planning Act, decisions affecting planning matters shall be “consistent with” the PPS.

The amended PPS includes additional policy direction for municipalities with respect to economic development and land supply. In the context of the Bass Pro Mills Drive MCEA study, additional policy guidance is provided to promote the integration of land use planning, growth management, transit-supportive development, intensification, and infrastructure planning to achieve cost-effective development patterns, optimizing transit investments and standards to minimize land consumption and servicing costs (PPS 2020).

The Bass Pro Mills Drive Extension MCEA supports matters of provincial interest as it aims to create an efficient intermodal transportation system that safely facilitates the movement of people and goods. The extension of Bass Pro Mills Drive also promotes economic development and competitiveness by ensuring necessary road infrastructure is provided to allow access to the planned employment area on the west side of Hwy 400, which will assist in addressing the projected employment needs of both the City and Region. As part of the Bass Pro Mills Drive Extension MCEA, efficient use will be made of existing servicing and transportation infrastructure, and consideration will be made to already planned infrastructure in order to minimize unnecessary public expenditures. Through the use of this MCEA and other city- and region-led transportation demand management strategies, efficient land development patterns will be developed within Vaughan and the surrounding area in order to provide the necessary employment areas to support current and projected needs.

This MCEA study will support the policy direction in the PPS by supporting the development of, and coordination with, land uses identified within the local Official Plans.

2.1.1.2 Growth Plan for the Greater Golden Horseshoe, 2020

The Growth Plan for the Greater Golden Horseshoe (GPGGH) was updated in 2020 to assist in the expansion of economic opportunities for the growing number of people expected to reside within the GGH over the next 20 years.

It is a goal of the GPGGH to develop an integrated transportation network that will allow people choices for easy travel both within and between urban centres throughout the region. Specifically, the transportation system will offer a balance of transportation choices that reduces reliance upon the automobile and provides multimodal access to jobs. As land development and transportation are interconnected, areas with high employment densities shall be planned to be better connected to transit and vacant/underutilized employment lands shall be used more effectively and efficiently.



This MCEA study will support the objectives within the GPGGH through the identification of an efficient transportation network to support growth and development within the Secondary Plan area.

2.1.1.3 York Region Official Plan (2010)

The York Region Official Plan (YROP, 2010) guides the economic, environmental and community building decisions that assist in the coordination and management of growth within the Region. The YROP (2010) promotes city building with a focus on regional centres and corridors, including innovated urban designs and green building.

The study area for this MCEA is designated as an Urban Area within the Regional structure, with a regional street (i.e., Weston Road) and highway (Highway 400) running along the eastern and western boundaries of the study area. The regional street network is composed of a system of urban and rural streets, with more north-south connections than east-west connections. Thus, it is a goal for the Region to investigate establishing continuous alternative east-west corridors to alleviate traffic congestion.

While not designated within the regional street network, the extension of Bass Pro Mills Drive will provide an east-west connection to existing regional roads, such as Weston Road, allowing for a more efficient flow of people and goods throughout the urban and rural transportation system.

2.1.1.4 City of Vaughan Official Plan (2010)

The City of Vaughan Official Plan (2010) is part of the overall Growth Management Strategy that will shape the future of the City and guide its continued transformation into a vibrant, beautiful, and sustainable City. A main goal of the Official Plan is to create a sustainable transportation network that compliments sustainable development, recognizing that land use and transportation are inextricably linked.

Within the Official Plan, the study area for this MCEA is comprised of Prestige and General Employment lands. The existing Bass Pro Mills Drive is designated as a Major Collector street and the proposed extension is shown within the Official Plan's Schedule 9 as a proposed new Major Collector Road Link. As such, the proposed extension shall be planned to carry moderate traffic volumes, continuously facilitate efficient traffic flow, and provide effective routing for transit vehicles, bicycles, and pedestrians.

The incorporation of the proposed Bass Pro Mills Drive extension will assist in supporting the City's goal of achieving a connected and continuous grid-like street network, with multiple connections to collector and arterial streets.

2.1.1.5 City of Vaughan Zoning By-law

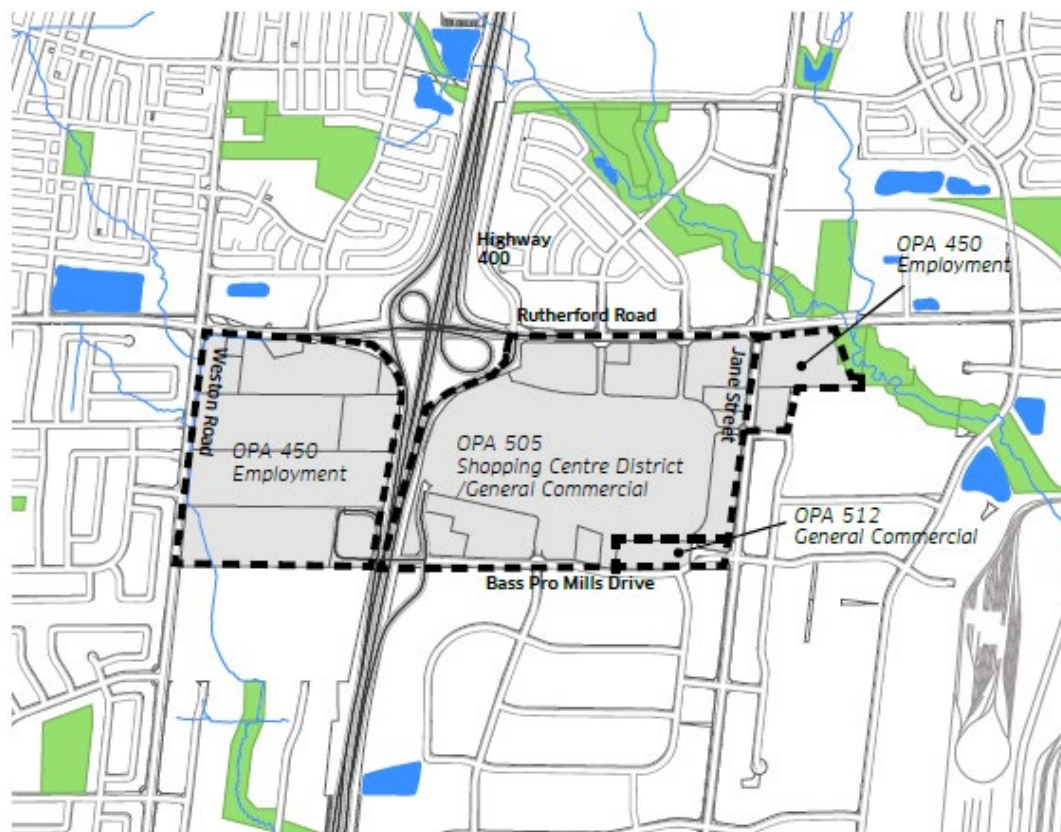
Current City of Vaughan Zoning By-law zones the land within the study area as a mixture of Agricultural (A), Employment (EM1), and Commercial (C1). These zones



permit a variety of uses, heights, and densities. The Agricultural zone requires larger lot sizes and low densities while the employment and commercial zones promote a more urban form.

It is expected the existing zoning for the study area will need to be realigned to accommodate the future density proposed by the VMCSPP, see **Figure 4** below. The rezoning may be undertaken by the City or be addressed as part of future plans of the subdivision. This realignment of the zoning will need to be considered during the MCEA process to ensure the Bass Pro Mills Drive extension and the development of the surrounding employment lands can be developed to meet the needs of both current and future residents.

Figure 4: VMCSPP Area Land Use Designation and Related OPAS



Vaughan Mills Centre Secondary Plan (2014)

2.1.1.6 City of Vaughan Transportation Master Plan (2012)

The City of Vaughan Transportation Master Plan (2012) identified key transportation issues for the City at the time, such as an auto-oriented urban structure. However, the City has become one of the fastest-growing municipalities in Canada and major Urban Growth Centers within the Greater Golden Horseshoe. To address this growth, the City is undertaking many strategic Master Plan updates, including updates to the VTMP. The



new VTMP study aims to support current and future residents, businesses, and visitors by providing high-quality, attractive, and sustainable travel choices.

The existing VTMP refers to there being discontinuities in the existing road grid, impacting the efficiency of travel within the City. The missing Bass Pro Mills Drive connection to the collector road network west of Highway 400 was identified as a major gap in the grid network.

2.1.2 Existing and Future Land Use

The study area, along with lands south of Rutherford Road, are the only remaining agricultural designated lands within this area of the City. The surrounding area to the west is mostly low-rise residential, with the areas to the north, south, and east a mixture of chain commercial, service commercial, and industry/office uses.

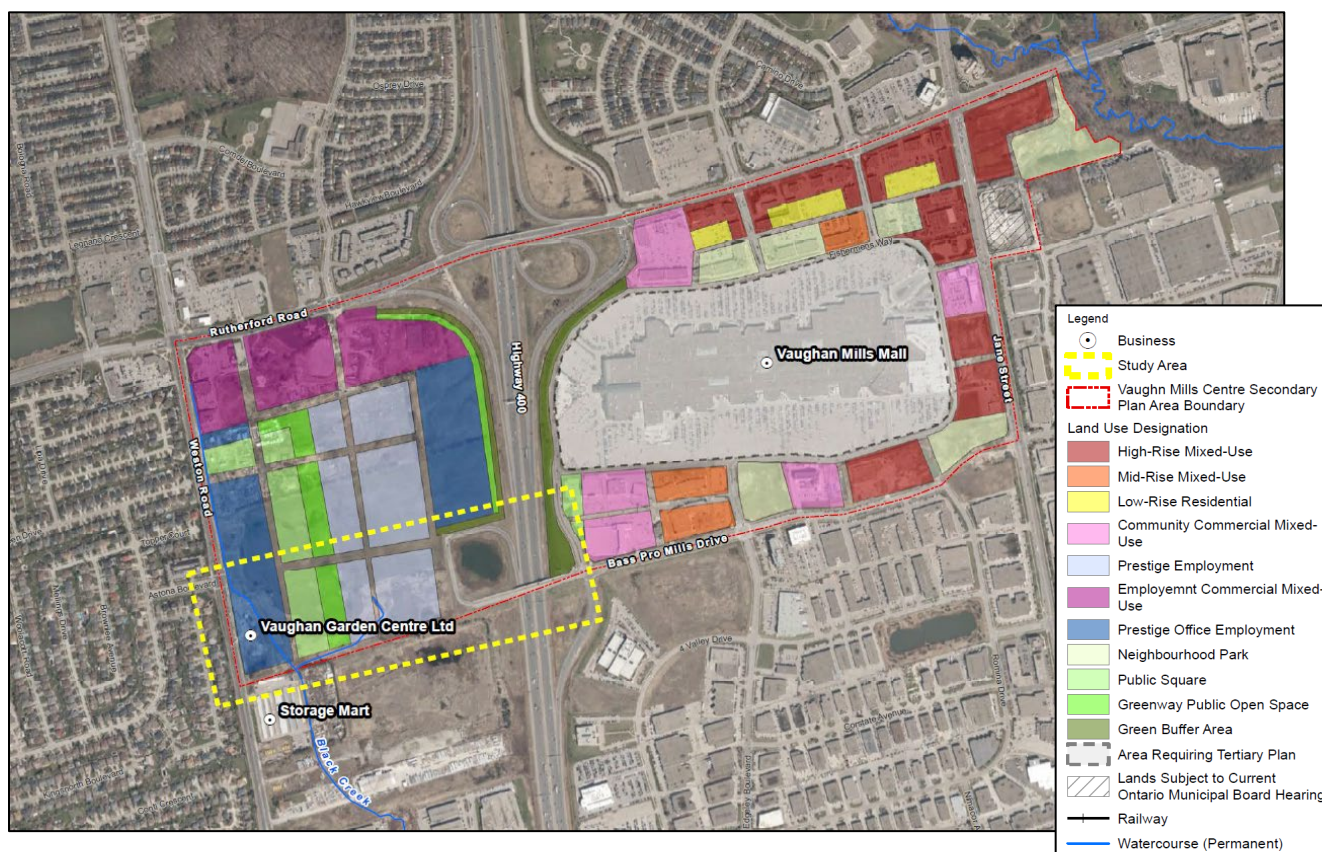
Within the area, there are a number of location businesses. In addition to the Vaughan Mills Mall to the east of the study area, the Vaughan Mills Garden Centre and Storage Mart properties are located at the future connection to Weston Rd (please refer to **Figure 5**). The MCEA study will need to continue discussions with these property owners and businesses held through the SP and VOP planning processes, to provide clear rationale and justification through the decision-making process.

As noted in **Section 1.2**, while there are currently no active developments within the study area, future land uses envisaged within the study area as part of the VMCSPP include Prestige Office Employment, Public Square, Greenway Public Space and Prestige Employment.

A copy of the Socio-Economic Environment Memo is available within **Appendix A**.



Figure 5: Existing and Future Land Use Plan

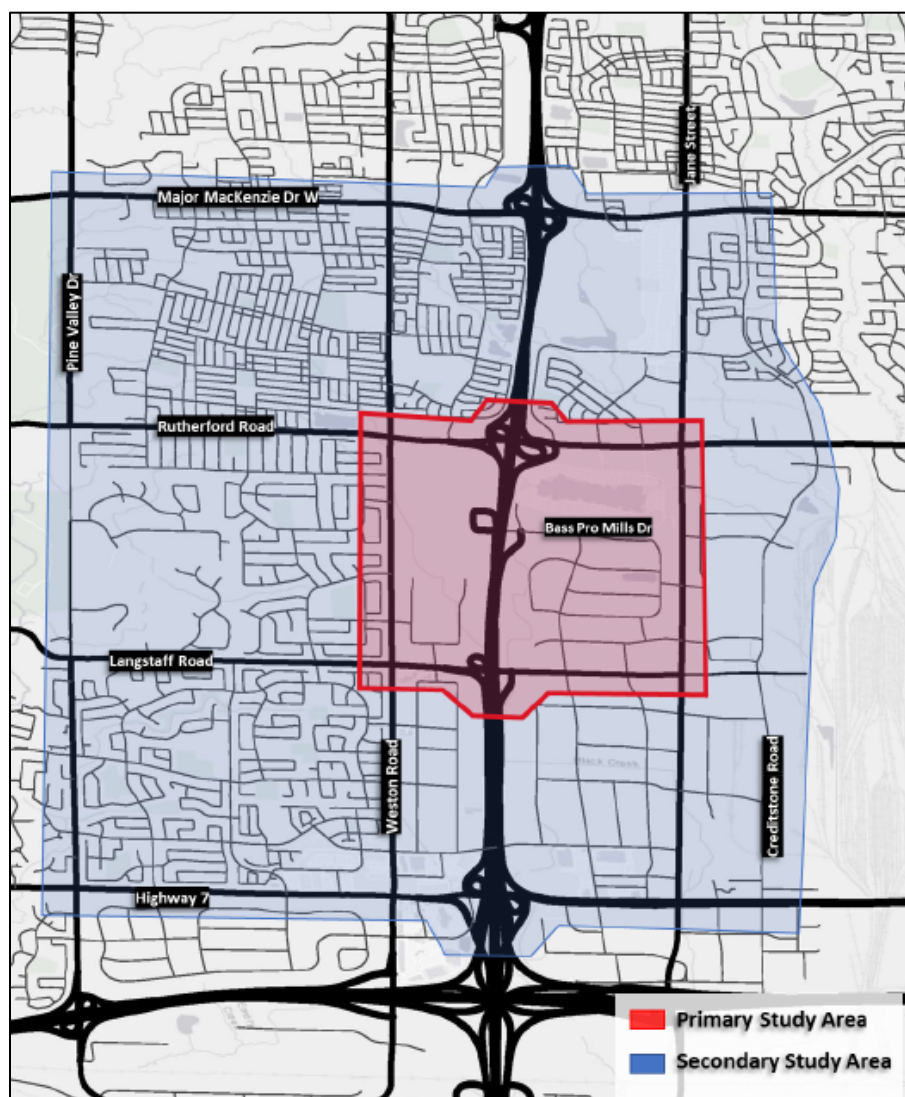


2.2 TRAFFIC IMPACT ASSESSMENT

The proposed study area includes a “Primary Study Area” and a “Secondary Study Area”, as illustrated in **Figure 6**.

- **Primary Study Area:** Bounded by Weston Road to the west, Jane Street to the east, Langstaff Road to the south and Rutherford Road to the north. The primary study area also includes the sections of Highway 400 from south of the interchange at Langstaff Road to north of the interchange at Rutherford Road. The microsimulation model was developed for the primary study area.
- **Secondary Study Area:** Bounded by Pine Valley Drive to the west, Credit Stone Road to the east, Highway 7 to the south and Major Mackenzie Drive West to the north. The secondary study area was used to guide the macro modelling review.

Figure 6: Primary and Secondary Study Areas



The existing Bass Pro Mills Drive is a four-lane roadway running east-west, extending from Highway 400 in the west to Romina Drive just west of Jane Street. Recently the Bass Pro Mills Drive was extended through Mammone lands and connected to Jane Street, opposite Locke Street. For calibration of the existing model, the Bass Pro Mills Drive extension to Jane Street was not considered as the traffic volumes available for the study were collected prior to the extension becoming operational. The existing Bass Pro Mills Drive has ramp connections to Highway 400 South, accommodating northbound and southbound off/on movements. West of Edgeley Boulevard, Bass Pro Mills Drive is a dividend roadway with a centre median separating the eastbound and westbound traffic, and east of Edgeley Boulevard it carries two lanes in each direction without a centre median.



A number of background studies from adjacent areas were considered for this study including:

- Weston Downs Traffic Study, 2016.
- Vaughan Mills Centre Secondary Plan, 2014.
- Vaughan Mills Centre Public Realm Strategy and Streetscape Master Plan, 2021.
- Weston Road Widening Design and Construction, ongoing.
- Langstaff Road Environmental Assessment, 2022.

Road network solutions for the Bass Pro Mills Drive extension will consider the impacts on Jane, Weston, Rutherford, Langstaff and Weston Downs to manage planned growth in these surrounding areas.

A Traffic Impact Assessment (TIA) was completed as part of this study in August 2020 to evaluate the transportation-related impacts associated with the proposed development on existing area intersections and the boundary road network, and to identify any mitigation measures, where warranted. This included analysis of the following roadways: Rutherford Road, Jane Street, Langstaff Road, Weston Road, Highway 400 and the existing Bass Pro Mills Drive.

2.2.1 Existing Traffic Volumes

An assessment of existing traffic conditions undertaken as part of the TIA indicated that the study areas is predominantly car-oriented with 91% in the AM peak period and 9% in the PM peak period of trips originating and destined to the area being auto-related, as seen in **Table 1** below.

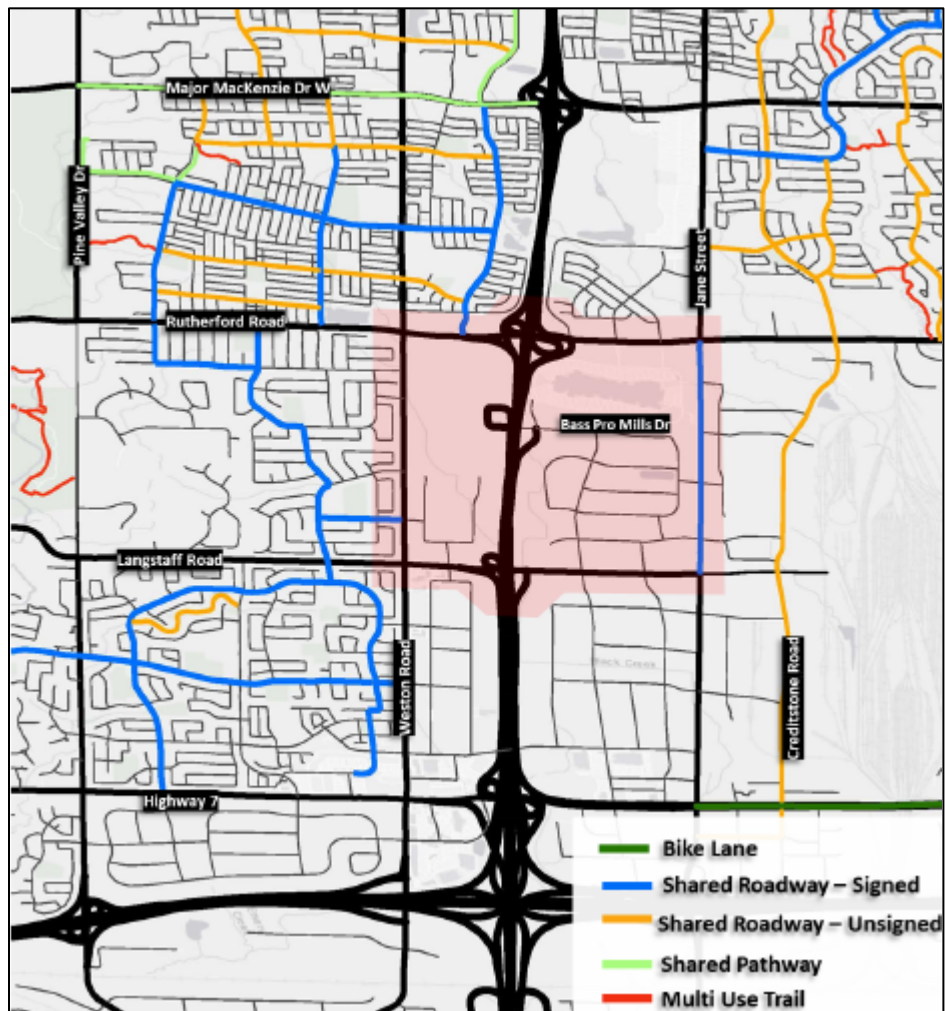
Table 1: Study Area Mode Split

	Transit	Cycling	Auto	Walk	Other
AM Peak Period					
Vaughan Mills Mall	5%	2%	91%	2%	0%
City of Vaughan	5%	0%	85%	7%	2%
PM Peak Period					
Vaughan Mills Mall	6%	0%	94%	0%	0%
City of Vaughan	9%	0%	89%	1%	0%

As seen within **Figure 7** below, overall, the study area intersections do not provide significant cycling or multi-use paths, however provisions for sidewalks are generally abundant. Of note is the one shared roadway with sharrows on Jane Street and an unsigned bike route on Springdale Road.



Figure 7: Bike Infrastructure in the Study Area



2.2.2 Traffic Growth

Based on the microsimulation model, the future baseline out to 2031 and 2041 scenarios shows significant deterioration in major performance metrics in the Primary study area when compared to the existing conditions. This deterioration is outlined in the **Table 2** below.

Table 2: Future Baseline Traffic Growth (2031 and 2041)

AM Peak Hour	Existing 2020	Future Baseline 2031	Future Baseline 2041
Delay (s/km)	50.1	86.6	83.0
Total Travel Time (veh-h)	2,136	5,516	3,347
Speed (km/h)	51.7	42.3	44.3
Vehicles waiting to enter network	663	1,636	4,495
PM Peak Hour	Existing 2020	Future Baseline 2031	Future Baseline 2041
Delay (s/km)	80.8	127.6	108.8
Total Travel Time (veh-h)	3,029	4,614	4,864
Speed (km/h)	43.9	37.5	35.8
Vehicles waiting to enter network	398	2,076	3,280

More information can be found within the Traffic Impact Assessment report available within **Appendix B**.



3.0 EXISTING CONDITIONS

Background studies and field investigations were carried out to help assess existing environmental conditions, including fisheries, aquatic and terrestrial resources, cultural heritage, surface water and subsurface soil and groundwater conditions. The background reviews to establish existing conditions were carried out between spring of 2019 and fall of 2021. Significant environmental features and/or constraints identified as a result of the background studies were documented and considered during the development and evaluation of alternatives.

3.1 CULTURAL ENVIRONMENT

3.1.1 Cultural Heritage Overview

A Cultural Heritage Overview Memorandum (CHOM) was completed in April 2020 as part of this study to determine existing cultural heritage conditions. A heritage screening consisting of the completion of the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) Criteria for Evaluating Potential for build Heritage Resources and Cultural Heritage Landscapes Checklist (the checklist) was completed. The Checklist identifies protected and potential properties within the study area and makes recommendations for further work, as necessary.

Based on the findings of the Checklist, two indicators of cultural heritage value or interest (CHVI) were identified, including that the study area is within a Canadian Heritage River watershed, and that it contains buildings or structures that are 40 or more years old. Although these two indicators were identified, they do not directly confirm CHVI value for the study area.

The structures identified in the study area over the 40-year age mark are located at 8955 and 8929 Weston Road. These two potential cultural heritage resources were evaluated for CHVI according to *Ontario Regulation (O.Reg.) 9/06: Criteria for Determining Cultural Heritage Value or Interest* under the *Ontario Heritage Act* (Government of Ontario 2006). Based on a review of available information and in accordance with O. Reg. 9/06 it has been determined that there is no CHVI identified for either of these properties, as they do not display any design or physical value as both are highly modified structures. Additionally, from the review of historic mapping and the completion of the MHSTCI Checklist no historical, associate, or contextual value was identified for either property given that the character of the area is in transition to an urban business park and neither property is a landmark structure.

A copy of the Cultural Heritage Overview Memorandum is available within **Appendix C**.



3.1.2 Archaeology

A Stage 1 Archaeological Assessment (Stage 1 AA) of the study area was carried out in accordance with the *Standards and Guidelines for Archaeological Assessments* (2011) and the *Ontario Heritage Act* (1990) to determine the potential for the presence of known and/or potential archaeological resources within the study area based on a review of relevant background information and a site visit conducted on November 4, 2020. In the absence of permission-to-enter private property, the site visit was conducted from publicly accessible municipal right-of-ways (ROWs). Based on the findings of the assessment, the following is noteworthy:

- The study area consists of approximately 31 ha of fallow agricultural land, scrubland, roads, highways, manicured lawn, residential and commercial space.
- The soil within the study area is primarily Malton clay, with elements of Chinguacousy clay loam and Peel clay, which are poorly drained and generally unsuitable for Indigenous agricultural practices. However, with the addition of fertilizer/drainage practices, they would be suitable for Euro-Canadian agricultural practices.
- The closest water source to the study area is Black Creek, a tributary to the Humber River that runs through the western portion of the study area (east of Weston Road) and drains into Humber River approximately 16 km south of the study area.
- There are no previously registered archaeological sites within 50 m of the study area. However, there are twenty-one (21) registered archaeological sites located within 1 km of the study area, including one (1) multi-component site, twelve (12) Indigenous sites, and eight (8) Euro-Canadian sites.

A portion of the study area does not retain the potential for recovery of archaeological resources due to it being permanently low and wet, steeply sloped and having been subject to previous deep ground disturbance. However, the Stage 1 AA identified that some portions of the study area retain the potential for the identification and recovery of archaeological resources.

A copy of the Stage 1 AA report is available within **Appendix D**.

3.2 NATURAL ENVIRONMENT

3.2.1 Natural Heritage

A preliminary review of natural environment features within the study area was undertaken in 2019 based on desktop analyses of available secondary source information, including relevant mapping, databases and information received from external agencies.



Additionally, the study team conducted a number of site visits to confirm the findings of the desktop review, assess existing conditions, establish a better understanding of potential impacts to natural environment features within the study area, and help determine appropriate mitigation measures. The timing of these site visits is summarized within **Table 3** . In the absence of permission-to-enter (PTE) private property, all site visits were conducted from publicly accessible municipal ROWs.

Table 3: Summary of Natural Environment Site Visits

Type of Field Work	Date(s) of Field Work
Vegetation Surveys	
Summer Botanical and Ecological Land Classification (ELC)	June 22, 2021
Wildlife Surveys	
Amphibian Call Surveys	April 8, 2021
	May 13, 2021
	June 10, 2021
Breeding Bird Surveys	June 4, 2021
	June 22, 2021
Wildlife Habitat Assessment	June 22, 2021
Fish Habitat Surveys	
Aquatic Habitat Assessment	March 23, 2021
	August 24, 2021

The findings of these desktop reviews and site visits are documented within an Environmental Impact Study (EIS) report, as summarized herein. A copy of the EIS report is provided within **Appendix E** of this ESR.

3.2.2 Aquatic Environment

The study area is located within the Black Creek Subwatershed of the Humber River watershed. Based on a review of recent aerial photographs and background information, surface water features located within the study area are briefly described below and depicted within **Figure 8**:

Black Creek

Black Creek is a mapped watercourse with a permanent flow regime and warmwater thermal regime that provides permanent warmwater fish habitat. While Black Creek lies within a Toronto and Region Conservation Authority (TRCA) regulated area, there are no records of provincially or federally regulated SAR within or downstream from the



study area. Background data from the Land Information Ontario (LIO) database from the Ministry of Natural Resources and Forestry (MNRF) indicated occurrences of several common fish species within Black Creek in a variety of locations downstream of the study area. However, the 2021 study team's field investigations confirmed the presence of Common Carp, Brook Stickleback and Creek Chub within the study area, all of which are common and widespread in southern Ontario. The study team also noted that many sections of the channel were densely vegetated by tall grasses, however, cover for fish was minimal, provided by pool areas where deeper water was available (up to approximately 0.5 m deep).

Headwater Drainage Feature A

Headwater Drainage Feature A (HDF-A) is a tributary to Black Creek, entering it from the east, which also has a permanent flow regime and warmwater thermal regime. It is not mapped as a classified drain and the availability of fish habitat within HDF-A could not be determined due to limitations in site access and a lack of existing fish community data available for this feature.

Unmapped Feature (Potential Headwater Drainage Feature)

The study team identified a potential surface water feature that is not currently mapped by MNRF/TRCA but is visible through 2021 aerial photographs. Based on historical aerial photography, the feature was not present prior to 2005, but appears adjacent to the wetland feature in aerial photographs in 2020. This feature may provide a hydrologic connection between the wetland and Black Creek, although this potential connection is obscured within 2020 aerial photography. This potential HDF was not included in field investigations due to site access restrictions. Stormwater Management (SWM) Pond

A constructed SWM pond is located near the east end of the study area (i.e., within the Bass Pro Mills Drive West to Highway 400 South on-ramp) and comprising an approximate length of 100 m. The SWM pond is surrounded by paved roads and does not have a surface connection to any watercourses. As this feature is a constructed SWM pond and is not connected to any surface water features, it was not assessed with respect to fish and fish habitat. However, it may provide suitable overwintering and/or summer residence to Snapping Turtles, although their presence within the study area has not been confirmed.



Figure 8: Existing Natural Environment Constraints



3.2.3 Terrestrial Environment

The study area is generally dominated by culturally influenced mixed meadow communities, much of which appear to consist of formerly cultivated lands. As depicted within **Figure 9** below, there is a large shallow marsh within the centre of the study area, as well as a shallow marsh associated with Black Creek.

The study area is surrounded by highways, municipal roads, residential and commercial development, and the Vaughan Mills Shopping Centre to the east. There are no woodlands or valleylands present within the study area and the closest heritage features are more than 2km away. The wetlands within the study area do not connect to any exterior wetlands.

Designated Areas

Through the review of background information and databases from the MNRF and TRCA, Black Creek and its short tributary were identified as regulated features on TRCA Regulated Areas Mapping. The wetlands present within the study area are not shown in existing regulated area mapping, and there are no significant woodlands, valleylands or Areas of Natural and Scientific Interest (ANSIs) within the study area.

Wetlands

Through review of existing MNRF and TRCA Regulation Mapping, no provincially significant wetlands or evaluated wetlands were identified within the study area. However, there are two unevaluated wetland communities present within the study area which consist of a shallow marsh community which is approximately 3.6 ha in size and divided by a berm with a narrow connection in its centre. Both communities are dominated by common invasive plant species including common reed and narrow-leaved cattail. Additionally, the northwest corner of the shallow marsh community is connected to Headwater Drainage Feature A.

Due to lack of access to the wetlands, the hydrologic/ecological functions, as well as the presence of fish/fish habitat and terrestrial wildlife are currently unknown. No amphibians were recorded during the roadside call count surveys undertaken in April, May, and June 2021. Although there was potential for calling individuals to have been missed due to the traffic noise generated from the adjacent Highway 400, survey locations were positioned to target the wetland features and it would have been possible to hear high amphibian calling activity. For this reason, it is unlikely that the wetland features in the study area provide significant wildlife habitat for breeding amphibians.



Figure 9: Existing Natural Heritage Conditions and Survey Locations



Species at Risk

Eighteen (18) terrestrial SAR and Species of Conservation Concern (SOCC) were identified as having the potential to occur within the study area. This list includes one amphibian, four mammals, nine birds, one plant, two reptiles and one insect. Of these, nine are SAR and eight are SOCC. However, there are no records of provincially or federally regulated aquatic SAR within or downstream from the study area.

3.2.4 Fluvial Geomorphology

A fluvial geomorphological assessment of Black Creek was carried out through a desktop analysis of available background information and site visit conducted in March 2021. As site access was not permitted at the time of the field investigation, observations were made from publicly accessible ROWs.

Based on the information collected for the study area, Black Creek comprises a straightened channel adjacent to Weston Road from Rutherford Road south to the future location of the Bass Pro Mills Drive extension, where it then continues southeast to connect with a realigned and restored reach of Black Creek downstream from the study area. An assessment of background information indicated that the existing Black Creek watercourse was previously realigned and restored prior to 1954 as part of the development of the Weston Road/ Highway 400 North Industrial Subdivision. However, there is no background fluvial geomorphological information available for this realignment. The current predominant land use within the watershed is industrial/commercial with a growing proportion of residential use in more recent years.

As the existing channel has been straightened, it contains few bedforms and habitat features. The channel cross-section of Black Creek within the study area is trapezoidal with a small low flow channel present within cattails and phragmites. The bank slopes are moderate with material that is soft and cohesive with a homogeneous and featureless bed morphology. Additionally, the bank and riparian vegetation consists of herbaceous and flood tolerant vegetation and non-woody plants.

Meander Belt Assessment

Meander belt is a term used to quantify the lateral extent of a river's occupation of its floodplain. Meander belts are inherently variable and dependent on among other things, hydrology, stormwater flows, bank erosion rates and slope, and the degree of channel confinement by the valley walls. A Meander Belt Assessment was conducted to determine the existing delineating limits of Black Creek's meander belt. Using the TRCA's empirical approach the meander belt assessment confirmed that Black Creek's meander belt width is 39 m.

A copy of the Fluvial Geomorphological Assessment report is available within **Appendix H**.



3.2.5 Physiology, Geology and Soils

The study area is located within the physiographical regions of the Peel Plain, in an area comprised of Bevelled Till Plain. Surficial and bedrock geology maps published by the Ontario Geological Survey (OGS) indicate that the predominant surficial geology type within the study area is fine textured glaciolacustrine deposits composed of interbedded silt and clay. The Precambrian bedrock geology within the study area is the shale-dominant Georgian Bay Formation of the Ordovician period, composed of shale, limestone, dolostone and siltstone.

The study area is situated within Ecodistrict 7E-4, which extends from the Rouge River west to Bronte Creek. The geology and substrate of the Toronto Ecodistrict is characterized by glacial and modern deposits, and approximately 7% of the Ecodistrict supports relatively natural cover.

3.2.6 Existing Stormwater Conditions

The study area is located within the Humber River Watershed which is under the jurisdiction of the TRCA. Lidar Topography also confirms that the study area is fully located within the Black Creek Subwatershed and that the land generally slopes toward Black Creek.

The existing Bass Pro Mills Drive, east of Highway 400 southbound on-ramp, has a high point at the midpoint of the Highway 400 overpass that directs stormwater runoff east and west. West of the high point, a small local storm sewer network collects stormwater runoff from existing Bass Pro Mills Drive and the adjacent south slope and discharges it westly towards the wetland shallow marsh/wetland community.

Under current conditions, it is unclear where the Highway 400 and Bass Pro Mills Drive stormwater management pond, previously discussed in **Section 3.2.2**, currently discharges flows to as the outlet structure that was to be connected to storm sewers that have not yet been constructed. Site access was not permitted during this study and thus, a field investigation could not be completed.

Other than the existing stormwater management pond there does not appear to be any other stormwater management measures within or adjacent to the proposed ROW corridor that would be able to provide either quality or quantity control for the stormwater runoff from the extension of Bass Pro Mills Drive.

3.2.7 Source Water Protection

Based on the Ontario Source Protection Information Atlas, and as delineated according to the Technical Rules under the Clean Water Act, the southeast corner of the study area east of Highway 400 is located in an area with a Highly Vulnerable Aquifer (HVA), as shown within **Figure 10**. HVAs consist of source granular aquifer materials and

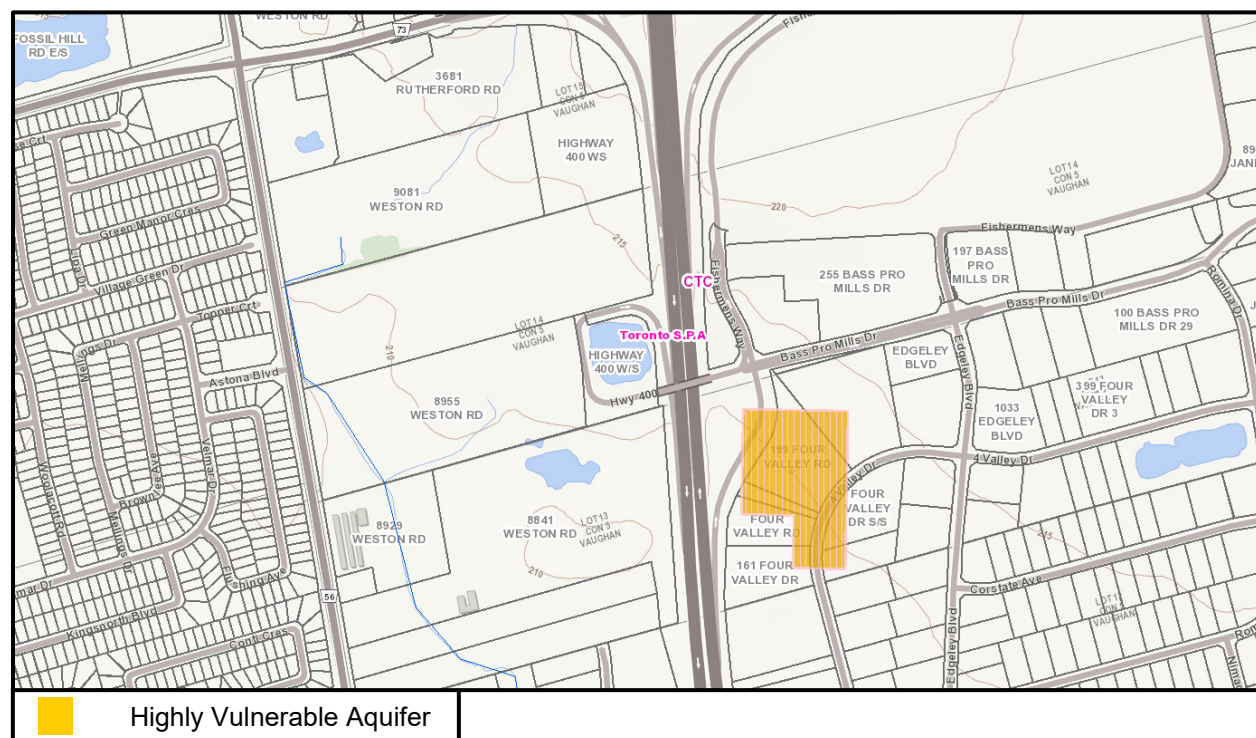


BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

fractured rock, have high permeability and are close to the ground surface with a relatively shallow water table. HVAs are vulnerable to contaminants due to their location near the ground's surface or where types of materials within the ground are highly permeable, allowing materials to migrate into and through the aquifer quickly, impacting water quality.

In addition, the Source Protection Information Atlas also indicated that the study area is located within Wellhead Protection Areas Q1 and Q2 with moderate stress.

Figure 10: Highly Vulnerable Aquifers Near Study Area



3.2.8 Potentially Contaminated Sites

A Contamination Overview Study (COS) was completed in February 2021 to assess the potential presence of subsurface contamination in the study area associated with current or historical land uses in the area. The COS included desktop review of available datasets, as well as windshield surveys from the study team's vehicles carried in April and August 2020.

Based on a review of historical records and observations made in 2020, approximately 3 properties are located within or near the study area and may present potential environmental concern to the study area. Historical records indicate that the properties were previously registered waste generators of petroleum hydrocarbons. In addition, one property was reported to be previously occupied by an automotive junkyard/waste



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disposal operation between approximately 1969 and 1980. Additionally, stockpiles of fill of unknown quality were observed on-site and while not directly observed or reported, there is the potential for on-site fueling associated with heavy equipment observed on-site during the study team's 2020 windshield survey.

A search of records and regulatory agency databases confirmed that several of the properties within a 250 m radius are registered generators of waste oils, lubricants, and organic laboratory chemicals, manufactures of concrete products, vendors of pesticides, non-hazardous industrial waste management sites.

Although an active Underground Storage Tank (UST) was noted approximately 50 m northwest of the study area, there are no records of bulk fuel storage reported and/or observed on-site.

Additional information, including the location of properties with a risk of contamination is available within the Contamination Overview Study is provided within **Appendix I**.



4.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE SOLUTIONS

4.1 IDENTIFICATION OF ALTERNATIVE SOLUTIONS

Alternative solutions were identified through a screening process to determine which solution could best meet the objectives as defined by the Problem and Opportunity Statement, with the least environmental impacts. As a result, the below five alternative solutions were identified for the study:

- **Alternative 1:** Do Nothing
- **Alternative 2:** Improve Transit, Employ Travel Demand Management Measures
- **Alternative 3:** Intersection and/or Operational Improvements
- **Alternative 4:** Improve Existing East-West Roadways in the Area
- **Alternative 5:** Extend Bass Pro Mills Drive to Weston Road

4.2 EVALUATION OF ALTERNATIVE SOLUTIONS

The alternatives were subjected to a detailed comparative evaluation using a reasoned argument approach, which describes both the advantages and disadvantages of each alternative in response to a defined set of evaluation criteria. The evaluation focuses on the ability of each alternative to address the problems and opportunities, as well as the recommendations set forth in the VMCSPP. Opportunities to incorporate mitigation measures to offset potential adverse impacts are also considered within this process.

The detailed evaluation of alternative alignments is provided below in **Table 4**.

4.2.1 Evaluation Criteria

Through City, regulatory and stakeholder priorities and concerns, the below criteria were identified to evaluate the alternative solutions against and determine a recommended solution:

Transportation

- Safety
- Active Transportation
- Transit
- Traffic Operations
- Enhance Emergency Vehicle Response/Access
- Road Network Compatibility/Connectivity

Cultural Environment

Technical

- Impacts of Utilities
- Construction Feasibility
- Stormwater/Drainage Quality & Quantity
- Cost

Socio-Economic Environment

- Noise
- Accessibility



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- Archaeological Resources
- Cultural Landscapes and Built Heritage Resources

Natural Environment

- Fisheries and Aquatic Habitat
- Surface Water Quality/Quantity
- Vegetation
- Wildlife Habitat
- Air Quality
- Climate Change

- Impacts to Entrances/Access to Private Properties
- Property Acquisition Requirements
- Provincial Planning Objectives
- Municipal Planning Objectives
- Compatibility with Existing and Proposed Development
- Business Operations
- Community Access during Construction Phase



Table 4: Evaluation Summary of Alternative Solutions

EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
Transportation						
Safety	<ul style="list-style-type: none"> Offers opportunity to promote vehicle travel safety/reduce collision (based on opportunity to reduce congestion) 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve vehicle travel safety Traffic congestion anticipated to increase over time in association with planned growth in the area 	Partially Preferred <ul style="list-style-type: none"> May reduce vehicle use, congestion in the short term Traffic congestion anticipated to increase over time in association with planned growth in the area 	Partially Preferred <ul style="list-style-type: none"> May reduce congestion and potential for collisions through improved intersection operations Traffic congestion anticipated to increase over time in association with planned growth in the area 	Partially Preferred <ul style="list-style-type: none"> May reduce congestion in the short term Traffic congestion anticipated to increase over time in association with planned growth in the area 	Preferred <ul style="list-style-type: none"> Provides best opportunity to improve vehicle travel safety within study area Anticipated to reduce congestion in the area in the longer term
Active Transportation	<ul style="list-style-type: none"> Provides safe and comfortable pedestrian/cycling access to area amenities Supports active transportation by creating new multi-modal transportation connections 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to enhance the pedestrian environment within the study area Does not support development of new multi-modal transportation connections for existing and future land uses 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to enhance the pedestrian environment within the study area Does not support development of new multi-modal transportation connections for existing and future land uses 	Partially Preferred <ul style="list-style-type: none"> Provides limited opportunity to enhance the existing pedestrian environment within the study area Somewhat supports the development of new multi-modal transportation connections for existing and future land uses Would result in discontinuity of sidewalk sections and does not provide bike lanes 	Partially Preferred <ul style="list-style-type: none"> Provides limited opportunity to enhance the existing pedestrian environment within the study area Supports the development of a new multi-modal connections for existing and future land uses; however, no new connections for existing and future land uses provided within study area 	Preferred <ul style="list-style-type: none"> Provides best opportunity to enhance the pedestrian environment within the study area Best supports development of new multi-modal transportation connections for existing and future land uses within the study area Offers opportunity for new and enhanced facilities within new right-of-way
Transit	<ul style="list-style-type: none"> Facilitates improved integration of existing transit services into planned system Opportunity for integration of York Region Transit and potential future transit stops 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to integrate transit services and/or stops into the transportation system 	Partially Preferred <ul style="list-style-type: none"> Provides opportunity to facilitate improved integration of transit services into the overall transportation system; however, no improved integration of services and/or potential future transit stops offered within study area 	Partially Preferred <ul style="list-style-type: none"> May provide limited opportunity to facilitate improved integration of transit services into the overall transportation system to some degree; however, no improved integration of services and/or potential future transit stops offered within study area 	Partially Preferred <ul style="list-style-type: none"> Provides opportunity to facilitate improved integration of transit services into the overall transportation system; however, no improved integration of services and/or potential future transit stops offered within study area 	Preferred <ul style="list-style-type: none"> Provides best opportunity to facilitate improved integration of existing transit services into the overall transportation system and/or potential future transit stops within study area
Traffic Operations	<ul style="list-style-type: none"> Potential to improve existing and future traffic operations and levels of service (LOS) including along Jane Street, Weston Road, Rutherford Road and the surrounding area. 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve existing and future traffic operations 	Partially Preferred <ul style="list-style-type: none"> May reduce vehicle travel to some degree, improving operations Not anticipated to improve traffic operations and LOS 	Partially Preferred <ul style="list-style-type: none"> Some potential to improve traffic operations and LOS Addresses operational deficiencies, however capacity deficiencies 	Partially Preferred <ul style="list-style-type: none"> Moderate potential to improve traffic operations and LOS Anticipated to provide short-term capacity to accommodate existing 	Preferred <ul style="list-style-type: none"> High potential to improve traffic operations and LOS Offers best opportunity to provide sufficient capacity to accommodate existing



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
			associated with future traffic operations	within study area imminent	travel demands, but not future demands within study area	and future travel demands within study area
Emergency Response	<ul style="list-style-type: none"> Provides opportunity to enhance response times and/or emergency service vehicles access 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve emergency vehicle access and/or response times 	Partially Preferred <ul style="list-style-type: none"> Slight reduction in auto use may improve network operations and associated emergency service vehicle response times No change to existing emergency vehicle access within study area 	Partially Preferred <ul style="list-style-type: none"> Modest improvement in network operations may improve response times in the short term No change to existing emergency vehicle access within study area 	Partially Preferred <ul style="list-style-type: none"> Modest improvement in network operations may improve response times in the short term No change to existing emergency vehicle access within study area 	Preferred <ul style="list-style-type: none"> Offers redundancy and improved traffic operations within the road network Offers ease of access for emergency vehicles within study area
Road Network Compatibility / Connectivity	<ul style="list-style-type: none"> Facilitates improved access between the western and eastern areas of the Vaughan Mills Centre Secondary Plan study area and lands divided by Highway 400 	Least Preferred <ul style="list-style-type: none"> Does not provide alternate multi-modal route or improve access between the western and eastern portions of the study area 	Partially Preferred <ul style="list-style-type: none"> Does not provide alternate multi-modal route between the western and eastern portions of the study area May facilitate access to some degree through slight reduction in vehicle travel/improved traffic operations 	Partially Preferred <ul style="list-style-type: none"> Does not provide alternate multi-modal route between the western and eastern portions of the study area May facilitate access to some degree through improved intersection capacity/operations 	Partially Preferred <ul style="list-style-type: none"> Does not provide alternate multi-modal route between the western and eastern portions of the study area May facilitate access to some degree through increased capacity/improved traffic operations 	Preferred <ul style="list-style-type: none"> Provides alternate multi-modal route between the western and eastern portions of the study area Redundancy in the road network will facilitate access through improved capacity and operations for all travel modes
Transportation Summary		Least Preferred	Least Preferred (as a standalone solution)	Least Preferred (as a standalone solution)	Partially Preferred	Most Preferred
Socio-Economic Environment						
Accessibility	<ul style="list-style-type: none"> Provides opportunity to improve accessibility/reduce barriers in the built environment Ability to accommodate accessibility design guidelines (AODA/City) 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve accessibility and/or accommodate AODA/City design guidelines 	Least Preferred <ul style="list-style-type: none"> Provides limited opportunity to improve accessibility and/or accommodate AODA/City design guidelines 	Partially Preferred <ul style="list-style-type: none"> Provides limited opportunity to improve accessibility and/or accommodate AODA/City design guidelines Accessibility improvements limited to study area intersections 	Partially Preferred <ul style="list-style-type: none"> Provides limited opportunity to improve accessibility and/or accommodate AODA/City design guidelines on other routes within City 	Preferred <ul style="list-style-type: none"> Provides best opportunity to accommodate accessibility as per AODA and City design guidelines within the study area
Impacts to Existing Entrances/ Access to Private Property	<ul style="list-style-type: none"> Maintains, improves, and/or maximizes opportunities to improve access to private properties 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve access to private property within the study area 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve access to private property within the study area 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to improve access to private property within the study area 	Least Preferred <ul style="list-style-type: none"> Provides limited opportunity to improve access to private property within the study area 	Preferred <ul style="list-style-type: none"> Provides best opportunity to improve access to private property within the study area by creating new east-west road right-of-way and associated opportunity for new connections



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
Property Requirements	<ul style="list-style-type: none"> Requires acquisition of private property 	Preferred <ul style="list-style-type: none"> No property severance/ acquisition expected to be required 	Preferred <ul style="list-style-type: none"> Limited to no property severance/ acquisition expected to be required 	Partially Preferred <ul style="list-style-type: none"> Limited property severance/ acquisition expected to be required 	Least Preferred <ul style="list-style-type: none"> Property severance/ acquisition expected to be required 	Least Preferred <ul style="list-style-type: none"> Property severance/ acquisition expected to be required
Provincial Planning Objectives	<ul style="list-style-type: none"> Consistency with the Growth Plan for the Greater Golden Horseshoe (i.e., Vaughan Corporate Centre Urban Growth Centre), and Provincial Policy Statement (2020) policies 	Least Preferred <ul style="list-style-type: none"> Inconsistent with Provincial Planning objectives Does not encourage development of compact communities, provide opportunity for inter-modal linkages and/or improve integration of vehicle and active transportation modes to support urban growth 	Partially Preferred <ul style="list-style-type: none"> Somewhat consistent with Provincial Planning objectives Promotes use of active transportation and transit; however, does not encourage the development of compact communities, provide opportunity for inter-modal linkages to support urban growth and/or improve integration of vehicle and active transportation modes 	Partially Preferred <ul style="list-style-type: none"> Somewhat consistent with Provincial Planning objectives Localized intersection improvements may promote integration of vehicle and active transportation modes, but does not encourage development of compact communities or provide opportunity for inter-modal linkages to support urban growth 	Partially Preferred <ul style="list-style-type: none"> Somewhat consistent with Provincial Planning objectives Improvements to alternative east-west routes may provide opportunity to improve intermodal linkages and promote active transportation and transit; however, it does not encourage development of compact communities to support urban growth within study area 	Preferred <ul style="list-style-type: none"> Most consistent with Project Planning objectives Encourages development of compact communities Provides opportunity to improve inter-modal linkages and integration of vehicle and active transportation modes to support urban growth. Extending the road will help to encourage development of compact communities
Consistency with Municipal Planning Objectives	<ul style="list-style-type: none"> Satisfies the goals and objectives of the City of Vaughan's Official Plan, Vaughan Mills Centre Secondary Plan, such as accommodating and encouraging a mix of uses to support a compact community that encourages, walking, cycling and transit use and allows pedestrians/cyclists to travel safely through Vaughan Mills Centre between Jane Street and Weston Road 	Least Preferred <ul style="list-style-type: none"> Does not address the City's planning objectives for the study area 	Least Preferred <ul style="list-style-type: none"> Does not fully address the City's planning objectives for the study area TDM measures do not address City's vision for a compact community and safe pedestrian and cyclist travel through Vaughan Mills Centre 	Least Preferred <ul style="list-style-type: none"> Does not fully address the City's planning objectives for the study area Intersection and/or operational improvements do not address City's vision for a compact community and safe pedestrian and cyclist travel through Vaughan Mills Centre 	Least Preferred <ul style="list-style-type: none"> Does not fully address the City's planning objectives for the study area Improving other east-west roadways in area does not address City's vision for a compact community and safe pedestrian and cyclist travel through Vaughan Mills Centre 	Preferred <ul style="list-style-type: none"> Fully addresses the City's objectives for the study area by support a compact community that encourages, walking, cycling and transit use and allows pedestrians/cyclists to travel safely through Vaughan Mills Centre between Jane Street and Weston Road
Compatibility with Existing and Proposed Developments	<ul style="list-style-type: none"> Potential to support existing and future development that encourages compact, mixed-use community that is well-connected to the external street network 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to support existing and future developments 	Least Preferred <ul style="list-style-type: none"> TDM measures do not support development that encourages compact, mixed-use community that is well-connected to the external street network Does not provide new road connection and opportunities for other local connections within the study area 	Partially Preferred <ul style="list-style-type: none"> Localized improvements provide limited opportunity to support existing and future development that encourages compact, mixed-use community that is well-connected to the external street network Does not provide new road connection and opportunities for other local connections within the study area 	Partially Preferred <ul style="list-style-type: none"> Improving other east-west roadways in area does not support existing and future development that encourages compact, mixed-use community that is well-connected to the external street network Does not provide new road connection and opportunities for other local connections within the study area 	Preferred <ul style="list-style-type: none"> Extending the roadway provides best opportunity to support existing and future development that encourages compact, mixed-use community that is well-connected to the external street network by providing new road connection and opportunities for other local connections within the study area



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
Business Operations	<ul style="list-style-type: none"> Maintains or improves commercial goods movement Facilitates access to existing and future business operations Supports opportunity for more walkable convenience-based retail offering (i.e., grocery, daily amenity, restaurant, medical) for Vaughan Mills Centre and other businesses in the area. 	<p>Least Preferred</p> <ul style="list-style-type: none"> Does not provide opportunity to improve commercial goods movement within the study area Maintains access to existing business operations, however, does not provide opportunity to improve access to future businesses in the area 	<p>Partially Preferred</p> <ul style="list-style-type: none"> May improve traffic operations/facilitate goods movement in the short term Maintains access to existing business operations, however, does not provide additional access required to support future businesses in the area Lack of improvements within study area may delay development interests 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Improved intersection operational improvements may relieve travel demands/facilitate goods movement in the short term Maintains access to existing business operations, however, does not provide additional access required to support future businesses in the area Lack of improvements within study area may delay development interests 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Improved capacity on alternative east-west routes may improve traffic operations/facilitate goods movement in the short term Maintains access to existing business operations, however, does not provide additional access required to support future businesses in the area Lack improvements within study area may delay development interests 	<p>Preferred</p> <ul style="list-style-type: none"> Redundancy in the road network anticipated to improve commercial goods movement within the study area and to/from the Downtown Maintains access to existing business operations Supports future business development within study area by providing opportunities for new local road and development blocks Improvements in the study area anticipated to support development interests within the study area
Noise	<ul style="list-style-type: none"> Potential to impact noise sensitive areas (NSAs) (i.e., residential dwellings, daycares, etc.) 	<p>Least Preferred</p> <ul style="list-style-type: none"> High potential to increase noise in NSAs in association with increased traffic volumes/congestion 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Moderate potential to increase noise in NSAs Increased traffic volumes/congestion anticipated over the longer term Noise mitigation measures can be implemented, where warranted and feasible (i.e., noise barrier walls) 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Moderate potential to increase noise in NSAs Increased traffic volumes/congestion anticipated over the longer term Noise mitigation measures can be implemented, where warranted and feasible (i.e., noise barrier walls) 	<p>Preferred</p> <ul style="list-style-type: none"> Low-moderate potential to increase noise in NSAs Increased traffic volumes/congestion anticipated over the longer term Road widening improvements may impose traffic noise closer to existing NSAs Noise mitigation measures can be implemented, where warranted and feasible (i.e., noise barrier walls) 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Low-moderate potential to increase noise in NSAs New road right-of-way perpendicular to established residential area Anticipated reduction in traffic congestion anticipated to decrease noise in NSAs Noise mitigation measures can be implemented, where warranted and feasible (i.e., noise barrier walls)
Community Access	<ul style="list-style-type: none"> Disruption to existing traffic and property access during construction 	<p>Preferred</p> <ul style="list-style-type: none"> No disruption to existing traffic or property access 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Limited disruption to existing traffic or property access during construction anticipated 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Some disruption to existing traffic or property access during construction anticipated 	<p>Least Preferred</p> <ul style="list-style-type: none"> Highest potential for disruption to existing traffic and property access during construction of improvements to existing roadways 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Limited disruption to existing traffic or property access expected New road right-of-way situated within presently undeveloped land Impacts to traffic operations at partial interchange and/or Weston Road anticipated to be managed within a shorter construction time,



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
						when compared to improvements to existing east-west roadways
Socio-Economic Environment Summary		Least Preferred	Partially Preferred	Partially Preferred	Partially Preferred	Most Preferred
Cultural Environment						
Archaeological Resources	<ul style="list-style-type: none"> Potential to impact previously undisturbed lands 	Preferred <ul style="list-style-type: none"> No impact to previously undisturbed lands within the study area 	Preferred <ul style="list-style-type: none"> No impact to previously undisturbed lands within the study area 	Partially Preferred <ul style="list-style-type: none"> Some potential to impact previously undisturbed lands 	Least Preferred <ul style="list-style-type: none"> High potential to impact previously undisturbed lands Road widening activities may encroach onto lands having archaeological potential 	Least Preferred <ul style="list-style-type: none"> High potential to impact previously undisturbed lands Road widening activities may encroach onto lands having archaeological potential
Built Heritage Resources / Cultural Landscape	<ul style="list-style-type: none"> Potential to impact known built heritage resources or cultural landscapes/features 	Preferred <ul style="list-style-type: none"> No potential to impact known built heritage resources or cultural landscapes/features 	Preferred <ul style="list-style-type: none"> Limited potential to impact known built heritage resources or cultural landscapes/features 	Partially Preferred <ul style="list-style-type: none"> Some potential to impact built cultural heritage features 	Least Preferred <ul style="list-style-type: none"> Highest potential to impact built cultural heritage features and/or landscapes in association with road widening activities beyond study area 	Preferred <ul style="list-style-type: none"> No known built cultural heritage features and/or landscapes within study area
Cultural Environment Summary		Most Preferred	Most Preferred	Partially Preferred	Least Preferred	Partially Preferred
Natural Environment						
Fisheries and Aquatic Habitat	<ul style="list-style-type: none"> Potential to impact aquatic habitat 	Preferred <ul style="list-style-type: none"> No impact to fish or aquatic habitat 	Preferred <ul style="list-style-type: none"> No impact to fish or aquatic habitat 	Partially Preferred <ul style="list-style-type: none"> Some potential to impact fish or aquatic habitat through intersection improvements Existing watercourses in area could be impacted by intersection/operational improvements Impacts can be mitigated by conducting construction activities within appropriate timing windows 	Least Preferred <ul style="list-style-type: none"> High potential to impact fish or aquatic habitat Existing watercourses in area may support fish/fish habitat Road widening activities would require modifications to existing roadways/disturbance to existing watercourses Impacts can be mitigated by conducting construction activities within appropriate timing windows 	Partially Preferred <ul style="list-style-type: none"> Moderate- high potential to impact fish or aquatic habitat New watercourse crossing required for Black Creek tributary, although potential to support fish/habitat not currently known Impacts can be mitigated by conducting construction activities within appropriate timing windows
Surface Water Quality and Quantity	<ul style="list-style-type: none"> Potential to implement a treatment train approach and/or at-source controls to protect water quality 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to implement surface water control measures 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to implement surface water control measures 	Partially Preferred <ul style="list-style-type: none"> Provides some opportunity to implement surface water control measures as part of improvements 	Preferred <ul style="list-style-type: none"> Provides opportunity to implement surface water control measures as part of improvements on other roadways 	Preferred <ul style="list-style-type: none"> Provides opportunity to implement surface water control measures as part of improvements



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
						<ul style="list-style-type: none"> Provides best opportunity to implement treatment train approach and/or at-source controls within study area
Vegetation	<ul style="list-style-type: none"> Potential to impact vegetation communities Potential to impact individual trees or landscaped features 	<p>Preferred</p> <ul style="list-style-type: none"> No impact to existing vegetation communities, individual trees and/or existing landscaped features 	<p>Preferred</p> <ul style="list-style-type: none"> Not anticipated to impact existing vegetation communities, individual trees and/or existing landscaped features 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Some impact to existing vegetation communities, individual trees and/or existing landscaped features anticipated Impacts can be mitigated through new plantings/landscape design/intersection features 	<p>Least Preferred</p> <ul style="list-style-type: none"> Highest potential to impact existing vegetation communities, individual trees and/or existing landscaped features anticipated through encroachment onto existing natural/vegetated areas Impacts can be mitigated through new plantings/landscape design/streetscape enhancements, where feasible 	<p>Least Preferred</p> <ul style="list-style-type: none"> Highest potential to impact existing vegetation communities, individual trees and/or existing landscaped features anticipated through development through vacant/vegetated land Impacts can be mitigated through new plantings/landscape design/streetscape enhancements
Wildlife	<ul style="list-style-type: none"> Potential to impact wildlife habitat Potential to impact or enhance corridors for wildlife movement Potential to reduce road mortality through corridor improvements and wildlife passages 	<p>Preferred</p> <ul style="list-style-type: none"> No impact to existing wildlife/habitat/natural corridors Does not provide opportunity to reduce road mortality 	<p>Preferred</p> <ul style="list-style-type: none"> Not anticipated to impact wildlife/habitat/natural corridors Does not provide opportunity to reduce road mortality 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Moderate potential to impact wildlife habitat/natural corridors (beyond study area) Provides limited to no potential to offer natural ecopassage and/or reduce road mortality through corridor improvements Impacts to some wildlife species can be mitigated by conducting construction activities within appropriate timing windows 	<p>Partially Preferred</p> <ul style="list-style-type: none"> High potential to impact wildlife habitat/natural corridors (beyond study area) Provides some to no potential to offer ecopassage and/or reduce road mortality through natural corridor improvements through modifications to existing crossings, if feasible Impacts to some wildlife species can be mitigated by conducting construction activities within appropriate timing windows 	<p>Partially Preferred</p> <ul style="list-style-type: none"> High potential to impact wildlife habitat/natural corridors within study area Provides highest potential to offer ecopassage and/or reduce road mortality through natural corridor improvements Impacts to some wildlife species can be mitigated by conducting construction activities within appropriate timing windows
Air Quality	<ul style="list-style-type: none"> Potential to impact air quality 	<p>Least Preferred</p> <ul style="list-style-type: none"> Anticipated increase in travel demands and traffic congestion anticipated to impact local and regional air quality 	<p>Least Preferred</p> <ul style="list-style-type: none"> Anticipated increase in travel demands and traffic congestion in the longer term anticipated to impact local and regional air quality 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Anticipated increase in travel demands and traffic congestion in the longer term anticipated to impact local and regional air quality 	<p>Partially Preferred</p> <ul style="list-style-type: none"> Improvement to local traffic flows within broader road network anticipated Increase in travel demands and traffic congestion in the longer term anticipated to impact local and regional air quality, although overall 	<p>Preferred</p> <ul style="list-style-type: none"> Improvement to local traffic flows within local road network anticipated Overall reduction in vehicle combustion emissions expected in future with implementation of new vehicle emission



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
					reduction in vehicle combustion emissions expected in future with implementation of new vehicle emission standards and alternative fuel sources (i.e., electric)	standards and alternative fuel sources (i.e., electric)
Climate Change	<ul style="list-style-type: none"> Ability to increase resilience to climate change (e.g., severe weather events) within the study area Ability to reduce known climate change contributors (e.g., GHG emissions) 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to increase resilience to climate change and/or reduce known climate change contributors 	Least Preferred <ul style="list-style-type: none"> Does not provide opportunity to increase resilience to climate change and/or reduce known climate change contributors 	Partially Preferred <ul style="list-style-type: none"> Provides some opportunity to increase resilience to climate change through provision of stormwater management features in accordance with current TRCA and City standards, where feasible Provides limited opportunity to reduce known climate change contributors 	Partially Preferred <ul style="list-style-type: none"> Provides some opportunity to increase resilience to climate change and reduce known climate change contributors through: <ul style="list-style-type: none"> provision of appropriate stormwater management features in accordance with current TRCA and City standards promotion of active transportation and anticipated reduction in reliance on auto travel 	Preferred <ul style="list-style-type: none"> Provides best opportunity to increase resilience to climate change within the study area and reduce known climate change contributors through: <ul style="list-style-type: none"> provision of appropriate stormwater management features in accordance with current TRCA and City standards promotion of active transportation and anticipated reduction in reliance on auto travel
Natural Environment Summary		Partially Preferred	Partially Preferred	Partially Preferred	Partially Preferred	Partially Preferred
Technical						
Utilities	<ul style="list-style-type: none"> Potential to impact existing utilities and accommodate future utilities 	Preferred <ul style="list-style-type: none"> No impact to existing utilities 	Partially Preferred <ul style="list-style-type: none"> Limited to no potential to impact existing utilities and/or accommodate future utilities 	Partially Preferred <ul style="list-style-type: none"> Limited potential to impact existing utilities and/or accommodate future utilities 	Least Preferred <ul style="list-style-type: none"> Highest potential to impact existing utilities Moderate potential to accommodate future utilities within existing developed lands 	Preferred <ul style="list-style-type: none"> Limited potential to impact existing utilities Provides best opportunity to accommodate future utilities through project planning within undeveloped lands
Construction Feasibility	<ul style="list-style-type: none"> Disruption to existing traffic and property access during construction 	Preferred <ul style="list-style-type: none"> Not applicable 	Preferred <ul style="list-style-type: none"> Limited to no disruption to existing property access/traffic operations anticipated 	Least Preferred <ul style="list-style-type: none"> Temporary disruption to traffic operations and property access during construction 	Least Preferred <ul style="list-style-type: none"> Temporary disruption to traffic operations and property access during construction Construction activities within existing developed lands 	Partially Preferred <ul style="list-style-type: none"> Minimal disruption to traffic operations and property access during construction Construction activities generally limited to within undeveloped lands



EVALUATION CRITERIA		ALTERNATIVE SOLUTIONS				
Factors	Measures	Do Nothing	Improve Transit, Employ Travel Demand Management Measures	Intersection and / or Operational Improvements	Improve Existing East-West Roadways in Area	Extend Bass Pro Mills Drive to Weston Road
Stormwater/Drainage	<ul style="list-style-type: none"> Provides opportunity to reduce stormwater quantity and/or improve stormwater quality 	Least Preferred <ul style="list-style-type: none"> No impact to existing stormwater quality/quantities Does not provide opportunity to reduce stormwater quantity/improve quality 	Least Preferred <ul style="list-style-type: none"> No impact to existing stormwater quality/quantities Does not provide opportunity to reduce stormwater quantity/improve quality 	Partially Preferred <ul style="list-style-type: none"> Low potential to impact existing stormwater quality/quantities Provides limited opportunity to reduce stormwater quantity/improve quality 	Partially Preferred <ul style="list-style-type: none"> High potential to impact existing stormwater quality/quantities Improved/widened right-of-way introduces new paved/impervious surface areas Moderate opportunity to reduce stormwater quantity/improve quality as part of construction activities 	Preferred <ul style="list-style-type: none"> High potential to impact existing stormwater quality/quantities. Provides best opportunity to improve stormwater drainage in the study area through provision of appropriate and enhanced stormwater management features designed in accordance with TRCA and City standards
Cost	<ul style="list-style-type: none"> Relative capital, operation, and maintenance costs (\$) 	Preferred <ul style="list-style-type: none"> No cost 	Partially Preferred <ul style="list-style-type: none"> Lowest cost (\$) 	Least Preferred <ul style="list-style-type: none"> Moderate cost (\$\$) 	Least Preferred <ul style="list-style-type: none"> High Cost (\$\$\$) 	Least Preferred <ul style="list-style-type: none"> Moderate-High cost (\$\$\$)
Technical Summary		Most Preferred	Partially Preferred	Partially Preferred	Least Preferred	Partially Preferred
Summary						
Recommended to be carried forward		NO – does not address the Problem/ Opportunity Statement	YES – within the overall strategy	YES – within the overall strategy	NO – subject to separate studies	YES – carried forward as the preferred alternative solution



4.3 RECOMMENDED SOLUTION

Based on the results of the evaluation, Alternative 5, extending Bass Pro Mills Drive to Weston Road is recommended based on the following key rationale:

- It provides the best opportunity to improve travel safety, enhance the pedestrian environment, support the development of new multi-modal transportation connections, provide an alternative east-west route, and alleviate traffic congestion for the long-term
- Has the highest potential to increase accessibility, improve access to private property, support existing and future development and is in line with municipal and provincial planning objectives
- It provides the best opportunity to increase resilience to climate change, improve air quality and implement surface water control measures
- Although the cost is moderate to high compared to other alternatives, there are limited impacts to utilities or the disruption of traffic operations as the construction activities would be generally limited to undeveloped lands.

4.4 TECHNICAL ADVISORY COMMITTEE MEETING 1

The first Technical Advisory Committee (TAC) meeting was held on September 9, 2020. In light of the COVID-19 pandemic and associated physical distancing requirements the meeting was held virtually. A presentation was provided to attendees to provide a brief overview of the study and solicit feedback on the study background information, existing environmental information collected to date, the proposed field investigation schedule, preliminary traffic analysis, preliminary evaluation of alternative solutions and associated evaluation criteria, preliminary design criteria and next steps in the study. Following the presentation, a question-and-answer period was held to allow attendees the opportunity to provide initial feedback on the information provided.

Multiple ongoing adjacent projects that may impact the extension of Bass Pro Mills Drive were discussed during this meeting (i.e., Langstaff Road MCEA, future widening of Weston Road, Vaughan Mills Centre Public Realm and Streetscape Plan, etc.). As such, it was agreed that the study team would do their best to coordinate with the other respective project teams to ensure design cohesiveness. In addition, it was suggested that the study team consider roundabouts for future intersections along the proposed Bass Pro Mills Drive extension, although it was understood that these intersection treatments often result in a significant amount of property requirements. As such, a roundabout screening was conducted and shared as part of PIC 2.

Furthermore, the TRCA requested a separate meeting with the study team to discuss the proposed realignment of Black Creek, as well as review the natural environmental



investigation findings and associated recommendations. Additional information regarding this meeting is discussed within **Section 5.3.1**.

A copy of the information presented as part of TAC 1 and associated meeting minutes are available within **Appendix O**.

4.5 STAKEHOLDERS GROUP MEETING 1

The first Stakeholder Group (SG) meeting was held on September 14, 2020. In light of the COVID-19 pandemic and associated physical distancing requirements the meeting was held virtually. A presentation was provided to attendees to provide a brief overview of the study and solicit feedback on the study background information, existing environmental information collected to date, the proposed field investigation schedule, preliminary traffic analysis, preliminary evaluation of alternative solutions and associated evaluation criteria, preliminary design criteria and a general project schedule and series of next steps in the study. Following the presentation, a question-and-answer period was held to allow attendees the opportunity to provide initial feedback on the information provided.

At this meeting stakeholders voiced their concern that the roadway extension would connect directly to Astona Boulevard resulting in increased traffic infiltration through the nearby Weston Downs neighbourhood. However, the study team indicated that at this time the design concepts had not yet been fully developed. While the VM CSP shows a preliminary alignment that was developed as part of the secondary plan process, this study will evaluate alternative alignments and cross-sections for the new road extension and determine the preferred based on the evaluation criteria presented, which includes potential traffic infiltration impacts to the neighbouring communities.

A copy of the information presented as part of SG meeting 1 and associated meeting minutes are available within **Appendix O**.

4.6 WESTON DOWNS RATE PAYERS ASSOCIATION MEETING

During SG meeting 1, a request was made by a representative of the Weston Downs Ratepayers Association (WDRA) to hold a separate meeting with representatives of WDRA and the study team. As such, a meeting was held on November 6, 2020 to provide an opportunity to discuss any questions and concerns regarding the study.

As the focus of discussion during this meeting was regarding why the roadway extension is needed, concerns for traffic infiltration and how local residents have been consulted throughout the study thus far, a follow-up memorandum was prepared. The purpose of this memorandum was to provide attendees with a greater understanding of the background and purpose of this study (and past supporting studies completed to



date), the MCEA and consultation process, as well as the existing and future traffic conditions.

A copy of the memorandum was emailed to meeting attendees on November 11, 2020 and is available within **Appendix O**.

4.7 ONLINE PUBLIC INFORMATION CENTRE 1

The first PIC was arranged to present and solicit public feedback on the study background, evaluation of alternative solutions and associated evaluation criteria, the recommended solution, and next steps in the study process. In light of the COVID-19 pandemic and associated physical distancing requirements, PIC 1 was held online on the City's dedicated study website from December 3, 2020, to January 8, 2021.

More information regarding Online PIC 1, including notification, information presented, and feedback received can be found within **Section 8.4.2.1**.



5.0 IDENTIFICATION AND EVALUATION OF ALTERNATIVE DESIGN CONCEPTS

Alternative design concepts represent alternative ways of carrying out the Preferred Solution, as identified in the VMCSPP. A staged approach was used to identify and evaluate alternative design concepts, the purpose of which was to eliminate alternatives that were considered to be significantly disadvantaged relative to other alternatives in order to streamline and simplify the decision-making process. This approach was used to identify a recommended design that is cost effective, provides safe and functional traffic operations, improves local access, and minimizes impacts to the environment.

The evaluation process included the following stages, and is described in more detail below:

- **Stage 1:** Identification and Evaluation of Alternative Cross-Sections
- **Stage 2:** Identification and Evaluation of Alternative Alignments
- **Stage 3:** Identification of Recommended Design

5.1 STAGE 1: IDENTIFICATION AND EVALUATION OF ALTERNATIVE CROSS SECTIONS

5.1.1 Evaluation Criteria

Through City, Region, regulatory and stakeholder priorities/concerns and public feedback from Online PIC 1, the below criteria were identified in Stage 1 to evaluate the alternative cross-sections against and determine a recommended cross-section:

Technical

- City of Vaughan Design Standards
- Operational Safety
- Streetlighting
- Municipal Infrastructure/Utilities
- Constructability
- Capital Costs
- Operations and Maintenance Costs

Socio-Economic Environment

- Streetscape
- Accessibility

Transportation

- Traffic Operations and Accommodation of Future Travel Demand
- Transit
- Active Transportation (Pedestrians & Cyclists)

Natural Environment

- Stormwater Management
- Climate Change

5.1.2 Identification of Alternative Cross-Sections

Four conceptual alternative cross-sections for the extension of Bass Pro Mills Drive were identified, as indicated in the figures below. These alternatives were selected



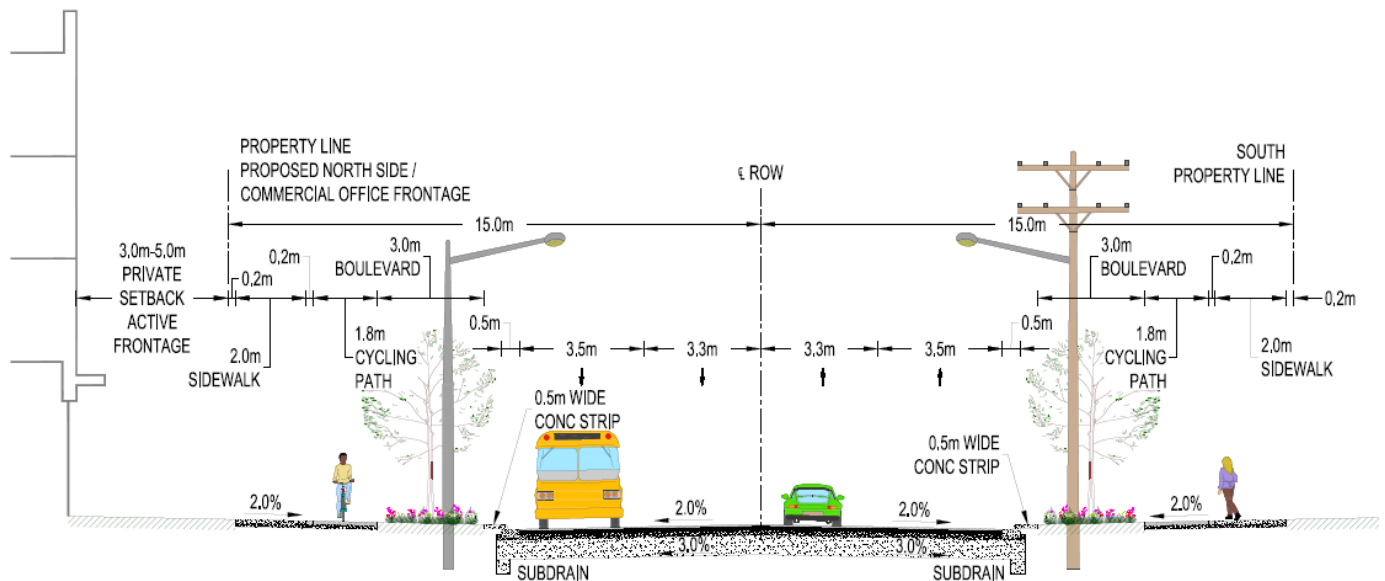
BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

based on comments received as part of Online PIC 1, City design criteria, the direction set forth in the VMCSPP and Public Realm, as well as the Streetscape Plan that was being undertaken concurrent to this MCEA.

Alternative Cross-Section 1

Alternative Cross-Section 1 consists of a 30 m right-of-way, with a 2.0 m wide sidewalk and 1.8 m wide cycling path on either side of the roadway. While there is no formal separation between pedestrians and cyclists, cyclists are separated from vehicular traffic by a 3.0 m boulevard, which would facilitate streetlighting, utilities, and streetscaping opportunities.

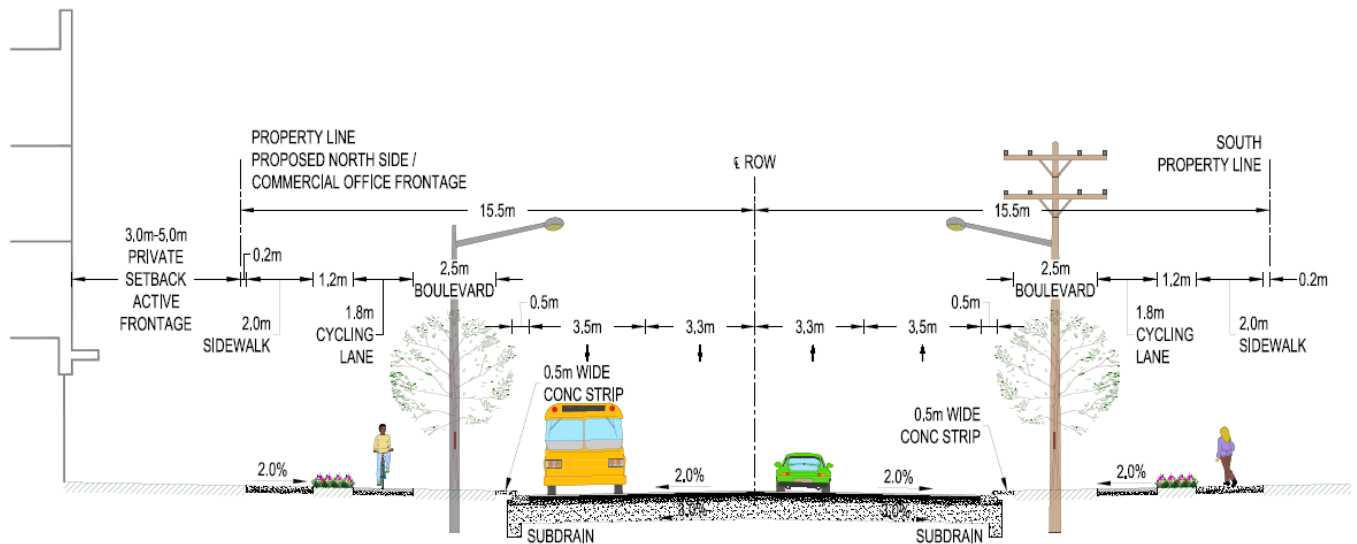
Figure 11: Alternative Cross-Section 1



Alternative Cross-Section 2

Alternative Cross-Section 2 consists of a 31 m wide right-of way, with a 2.0 m wide sidewalk and 1.8 m wide cycling path on either side of the roadway. A 2.5 m wide boulevard is provided as part of this option and offers a 1.2 m landscape buffer between the sidewalk and cycling path. Cyclists and pedestrians are also separated from vehicles by the 2.5 m boulevard, which would also facilitate streetlighting, utilities, and streetscaping.

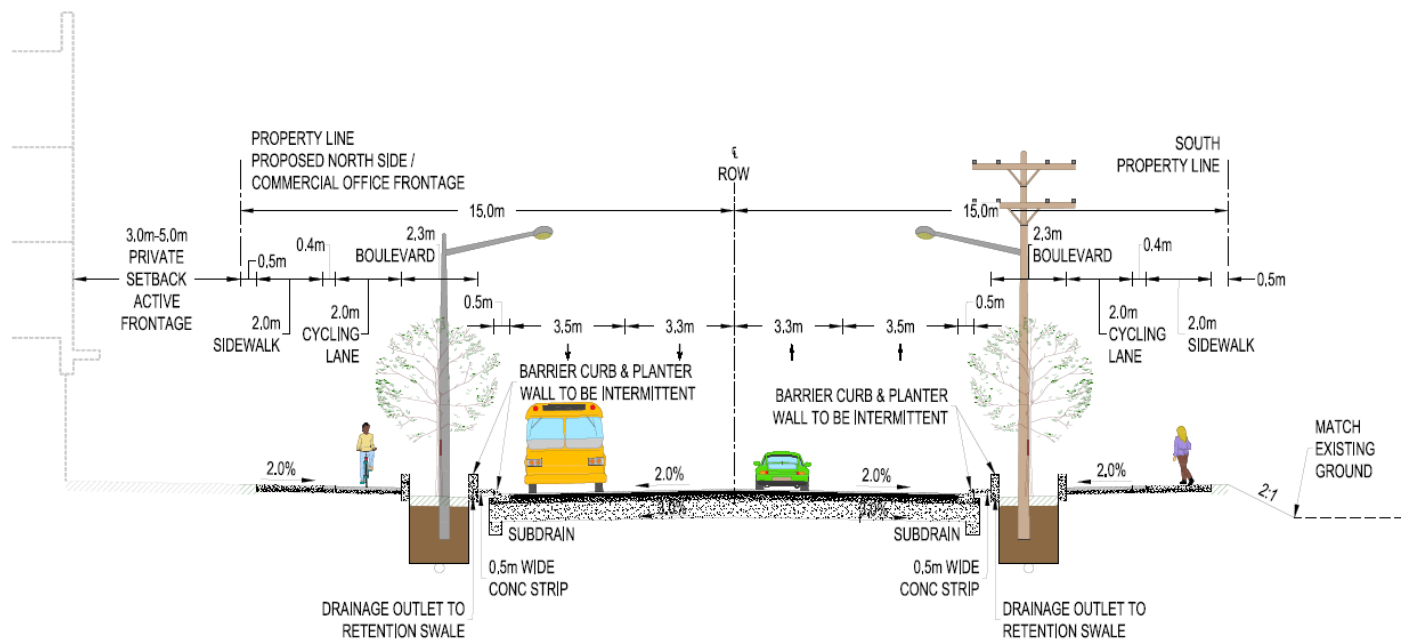
Figure 12: Alternative Cross-Section 2



Alternative Cross-Section 3

Alternative Cross-Section 3 consists of a 30 m right-of-way with a 2.0 m wide sidewalk and 2.0 m wide cycling path on either side of the roadway. A 0.4 m wide paved buffer is offered between the sidewalk and cycling path within a 2.3 m boulevard. Cyclists are separated from vehicles by the 2.3 m boulevard, which would also facilitate a bio-retention swale, streetlighting, utilities, and streetscaping.

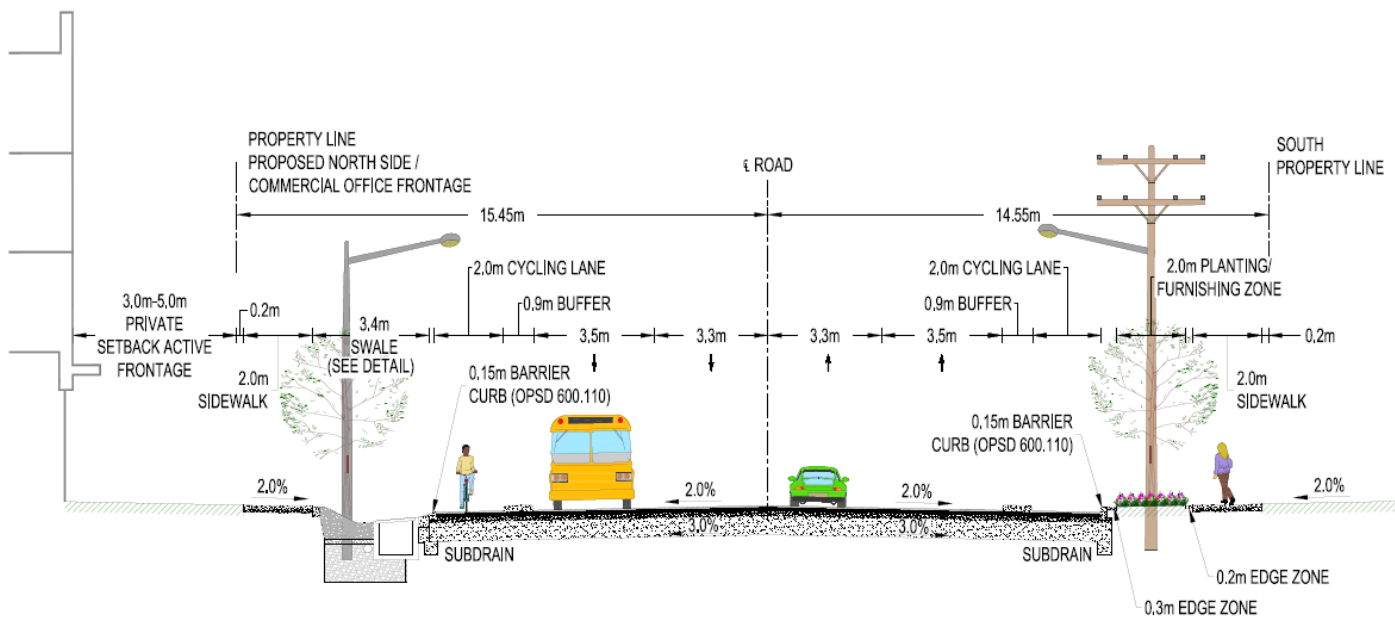
Figure 13: Alternative Cross-Section 3



Alternative Cross-Section 4

Alternative Cross-Section 1 consists of a 30 m right-of-way with a 2.0 m wide sidewalk on either side of the roadway. Cycling facilities are provided on either side of the roadway within 2.0 m wide cycling lanes that are separated from vehicular traffic by a 0.9 m wide concrete buffer. A 3.4 m wide swale would be incorporated within the north side of the right-of-way, and 2.0 m wide planting/furnishing zone would be provided on the south side.

Figure 14: Alternative Cross-Section 4



5.1.3 Evaluation of Alternative Cross-Sections

The detailed evaluation of alternative cross-sections was completed using a reasoned argument approach that took into account the technical feasibility of each alternative, as well as their potential to impact the natural, cultural and socio-economic environments. A summary of this evaluation is provided within **Table 5**.



Table 5: Evaluation Summary of alternative Cross-Sections

Evaluation Criteria and Measures	Alternative 1A (30 m ROW - 2.0 m sidewalk, 1.8 m cycling path and 3.0 m boulevard)	Alternative 2A (31 m ROW - 2.0 m sidewalk with 1.2 m landscaped buffer between 1.8 m cycling path and 2.5 m boulevard)	Alternative 3A (30 m ROW - 2.0 m sidewalk with 0.4 m patterned paved buffer between 2.0 m cycling path and 2.3 m boulevard)	Alternative 4A (30 m ROW - 2.0 m sidewalk, 3.4 m swale, 2.0 m on-road cycling lane with 0.9m concrete buffer on north side, and 2.0 m on-road cycling lane with 0.9 m concrete buffer, 2.0m planting/furnishing zone and 2.0m sidewalk on south side)
TECHNICAL				
City of Vaughan Design Standards <ul style="list-style-type: none"> Potential to meet City Design Standards for a major collector roadway, such as: <ul style="list-style-type: none"> 70km/hr design speed 50km/hr posted speed 30m Right-of-Way (ROW) width 3.3m inside lane width, 3.5 m curb (outside) lane 1.5 m – 2.0m sidewalk width 1.8 m – 3.0m cycling lane width minimum 0.5m buffer between cyclists and clearways 	<ul style="list-style-type: none"> High potential to conform to City Design Standards as widths of ROW, sidewalks, cycling paths and vehicle lanes meet the specified widths and spacing No significant difference between Alternatives 1A, 3A and 4A 	<ul style="list-style-type: none"> Lowest potential to conform to City Design Standards as 31m ROW width is a 1m increase to the 30m wide City Design Standard Sidewalks, cycling paths and vehicle lanes conform to the specified widths and spacing 	<ul style="list-style-type: none"> High potential to conform to City Design Standards as widths of ROW, sidewalks, cycling paths and vehicle lanes meet the specified widths and spacing No significant difference between Alternatives 1A, 3A and 4A 	<ul style="list-style-type: none"> High potential to conform to City Design Standards as widths of ROW, sidewalks, cycling paths and vehicle lanes meet the specified widths and spacing No significant difference between Alternatives 1A, 3A and 4A
Operational Safety <ul style="list-style-type: none"> Potential to satisfy road design guidelines for traffic safety, such as: <ul style="list-style-type: none"> 50 km/hr posted speed 70 km/hr design speed 15 m radius at intersection minimum 0.5 m buffer between cycling lanes and clearways Ability to accommodate access management features 	<ul style="list-style-type: none"> No significant difference between alternatives High potential to satisfy road design guidelines for traffic safety such as posted/design speeds, intersection radius and a minimum 0.5m buffer between cyclists and vehicles High potential to accommodate access management features All alternatives meet road design guidelines, including the City of Vaughan and Ontario Provincial Standards 			
Streetlighting <ul style="list-style-type: none"> Ability to satisfy City lighting design standards 	<ul style="list-style-type: none"> High potential to satisfy the City of Vaughan's lighting design standards within the planned 3.0 m boulevard No significant difference between Alternatives 1A, 2A and 3A 	<ul style="list-style-type: none"> High potential to satisfy the City of Vaughan's lighting design standards within the planned 2.5 m boulevard No significant difference between Alternatives 1A, 2A and 3A 	<ul style="list-style-type: none"> High potential to satisfy the City of Vaughan's lighting design standards within the planned 2.3 m boulevard No significant difference between Alternatives 1A, 2A and 3A 	<ul style="list-style-type: none"> Lowest potential to satisfy the City of Vaughan's lighting design standards, when compared to other alternatives Narrow 2.0 m planting/furnishing zone poses spatial challenges for the installation of streetlighting poles
Municipal Infrastructure/Utilities <ul style="list-style-type: none"> Facilitates integration, operation, and maintenance of existing and future municipal services and utilities 	<ul style="list-style-type: none"> Alternatives 1A and 2A provide a high potential to integrate with existing and future municipal services and utilities, including their operational and maintenance requirements. 		<ul style="list-style-type: none"> High potential to accommodate municipal services and utilities as retention swale on north and south sides of ROW will occur intermittently along length of roadway 	<ul style="list-style-type: none"> Lowest potential to accommodate municipal services and utilities as space is limited on the north side due to the implementation of a continuous retention swale along length of roadway
Constructability <ul style="list-style-type: none"> Relative time to implement Phasing/staging requirements Anticipated complexity and constraints 	<ul style="list-style-type: none"> Alternatives 1A and 2A are anticipated to have similar implementation timelines and phasing/staging plans which are shortest in relation to Alternatives 3A and 4A 		<ul style="list-style-type: none"> Longest relative time to implement due to complexity of retention swale on north and south sides of ROW 	<ul style="list-style-type: none"> Moderately long relative time to implement due to complexity of retention swale on north side



Evaluation Criteria and Measures	Alternative 1A (30 m ROW - 2.0 m sidewalk, 1.8 m cycling path and 3.0 m boulevard)	Alternative 2A (31 m ROW - 2.0 m sidewalk with 1.2 m landscaped buffer between 1.8 m cycling path and 2.5 m boulevard)	Alternative 3A (30 m ROW - 2.0 m sidewalk with 0.4 m patterned paved buffer between 2.0 m cycling path and 2.3 m boulevard)	Alternative 4A (30 m ROW - 2.0 m sidewalk, 3.4 m swale, 2.0 m on-road cycling lane with 0.9m concrete buffer on north side, and 2.0 m on-road cycling lane with 0.9 m concrete buffer, 2.0m planting/furnishing zone and 2.0m sidewalk on south side)
Capital Costs <ul style="list-style-type: none"> Relative capital cost to construct and acquire property 	<ul style="list-style-type: none"> Lowest relative capital cost anticipated Absence of landscaped buffer or concrete barrier for cyclists reduces capital costs Lower property acquisition cost when compared to Alternative 2A as ROW is within 30 m ROW 	<ul style="list-style-type: none"> Moderate relative capital cost anticipated Increased landscaping and paving required to accommodate 31 m ROW Highest property acquisition cost due increased property required for 31 m ROW 	<ul style="list-style-type: none"> Moderate relative capital cost Intermittent retention swales on north and south sides of roadway slightly increases overall costs Lower property acquisition cost when compared to Alternative 2A as ROW is within 30 m ROW 	<ul style="list-style-type: none"> Moderate relative capital cost Continuous retention swale on north side of roadway slightly increases overall costs Lower property acquisition cost when compared to Alternative 2A as ROW is within 30 m ROW
Operations and Maintenance Costs <ul style="list-style-type: none"> Relative cost to operate and maintain Life cycle costs 	<ul style="list-style-type: none"> Alternatives 1A and 3A are anticipated to have relatively routine operations and maintenance and life cycle costs when compared to Alternatives 2A and 4A 	<ul style="list-style-type: none"> Moderate-High operations and maintenance cost/complexity when compared to other alternatives Landscaped buffer between cyclists and pedestrians anticipated increase costs for routine winter road maintenance activities 	<ul style="list-style-type: none"> Alternatives 1A and 3A are anticipated to have relatively routine operations and maintenance and life cycle costs when compared to Alternatives 2A and 4A 	<ul style="list-style-type: none"> Highest operations and maintenance cost/complexity when compared to other alternatives On-street buffer between cyclists and vehicles would increase costs for routine winter road maintenance activities Expected to incur higher life cycle costs when compared to other alternatives as a potential need to replace on-street cyclist barrier due to wear/tear and potential collisions with winter maintenance vehicles
TECHNICAL SUMMARY	PREFERRED	PARTIALLY PREFERRED	MDOERATELY PREFERRED	LEAST PREFERRED
TRANSPORTATION				
Traffic Operations and Accommodation of Future Travel Demand <ul style="list-style-type: none"> Potential to accommodate long-term vehicular travel demands 	<ul style="list-style-type: none"> No significant difference between alternatives Forecasted travel demands are accommodated by each alternative 			
Transit <ul style="list-style-type: none"> Potential to integrate with existing York Region Transit network Ability to accommodate transit facilities 	<ul style="list-style-type: none"> No significant difference between alternatives Each alternative provides high potential to integrate with the existing York Region Transit Network and accommodate future transit facilities along the corridor 			
Active Transportation <ul style="list-style-type: none"> Accommodation of active transportation (i.e., ability to provide pedestrian/cycling connections to future transit stops, streets, paths, and trails) Ability to accommodate pedestrian/cyclist connections to existing/future active transportation infrastructure both east and west of the study area. (i.e., the existing Bass Pro Mills Drive to the east and existing/future widening of Weston Road to the west) 	<ul style="list-style-type: none"> High potential to accommodate pedestrian and cycling connections to future transit stops, streets and trails/paths as alternatives provides a dedicated pedestrian sidewalk and cycling path within the boulevard on both sides of the roadway Moderate ability to effectively and conveniently transition to existing and future active transportation facilities located within the boulevard east of Highway 400 and with planned improvements at Weston Road 	<ul style="list-style-type: none"> High potential to accommodate pedestrian and cycling connections to future transit stops, streets and trails/paths as alternatives provides a dedicated pedestrian sidewalk and cycling path within the boulevard on both sides of the roadway Moderate ability to effectively and conveniently transition to existing and future active transportation facilities located within the boulevard east of Highway 400 and with planned improvements at Weston Road 	<ul style="list-style-type: none"> High potential to accommodate pedestrian and cycling connections to future transit stops, streets and trails/paths as alternatives provides a dedicated pedestrian sidewalk and cycling path within the boulevard on both sides of the roadway Moderate ability to effectively and conveniently transition to existing and future active transportation facilities located within the boulevard east of Highway 400 and with planned improvements at Weston Road 	<ul style="list-style-type: none"> High potential to accommodate pedestrian and cycling connections to future transit stops, streets and trails/paths as alternatives provides a dedicated pedestrian sidewalk and cycling path within the boulevard on both sides of the roadway Lowest ability to effectively and conveniently transition from on road facility and connect with existing and future active transportation facilities located within the boulevard east of Highway 400 and with planned improvements at Weston Road



Evaluation Criteria and Measures	Alternative 1A (30 m ROW - 2.0 m sidewalk, 1.8 m cycling path and 3.0 m boulevard)	Alternative 2A (31 m ROW - 2.0 m sidewalk with 1.2 m landscaped buffer between 1.8 m cycling path and 2.5 m boulevard)	Alternative 3A (30 m ROW - 2.0 m sidewalk with 0.4 m patterned paved buffer between 2.0 m cycling path and 2.3 m boulevard)	Alternative 4A (30 m ROW - 2.0 m sidewalk, 3.4 m swale, 2.0 m on-road cycling lane with 0.9m concrete buffer on north side, and 2.0 m on-road cycling lane with 0.9 m concrete buffer, 2.0m planting/furnishing zone and 2.0m sidewalk on south side)
<p>Pedestrians</p> <ul style="list-style-type: none"> Ability to provide a safe and comfortable environment for pedestrians <p>Cyclists</p> <ul style="list-style-type: none"> Ability to provide a safe and comfortable environment for cyclists 	<ul style="list-style-type: none"> Lowest potential to offer safe and comfortable environment for pedestrians as separation of pedestrian/cyclist travel is only limited by a 0.2m painted centerline resulting in a higher potential for pedestrian-cyclist conflicts when compared to other alternatives. High potential to offer a safe and comfortable environment for cyclists as cycling path is separated from vehicle traffic by a 3.0 m boulevard on both sides of roadway 	<ul style="list-style-type: none"> High potential to offer safe and comfortable environment for pedestrians as pedestrian/cyclist travel is separated by a 1.2m planted buffer resulting in a low potential for pedestrian-cyclist conflicts High potential to offer a safe and comfortable environment for cyclists as cycling path is separated from vehicle traffic by a 2.5 m boulevard on both sides of roadway 	<ul style="list-style-type: none"> Moderate-High potential to offer safe and comfortable environment for pedestrians as pedestrian/cyclist travel is separated by a 0.4 m patterned paved buffer resulting in a low potential for pedestrian-cyclist conflicts High potential to offer a safe and comfortable environment for cyclists as cycling path is separated from vehicle traffic by a 2.3 m boulevard on both sides of roadway 	<ul style="list-style-type: none"> Highest potential to offer safe and comfortable environment for pedestrians as cycling path is not located within the boulevard, resulting in the lowest potential for pedestrian-cyclist conflicts Lowest potential to offer a safe and comfortable environment for cyclists, when compared to other alternatives Cycling path is located within the ROW and separated from vehicle traffic by a 0.9 m concrete buffer
TRANSPORTATION SUMMARY	PARTIALLY PREFERRED	PREFERRED	PREFERRED	LEAST PREFERRED
SOCIO-ECONOMIC ENVIRONMENT				
<p>Streetscape</p> <ul style="list-style-type: none"> Ability to support City's vision for community and public realm, such as: <ul style="list-style-type: none"> Enhanced greenspaces (i.e., increased urban tree canopy and planting zones) Green infrastructure (i.e., bio-retention swales, storm planters, curb extensions with bio-retention etc.) Pedestrian friendly spaces (i.e., streetlighting, wayfinding and accessible street furniture) 	<ul style="list-style-type: none"> Moderate-Low potential to support the City's vision for community and public realm, when compared to other alternatives High potential to provide enhanced green spaces through 3.0 m boulevard Lowest potential to provide green infrastructure such as bio-retention swales, storm planters, etc. High potential to provide pedestrian friendly spaces through the implementation of streetlighting, wayfinding and accessible street furniture within the 3.0 m boulevard 	<ul style="list-style-type: none"> Moderate-High potential to support the City's vision for community and public realm High potential to provide enhanced green spaces within 2.5 m boulevard and 1.2 m landscaped buffer Moderate potential to provide green infrastructure as it provides maximum greenspace through 2.5 m boulevard and 1.2 m landscaped buffer. High potential to provide pedestrian friendly spaces through the implementation of streetlighting, wayfinding and accessible street furniture within the 2.5 m boulevard 	<ul style="list-style-type: none"> Highest potential to support the City's vision for community and public realm High potential to provide enhanced green spaces within 2.3 m boulevard High potential to provide green infrastructure through the implementation of an intermittent retention swale on both the north and south side of roadway High potential to provide pedestrian friendly spaces through the implementation of streetlighting, wayfinding and accessible street furniture within the 2.3 m boulevard 	<ul style="list-style-type: none"> Moderate potential to support the City's vision for community and public realm, when compared to the other alternatives Lowest potential to provide enhanced green spaces when compared to other alternatives as greenspace is limited to 2.0 m planting/furnishing zone to south and continuous retention swale to north would pose spatial challenges for tree planting Moderate-High potential to provide green infrastructure through the implementation of a continuous retention swale on north side of roadway Lowest potential to provide pedestrian friendly spaces as the slope of the continuous retention swale to north and narrow 2.0 m planting/furnishing zone to south pose spatial challenges for the implementation of streetlighting, wayfinding/signage, fire hydrants accessible street furniture, etc.



Evaluation Criteria and Measures	Alternative 1A	Alternative 2A	Alternative 3A	Alternative 4A
	(30 m ROW - 2.0 m sidewalk, 1.8 m cycling path and 3.0 m boulevard)	(31 m ROW - 2.0 m sidewalk with 1.2 m landscaped buffer between 1.8 m cycling path and 2.5 m boulevard)	(30 m ROW - 2.0 m sidewalk with 0.4 m patterned paved buffer between 2.0 m cycling path and 2.3 m boulevard)	(30 m ROW - 2.0 m sidewalk, 3.4 m swale, 2.0 m on-road cycling lane with 0.9m concrete buffer on north side, and 2.0 m on-road cycling lane with 0.9 m concrete buffer, 2.0m planting/furnishing zone and 2.0m sidewalk on south side)
Accessibility <ul style="list-style-type: none"> Ability to accommodate those with disabilities (e.g., wheelchair access) Ability to avoid physical barriers to existing and new facilities 	<ul style="list-style-type: none"> No significant difference between alternatives All alternatives would be designed to provide high potential to accommodate those with disabilities and to reduce physical barriers to existing and future facilities. 			
SOCIO-ECONOMIC ENVIRONMENT SUMMARY	LEAST PREFERRED	MODERATELY PREFERRED	PREFERRED	PARTIALLY PREFERRED
NATURAL ENVIRONMENT				
Stormwater Management <ul style="list-style-type: none"> Potential to increase paved surface areas Potential to accommodate SWM features 	<ul style="list-style-type: none"> Moderate-Low impervious paved surface area and potential to increase surface water runoff Moderate potential to accommodate advanced SWM features within 3.0 m boulevard, such as the implementation of LIDs 	<ul style="list-style-type: none"> Low impervious paved surface area and potential to increase surface water runoff Greatest ROW width, when compared to other alternatives Moderate potential to accommodate advanced SWM features within 2.5 m boulevard, such as the implementation of LIDs 	<ul style="list-style-type: none"> Moderate-High impervious paved surface area and potential to increase surface water runoff Highest potential to accommodate advanced SWM features within 2.3 m boulevard, through retention swales at north and south side, and potential for the implementation of LIDs 	<ul style="list-style-type: none"> High impervious paved surface area and potential to increase surface water runoff Moderate-High potential to accommodate advanced SWM features such as retention swale on north side and potential to implement LIDs within 2.0 m boulevard
Climate Change <ul style="list-style-type: none"> Ability to accommodate climate change adaptability measures 	<ul style="list-style-type: none"> No significant difference between alternatives Stormwater management measures will be implement as required for detention and treatment of stormwater 			
NATURAL ENVIRONMENT SUMMARY	PARTIALLY PREFERRED	LEAST PREFERRED	PREFERRED	MODERATELY PREFERRED
OVERALL CONCLUSION	NOT RECOMMENDED	NOT RECOMMENDED	TECHNICALLY RECOMMENDED DESIGN	NOT RECOMMENDED
LEGEND				
PREFERRED				
MODERATELY PREFERRED				
PARTIALLY PREFERRED				
LEAST PREFERRED				



5.1.4 Recommended Cross-Section

Based on the results of the evaluation, Alternative Cross-Section 3 was selected as it was consistent with City design standards, the vision for the community and Public Realm and Streetscape Plan study being undertaken concurrent to this MCEA, as well as the recommendations made in the approved VMCSPP. Alternative Cross-Section 3 is also anticipated to have moderate capital, operations, and maintenance costs, offers a safe and comfortable environment for cyclists and pedestrians alike, and provides opportunities to create a pedestrian friendly space through streetlighting, wayfinding, accessible furniture, etc. Additionally, Alternative Cross-Section 3 has a high potential to accommodate municipal infrastructure, such as utilities and streetlighting, as well as green infrastructure through the implementation of a bio-retention swale on both sides of the ROW.

5.2 STAGE 2: IDENTIFICATION AND EVALUATION OF ALTERNATIVE ALIGNMENTS

5.2.1 Evaluation Criteria

Through City, Region, regulatory and stakeholder priorities/concerns and public feedback received during Online PIC 1, the below criteria were identified in Stage 2 of the evaluation process to subject alternative alignments to a comparative assessment and determine a recommended alignment:

Technical

- Traffic Operations and Accommodation of Future Travel Demand
- Road Network Compatibility/Connectivity
- Response Times/Access for Emergency Vehicles
- Impacts to Existing and Future Services/Utilities
- Construction Staging/Constructability
- Cost

Socio-Economic Environment

- Land Use
- Noise
- Business Operations
- Property Requirements
- Traffic Infiltration

Cultural Environment

- Archaeological Resources

Natural Environment

- Vegetation
- Wildlife
- Fish/Fish Habitat
- Natural Hazards
- Surface Water Drainage/Stormwater Management
- Groundwater
- Climate Change



5.2.2 Identification of Alternative Alignments

Based on the recommended cross-section identified through Stage 1 of the evaluation process the study team proceeded with Stage 2 to identify alternative alignments. Two conceptual alternative alignments for the extension of Bass Pro Mills Drive were identified within the study area, as indicated in **Figure 15** and **Figure 16** below. The alternatives were selected based on City of Vaughan Design Standards, the previously approved VMCSPP, a desktop review of existing conditions and feedback received in response to Online PIC 1. While consideration was given to other potential alignments, due to significant property impacts and intersection spacing, these alignments were screened out and were not carried forward in the evaluation.

5.2.3 Evaluation Summary of Alternative Alignments

A detailed evaluation of alternative alignments was conducted using a reasoned argument approach which considered the net impacts each alignment would have on the natural, socio-economic, and cultural environments, as well as technical feasibility. The detailed evaluation of alternative alignments is provided in **Table 6**.



BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Figure 15: Alternative Alignment A

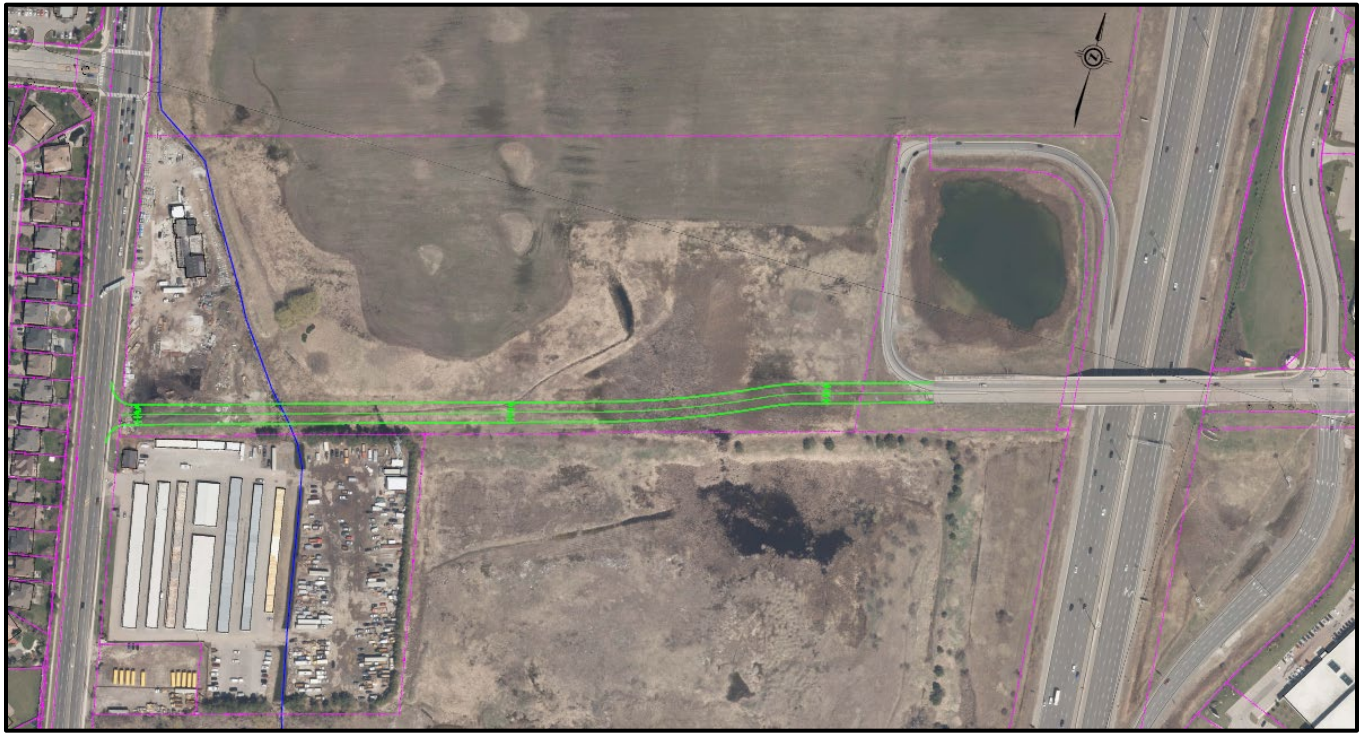


Figure 16: Alternative Alignment B



Table 6: Evaluation Summary of Alternative Alignments

Evaluation Criteria and Measures	Alternative A (Straight Connection to Weston Rd)	Alternative B (Astona Blvd Connection)
TECHNICAL		
Traffic Operations and Accommodation of Future Travel Demand <ul style="list-style-type: none"> Potential to accommodate long-term vehicular travel demands Potential to integrate with existing York Region Transit network, provide future transit stops and meet future transit demand 	<ul style="list-style-type: none"> Higher potential to accommodate both long-term vehicular and transit travel demands due to slightly higher vehicle capacity when compared to Alternative B High potential to integrate with the existing York Region Transit Network and provide future transit stops Proposed boulevard width sufficient to accommodate transit amenities 	<ul style="list-style-type: none"> Lower potential to accommodate both long-term vehicular and transit travel demands due to slightly lower vehicle capacity when compared to Alternative A High potential to integrate with the existing York Region Transit Network and provide future transit stops Proposed boulevard width sufficient to accommodate transit amenities
Road Network Compatibility/Connectivity <ul style="list-style-type: none"> Potential to be consistent with the proposed transportation system and function of roads in the long term (i.e., Vaughan Mills Centre Secondary Plan (VMCSP)) Potential to be compatible with other planned road network improvements (e.g., Weston Road) Potential to maintain integrity of MTO Highway 400 interchange traffic movements 	<ul style="list-style-type: none"> Higher potential to be consistent with the proposed transportation system and function of roads in the long term Most consistent with the road network configuration envisaged as part of the VMCSP New intersection with Weston Road will be designed to accommodate future road improvement activities being planned by York Region Maintains the integrity of MTO Highway 400 interchange traffic movements and potential to improve access to southbound Highway 400 traffic from Weston Road 	<ul style="list-style-type: none"> Low potential to be consistent with the proposed transportation system and function of roads in the long term, including the proposed road network within the VMCSP. However, could still be compatible with the future widening of Weston Road. Maintains the integrity of MTO Highway 400 interchange traffic movements and potential to improve access to southbound Highway 400 traffic from Weston Road
Response Times/Access for Emergency Vehicles <ul style="list-style-type: none"> Potential to improve response time / accessibility for emergency vehicles due to anticipated changes in travel time 	<ul style="list-style-type: none"> Higher potential to improve emergency response times Reduced roadway length expected to offer a slightly reduced travel time, when compared to Alternative Alignment B 	<ul style="list-style-type: none"> Lower potential to improve emergency response times Longer roadway length expected to impose a slightly greater travel time, when compared to Alternative Alignment A
Services/Utilities <ul style="list-style-type: none"> Potential impact to existing and future services and/or utilities 	<ul style="list-style-type: none"> Low potential to impact existing services or utilities as the alignment traverses through primarily undeveloped agricultural land. Minimal impacts are anticipated to existing utilities at connection to Weston Road and existing Bass Pro Mills Drive. 	<ul style="list-style-type: none"> Low potential to impact existing services or utilities as the alignment traverses through primarily undeveloped agricultural land. Minimal impacts are anticipated to existing utilities at connection to Weston Road and existing Bass Pro Mills Drive.
Construction Staging/Constructability <ul style="list-style-type: none"> Potential impacts to traffic operations during construction 	<ul style="list-style-type: none"> Low potential to impact traffic operations during construction Traffic will be maintained on existing roadways during construction Construction activities primarily limited to undeveloped land Higher potential for direct entrances to properties to be impacted as the alignment is anticipated to impact entrance to 1 existing business operation located at proposed new connection to Weston Road 	<ul style="list-style-type: none"> Low potential to impact traffic operations Traffic will be maintained on existing roadways during construction Construction activities primarily limited to undeveloped land Lower potential for direct entrances to properties to be impacted as the alignment traverses through primarily undeveloped agricultural land.
Cost <ul style="list-style-type: none"> Relative cost in terms of capital/construction costs and property acquisition Relative maintenance/life cycle costs Potential to encounter contaminated subsurface soil/groundwater conditions 	<ul style="list-style-type: none"> Lower relative costs expected Reduced roadway length expected to incur lower capital/construction and maintenance costs, when compared to Alternative B Anticipated to require acquisition of 1 private property. Higher potential to encounter contaminated subsurface soil/groundwater conditions (further investigation required to confirm subsurface conditions) 	<ul style="list-style-type: none"> Higher relative costs expected Increased roadway length expected to incur higher capital/construction and maintenance costs, when compared to Alternative A. Anticipated to require acquisition of 2 private properties. Lower potential to encounter contaminated subsurface soil/groundwater conditions (further investigation required to confirm subsurface conditions)
Technical Summary	Preferred	Least Preferred



Evaluation Criteria and Measures	Alternative A (Straight Connection to Weston Rd)	Alternative B (Astona Blvd Connection)
CULTURAL		
Archaeological Resources <ul style="list-style-type: none"> Potential for recovery of archaeological resources 	<ul style="list-style-type: none"> Lower potential for recovery of archaeological resources, when compared to Alternative Alignment B Majority of alternative identified as requiring additional Archaeological Assessment activities 	<ul style="list-style-type: none"> Higher potential for the recovery of archaeological resources when compared to Alternative A due to greater area disturbed given the S-Shape of the alignment Majority of alternative identified as requiring additional Archaeological Assessment activities
Cultural Environment Summary	Preferred	Least Preferred
SOCIO-ECONOMIC ENVIRONMENT		
Land Use <ul style="list-style-type: none"> Impact to planned land use (as outlined within the VM CSP) 	<ul style="list-style-type: none"> Lower impacts to planned land use anticipated Alternative A best aligns with the land use configuration presented within the VM CSP 	<ul style="list-style-type: none"> Greater impacts to future planned land use anticipated Alternative B traverses lands identified for other uses Does not align with land use configuration presented within the VM CSP.
Business Operations <ul style="list-style-type: none"> Potential to effect business operations (i.e., access/entrances) Potential to displace existing businesses 	<ul style="list-style-type: none"> Higher potential to effect business operations Not anticipated to impact accesses/entrances serving existing business operations May displace 2 existing businesses and 1 existing business entrance 	<ul style="list-style-type: none"> Lower potential to effect business operations Not anticipated to impact accesses/entrances serving existing business operations Not anticipated to displace any existing businesses and/ or entrances
Property Requirements <ul style="list-style-type: none"> Potential to directly impact private property (i.e., relative approximate area and number of properties directly impacted by alternative) 	<ul style="list-style-type: none"> High potential to impact private property Acquisition of a portion of at least 1 private property anticipated to be required 	<ul style="list-style-type: none"> Higher potential to impact private property Acquisition of a portion of at least 2 private properties anticipated to be required
Noise <ul style="list-style-type: none"> Potential to increase noise in noise sensitive areas (e.g., residential) 	<ul style="list-style-type: none"> Potential to increase noise within noise sensitive areas No significant difference between the alternatives 	
Traffic Infiltration <ul style="list-style-type: none"> Potential to increase traffic within adjacent residential neighbourhoods 	<ul style="list-style-type: none"> Lower potential to increase traffic infiltration within adjacent neighbourhoods Alignment does not provide direct connection to adjacent residential communities 	<ul style="list-style-type: none"> Higher potential to increase traffic infiltration within adjacent neighbourhoods Alignment offers a direct connection to adjacent residential communities via Astona Boulevard which could be used as a shortcut to Rutherford Road or Langstaff Road
Socio-Economic Environment Summary	Preferred	Least Preferred
NATURAL ENVIRONMENT		
Vegetation <ul style="list-style-type: none"> Potential impact to vegetation communities Relative impacts to existing riparian vegetation surrounding Black Creek Potential to impact plant Species at Risk (SAR) 	<ul style="list-style-type: none"> Lower impacts to vegetation communities expected when compared to Alternative B Traverses smaller area of meadow and shallow marsh community Greater relative impacts to existing riparian vegetation surrounding Black Creek Impacts may be mitigated through restoration design 	<ul style="list-style-type: none"> Greater impacts to vegetation communities expected, when compared to Alternative A Traverses larger area of meadow and shallow marsh community
Wildlife <ul style="list-style-type: none"> Potential to impact significant wildlife habitat Potential to impact wildlife SAR 	<ul style="list-style-type: none"> Lower potential impacts to significant wildlife habitat/wildlife SAR anticipated, when compared to Alternative B Traverses smaller area of meadow and shallow marsh community Moderate potential to impact reptile hibernation/turtle wintering areas that may exist within the shallow marsh community Potential impacts to SAR to be confirmed through ongoing field investigations 	<ul style="list-style-type: none"> Greater potential impacts to significant wildlife habitat, when compared to Alternative A Traverses larger area of meadow and shallow marsh community Moderate potential to impact reptile hibernation/turtle wintering areas that may exist within the shallow marsh community Potential impacts to SAR to be confirmed through ongoing field investigations



Evaluation Criteria and Measures	Alternative A (Straight Connection to Weston Rd)	Alternative B (Astona Blvd Connection)
Fish/Fish Habitat <ul style="list-style-type: none"> Potential to impact fish/fish habitat Potential to provide a naturalized channel design (Black Creek) 	<ul style="list-style-type: none"> Moderate potential impact to fish/fish habitat No fish species identified within watercourse to date; however, the Black Creek tributary contributes to known fish/fish habitat downstream New culvert/creek crossing will be required at Black Creek tributary Provides opportunity to provide naturalized channel design for future Black Creek tributary realignment No significant difference between alternatives 	
Natural Hazards <ul style="list-style-type: none"> Potential impact to flooding and erosion 	<ul style="list-style-type: none"> Low potential to impact flooding or erosion. Falls within TRCA's designated floodplain area. No significant difference between alternatives 	
Surface Water Drainage/Stormwater Management <ul style="list-style-type: none"> Potential to impact the existing surface water drainage/stormwater Potential to provide stormwater management features/controls and improve road drainage treatment 	<ul style="list-style-type: none"> Lower potential to impact existing surface water flows/stormwater, when compared to Alternative B Alternative traverses primarily undeveloped/vacant land Smaller area of new pavement/impervious surface associated with alternative alignment configuration Falls within TRCA Regulated Area Impacts can be mitigated through stormwater management features/controls designed in accordance with City and TRCA requirements 	<ul style="list-style-type: none"> Higher potential to impact existing surface water flows/stormwater, when compared Alternative A Alternative traverses primarily undeveloped/vacant land Greater area of new pavement/impervious surface associated with alternative alignment configuration Falls within TRCA Regulated Area Impacts can be mitigated through stormwater management features/controls designed in accordance with City and TRCA requirements
Groundwater <ul style="list-style-type: none"> Potential to effect existing groundwater system Potential to impact designated Source Water Protection areas 	<ul style="list-style-type: none"> Low potential to effect existing groundwater system or Avoids designated Source Water Protection areas Highly vulnerable aquifer located within the southeast corner of the study area Impacts to be confirmed as part of intrusive geotechnical and hydrogeological investigations during detail design No significant difference between alternatives 	
Climate Change <ul style="list-style-type: none"> Potential to reduce project impact on climate change (climate change mitigation opportunities) Potential to increase resilience to climate change (adaptation) 	<ul style="list-style-type: none"> Higher potential to reduce project impact on climate change and/or increase resiliency to climate change, when compared to Alternative B Smaller area of new pavement/impervious surface associated with alternative alignment configuration Impacts can be mitigated through design of low impact development (LID) stormwater design and consideration of increases in precipitation/major event flows 	<ul style="list-style-type: none"> Lower potential to reduce project impact on climate change and/or increase resiliency to climate change, when compared to Alternative A Smaller area of new pavement/impervious surface associated with alternative alignment configuration Impacts can be mitigated through design of low impact development (LID) stormwater design and consideration of increases in precipitation/major event flows
Natural Environment Summary	Preferred	Least Preferred
Overall Conclusion	RECOMMENDED	NOT RECOMMENDED



5.2.4 Recommended Alignment

Based on the results of the evaluation, Alternative A was recommended as it posed the least impact to the technical, socio-economic, natural, and cultural environments given that the majority of the land had been previously disturbed, and it avoided providing a direct route to adjacent residential areas, which had a higher potential to attract traffic infiltration.

5.3 STAGE 3: IDENTIFICATION OF THE TECHNICALLY RECOMMENDED DESIGN

Stage 3 of the evaluation process includes the identification of the Technically Recommended Design, which is comprised of the road cross-section of Alternative Cross-Section 3 and roadway alignment of Alternative Alignment A.

The Plan and Profile for Technically Recommended Design 3A includes an extension of the existing Bass Pro Mills Drive roadway with a straight connection to Weston Road, a 30 m right-of-way (including 4 lanes of vehicular travel, with 2 lanes in each direction), a 2.0 m wide sidewalk and 2.0 m wide cycling path on either side of the roadway, a 0.4 m wide paved buffer between the sidewalk and cycling path and a 2.3 m boulevard with an intermittent bio-retention swale. The Technically Recommended Design will also leave space for utilities, and alternating streetlighting and streetscaping along the boulevards. There is also the potential for a gateway feature located at the proposed new roadway intersection with Weston Road and a new culvert crossing of the Black Creek tributary.

The 3D rendering in **Figure 17** below was developed as part of the Vaughan Mills Centre Public Realm and Streetscape Master Plan Study, 2021 and provides an illustration of what the future extension of Bass Pro Mills Drive cross-section could look like.



Figure 17: Vaughan Mills Centre Public Realm and Streetscape Master Plan Study Preliminary Cross-Section



Design Standards

1. Planned ROW: 30.0 m
2. Pavement Width: 13.6 m
3. Lane Width: 3.5 m curb lanes / 3.3. m travel lanes
4. Overall Boulevard Widths: 8.2 m
5. Clear Sidewalk Width: 2.0 m
6. Cycle Facilities: 2.0 m
7. Curb Extensions: None
8. Green Infrastructure (GI): street trees in open planters; passive irrigation underground storage; bio-retention planters

5.3.1 TRCA Meeting

A meeting with the TRCA was held on May 25, 2021, to provide an update on the progress of the study and discuss the study team's approach to an interim crossing at the existing location of Black Creek and providing potential alternatives for its ultimate realignment to be confirmed during detailed design when the ongoing appeals process for the VM CSP have ended. The study team provided a presentation to the TRCA followed by a question/answer period to allow attendees the opportunity to provide initial feedback on the alternative design concepts being considered.

At this meeting, TRCA stressed the importance of maintaining the connectivity of the wetlands to the north and south of the recommended alignment that would be bisected



by the future roadway. Although not listed on the TRCA's online pre-screening tool, it was also noted that Black Creek and these wetlands lie within one of TRCA's Regulated Areas. Ultimately, TRCA agreed with the study team's proposed approach to the crossing of Black Creek, provided considerations are made for the TRCA's watercourse crossing guidelines and connectivity be maintained between the wetland areas.

A copy of the TRCA meeting minutes and all relevant correspondence is provided within **Appendix O**.

5.3.2 Technical Advisory Committee Meeting 2

A meeting with the TAC was held on July 27, 2021, to provide an update on the progress of the study, share information that was to be presented at PIC 2 including the Technically Recommended Design, and gather any technical feedback organizations may have prior to the upcoming PIC 2. During this meeting, the study team provided a presentation to attendees followed by a question/answer period to allow participants the opportunity to provide valuable technical feedback on the PIC materials and the Technically Recommended Design.

During the meeting York Region noted that more details should be shown on the preliminary design drawings regarding the future intersection of Bass Pro Mills Drive and Weston Road, including general lane configuration, layout, traffic medians, signalization, etc. The study team agreed that the preliminary design plans for this study will show what was presented within the previously completed Weston Road Individual EA study, noting that design details will be coordinated between York Region and the City during the detail design phase of the Bass Pro Mills Drive extension project.

Following the meeting, the study team provided a copy of the presentation and high-resolution version of the Recommended Plan to attendees to review and provide comments on. All comments were encouraged to be provided back to the study team by August 6, 2021, to allow any necessary changes to be made ahead of PIC 2.

York Region submitted comments to the study team on July 28, 2021, regarding the future Bass Pro Mills Drive/Weston Road intersection spacing and configuration and traffic operational issues. As such, a follow-up meeting with York Region was scheduled for September 9, 2021 and discussed in **Section 5.3.7**.

A copy of the TAC 2 meeting minutes and all relevant correspondence is provided within **Appendix O**.

5.3.3 Highway 400 Bridge Cross-Section

The existing Bass Pro Mills Drive bridge over Highway 400 was constructed by the City in 2004 to provide a mid-block crossing of the Highway 400 corridor between Langstaff Road and Rutherford Road that facilitated movement between Highway 400 and the



BASS PRO MILLS DRIVE, FROM HIGHWAY 400 TO WESTON ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

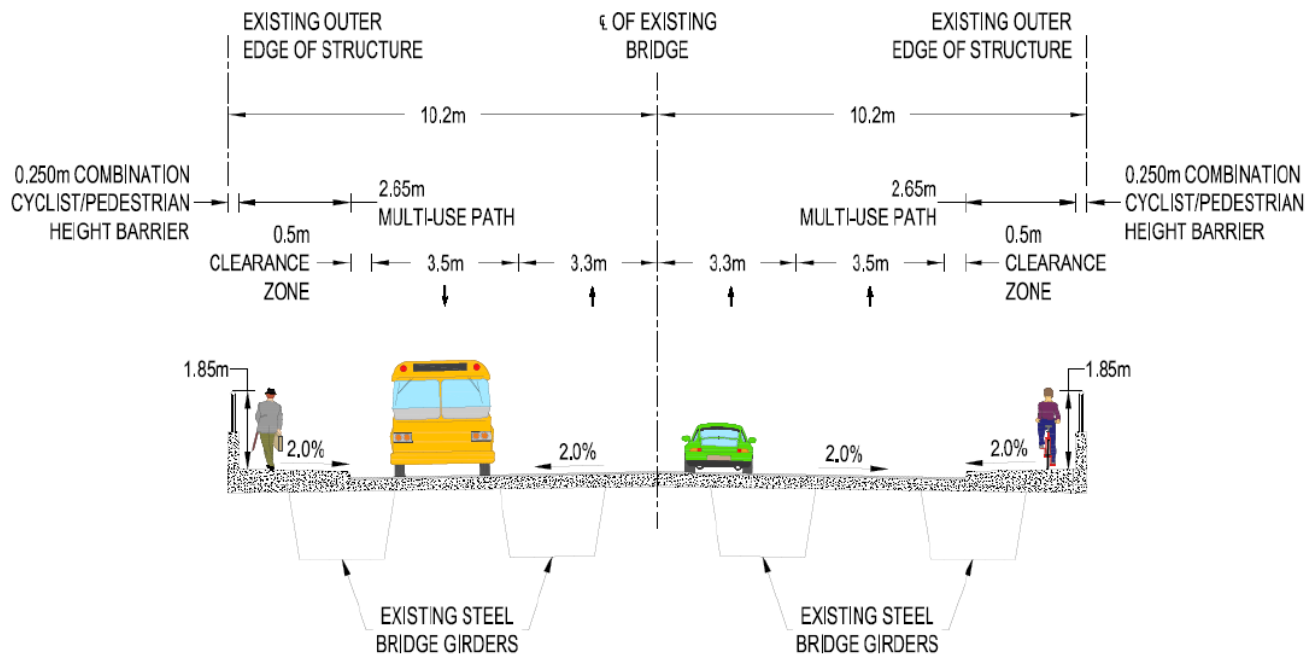
Vaughan Mills Center. Although constructed as a 4-lane bridge (2 lanes of vehicular travel in each direction), the structure has only functioned as a connection to the southbound Highway 400 from westbound Bass Pro Mills Drive.

The existing bridge is located within the MTO's Controlled Access Highway (CAH) limit and therefore subject to MTO requirements.

As part of the Technically Recommended Design the existing Highway 400 bridge would need to be modified to accommodate active transportation and connection to existing sidewalks along the existing Bass Pro Mills Drive on the east side of the bridge. A preliminary configuration for a new bridge cross-section was developed and shared as part of Online PIC 2 (please refer to **Section 8.4.2.2**). This included 2.65 m wide multi-use paths on either side of the roadway to allow for active transportation users to travel east-west across the structure, and to provide a connection between the existing facilities on the east side of the structure and the new active transportation facilities provided within the proposed new roadway extension.

The preliminary reconfiguration of the Highway 400 bridge, as shared at TAC 2 and Online PIC 2, is shown in **Figure 18** below.

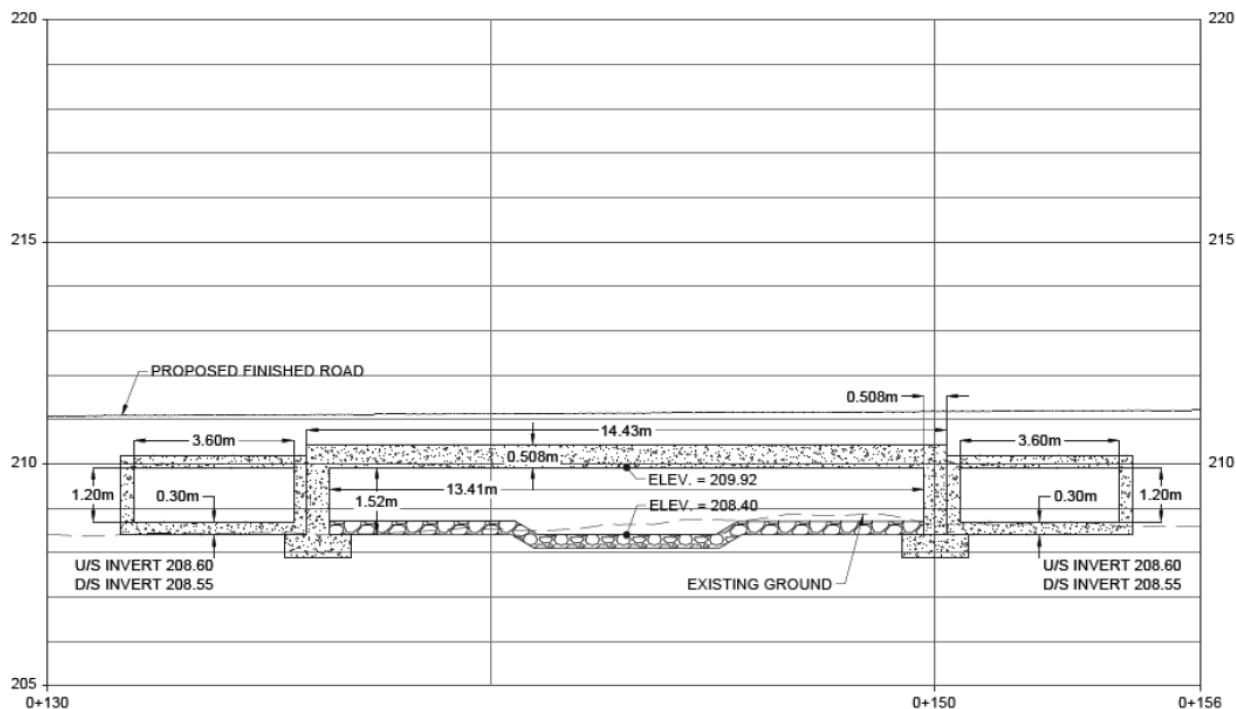
Figure 18: Highway 400 Bridge Cross-Section (TAC 2 and PIC 2)



5.3.4 Proposed Black Creek Culvert Locations

A new crossing of Black Creek is required to accommodate the new roadway extension. As shown within **Figure 19** below, a new 13.41 m by 1.52 m trispan concrete culvert is proposed to span the creek. In addition, two, 3.6 m by 1.2 m box culverts are proposed to assist in potential accommodating any increases in flows or storm events.

Figure 19: Proposed Black Creek Culvert

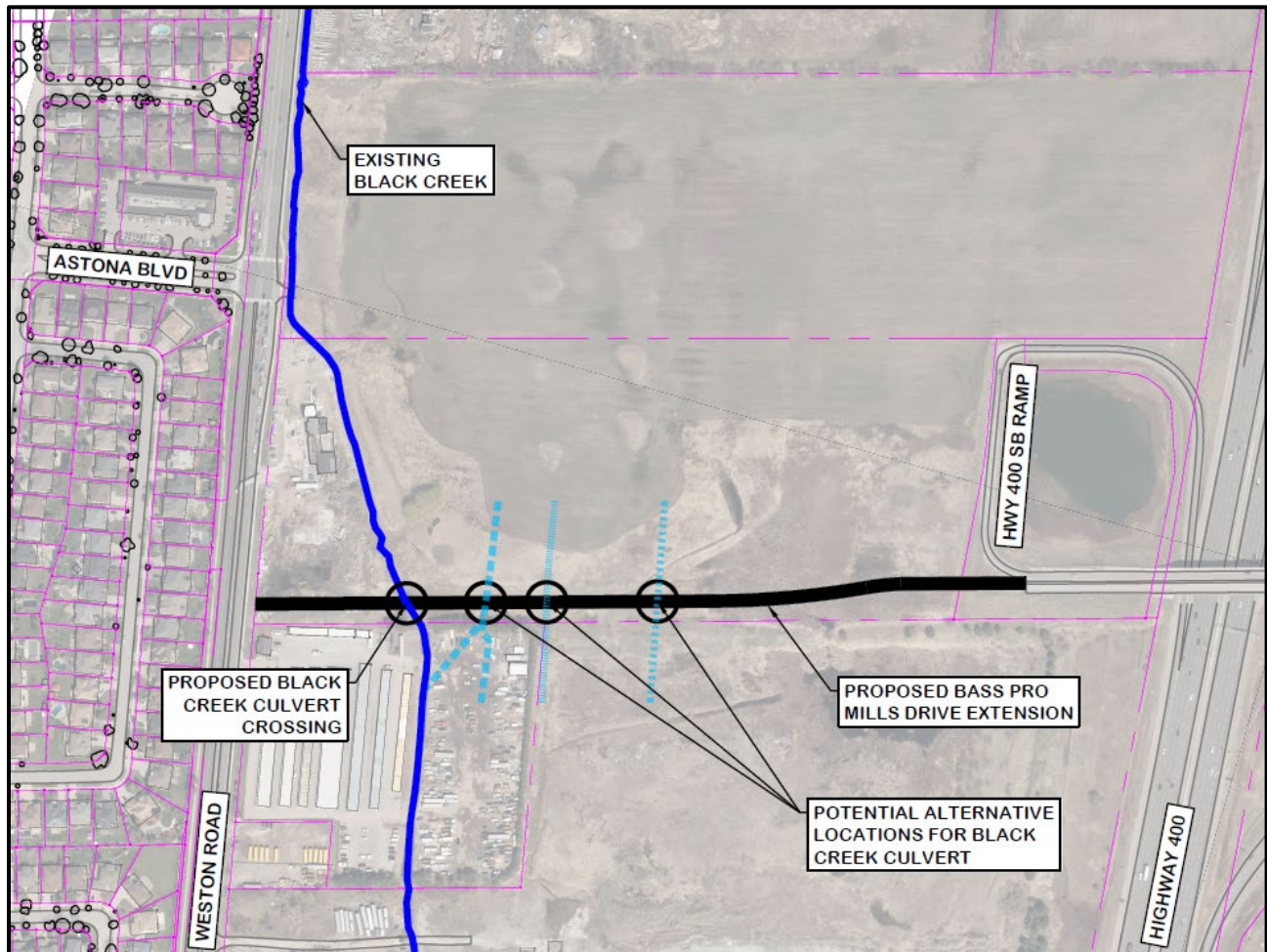


While the VMCSPP was completed in 2014, the future configuration of local roadways and the distribution of land uses within the planning area has not yet been confirmed. Thus, it is understood that the future realignment of Black Creek may also be required as part of future development planning in this area.

At this time, the new crossing of Black Creek is proposed at the existing creek location for the interim; however, depending on the future land use and roadway configurations in this area, the study team prepared a set of potential future locations of a new ultimate crossing. It should be noted that the proposed new culvert, designed as part of this study, can generally be applied at any of these potential future locations. The potential future locations are shown within **Figure 20** below.



Figure 20: Potential Future Black Creek Culvert Locations



5.3.5 Headwater Drainage Feature Management Proposed Approach

There are three confirmed and one potential HDFs within the study area. While it is not anticipated for the potential HDF to be impacted by the Technically Recommended Design, each of the three confirmed HDFs will be impacted by the construction of the new roadway. The impact to these three HDFs include:

1. The reconfiguration of Black Creek.
2. The removal of a portion of the wetland vegetation community; and
3. The reconfiguration of the existing channel between Black Creek and the wetland.

To help mitigate these impacts, the following is proposed:

- Black Creek will be modified to accommodate the new roadway and crossing structure. A natural channel design with riparian vegetation features will be



established and will connect to the existing creek to the immediate north and south of the new roadway.

- An equalization culvert will be constructed beneath the new roadway to maintain flows associated with the existing wetland.
- The existing connection channel will be reconfigured along the north side of the new road ROW and will maintain the connection between the wetland and Black Creek.

5.3.6 Stakeholder Group Meeting 2

The second SG meeting was held on July 30, 2021 from 9:00 AM to 10:40 AM. In light of the COVID-19 pandemic and associated physical distancing requirements the meeting was held virtually. A presentation was provided to attendees to provide a brief overview of the study and solicit feedback on the study background and feedback received to date, existing ecological features, the identification and evaluation of alternative design concepts, the preliminary findings of the traffic analysis, the proposed approach to stormwater and headwater drainage feature managements, as well as potential impacts and mitigation measures associated with the project. Following the presentation, a question-and-answer period was held to allow attendees the opportunity to provide initial feedback on the information provided.

Most of the discussion during the meeting was regarding the traffic modeling results and potential for increases in traffic congestion and potential queuing on Weston Road, and traffic infiltration into the adjacent Weston Downs neighbourhood. While the study team could only share preliminary traffic modeling results at the time of the meeting, it was indicated that the full Traffic Impact Assessment report would be available for review with the issuance of the Environmental Study Report. Additionally, suggestions made by attendees were taken into consideration for PIC 2 to include visuals for the proposed raised planters / bio retention swales, as well as to provide further explanation for viewers regarding the traffic modeling results, including the explanation of technical terms/acronyms. A comment/response table was prepared to provide detailed answers to the questions that arose during the meeting and was emailed to attendees on September 1, 2021.

A copy of the information presented as part of SG meeting 2 and associated meeting minutes and comment/response table are available within **Appendix O**.

5.3.7 Online Public Information Centre 2

Online PIC 2 was held to inform and engage City residents and other stakeholders on the study background, outcomes of the first PIC, the preliminary findings of the traffic analysis and environmental investigations, evaluation of alternative alignments and cross-sections, Technically Recommended Design, and next steps within the study process. Similar to PIC 1, PIC 2 was hosted on the City's dedicated study website from August 19, 2021, through September 16, 2021.



More information regarding Online PIC 2, including notification, information presented, and feedback received can be found within **Section 8.4.2.2**.

5.3.8 York Region Meeting

A meeting with the Region of York was held on September 9, 2021, to discuss the Region's comments on the information presented at TAC Meeting 2, the Traffic Impact Assessment, the configuration of and spacing between the future Bass Pro Mills Drive/Weston Road intersection and the existing Astona Boulevard/Weston Road intersection, as well as its proximity to a commercial driveway to the south.

The minutes from this meeting are provided within **Appendix M** and **Section 8.6.2** further discusses how York Region's comments were addressed as part of this study.

5.3.9 Property Owner Meetings

Meetings with property owners who have potential to be impacted by the Technically Recommended Design were held in September 2021 to discuss potential impacts, the property acquisition process and study schedule. More information on what was shared at these meetings is discussed within **Section 8.5**.

5.3.10 Feasibility Study of Active Transportation Facilities extending to Jane Street

The feasibility of extending the active transportation facilities being proposed as part of the preferred design from east of the Highway 400 bridge easterly to Jane Street was examined as part of this study. The feasibility review included consideration of a 2.0 m sidewalk and a separate 2.0 m off-road cycling facility separated by a 400 mm buffer; similar to the active transportation being proposed for the future Bass Pro Mills Drive extension.

Based on this feasibility review, the proposed facilities would be accommodated within the existing Bass Pro Mills Drive right-of-way situated between the Highway 400 bridge and Jane Street, without the need for property acquisition.

Should the facilities be extended the following activities were noted to be required to facilitate implementation;

- Removal of existing boulevard trees;
- Relocation of existing street lighting;
- Relocation of existing fire hydrants;
- Modification to the Fishermens Way/Bass Pro Mills Drive and Edgeley Boulevard/Bass Pro Mills Drive signalized intersections for cross-rides. These modifications will include conversion of the existing crosswalks to cross-rides



(crosswalks for bicycles that allow cyclists to remain on their bikes and safely cross through intersections) with associated adjustments to the traffic signal push-button positioning and tactile plates for AODA compliance

- Modification to the Bass Pro Mills Drive/Romina Drive intersection for cross-rides (future 4 leg intersection). This location has emerging development on the north side where a future 4th leg may be introduced at the current 'T' intersection, requiring conversion of existing crosswalks to cross-rides to accommodate cyclists; and
- Reconstruction of the existing Bass Pro Mills Drive boulevard between Romina Drive and Jane Street. This reconstruction will include modifications to the boulevard and planter areas that were constructed with the most recent extension of Bass Pro Mills Drive to Jane Street to allow for new separated sidewalk and cycling path that is consistent with the future extension to the west.

Based on preliminary order of magnitude estimates, should the City schedule the work within the Financial Plan and 10-Year Capital Program for future implementation, the estimated cost may be approximately \$2.3M. This estimate assumes no roadway work would be required (i.e., narrowing the width of the roadway).

5.4 MODIFICATION OF THE TECHNICALLY RECOMMENDED DESIGN

5.4.1 Ministry of Transportation Ontario (MTO) Meeting

A meeting was held with MTO on February 9, 2022, in response to the comments received from MTO by the study team regarding the preliminary cross-section design for the existing bridge over Highway 400. At this meeting, MTO noted that a detail design study for the widening of Highway 400 was forthcoming (Notice of Study Commencement for the Highway 400 widening was later published on April 7, 2022), and concerns with future clearance issues beneath the bridge were raised in association with widening the bridge over the highway. In addition, MTO indicated concerns related to traffic lane widths, the lack of a barrier between cyclists and vehicles, no median as well as a lack of continuity of active transportation facilities on either side of the bridge. It was noted that these elements (shown in **Figure 18**) did not meet MTO standards. As such, the study team agreed to re-evaluate potential bridge cross-sections to identify a more suitable solution.

In relation to this meeting with MTO and associated comments received, the study team identified and evaluated several options for the Highway 400 crossing location to provide adequate provisions for cyclist and pedestrian activity, including those requiring mobility assistance at the Bass Pro Mills bridge structure over Highway 400. The various schemes examined by the project team considered the existing General Bridge Arrangement, MTO and TAC design guidelines, cost, property impacts, functionality and safety.



5.4.2 Modifications to Highway 400 Bridge Cross-Section

The existing structure consists of a two-span slab on steel box girder bridge supported on integral abutments with an overall length of 91 m. The existing structure has an overall width of 20.4 m, and currently provides for 2 westbound and 2 eastbound vehicular lanes, as well as a 1.5 m sidewalk on the north side, with 0.25 m clearance. The structure has a centre raised traffic median and a 1.75 m shoulder on the south side, as shown in **Appendix L**.

To accommodate cycling and pedestrian facilities, the existing bridge structure was reviewed in relation to the feedback received from MTO. The options considered ranged from 'do nothing', modifying the existing structure, widening the bridge, and developing a dedicated active transportation bridge adjacent to the existing bridge.

The underlying objective for extending Bass Pro Mills Drive is to provide an economically feasible solution that alleviates traffic congestion within the area, provides a direct east-west connection between Jane Street and Weston Road and supports future area development. Options that required widening of the structure were ultimately ruled out as they were significantly costlier than those that required modification to the existing structure and would result in impacts to private property northeast of the structure. Widening the existing bridge structure was also not preferred due to the unknown timing and potential impacts associated with separate projects being planned within and in the vicinity of the study area, including modifications planned at the Langstaff Road/Highway 400 interchange, south of Bass Pro Mills Drive, and anticipated widening of Highway 400 to 10 lanes between 2024 and 2046. In addition, according to the City's capital program, the construction of the project could be initiated by 2027 (subject to City capital programming), preferably possibly in coordination with the Region of York widening of Weston Road.

Similarly, options that included a separate active transportation bridge located to the immediate south of the existing structure were also screened out due to construction and operation costs associated with a new structure, and the complexities associated with maintaining a structure of this nature (e.g., snow removal). It was also noted that the separate AT bridge may not be attractive for pedestrians and cyclists being moved off the main roadway, and that it may not be ideal for the accommodation of all ages and abilities with the additional crossing distance. It would also leave unused deck width that could encourage drivers to raise their speed, and pedestrians and cyclists to use the bridge unsafely.

The MTO Provincial Engineering Memorandum #2018-07 (October 22, 2018) discusses incorporating cycling facilities into bridge rehabilitation projects within provincial highway ROWs and recognizes that it is not always feasible to apply design guidelines for the design of provincial highways. For such situations, consideration may be given to apply alternative design guidelines or aspects at the lower end of the design domain. The



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MTO policy statement allows for the narrowing of features such as centre islands and shoulders, or the elimination of shoulders entirely. Further, the policy suggests that consideration can be given to road diets, if necessary. The modified Highway 400 crossing recommended cross-section is further discussed within **Section 6.1**.



6.0 PROJECT DESCRIPTION

The preferred design for the extension of Bass Pro Mills Drive, between Highway 400 and Weston Road, considers the planning for the Vaughan Mills Centre Secondary Plan area, and incorporates information from the Vaughan Mills Centre Public Realm and Streetscape Plan, 2021.

The extension of Bass Pro Mills Drive is recommended to include a 4-lane urban collector road with active transpiration facilities and drainage retention measures within the boulevards located along both sides of the road ROW. The preferred design introduces a new 3-leg intersection with Weston Road, south of Astona Boulevard.

The current loop ramp to southbound Highway 400 from Bass Pro Mills Drive is being maintained and the existing bridge over Highway 400 is proposed to be modified to include without widening the bridge structure.

The preferred design for the proposed extension of Bass Pro Mills Drive has been developed using several design standards, including:

- City of Vaughan Design requirements
- TAC Geometric Guide for Canadian Roads
- MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads
- MTO Drainage Manual
- Ontario Traffic Manual

6.1 PREFERRED DESIGN

Following the evaluation process to select the preferred design, a preliminary design was developed, as shown in the preliminary design plans in **Appendix L**.

The key features of the preliminary design for the road extension are as follows:

- Extend Bass Pro Mills Drive from the existing Highway 400 bridge structure westerly to Weston Road.
- New signalized intersection at Weston Road.
- Separated sidewalks and cycling facilities along each side of the roadway
- Streetscaping features within a drainage retention swale along each side of the roadway
- An interim crossing of the Black Creek with consideration for potential ultimate locations of the Black Creek.



- Full roadway and boulevard illumination.
- Storm water measures to control water quantity and quality, including an equalizer culvert sized to accommodate wildlife crossings.

The typical cross-sections for the proposed extension of Bass Pro Mills Drive are presented in **Appendix L**. The key features of the typical cross-section include:

- Four (4) lane urban road with 3.3 m inside lanes and 3.5 m outside (curb) lanes;
- Continuous 2.0 m sidewalk and 2.0 m cycling path within the boulevard and separated by a 200 mm buffer;
- Approximately 2.5 m wide intermittent drainage retention feature between the cycling facility and roadside curb; and
- Light poles and hydro poles for illumination.

Highway 400 Bridge

It is recommended that the existing Highway 400 bridge be modified to provide a 1.8 m wide sidewalk and 500 mm shoulder clearance on either side of the roadway, four 3.5 m wide vehicle lanes (2 lanes in each direction), a 1.2 m wide raised centre median, and that the design modifications be based on a 60 km/hr design and 50 km/hr posted speed limit. Signs will be posted at each end of the bridge showing that cyclists must dismount.

Additional information regarding the preferred design for the Highway 400 Bridge cross-section is provided within the Crossing Assessment Memo available within **Appendix L**.

6.2 DESIGN CRITERIA

The design criteria associated with the preferred design for the proposed extension of Bass Pro Mills Drive were established based on input from the City of Vaughan and TAC guidelines. In addition, design standards from several area municipalities (Town of Whitby, City of Markham, Town of Milton and the Region of York) were reviewed in relation to the criteria proposed for the extension of Bass Pro Mills Drive.

The design criteria proposed for the preferred design is for a Major Collector road classification with a design speed of 60km/hr.

The design criteria developed for the proposed extension of Bass Pro Mills Drive are provided below in **Table 8**.



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Table 7: Bass Pro Mills Drive Extension EA Study Design Criteria

DESIGN CRITERIA	
CRITERIA	BASS PRO MILLS DRIVE EXTENSION PROPOSED STANDARDS
Classification	Collector
Design Speed	60 Km/hour
Posted Speed	50 Km/hour
Minimum Radius	200 m
Minimum Stopping Sight Distance	85 m
Minimum Decision Sight Distance	250 m
Minimum 'K' Value:	
Crest	15 / 20
SAG:	
Headlight Control	20
Comfort Control	10
Grades:	Minimum 0.5% and Maximum 6%
Maximum Grade For Through Roads At Intersection	3%
Maximum Grade For Stop Roads At Intersection	2%
Minimum Radius At Intersection	15 m
Lane Width:	
Through Lanes	3.3 m
Curb Lanes	3.5 m
Left Turn Lanes	Minimum 3.3 m and 3.0 m adjacent to traffic median
Two-Way Left Turn Lane	5.0 m
Right Turn Lanes	3.5 m
Parking Lanes/Layby	N/A
Minimum Crossfall	2%
Minimum Crossfall Through Intersection	1%
Buffer Between Cycling And Clearways	Minimum 0.5 m
Cycle Tracks (One Way/Two Way)	1.8 m and 3.0 m Minimum where bi-directional
Edge Zone / Splash Pad	0.5 m
Boulevard Slope	2% to 5%
Boulevard Width	Minimum 5.0 m
Sidewalk Width	Minimum 1.5 m and 2.0 m adjacent to curb
Multi-Use Path Width	3.0 m



All proposed horizontal/vertical curves and roadway gradients for Bass Pro Mills Drive are within acceptable parameters, sufficient sight distance is provided at all locations. The profile proposed accommodates a future signalized intersection immediately west of Highway 400.

Highway 400 Bridge

Table 7 demonstrates that the recommended design criteria satisfying the requirements outlined in MTO policy #2018-17. However, the recommended design criteria can be further reviewed during detail design in consultation with MTO.

Table 8: Proposed Highway 400 Design Criteria vs. Standard Guidelines

	Sidewalk (m)	Lane Width (m)	Traffic Median	Railing Height (m)	Shoulder Width (m)
Minimum Required	1.8	3.5	1.2	1.37	0.5
Parameter Proposed	1.8	3.5	1.2	1.37	0.5
Standard/ Guideline/ Reference	AODA	MTO Design Supplement Exhibit 4-B	City Standard/MTO #2018-07	CHBDC	MTO Design Supplement Exhibit 4-U / TAC Table 4.10.1 (60 Design Speed)
Compliance	Yes	Yes	Yes	Yes	Yes

It is further recommended that signage be posted at the bridge approaches to advise cyclists to dismount their bicycles before crossing the structure.

Roadway Illumination

Preliminary roadway illumination layouts were reviewed in the context of the preferred design typical section and current planning for locations of internal VMCS road connections to Bass Pro Mills Drive. The preliminary illumination layout followed required City guidelines of IES RP-08-18.

Photometric calculations and lighting layout for Bass Pro Mills Drive was based on the 2014 VMCS north-south internal road network, which is subject to final approval via the Planning Act process. During detail design, photometric calculations and lighting layout will need to be reviewed and confirmed in relation to the final locations of the future north-south road connections within the VMCS planning area. In addition, the sidewalk illumination layout will need to meet City standards.

The intersection of Weston Road/Bass Pro Mills Drive will be within the Region’s jurisdiction and the illumination design will be provided by the Region as part of the



detail design for Weston Road, which was ongoing at the time of preparation of this ESR.

Roadside Safety

TAC Design Guidelines and MTO Roadside Safety Manual outlines measures for roadside safety and the application of necessary roadside safety measures where warranted. The extension of Bass Pro Mills Drive was reviewed in relation to roadside safety, lateral clearance and accommodation of pedestrians and cyclists. During the detail design phase, roadside safety will need to be reviewed in relation to the confirmed locations and geometric design of intersections with the north-south roads being planned as part of the VMCSPP, location of the realigned Black Creek, and corresponding culvert location for the realigned Black Creek location. The culvert structure shown in **Figure 19**, with the exception of invert elevations and ground above culvert, can be applicable for any of the potential Black Creek realignment locations illustrated within **Figure 20**.

6.3 UTILITIES AND SERVICING

Based on the consultation carried out with various local utilities, it was confirmed that there are no utilities present within the limits of the project, which primarily lies within vacant undeveloped lands. Additionally, there are no known current or future plans for new utilities to be installed within the project limits, prior to the implementation of the roadway extension.

An existing cell tower and associated overhead line are located within the property immediately south of the proposed Bass Pro Mills Drive right-of-way and will not be impacted by the implementation of the Bass Pro Mills Drive extension.

Enbridge gas, hydro, Bell, telecommunications, storm and watermain services are situated within the existing Weston Road right-of-way, at the proposed future intersection with the west limit of the extension of Bass Pro Mills Drive. Utility relocation at this intersection will be necessary to address utility conflicts and will be coordinated with the Region during the detail design phase to establish an overall coordinated and holistic utility relocation plan that suits both the Region's and City's design plans.

Between Highway 400 and Fisherman's Way, there are existing underground electrical conduits associated with the existing roadway illumination and traffic signals at the Fisherman's Way intersection that will need to be addressed during detail design.

Future utilities and municipal services required as part of the implementation of the proposed Bass Pro Mills Drive extension will be identified during the detail design phase of the project or reviewed in relation to site servicing plans as part of development applications for the VMCSPP.



6.4 INTERSECTION DESIGN

The preliminary intersection design is currently based on the 2014 VMCSP north-south internal road network and is subject to change pending Planning Act approval processes for development planning within the VMCSP area.

The intersection designs, once locations are finalized, will review elements from the Vaughan Mills Centre Public Realm Strategy and Streetscape Master Plan (2021) and may provide public realm enhancements at intersections.

All intersections will be designed in accordance with AODA requirements and may provide linkage connections to proposed active transportation facilities.

The design of the proposed new intersection with Weston Road will be carried out by the Region as part of the detail design of Weston Road, in consultation with the City of Vaughan.

The existing intersection of Fisherman's Way with Bass Pro Mills Drive is proposed to operate as per current conditions (i.e., no eastbound left turn). However, dual left turn lanes are proposed from the Highway 400 northbound off ramp to westbound Bass Pro Mills Drive. The existing traffic signals at this intersection are under MTO jurisdiction and traffic signal timing will be adjusted by MTO to suit future operating conditions.

Cross-rides are proposed at intersection locations where cycling and pedestrian activity is planned.

6.5 ACTIVE TRANSPORTATION FACILITIES

The active transportation facilities proposed along the extension of new Bass Pro Mills Drive will be consistent with the Vaughan Mills Centre Public Realm Strategy and Streetscape Master Plan, 2021, which includes separated sidewalk and cycling facilities along both sides of the roadway. The facilities will be designed to accommodate a broad range of users including pedestrians, cyclists, and citizens requiring assisted mobility, including a range of cyclists' needs from the commuter cyclist to the recreational cyclist.

The active transportation facilities will connect to the future facilities being planned along Weston Road. This includes a sidewalk on the west side of Weston Road, and the sidewalk and separated cycling facility proposed along the east side of Weston Road, once the development planning within the VMCSP is confirmed, including the future realignment of Black Creek. The development of AT on the east side of Weston Road is planned to be provided pursuant to the Vaughan Mills Centre Public Realm Strategy and Streetscape Master Plan, 2021, which identified active transportation facilities for Weston Road, and the Region's Weston Road Detail Design project (Bass Pro Mills Drive to Hawkview Boulevard) that is currently ongoing.



The active transportation facilities provided for Bass Pro Mills Drive will connect to other active transportation facilities planned within the VMSCP area and will provide continuity for active transportation on Bass Pro Mills Drive between Weston Road and Jane Street, where active transportation enhancements may be made by the City in the future. See Section 5.3.9 for the Feasibility Study of Active Transportation Facilities extending from east of the Highway 400 Bridge to Jane Street.

6.6 PRELIMINARY COST ESTIMATE

With the exclusion of engineering design, contract administration, property, and utility relocation costs, the preliminary cost estimate associated with implementing the preferred design is presented in **Table 9** below.

Table 9: Preliminary Cost Estimate for the Implementation of the Preferred Design

Design Item	Total Cost
Roadway, Storm Sewers and Intersections	\$ 2,560,000
Streetlight and Traffic Signals	\$ 1,002,500
Boulevard, Active Transportation and Streetscaping	\$ 1,291,800
Highway 400 Bridge Modifications	\$2,000,000
Black Creek Culvert Structure (Interim)	\$300,000
Black Creek Culvert Structure and Equalizer Culvert (Ultimate)	\$1,000,000
Sub-Total	\$8,154,900
Contingency Allowance (25%)	\$2,038,725
Total Probable Cost Estimate (Excluding Property)	\$10,193,625

The estimate does not include costs for:

- Acquisition of land.
- Engineering design for the project.
- Construction administration
- Utilities (i.e., Bell, Enbridge, Alectra, Rogers, etc.).
- Operation and maintenance of the future roadway.

A more detailed cost estimate is provided in **Appendix L** of this ESR.



Implementation Timeframe and Schedule

The implementation of the Bass Pro Mills Drive extension between Highway 400 and Weston Road has an anticipated construction start in 2027, dependent upon the City's available funding and programming.

Completion of detail design, coordination with the Region of York's Weston Road project, which is also planned for 2027 construction, VMCSPP planning decisions, and realignment of the Black Creek may influence the proposed construction start timeline.

Timelines for the implementation of improvements within the MTO Highway 400 corridor may depend on Ministry planning for widening of Highway 400 to 10-lanes and Region of York's planning for the improvement of Langstaff Road and Highway 400 interchange south of Bass Pro Mills Drive, which are both undermined at this time.

6.7 DRAINAGE AND STORMWATER MANAGEMENT

A Stormwater Management Report was completed to document the existing drainage through the study area and evaluate the potential impacts of the preferred design on the receiving surface water system and subsequent mitigation measures. A copy of the Stormwater Management Report is available within **Appendix G**, the findings of which are described herein.

The preferred design indicates that stormwater runoff from the ROW will be captured via on-street catchbasins and/or overflow structures (bioswales) present within the 2.3 m boulevard and planters on either side of the roadway and conveyed to the selected quantity control measure via storm sewers. The proposed storm sewers are to be designed to capture and convey, at minimum, 5-year storm runoff from the road. Flows in excess of the 5-year storm event will be routed overland within the proposed ROW. Within the study area, 100-year capture is required in order to meet the allowable release rates, which can be accomplished by increasing the number of catchbasins or establishing a 100-year capture location at the proposed low point. The storm sewers are to be sized using a minimum 5-year runoff coefficient of 0.75 and a minimum 100-year coefficient of 0.90.

In order to implement the preferred design, two crossings are required as part of the proposed Bass Pro Mills Drive extension, one at Black Creek and a second equalizer culvert to join the bisected wetland in the east portion of the study area.

The preferred road alignment crosses Black Creek at one location, however the final land use plan and ultimate watercourse location for the adjacent lands of the VMCSPP is currently unknown. As such, in discussion with TRCA staff, it was agreed that the proposed crossing would be situated and sized at the existing location. The preliminary crossing of Black Creek consists of 32.5 m long x 13.4 m wide x 1.5 m high pre-cast open bottom culvert flanked by two 32.5 m long x 3.6 m wide x 1.2 m high box culverts.



To permit wildlife movement and fish passage, the proposed road crossing is an open bottom culvert to accommodate target species of small mammals, amphibians and reptiles. To reduce impacts to the adjacent lands and avoid increasing the crossing length, the proposed culverts will be situated perpendicular to the proposed ROW. A small channel realignment will be required on the upstream side due to the slight skew in Black Creek at the existing location. Due to the meander belt width, it is not practical to span its entirety with a single span structure, therefore, a large pre-cast open bottom culvert is proposed. The proposed preliminary size will need to be discussed with TRCA during detail design, and if required, additional geomorphic studies in support of the proposed size will need to be completed.

The extension of Bass Pro Mills Drive will bisect the wetland community in the east portion of the study area, dividing it into two separated wetlands and reducing contributing drainage area from 23.4 ha to 22.4 ha. An evaluation of the sensitivity of the wetland could not be completed at this time as site access was not permitted and a field investigation could not be completed. However, a preliminary evaluation of the magnitude of potential hydrological change was completed utilizing desktop evaluation of the wetland limits and the proposed ROW alignment. The results of which indicate that the anticipated hydrologic change that may result due to the preferred design will be considered as 'low' magnitude. Based on the recommendations from the TRCA's Wetland Water Balance Risk Evaluation (WWBRE), pre-development water balance monitoring will not be required. Instead, a desktop derived feature based Thornwaite Mather water balance assessment will need to be completed during detail design when more information on the wetland community and the contributing drainage area are known.

An equalizer culvert between the north and south portions of the wetland is required to maintain the hydraulic connectivity of the two wetland sections, as well as facilitate wildlife crossing requirements. The culvert will be sized during detail design and should be countersunk, and the bottom filled with river stone to ensure wetland connectivity. Overtime, fines from the wetland will fill the voids in the river run stone, which will provide a natural substrate for wildlife passage.

The east/west alignment of the preferred design will impede any northeast to southwest sheet drainage that occurs under existing conditions. As such, HDF-A will need to be relocated to the north to maintain its current function as a surface water connection to Black Creek. During detail design, HDF-A should be designed using natural channel design principals to maintain, at minimum, current conveyance capacity will ensuring adequate separation between high water level and elevations at ROW limits.

The preferred design will increase the amount of impervious surface area which has the potential to impact receiving watercourses by:



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- Increasing the amount of pollutants which are commonly found in roadway runoff (i.e., phosphorus, hydrocarbons, metals, chlorides, etc.), all of which can impair the aquatic ecosystem of the receiving watercourse; and
- Generating a greater volume and rate of surface water runoff being directed into the receiving watercourse.

Quantity and quality controls can be provided through the implementation of oversized pipes, a combined retention/detention underground chamber, and erosion controls (on-site retention of 5mm of rainfall) through the use of bioretention facilities within the boulevard, infiltration rock trench or underground chamber, etc.

A portion of the existing and future Bass Pro Mills Drive ROW has already been accounted for in the design of the Highway 400 and Bass Pro Mills Drive stormwater management pond, which may be a viable option to provide quality and quantity control for Bass Pro Mills Drive if storm servicing can be coordinated with the adjacent developers of the VMCSF. Opportunities for potential combined stormwater management facilities that service both the future Bass Pro Mills Drive and VMCSF should remain open for further discussion/confirmation during the detail design phase, and as capital planning for the roadway extension and future plan of subdivisions are being advanced in parallel.



7.0 IMPACTS, MITIGATION AND MONITORING

7.1 TRAFFIC

A review of the modelling results indicates that the proposed extension of Bass Pro Mills Drive will improve traffic operations within the study area transportation network in both the 2031 and 2041 horizons, with consideration of the future widening of Weston Road from the Bass Pro Mills Drive extension to Hawkview Boulevard. The results of this analysis are summarized within **Table 10**.

The results of the modelling confirmed that several intersections within the primary study area will have operational issues in both the 2031 and 2041 horizon years. Although the proposed Bass Pro Mills Drive extension will result in the overall improvement of traffic within the study area, increases in traffic demand due to projected population growth and future development within the already congested road network may result in these operational issues.

Table 10: Traffic Modelling Results Summary

	2031 Without Extension	2031 With Extension	2041 Without Extension	2041 With Extension
AM Peak Hour				
Delay (s/km)	86.6	81.8	83.0	83.8
Total Travel Time (veh-h)	5,516	3,410	3,347	3,568
Speed (km/h)	42.3	42.5	44.3	43.2
Vehicles waiting to enter network	1,636	1,171	4,495	2,154
PM Peak Hour				
Delay (s/km)	127.6	112.6	108.8	116.3
Total Travel Time (veh-h)	4,614	4,516	4,864	4,697
Speed (km/h)	37.5	37.7	35.8	37.1
Vehicles waiting to enter network	2,076	1,330	3,280	2,725
Vehicles waiting to enter network	2,076	1,330	3,280	2,725

Additionally, a queuing analysis review was conducted based on the microsimulation model results for the segment of Weston Road between Astona Boulevard and the future Bass Pro Mills Drive extension. The results indicated that with the extension of Bass Pro Mills Drive the maximum queue lengths may be greater than the space provided between intersections; however, on average the queueing lengths will fall below the provided length of space. Thus, it was concluded that this segment of Weston



Road will be able to support traffic in both directions while congestion may be experienced for short periods of time. It should be noted that when the future development of the VMCSPP is considered, the maximum and average queueing lengths will be greater than the space provided. As such, it is recommended that the queueing lengths on this segment of Weston Road be further reviewed as part of a future VMCSPP transportation study.

It should also be noted that the Traffic Impact Assessment completed as part of this MCEA study was based on the current understanding of the road network approved within the VMCSPP 2014, which was undergoing an appeals process at the time of this study. Further investigations will be required by others to help confirm the design and future configuration of roadways within the VMCSPP planning area, as well as the arrangement of Bass Pro Mills Drive and Weston Road intersection.

A copy of the Traffic Impact Assessment report is available within **Appendix B**.

7.2 SOCIO-ECONOMIC ENVIRONMENT

7.2.1 Land Use

Construction of the new roadway extension is anticipated to directly impact one contiguous property currently consisting of vacant/undeveloped land and one business operation. These lands are situated within the VMCSPP area and have been identified for use as a future roadway with mainly prestige employment uses planned on the north side of the future Bass Pro Mills Drive extension, as part of the VMCSPP 2014 document.

7.2.2 Property

As a result of the alignment of the preferred design, temporary and permanent impacts are anticipated for three private properties. The preferred alignment traverses a private property comprising approximately 1.7 hectares (ha) of property required to accommodate the proposed ROW. Additionally, daylighting triangles on either side of the future Bass Pro Mills Drive and Weston Road intersection will be required to maintain horizontal sight lines for vehicles turning onto and off of the future extension of Bass Pro Mills Drive. As such, approximately 0.0113 ha will be required from private property to the north and 0.005 ha will be required from the private property to the southwest.

Temporary private property impacts are also anticipated during construction due to earth movement and grading. Temporary grading impacts along the length of the future ROW will impact approximately 1.69 ha of the property to the north, and approximately 0.073 ha of the property located to the immediate south. However, the construction of a retaining wall to the south of the ROW is recommended as part of the preferred design to reduce the amount of grading and subsequent impacts to the property immediately south of the preferred design. Additionally, within the property to the southwest there is



a 0.21 ha temporary area of interest which may be impacted during construction to accommodate the construction of a new culvert over the existing Black Creek.

The approximate total area of impacts is summarized in **Table 11** below:

Table 11: Summary of Impacts to Private Property

Private Property	Permanent Impacts (ha)	Temporary Impacts (ha)
Private Property North of ROW	1.70	0.027
Private Property South of ROW	0.0	0.073
Private Property Southwest of ROW (Abutting onto Weston Rd)	0.005	0.021
Total Area of Impact (ha)	1.705	0.12

Impacts and associated mitigation measures will be reviewed and confirmed during detail design in consultation with affected property owners. Acquisition of private property will be negotiated with affected property owners and purchased at market value.

A property impact plan is available within **Appendix L**.

7.2.3 Acoustics

A noise impact assessment for the preferred design was conducted to determine the changes in noise associated with the construction and operation of the project, and associated impacts to surrounding noise sensitive areas in accordance with applicable regional and provincial noise guidance documents for roadway projects.

The project's noise impact was assessed by predicting future road traffic noise levels, from the Bass Pro Mills Drive extension to Weston Road at representative outdoor living areas (OLAs), and then comparing those noise levels against applicable criteria. Future road traffic noise levels were based on projected traffic data provided by York Region and obtained from the Traffic Impact Assessment completed for this study. Although noise sensitive developments are not currently planned within the VMCSPP area, it is anticipated that any future development will undertake noise assessment as part of the Planning Act approval process and develop noise mitigation measures, if required. Therefore, only existing noise sensitive land uses in the vicinity of the study area were evaluated as part of this assessment.

The existing residential subdivision located on the west side of Weston Road, west of the proposed extension/intersection with Weston Road, is the only noise sensitive land use present within the study area and assessed as part of the analysis. Residences



within this area consist of OLAs that are exposed to noise associated with traffic operations along Weston Road, and the proposed extension of Bass Pro Mills Drive.

Noise impacts were assessed based on four scenarios, no-build (without the Bass Pro Mills Drive extension) and build (with the Bass Pro Mills Drive extension) for the construction year of 2027 and the mature state of development horizon of 2041.

Both provincial (MECP and MTO) and regional (York Region) transportation noise guidelines are applicable to this project. The requirements of these guidelines are as follows:

- **MECP Publication NPC-300 Environmental Noise Guideline:** requires that noise levels within the OLA must be consistent with the provincial objective of 55 decibel A-weighted (dBA) ten years after construction.
- **MTO Environmental Guide for Noise:** denotes the importance of noise impacts based on a change in noise levels from the existing conditions. Under this guide, noise mitigation is warranted when sound levels are increased to either 65 dBA or 5 decibels (dB) over the no-build ambient conditions. Noise mitigation measures (i.e., noise barriers, noise reducing asphalt, etc.) where applied must be administratively, economically, and technically feasible, and must provide a reduction of at least 5dB over the first row of noise-sensitive receivers.
- **York Region Noise Policy:** states that mitigation is not considered unless projected noise levels are greater than 60 dBA either at construction or mature state of development. The Policy also requires for projected noise levels greater than 55 dBA, and future noise level increases greater than 5 dB, the feasibility of noise mitigation measures shall be investigated where a minimum attenuation of 6 dB can be achieved. Further any mitigation deemed necessary shall achieve a minimum reduction of 6 dB against the greater of either the objective level (55 dBA) or the established ambient noise level at the start of construction.

The noise assessment results under provincial guidelines predicted a marginal increase of 1 dB by 2037 with the extension of Bass Pro Mills Drive, and an increase of 2 dB from 2027 to 2041 based on the noise assessment results under regional guidelines. Based on the regional assessment, this increase may result in the operation of the extension of Bass Pro Mills Drive and increasing traffic volumes on the existing Weston Road. As the predicted sound level of 67 dBA is expected to exceed both the provincial and regional absolute noise limits (65 dBA), noise mitigation investigation was warranted. Based on site observations, there are existing noise barriers (walls) for the residences situated along Weston Road, between Valeria Boulevard and Rutherford Road. These noise walls are continuous with heights ranging from 2 m and 2.3 m above ground surface. Based on the findings of the investigation, noise mitigation would not decrease noise levels by the required 5 dB, and as such are not considered technically feasible at these locations.



The typical sound levels from most construction equipment shows that they can be operated within compliance of MECP's NPC-115 limits. However, there is potential for higher noise levels for some equipment (i.e., dump trucks, paving equipment, etc.). Thus, it is recommended that construction equipment sound levels be reviewed during detail design to confirm that noise emissions are within the permissible limits and to finalize construction scheduling.

A copy of the Noise Impact Assessment Report is available within **Appendix M**.

7.2.4 Air Quality

An air quality assessment was undertaken to characterize existing air pollutant emissions and predict air quality changes within the study area, following the implementation of the project, in the year 2031. Predicted future emissions with project implementation (future build) and without the project (future no-build) were compared against the existing conditions in 2020 (baseline). Baseline ambient air quality conditions were characterized from historical data obtained from the National Air Pollution Surveillance Network and MECP for nearby stations to the study area. The predicted ambient air quality results for each scenario were then compared against relevant Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS).

The air contaminant emission sources expected from the project operation phase are mobile sources that emit combustion gases from burning fossil fuels (i.e., gasoline and diesel) and fugitive dust from road traffic. Combustion emissions depend on the combustion device type (engine type), fuel composition, fuel consumption rate and operating time. Fugitive dust emissions are generated by road traffic during the movement of mobile sources (i.e., cars and trucks). Contaminants of interest (COIs) selected for this study are based on the most relevant transportation-related contaminants as listed within the MTO Guide (MTO, 2020) and include nitrogen dioxide, carbon monoxide, particulate matter with diameter less than 10 micrometres, particulate matter with diameter less than 2.5 micrometres, acrolein, benzene, 1,3-butadiene, benzo(a)pyrene, acetaldehyde and formaldehyde.

Based on the results of the air quality assessment, the concentrations of COIs were below the applicable standard in the current, future build and future no-build scenarios, with the exception of benzo(a)pyrene. However, levels of benzo(a) pyrene are expected to decrease by approximately 80% in the future build and future no-build scenarios despite this exceedance due to advanced vehicle technology which is anticipated to lower emissions.

Cumulative concentrations of contaminants are below the applicable standard, with the exception of particulate matter, nitrogen dioxide, benzene and beno(a)pyrene. However,



ambient background levels are the major contributor to the cumulative exceedances, with the background concentration of beno(a)pyrene alone being more than 2 times and 8 times the daily and annual average standard, respectively. According to background data from MECP, measured concentrations of benzene, nitrogen dioxide and particulate matter have shown decreasing trends between 2009 and 2018. Thus, it is likely that background levels of these contaminants will continue to improve in the future.

Greenhouse gases (GHGs) are any gas that contribute to climate change, including carbon dioxide, methane, nitrous oxide, among other air contaminants. Changes in GHG emissions were assessed during this study by comparing the results for each scenario (future build and future no-build) against relevant National and Provincial totals for 2019 and 2030 emissions targets. The 2031 future build scenario presented a decrease in GHG emissions of approximately 50% compared to the baseline scenario due to expected improvements in engine technology and cleaner fuels. A 29% increase in GHG emissions is anticipated in the future build scenario when compared to the future no-build scenario due to increased traffic in the area with the proposed road extension. However, the release of GHGs from the project are expected to be insignificant compared to the 2019 Canada and Ontario totals, and the 2030 emissions targets.

Although the extension of Bass Pro Mills Drive may lead to minor increases of contaminant concentrations when compared to the future no-build scenario, implementation of the project will improve the traffic flow and congestion in the local road network, thereby minimizing impacts on air quality.

Construction Phase

During the construction phase of the project, emissions to the atmosphere will occur primarily due to fuel combustion from vehicles and construction equipment, as well as fugitive dust from construction activities.

Total construction related air emissions are anticipated over several weeks to potentially months. For the construction phase, a construction dust management plan should be prepared and implemented. With the implementation of appropriate mitigation measures and purposeful management of construction dust and combustion gases, emissions from the construction phase and associated impacts to the local air quality can be minimized.

A copy of the Air Quality Impact Assessment report is available within **Appendix N**.



7.3 CULTURAL ENVIRONMENT

7.3.1 Cultural Heritage

Through the completion of the MHSTCI's Cultural Heritage Landscapes Checklist, the Canadian Heritage River watershed indicator was selected as the study area is within the Humber River watershed; however, the study area is greater than 5 kms east of the Humber River and lies within the largely developed Black Creek Subwatershed. As such there is no potential for the project to impact the cultural heritage value of the Humber River watershed. As discussed within the VMCSPP, Black Creek running through the study area is proposed to be conserved, restored, and enhanced as a natural corridor if Bass Pro Mills Drive is extended.

Given the findings of the CHOM (noted within **Section 3.1.1**), no additional heritage studies are recommended.

A copy of the Cultural Heritage Overview Memorandum is available within **Appendix C**.

7.3.2 Archaeology

As previously stated within **Section 3.1.2**, as per Section 1.3.1 and Section 7.7.4 of the MHSTCI's 2011 *Standards and Guidelines for Consultant Archaeologists*, a Stage 2 AA is recommended for the portions of the study area retaining archaeological potential. The objective of the Stage 2 AA will be to document archaeological resources within the portions of the study area still retaining archaeological potential and to determine whether these archaeological resources require further assessment (i.e., Stage 3 AA).

Due to the lack of access to private property during the course of this study, the Stage 2 AA is recommended to take place during the detail design phase of the project. Archaeological field liaisons representing Huron Wendat First Nation and Mississaugas of the Credit First Nation will be invited to participate in the future Stage 2 AA field investigation and review the associated reporting.

A copy of the Stage 1 AA report is available within **Appendix D**.

7.4 NATURAL ENVIRONMENT

7.4.1 Fisheries and Aquatic Resources

The relocation and new crossing of Black Creek, relocation of the Headwater Drainage Features, and new road connections will be confirmed during detail design. Although a realignment of Black Creek is proposed, the location and length of the proposed realigned channel will also be determined during detail design, in particular once the land use and road configuration of the VMCSPP has been confirmed. If natural channel techniques are applied, long-term effects of the Black Creek realignment on fish and



fish habitat are not anticipated. However, this summary of potential impacts is based on the preferred design information and will need to be updated during the subsequent detail design phase of the project. Potential enhancement opportunities will also be identified at that time.

As various common fish species are present within Black Creek, potential impacts to fish during construction may occur. These impacts include effects from vibration due to construction, and changes in water quality due to sediment in runoff and/or spills. It is recommended that erosion and sediment control measures be put in place to reduce the likelihood of impacts to the natural environment (i.e., silt fencing, refueling equipment at minimum 30 m away from watercourses, monitoring, etc.). Natural channel design principles should also be applied to the design of the realigned channel to reduce the effects on fish and fish habitat to the extent possible.

Additionally, there are two culverts being proposed for the extension of Bass Pro Mills Drive, one at Black Creek and an equalizer culvert to connect the bisected wetland situated within the east portion of the study area. It is not known whether the wetland within the study area supports turtles and/or if turtles use Black Creek as a movement corridor. The implementation of crossing guidelines and best management practices recommended by the TRCA, and CVC shall be utilized to determine the sizing and openness ratio for these culverts to facilitate the passage of amphibians and reptiles.

In cases where impacts to fish and fish habitat cannot be avoided, a Request for Review form to Fisheries and Oceans Canada (DFO) is required to review the project, including the realignment and the proposed culvert crossing of Black Creek, to identify the potential risks to the conservation and protection of fish and fish habitat, and to provide advice and guidance on how to comply with the *Fisheries Act* (1985). The need to include the realignment of HDF-A within the DFO review will be determined during detail design when the feature can be assessed in more detail for the presence of fish and fish habitat. During isolation of flow, fish recovery and transfer will need to be obtained from the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR), and conducted in accordance with a License to Collect Fish for Scientific Purposes.

A copy of the Environmental Impact Study report is available within **Appendix E**.

7.4.2 Terrestrial Habitat

The proposed extension of Bass Pro Mills Drive will result in the permanent loss of vegetation (i.e., approximately 1.2 ha of marsh and 3.4 ha of meadow). Additionally, the proposed extension will bisect wetland communities (i.e., MASM1 and MASM1-1, please refer to **Figure 8**), resulting in approximately 1.2 ha of wetland community loss.

Temporary short-term disturbance to vegetation outside of the direct impacts may also occur during construction (i.e., through soil compaction, sedimentation, contamination



from spills, dust generation, etc.). However, these indirect impacts are associated with the construction phase of the project and will be mitigated through the application of appropriate construction techniques and mitigation measures, as discussed within **Section 9.0**.

An equalizer culvert is being proposed to connect the two wetland sections of MASM1/MAMM1 wetland beneath the proposed extension of Bass Pro Mills Drive, as shown within **Figure 8**. Where possible, the culvert design shall combine both aquatic and terrestrial wildlife passage. TRCA's Crossings Guideline for Valley and Stream Corridors (TRCA 2015) and CVC's Fish and Wildlife Crossing Guidelines (CVC 2017) should inform the sizing and openness ratio requirements for the proposed culvert and crossing to provide passage for both fish and terrestrial wildlife, including mid-sized mammals.

Due to lack of access to private property during the course of this study, field visits were undertaken from publicly accessible ROWs. As such, it is recommended that additional environmental investigations be undertaken during the detail design phase of the project to confirm or refute the presence of SAR and species of concern or habitat.

The proposed construction area is located adjacent to watercourses and wetland communities that may provide habitat for turtles. To avoid interaction with turtle habitat, sediment fencing outside of turtle nesting season is recommended at the watercourse and wetland communities. If in-water work is proposed when turtles are overwintering (generally November 1 to March 31) MNRF should be consulted to determine authorization and mitigation requirements under the *Fish and Wildlife Conservation Act* (FWCA, 1997). If in-water work areas are determined to be suitable for overwintering turtles, a permit to handle and relocate turtles that are disturbed by the project during hibernation may be required.

A copy of the Environmental Impact Study report is available within **Appendix E**.

7.4.3 Climate Change

The MECP's guide, *Consideration of Climate Change in the Environmental Assessment Process*, outlines two approaches for considering and addressing climate change in project planning, including:

- Reducing a project's impact on climate change (through climate change mitigation measures)
- Increasing the project's and local ecosystem's resilience to climate change (through climate change adaptations)

As part of this study, the objectives of the climate change document have been considered and incorporated into the generation and evaluation of alternatives and mitigation measures. Additionally, a Climate Change Resiliency Assessment (CCRA)



has been prepared as part of this study to identify the climate risks to the project at a broad systems-level based on a future climate scenario and provides a discussion of the potential climate impacts on the project over the course of its construction and operational life. The CCRA is intended to inform the project team of the projected changes in climate and associated risks that should be considered at the detailed design phase regarding the impact of climate change on project infrastructure through the expected service life of the roadway (32 years which aligns with the average expected useful life of a collector road in Ontario).

Through the CCRA, the following climate change parameters were identified as having the highest potential to pose hazards to the project:

- High temperature extremes (high potential risk to result in more maintenance requirements and decrease the service life of the components of the roadway surfaces, as well as increased evaporation losses and more stress to vegetation and habitats of surrounding habitats of meadows, marshes and Black Creek which could threaten the survival of species).
- Freeze-thaw cycles (high potential risk of contraction/expansion of soils and extra pressure on pavement structure resulting in cracking, instability pothole formations, etc.).
- Short duration – high intensity rainfall (moderate risk to roadway and high risk to stormwater management system as a result of increased runoff overwhelming the stormwater drainage system resulting in flooding, as well as increased runoff to the tributary, meadows and marshes and increased delivery of nutrients and sediments).
- Heavy snowfall (high potential risk that increased maintenance requirements of roadway surfaces could result in safety issues for operations and maintenance staff).
- Freezing rain events (high potential risk that poorly impacted roadway conditions could result in safety issues for operations and maintenance staff as well as power line failure); and
- Wind gusts (high potential risk for wind speed to impact lighting/signage, landscaped vegetation and the safety of operations and maintenance staff and roadway users. High wind speed may cause trees to fall onto power lines resulting in power failure).

To minimize future climate change risks the following should be considered during detail design:

- Ensure project constructor takes future climate change parameters into account
- Continue consultation with stakeholders (i.e., TRCA, etc.)
- Consider reviewing climate risk assumptions and implement necessary measures at the time of retrofits and replacements, end of service life of components or assets.



- Consider developing operations and maintenance policies around monitoring for and addressing adverse weather conditions (i.e., clearing snow and debris, environmentally focused strategies for applying de-icing materials, etc.)
- Consider green infrastructure practices such as tree planting to provide shade and the use of bio-retention swales to slow down runoff and increase stormwater infiltration
- Consider the protection and rehabilitation of riparian vegetation to maintain current water temperature and minimize impacts on sensitive species under a warming climate and incorporate measures to reduce habitat fragmentation and increase connectivity by creating corridors for species movement.

A copy of the Climate Change Assessment Report is available for review in **Appendix F**.

7.5 SUBSURFACE SOILS AND GROUNDWATER

7.5.1 Soils

Based on the findings of the desktop review, subsurface soils within the project area are expected to consist of clay to silt-textured till, coarse- and fine- textured glaciolacustrine deposits and modern alluvial deposits, underlain by shale, limestone, dolostone and siltstone. A site-specific geotechnical investigation will be required during detail design to confirm subsurface soil conditions on-site.

7.5.2 Groundwater

Based on the findings of the desktop review, existing groundwater levels recorded on-site generally ranged between 3 m to 61 m below ground surface. A site-specific hydrogeological investigation will be required during detail design to confirm groundwater conditions on-site.

In addition, a review of MECP Water Well Records (WWRs) indicates that there are approximately 35 WWRs within 500 m of site. The purpose and status of these wells are reported to be as follows:

- 7 were recorded for domestic use;
- 5 were recorded as monitoring and test holes;
- 7 were recorded as test holes;
- 9 were recorded as not used; and
- 7 were recorded as unknown use.



Of these 35 WWRs, only 6 were located within or near the study area, most of which are located to the west of the study area 5 of which were recorded to be of unknown use or unused, and 1 was recorded be used for domestic purposes. However, this domestic WWR is located at an intervening distance and south of the preferred alignment.

During construction activities, if groundwater dewatering is required, the MECP requires a Permit to Take Water (PTTW) for construction dewatering in excess of 400,000 L/day, and an Environmental Activity and Sector Registry (EASR) for construction dewatering between 50,000 and 400,000 L/day. The potential need for a PTTW/EASR should be evaluated as part of detailed design and supported by site specific monitoring data. The PTTW/EASR review would include an evaluation of potential impacts to adjacent private wells and recommend mitigation measures as applicable.

7.5.3 Contaminated Sites

Based on background information and a site visit undertaken from publicly accessible areas, some of the properties within the study area have potential for contamination that could pose environmental concerns within the project area. The recommended alignment traverses properties which have been identified as having a high risk of contamination. As such, Phase One and Two Environmental Site Assessment investigations are recommended to assess if soil and/or groundwater impacts are present on-site, and to determine excess soil management procedures during construction.

7.5.4 Source Water Protection

The preferred design is located approximately 150 m northwest of an existing Highly Vulnerable Aquifer (HVA). AHVA can be easily changed or affected by contamination from both human activities and natural processes as a result of its intrinsic susceptibility, as a function of the thickness and permeability of overlaying layers; or by preferential pathways to the aquifer. The Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Plan (SPP) contains policies that apply in HVAs relating to the application of road salt and the handling and storage of dense non-aqueous phase liquids (DNAPLs) and organic solvents. While these policies are not applicable to the project due to the project's location outside of the HVA, the project will have a regard for these policies including developing a design that may discourage salt application or reduce the amount of salt water that recharges into the groundwater (e.g., through curb and gutter design, avoiding low spots for ponding, etc.). Preventative measures will also be considered as part of detail design of the project, such as the implementation of safe equipment fueling practices, maintenance of minimum setback distances from all surface water features for refueling/maintenance sites and storage of equipment/chemicals shall be in place during construction. All chemical storage and equipment maintenance activities will be located as far from the HVA as possible. In



addition, spill management equipment shall be readily available on-site during the project and any contaminated groundwater should not be discharged at the site without proper treatment. Following construction, the project will be included in the City of Vaughan's Salt Management Plan which ensures that the City continually improves the management of road salt used in winter maintenance operations through the use of best management practices.

According to the Source Protection Information Atlas, the study area is located within Wellhead Protection Areas Q1 and Q2, with moderate stress. The CTC SPP contains policies relating to activities within Wellhead Protection Areas Q1 and Q2 which could directly deplete, or reduce recharge to, an aquifer or surface water body. Should the project require dewatering during construction, policy DEM-1 within the plan could be applicable and states the following:

“Within the Tier 3 Water Budget WHPA-Q1 where a water taking is or would be a significant water quantity threat, the Ministry of the Environment, Conservation and Parks shall ensure each water taking threat ceases to be, or does not become significant, through actions the Director considers appropriate on a case by case basis, such as:

Issuing Permits to Take Water for new or increased takings, located within WHPA-Q1 with moderate or significant risk levels, only if it can be satisfactorily demonstrated, using the findings of the most recently approved Tier 3 Water Budget Model and other available data, where appropriate, that the taking: a) can be maintained on a sustainable basis; b) will not affect the ability of the aquifer to meet the municipal water supply requirements for the current and planned service capacity; and c) will ensure the hydrological integrity of municipal wells will be maintained”

As such, if construction dewatering is required, the collected groundwater will be discharged in such a way that it is returned to the same aquifer system so that the project does not result in a significant groundwater threat.

In addition, mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. An Erosion and Sediment Control Plan is recommended to be developed during the detail design phase of the project to confirm appropriate erosion and sediment protection measures when construction staging plans are developed.

7.5.5 Fluvial Geomorphology

As the existing Black Creek channel has been disturbed through a previous realignment and contains few bedforms and habitat features, minimal impacts are anticipated as a result of the implementation of the preferred design. The preferred design minimizes impacts to the existing Black Creek and its floodplain by requiring the least extensive



realignment and impacts to the current geomorphological function of Black Creek within the study area. The proposed Black Creek culvert is oriented perpendicular to the road stationing which will require a minor realignment of Black Creek, but minimizes channel length within the culvert, which in turn minimizes habitat loss. Additionally, the new culvert will allow Black Creek to tie into the existing watercourse downstream of the crossing, without impacting the property to the south. This will allow for the incorporation of flows from the existing tributary east of Black Creek, upstream of the crossing.

The existing tributary east of Black Creek was not observed during this assessment, as site access was not permitted during the field investigation. However, the tributary appears small in dimension, and it is anticipated that a realignment of the tributary could be designed to provide equivalent or improved habitat and conveyance capacity than exists presently.

Due to the lack of site access during this study, it is recommended that additional cross-sections be evaluated during the detail design phase of the project to confirm bankfull dimensions. Additionally, site specific geomorphic and topographic data for Black Creek and the east tributary should be obtained through a detailed field assessment prior to detail design, once full site access is available. This information will support the detail design of the minor realignment of Black Creek at the proposed culvert crossing and the design of the east tributary realignment.

A copy of the Fluvial Geomorphological Report is available within **Appendix H**.



8.0 CONSULTATION

Consultation is an integral part of the MCEA process and requires thoughtful planning and management. The goal of the consultation process for this study was to facilitate effective two-way communication between the City, public, First Nations, and key stakeholders such that the exchange of information effectively influences the decision-making during planning. Communication with potentially impacted and/or interested parties is key in the planning process and provides a mechanism for the City to define and respond to issues prior to key decisions being made. Recognizing this, the study team initiated a comprehensive consultation program from the onset of the study, as described herein.

A copy of the Consultation Plan is available within **Appendix O**.

8.1 STUDY WEBSITE

A study website (vaughan.ca/BassProMillsEA) was developed at the onset of the study to provide the public with easy access to project information, which was updated throughout the study process and included study background information, project team member contact information, Public Information Centre materials, links to project-specific documentation (i.e., VMCSP, PIC summary reports, etc.) and supplementary information.

8.2 STUDY CONTACT LIST

A study contact list was developed at study initiation and included multilevel government agencies and officials, City and Region staff, Council members, utilities, emergency service providers, potentially interested Indigenous communities, members of the public, and other local organizations and special interest groups. The study contact list was regularly updated to include those who expressed interest within the study.

8.3 NOTICES

All public notices were published within the Vaughan Citizen and Thornhill Liberal local newspapers to offer notification of study milestones and to invite members of the public to comment on the study. Each notice provided contact information should the reader have any questions, comments or concerns and wish to contact the study team directly. The public notices that were issued as part of this study are summarized below in **Table 12**.



Table 12: Summary of Notification Distribution

Public Notice	Method and Date of Distribution
Notice of Study Commencement	<ul style="list-style-type: none"> • Hardcopy mailed to study mailing list on March 5, 2020 • Electronic copy emailed to study mailing list on March 5, 2020 • Posted in local newspapers (Vaughan Citizen and Thornhill Liberal Newspaper) on March 5, 2020
Notice of Online Public Information Centre 1	<ul style="list-style-type: none"> • Hardcopy mailed to study mailing list on November 19, 2020 • Electronic copy emailed to study mailing list on November 19, 2020 • Posted in local newspapers (Vaughan Citizen and Thornhill Liberal Newspaper) on the following dates: <ul style="list-style-type: none"> – November 19, 2020 – December 3, 2020 – December 17, 2020
Notice of Online Public Information Centre 2	<ul style="list-style-type: none"> • Hardcopy mailed to study mailing list on August 12, 2021 • Hardcopy mailed to residents situated along Weston Road in the vicinity of the proposed extension • Electronic copy emailed to study mailing list on August 12, 2021 • Posted in local newspapers (Vaughan Citizen and Thornhill Liberal Newspaper) on the following dates: <ul style="list-style-type: none"> – August 12, 2021 – September 2, 2021
Notice of Study Completion	<ul style="list-style-type: none"> • Hardcopy mailed to study mailing list on August 18, 2022 • Hardcopy mailed to residents situated along Weston Road in the vicinity of the proposed extension • Electronic copy emailed to study mailing list on August 18, 2022 • Posted in local newspapers (Vaughan Citizen and Thornhill Liberal Newspaper) on the following dates: <ul style="list-style-type: none"> – August 18, 2022 – August 25, 2022

In addition to the local newspaper postings, study notifications ‘dropped’ via Canada Post AdMail in flyer format to approximately 4,900 residents and property owners within a 200 m radius of the study area on the first date of issuance for each notice.



A copy of the study notices is provided within **Appendix O**.

8.4 PUBLIC CONSULTATION

8.4.1 Stakeholder Group

A Stakeholder Group was established at the onset of the study to ensure that representatives from the community who have a good understanding of the local conditions were involved in the decision-making process. Invitations to participate in the Stakeholder Group were also issued to the local landowners group, developers, property owners, and business operators, as part of the Notice of Study Commencement.

Two Stakeholder Group meetings were held over the course of the study, in advance of PIC 1 and PIC 2, so that any ideas generated through this process could be incorporated into the technically recommended solution or design prior to the PIC. Each of the two Stakeholder Group meetings included a presentation from the study team, followed by a question-and-answer period. The Stakeholder Group generally consisted of representatives of the local landowners group, developers, property owners and members of the public who expressed an interest in participating in the Stakeholder Group. All stakeholders were included in the study mailing list and updated regularly to ensure communication effectiveness. A record of the relevant correspondence with the Stakeholder Group is provided in **Appendix O**.

Stakeholder Group Meeting 1

Stakeholder Group Meeting 1 was held virtually on September 14, 2020, in advance of Online PIC 1. The purpose of the meeting was to present and gather feedback on study background information, preliminary traffic/transportation analysis, problems and opportunities, the nature and timing of field work, existing area conditions, the evaluation of alternative solutions, draft design criteria and the general project schedule and timelines.

At this meeting, attendees shared their concerns with existing and potentially exasperated traffic infiltration within the Weston Downs neighbourhood situated to the west of Weston Road, should a new road extension be developed in this area.

Stakeholder Group Meeting 2

Stakeholder Group Meeting 2 was held virtually with key representatives on July 30, 2021, in advance of Online PIC 2. The purpose of the meeting was to present and gather feedback on study background information, traffic impact assessment, natural environment conditions, evaluation of alternative designs, the technically recommended design, stormwater management approach, potential impacts and mitigation measures, and next steps in the study process.



At this meeting, participants were in generally agreement with the technically recommended design, particularly since the recommended alignment did not intersect Weston Road at its existing intersection with Astona Boulevard to the west.

A copy of the minutes of Stakeholder Group Meetings 1 and 2, as well as the information shared at the meetings are provided in **Appendix O**.

8.4.2 Public Information Centres

Two PICs were held to share information and solicit feedback from the public, agencies, Indigenous communities, and other stakeholders. While PICs are typically held in person, the COVID-19 pandemic occurred shortly following commencement of this study. Due to associated physical distances requirements, both PICs were held online via the City's dedicated study website using the *Articulate Storyline* platform. As such, each PIC included a pre-recorded presentation which shared the study materials on a set of slides, along with a transcript, which was available both audibly and visually next to each slide. This format allows participants to read/listen to the presented information, as well as pause the presentation, or skip ahead to the section that interests them most.

8.4.2.1 Online Public Information Centre 1

The first PIC was arranged to present and solicit feedback on the study background, evaluation of alternative solutions and associated evaluation criteria, the recommended solution, and next steps in the study process.

PIC 1 was held online on the study website from December 3, 2020, to January 8, 2021. Online PIC 1 participants were encouraged to submit feedback and ask questions via an online survey, or by contacting study team members directly. All participants were encouraged to provide their feedback by January 8, 2021.

In total, 471 unique visitors to the Online PIC presentation were recorded, and 101 survey responses were received. In addition, 2 telephone calls and 12 emails were received during the Online PIC 1 review period. Further, 19 comments were received through the City's social media account pushes on Instagram and Facebook.

In general, comments received during the PIC review period included concerns for a potential increase in traffic congestion, traffic infiltration into adjacent communities, lack of alternative routes and the need for pedestrian/cyclist facilities and safety.

A copy of the Online PIC 1 Summary Report is provided within **Appendix O**.

8.4.2.2 Online Public Information Centre 2

Online PIC 2 was arranged to inform and engage City residents and other stakeholders on the study background, feedback received in response to Online PIC 1, the preliminary findings of the traffic analysis and environmental investigations, evaluation



of alternative cross-sections and alignments, the Technically Recommended Design, and next steps within the study process.

Similar to Online PIC 1, PIC 2 was hosted on the City's dedicated study website from August 19, 2021, through September 16, 2021. An online survey was provided at the end of the presentation to allow participants to provide feedback and ask questions, as well as study team contact information should participants wish to contact the study team directly. All participants were encouraged to provide their feedback by September 16, 2021.

In total, 309 unique visitors to the Online PIC 2 presentation were recorded, and 2 survey responses, 1 telephone call and 2 emails from the general public were received. In general, the feedback received was positive in nature, including support for the provision of active transportation facilities within the Technically Recommended Design, and agreement that the extension would provide much needed alleviation of east-west traffic conditions. Additionally, concerns regarding potential increases in traffic congestion on Weston Road, traffic infiltration into adjacent neighbourhoods and cyclist/pedestrian safety were also received.

A copy of Online PIC 2 Summary Report is provided within **Appendix O**.

8.5 PROPERTY OWNER CONSULTATION

Following PIC 2 and the confirmation of the Technically Recommended Design, each impacted property owner was emailed to request to meet individually to discuss the project. The purpose of these meetings was to inform property owners of the progress of the study and the Technically Recommended Design, as well as discuss potential impacts and mitigation strategies one-on-one with each property owner. Due to the ongoing COVID-19 pandemic, virtual meetings were held in September 2021 with each of the three property owners who have the potential to be directly impacted by the Technically Recommended Design. As part of each meeting, representatives from the study team offered a brief overview of the study, anticipated timeline, and rationale for the selection of the Technically Recommended Design. In addition, conceptual drawings were shared to help to describe potential property impacts and mitigation approaches.

In summary, the property owners were generally in favour of the project; however, some were concerned regarding potential impacts to their entrances/exits and how their business may operate following the implementation of the extended roadway. Some wanted to confirm that the study team was aware of the ongoing Planning Act process for the VM CSP and acknowledgement that the road network and ultimate location for Black Creek were under review.

Consultation with property owners has been ongoing throughout the study process and will continue to be carried out during detail design to confirm impacts and property acquisition requirements.



Copies of the minutes from each property owner meeting is available in **Appendix O**.

8.6 AGENCY CONSULTATION

The following external agencies and stakeholders were contacted directly via mail and/or email, as appropriate, as part of each round of notification:

Federal / Provincial Agencies:

- Ministry of Agriculture Food and Affairs
- Infrastructure Ontario
- Ministry of Municipal Affairs and Housing
- Ministry of Heritage, Sport, Tourism and Culture Industries
- Ministry of Natural Resources and Forestry
- Ministry of the Environment, Conservation and Parks
- Ministry of Transportation Ontario
- Environment Canada

Municipal Agencies & Conservation Authorities:

- Toronto and Region Conservation Authority

- Regional Municipality of York

Local Elected Representatives:

- City of Vaughan – Mayor and Council Representatives
- Vaughan-Woodbridge - MP

Emergency Services:

- York Region Police Services
- Vaughan Fire and Rescue Service Department
- York Region Paramedic Services
- Ontario Provincial Police

School Boards / Bus Services:

- York Region District School Board
- York Catholic District School Board
- VivaNext

8.6.1 Technical Advisory Committee

A Technical Advisory Committee (TAC) was established at the onset of the study to meet at key study milestone and allow participants to provide technical input into the existing study area conditions, confirm the requirements for the project and review and provide feedback on the alternatives and preliminary design. An invitation to join the TAC was distributed to selected agencies, municipal representatives, utilities, and other stakeholders in conjunction with the Notice of Study Commencement. Each meeting was held in advance of the two PICs to allow participants to provide valuable input to project planning. A summary of the feedback received and how it was addressed as part of this study has been incorporated within **Table 13** below.



TAC Meeting 1

TAC Meeting 1 was held with agency representatives on September 9, 2020, in advance of PIC 1. As part of this meeting the study team shared a presentation with attendees, which was followed by an open question/answer period to provide participants with an opportunity to raise questions, discuss concerns and provide valuable technical feedback and suggestions. The purpose of the meeting was to present and gather feedback on study background information, preliminary traffic/transportation analysis, problems and opportunities, the nature and timing of field work, existing area conditions, the evaluation of alternative solutions, draft design criteria and the general project schedule and timelines.

TAC Meeting 2

Technical Advisory Committee (TAC) Meeting 2 was held with agency representatives on July 27, 2021, in advance of PIC 2. As part of this meeting the study team shared a presentation with attendees, which was followed by an open question/answer period to provide participants with an opportunity to raise questions, discuss concerns and provide valuable technical feedback and suggestions. The purpose of the meeting was to present and gather feedback on study background information and public feedback received to date, traffic analysis, natural environment conditions, evaluation of alternative designs, the Technically Recommended Design, stormwater management approach, potential impacts and mitigation measures and next steps in the study process.

A copy of the meeting minutes and the information shared at the meetings is provided in **Appendix O**.

8.6.2 Agency Correspondence

All relevant agencies were included in the study mailing list and updated regularly to ensure communication effectiveness. During the course of this study responses were received from the following agencies: Ministry of Environment, Conservation and Parks, TRCA, Ministry of Heritage, Sport, Tourism and Culture Industries, MTO, Ministry of Municipal Affairs and Housing, York Region, Zayo and Hydro One, copies of which are provided in **Appendix O**.

In addition, individual meetings were held with the TRCA, York Region and MTO to present information and gather feedback on the traffic modeling and natural environment investigations and recommendations, evaluation of alternative design concepts and the subsequent Technically Recommended Design. The information presented at these meetings and feedback received is discussed within **Section 5.0**, and a copy of the information presented at the meetings and associated meeting minutes is available within **Appendix O**.



A summary of key comments submitted by agencies and responses provide and/or actions taken during the course of the study are summarized within **Table 13**.

Table 13: Summary of Agency Comments and How They’ve Been Addressed

Comment/Theme	Response Provided and/or Action Taken
<p>MTO reviewed the Traffic Impact Assessment (TIA) report and requested that the traffic analysis consider a dual left turn lane onto Bass Pro Mills Drive from the north-bound off ramp to ensure that there are no impacts to the ramp operations resulting from the road extension.</p>	<p>The TIA and preliminary design plans were updated to incorporate this feedback. Stantec considered rationalizing the Bass Pro Mills Drive/Fishermens Way intersection to mitigate drivers going the wrong direction. As such, the north ramp was not altered significantly.</p>
<p>MTO indicated that the Fishermens Way/Bass Pro Mills Drive intersection will need to be updated to meet AODA standards.</p>	<p>Study team acknowledged this requirement and noted that this will be considered during detail design.</p>
<p>MTO provided standards with their desired dimensions for the Highway 400 Bridge crossing, including implementing a median, all 3.5 m lanes, and desired widths for clearance, AT facilities (preferred to be consistent with the approaches) and barriers.</p>	<p>The study team had reviewed a number of alternatives for the Highway 400 Bridge crossing that could satisfy MTO’s desired standards and dimensions including Bidirectional and on-street cycling facilities. These were screened out for a number of reasons, mainly for user comfort and safety. A separate AT bridge was also considered, but while offering safety for users, would be costly to build and maintain, not as accessible for all ages and abilities, could potentially impact private property and would leave a lot of unused deck width on the existing bridge that could encourage speeding and possibly encourage cyclists and pedestrians to use the bridge unsafely.</p> <p>Continuity of the recommended separated cycling lane and sidewalk or multi-use path on both sides of the</p>



Comment/Theme	Response Provided and/or Action Taken
	<p>bridge, would be very costly to implement on the crossing structure as it would require the widening of the existing structure on both sides to provide for MTO's desired dimensions. There are also concerns with horizontal clearance beneath the bridge which could be impacted by the Highway 400 widening project and future plans for a full moves interchange at Langstaff Road. As such, the preferred design includes sidewalks on either side of the structure with signage instructing cyclists to dismount while crossing the structure, 0.5m clearance, 3.5m lanes and a median are maintained. Reference is being made to a 2018 MTO memo which allows for reduced widths in constrained areas in order to accommodate AT facilities.</p>
<p>York Region requested that plan and profile drawings of the Preferred Design show a fully signalized intersection at the future Bass Pro Mills Drive and widened Weston Road, along with a raised centre median and turning lanes.</p>	<p>Design drawings were updated to show the proposed intersection at Weston Road, noting that they are conceptual in nature and subject to change based on future developments (i.e., future widening of Weston Road and implementation of the VM CSP).</p>
<p>York Region indicated that the spacing between Astona Boulevard and the future Bass Pro Mills Drive intersections is less than York Region's minimum spacing requirements for adjacent intersections.</p>	<p>A queuing analysis review was conducted based on the microsimulation model results for the segment of Weston Road between Astona Boulevard and the future Bass Pro Mills Drive extension. The results indicated that the maximum queue lengths may be greater than the space provided between intersections; however, on average the queueing lengths will fall below the provided length of space. Thus, it was concluded that this segment of Weston Road will be able to support</p>



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Comment/Theme	Response Provided and/or Action Taken
	<p>traffic in both directions while congestion may be experienced for short periods of time. It should be noted that when the future development of the VMCSP is considered, the maximum and average queueing lengths will be greater than the space provided. As such, it is recommended that the queueing lengths on this segment of Weston Road be further reviewed as part of a future VMCSP transportation study. This information was reflected within the TIA.</p>
<p>York Region indicated that traffic operational issues for the existing commercial driveway for the southwest property owner (abutting onto Weston Road) were not considered within the TIA.</p>	<p>The TIA was updated to consider and evaluate potential impacts to this commercial driveway. Future conceptual entrances/exit plans were subsequently developed and shared with the Region and property owner for consideration.</p>
<p>TRCA indicated that a Fluvial Geomorphology Study and EIS report would be required to analyze the feasibility of the location of Black Creek.</p>	<p>As the future alignment of Black Creek is subject to future development (VMCSP), the study team assessed realignment options at a high level to confirm feasibility and functionality. Additional investigations were deferred to detail design, at which time the land access and land use configuration will be known. As such, the detailed review will be completed by others as part of the Planning Act requirements and/or Site Plan Application process.</p>
<p>TRCA requested that the preferred design include an equalizer culvert to connect the wetland that will be bisected by the future roadway extension and provide a terrestrial passage for wildlife.</p>	<p>A commitment to consider the implementation of an equalizer culvert and terrestrial ecopassage during detail design has been added to this ESR. The timing of which will allow for additional species-specific surveys and an Ontario</p>



Comment/Theme	Response Provided and/or Action Taken
	Wetland Evaluation System (OWES) can be undertaken.
TRCA requested copies of the draft SWM and EIS reports for review.	Copies of these reports were provided to the TRCA prior to the draft ESR agency review period. Comments provided by TRCA were considered and implemented where appropriate. In addition, two sets of comprehensive responses were prepared to help ensure that each comment was responded to and/or addressed.

The list of ministries, municipalities, agencies, and authorities contacted as part of this study is provided in **Appendix O**, along with a copy of relevant correspondence.

8.7 INDIGENOUS CONSULTATION

The appropriate Indigenous communities and/or organizations to contact concerning this study were identified based on desktop research during the initial stages of the MCEA process and in consultation with the MECP.

The following Indigenous communities were notified as part of this study:

- Williams Treaties First Nations
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Mississaugas of the Credit First Nation
- Huron-Wendat National Council

The first point of contact was provided via the Notice of Study Commencement and Notice of Request to Consult, which was sent via email and direct mail to representatives of the above-noted communities on March 6, 2020. Where a response was not received, follow-up telephone calls and emails were undertaken to help ensure that communities had sufficient information to determine their level of interest in the study and to discuss any initial comments and/or concerns.

Notices for each of the Online PICs were issued via mail and email to these Indigenous communities on the following dates:



- Online Public Information Centre 1 - November 27, 2020
- Online Public Information Centre 2 - August 12, 2021

In summary, 6 responses were received from Indigenous communities contacted as part of this MCEA study. A summary of the comments received and how they were addressed is documented in **Table 14** below.

Table 14: Summary of Indigenous Community Comments and Responses

Comment/Theme	Response Provided and/or Action Taken
Requested a copy of the GIS shapefiles of the study area.	The requested GIS shapefiles were provided.
Requested a copy of the Stage 1 Archaeological Assessment Report and Environmental Impact Assessment.	Electronic copies of the draft reports were provided to each Indigenous community who requested a copy. Following the distribution of the reports the Indigenous communities confirmed that they had no comments on the reports.
Requested to be included in any future Stage 2 AA field work.	Written commitment to include representative field liaisons during the Stage 2 AA, which will be completed during detail design.

A record of correspondence carried out with Indigenous communities is documented within the Indigenous Consultation Log provided within **Appendix O**.

8.8 NOTICE OF STUDY COMPLETION

Upon finalizing this ESR, the City of Vaughan issued a Notice of Study Completion on **August 18, 2022**, providing a minimum 30-day period during which documentation may be reviewed and comments and input can be submitted to the City. The Notice of Study Completion was submitted to MECP via the appropriate regional email address (eanotification.cregion@ontario.ca).

The City may not proceed with the project until at least 30 days after the end of the comment period provided for within the Notice of Study Completion.

Interested persons may provide written comments to the study team by **September 19, 2022**. All comments and concerns should be sent directly to the below City contact:



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Hilda Esedebe, P.Eng.
City of Vaughan
Project Manager
2141 Major Mackenzie Drive
Vaughan, ON L6A 1T1
Hilda.Esedebe@vaughan.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name.

Requests should specify what kind of order is being requested (request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Requests should also be copied to the above City contact by mail or by e-mail. Please visit the ministry's website for more information on requests for orders under section 16 of the Environmental Assessment Act at: <https://www.ontario.ca/page/class-environmentalassessments-part-ii-order>

All personal information included in your request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected



for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

A copy of the Notice of Study Completion is provided within **Appendix O**.

8.9 SUMMARY OF PUBLIC CONCERNS AND ASSOCIATED CONSIDERATIONS

Over the duration of the study, many comments were received from the general public and stakeholders that covered various themes including traffic congestion, active transportation facilities, and comments on the preferred design. **Table 14** provides a summary of the main comments/themes and associated responses provided and/or action taken by the project team. A copy of all correspondence is included within **Appendix O**.

Table 15: Summary of Public Comments and Actions Taken

Comment/Theme	Action Taken
Concern for increased traffic congestion and lack of alternative routes within the study area.	The completion of a Traffic Impact Assessment (TIA) confirmed that the implementation of the extension of Bass Pro Mills Drive, as well as the widening of Weston Road, will result in an overall reduction in travel delays and provide an alternative east-west route for traffic to alleviate Rutherford Road. Additional information was provided on the slides presented at both PIC 1 and PIC 2 to summarize the findings of the TIA.
Concern that the extension of Bass Pro Mills Drive will increase traffic congestion on Weston Road.	The findings of the TIA confirmed that although the proposed Bass Pro Mills Drive extension will result in the overall improvement of traffic within the study area, increases in traffic demand due to projected population growth and future development within the already congested road network will result in operational issues. However, on average the queueing lengths will fall below the provided length of space. Thus, it was



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Comment/Theme	Action Taken
	concluded that this segment of Weston Road will be able to support traffic in both directions while congestion may be experienced for short periods of time. These findings were summarized on the slides presented at PIC 2.
Concern that the extension of Bass Pro Mills Drive will encourage east-west traffic infiltration through the adjacent neighbourhoods.	The TIA confirmed that the extension of Bass Pro Mills Drive will not increase traffic infiltration into adjacent neighbourhoods. Slides were presented at PIC 2 to summarize these findings, and responses were sent to residents and neighbourhood ratepayers associations to address their concerns.
Need for pedestrian and cyclist friendly routes within the study area and concern regarding cyclist safety near the existing Highway 400 ramp.	The need for safe and comfortable active transportation facilities was considered through the identification and evaluation of Alternative Cross-Sections. Sidewalks and separated cycling facilities have been incorporated into the preferred design on either side of the roadway. An illustration of the recommended cross-section was presented as part of PIC 2. A commitment to direct cyclists to dismount their bicycles before entering Highway 400 bridge has been recommended as part of this study to help support cyclist safety.
Concern regarding the potential for impacts to the environment, wildlife and noise/air pollution.	A Noise Impact Assessment, Air Quality Impact Study and Environmental Impact Study were prepared to investigate existing conditions within the study area, identify potential impacts as a result of the preferred design and recommended mitigation measures. Summary slides were developed and presented in PIC 1 and PIC 2 to present the findings of the studies.
Suggestion to incorporate roundabouts at future intersections along the roadway	A roundabout screening was completed to confirm the feasibility of incorporating roundabouts in the preferred design.



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Comment/Theme	Action Taken
extension to mitigate potential traffic congestion.	However, it was not recommended due to additional spatial and ROW requirements, operational challenges and pedestrian/cyclist crossing concerns. A slide summarizing the findings of the roundabout screening was prepared and presented at PIC 2.



9.0 MITIGATION MEASURES, IMPLEMENTATION COMMITMENTS AND MONITORING

The various environmental sensitivities and areas of concerns related to the preferred design are summarized within **Table 16** below. These mitigation measures and implementation commitments will serve as a reference during detail design and construction. It should be noted that detail design of the proposed extension of Bass Pro Mills Drive will be fully integrated with the land use planning activities associated with the Vaughan Mills Centre Secondary Plan Area. City contract administration staff shall undertake normal supervisory activities within respect to the administration of environmental controls incorporated into the contract package, as well as ensuring their effective application in accordance with the spirit and intent of this report.

Table 16: Summary of Mitigation Measures, Implementation Commitments and Monitoring

Item	Description
Individual Trees	<ul style="list-style-type: none"> • Tree removals should be conducted by a qualified arborist following best arboricultural practices. • Removal activities will avoid or minimize impacts to adjacent trees to be preserved and timing of removals shall occur outside of the breeding bird period (April 1 to August 31). • If tree removal must occur within this window, a wildlife sweep conducted by a qualified biologist shall be completed to document bird nests of species protected under federal Migratory Birds Convention Act (1994). • New trees will be provided within the new ROW boulevard as part of the streetscaping plan, to be completed during detail design. • TRCA’s Landscaping and Tree Preservation Guidelines will be used for guidance in the planting of new SWM facilities.
Terrestrial Environment	<ul style="list-style-type: none"> • Detailed ecological field investigations will be undertaken during detail design to further refine Ecological Land Classification vegetation communities and to collect additional botanical information for the inaccessible areas. • Marsh bird call playback surveys will be carried out during detail design to inform the wetland compensation. • Delineation of the wetland boundaries, including along Black Creek, will be undertaken during detail design to confirm the size, wetland type and function of the existing



Item	Description
	<p>wetland, and to apply the appropriate compensation measures for the removal of the wetland to accommodate the project. The wetland shall be delineated and staked in the field with TRCA, when land access becomes available.</p> <ul style="list-style-type: none"> • Marsh breeding bird surveys and turtle basking surveys are required to be completed during detail design to confirm the presence/absence of significant wildlife habitat for marsh breeding birds and turtle wintering areas, which will assist with evaluating the wetland and determining appropriate compensation for the ecosystem structure and functions. • The Mississaugas of the Credit First Nation and Huron Wendat will be invited to participate in the future natural environment field assessments to take place during detail design. • The development and implementation of a management plan shall be undertaken to prevent the introduction of invasive European reed into the work areas and prevent seed from spreading to disturbed substrates. • A clean equipment protocol to prevent spread through equipment transfer and monitoring plant to control new colonies is recommended. • Considerations related to substrate within the Black Creek channel and crossing structure, fencing to guide animals and the approach to the structure design is to be considered at detailed design. • Compensation for wetlands will be confirmed during detail design, in consultation with TRCA, and will follow the requirements in the TRCA's Guideline for Determining Ecosystem Compensation. • An equalizer culvert to maintain water balance between the bisected wetlands shall be designed to accommodate wildlife passage. • The Black Creek culvert shall also incorporate an open bottom culvert to permit wildlife movement and fish passage to accommodate target species of small mammals, amphibians and reptiles. • The new Black Creek and equalizer culvert shall be design in consideration of the Crossing Guideline for Valley and Stream Corridors and the Fish and Wildlife Crossing Guidelines



Item	Description
	<ul style="list-style-type: none"> • A planting plan will be established to improve the riparian conditions and increase habitat diversity within wetland and wet meadows. • If in water work is required when turtles are overwintering (November 1 to March 31), MNRF shall be consulted to determine authorization and mitigation requirements under the Fish and Wildlife Conservation Act (FWCA, 1997). • Re-vegetation should include only native plants that are suitable to the site conditions. Re-vegetation plans should be prepared to the satisfaction of the TRCA. • Any disturbed natural areas must be restored to pre-construction conditions following the completion of construction activities.
Fish/Fish Habitat	<ul style="list-style-type: none"> • Realignment of Black Creek is proposed. The length of the proposed channel will be determined during detail design. • DFO review under the <i>Fisheries Act</i> will be required for the realignment of a section of Black Creek and the realignment of its tributary and for the new crossing if in water work is required only. • A determination regarding whether the in or near water work will require DFO review during detail design. If it is determined that DFO review is required, DFO's Request for Review Form submission will be made • During isolation of flow, fish recovery and transfer will need to be conducted in accordance with a Licence to Collect Fish for Scientific Purposes obtained from the MNRF.
Fluvial Geomorphology	<ul style="list-style-type: none"> • It is recommended that additional Black Creek culvert cross-sections be evaluated during the detail design phase of the project to confirm bankfull dimensions. • All future channel realignments will follow the TRCA's Channel Modification Design and Submission Requirements • Site specific geomorphic and topographic data for Black Creek and the east tributary shall be obtained through a detailed field assessment prior to detail design, once full site access is available. This information will support the detail design of the minor realignment of Black Creek at the proposed culvert crossing and the design of the east tributary realignment.



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Item	Description
Archaeology	<ul style="list-style-type: none"> • Areas having the potential for the recovery of archaeological resources have been identified within the study area. • A Stage 2 Archaeological Assessment will be undertaken during detail design within the areas expected to be impacted by construction activities. • The Mississaugas of the Credit First Nation and Huron Wendat will be invited to participate in the Stage 2 field assessment and provided with a copy of the Stage 2 Archaeological Assessment report. • Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b). • The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Government and Consumer Services.
Air Quality	<ul style="list-style-type: none"> • The recommendations set forth in the Environment and Climate Change Canada’s (ECCC’s) guideline “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” will be followed to reduce construction emissions, such as material wetting, use of wind barriers and limiting exposed areas which may be a source of dust, equipment washing, proper maintenance of construction equipment and vehicles, introduction of no-idling policy to control construction vehicle emissions where applicable, etc. • Non-chloride dust suppressants will be used for the entrainment of fugitive dust particles during construction • Construction best management practices be developed and implemented during the construction phase. • The contractor may consider following ECCC’s guideline on ambient monitoring of dust or combustion gases (e.g.,



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Item	Description
	<p>NO₂), to measure contaminant concentrations, detect potential exceedances of a standard, adjust mitigation measures and confirm effectiveness.</p>
Noise (Construction)	<ul style="list-style-type: none"> • Equipment used beyond typical construction hours (i.e., daytime hours) shall conform with MECP’s noise publication guidelines NPC-115 (Sound emission standards for construction equipment) and NPC-118 (Sound emission standards for motorized conveyances). • The contractor will comply with the terms and conditions of City of Vaughan’s Noise By-law 121-2021. An exemption from these by-laws would be required if the construction activities are expected to extend beyond the allowable construction hours set by this by-law (i.e., 7 a.m. to 7 p.m.), or on Sundays/statutory holidays. • Practices to reduce noise generated at the site, such as ensuring equipment and machinery are turned off when not in use, will be employed throughout construction. • Temporary noise generated during construction is expected to be variable and intermittent in nature. Where required, temporary noise mitigation measures, such as installing of shipping containers to block the direct line-of-sight between the site and nearby receptors, may be implemented. • For areas where the noise impact is considered to be significant, construction activities timing/scheduling will be implemented, such as limiting simultaneous occurrence of major noise generating activities. • Major noise generating activities will be scheduled to take place during daytime hours when the background noise levels are expected to be higher. • Practices to reduce noise, such as ensuring equipment and machinery are turned off when not in use will be employed.
Vibration	<ul style="list-style-type: none"> • Construction vibration monitoring related to construction activities will be carried out to verify that acceptable construction vibration levels are not exceeded.
Contamination	<ul style="list-style-type: none"> • At a minimum, Phase One and Two Environmental Site Assessment investigations will be completed to determine the need for additional investigations and identify appropriate mitigation measures and procedures.



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Item	Description
Subsurface Soil Conditions	<ul style="list-style-type: none"> • A site-specific geotechnical and hydrogeological investigation will be completed during detail design to confirm subsurface soil conditions on-site. • The geotechnical study undertaken during detail design and any supporting field data will assess the impacts of the required water taking on the zone of influence and identify any potential for structural damage.
Excess Soil Management	<ul style="list-style-type: none"> • Excess materials generated during construction will be managed in accordance with O.Reg. 406/19. All materials and debris will be removed upon completion of the work, in accordance with O.Reg. 406/19. • At the time of issuing this ESR, O.Reg 338/22, which outlines a temporary suspension of certain requirements of O.Reg. 406/19: On-Site and Excess Soil Management, that came into effect on January 1, 2022, was in place (effective April 20, 2022). However, it is understood that the O.Reg. 406/19 requirements suspended as part of O.Reg. 338/22 are temporary in nature and are expected to be effective only until January 1, 2023. Given that detail design and construction of this project are anticipated to occur after January 1, 2023, the provisions set forth under O.Reg. 406/19 are expected to apply to this undertaking.
Erosion and Sediment Control	<ul style="list-style-type: none"> • An Erosion and Sediment Control Plan will be completed during detail design in consideration of site-specific conditions to address possible construction-related impacts on surface water features and the natural environment. • Silt fencing and/or barriers are recommended where there is potential for sedimentation of watercourses or inadvertent encroachment of construction activities into natural areas. • Exposed soil areas should be stabilized and re-vegetated through the placement of native seed mixes, mulching and an erosion control blanket promptly upon completing construction. • Equipment will be refueled at minimum 30 m away from watercourses to avoid potential impacts if an accidental spill occurs. • All sediment and erosion controls will be monitored and properly maintained regularly, and controls shall only be removed after soils of the construction area have been



Item	Description
	<p>stabilized and adequately protected, or until cover has been re-established.</p>
<p>Stormwater/Drainage</p>	<ul style="list-style-type: none"> • The final design of the stormwater drainage system will be completed in accordance with City standards and guidelines. • Due to the change in contributing drainage area as a result of the preferred design, the wetland will need to be evaluated utilizing TRCA’s WWBRE screening tool to determine the extent of the required feature-based water balance assessment. • A desktop derived feature based Thornwaite Mather water balance assessment for the wetland will need to be completed during detail design when more information regarding the wetland and contributing drainage area are known. • Various relevant Low Impact Development (LID) measures (i.e., bioretention facility, grass swales, bioswales, underground chambers, infiltration rock trenches, soil support systems, etc.) shall be further reviewed and implemented during detail design to promote the management of water quality/quantity and erosion control as a result of roadway runoff. These features shall be designed in accordance with MECP Guidelines, the LID SWM Design Guide, or the most current design publications. • A combined SWM facility that services both the preferred design and VMCSP should be considered during detail design if the timing of the construction of the two developments coincides. • During final stages of the MCEA process, TRCA was unable to confirm acceptability of a specific design and/or the interim and ultimate locations of the Black Creek Crossing. As such, a refined level of design will be developed in consultation with TRCA, and in association with the Planning Act process associated with development within the VMCSP area, at which time the final location and configuration of the realigned Black Creek watercourse will be confirmed. • An equalizer culvert between the north and south portions of the bisected wetland is required to maintain water balance, hydraulic connectivity, as well as facilitate wildlife crossing requirements. The culvert will be sized during



Item	Description
	<p>detail design and should be countersunk, and the bottom filled with river stone to ensure wetland connectivity and accommodate wildlife passage.</p> <ul style="list-style-type: none"> • An assessment of the project’s potential impact on surface water features within the zone of influence shall be completed by a surface water specialist during detail design. • During construction, all chemical storage and equipment maintenance will be located as far from the HVA as is practical. • A performance monitoring and maintenance plan shall be developed during detail design to ensure the treatment efficiency of SWM facilities. • The SWM facilities will be designed to meet the proposed Enhanced Water Quality Control (80% TSS removal).
Groundwater	<ul style="list-style-type: none"> • A site-specific hydrogeological investigation will be completed during detail design to confirm subsurface groundwater conditions on-site. • During construction activities, if groundwater dewatering is required, the MECP requires a Permit to Take Water (PTTW) for construction dewatering in excess of 400,000 L/day, and an Environmental Activity and Sector Registry (EASR) for construction dewatering between 50,000 and 400,000 L/day. • The potential need for a PTTW/EASR shall be evaluated as part of detail design and supported by site specific monitoring data. • The potential need for a dewatering permit shall be evaluated as part of detailed design and supported by site specific monitoring data. If a dewatering permit is required, the hydrogeological study and supporting field data will assess the impacts of the required water taking on the surrounding environment and other water users. • If a dewatering permit is required, a groundwater quality assessment and discharge plan will be completed as part of the supporting documents for the PTTW application(s). • Should a dewatering permit be required, a related monitoring and mitigation plan for preventing the redirection and mobilization of potential contamination identified in the potential contaminated sites shall be provided in support of a PTTW application(s) and will be implemented to ensure potential neighbouring private wells



Item	Description
	<p>are not permanently impacted and prevent any structural damage.</p> <ul style="list-style-type: none"> • Should a dewatering permit be required within any properties which are not owned by the City, a written permission to carry out the water taking will be obtained from the owner(s) of the property(ies) prior to any water taking. Written permission(s) will be required as part of the supporting documents for the PTTW application(s). • If construction dewatering is required, the collected groundwater will be discharged in such a way that it is returned to the same aquifer system so that the project does not result in a significant groundwater threat. • Detail design will consider ways to discourage salt application or reduce the amount of salty water that recharges into groundwater (i.e., curb and gutter design, no low spots for ponding, etc.). Upon completion, the project will be included within the City's Salt Management Plan which ensures the continuous improvement of the management of road salt used in winter maintenance operations through the use of best management practices. • Groundwater levels will be monitored during construction activities to assess potential changes in groundwater levels. • To prevent the release of any contaminants to the sewers and/or subsurface, detail design will consider appropriate catchment and containments. • Subsurface municipal service installation will consider the use of a channel/trench barrier mechanism to prevent the creation of preferential pathways for any future contamination.
Utilities	<ul style="list-style-type: none"> • The City will continue to engage with York Region and utility providers during detail design.
Property	<ul style="list-style-type: none"> • Modifications to existing driveway entrances will be required. Driveway profiles will be confirmed during detail design to confirm grades and impacts. The City will work with affected property owners to develop restoration plans for work on private property and will negotiate agreements giving the City permission to enter and construct on private property.



Item	Description
	<ul style="list-style-type: none"> Property impacts and subsequent mitigation measures will be confirmed during the detail design stage of the project in continued consultation with affected property owners. Property acquisition will be undertaken in accordance with the City's procedures and will occur during detail design, following the completion of this study.

Mitigation measures shall be implemented and maintained through on-site inspections by City staff, who will ensure that impacts to the natural, social and economic environments are minimized, where possible. The inspection staff will also ensure that items such as sedimentation controls and appropriate signage are maintained throughout construction.

Closure events and restricted access to local residents and/or businesses shall be minimized to the greatest extent possible to facilitate vehicle and pedestrian movement during construction.

9.1 PERMITS AND APPROVALS

Any permits required should be identified during detail design. Prior to commencing design implementation, the following permits and approvals may be required:

- MTO Occupancy Permit;
- *Ontario Heritage Act* requirements for Archaeological Clearance;
- Health and safety requirements during construction under Ontario's Occupational Health and Safety Act;
- Notification to respective utilities within the area;
- Under O. Reg. 166/06 a permit for development or interference with wetlands and alterations to shorelines and watercourses. When required, a permit application package will need to be prepared and submitted to the TRCA;
- DFO review under the *Fisheries Act*
- A Permit to Take Water (PTTW) for construction dewatering, if required;
- MECP – Environmental Compliance Approvals for storm and sanitary infrastructure; and
- Other site-specific data as required.

The City will continue to engage First Nations, TRCA, MECP, MTO and MNRF during detail design.

