City of Vaughan

North Maple Community Bridge
Municipal Class Environmental Assessment

Prepared by:

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Revision #	Revised By	Date	Issue / Revision Description
1	D. Brutto	December 11, 2013	Revision based on City's comments

AECOM Signatures

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Executive Summary

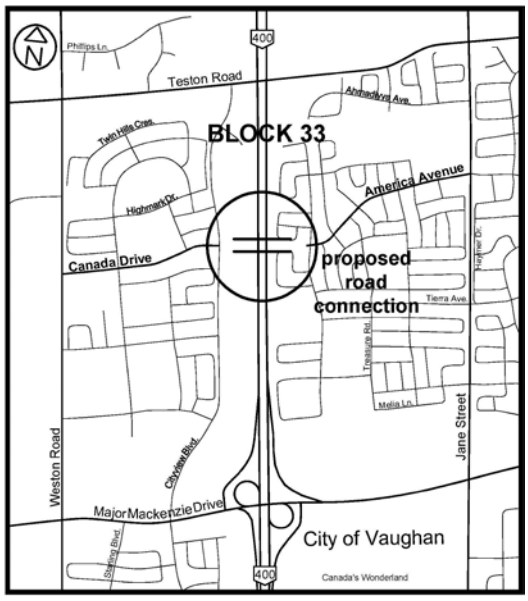
Introduction

The transportation objectives of the City of Vaughan's Official Plan Amendment No. 600 and various other policies identified the need to establish a primary road connection over Highway 400 between Major Mackenzie Drive and Teston Road in Block 33. This road connection is not only a key component of the area multi-modal transportation system but also a means of providing the residents in the communities on either side of Highway 400 with better access to community services.

The design and layout of the road system in Block 33 provides for this primary road connection over Highway 400 to be located at America Avenue and Canada Drive.

Acting according these policies, the City of Vaughan initiated this Class Environmental Assessment (EA) Study in 2008 to identify existing and future transportation problems and opportunities in the study area and to determine a preferred solution. This EA was undertaken in accordance with Schedule 'C' of the *Municipal Class Environmental Assessment* (2000, amended 2007 & 2011).

Figure ES-1: Project Study Area



The study area was established early in the Class EA process and comprises Block 33 identified in the City of Vaughan Official Plan Amendment (OPA) 400 and OPA 600, part of Vellore Urban Village 1 and is bounded by Teston Road to the north, Jane Street to the east, Major Mackenzie Drive to the south, Weston Road to the west, and Highway 400 bisects the overall study area.

The ESR documents the planning and decision making process, including public-consultation, which was followed to arrive at the preferred bridge design. The ESR also sets out mitigating measures proposed to avoid or minimize environmental impacts prior to, during, and after construction.

Specifically, this ESR documents:

- the background to the study;
- the consultation process;
- the need and justification for the study;
- description of existing conditions;
- the alternative solutions and design concepts;
- description of the preferred bridge design; and
- anticipated impacts and mitigation prior to, during, and after construction.

Consultation

The involvement of the community – residents, stakeholders, agencies and those who may be potentially affected by a project – is an integral part of the Class EA process. The purpose of the EA Study consultation process is to provide an opportunity for stakeholder groups and the public to gain an understanding of the study process;

contribute to the process for development and selection of alternatives; and provide feedback and advice at important stages in the EA process. Specifically, the consultation efforts had the following objectives:

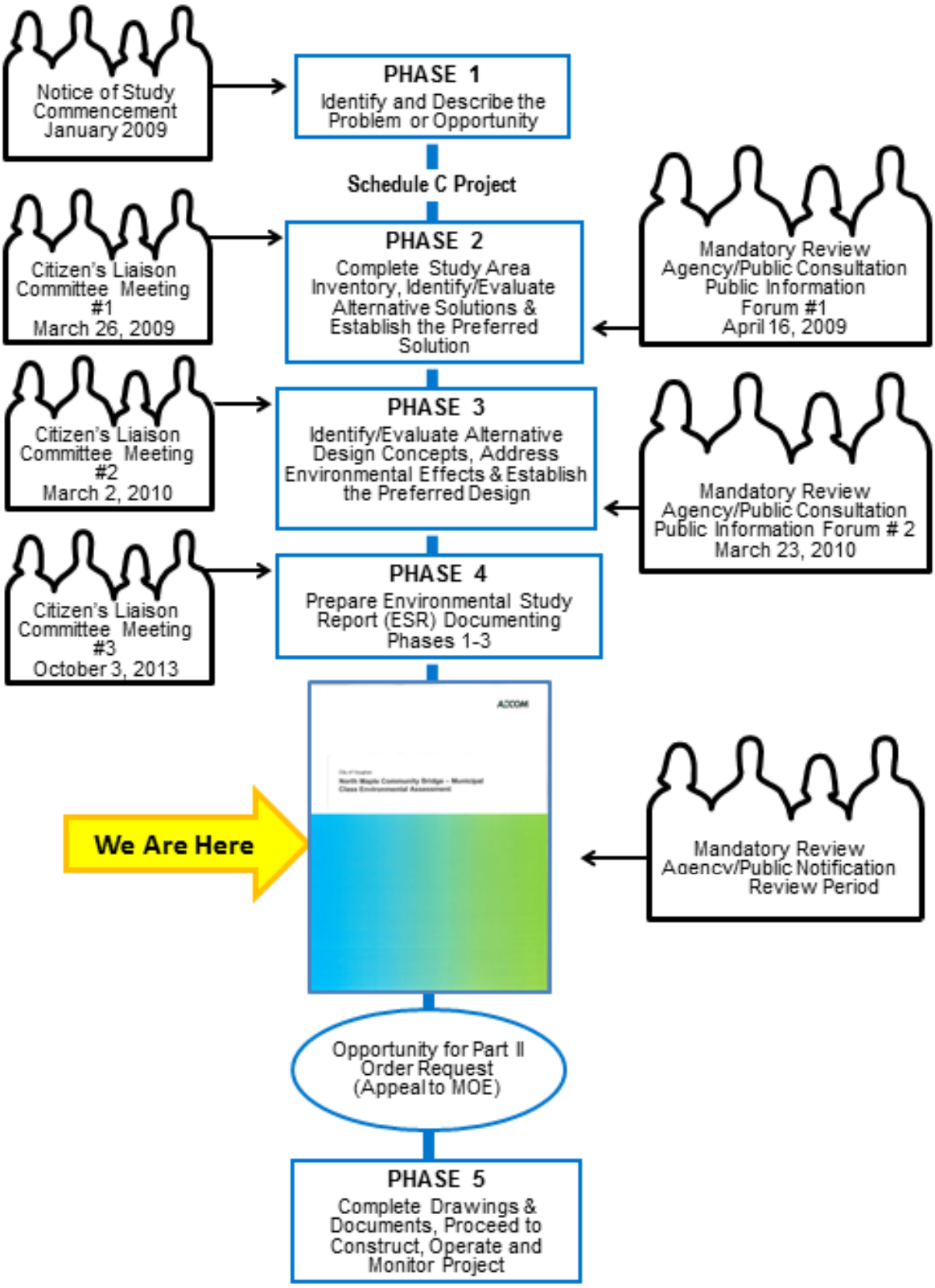
- Generate awareness of the project and provide opportunities for involvement throughout the planning process; and,
- Facilitate constructive input from public and agency stakeholders at key points in the EA process, prior to decision-making.

An enhanced consultation program was incorporated into the study, including five public consultation milestone meetings, which exceed the requirements of the Municipal Class EA. The consultation program included:

- Posting project milestones on City of Vaughan's website (http://www.northmaplebridge.ca) ;
- Holding meetings with the Ministry of Transportation at key phases during the study;
- Publication of newspaper notices in the Vaughan Citizen and The Liberal newspapers for all project milestones;
- Notification to stakeholders, affected land owners, general public and review agencies regarding project milestones;
- Holding two Public Information Forums to engage and obtain input from the public, review agencies and stakeholders;
- Holding three Citizens' Liaison Committee meetings to engage and obtain input from a cross section of residents, representatives from essential services and other stakeholders in the neighbourhood; and,
- Issuing a Notice of Study Completion

Refer to **Figure ES-2** for the Project Schedule, including key dates of consultation. The main areas of concern raised by the public related to confirming the need for the bridge, safety of residents, especially children, decreased property values and bridge costs, traffic and congestion, and noise and air quality impacts. These issues have been addressed throughout the EA Study process and are documented in this ESR.

Figure ES-2: Project Schedule



Phase One: Problem/Opportunity Statement

An opportunity exists to:

- Improve the multi-modal connectivity of the two communities on either side of Hwy 400 (Block 33 East and West), while still retaining the local character and pace;
- Provide residents with better access to amenities (schools, parks, recreational facilities, emergency and other public services, etc.);
- Provide for more sustainable modes of travel (i.e. cycling, pedestrian, transit) as the current configuration of Block 33 negates this; and,
- Complete the planned road network for the community.

A review of existing and future conditions indicates:

- Numerous planning documents and studies, including City of Vaughan Official Plan Amendments No. 400/600, Official Plan 2010, Block 33 Development Plans, York Region Official Plan, York Region Transportation Master Plan, City of Vaughan Pedestrian and Bicycle Master Plan, City of Vaughan Transportation Master Plan) have established a need for a primary road connection over Highway 400 within Block 33;
    - Currently, residents must utilize major arterials to move from one side of Highway 400 to the other (i.e. Jane Street, Teston Road, Major Mackenzie Drive, Weston Road), resulting in longer distance trips and overloading of key signalized intersections;
    - Background traffic growth and expected development within and surrounding the study area will generate travel demands that exceed the practical capacity of the existing roadway network capacity for 2021 and beyond;
- The study area comprises primarily low density residential and prestige employment land use. Five schools, two religious institutions, and six community parks are also present within the study area.
- Four public transportation routes and approximately 50 school bus transportation routes serve the study area and areas/schools outside of the study area

Phase Two: Alternative Solutions

Alternative solutions were identified to address the need for transportation improvements within the study area. Alternative solutions were assessed on the basis of a comprehensive set of factors and criteria that reflected the following considerations:

- Provincial and federal government legislation, policies and guidelines;
- Municipal policy (City of Vaughan, and the Region of York);
- Existing and future social, economic, cultural and engineering conditions within the study area;
- Issues and concerns identified during consultation with ministries, agencies, municipalities, ratepayer and interest groups and the general public; and,
- Project Team investigations and expertise.

Technical, Socio-Economic and Financial screening criteria were used as the basis for assessment for the following alternative solutions. This list of alternative solutions was reviewed with Project Team members and CLC members to “screen-out” unsuitable alternatives and ensure that only the alternative solutions that adequately address the identified transportation problems/opportunities were carried through to the detailed assessment.

1. Do Nothing

- Included as a benchmark for the assessment of the other alternatives

- Involves no physical and/or operational modifications to transportation infrastructure in the study area

2. **Reduce Auto Demand**
   - Introduce Transportation Demand Management (TDM) strategies to promote use of alternative modes of transportation such as transit, cycling, and walking) within and around the study area

3. **Upgrade/Improve Other Roadways**
   - Improve and upgrade adjacent and parallel roadways within the study area in conjunction with the improvements identified to the west of the study area as part of Western Vaughan Transportation Improvements Individual EA

4. **Bridge Overpass/Midblock Connection**
   - Construct a mid-block connection bridge over Highway 400 between America Avenue and Canada Drive

Thorough assessment of the alternative solutions (developed in consultation with public and agency stakeholders) resulted in a combination of **Alternative 2 - Reduce Auto Demand** and **Alternative 4 – Bridge Overpass/Midblock Connection** recommended to be carried forward as the Preferred Solution.

Alternative 1 was not recommended as it would not fully address the current or future operation efficiency problems and does not complete the City's road network as outlined in the Official Plan. Alternative 3 was not recommended as it would not fully address the current or future operation efficiency problems, does not complete the City's road network as outlined in the Official Plan, and major upgrades to existing roadways would be required.

Alternatives 2 and 4 (in combination) are expected to address the Problem/Opportunity Statement as they offer the best opportunity to deal with the identified operational efficiency concerns for personal vehicles and emergency services and will fully implement and complete the planned road network as identified in the City's Official Plan.

Implementing these Alternatives will also provide a local road connection within Block 33, which will allow for the sustainable movement of multi-modal services, including buses, cyclists and pedestrians, and therefore, facilitate access to local community facilities, businesses and schools.

Phase Three: Alternative Design Concepts

Alternative design concepts were identified, developed and evaluated for the Preferred Solution.

For Phase 3 of the study, the assessment criteria were further refined and the road design standards were identified to reflect an appropriate level of detail associated with the Preferred Solution. Following the identification of any constraints, the Alternative Design Concepts were organized into three evaluation groups:

- **Vertical Approach** (6% Grade vs. 7.5% grade),
- **Horizontal Approach** (Alignment centred vs. Alignment shifted south within available property), and
- **Bike Lanes** (dedicated bicycle lanes vs. bicycle lanes shared with vehicular lanes)

Based on the evaluation groups, the Alternative Design Concept Options were developed as follows:

  - **Option 1** - Vertical Alignment with 6% approaches and Horizontal Alignment centered in the existing right-of-way
  - **Option 2A** - Vertical Alignment with 7.5% approaches and Horizontal Alignment centered in the existing right-of-way

- **Option 2B** - Vertical Alignment with 7.5% approaches and Horizontal Alignment shifted to the south within available property
- **Option 3A** - Bridge with 2.0m sidewalk, provision for 1.5m bicycle lanes and 3.5m vehicular lanes
- **Option 3B** - Bridge with 2.5m sidewalk, and 4.2m vehicular lanes shared with bicycles

The final comparative evaluation of the alternative design concepts incorporated a confirmation of the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts. The evaluation process was completed separately for each assessment group.

Based on the detailed evaluation completed and documented within **Section 6** of this ESR, it is recommended that a combination of the following alternative design concepts be advanced as the Preferred Solution:

- **Option 2B**- Vertical Alignment with 7.5% approaches and Horizontal Alignment shifted to the south
- **Option 3A**- Bridge with 2.0m sidewalks, provision for 1.5m bicycle lanes and 3.5m vehicular lanes
- Extension of the provision for 1.5m bike lanes through both approaches to the bridge

Project Description

The Preferred Design for the North Maple Community Bridge, as illustrated in the design plans, profiles and drawings included in **Section 7** and **Appendix B** of this ESR, includes:

- 2-lane roadway, including sidewalks and bicycle lanes on a mostly straight alignment slightly shifted to the south side of the ROW;
- 7.5% east and west bridge approach slopes consistent with a design speed of 60 km/h;
- Bridge consists of a three steel box girder structure with two spans of 41.2m each with a central pier in the median of Highway 400;
- Intersections at Cityview Boulevard/Canada Drive (requiring re-grading) and John Deisman Boulevard/ America Avenue;
- A minor system of catchbasins and storm pipes to drain into the existing municipal drainage system;
- A Landscaping Plan to be confirmed during the detail design phase.

Figure ES-3: Preliminary Design Concept and Landscaping Plan

Minor traffic staging is required for resurfacing the intersections. A more elaborate traffic staging on Highway 400 is required and will be confirmed and approved by MTO during the detail design phase.

The preliminary construction cost associated with the preferred design is estimated at $7.8 million.

The bridge design enables access to enhanced transit services and bicycle networks.

Anticipated Impacts and Proposed Mitigation Measures

Many of the environmental concerns related to this project have been mitigated through the process by which the preferred design was selected, as described in this ESR. It is recognized that the proposed construction of the North Maple Community Bridge with preferred alternative design concepts **2B** and **3A** with the extension of the provision for 1.5 m bike lanes through both approaches to the bridge will result in minor impacts on the existing environment. Mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detailed design. There were no concerns with respect to the natural environment, due to the urban nature of the Study Area and relative absence of sensitive vegetation and wildlife. The ESR has identified potential impacts and recommended mitigation measures to address commonly experienced impacts (mostly during the construction period) relating to noise, air quality, erosion and sedimentation, wildlife and migratory birds, waste management, landscaping, and archaeology. Traffic related impacts during construction will be mitigated during the detail design and construction phase by reviewing the need for traffic calming measures and notifying area residents and businesses of traffic disruptions prior to construction start.

In addition, post-construction traffic patterns will be monitored and compared against estimates in **Section 4** of this ESR. If warranted, the City will mitigate traffic impacts resulting from the implementation of the project by using traffic calming measures, additional signs and traffic restrictions. **Table ES-1** below presents the proposed mitigation measures in further detail.

Table ES-1: Proposed Mitigation Measures

Factor	Potential Impacts	Potential Mitigation
Traffic Management	During construction there may be temporary disruptions to traffic on: • America Avenue • John Deisman Boulevard • Canada Drive • Highway 400 Alterations to traffic patterns post-construction.	**During Detail Design:** • Develop requirements for potential traffic disruption signing to be in place during construction. • Review need for traffic calming measures. **Prior to Construction:** • Undertake notification to area residents and businesses. • Erect signs advising of traffic disruptions. **During Construction:** • Relocate heavy equipment travel routes away from residential roads, if possible. **Post Construction:** • Monitor traffic patterns and compare against EA estimates.
Noise	Disruption to residences and businesses.	**During Detail Design:** • Construction noise constraints will be incorporated into contract documents. • Construction activities throughout the project will conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. **Prior to Construction:** • Develop reactive complaint resolution procedure for responding to complaints resulting from construction. **During Construction:** • Comply with MOE noise limits, and local noise control by-laws. • Use construction equipment that meets the requirements of the MOE Construction Equipment Publication (NPC 115). • Prevent unnecessary noise and vibration by maintaining equipment in proper operating condition, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts. • Restrict use of equipment to the minimum necessary to perform the specified work. Do not allow excessive idling. • Monitor complaints resulting from construction. • Arrange for a post construction building condition survey to be undertaken.
Air Quality	Potential for decrease in localized air quality due to construction dust.	**During Construction:** • Apply water and dust suppressants during construction to protect air quality due to dust, as needed • During construction, vehicles/machinery and equipment should be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
Erosion and	Potential for erosion	**During Detail Design:**

Table ES-1: Proposed Mitigation Measures

Factor	Potential Impacts	Potential Mitigation
Sedimentation	and sedimentation.	• Develop erosion and sedimentation control strategy. **During Construction:** • Implement and monitor the erosion and sedimentation control strategy, including appropriate phasing to avoid impacts to Cold Creek north of the study area. • Any areas disturbed by construction will be restored and stabilized as soon as practically possible.
Wildlife and Migratory Birds	Disruption to wild life habitat and migration patterns.	**During Detail Design:** • Complete Species at Risk surveys. • Confirm Migratory Bird Nesting season **During Construction:** • Require contractor to avoid disturbance of any migratory birds found nesting in the project area during the peak breeding season; - Removal of trees to be performed outside this period. - Prevent bird nesting on bridge during construction and remove any nests after this period.
Waste Management and Control of Inadvertent Spills	Potential inadvertent spill of hazardous materials during construction.	**During Construction:** • Store all oils, lubricants, fuels and chemicals in secure areas. • Contact appropriate regulatory agencies in event of a spill to the environment.
Landscaping and Vegetation Protection	Physical damage and loss of vegetation/trees for material management and construction activities	**During Detail Design:** • Finalize Landscaping Plan to address possible tree removals and streetscape enhancement. • Construction restrictions and maintenance practices such as the following should be considered for tree protection during development of the contract specifications: • If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. • No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction. - If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. - No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction.

Table ES-1: Proposed Mitigation Measures

Factor	Potential Impacts	Potential Mitigation
		• A construction work plan will be developed which designates locations for stockpiling of soils and other materials including fuel. Prior to commencement of construction, the limits of protection areas will be delineated and fenced to avoid inadvertent intrusion of machinery or other activities such as stockpiling of excess material **During Construction:** • Restrict removal of trees to work areas specified in construction contract • Fence areas of retained trees prior to construction commencement, and prohibit entry of equipment and materials within fenced areas until final grading and landscaping is completed.
Archaeology	Loss or disruption to archaeological resources.	**During Detail Design:** • Confirm MTCS clearance of site. **During Construction:** • No excavations shall take place within the study area prior to the Ministry of Tourism, Culture and Sport (Heritage Operations Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied. • Should previously unknown or unassessed deeply buried archaeological remains be uncovered during construction; - Cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario *Heritage Act*. • The office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146) should be contacted immediately. Any person discovering human remains must immediately notify the office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146), the police or coroner, and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Government Services (416-326-8404).

Based upon results of the study, it is concluded that following the implementation of mitigation measures, the construction and operation of the North Maple Community Bridge will not have significant adverse effects on the environment. The anticipated impacts and proposed mitigation measures and post construction monitoring have been described in detail in **Section 8.**

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1. Introduction

1.1 Purpose of Environmental Study Report and Study Background

This Environmental Study Report (ESR) documents the planning and preliminary design components for the North Maple Community Bridge Class Environmental Assessment (EA) Study. A variety of tasks were undertaken for this Class EA including the identification of a project need/justification, public / agency consultation, assessment of design alternatives, environmental and socio-economic impact reviews, development of a preferred design concept and preparation of this ESR.

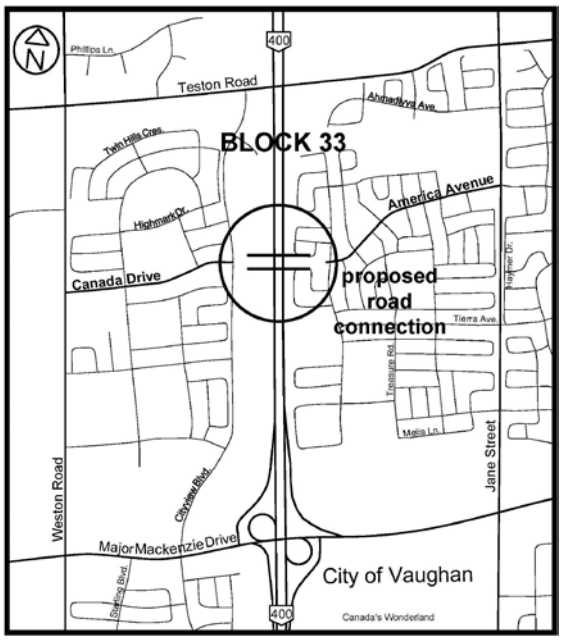
The transportation objectives of the City of Vaughan's Official Plan Amendment No. 600 and various other policies identify the need to establish a primary road connection over Highway 400 between Major Mackenzie Drive and Teston Road in Block 33. This road connection is not only a key component of the area transportation system (vehicles, cycling and pedestrians) but also a means of providing the residents in the communities on either side of Highway 400 with better access to community services such as schools, parks, recreational facilities, shopping and emergency services. The design and layout of the road system in Block 33 provides for this primary road connection over Highway 400 to be located at America Avenue and Canada Drive.

This ESR was undertaken in accordance with Schedule 'C' of the Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* (Municipal Class EA) (October 2000, amended 2007).

1.2 Study Area

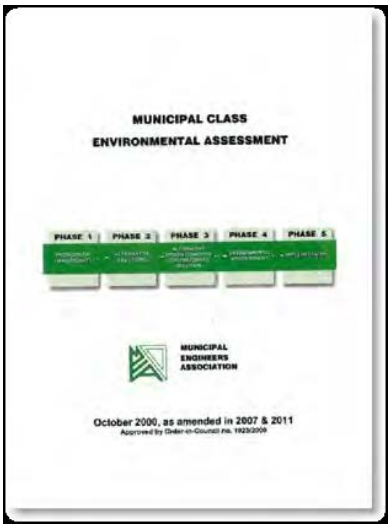
The study area, indicated on **Figure 1-1**, comprises Block 33 identified in the City of Vaughan Official Plan Amendment (OPA) 400 and OPA 600, part of Vellore Urban Village 1 and is bounded by Teston Road to the north, Jane Street to the east, Major Mackenzie Drive to the south, Weston Road to the west, and Highway 400 bisects the overall project study area. The study area was established early in the Class EA process.

Figure 1-1: Study Area



1.3 Municipal Class Environmental Assessment Process

To address the need and justification for the proposed road connection and develop and evaluate a range of alternative design concepts to address the multi-modal transportation needs, the City of Vaughan must comply with the requirements of the Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* document (2000, as amended in 2007 & 2011). Approved under the Ontario *Environmental Assessment Act*, the Municipal Class EA process incorporates the following key principles of EA planning:



- consultation with affected parties early in and throughout the process, such that the planning process is a cooperative venture
- consideration of a reasonable range of alternatives, both the functionally different 'alternatives to' and the 'alternative methods' of implementing the solution
- identification and consideration of the effects of each alternative on all aspects of the environment
- systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects
- provision of clear and complete documentation of the planning process followed, to allow 'traceability' of decision-making with respect to the project.

As illustrated in **Figure 1-2**, the Municipal Class EA document outlines a mandatory five-phase planning and design process. Each phase is summarized below:

Phase 1. **Problem or Opportunity**:
Identify the problem and/or opportunity, need and justification.

Phase 2. **Alternative Solutions:**
Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and regulatory agency review and input.

Phase 3. **Alternative Design Concepts for Preferred Solution**:
Examine alternative methods of implementing the preferred solution taking into account the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts.

Phase 4. **Environmental Study Report:**
Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design and consultation process undertaken through Phases 1 to 3. The ESR is made available for public and agency review and comment.

Phase 5. **Implementation:**
Complete contract drawings and documents and proceed to construction and operation. Monitor construction and operation where necessary for adherence to environmental provisions and mitigation. Phase 5 is not part of this study. This phase will be undertaken immediately prior to construction.

In addition, the Municipal Class EA document classifies projects into four separate categories (i.e., schedules). These are referred to as Schedule A, A+, B or C projects based on the anticipated level of impact, and for some projects, the anticipated construction costs. Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to the Class type. Each schedule is described as follows:

Schedule A: Projects are limited in scale, have minimal adverse environmental impacts, and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the fill Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities where environmental effects of these activities are usually minimal. Examples of Schedule A projects include culvert repairs and replacements where capacity is not increased or road resurfacing with no change to road alignment. As such, these projects are pre-approved and consequently do not require any further planning and public consultation.

Schedule A+: The purpose of Schedule A+ is to ensure some type of public notification for certain projects that are pre-approved under the Class EA. It is appropriate to inform the public of municipal infrastructure project(s) being constructed or implemented in their area; however, there would be no ability for the public to request a part II Order. If the public has comment, they should be directed to municipal staff and/or municipal Council where they would be appropriately addressed. Examples of Schedule A+ projects include construction of localized operations improvements at specific locations (e.g. addition of turning lanes at an intersection, but not a continuous centre left turn lane).

Schedule B: The projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process, involving mandatory contact with the directly affected public and regulatory agencies, to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Examples of Schedule B projects include reconstruction or widening where the reconstructed road results in additional lanes. As a result, the proponent is required to proceed through the screening phase (Phases 1 and 2) including consultation with those who may be affected. At the end of Phase 2, a Project File documenting the planning process shall be finalized and made available to the public and agency review. However, if the screening process raises a concern which cannot be resolved, a Part II Order may be requested and considered by the Minister of the Environment. Alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking.

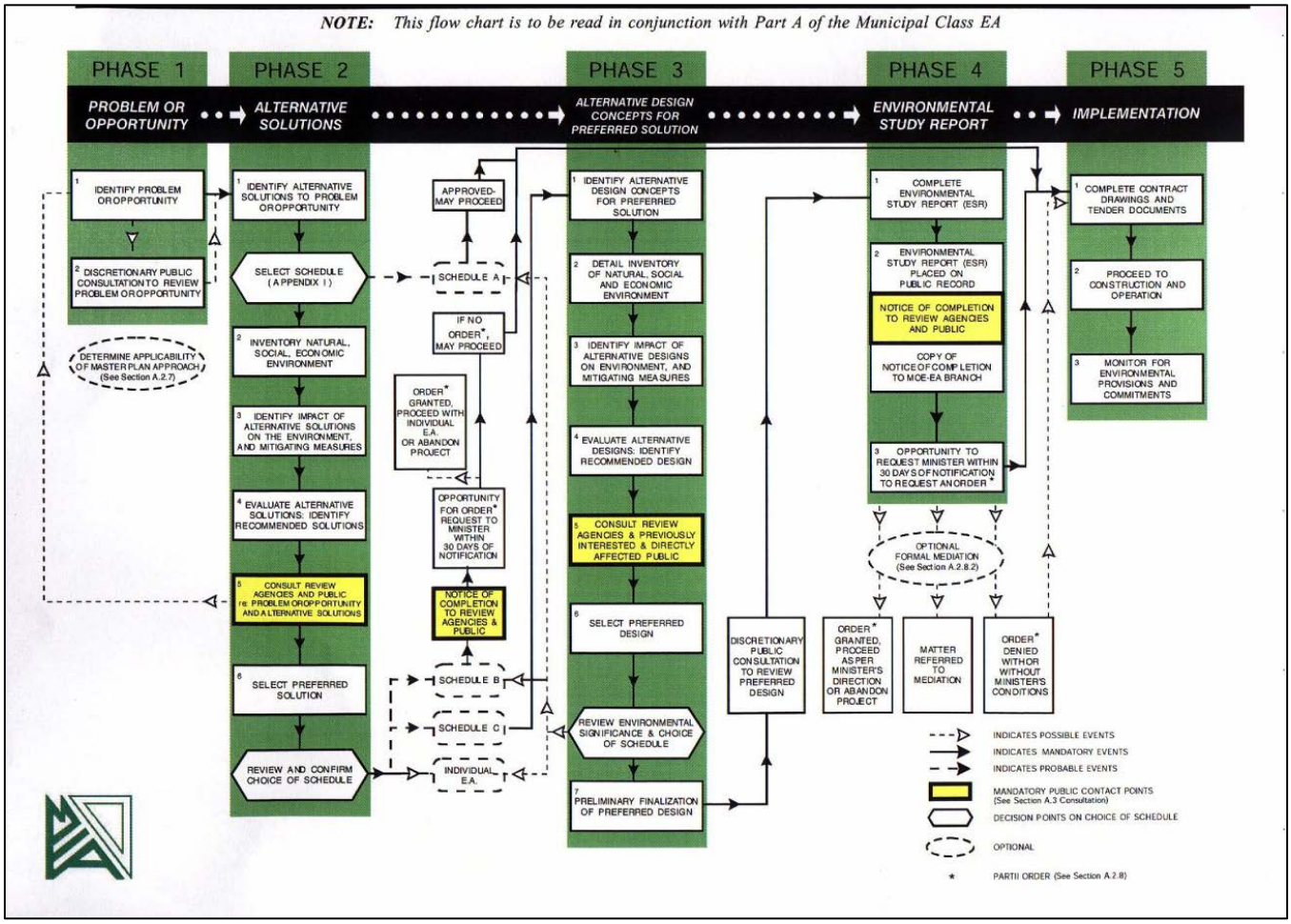
Schedule C: Projects have the potential for significant environmental impacts and must proceed under the full planning and documentation (Phase 1 to 4) procedures of the Municipal Class EA document. Schedule C projects require that an ESR be prepared and filed on the public record for review by the public and regulatory agencies. If concerns are raised that cannot be resolved than a Part II Order may be requested.

1.3.1 Class EA Schedule

This Study is classified as a Schedule C project which involves completion of Phases 1 through 4 of the planning and design process (Phase 5 will be completed prior to construction). The planning and design process for

'Schedule C' projects are documented within an ESR. The ESR is prepared for a minimum 30-day public review period. During this review period, any person or party with an outstanding issue may bring the issue forward to the City for resolution. If the issue cannot be resolved, the person or party with the concern may request the Minister of the Environment to order the City to comply with 'Part II' of the *Environmental Assessment Act*. 'Part II' of the *Environmental Assessment Act* requires the completion of an individual EA study with formal government review and approval. This request is called a 'Part II Order Request' (formerly 'Bump-up Request') and must be submitted to the Minister in writing within the review period from December 12, 2013 to February 3, 2014. If no requests for a 'Part II Order' are received during the public review period, the project will proceed to Phase 5 (Design and Construction).

Figure 1-2: Municipal Class EA Five Phase Planning and Design Process



1.3.2 Canadian Environmental Assessment Act (CEAA)

The *Canadian Environmental Assessment Act* (*CEAA*) was recently repealed and replaced with *CEAA 2012* which received Royal Assent on July 6, 2012. Recent changes to *CEAA* include replacing "triggers" with the *CEAA 2012* Regulation Designating Physical Activities list. A proponent is not required to complete the Federal EA Process if a project is not on this list. A review of this list has determined that the Trafalgar Road Improvements Class EA Study does not include physical activities identified on the list and is therefore not a Designated Project. This study is not subject to the federal EA process.

1.3.3 Consultation and Communications Program

The MEA Municipal Class EA document outlines specific mandatory public and agency consultation contact points and methods. As part of the Municipal Class EA 'Schedule C' planning process, several steps have been undertaken to inform government agencies, affected landowners, the local community and the general public of the project and to solicit comments. In order to properly communicate the project and solicit feedback throughout the planning process, the following activities were undertaken:

- Posting project milestones on City of Vaughan's website, including Notices of Study Commencement, Community Liaison Committee meetings (CLCs), Public Information Forums (PIFs) and Study Completion (http://www.northmaplebridge.ca) ;
- Holding meetings with the Ministry of Transportation at key phases during the study;
- Publication of newspaper notices in the *Vaughan Citizen* and *The Liberal* newspapers for all project milestones;
- Notification to stakeholders, affected land owners, general public and review agencies regarding project milestones;
- Holding two PIFs to engage and obtain input from the public, review agencies and stakeholders;
- Holding three CLCs to engage and obtain input from a cross section of residents, representatives from essential services and other stakeholders in the neighbourhood; and,
- Issuing a Notice of Study Completion that was published in the *Vaughan Citizen* and *The Liberal* newspapers. The notice was also mailed to adjacent property owners and general public who requested to be included on the contact list, as well as agencies for the review period from December 12, 2013 to February 3, 1214.

The above communications and consultation program outputs are further described in **Section 2**.

1.3.4 EA Documentation Filing

The filing of this ESR completes the planning and preliminary design stage of the project. The ESR is placed on the public record and made available for review for a period starting December 12, 2013 and ending on February 3, 2014. A public notice (Notice of Study Completion) was published to announce commencement of the review period. To facilitation public review of the document, hard copies of the report were made available for during regular business hours at the following locations:

Vaughan City Hall Clerk's Department	Vellore Village Community Centre	Maple Library
2141 Major Mackenzie Drive	1 Villa Royale Avenue	10190 Keele Street
Vaughan, ON L6A 1T1	Vaughan, ON L4H 2Z7	Maple, ON L6A 1G3

The Notice of Study Completion advises that if, after reviewing the report, stakeholders had questions or concerns they should follow this procedure:

- Contact Michael Frieri, City of Vaughan Project Manager, at the address below to discuss your questions or concerns:

  Michael Frieri, C.E.T.
  City of Vaughan Project Manager
  Development/Transportation
  Engineering Department
  2141 Major Mackenzie Drive, Vaughan, ON L6A 1T1
  Tel: 905-832-8585, Ext. 8729 Fax: 905-832-6145
  Email: michael.frieri@vaughan.ca

- Arrange a meeting with the above, if you have significant concerns that require more detailed explanations.
- If you raise major concerns, the City will attempt to resolve the issue(s). A mutually acceptable time period for this meeting will be set. If the issues remain unresolved, you may request that the Minister of the Environment (see address below), by order, to require the City to comply with Part II of the *EAA* before proceeding with the project, this is called a Part II Order request. The Minister may make one of the following decisions:
  - Deny the request with or without conditions
  - Refer to matter to mediation; or
  - Require the City to comply

The Class EA process contains a provision that allows for changing the status of a project from a Class EA to an Individual Environmental Assessment. This is called a 'Part II Order'. Members of the public, interest groups, government agencies and others may request that an Individual Environmental Assessment be prepared for a specific project if they feel their concerns have not been addressed through the Class EA planning process. The Ministry of the Environment determines whether or not this is necessary and the decision in this regard is final. If the 'Part II Order' is granted, the project cannot proceed unless an Individual Environmental Assessment is prepared. The Individual Environmental Assessment is subject to a formal government review and approval process and may result in a formal public hearing. Anyone wishing to request a 'Part II Oder' of the North Maple Community Bridge Class Environmental Assessment Study must submit a written request by the end of the review period (February 3, 2014) to the Minister of the Environment at the following address, with a copy sent to City of Vaughan:

Ministry of the Environment address:	**City of Vaughan address:**
Honorable Jim Bradley, MPP	Mr. Michael Frieri, C.E.T.
Minister of the Environment	Development/Transportation
77 Wellesley Street West	Engineering Department
11th Floor, Ferguson Block	2141 Major Mackenzie Drive
Toronto, ON M7A 2T5	Vaughan, ON L6A 1T1

1.4 Project Team

City of Vaughan retained AECOM Canada Ltd. (AECOM) to undertake the Class EA for this study. The project team included representatives from City of Vaughan and AECOM. General direction was provided by the Citizens' Liaison Committee (CLC) with project team meetings held at key points in the process and prior to presenting the study findings to public and agency stakeholders.

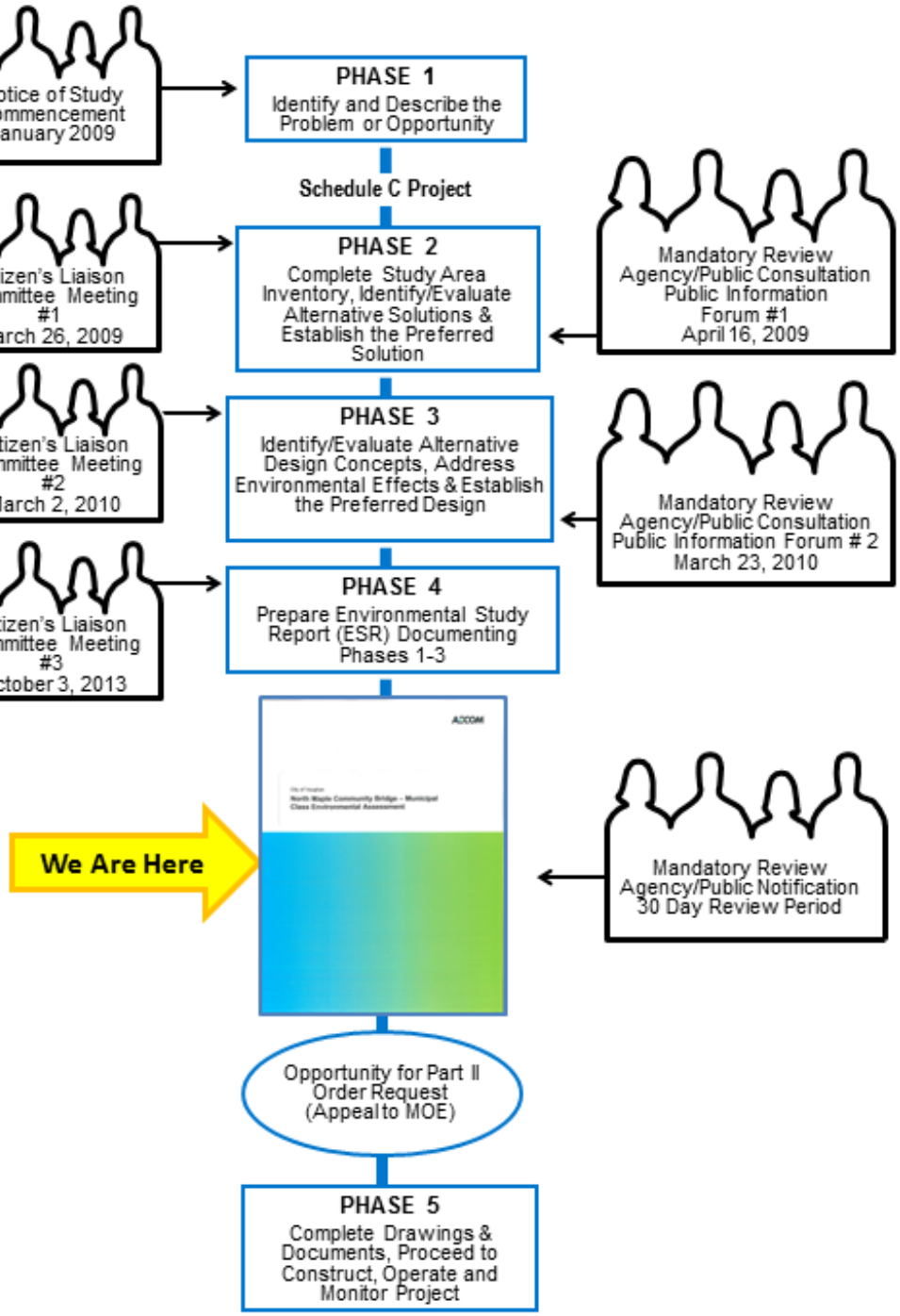
Figure 1-3 depicts the study organization.

Figure 1-3: Study Organization

1.5 Project Schedule

The Class EA work was undertaken from 2009 through 2013. The Project Schedule, including the key points of consultation, is presented in **Figure 1-4** below. As depicted below, submission of this Environmental Study Report falls between Phases 4 and 5 of the overall project schedule.

Figure 1-4: Project Schedule



2. Consultation

2.1 Purpose and Objectives of the Consultation Efforts

The involvement of the community – residents, stakeholders and those who may be potentially affected by a project – is an integral part of the Class EA process. The purpose of the EA Study consultation process is to provide an opportunity for stakeholder groups and the public to gain an understanding of the study process; contribute to the process for development and selection of alternatives; and provide feedback and advice at important stages in the EA process. Specifically, the consultation efforts had the following objectives:

- Generate awareness of the project and provide opportunities for involvement throughout the planning process; and
- Facilitate constructive input from public and agency stakeholders at key points in the EA process, prior to decision-making.

2.2 Agency Involvement

At the initiation of this study, a mailing list (see **Appendix A1**) was created from regulatory agencies and potential interested stakeholders. The agencies were identified according to Appendix 3 of the Municipal Class EA Document, which outlines relevant agencies, based on the nature of a project, as well as guidelines for establishing contact with these review agencies. Throughout the study, this list was used to notify stakeholders of study milestones and upcoming public consultation events. The list was updated regularly.

2.2.1 Federal Agencies

- Fisheries and Oceans Canada
- Environment Canada
- Indian and Northern Affairs Canada

2.2.2 Provincial Agencies

- Ministry of Aboriginal Affairs
  - Negotiations Branch
  - Legal Services Branch
  - Policy and Relationships Branch
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Culture, Tourism, and Sport
- Ministry of Municipal Affairs and Housing
- Ministry of the Environment
  - Central Region Office
  - EA Approvals Board
  - York-Durham District Office
  - Project Coordination Section
- Ministry of Transportation
  - Planning and Environmental Office
  - Engineering Office
- Ministry of Natural Resources

2.2.3 Municipal Agencies and Authorities

- Corporate Services
- Infrastructure Planning
- Transportation Planning
- Community Planning
- Transportation and Works
- York Region Transit/VIVA
- Ontario Provincial Police
- York Regional Police
- York Region Emergency Medical Services
- City of Vaughan Fire and Rescue Service
- Toronto and Region Conservation Authority
- York Region District School Board
- York Region Catholic District School Board
- Student Transportation Services of York Region

2.2.4 Local Stakeholders

- Rimwood Estates Homeowners Association
- Vaughanwood Estates Homeowners Association
- Millwood Woodend Ratepayers' Association
- Canada's Wonderland
- Ahmadiyya Muslim Community Canada
- Kleinburg and Area Ratepayers' Association
- Maple Sherwood Ratepayers' Association
- Vellore Woods Ratepayers' Association
- Maple Village Ratepayers'

2.2.5 Utilities

- Bell Canada
- Hydro One
- Enbridge Gas
- Rogers Cable

Study notices, newsletters, and presentation materials were also posted on the project website at http://www.northmaplebridge.ca throughout the project duration.

2.2.6 Notice of Study Commencement (Phase 1)

A Notice of Study Commencement was placed in the *Vaughan Citizen* and *The Liberal* publications in January, 2009. The Notice was also delivered via direct mail to a number of review agencies and all potential adjacent property owners in January 2009. In total, over 150 potential adjacent property owners were mailed the notice.

Copies of the published Notice of Study Commencement and letters provided to the public, and review agencies are provided in **Appendix A1**.

2.3 Public Consultation

2.3.1 Citizens' Liaison Committee Meeting #1 (Phase 2)

As noted in **Section 1.3.2**, a Citizens' Liaison Committee (CLC) was established to engage and obtain input from a cross section of residents, representatives from essential services and other stakeholders in the neighbourhood. The committee was established as an enhanced consultation measure beyond the requirements of a Schedule C EA in order to obtain more feedback from the interested public. The purpose of the CLC was to act as a sounding-board whereby the Study Team could test ideas, findings and study approaches with the CLC members. Further, this format allowed for the exchange of information about the project that would keep the residents and other stakeholders up-to-date current and future events. The CLC was chosen to represent a broad spectrum of community opinion, as shown below on **Figure 2-1**. The CLC membership generally followed this arrangement throughout the course of the study (see **Appendix A** for further detail on members attending each CLC meeting)

Figure 2-1. General Composition of the Citizens' Liaison Committee

Invitations to prospective CLC members were sent out via mail and email the week of February 24, 2009.

Following confirmation of the CLC membership, an invitation to CLC #1 was sent in March 2009. The first CLC Meeting was held at Vellore Village Community Centre (1 Villa Royale Avenue, Woodbridge) on March 26, 2009, from 6:00 p.m. to 9:00 p.m.

The meeting was attended by 23 members who, following a light supper and meet and greet, were given an overview of the project to begin the formal portion of the meeting. Following the overview, the meeting was composed of the following sessions:

Session 1: Study Findings to date
Session 2: Q & A – Facilitated Roundtable Discussion
Session 3: Next Steps –April 16 Public Information Forum

CLC members were also encouraged to fill out "I didn't get a chance to say…" forms to ensure all comments and concerns were noted and carried forward for consideration. The main comments/questions/concerns from CLC #1 included:

- Teston Road traffic counts inclusion in analysis
- Ahmadiyya Muslim Community Bridge support
- Concern over traffic model counts for bridge
- Clarify why the Tierra Avenue Overpass was cancelled and North Maple Bridge is being carried forward
- Safety concerns for children and residents
- Confirm the need for overpass
- Reconsider the Problem/Opportunity Statement
- Consider traffic calming measures
- Essential service providers indicated support for the bridge
- Cost concerns –Where does the money come from?
- Resident concerns regarding whether there was adequate information on the proposed overpass in the original Agreement for Offer of Purchase and Sale of homes

Additionally, following the CLC, a response to comments document was prepared and sent to CLC members.

Copies of the notification materials, presentation, reference materials, facilitator's summary report, comments, and responses to comments are provided in **Appendix A2**.

2.3.2 Public Information Forum #1 (Phase 2)

All appropriate review agencies, relevant Aboriginal organizations, and interested members of the public were invited to a Public Information Forum (PIF), held on April 16, 2009, from 7:00 p.m. to 9:00 p.m. at the Michael Cranny Public Elementary School Gymnasium (155 Melville Avenue, Maple).

Notification of PIF #1 was provided through direct mailings on April 3, 2009, to those stakeholders and review agencies contained in the project's contact database, as well as to all residents who either front, back or side on to America Avenue and Canada Drive. Further, a bulk mail-out was utilized which allowed for the entire Block 33 to be notified via Canada Post. The Notice was also posted on the projects website and through newspaper advertisements within the *Vaughan Citizen* and *The Liberal* Newspaper on April 2, 2009 and April 9, 2009.

The PIF provided an opportunity for ministries, agencies, public and other stakeholders to discuss the proposed undertaking, including the preliminary recommended alternative, and allow the public to discuss their issues or concerns directly with the City and their consulting team. This feedback was used to confirm the recommended alternative solution and provide insight into the issues of concern regarding the future mitigation measures.

The PIF was well attended and the attendees were vocal in their displeasure with the project in general and the format of the PIF being an Open House, rather than a presentation and Question and Answer session. A total of 55 people registered at the PIF, with many others in attendance, but opting not to sign-in. The main issues raised include:

- Need for bridge on a traffic basis
- Safety of residents and most importantly children
- Noise, Air and Health impacts
- Property Value decrease
- Increased traffic and congestion along their streets.

Copies of the notification materials, presentation boards, reference materials, summary report, comments, and responses to comments are provided in **Appendix A2**.

2.3.3 Citizen Liaison Committee Meeting #2 (Phase 3)

The second Citizens Liaison Committee meeting was held on March 2, 2010 at Vellore Hall (9541 Weston Road, Vaughan), from 7:00 p.m. to 9:30 p.m.

Notification of CLC #2 was provided through direct mailings on February 16, 2010, to all CLC members. In addition to the notice, CLC members received a newsletter which provided an update on the project.

The alternative design concepts developed along with their evaluation were formally presented. The meeting provided an opportunity for members of the CLC to discuss the proposed undertaking, including the preliminary recommended alternative and design concepts, and allowed CLC members to discuss their issues or concerns directly with the City and their consulting team. This feedback was used to confirm the recommended alternative design concept and provide insight into the issues of concern regarding the future mitigation measures. CLC members requested that the project team discusses the responses to their questions as part of a smaller meeting with city officials.

The main issues raised during the second CLC meeting included:

- Need for the bridge
- Safety of residents and most importantly children
- Noise, air and health impacts
- Property values decrease
- Increased traffic and congestion along their streets
- Cost of the proposed bridge
- The need to look at other Alternatives (i.e. a pedestrian/bike only bridge etc.)

Copies of the notification materials, presentation, summary report, comments, and responses to comments are provided in **Appendix A3**.

2.3.4 Public Information Forum #2 (Phase 3)

PIF #2 was held on March 23, 2010 to present the alternative design concepts developed along with their evaluation. Notification was provided through direct mailings on March 5, 2010 to stakeholders and review agencies contained on the project mailing list, as well as to residents who either front, back, or side on to America Avenue and Canada Drive. Further, a general bulk mail out to all residents of Block 33 was utilized. The Notice was also posted on the project website and through newspaper advertisements in the *Vaughan Citizen* and *The Liberal* on March 7, 11, and 18, 2010.

The PIF provided an opportunity for the public and other stakeholders to discuss the proposed undertaking, including the preliminary recommended alternative and design concepts, and allowed the public to discuss their issues or concerns directly with the City and their consulting team. This feedback was used to confirm the recommended alternative design concept and provide insight into the issues of concern regarding the future mitigation measures.

The second PIF was well attended and the attendees were vocal in their displeasure with the project in general. A total of 36 people registered at the PIF, with many others in attendance, but opting not to sign-in. The main issues raised included many of the issues raised during prior public consultation, namely:

- Need for the bridge
- Safety of residents and most importantly children
- Noise, air and health impacts

- Property values decrease
- Increased traffic and congestion along their streets
- Cost of the proposed bridge
- The need to look at other Alternatives (i.e. a pedestrian/bike only bridge etc.)

Public members requested that the project team commit to slowing down with the process of this project and to move forward with the proposed undertaking after the Official Plan Review is complete. Further, the public requested that the traffic study currently underway for the proposed Hospital Campus Centre be included in this Class EA in terms of the need for the bridge. The City committed to slowing down the process in an attempt to address the concerns of the residents and to look into the proposed suggestions submitted. The project team made residents aware that the City of Vaughan is developing at a fast pace and there are a number of initiatives on the go.

Copies of the display boards, presentation slides and boards, reference materials, comments, and responses to comments are provided in **Appendix A3**.

2.3.5 Citizen Liaison Committee Meeting #3 (Phase 4)

In response to the concerns noted from prior phases of consultation, the project team slowed down the process to allow additional updated traffic analysis to inform project recommendations.

The third Citizens Liaison Committee meeting was held on October 3, 2013 at Vaughan City Hall, Committee Room 244 (2141 Major Mackenzie Drive), from 7:00 p.m. to 9:00 p.m.

Due to the project hiatus, the CLC member list was revised, where necessary, to include appropriate members representing a similar cross section of interests as from the prior study phases. Notification of CLC #3 was provided via email on September 17, 2013, to all CLC members.

CLC #3 included a general study update and the results of updated traffic analysis, including implications for recommendations, and a discussion of next steps in the project.

Comments and concerns generally echoed those of the previous phases of the study, however, a greater consensus was that the consideration of traffic calming and safety measures during the detailed design phases of the project would help mitigate most of the concerns.

Copies of the notification materials, presentation, and meeting minutes are provided in **Appendix A4**.

2.4 Agency Consultation

Agencies were provided notification of the project at each milestone and were invited to provide input. Many of the agencies provided input through participation in the CLC Meetings (see **Section 2.3.1**). Any agency correspondence received that was not part of the CLC is included in **Appendix A5**. This correspondence was also used to inform project design (see **Section 7**) and mitigation/permitting requirements (see **Section 8**).

2.4.1 Ministry of Transportation Meetings

The project team met with Ministry of Transportation (MTO) staff on June 18, 2009 to discuss potential bridge structure implications for Highway 400. MTO was briefed and shown the initial design concepts and provided input

on the design. MTO expressed no objections to the bridge profile as long as it does not compromise the future maintenance of the bridge. MTO also indicated that the bridge needs to follow MTO aesthetic guidelines.

A second meeting with the Ministry of Transportation was convened on January 21, 2010 where bridge structural details and design were further refined, most notably establishing that a minimum of three girders be used for the bridge design. The MTO also noted that the proposed grade of 7.5% is considered acceptable.

Refer to **Appendix A5** for MTO correspondence.

2.5 First Nations Involvement

As noted in **Section 2.2**, a Study Notification Letter was mailed to the Ministry of Aboriginal Affairs (MAA) and Aboriginal Affairs and Northern Development Canada (formerly Indian and Northern Affairs Canada) February 2009. The purpose of the letter was to inform each agency of the project and to solicit their respective input. In addition to the government contacts, the Chippewas of Georgina Island First Nation was mailed notification of the study on November 20th, 2009. No response was received from either of the agencies or the Chippewas of Georgina Island.

Refer to **Appendix A1** for the study mailing list.

2.6 Summary of Key Consultation Events

Table 2-1 provides a chronological summary of the key points of contact with agencies and public stakeholders throughout the EA Study. See the subsections above for details of issues raised during consultation events. The issues raised during the consultation events were addressed as the project team worked through the Phases of this EA, and the ESR documents this process.

Table 2-1: Key Consultation Events

Consultation Event	Date	Purpose
Community Liaison Committee Meeting #1	March 26, 2009	Provide study overview and findings to date, including presenting the preliminary recommended alternative solution; garner input and concerns.
Public Information Forum #1	April 16, 2009	
Ministry of Transportation Co-ordination Meeting #1	June 18, 2009	Discuss potential bridge structure implications for Highway 400.
Community Liaison Committee Meeting #2	March 2, 2010	Present alternative design concepts and evaluation, including the preliminary recommended alternative design concepts(s), garner input and concerns to assist in developing future mitigation measures.
Public Information Forum #2	March 23, 2010	
Ministry of Transportation Co-ordination Meeting #2	January 21, 2010	Preliminary bridge design submission and refinement.
Community Liaison Committee Meeting #3	October 3, 2013	Provide the results of updated traffic analysis, including implications for study recommendations, discuss next steps in the project.

2.7 Notice of Study Completion/Filing of the ESR

This ESR will be filed in the public record for an extended 54-calendar days and the public will be notified by means of newspaper advertisements, a City of Vaughan's website posting, and mailings to agencies, interested individuals and adjacent property owners.

3. Description of the Existing Environment

This section provides a description of the existing and future conditions for the North Maple Community Bridge study area for planning context. It deals with the provincial and municipal planning framework and the technical, socio-economic, cultural, and transportation conditions for the study area corridor. In preparing the baseline description of the study area, available background information was assembled and reviewed. A number of secondary source information (e.g., maps, reports) were used to characterize the study area corridor and record significant natural, socio-economic and cultural features. Much of the data collected were obtained from provincial agencies, City of Vaughan, and York Region.

In addition, roadside reconnaissance activities and technical studies were carried out to confirm and/or augment the secondary information collected and reviewed. The scope of the data collection exercise was to provide the City of Vaughan with sufficient information to identify, evaluate and compare Planning Alternatives.

3.1 Technical

3.1.1 Road Network

The Block 33 community is bounded by four major arterial roadways, including Major Mackenzie Drive to the south, Weston Road to the west, Teston Road to the north, and Jane Street to the east. The existing internal collector roadways that lead to the future North Maple Community Bridge include Canada Drive and America Avenue. Highway 400 bisects the east and west halves of the community, and is accessible from either Teston Road to the north, or Major Mackenzie Drive to the south.

An assessment of existing transportation conditions in the study area was undertaken in order to evaluate the ability of the existing transportation network to accommodate future development and to provide a basis for the assessment of alternative road network improvements. This assessment is located in **Appendix D**. The assessment incorporated a review of road network characteristics, traffic volumes, and the corresponding operating Levels of Service (LOS). Currently, residents must utilize major arterials to move from one side of Highway 400 to the other (i.e. Jane Street, Teston Road, Major Mackenzie Drive, Weston Road), resulting in longer distance trips and overloading of key signalized intersections.

Based on the findings of the traffic assessment, the major arterial roadways in their existing configurations will not be able to accommodate the growth in east-west travel demand anticipated by the year 2021. Background traffic growth and expected development within and surrounding the study area will generate travel demands that exceed the practical capacity of the existing roadway network capacity for 2021 and beyond.

3.1.2 Road Characteristics

Characteristics of the surrounding road network were also reviewed to determine the function of the broader transportation network and to establish the possible effects of the introduction of additional vehicular volumes to the overall transportation system.

The completed traffic assessment is included in **Appendix D**, including the existing traffic volumes and operating characteristics/conditions at the key intersections within the study area. The road network and existing configurations for the key intersections in the study area are described below and shown in **Figure 3-1.**

Figure 3-1: Existing (2009) Road Network Lane Configuration and Method of Control at Major Intersections

3.1.2.1 Arterial Roads

Major Mackenzie Drive (Regional Road 25) is an east-west arterial corridor under the jurisdiction of the Region of York having a four lane configuration. There are six signalized intersections within the study area along Major Mackenzie Drive. Posted speed on this section of Major Mackenzie Drive is 60 km/h. Major Mackenzie Drive is connected to Highway 400 through a grade separated interchange which provides for all possible movements.

Jane Street (Regional Road 55) is four-lane north-south arterial corridor under the jurisdiction of the Region of York with a posted speed of 60 km/h. Within the study area, there are five signalized intersections and two (2) unsignalized intersection.

Teston Road (Regional Road 49) under jurisdiction of the Region of York has been widened west of Jane Street to four lanes, including an interchange with Cityview Boulevard (Summer 2009 construction).

Weston Road (Regional Road 56) between Major Mackenzie Drive and Teston Road is four lanes with a continuous centre left turn lane under the jurisdiction of the Region of York. The posted speed limit on this roadway is 60 km/h.

3.1.2.2 Collector Roads

Cityview Boulevard is a Collector Road under the jurisdiction of the City of Vaughan with a two lane cross-section. The posted speed along Cityview Boulevard is 50 km/h.

As per the Vaughan Transportation Master Plan – A New Path (TMP), collector roads are intended to afford organization for the local street system within residential areas and provide the main connecting points to the arterial system. They are designed to be continuous and are expected to carry moderate traffic volumes.

3.1.2.3 Primary Roads

America Avenue and Canada Drive, on east and west of Highway 400 respectively, are defined as primary roads in Official Plan Amendment 600. The posted speed on both roadways is 50 km/h. Primary roads, in addition to collector roads, are intended to afford organization for the local street system within residential areas and provide the main connecting points to the arterial system. They are designed to be continuous and are expected to carry moderate traffic volumes.

Both these roads have two lane cross-sections and most intersections are controlled through stop signs. As per OPA 600, the designated right of way width for primary roads is 23 metre (m), and they are intended to accommodate a maximum of two continuous through traffic lanes. All primary roads should be active, pedestrian oriented, and provide for on-street parking, and transit routes.

3.1.3 Transportation Analysis

An assessment of existing transportation conditions in the study area was undertaken in order to evaluate the ability of the existing transportation network to accommodate future development and to provide a basis for the assessment of alternative road network improvements. The assessment incorporated a review of traffic volumes, and the corresponding operating Levels of Service (LoS). Currently, residents must utilize major arterials to move from one side of Highway 400 to the other (i.e. Jane Street, Teston Road, Major Mackenzie Drive, Weston Road), resulting in longer distance trips and overloading of key signalized intersections. Characteristics of the surrounding road network were also reviewed to determine the function of the broader transportation network and to establish the possible effects of the introduction of additional vehicular volumes to the overall transportation system.

3.1.3.1 Existing Traffic Operations

The effectiveness of an intersection's operations is measured in terms of Level-of-Service (LOS). LOS ranges from LOS "A" to LOS "F", with LOS "A" being the best level of operation for an intersection and LOS "F" being the worst. LOS "A" represents free flow conditions where the general level of comfort and convenience experienced by motorists is excellent. Typically, the minimum LOS acceptable for design purposes is LOS "D". As traffic demand approaches or exceeds the available capacity, intersection failure occurs. This is indicated by a grade of LOS E. When the intersection fails, vehicles can no longer pass through the intersection during a single green phase of the signal cycle, resulting in extensive amounts of traffic congestion and long vehicle queues. LOS F is an indication of an over-saturated condition. When this occurs in several locations within an urban area, a condition commonly known as "grid-lock" usually occurs.

As summarized in **Appendix D**, under existing lane configurations and optimal signal timings, two signalized intersections along Major Mackenzie Drive (Major Mackenzie Drive/Cityview Blvd and Major Mackenzie Drive/Jane Street) and the Teston Road / Jane Street intersection have V/C ratio exceeding 0.85 in the AM peak hour. During

the evening peak hour, all the signalized intersections along Major Mackenzie Drive except Major Mackenzie Drive / Hwy 400 SB Off Ramp intersection have V/C ratios far exceeding 0.85. The rest of the signalized intersections in the study area except Teston Road / Jane Street would operate with sufficient reserve capacity.

3.1.3.2 Future Traffic Analysis

In order to address intersection issues in the study area for the future 2021 traffic, the following two network scenarios were evaluated:

- Network Scenario 1: future 2021 volumes assigned to the existing road network without proposed Canada Drive/America Avenue overpass

Most of the signalized intersections in the study area in the morning peak hour have control delays less than 80 seconds except at intersections of, Major Mackenzie Drive/Jane Street in the morning peak hour. While in the evening peak hour, three major signalized intersections along Major Mackenzie Dr. (Major Mackenzie Drive/Weston Road, Major Mackenzie Drive/Hwy 400 SB Off Ramp, and Major Mackenzie Drive/Jane Street) and two major signalized intersections along Teston Road (Teston Road/Hwy 400 NB Off Ramp and Teston Road/Weston Road) would experience an average delay exceeding 80 seconds. In terms of v/c ratios, Major Mackenzie Drive/Weston Road, Major Mackenzie Drive/Jane Street, Jane Street Grand Valley Blvd and Teston Road/Weston Road intersections would operate above capacity level. Traffic operational conditions in the evening peak hour are worse than AM peak hour. All the key signalized intersections along Major Mackenzie Drive would operate with over-saturation .Refer to **Appendix D** for further detail.

- Network Scenario 2: future 2021 volumes assigned to the existing road network with proposed Canada Drive/America Avenue overpass

The study area network was established defining the required attributes (number of lanes, speed, travel time, base link flows and capacity) and traffic zones (internal and external). All signalized and key unsignalized intersections within the study area were analysed. As noted in the 2010 Traffic Study, the volumes on the bridge are estimated at 330 vehicles in the AM peak hour (between 7 to 9 a.m.) and 485 vehicles in the PM peak hour (between 4 to 6 p.m.). On America Avenue east approach to John Deisman – 140 vehicles in the AM peak hour and 160 vehicles in the PM peak hour. On Canada Drive west approach to Cityview Boulevard – 240 vehicles in the AM peak hour and 200 vehicles in the PM peak hour.

These alternative scenarios were assessed for the purpose of identifying intersection issues resulting from approach lane deficiencies, overall intersection capacity deficiencies and identifying potential road network improvements which would address future capacity deficiencies.

3.1.4 Access

The North Maple Community Bridge can be accessed via Canada Drive and Cityview Boulevard from the west and America Avenue and John Deisman Boulevard from the east. Currently on the east side of the bridge, there is no access to major arterial roadways (Teston Road and Major Mackenzie Drive) without first accessing Jane Street. In contrast, immediately on the west side of the bridge, Cityview Boulevard runs north/south and connects to both Teston Road and Major Mackenzie Drive while Canada drive intersects with Weston Road.

3.1.5 Transit Network

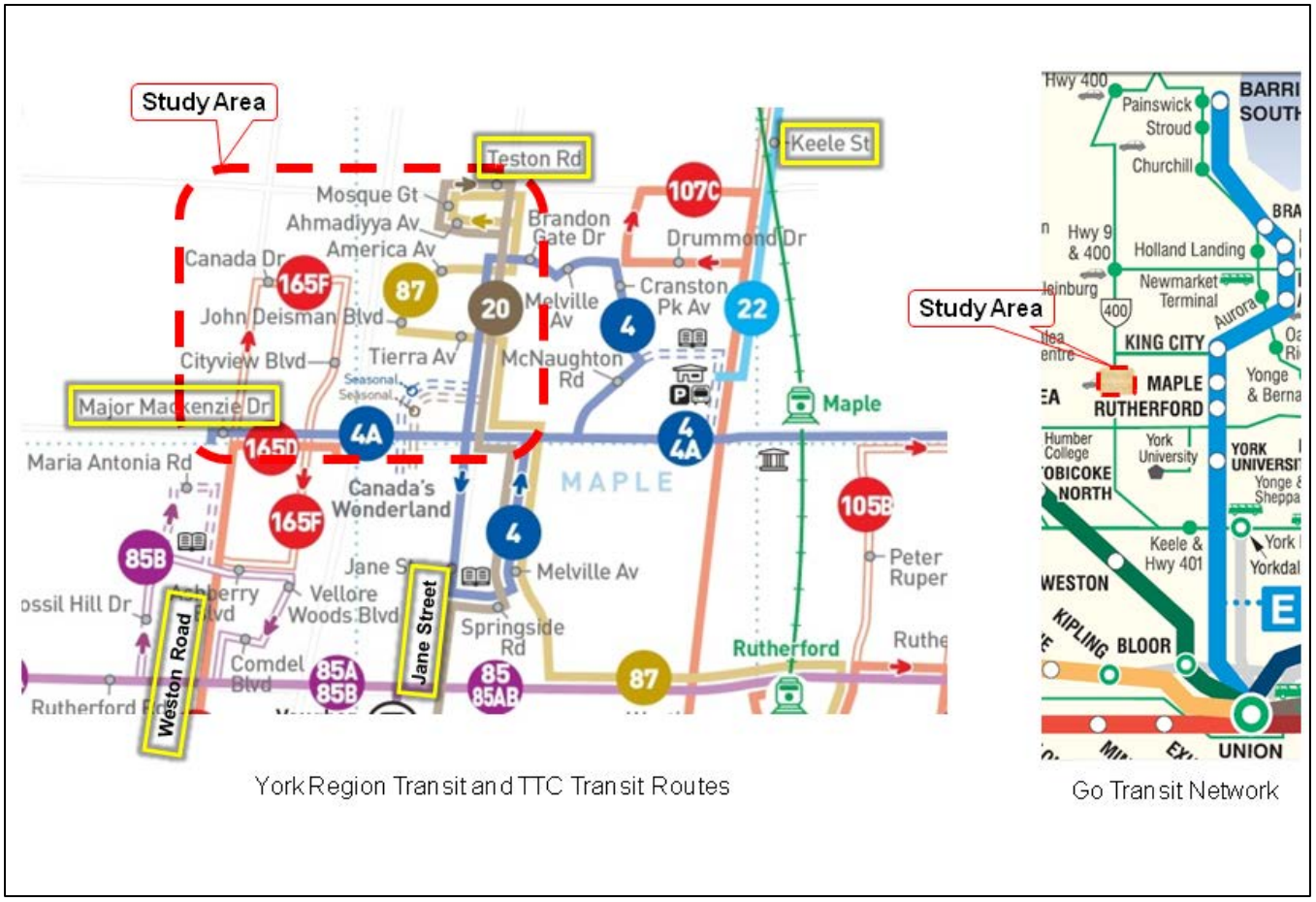
York Region Transit (YRT) and Toronto Transit Commission (TTC) are currently providing transit services in the study area. YRT is operating on four routes in the study area. The existing transit route network in the study area is presented in **Figure 3-2**.

YRT Route #4A (Markham Stouffville Hospital – Weston Road) operates in east-west direction along Major Mackenzie Drive. This route operates at a frequency of 18 minutes and 25 minutes in AM and PM peak hours respectively and 50 minutes in off-peak hour.

YRT Route #4 is short route to serves residential areas along Tierra Avenue, America Avenue and Ahmaddiya Avenue in Block 33 (East). The frequency of this route during the AM and PM peak hours is 30 minutes, while the traffic volume during off peak hours the frequency is reduced to 1 hour. This route is currently under revision by YRT.

YRT Route #20 (Jane-Concord) operates along a north-south direction along Jane Street, originating at York University and terminating at Mosque Gate and Teston Road.

Figure 3-2: Transit Routes in the Broader Study Area



YRT Route #87 (Langstaff-Maple) operates along Jane Street between Teston Road and Major Mackenzie Drive, and along Rutherford Road between Melville Avenue and Keele Street.

TTC Route #165 (Weston Rd North) bus route operates between York Mills Station on the Yonge-University-Spadina Subway, along Weston Road between Rutherford Road and Canada Drive, along Cityview Boulevard/ Vellore Woods Blvd. between Canada Drive and Ashberry Blvd. in proximity of the study area. It also serves the Wilson Station on the Yonge-University-Spadina Subway.

GO Transit operates an express bus route along Highway 400 between Toronto (Yorkdale Bus Terminal) and Barrie. This route has a stop at the Major Mackenzie Drive carpool lot. The express bus service has a frequency of 15 min. in the morning and evening peak hours and 1 hour in off-peak hours. The Barrie GO train service is accessible at the Maple GO Station east of the study area.

3.1.6 Pedestrian and Cycling Facilities

There are no designated trails in the study area. Bartley Smith Greenway trail is close to the study area and the trail commences at Steeles Avenue near Dufferin Street, extends northward through Marita Payne Park and terminates at Langstaff Road.

3.1.7 Right of Way

America Avenue and Canada Drive have an existing right of way (ROW) width of 23 m. The designated ROW for both roads extends to the Highway 400 property line. In addition to the ROW the City owns additional land for the bridge approaches that varies from 23 m to 60 m.

3.1.8 Utilities

AECOM's site visit confirmed the absence of above ground utilities in both east and west bridge approaches. As part of this study the relevant utility companies were contacted to ascertain the location of their respective plant within the study area corridor. Correspondence received from Hydro One Networks Inc. indicated that they do not own utilities within the study area corridor. The following summarizes the companies that own utilities in the project area:

- Bell Canada with buried cables at Cityview Blvd. and Canada Drive intersection as well America Avenue and John Deisman Blvd. intersection.
- Enbridge Gas with a gas main at Cityview Blvd. and Canada Drive intersection as well America Avenue and John Deisman Blvd. intersection.
- Rogers with buried cables at Cityview Blvd. and Canada Drive intersection as well America Avenue and John Deisman Blvd. intersection.

3.1.9 Underground Services

There are several underground services in the vicinity of the project, including storm and sanitary sewers and two watermains. Of those services, AECOM identified that 400 mm watermain that crosses the east bridge approach may be in conflict with the proposed east bridge approach. This watermain is illustrated on the drawing prepared by Cole Engineering and included in **Appendix E.**

3.2 Socio-Economic

3.2.1 Land Uses

The study area lies entirely within the City of Vaughan and the Region of York. As stated previously, the regional arterial roads of Teston Road, Weston Road, Major Mackenzie Drive, and Jane Street frame the study area. A review of the orthophotography indicates that the study area is predominately a residential community with a portion consisting of a mixture of commercial and light industrial areas. The commercial and light industrial areas are mostly confined to the block west of Highway 400, east of Cityview Boulevard, and south of Retreat Boulevard, with the exception of a gas bar on the northwest corner of the Jane Street/Major Mackenzie Drive Intersection. The residences all have frontage and access on local roads within the block. These residential land uses consist of a mix of townhomes, semi-detached and detached residences. The study area is bisected by Highway 400, with existing interchanges providing access to Teston Road/Cityview Boulevard and Major Mackenzie Drive.

There are five schools within the study area, including:

1. Discovery Public Elementary School, 120 Discovery Trail (York Region District School Board (YRDSB))
2. Teston Village Public Elementary School, 80 Murray Farm Lane (YRDSB)
3. St. James Catholic Elementary School, 171 Mast Road (York Region Catholic District School Board (YRCDSB))
4. Glenn Gould Public Elementary School, 675 Vellore Park Avenue (YRDSB)
5. St. Mary of the Angels Catholic Elementary School, 351 Vellore Park Avenue (YRCDSB)

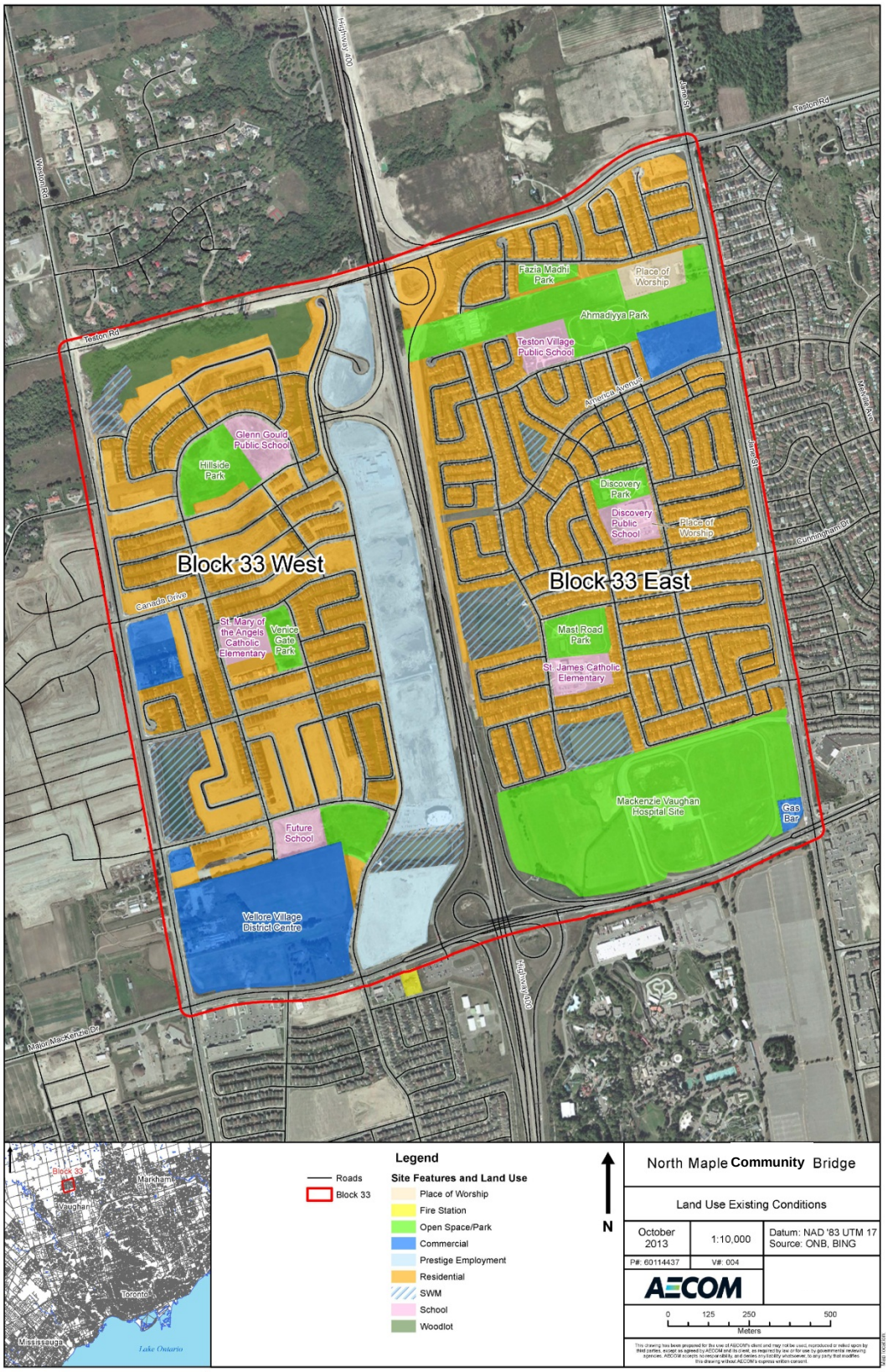
Land is being held in Block 33 West for the development of a future school. Other institutional land uses in the study area include the Baitul Islam Mosque (10610 Jane Street) and the Maple Community Church (120 Discovery Trail). There are six community parks within the study area, including:

1. Ahmadiyya Park, 10 Murray Farm Lane
2. Discovery Park, 90 Discovery Trail
3. Fazia Mahdi Park, 151 Ahmadiyya Avenue
4. Mast Road Park, 195 Mast Road
5. Hillside Park, 549 Vellore Park Avenue
6. Venice Gate Park, 180 Trudeau Drive

In addition to the parkspace, there are two woodlots on the western portion of the study area, one on the southwest corner and one in the northwest corner. Four stormwater management ponds are also found within the study area, two on the western half of the block and two on the eastern half of the block. A large empty lot comprises the southern half of Block 33 East, which is slated for the future development of the Mackenzie Vaughan Hospital. The study area is largely built-out, with the exception of the future hospital in Block 33 East, and a future school site, and a portion of the prestige employment lands in Block 33 West.

Figure 3-3 illustrates the existing land use in the study area.

Figure 3-3: Existing Land Use in the Study Area



3.2.2 School Bus Transportation Routes and Pickup Areas

The study team conducted an in-depth review of York Region Catholic District School Board (YRCDSB) and York Region District School Board (YRDSB) school bus transportation routes and designated student pickup areas within the study area. The transportation routes serve all of the schools located within the study area identified in **Section 4.2.1** above, as well as other schools throughout York Region. All of the routes currently use Jane Street, Major Mackenzie Drive, Weston Road, and Teston Road to access local streets within the study area.

Table 3-1 provides a summary of the school bus transportation routes in the study area.

Table 3-1: York Region School Bus Transportation Routes

School Bus Transportation Routes	Total Approximate Number of Routes, AM and PM
Utilizing Roads Within the Study Area	49
Utilizing Local Roads Within Block 33 West	19
Utilizing Local Roads Within Block 33 East	38
Utilizing America Avenue, or Crossing America Avenue on Local Roads	21
Utilizing Canada Drive, or crossing Canada Drive on Local Roads	14

Following review of the school bus routes, pickup locations were identified on America Avenue and Canada Drive.

Along America Avenue, designated student pickup locations[1] include:

- A private residence on America Avenue
- Pinta Way
- Gale Way
- Coast Avenue
- Ocean Avenue
- John Deisman Boulevard

Along Canada Drive, designated student pickup locations include:

- Summit Drive
- Vellore Park Avenue

3.2.3 Provincial Planning Studies

The following Provincial Policies lay the framework for local and regional planning policy in the study area:

- Provincial Policy Statement
- Greenbelt Plan
- Growth Plan for the Greater Golden Horseshoe

3.2.3.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued in 2005 under the authority of Section 3 of the *Planning Act* and provides policy direction related to land use planning and development in Ontario. The PPS ensures that

1. At least one AM and PM bus route serves each of the identified locations; in some cases more than one route serves each location.

transportation systems are provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs. As per Section 1.6.6.1 of the PPS, "Planning authorities shall plan for and protect corridors and rights-of-way for transportation, transit and infrastructure facilities to meet current and projected needs".

The PPS also provides guidance for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural environment through a detailed set of policies that generally address the following:

- Building Strong Communities
- Wise Use and Management of Resources
- Protecting Public Health and Safety

Several of the objectives outlined in Part V, Sections 1.0 and 2.0 of the PPS (i.e., Building Strong Communities and Wise Use and Management of Resources, respectively) are considered applicable to this study. The PPS provides the following policies regarding the provision of transportation infrastructure to support future urban development relevant to the study area:

PPS Section 1.6 - Infrastructure and Public Service Facilities

1.6.2 The use of existing infrastructure and public service facilities should be optimized, wherever feasible, before consideration is given to developing new infrastructure and public service facilities."

1.6.5 Transportation Systems

1.6.5.1 Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.

1.6.5.2 Efficient use shall be made of existing and planned infrastructure.

1.6.5.5 Transportation and land use considerations shall be integrated at all stages of the planning process

It is clear from the PPS that optimizing/improving existing infrastructure to a standard that improves safety is desirable. As part of conformity to the PPS, the Block 33 Plan encourages and protects for an effective transportation network that will facilitate a connection for Block 33 West and East, promotes public transit and is intended to accommodate future automobile traffic generated by the development of these lands.

3.2.3.2 Greenbelt Plan

The Greenbelt Plan (2005) identifies where urbanization should not occur in order to provide permanent protection to an agricultural land base and the ecological features occurring on a landscape. The Greenbelt is 1.8 million acres of land, which spans from the Niagara Peninsula in the southwest to Rice Lake in the east and contains some the most threatened environmentally sensitive and agricultural lands in the province, and safeguards them from major urban development. The study area is situated outside the Greenbelt in an area identified as "Settlement Areas Outside the Greenbelt," as per Schedule 1: Greenbelt Plan Area, February 2005.

3.2.3.3 Growth Plan for the Greater Golden Horseshoe

In June 2006, the Province of Ontario released the Growth Plan for the Greater Golden Horseshoe (Growth Plan). The Growth Plan was prepared under the *Places to Grow Act*, 2005 which provides a legal framework for growth planning in Ontario. The Growth Plan guides decisions on a wide range of issues including transportation, infrastructure, land use planning, housing, natural heritage and resource protection. Planning and strategic investment for transportation, water and wastewater systems and community infrastructure to support efficient growth is outlined in the Growth Plan.

The Growth Plan aims to revitalize downtowns to become more vibrant centres by: creating communities that offer more options for living, working, shopping and playing; providing a variety of housing types to meet the needs of people at all stages of life; curb urban sprawl; protect farmland and green spaces; and, reduce traffic gridlock by improving access to a greater range of transportation choices.

The Growth Plan establishes the Province's vision for managing population and employment growth in the Greater Golden Horseshoe (GGH) and presents population and employment forecasts for Region of York up to the year 2031. Growth projections reported within the Growth Plan indicate that the population and employment statistics for the Region of York will increase to approximately 1,500,000 and 780,000 by 2031.

It should be noted that Amendment 2 to the Growth Plan came into effect on June 17, 2013, and extends the Growth Plan's population and employment forecasts up to 2041. This amendment also includes updated forecasts for the 2031 forecasts indicated in the 2006 Growth Plan. Amendment 2 to the Growth Plan indicates that the 2031 population and employment statistics for the York Region are forecast to increase to approximately 1,590,000 and 787,000, respectively. In addition, by 2041, population and employment in York Region is anticipated to increase to approximately 1,790,000 and 900,000, respectively. In the City of Vaughan, population is expected to increase 68%, from 250,000 (2006) to 420,000 in 2031. Employment in this same time period is expected to increase 67%, from 159,000 (2006) to 266,000.

3.2.4 Regional/ Local Planning Studies

The need for a primary crossing of Highway 400 has been established at the planning level through the following policies/studies:

- York Region Official Plan
- York Region Transportation Master Plan
- City of Vaughan Official Plan
- Vaughan Official Plan Amendment (OPA) No. 400 and Transportation Study
- Vaughan OPA No. 600 and Transportation Study
- Block 33 (East) Planning Basis Report and Transportation Study
- Block 33 (West) Planning Basis Report and Transportation Study
- City of Vaughan Pedestrian and Bicycle Master Plan
- City of Vaughan City-Wide Transportation Master Plan 2013

3.2.4.1 York Region Official Plan

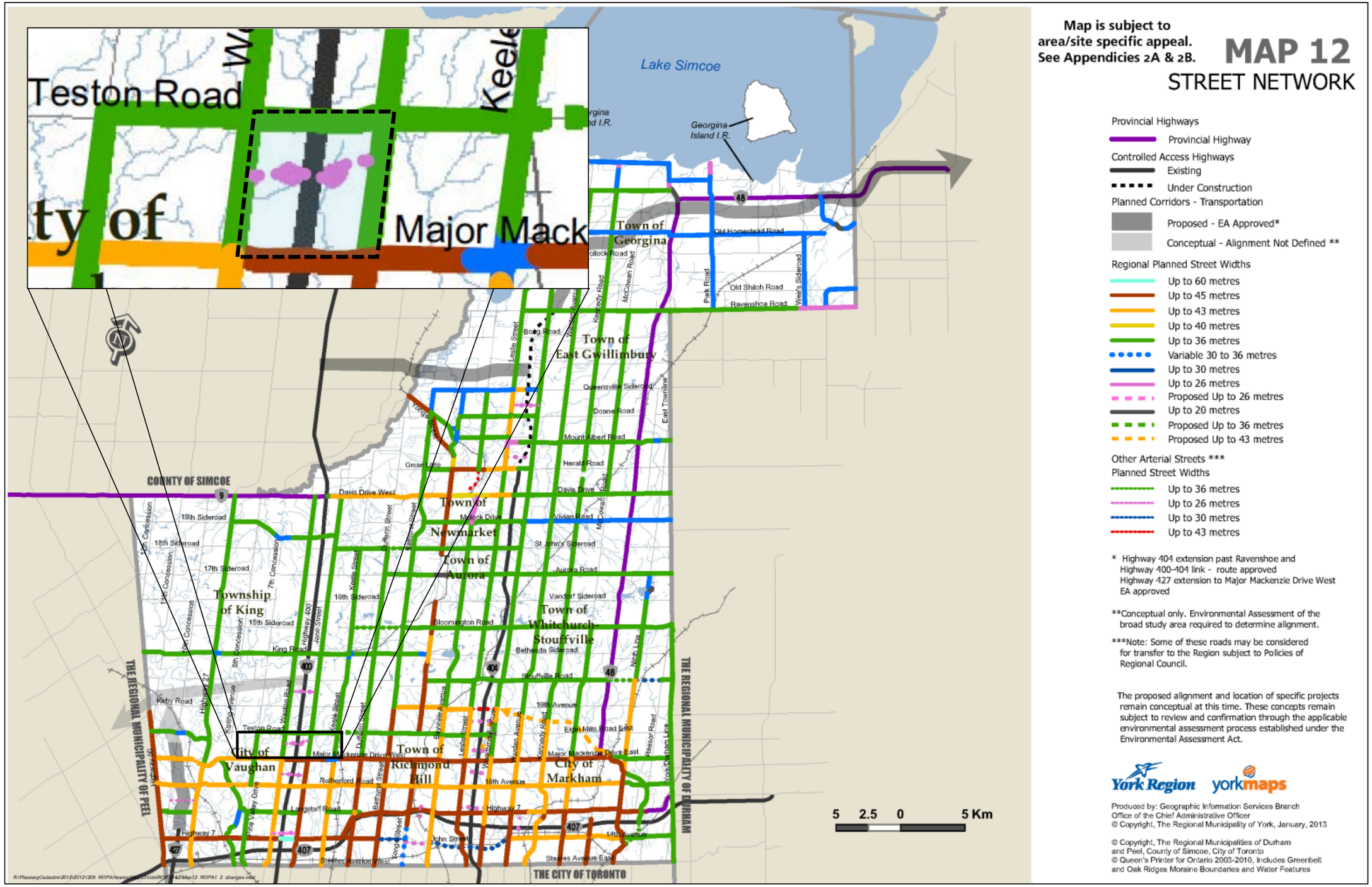
The Region of York Official Plan (RYOP) - 2010 was approved by the Minister of Municipal Affairs and Housing on September 7, 2010 and appealed to the Ontario Municipal Board (OMB). Since then, the York Region Official Plan - 2010 has been partially approved by the OMB and specific policies of the York Region Official Plan - 1994 have been repealed; effective the following dates: July 11, 2012, September 21, 2012, November 19, 2012 and January 14, 2013.

One of the primary objectives in the Region of York Official Plan (RYOP) 2010 is to develop road infrastructure that supports future urban and rural structure and can accommodate all future transportation demands. The RYOP encourages road improvements that support all modes of transportation including walking, cycling, and automobile, transit and truck so that increased carrying capability of the regional street and road network is consistent with the overall RYOP goals and objectives. In regard to mid-block connections, the RYOP provides the following guidance (Section 7.2.61, not subject to site-specific appeal):

> *"To require local municipalities to plan and implement, including land takings necessary for, mid-block crossings of 400-series highways, as shown on Map 12……."*

A proposed regional planned street width of up to 26 m is shown east-west mid-block 33 on Map 12 of the RYOP. See **Figure 3-4** for detail. It should further be noted that the formerly in-force policies of RYOP (1994) also provided support for, and illustrated, a similar Block 33 mid-block connection.

Figure 3-4: York Region Official Plan Street Network



3.2.4.2 York Region's Transportation Master Plan

According to the York Region Transportation Master Plan 2002 (TMP 2002), York is the fastest growing region in both population and employment the Greater Toronto Area. Current York Region residents are highly dependent on auto, as evidenced in the majority of trips made within the Region by automobile. For this reason York Regions transportation system is under considerable strain, particularly in the five urban municipalities that comprise "Urban York". Prior to finalizing the TMP, a survey was given to over 1,000 York Region residents whom identified transportation and traffic congestion to be the most important issues the Region.

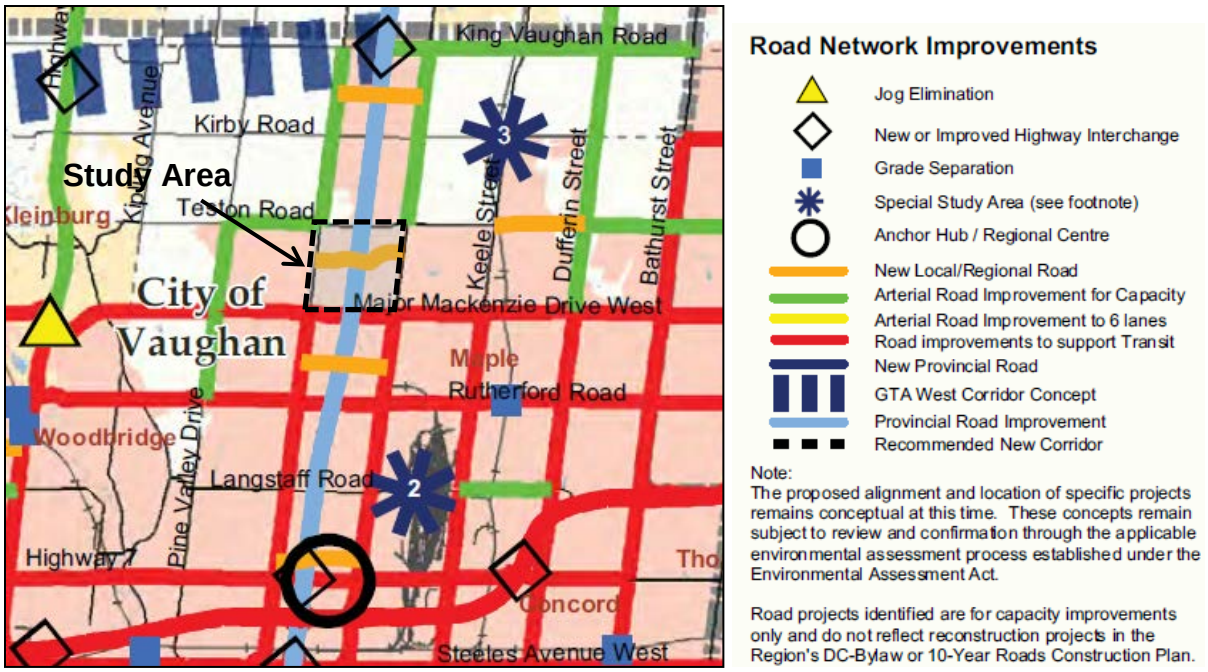
The Regional Transportation Master Plan has incorporated a road pattern within the study area that is based on a grid pattern and the Block Plan protects for a mid-block connector that will connect Block 33 East with Block 33 West, over Highway 400. The Transportation Master Plan has a number of policies to support the establishment and protection of local mid-block freeway crossings:

> *"(Municipalities should) Undertake future studies to….review, designate and protect rights-of way for potential mid-block collectors across freeways." (Section 3.4.7)*
>
> *"Five initiatives are proposed with respect to planning for efficient goods movement….(one of which is) expanding the number of mid-block freeway crossings." (Section 4.4)*
>
> *"The area municipalities may be required to modify their Official Plan policies to….recognize the need for mid-block collector roadways capable of providing transit service." (Section 3.4.2)*

On November 19, 2009, York Regional Council adopted the Transportation Master Plan Update, the Region's transit and roads plan to 2031.

The 2009 Transportation Master Plan Update identifies a "New Local/Regional Road' crossing Highway 400 in Vaughan Block 33 on the Regional 2031 Road Network Map. See **Figure 3-5** for details.

Figure 3-5: York Region Transportation Master Plan Road Network Improvements



3.2.4.3 City of Vaughan Official Plan

On September 7, 2010, Vaughan City Council adopted a new Official Plan. It addresses all elements of effective, sustainable and successful city-building, while managing projected growth to 2031.

The study area falls within the 'Urban' Planning Area under the City of Vaughan's Official Plan. In addition, lands to the north of the study area are designated as Agricultural Rural Area, similar to that of the RYOP. A future crossing of Highway 400 within Block 33 is designated within the Official Plan as a 'Minor Collector Road' with proposed 24 m right-of-way. See **Figure 3-6** for details.

In-force policies of the 2010 Official Plan most pertinent to the North Maple Community Bridge are described in further detail below.

4.2.1 Collector Streets

4.2.1.23. To provide a minimum of 2 north / south and 2 east / west collector streets in new development where feasible, including grade-separated crossings of 400-series highways and rail corridors. The purpose of these streets will be to provide for local travel between and within concession blocks without the necessity of traveling on arterial streets and to provide effective routing for transit vehicles.

4.2.1 Street Construction, Improvements, and Maintenance

4.2.1.32. To co-ordinate street system improvements with Block Plan and Plan of Subdivision approvals so that adequate street system capacity is in place, particularly on the arterial, and collector street networks including mid-block crossings of 400-series highways and rail corridors, to accommodate the projected traffic volumes concurrent with the development of the block.

As per the above, it is clear that the policy within the 2010 City of Vaughan Official Plan supports a Block 33 mid-block collector road crossing of Highway 400.

3.2.4.4 City of Vaughan Official Plan Amendment No. 400

At the municipal level, Official Plan Amendment 400, was adopted by the City in 1995 and was formally approved by the Ontario Minister of Housing and Municipal Affairs in 1996. Within OPA 400 the majority of the required transportation infrastructure for Block 33 was approved and documented prior to any residential and/or commercial development.

During the planning process for Block 33 (East) the City identified key infrastructure requirements such as the need to produce an efficient internal road system with linkages to the existing and planned external road systems. As such, the Block Plan has designated a northerly east/west primary road across Highway No. 400, connecting Block 33 East with Block 33 West (see **Figure 3-7**). As stated in the Consolidated Block Plan Report approved by the City of Vaughan in 1996:

"the basis for this approach is that as the designated transit route, its connection to Block 33 (West) will integrate into the overall planned transit system and that this linkage, together with the remainder of the transportation system proposed, can accommodate the development planned for Block 33 (East)." (Section 2.3.3.1 (1))

Figure 3-6. City of Vaughan Official Plan Future Transportation Network

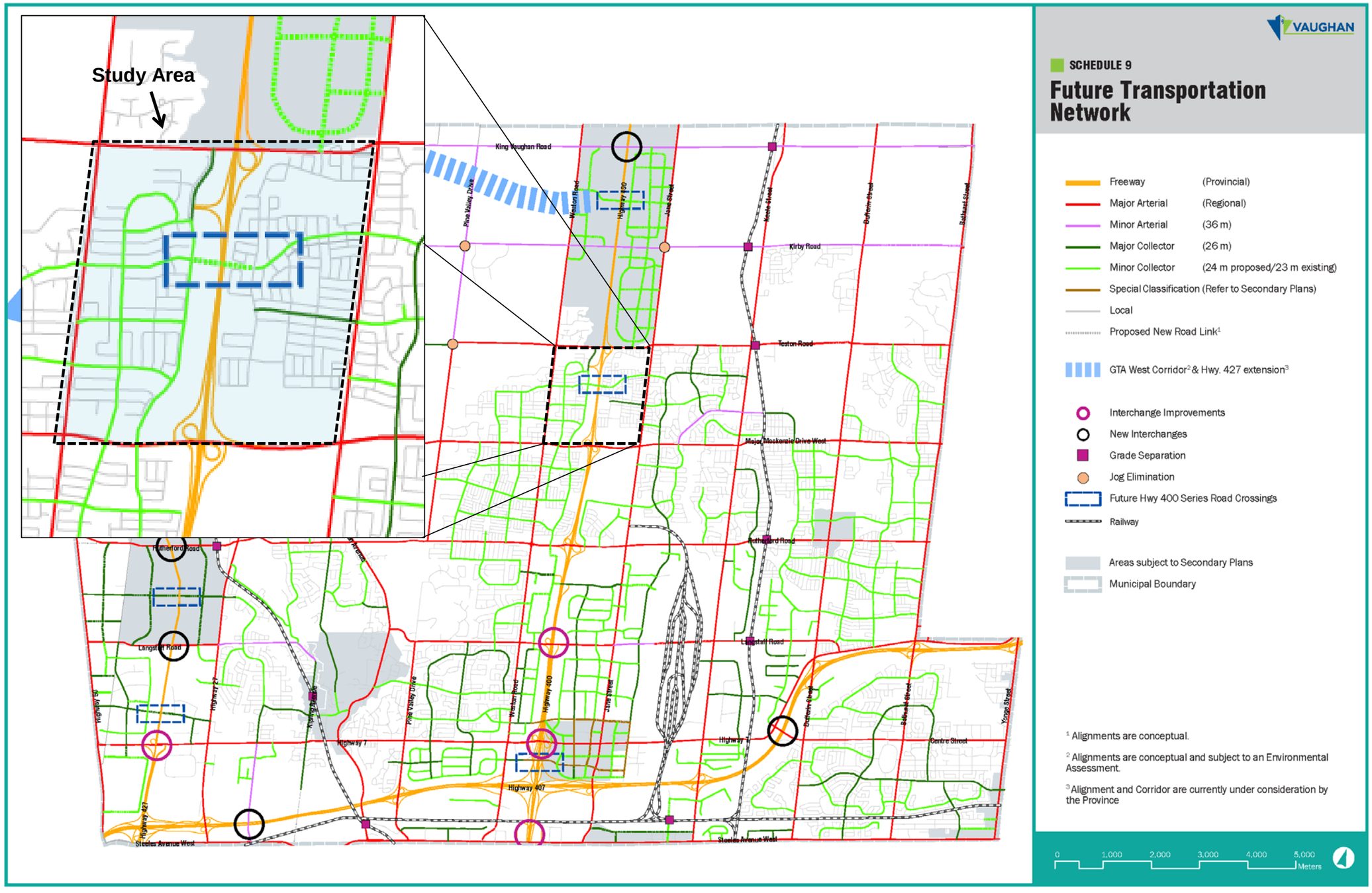


Figure 3-7: Vaughan Official Plan Amendment 400 Land Use Plan

The supporting transportation report included as part of the original Block Plan submission states that:

> *"Street 'B' (Canada Drive) is intended to be the main east-west primary road that will eventually connect to America Drive in Block 33 (East), over Highway 400. Street 'B' also serves as a mid-block gateway into Block 33 west and provides access to the Neighbourhood Commercial Centre."*

Furthermore, the study area adheres closely to the structuring elements as contained in subsection 3.5 of OPA 400, as described below:

a) Greenway Systems provide a strong linkage network of pedestrian walkways and bicycle paths, connecting the neighbourhoods and the public/community used elements. They have been designed to provide as much continuity as possible.

b) Primary Road Grid System has been incorporated into the study area Plan in close conformity with the Secondary plan. It has been reinforced through a modified grid of local roads. Connections have been provided to Teston Road and Jane Street and opposite existing or planned intersections where appropriate. Opportunities for connections to the south, through PCW to Major Mackenzie Drive and to the west, across Highway 400, have been preserved.

c) Neighbourhoods are to be the basis for community structuring and the Block Plan demonstrates effective use of this approach. Three neighbourhoods are created based on the careful locating of three school/park campuses. These neighbourhood centres are based on the criterion of the five minute walk. These features provide a distinctive character to the study area and they are also key elements in the public/community uses which are easily accessed by means of the Greenway System. As required by OPA 400 each of the three neighbourhoods has access to the greenway system, a primary street and a local park.

3.2.4.5 City of Vaughan Official Plan Amendment No. 600

OPA 600 was undertaken as way of reviewing the effectiveness of OPA 400. OPA 600 determined that the policies in OPA 400 relating to transportation and the transportation system were in need of some refinement in order to address potential shortcomings due to modifications made through plan approvals since 1995.

The proposed Block Plan 33 West is located in the northeast quadrant of Vellore Urban Village I (see **Figure 3-8**). Official Plan Amendment 600 designates these lands for a mix of low and medium density residential housing, valleylands to the north and high performance employment along Highway 400. The Block Plan includes two public elementary school sites to serve a population of approximately 8,490.

One of the main objectives was to perform a transportation study to develop a citywide strategy to determine the needs of existing development, which could anticipate future development patterns and encourage transit use:

> *"The Secondary Plan provides a comprehensive system of primary roads connecting key origins and destinations within the proposed communities, between communities and adjacent municipalities…The continuous street grid minimizes travel distance and time, promotes movement efficiency, provides alternative route options and is very efficient for transit operations." (Section 8)*

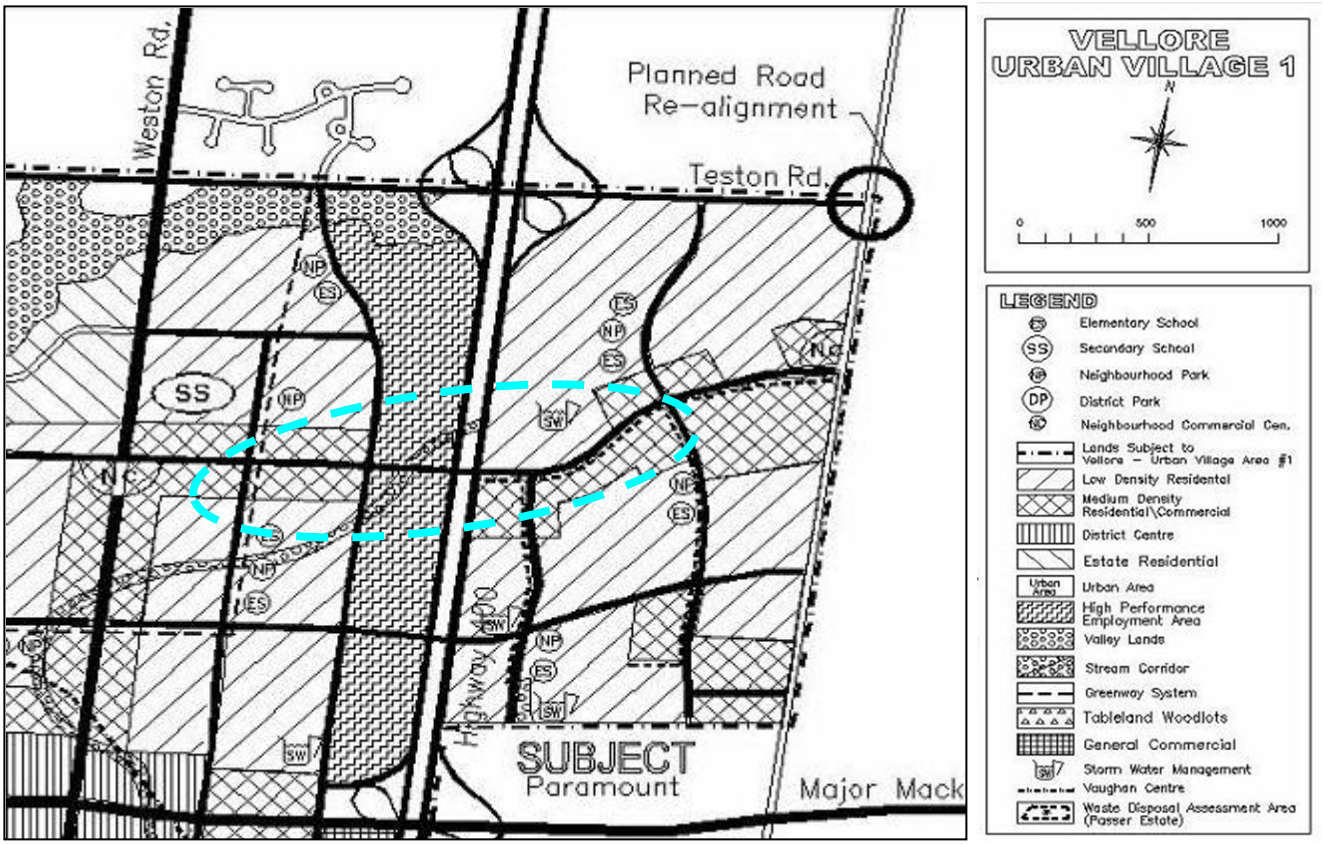
This system of primary roads is intended to carry a lower volume of traffic than a typical mid-block collector. OPA 600 goes on to state that wherever possible, the primary road network has been extended through more than one block to facilitate local traffic in order to make travel possible over longer distances without adding to traffic on the arterial road network.

The transportation policies of OPA 600 reflect the City's intent to provide efficient, functional transportation services and facilities while also encouraging public transit and pedestrian friendly travel:

> *"Primary roads and collector roads are intended to afford organization for the local street system within residential areas and provide the main connecting points to the arterial system. They are designed to be continuous and are expected to carry moderate traffic volumes." (Section 8.2.4, (a))*

The proposed connection will offer an alternative to Teston Road, Major Mackenzie Drive, Weston Road and Jane Street, and will encourage such forms of travel.

Figure 3-8: OPA 600 Vellore Urban Village 1 Land Use



3.2.4.6 Official Plan Amendment No. 650 (Vellore Village District Centre Secondary Plan)

OPA 650 was implemented to build on OPA 600 and further define and establish policies relating to the future development of the Vellore Village District Centre. The Vellore Village District Centre comprises approximately 58 hectares located around the four quadrants of the intersection of Major Mackenzie Drive and Weston Road, encompassing the western portion of the project study area. This location allows for the District Centre to be accessible to pedestrians, private vehicles and public transit services from the neighbourhoods in the surrounding Vellore community.

According to the Plan, the Vellore Village District Centre is intended to be the focus of the highest intensity land uses within the Vellore Community. These land uses include low-rise residential and a range of retail and office commercial uses.

A major element of the Vellore Village District Centre is that it provides support for transit within the Centre, as well as the surrounding areas, including Block 33 East and West. OPA 650 states that:

> *"A crucial element in the establishment of the Vellore Village District Centre and its long term success, will be its establishment as a hub for local transit facilities serving the Vellore community and linked to inter-regional and regional transit services"*

The local road network within Block 33 West will eventually feed into the Vellore Village District Centre (i.e. the connection of Vellore Park Blvd. and Starling Blvd.), allowing for local residents to access a variety of commercial

uses and the transportation hub. Further, by providing the connection between America Avenue and Canada Drive, Block 33 East residents would be able to access the Vellore Village District Centre in a more efficient manner, by personal vehicle, bicycle or walking.

OPA 650 supports the above point as follows:

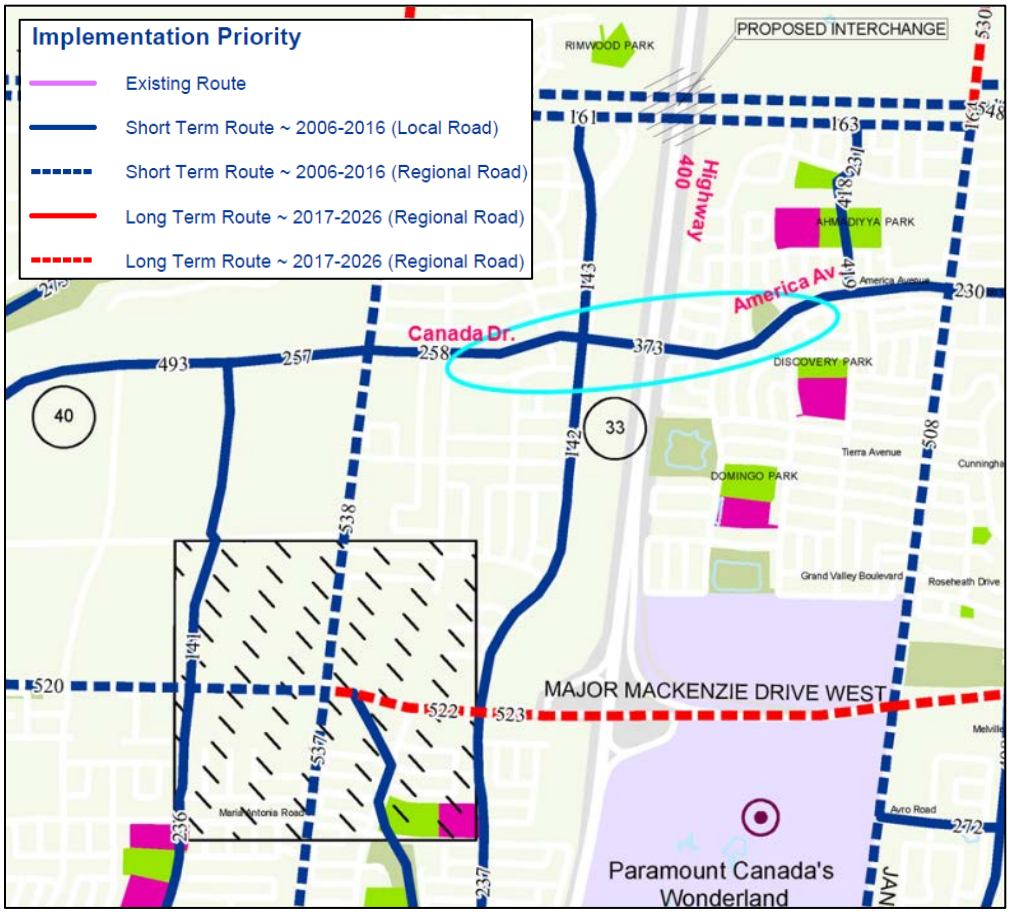
> *"The local road network within the Vellore Village District Centre will:*
>
> *Enhance the primary road grid network and provide appropriate connections to the primary and arterial network serving the Vellore Community"*

3.2.4.7 City of Vaughan Pedestrian and Bicycle Master Plan (2007)

In 2007, the City of Vaughan adopted the Pedestrian and Bicycle Master Plan to guide improvements to existing and proposed pedestrian and cycling facilities in order to create a friendlier environment for residents.

As shown on **Figure 3-9**, the plan visually depicts the connection between Canada Drive and America Avenue as a 'Local Road' and designates it as a 'Short Term Route', targeted for implementation between 2006 and 2016.

Figure 3-9: City of Vaughan Pedestrian and Bicycle Master Plan Implementation Priorities



Source: *City of Vaughan Pedestrian and Bicycle Master Plan (MMM et al., 2007),* Map 5 – Pedestrian and Bicycle Network: Implementation Priorities

The City of Vaughan Pedestrian and Bicycle Master Plan designates this connection as a key component of the Block 33 multi-modal transportation system, which includes personal vehicles, cyclists, pedestrians and transit. It also provides for community connectivity with other public services and amenities and allows for accessibility for emergency services.

3.2.4.8 City of Vaughan City-Wide Transportation Master Plan 2013 (A New Path)

The Vaughan Transportation Master Plan (TMP) is the City's transportation "blueprint" to assist with addressing growth in a sustainable manner through to 2031. Public and stakeholder engagement was a central element of the Vaughan Transportation Master Plan. The primary vehicles of engagement were newsletters, public open houses, a series of "A Blueprint to Move Vaughan" workshops, and meetings of a Technical Advisory Committee (TAC).

The TMP balances the need for local improvements, strong Regional investments in transit service and arterial road improvements, sidewalks, on-street and off-street bicycle facilities, and a mix of land uses and activities. The TMP confirms the importance of the collector road network and associated specific need for mid-block crossings of 400-series highways.

> *"These major facilities (such as Highway 400) pose major barriers to crossing traffic, often resulting in heavy congestion on the arterial crossings which also have to serve as interchanges with the freeway traffic, thus limiting the flow of crossing traffic. "(Section 2.3.1)*

The TMP has confirmed the need for the North Maple Community Bridge crossing of Highway 400 and identified the bridge as a key initiative for the 2021 time horizon (Section 7.5).

3.3 Natural

Existing conditions of the natural environment within the study area were identified based on a review of secondary source information and desktop analysis. The following existing documentation was reviewed:

- Ecologistics Limited. 1996. Consolidated Block Plan Report Block 33 (East), Environmental Impact Study
- URS Cole Sherman *et al.*, 2003. Consolidated Block Plan Report, The Community of Weston Highlands in the Village of Vellore – Master Environmental Servicing Plan/Report.
- Aerial Photos and associated mapping;
- Information obtained from the websites of York Region, the City of Vaughan, TRCA, and MNR

The biological resources within the overall study area include two small woodlots, in the southwest corner and northwest corner and the four stormwater management ponds. The woodlots are isolated, providing diversity in the landscape but they are too small to be considered significant in the region. They provide habitat for birds and wildlife which make use of open fields, hedgerows and small wooded areas in close proximity to human settlement.

Although no formal wildlife surveys were conducted, considering the disturbed character of the habitat within the study area, wildlife species anticipated to occur within the area would be those typical of urban settings and of very common occurrence. Typical wildlife species would include eastern chipmunk, raccoon, groundhog, woodchuck, gray squirrel, and coyote.

The land generally slopes from north to south, with drainage from the area flowing south and west, eventually joining the Don River. There are no permanent watercourses within the study area, with the exception of Purpleville Creek in the extreme northwestern portion of the study area. A few highly disturbed, intermittent channels which

drain into the West Don River Watershed are incapable of providing fish spawning or nursery habitat, rearing, or migration areas. The four stormwater management ponds in the study area are designed to protect water quality, although they may provide additional wildlife habitat.

There are no ANSIs, Provincially Significant Wetlands (PSW's), Environmentally Sensitive Areas (ESA's), Natural Corridors, significant woodlands, or habitat for threatened or endangered species in the study area, or in the immediate vicinity.

3.3.1 Soils/Physiography

The study area lies within the South Slope of the Oak Ridges Moraine physiographic region. This is a broad crescent of lands lying south of the Oak Ridges Moraine and north of the flat Peel Plain. A review of the Physiography of the South Central Portion of Southern Ontario indicates the study area specifically is composed off Bevelled Till Plains and Till Plains (Drumlinized) (Chapman and Putnam, 1984). The boundary of the physiographic regions roughly divides the study area from northwest to southeast, with the Bevelled Tills Plains in the southwest portion and the Till Plains (Drumlinized) in the northeast portion.

Geotechnical field investigations completed at the proposed bridge site between December 7 and 16, 2009 revealed subsoil conditions generally consisting of an upper deposit of clayey silt till underlain by sand and silt deposits and a lower deposit of clayey silt till. Groundwater was observed at 4.6 m, 4.3 m (January 4, 2010 observation), and 3.4 m at three different borehole locations on-site. The groundwater levels are expected to fluctuate seasonally and should be expected to rise during wet periods of the year.

Refer to **Appendix F** for the Foundation Investigation and Functional Design (Geotechnical) Report.

3.3.2 Archaeology

In March of 2010, Archeoworks Inc. conducted a Stage 1 archaeological assessment of the study area. Detailed background research was conducted to illustrate the specific features contributing to the classification of high archaeological potential zones within the limits of the subject lands. Consultation of the Ontario Heritage Properties Database confirmed the absence of both listed and designated heritage properties within close proximity to the study corridor.

Additional background research included a review of the Ministry of Tourism and Culture archaeological site database, which has revealed that 26 archaeological sites have been found within a 1,000 m radius of the study corridor, while two sites are located within 250 m of the study corridor, indicating the potential for locating additional sites within this region. Further criteria to support the possibility of encountering additional archaeological resources is directly related to the proximity of two former tributaries of the Don River West Branch to the study corridor boundaries; high Aboriginal archaeological potential zones having been established within 300 m of this primary water source. Further review of the study corridor within Tremaine's Map of York County, 1860 and Illustrated Historical Atlas of York County, 1878, revealed no structures are illustrated in or within 100 m of the study corridor. As such, the report noted there is low potential for the recovery of historic artifactual material within the study area limits as a result of the presence of disturbed areas consisting of the King's Highway 400, paved and gravel roadways.

It was recommended that while the fallow margin west of the King's Highway 400 appears to be disturbed by the dumping of fill, further Stage 2 field investigation would be required to confirm ground conditions. Additionally, it was recommended that the manicured grassed margins would also require further Stage 2 field assessments as they have been classified as having potential for the recovery of Aboriginal, prehistoric remains.

Further to the Stage 1 Archaeological Assessment of the study corridor, the following Archaeological Reports were reviewed to confirm the archaeological potential of the study corridor and surrounding area:

- *Stage 1 and 2 Archaeological Assessment, Draft Plan of Subdivision 19T-96V10, Parts of Lots 23 and 24, Concession 5, City of Vaughan, Regional Municipality of York (Archaeological Services Inc., 1997)*
- *Stage 1 and 2 Archaeological Assessment, Draft Plan of Subdivision 19T-00V10, Weston-400 Holdings, Part of Lot 24, Concession 5, City of Vaughan (Archaeological Services Inc., 2003)*
- *A Stage 3 Archaeological Assessment of the Murray 3 Site (AIGv-46), Block 33 (East), Lots 22, 23, 24, and 25, Concession 5, City of Vaughan, Regional Municipality of York (Archaeological Services Inc., 1998)*

The Stage 2 Archaeological Assessments completed and documented in the above mentioned reports are inclusive of the lands within the study corridor. Letters to the City of Vaughan dated April 28, 1998 and November 17, 2003 from the Ministry of Culture (MTC) clear the areas of archaeological concern and concur with the above referenced report recommendations that no further documentation of these sites is necessary. The Stage 3 Archaeological Assessment of the Murray 3 Site (AIGv-46) was also reviewed and approved by MTC in a letter to City of Vaughan Staff dated April 28, 1998.

Following a review of the Stage 2 background reports and above noted Ministry correspondence confirming archaeological clearance of the lands within the study corridor, the project team requested Stage 2 Archaeological clearance from the Ministry of Tourism, Culture, and Sport (MTCS).

Refer to **Appendix C** for copies of the above-referenced materials.

3.3.3 Cultural Heritage

Background research revealed no cultural heritage resources located within the study area.

3.3.4 Noise

The principal source of noise in the study area is road traffic on the following existing roads: Highway 400, Major Mackenzie Drive, Weston Road, and Teston Road – with Highway 400 being the most significant source of noise. Noise mitigation measures, including berms and noise barriers, exist along Highway 400 in the study area.

Consideration has also been given to the stationary noise sources located in the vicinity of the study area, namely Canada's Wonderland theme park located at the southeast quadrant of Highway 400 and Major Mackenzie Drive and the Ministry of Transportation Salt Facility located southwest of the western extent of the study area.

4. Phase One: Problem/Opportunity Statement

4.1 Background Studies

Numerous planning documents and studies have established a need for a primary road connection over Highway 400 within Block 33:

- City of Vaughan Transportation Master Plan (*A New Path*)
- Vaughan Official Plan Amendment (OPA) No. 400 and Transportation Study
- Block 33 (East) Planning Basis Report and Transportation Study
- Vaughan OPA No. 600 and Transportation Study
- Block 33 (West) Planning Basis Report and Transportation Study
- City of Vaughan Pedestrian and Bicycle Master Plan
- York Region Official Plan
- York Region Transportation Master Plan

Continued development throughout the City and the Region will constrain the existing Block 33 transportation network. Currently, residents must utilize major arterials to move from one side of Highway 400 to the other (i.e. Jane, Teston, Major Mackenzie, Weston), resulting in poor transportation efficiency and connectivity for the area.

Numerous planning documents and studies (i.e. OPAs No. 400 and 600, York Region's Official Plan and TMP, City of Vaughan Pedestrian and Bicycle Master Plan) have established a need for a primary road connection over Highway 400 in Block 33. This road connection is a key component of the Block 33 multimodal transportation system for:

- Personal vehicles;
- Cyclists;
- Pedestrians;
- Transit;
- Community Connectivity;
- Emergency Services; and,
- Other Public Services

As indicated in **Section 3.2**, OPA 400 identified the need for mid-block connections across Highway 400 (including America Avenue) to ensure that a porous transportation network was established within the new development areas throughout the City. Also, OPA 600 indicates that the City shall encourage and facilitate development of a transportation network to efficiently address the needs of Vaughan residents and the traveling public, and facilitate goods, pedestrian and bicycle movements.

The focus of this first phase of the Class EA is the establishment of future (year 2021) transportation needs taking into account changes in land use and new developments expected in the broader America Avenue/Canada Drive corridor and growth in general background traffic. This includes addressing existing transportation capacity deficiencies, as well as connectivity and the present and future transportation needs of Block 33 as identified in Section **3.1.3** above.

Block 33 was identified in the City's Official Plan Amendments (OPA) 400 and 600 as part of Vellore Urban Village 1 bounded by Major Mackenzie Drive to the south, Weston Road to the west, Teston Road to the north, and Jane

Street to the east. Highway 400 divides Block 33 in half. The development of the east half is close to completion and the development of the west half currently underway. An overpass of Highway 400 was originally identified in the overall approved transportation network within Block 32 immediately to the south, but was subsequently deleted from the OP by Vaughan Council.

Based on the review of the operational performance of the study area intersections with optimized signal timings, the major arterial roadways in their existing configurations will not be able to accommodate the growth in east-west travel demand anticipated by the year 2021. Background traffic growth and expected development within and surrounding the study area will generate travel demands that exceed the practical capacity of the existing roadway network capacity for 2021 and beyond.

The connection of America Avenue and Canada Drive is expected to result in changes in travel patterns for the Block 33 residents. It will improve the multi-modal connectivity of the two communities on either side of Hwy 400 (Block 33 East and West), and if built, it will alleviate existing and future congestion in the broader east west corridor. The proposed overpass will improve the overall transportation efficiency of the road network serving the Block 33 community by shortening travel times, improving emergency response services, providing additional pedestrian facilities and offering access to enhanced transit systems and bicycle networks. This opportunity is consistent with the City's Official Plan, offers better access to community amenities and promotes sustainable multi-modal transportation options contributing to the reduction of vehicle emissions.
An opportunity exists to:

- Improve the multi-modal connectivity of the two communities on either side of Highway 400 (Block 33 East and West), while still retaining the local character and pace;
- Provide residents with better access to amenities (schools, parks, recreational facilities, emergency and other public services, etc.);
- Provide for more sustainable modes of travel (i.e. cycling, pedestrian, transit) as the current configuration of Block 33 negates this; and,
- Complete the planned road network for the community.

4.2 Problem/Opportunity Statement

Input obtained from Citizens' Liaison Committee Meeting No.1 and Public Information Forum #1 led to the development of the Problem/Opportunity Statement as follows:

> *"In accordance with the infrastructure components identified within its Official Plan, the City is now proceeding to complete the approved transportation network for Block 33 in order to achieve connectivity between the east and west sides of Highway 400. Currently, residents must utilize major arterial roads to move from one side of Highway 400 to the other (i.e. Jane, Teston, Major Mackenzie, Weston), resulting in poor transportation efficiency. As a result, the surrounding arterial roads are reaching capacity, and according to various traffic studies, this is predicted to increase in severity over the next 20 years.*
>
> *An opportunity exists to improve the transportation efficiency of Block 33 by providing a continuous local road network between Blocks, shortening travel times, improving emergency services response times, providing additional pedestrian facilities and offering access to enhanced transit systems and bicycle networks.*
>
> *Further, this opportunity allows for the implementation of an identified component of the City's Official Plan, and promotes sustainable multi-modal transportation options contributing to the reduction of gas emissions."*

5. Phase Two: Alternative Solutions

Phase 2 of the Class EA process requires the identification and evaluation of alternative solutions to address the identified problem and/or opportunity. Alternative solutions represent transportation planning options for addressing the identified transportation problems and opportunities. The problem and opportunity statement has identified the need for improving transportation efficiency between Block 33 East and West. Alternative solutions typically include improvements to existing roads or building new roads; improving transit; transportation systems management (optimizing transportation performance); and transportation demand management (reducing travel demand).

Alternative solutions were assessed on the basis of a comprehensive set of factors and criteria that reflected the following considerations:

- Provincial and federal government legislation, policies and guidelines;
- Municipal policy (City of Vaughan, and the Region of York);
- Existing and future social, economic, cultural and engineering conditions within the study area;
- Issues and concerns identified during consultation with ministries, agencies, municipalities, ratepayer and interest groups and the general public; and
- Project Team investigations and expertise.

A number of planning alternatives were identified and subjected to a screening process to determine whether they would improve the efficiency of Block 33 within the study area and serve the short and long term growth of the surrounding area.

5.1 Identification of Alternative Solutions

The following list of alternative solutions was identified as having potential to address the problems and opportunities within the study area. Alternative solutions considered and presented at PIF #1 include:

- Alternative 1 – Do Nothing
- Alternative 2 – Reduce Auto Demand
- Alternative 3 – Upgrade/Improve Other Roadways
- Alternative 4 – Bridge Overpass/Midblock Connection

5.1.1 Alternative 1 – Do Nothing

The alternative demonstrates what would happen if no action was taken to improve the connectivity within the existing Block 33 road network. This alternative solution was included for comparison purposes for evaluating the other alternatives.

5.1.2 Alternative 2 – Reduce Auto Demand

This alternative would involve introducing Transportation Demand Management (TDM) strategies to promote use of alternative modes of transportation such as transit, cycling, and walking) within and around the study area.

5.1.3 Alternative 3 – Upgrade/Improve Other Roadways

This alternative would involve improvements and upgrades to adjacent and parallel roadways within the study area in conjunction with the improvements identified to the west of the study area as part of Western Vaughan Transportation Improvements Individual EA.

5.1.4 Alternative 4 – Bridge Overpass/Midblock Connection

This alternative involves the construction of a mid-block connection bridge over Highway 400 between America Avenue and Canada Drive.

5.2 Identification of Assessment Criteria for Alternative Solutions

An evaluation framework was developed and is presented in **Table 5-1**, including technical considerations and environmental components that address the broad definition of the environment as described in the *Environmental Assessment Act* in addition to considering comments received from review agencies. The factor groups for evaluation criteria were confirmed through consultation with project team members, the CLC and by public attendees of PIF #1. The existing environment was taken into consideration leading to a descriptive or qualitative assessment based on criteria developed within the following categories.

Table 5-1: Evaluation Factors and Description

Factor	Description/Measure
Technical	• Potential to improve traffic operations and future transportation needs • Potential to improve safety for the travelling public • Potential for physical and operational implementation • Support to support alternative modes including transit, cycling and pedestrian
Socio-Economic	• Potential for disturbing existing residences, community and recreation facilities through temporary and/ or permanent effects (i.e. construction/ traffic noise, dust, traffic disruption, • Property access disruption • Potential for property impacts • Degree of compatibility with Regional and Municipal Official Plans, Transportation Plans, and other Policies • Potential to improve emergency services response times (fire, police and ambulance services) • Potential effects on existing community character • Potential sustainability improvements to the community • Potential to improve safety to cyclists and pedestrians • Potential for sharing community resources • Potential for improving access to employment and commercial areas
Financial	• Potential cost of acquiring property • Potential Capital costs to the City of Vaughan for implementation • Potential future maintenance costs

5.3 Evaluation of Alternative Solutions

The alternatives were assessed using the reasoned argument method of evaluation. This method identifies and highlights the differences in net impacts associated with the various alternatives. The relative significance of the impacts is examined to provide a clear rationale for the selection of a preferred alternative. The Criteria have been put forward based on their ability to identify the potential environmental effects of each alternative and distinguish the advantages and disadvantages between them

Table 5-2 presents the assessment table used to evaluate the four Alternative Solutions including the Do Nothing Alternative. Through this table, technical, socio-economic and financial environments, are used to evaluate and compare impacts of each of the Alternative Solutions. A recommendation was made for the Preferred Alternative Solution based on the results presented in this table.

Table 5-2: Evaluation of the Alternative Solutions

Evaluation Criteria	Alternative 1 Do Nothing	Alternative 2 Reduce Auto Demand	Alternative. 3 Upgrade/ Improve Other Roadways	Alternative. 4 Build Highway 400 Overpass
	No changes or improvements to the Block 33 transportation network would be undertaken,	Improve public transit, cycling and Travel Demand Management (TDM) initiatives within and around the study area	Improvements to other local roadways within the study area in conjunction with related ongoing studies.	Provide for a mid-block connection over Highway 400 between America Avenue and Canada Drive.
TECHNICAL				
Potential to improve traffic operations and address future transportation needs.	Analysis shows almost all signalized regional road intersections reaching failing conditions during the 2009 PM peak hour and many intersections at critical LOS during the 2021 PM peak hour. Local trips using Highway 400 will experience significant delays on Major Mackenzie Drive and Teston Road.	At best, the reduction of personal auto demand is assumed to be in the level of 5 to 10%. The conditions would be somewhat better than Do Nothing.	The widening of Major Mackenzie Drive to six lanes for High Occupancy Vehicles (HOV) and improved transit use has been identified in the York Region Transportation Master Plan (TMP) Update and in the Western Vaughan Individual Environmental Assessment (IEA). This improvement would address regional transportation needs.	Building of overpass provides significant opportunity for connectivity benefits for both east and west communities in order to travel within and around Block 33.
Potential to improve safety for the travelling public.	Unsafe conditions. Congested regional intersections would create delays and more driver frustration and aggressive behavior.	Since traffic volumes would not be significantly reduced, safety would not be measurably improved.	Traffic volumes on local and regional roads not expected to be reduced; therefore safety would not be improved significantly.	Improved safety for cyclists and pedestrians.
Potential for physical and operational implementation.	No physical or operational improvements.	Minor physical or operational improvements assumed for local roads.	Minor physical or operational improvements assumed for local roads. Widening of Major Mackenzie Drive is physically and operationally feasible.	A new link connecting Canada Drive and America Avenue is shown in the City Official Plan (OP) and necessary ROW has been protected.
Potential to support alternative modes including transit, cycling and pedestrian.	Sufficient right of way (ROW) for cycling, pedestrian, and transit improvements.	Through implementation of TDM initiatives and by increasing the percentage of trips made by public transit and bicycle, the demand for weekday peak hour trips by automobile can be reduced, thus reducing the need for road system improvements.	Widening of Major Mackenzie Drive will support transit and cycling modes of travel.	Building of overpass provides significant opportunity for connectivity benefits for transit, pedestrians, and cycling.
SOCIO-ECONOMIC				
Potential for disturbing existing residences, community and recreation facilities through temporary and/or permanent effects (i.e. construction/ traffic noise, dust, traffic disruption, property access disruption, etc.)	No disturbance to existing residents, community and recreation facilities through temporary and/ or permanent effects.	Improvements to public transit service and cycling would require roadway alterations (such as bus bays, bicycle lanes). These improvements have the potential for temporary and permanent construction effects, but can be mitigated with noise, dust, and odour controls.	Improvements to other roadways within the study area would require roadway widening, resulting in both temporary and permanent construction effects. However, these effects can be mitigated with noise, dust, and odour controls.	Implementing a mid-block connection over Highway 400 between America Avenue and Canada Drive would result in localized temporary effects to existing residents, but can be mitigated with noise, dust and odour controls.
Potential for property impacts.	No potential for property impacts.	Improvements to public transit service and cycling may require roadway alterations (such as bus bays, bicycle lanes), and would therefore likely impact private property through temporary or permanent property taking.	Improvements to other roadways within the study area would require roadway widening and would therefore likely impact private property through temporary or permanent property taking.	Implementing a mid-block connection over Highway 400 between America Avenue and Canada Drive would not result in property impacts, as the property (owned by the City) for the connection has been protected.
Degree of compatibility with Regional and Local Official Plans (OP), Transportation Plans and other relevant policies and plans.	The Do Nothing alternative is not compatible with the Regional OP as it would not allow for a mid-block connection. Further, this alternative is not compatible with the Local OP and the supporting transportation plans, as a mid-block connection has been provided for in Schedule B to OPA 600.	This alternative is in keeping with the Regional and Local OP's as well as associated transportation plans (i.e. York Region TMP). However, this alternative does not allow for the City to fully implement the road network outlined in Schedule B to OPA 600.	This alternative is in keeping with the Regional and Local OP as well as associated transportation plans (i.e. York Region TMP). However, this alternative does not allow for the City to fully implement the road network outlined in Schedule B to OPA 600.	This alternative is in keeping with the Regional and Local OP's as it provides for a mid-block connection as per the Region's policies and allows the City to fully implement the road network outlined in Schedule B to OPA 600.
Potential to improve emergency services response times.	No potential to improve emergency services response times.	Minimal potential to improve emergency services response times due to roadway widening, however emergency services will still need to access major arterial roadways in order to cross Highway 400.	Minimal potential to improve emergency services response times due to roadway widening, however emergency services will still need to access major arterial roadways in order to cross Highway 400.	High potential to improve emergency services response times as the mid-block connection will allow for a faster route over Highway 400, reducing the dependence on major arterial roadways.
Potential effects on existing community character.	No potential effects on existing community character.	Potential positive effect on existing community character, by providing for pedestrian and cycle friendly streets. However, without a connection between the two communities, fragmentation may occur.	No potential effects on existing community character.	Potential positive effect on community character by providing for pedestrian and cycle friendly streets. Further, by providing a connection between the two areas, a more cohesive community connection may occur.
Potential sustainability improvements to the community, including greenhouse gas emissions.	No potential for sustainability improvements to the community.	Increased potential for improving local sustainability, by providing alternative transportation modes in order to reduce auto dependency.	No potential for sustainability improvements to the community.	Increased potential to improve local sustainability as the connection over Highway 400 will allow for the efficient multi-modal travel (i.e. car, bus, cycle and pedestrian).
Potential to improve safety to cyclists and pedestrians.	No potential to improve safety to the local community, including cyclists and pedestrians.	Some potential to improve safety to cyclists and pedestrians through the provision of bicycle lanes. The improvements are minor as cyclists and pedestrians will still need to access major arterial roadways in order to cross Highway 400.	No potential to improve safety to the local community, including cyclists and pedestrians.	High potential to improve safety to cyclists and pedestrians as a connection will be provided over Highway 400 that will be designed and operate as a local road (i.e. speeds, width, etc.).
Potential for sharing community resources (including community centers, worship sites, etc.)	Sharing of community resources would remain the same.	Sharing of community resources would remain the same.	Sharing of community resources would remain the same.	Potential for sharing community resources would be improved as they would be more easily accessible for cars, buses, cyclists and pedestrians.
Potential for improving access to employment and commercial areas	No potential for improving access to employment and commercial areas	No potential for improving access to employment and commercial areas.	No potential for improving access to employment and commercial areas.	Higher potential to improve access to employment and commercial areas by providing a more efficient means of travelling to these areas via the mid-block connection.

Table 5-2: Evaluation of the Alternative Solutions

Evaluation Criteria	Alternative 1 Do Nothing	Alternative 2 Reduce Auto Demand	Alternative. 3 Upgrade/ Improve Other Roadways	Alternative. 4 Build Highway 400 Overpass
	No changes or improvements to the Block 33 transportation network would be undertaken,	Improve public transit, cycling and Travel Demand Management (TDM) initiatives within and around the study area	Improvements to other local roadways within the study area in conjunction with related ongoing studies.	Provide for a mid-block connection over Highway 400 between America Avenue and Canada Drive.
FINANCIAL				
Potential cost for acquiring property.	No potential costs.	Costs for acquiring property would be minimal.	Costs for acquiring property would be minimal.	No potential costs.
Potential Capital costs to the City of Vaughan for implementation.	No potential Capital costs.	Capital costs to the City of Vaughan would be minimal.	Improving existing roadways would result in higher Capital costs to the City of Vaughan.	Capital costs to the City of Vaughan would be offset by funds provided via the Local Development Funds.
Potential future maintenance costs.	Future maintenance costs would remain the same.	Future maintenance costs would remain the same.	Future maintenance costs would be high.	Future maintenance costs would be high.
Ranking of Alternative Solutions	**Not Recommended (Ranked 3rd)** This Alternative Solution is not recommended for the following reasons: ▪ Does not address current and future traffic operation issues ▪ Does not improve safety ▪ Does not implement the road network as outlined in the City's Official Plan ▪ Does not improve emergency services response times ▪ Does not provide connectivity for multi-modal transportation options Further, this alternative does not fully address the problems and opportunities for the project and therefore, will not be carried forward.	**Recommended (Ranked Tied for 1st)** This Alternative Solution is recommended for the following reasons: ▪ Improves current and future traffic conditions ▪ Improves safety ▪ Provides for multi-modal transportation options ▪ Improves local sustainability ▪ Low Capital costs ▪ Low future maintenance costs Although this alternative does not implement the road network as outlined in the City's Official Plan and does not improve emergency services response times, when combined with Alternative #4, the problem and opportunities for the project will be met. Therefore, this alternative will be carried forward to Phase 3 of the Class EA process.	**Not Recommended (Ranked 2nd)** This Alternative Solution is not recommended for the following reasons: ▪ Does not address current and future traffic operation issues ▪ Does not improve safety ▪ Does not implement the road network as outlined in the City's Official Plan ▪ Minimal improvement to emergency services response times ▪ Does not provide connectivity for multi-modal transportation options ▪ Capital costs will be high ▪ Future maintenance costs will be high Further, this alternative does not fully address the problems and opportunities for the project and therefore, will not be carried forward.	**Recommended (Ranked Tied for 1st)** This Alternative Solution is recommended for the following reasons: ▪ Improves current and future traffic conditions ▪ Provides connectivity for multi-modal transportation options ▪ Implement the road network as outlined in the City's Official Plan ▪ Improves emergency services response times ▪ Improves local sustainability ▪ Improves ability to access community facilities throughout Block 33 ▪ No costs for acquiring property ▪ No Capital costs This alternative, in combination with Alternative #2, will fully address the problems and opportunities for the project and will be carried forward to Phase 3 of the Class EA process.

5.4 Identification of the Preferred Solution

Based on the detailed comparative evaluation, a combination of **Alternative 2 - Reduce Auto Demand** and **Alternative 4 – Bridge Overpass/Midblock Connection** was recommended to be carried forward as the Preferred Solution.

Alternative 1 was not recommended as it would not fully address the current or future operation efficiency problems and does not complete the City's road network as outlined in the Official Plan. Alternative 3 was not recommended as it would not fully address the current or future operation efficiency problems, does not complete the City's road network as outlined in the Official Plan, and major upgrades to existing roadways would be required.

Alternatives 2 and 4 (in combination) are expected to address the Problem/Opportunity Statement as they offer the best opportunity to deal with the identified operational efficiency concerns for personal vehicles and emergency services and will fully implement and complete the planned road network as identified in the City's Official Plan.

Implementing these Alternatives will also provide a local road connection within Block 33, which will allow for the sustainable movement of multi-modal services, including buses, cyclists and pedestrians, and therefore, facilitate access to local community facilities, businesses and schools.

6. Phase Three: Alternative Design Concepts

This section of the report discusses alternative design concepts that were identified, developed and evaluated for the Preferred Solution. These alternative design concepts are described below followed by the evaluation and selection of the Preferred Design. Details of the Preferred Design are presented in **Section 7.0**.

6.1 Assessment Criteria

For Phase 3 of the study, the assessment criteria were further refined and the road design standards were identified to reflect an appropriate level of detail associated with the Preferred Solution. **Table 6-1** presents the refined Assessment Criteria for Phase 3 of the study.

Table 6-1: Refined Assessment Criteria

Factor	Description/Measure
Technical	• Type of additional structure required for implementation • Type of additional civil work required for implementation
Socio-Economic	• Potential for short-term disturbance to local residences, from noise, dust, odour and access disruption during construction • Potential for acquiring private property • Potential visual impacts • Potential to improve safety to drivers • Potential to improve safety to cyclists and pedestrians • Potential for promoting Active Lifestyle
Financial	• Potential cost for acquiring property • Potential Capital costs to the City of Vaughan for implementation • Potential future maintenance costs

Table 6-2 lists the road design standards that were taken into account.

Table 6-2: Road Design Standards

Description		Design Standards	Reference	Proposed Standards
Road Classification		UCU60	TAC Geometric Design Guide for Canadian Roads Table 1.3.2.1	UCU60
Design Speed (DS)		60 km/hr	TAC Geometric Design Guide for Canadian Roads	60 km/hr
Posted Speed (PS)		50 km/hr	City of Vaughan	50 km/hr
Collector		ROW width (23 m)	City of Vaughan	23 m
		Horizontal Radius (115 m)	City of Vaughan	800 m
		Minimum Tangent length at the Intersection (30 m)	TAC Geometric Design Guide for Canadian Roads	30 m
Horizontal Alignment	*Maximum Intersection Angles*	90 Degree		90+/-5 Degree
	Minimum Curb Radius	12 m		12 m
Vertical Alignment	*Vertical Curve*	**Stopping Sight Distance on Crest Curve.** K = 10 Min.(m)	TAC Geometric Design Guide for Canadian Roads Table 2.3.1.2	K=10
		Sag – Comfort K = 8 Min.(m)	TAC Geometric Design Guide for Canadian Roads Table 2.3.1.4	K=8
	Min. C/L Grade	0.5%	City of Vaughan	0.5%
	Max. C/L Grade	12% (Max.)	TAC Geometric Design Guide for Canadian Roads 2.1.3.1 Maximum Grade design domain application heuristics. (8.)	7.5 %
Cross Sections	*Lane Width*	Through Lane = 3.5 to 3.70 m	TAC Geometric Design Guide for Canadian Roads Table 2.2.2.3	3.5 m
	Sidewalk	1.5 m to 2.3 m	TAC Geometric Design Guide for Canadian Roads 2.2.6.1.	1.5 m On Bridge 2.0 m
Sight Triangles	*Visibility Triangles at Intersections*	15 m x 15 m collector to collector		15 m x 15 m

Based on the City of Vaughan Engineering Design guidelines the following minimum pavement structure needs to be validated during the detail design phase:

Top Course Asphalt Hot Mix HL3 ..... 40 mm
Base Course Asphalt Hot mix HL8 ..... 75 mm
Granular Base 20 mm Crusher Run Limestone..... 125 mm
Granular Sub-Base 50 mm Crusher Run Limestone ..... 350 mm

6.1.1 Constraints to Alternative Design Concepts

Following confirmation of the refined assessment criteria and road design standards, the following constraints were identified prior to the development of the Alternative Design Concepts:

- Existing right-of-way alignment and available property
- Existing elevation at John Deisman Blvd. / America Avenue
- Existing elevation at Cityview Blvd. / Canada Drive
- Bridge span sufficient to allow a Highway 400 future cross-section, which includes:
  - 10 lanes plus ramps
  - A minimum vertical clearance of 5 m
  - A two span structure over Highway 400 with a central pier
- MTO design requirements

6.2 Identification and Description of Alternative Design Concepts

Alternative Design Concepts were organized into three evaluation groups: Vertical Approach, Horizontal Approach, and Bicycle Lanes.

Option 1..... Vertical Alignment with 6% approaches and Horizontal Alignment centered in the existing right-of-way

Option 2A..... Vertical Alignment with 7.5% approaches and Horizontal Alignment centered in the existing right-of-way

Option 2B..... Vertical Alignment with 7.5% approaches and Horizontal Alignment shifted to the south within available property

Option 3A..... Bridge with 2.0 m sidewalk, provision for 1.5 m bicycle lanes and 3.5 m vehicular lanes

Option 3B..... Bridge with 2.5 m sidewalk, and 4.2 m vehicular lanes shared with bicycles

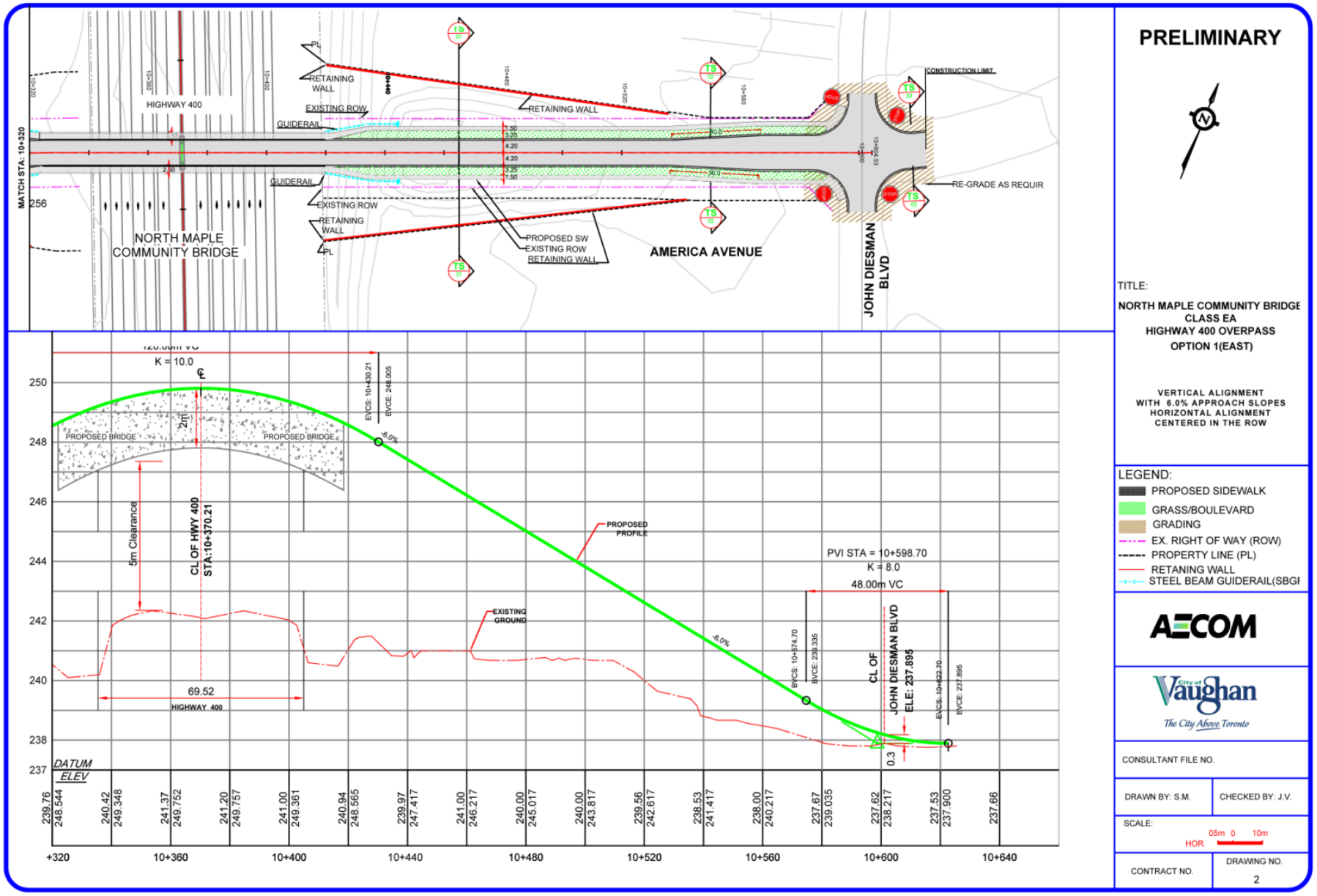
Figures 6-1 through **6-6** illustrate the Alternative Design Concepts that were carried forward for comparative evaluation.

6.2.1 Option 1 (Figures 6-1 and 6-2)

This option considers a vertical alignment with 6% approaches for both sides of the bridge. A 6% slope is optimal for winter operation. However, due to constraints for future widening of Highway 400, the bridge needs to provide a 5 m clearance close to the abutments. This constrain increased the length of the vertical curve on the bridge pushing the vertical tangents to the east and west. As a consequence the vertical alignment matches the existing ground beyond the Cityview Blvd. / Canada Drive and John Deisman Blvd. / America Avenue intersection. This option requires significant re-grading of the mentioned intersections, development of retaining walls and property impacts to the properties at the intersections.

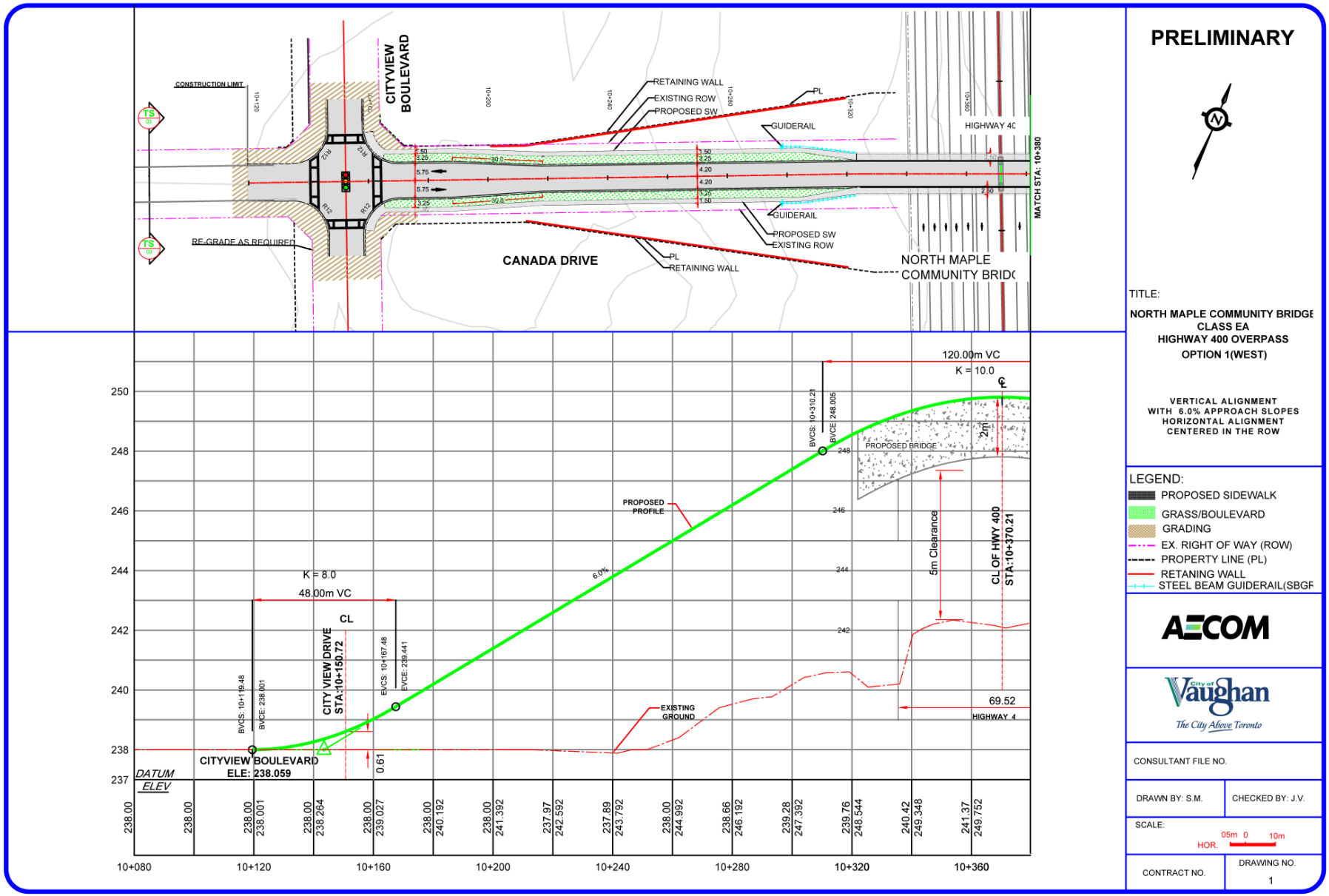
Approach Slopes (East Approach)

Figure 6-1: Alternative Design Concept Option 1 - Vertical Alignment with 6.0%



Approach Slopes (West Approach)

Figure 6-2. Alternative Design Concept Option 1 – Vertical Alignment with 6.0%

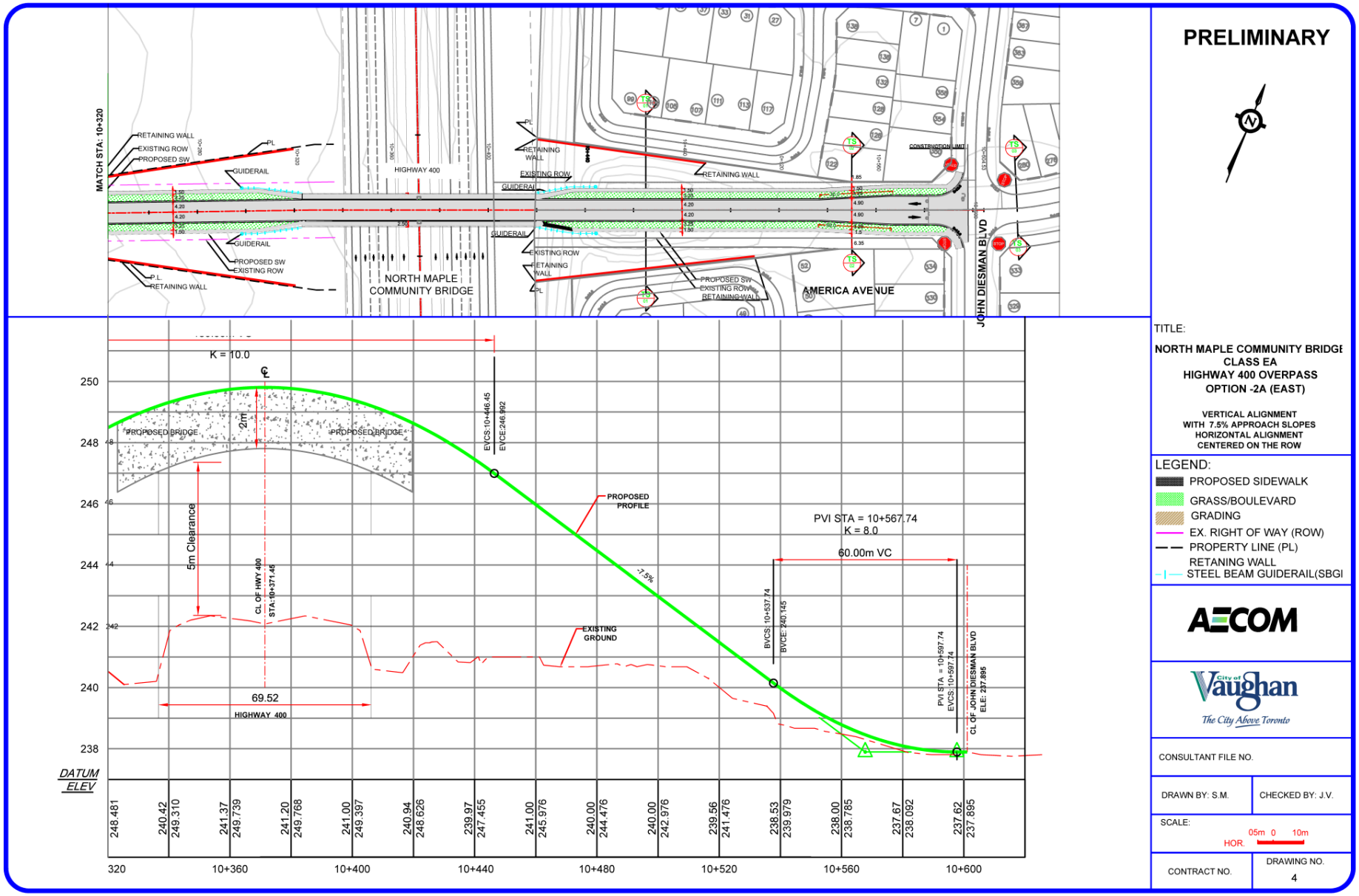


6.2.2 Option 2A (Figures 6-3, 6-4 and 6.5)

This option considers increasing the grades for both approaches of the bridge to 7.5%. Although this slope is steeper than Option 1, it is considered acceptable by TAC design guidelines. By increasing the slope the total length of the vertical alignment is reduced minimizing the impact to the Cityview Blvd. / Canada Drive and John Deisman Blvd. / America Avenue intersections. This option requires minimal re-grading of the mentioned intersections, and has no property impacts. This option is also centered on the existing ROW.

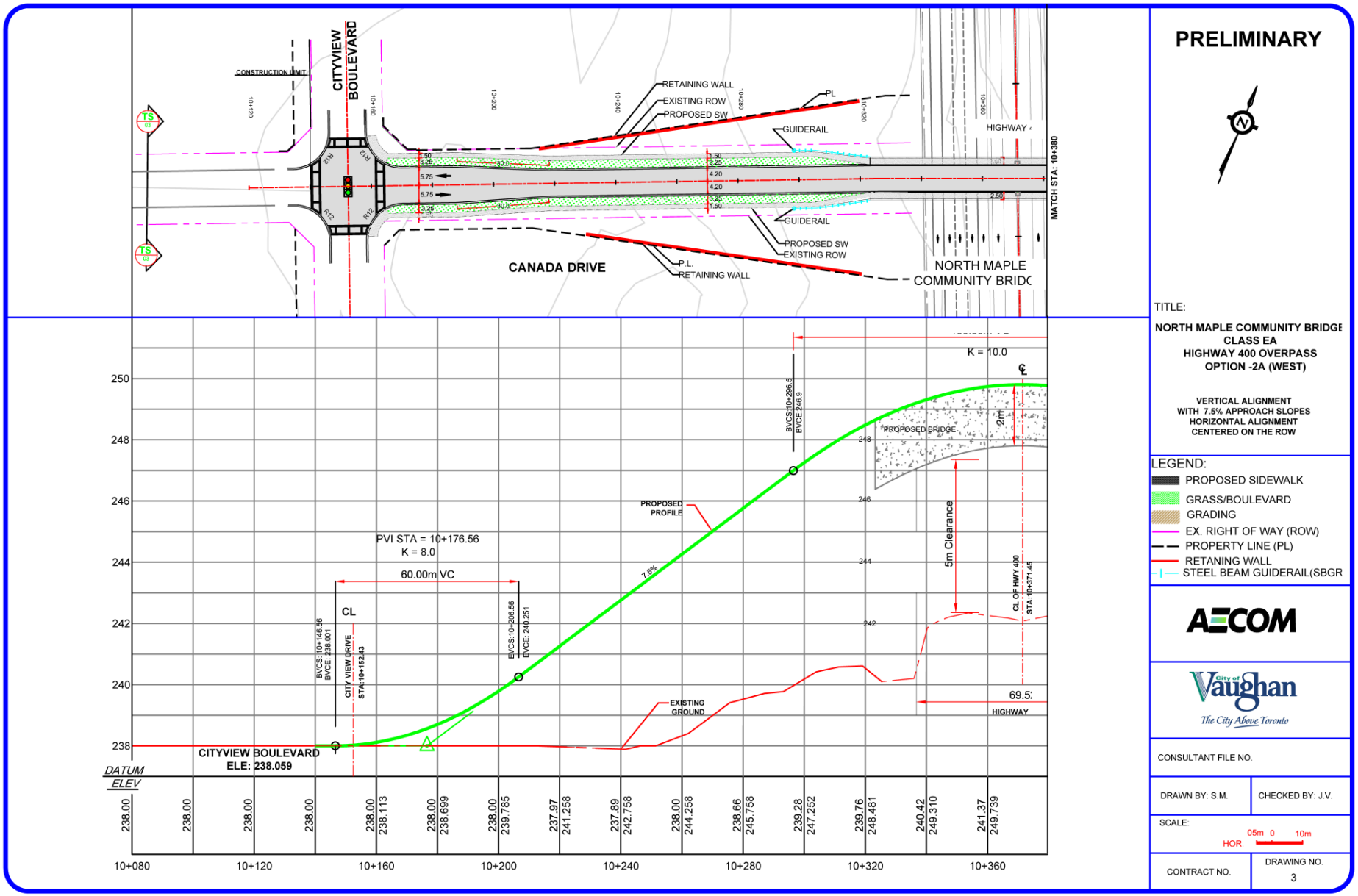
Approach Slopes (East Approach)

Figure 6-3: Alternative Design Concept Option 2A – Vertical Alignment with 7.5%



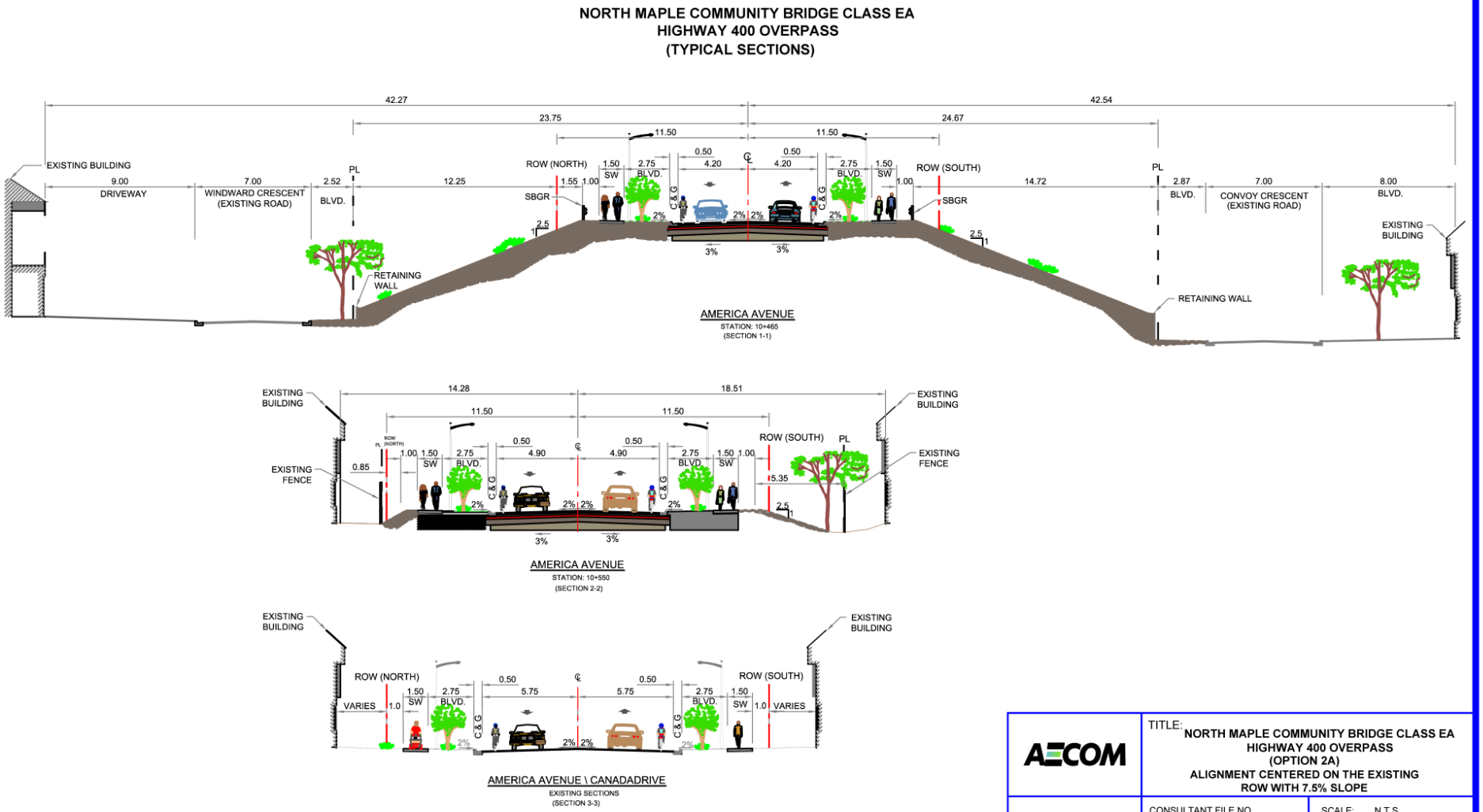
Approach Slopes (West Approach)

Figure 6-4: Alternative Design Concept Option 2A – Vertical Alignment with 7.5%



Horizontal Approach

Figure 6-5: Alternative Design Concept Option 2A – Alignment Centred in the Existing Right-of-Way

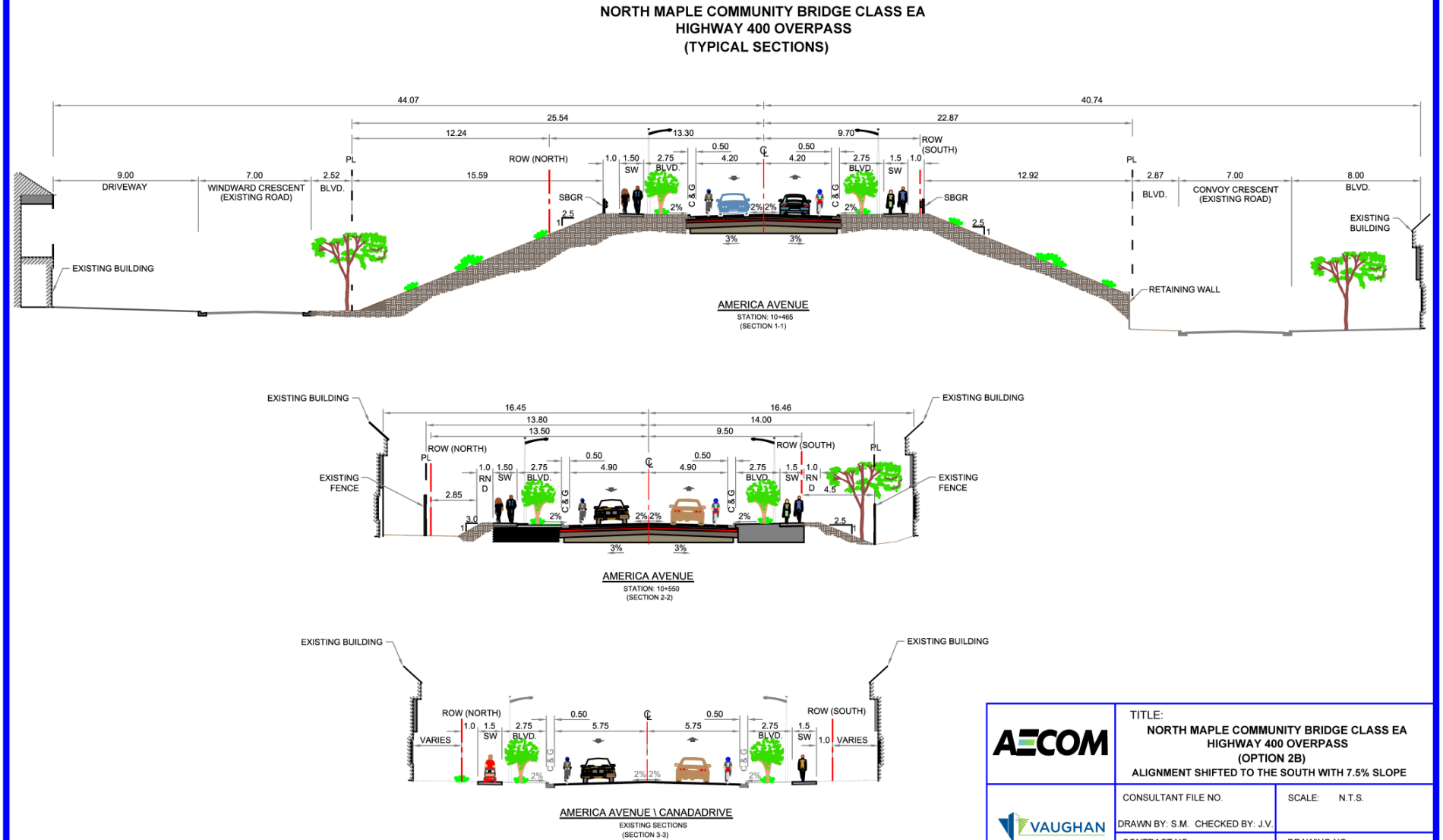


6.2.3 Option 2B (Figure 6-6)

Option 2B is compared with the cross-section of Option 2A. It considers shifting the road alignment 1.8 m to the south. The purpose of this displacement is maximizing the use of the existing property and minimizing the height of the retaining walls.

Horizontal Approach

Figure 6-6: Alternative Design Concept Option 2B – Alignment Shifted to the South



6.2.4 Option 3A (Figure 6-7)

Option 3A considers a cross section at the bridge with 2 m sidewalks, 1.5 m bike lanes and 3.5 m vehicular lanes. The purpose of this option is keeping the bikers separated from the vehicular traffic. This option is compared with Option 3B.

6.2.5 Option 3B (Figure 6-7)

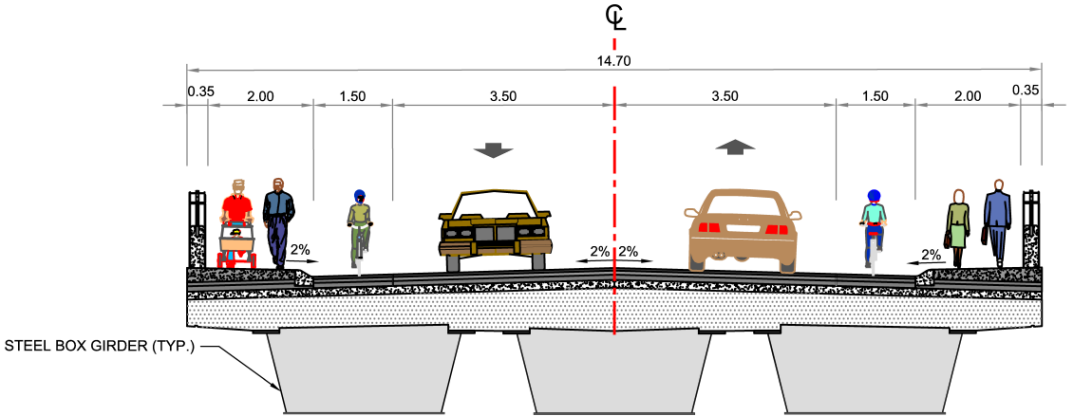
Option 3B considers a cross section at the bridge with 2.5 m sidewalks and 4.2 m vehicular lanes. The purpose of this option is giving more space to pedestrians while mixing vehicular and bicycle in a wider lane. This option is compared with Option 3A.

Bicycle Lanes (Bridge Cross-Sections)

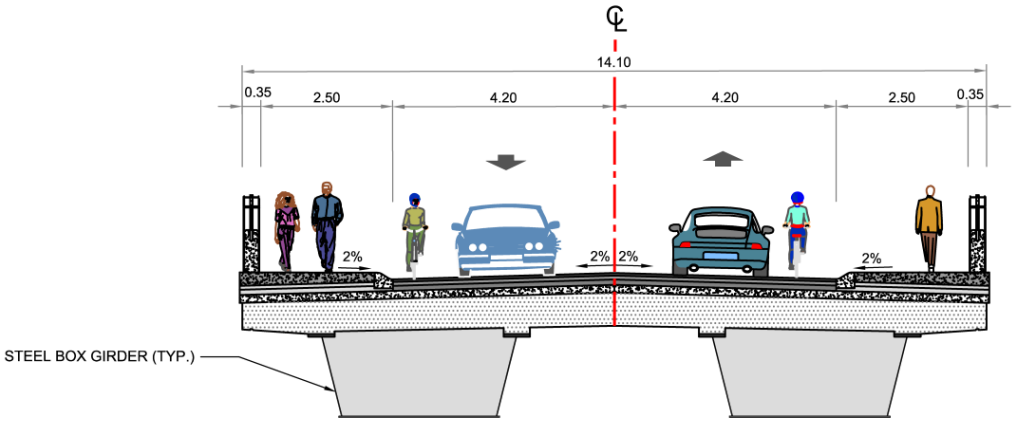
Figure 6-7: Alternative Design Concepts 3A vs 3B

NORTH MAPLE COMMUNITY BRIDGE CLASS EA
HIGHWAY 400 OVERPASS

PRELIMINARY



NORTH MAPLE COMMUNITY BRIDGE
BRIDGE WITH SIDEWALKS 2.00m, 1.50m BIKE LANES AND 3.50m VEHICLE LANES
(OPTION 3A)



NORTH MAPLE COMMUNITY BRIDGE
BRIDGE WITH SIDEWALK 2.50m AND 4.20m SHARED BIKEWAY
(OPTION 3B)

TYPICAL SECTIONS

AECOM	TITLE: NORTH MAPLE COMMUNITY BRIDGE CLASS EA HIGHWAY 400 OVERPASS (OPTION 3A&3B)	
City of Vaughan The City Above Toronto	CONSULTANT FILE NO. DRAWN BY: S.M. CHECKED BY: J.V.	SCALE: N.T.S.
	CONTRACT NO.	DRAWING NO. 7

Some of the pros and cons associated with the preliminary design concepts were presented to the public during **PIF #2 (**see **Appendix A3)**. **Table 6-3** through **6-5** below summarize the pros and cons.

Table 6-3: Vertical Alignment Options Pros and Cons

Option 1: Vertical Alignment with 6% Approaches		**Option 2A: Vertical Alignment with 7.5% Approaches**	
PROS	**CONS**	**PROS**	**CONS**
• Design has a gentler slope	• Longer retaining walls required	• Shorter retaining walls required	• Vertical design slope results in less desirable operational conditions for vehicles
• Lower future winter maintenance costs	• Private property is required – at intersections with John Deisman Blvd. and Cityview Blvd	• No impacts on private property	• Higher future winter maintenance costs
	• Higher capital costs for re-grading intersections	• No need to re-grade intersections, lower capital costs	
	• Permanent impact to the front yards of properties abutting the intersections	• No impact to front yards of properties abutting intersections	

Table 6-4: Horizontal Alignment Options Pros and Cons

Option 2A: Horizontal Alignment centered in the existing Right-of-Way		**Option 2B: Horizontal Alignment shifted to the south**	
PROS	**CONS**	**PROS**	**CONS**
• No impact on private property	• Longer retaining walls required	• Shorter retaining walls required	• Marginal additional costs resulting from minor adjustments to America Ave/ John Deisman Blvd. intersection configuration
• No need to re-grade existing intersections at John Deisman Blvd. and Cityview Blvd. resulting in less capital costs	• No improvement to America Ave/ John Deisman Blvd. intersection (existing intersection not exactly perpendicular)	• No impacts on private property	
	• Unbalanced visual effect for properties on the east approach of the bridge	• Improvement to America Avenue/ John Deisman Blvd. intersection • (becomes perpendicular)	
		• Balanced visual effect for properties on the east approach of the bridge	
• Future maintenance requirements are comparable to Horizontal Alignment Option 2B`		• Future maintenance requirements are comparable to Horizontal Alignment Option 2A	

Table 6-5: Bridge Cross-Sections Options Pros and Cons

Option 3A: Bridge with 2 m sidewalk, 1.5 m bike lane and 3.5 m vehicular lane		Option 3B: Bridge with 2.5 m sidewalk and 4.2 m vehicular lane shared with bike lane	
PROS	**CONS**	**PROS**	**CONS**
• Conforms with Metrolinx vision of The Big Move by enhancing and expanding active transportation by promoting designated bike lanes	• Wider bridge cross-section would require higher capital costs	• More narrow bridge cross-section, resulting in lower capital costs	• Less desirable operational conditions for cyclists, as they will need to share the lane with vehicles
• Improves safety for cyclists by providing more space and a designated painted bike lane	• Less available space for pedestrians	• More available space for pedestrians	• Not consistent with Metrolinx vision to enhance and expand active transportation by providing designated bike lanes
• Future maintenance requirements are comparable to Option 3B		• Future maintenance requirements are comparable to Option 3A	
• Conformance with York Region Transportation Master Plan, comparable to Option 3B		• Conformance with York Region Transportation Master Plan, comparable to Option 3B	

6.3 Evaluation of the Alternative Design Concepts

Taking into account the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts, the final comparative evaluation of the alternative design concepts is presented in **Table 6-6** through **6-8** below.

6.4 Identification of the Preferred Alternative Design Concepts

Based on the detailed technical evaluation completed, it is recommended that a combination of the following alternative design concepts be advanced as the Preferred Solution:

- **Option 2B**- Vertical Alignment with 7.5% approaches and Horizontal Alignment shifted to the south
- **Option 3A**- Bridge with 2.0 m sidewalks, provision for 1.5 m bicycle lanes and 3.5 m vehicular lanes
- Extension of the provision for 1.5 m bike lanes through both approaches to the bridge

Table 6-6: Vertical Alignment Alternative Design Concepts Comparative Evaluation

Areas of Consideration/Criteria	Option No. 1 Vertical Alignment with 6% Approaches	Option No. 2A Vertical Alignment with 7.5% Approaches
Technical Assessment Group		
Type of additional structure required for implementation	Retaining walls are required. Based on the vertical alignment, longer retaining walls than Option 2A would be required. This option requires re-grading of the approach intersections with additional retaining walls in the front yards of the properties abutting the intersections.	Retaining walls are required. Based on the vertical alignment, shorter retaining walls than Option 1 would be required. No retaining walls at the intersections.
Type of additional civil work required for implementation	Re-grading of the John Deisman/America Avenue and Cityview Blvd. / Canada Drive intersections with changes in the road and sidewalk grades.	No changes to the John Deisman/America Avenue and Cityview Blvd./Canada Drive intersections
Social-Economic Assessment Group		
Potential for short-term disturbance to local residences, from noise, dust, odour and access disruption during construction.	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures • Construction will take place during daytime hours and adhere to the City's Noise By-Law • Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • Temporary access will be provided to those individuals whose access is disturbed	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures: • Construction will take place during daytime hours and adhere to the City's Noise By-Law • Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • Temporary access will be provided to those individuals whose access is disturbed
Potential for acquiring private property	Private property is required for the construction of retaining walls at the intersections with a permanent impact to the properties at John Deisman/America Avenue and Cityview Blvd. / Canada Drive intersections.	No private property will be required for this option
Potential visual impacts	Visual impacts will be mitigated through vegetative screening. Properties immediately adjacent to the intersections will have the greatest change to their current viewshed	Visual impacts will be mitigated through vegetative screening. Properties immediately adjacent to the intersections will have the greatest change to their current viewshed
Potential to improve safety to drivers	This option would improve safety to drivers more than Option 2A as the road design and operation has a gentler slope.	While this is a safe option, the road design and operation has a steeper slope than Option 1 and would therefore not improve safety to drivers to the greatest extent possible.
Potential to improve safety to cyclists and pedestrians.	This option would improve safety to cyclists and pedestrians more than Option 2A as the road design and operation has a gentler slope.	While this is a safe option, the road design and operation has a steeper slope than Option 1 and would therefore not improve safety to cyclists and pedestrians to the greatest extent possible.
Financial Assessment Group		
Potential cost for acquiring property.	Higher costs for acquiring property as easements are required to accommodate the retaining walls for changes of grade at the intersections.	No costs for acquiring property.
Potential Capital costs to the City of Vaughan for implementation.	Higher capital cost required for re-grading the intersections	No Capital costs required for re-grading of intersections
Potential future maintenance costs.	Less future winter maintenance costs in the future than Option 2A	Higher future winter maintenance costs in the future than Option 1.
Summary of Comparative Evaluation	Option 1 has the following advantages: • Design has a gentler slope • Lower future winter maintenance costs Option 1 has the following disadvantages: • Longer retaining walls are required • Private property is required in order to implement this Option, which would also include higher costs for acquiring the property as easements are required for the retaining walls • Higher Capital costs for re-grading John Deisman/America Avenue and Cityview Blvd./Canada Drive • Permanent impact to the front yards of properties abutting the intersections mention above Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 2A, Option 1 is not recommended to be carried forward for implementation.	Option 2A has the following advantages: • Shorter retaining walls are required • No private property is required, therefore no costs to acquire • No Capital costs required, as there is no need to re-grade intersections • No impact to the front yards of properties abutting the intersections Option 2A has the following disadvantages: • Design has a steeper slope, which may be more difficult for some vehicles to operate in the winter • Higher future winter maintenance costs Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 1, Option 2A option is recommended to be carried forward for implementation.

Table 6-7: Horizontal Alignment Alternative Design Concepts Comparative Evaluation

Areas of Consideration/Criteria	Option No. 2A Horizontal Alignment centered in the existing Right-of-Way	Option No. 2B Horizontal Alignment shifted to the south
Technical Assessment Group		
Type of additional structure required for implementation	Retaining walls are required. Based on the vertical alignment, longer retaining walls than Option 2B would be required	Retaining walls are required. Based on the vertical alignment, shorter retaining walls than Option 2A would be required
Social/ Land Use Assessment Group		
Potential for short-term disturbance to local residences, from noise, dust, odour and access disruption during construction.	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures: • Construction will take place during daytime hours and adhere to the City's Noise By-Law • Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • Temporary access will be provided to those individuals whose access is disturbed	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures: • Construction will take place during daytime hours and adhere to the City's Noise By-Law • Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • Temporary access will be provided to those individuals whose access is disturbed
Potential for acquiring private property	No private property will be required for this option	No private property will be required for this option
Potential visual effects	Visual impacts will be mitigated through vegetative screening. Higher visual effects to the north properties on the east approach of the bridge	Visual impacts will be mitigated through vegetative screening. Balanced visual effects to the north properties on the east approach of the bridge
Potential to improve safety to drivers	While this is a safe option, no improvements to America Avenue / John Deisman Blvd. intersection configuration would not improve safety to drivers to the greatest extent possible	This option would improve safety to drivers more than Option 2A. The improvement to the America Avenue / John Deisman Blvd. intersection configuration will make the east approach perpendicular to John Deisman Blvd.
Potential to improve safety to cyclists and pedestrians.	While this is a safe option, no improvements to America Avenue / John Deisman Blvd. intersection configuration would not improve safety to cyclists and pedestrians to the greatest extent possible	This option would improve safety to bicycles and pedestrians more than Option 2A. The improvement to the America Avenue / John Deisman Blvd. intersection configuration will make the east approach perpendicular to John Deisman Blvd.
Financial Assessment Group		
Potential cost for acquiring property.	No costs for acquiring property	No costs for acquiring property
Potential Capital costs to the City of Vaughan for implementation.	Equal Capital costs would be required for both options	Equal Capital costs would be required for both options
Potential future maintenance costs.	Equal future maintenance costs would be required for both options	Equal future maintenance costs would be required for both options
Summary of Comparative Evaluation	Option 2A has the following advantages: • No private property is required, therefore no costs to acquire • No need to reconfigure the John Deisman/ America Avenue intersection, which would result in lower Capital costs Option 2A has the following disadvantages: • Longer retaining walls are required • No improvements to John Deisman and America Avenue intersection • Unbalanced visual effects to the properties on the east approach of the bridge • Future maintenance requirements are comparable to Horizontal Alignment Option 2B. Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 2B, Option 2A is not recommended to be carried forward for implementation.	Option 2B has the following advantages: • Shorter retaining walls are required • No private property is required, therefore no costs to acquire • Improvements to John Deisman/ America Avenue intersection • Balanced visual effects to the properties on the east approach of the bridge Option 2B has the following disadvantages: • Marginal additional costs associated with the reconfiguration of John Deisman/ America Avenue intersection • Future maintenance requirements are comparable to Horizontal Alignment Option 2A. Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 2A, Option 2B is recommended to be carried forward for implementation.

Note: Recommended Solution

Table 6-8: Bicycle Lanes Alternative Design Concepts Comparative Evaluation

Areas of Consideration/Criteria	Option No. 3A Bridge with 2.0 m sidewalk, provision for 1.5 m Bicycle lanes and 3.5 m for Vehicular lanes	Option No. 3B Bridge with 2.5 m sidewalk, and 4.2 m Vehicular lanes shared with Bicycle lanes
Technical Assessment Group		
Type of additional structure required for implementation	This option would require a wider Bridge Cross-section including additional pavement width for providing continuous 1.5 m bike lanes from Cityview Blvd./Canada Drive intersection to John Deisman/America Avenue intersection.	This option would require a narrower Bridge Cross-section.
Social/ Land Use Assessment Group		
Potential for short-term disturbance to local residences, from noise, dust, odour and access disruption during construction.	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures: • -Construction will take place during daytime hours and adhere to the City's Noise By-Law • -Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • -Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • -Temporary access will be provided to those individuals whose access is disturbed	While there is the potential for short-term disturbances on the existing area residences due to noise, dust, odour and access during construction, these effects will be minimized/eliminated through standard mitigation measures: • -Construction will take place during daytime hours and adhere to the City's Noise By-Law • -Dust will be controlled through standard dust suppression measures (i.e. applying water to control dust emissions) • -Equipment should be maintained in an operating condition that maintains low emission rates and operated only as required • -Temporary access will be provided to those individuals whose access is disturbed
Potential for acquiring private property	No private property will be required for this option	No private property will be required for this option
Potential visual effects	Potential visual effects will be mitigated by vegetative screening.	Potential visual effects will be mitigated by vegetative screening.
Potential to improve safety to drivers	There is no discernible difference between the two options in relation to improving safety to drivers.	There is no discernible difference between the two options in relation to improving safety to drivers.
Potential to improve safety to cyclists and pedestrians.	This option improves the safety of cyclist by providing more space and a designated painted Bike Lane	This option is not as safe for cyclists as Option 3A as cyclist need to share the lane with vehicles.
Potential for promoting Active Lifestyle	This option has a higher potential for designated painted bike lanes along Canada Drive – America Avenue corridor encouraging the use of bicycles as an alternative transportation mode.	Although this option contemplates a shared bike lane it may become a bottleneck for a future designated painted bike lane on the Canada Drive – America Avenue corridor.
Financial Assessment Group		
Potential cost for acquiring property.	No costs for acquiring property.	No costs for acquiring property.
Potential Capital costs to the City of Vaughan for implementation.	Higher Capital costs required for wider road and bridge cross-section	Lower Capital costs required for narrower road and bridge cross-section
Potential future maintenance costs.	Equal future maintenance costs would be required for both options	Equal future maintenance costs would be required for both options
Summary of Comparative Evaluation	Option 3A has the following advantages: • Promotes an Active Lifestyle encouraging bicycles as an alternative transportation mode • Improves safety for cyclists by providing more space and a designated painted bike lane Option 3A has the following disadvantages: • Wider bridge cross-section would require higher Capital costs • Less available space for pedestrians • Future maintenance requirements are comparable to Option 3B. Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 3B, Option 3A is recommended to be carried forward for implementation.	Option 3B has the following advantages: • Narrow bridge cross section would require lower Capital costs • More available space for pedestrians Option 3B has the following disadvantages: • Not as safe for cyclists as they will need to share the lane with vehicles • May discourage individuals from taking alternative transportation mode (bicycle) • Future maintenance requirements are comparable to Option 3A. Therefore, given the advantages and disadvantages associated with this Option in comparison to Option 3A, Option 3B is not recommended to be carried forward for implementation.

Note: Recommended Solution

7. Project Description

The purpose of this section is to provide a preliminary design and details concerning the major features of the preferred alternative design concept selected in Phase 3 of the study which include the following alternative combinations:

- **Option 2B** - Vertical Alignment with 7.5% approach slopes and Horizontal Alignment shifted to the south within available property limits
- **Option 3A** - Bridge with 2.0 m sidewalk, provision for 1.5 m bicycle lanes and 3.5 m vehicular lanes
- Extension of the provision for 1.5 m bike lanes through both approaches to the bridge

The Preliminary Design plans are enclosed in **Appendix B.**

7.1 Preferred Design Concept

7.1.1 Plan

The connection of Canada Drive on Block 33 West with America Avenue on Block 33 East it is achieved using a mostly straight alignment that introduces a very flat horizontal curve for shifting the alignment to the south side of the ROW. The purpose of this shift is to maximize the use of the City's available lands and reduce the height of the retaining walls.

7.1.2 Profile

As discussed during the evaluation of the alternative design concepts (see **Figure 6-3** and **6-4)** the road profile requires 7.5% approach slopes necessary for meeting the minimum clearance requirements of the bridge over Highway 400. The vertical tangents of the alignment are connected with a vertical curve with K= 10.0 that is consistent with a Design Speed of 60 km/h.

7.1.3 Typical Sections

Figure 7-1 depicts the cross sections of the proposed bridge approaches and existing roads.

The uppermost cross section shown on **Figure 7-1** corresponds to the east and west bridge approaches. The middle cross-section corresponds to the bridge approach on America Avenue just west of John Deisman Boulevard. The bottom illustration depicts the existing cross sections of America Avenue and Canada Drive.

Figure 7-2 depicts the proposed bridge cross section. This section has been co-ordinated with MTO and addresses their concerns and comments included in **Appendix A5**.

Figure 7-1: Preferred Design Concept – Proposed Approach and Existing Sections

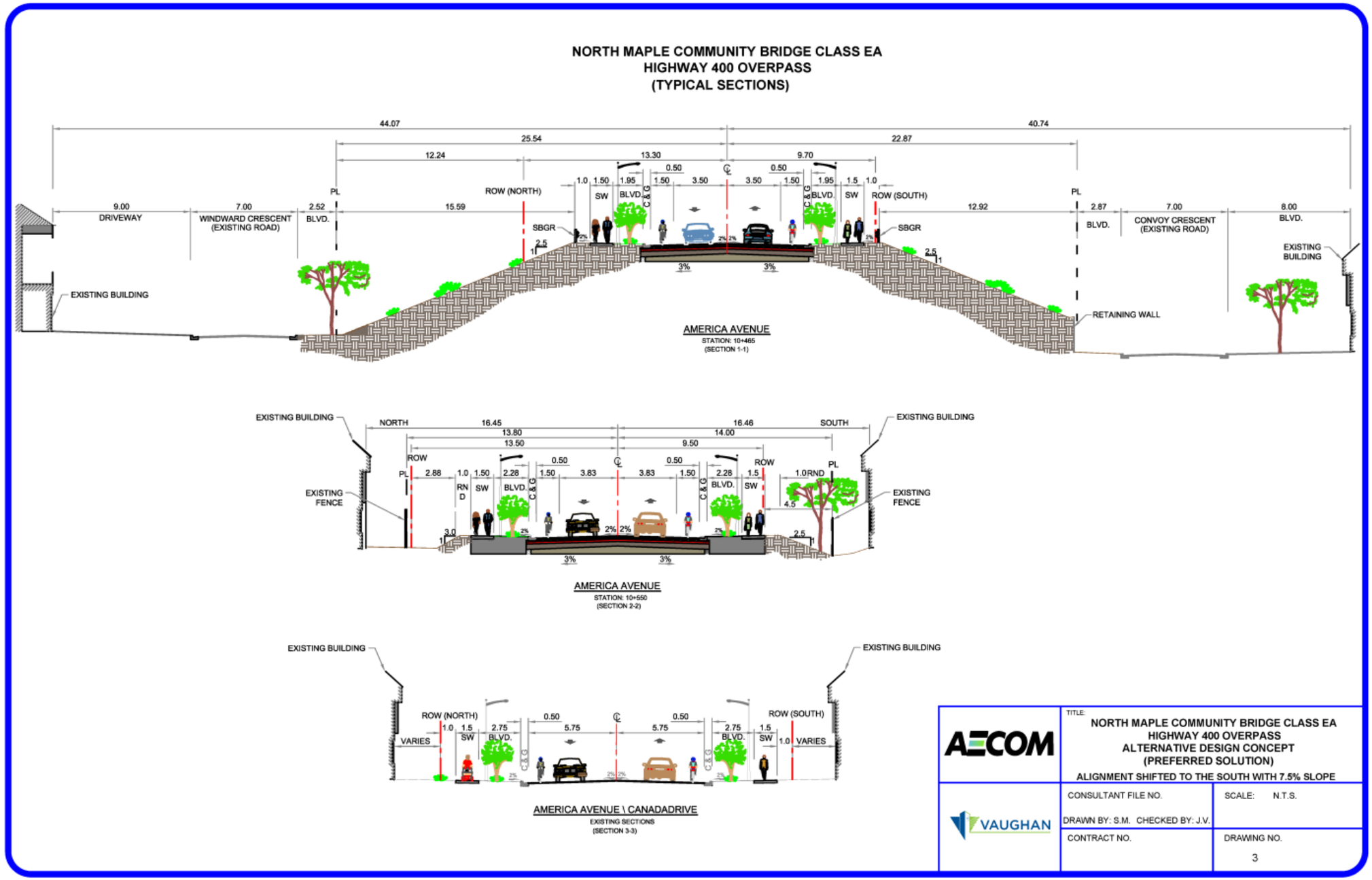
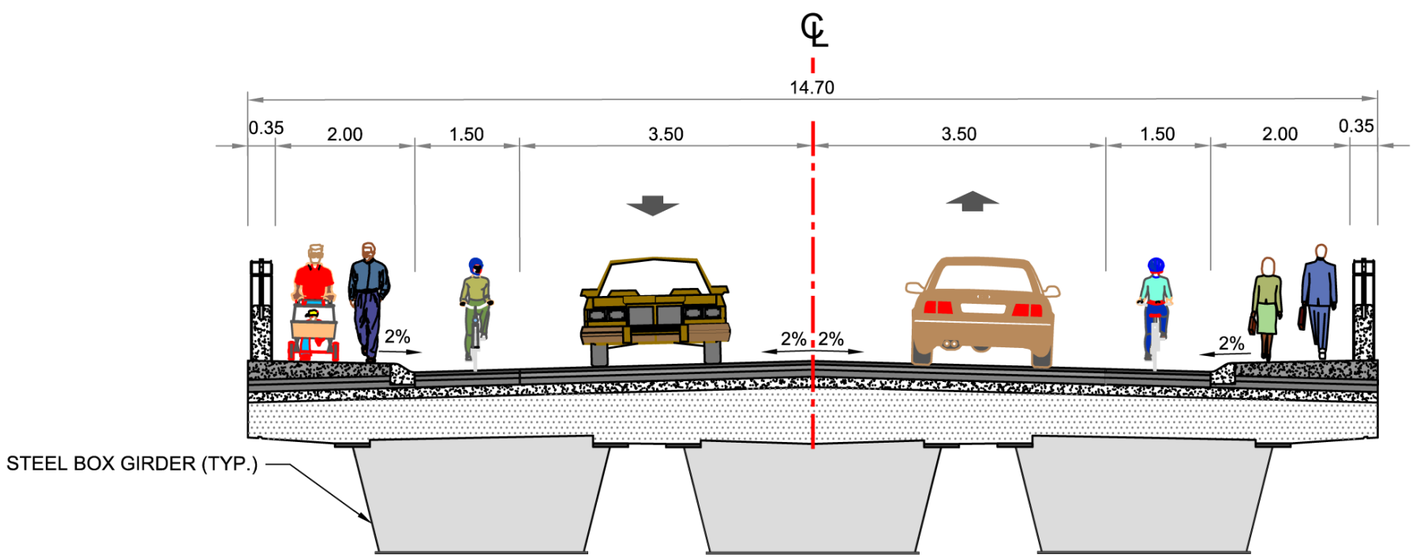


Figure 7-2: Proposed Bridge Section

NORTH MAPLE COMMUNITY BRIDGE CLASS EA
HIGHWAY 400 OVERPASS



NORTH MAPLE COMMUNITY BRIDGE

BRIDGE WITH SIDEWALKS 2.00m, 1.50m BIKE LANES AND 3.50m VEHICLE LANES

TYPICAL SECTIONS

AECOM	TITLE: **NORTH MAPLE COMMUNITY BRIDGE CLASS EA HIGHWAY 400 OVERPASS ALTERNATIVE DESIGN CONCEPT (PREFERRED SOLUTION)**	
VAUGHAN	CONSULTANT FILE NO. DRAWN BY: S.M. CHECKED BY: J.V.	SCALE: N.T.S.
	CONTRACT NO.	DRAWING NO. 4

7.1.4 Bridge

The proposed new bridge is a two-span, steel box girder bridge with integral abutments consisting of three 1.5 m deep steel box girders. The bridge will have equal span lengths of 41.2 m and a skew angle of 0O 57' 7". The conceptual design of the structure was closely co-ordinated with MTO and addresses the requirements of future widening of Highway 400. The Bridge provides a minimum vertical clearance of 5.0 m across the entire future Highway 400 cross-section. The 14.6 m wide deck will accommodate one lane of traffic and a bike lane in each direction on a 10.0 m wide roadway, and 2.0 m wide sidewalks and parapet walls with railing on each side.
Special aesthetic consideration was given to the bridge and it was decided to use City of Toronto railing T-900.01-2 as included in **Appendix B**.

Additional information may be found on the General Arrangement drawing included in **Appendix B**.

7.1.5 Intersections

The proposed road includes two intersections the first one is the intersection of Canada Drive and Cityview Boulevard. This intersection will require re-grading for accommodating the change of the profile of the proposed road. This intersection will be signalized. The second one is the intersection of America Avenue and John Deisman Boulevard. This intersection will be stop controlled. For additional details refer to the preliminary design drawings included in **Appendix B**.

7.1.6 Drainage

The existing corridor is already draining to the municipal storm sewer. The road extension will need to connect to existing system by an additional minor system consisting of catchbasins and storm pipes. It is expected that the change of the run-off coefficient will have a minimum impact on the flow running to the existing system.

7.1.7 Property

The City of Vaughan owns the necessary lands for the construction of the project and no property acquisition is anticipated.

7.1.8 Utilities and Street Lighting

As mentioned on **Section 4**, Bell Canada, Enbridge Gas and Rogers own utilities in the vicinity of the project and no conflict with these utilities is anticipated.

The utility owners need to be contacted during the detail design phase to ascertain the need to use the new road for future expansion.

7.1.9 Landscaping

The proposed Landscape Concept Plan for the bridge approaches is presented in **Figure 7-3**. The Landscape Concept Plan will be confirmed in the detail design phase.

Figure 7-3. Preliminary Landscape Concept Plan

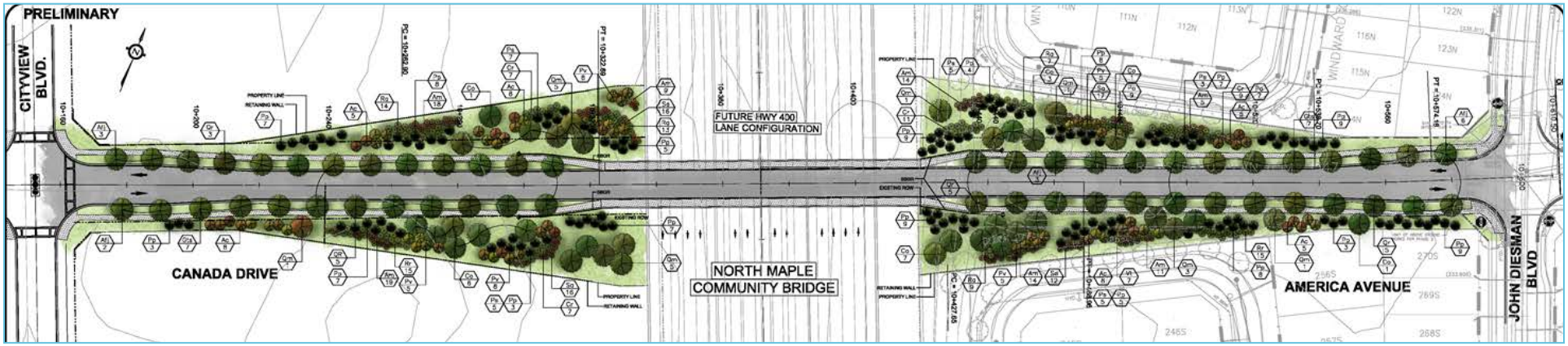


Table 7-1 lists the vegetation species to be considered in the landscaping plan.

Table 7-1: Vegetation Species for Landscaping Consideration

Symbol	Quantity	Botanical Name	Common Name	Size		Characteristics
				Caliper mm	Height cm	
Deciduous Trees						
Afj	14	*Acer x freemanii*	Autumn Blaze Red Maple	60		• Hardy, drought tolerant • Excellent Fall Colour
Ac	39	*Amelanchier canadensis*	Serviceberry		200	• Native to Ontario • White flowers in spring • Good fall colour • Fruit attracts birds
Co	19	*Celtis occidentalis*	Hockberry	60		• Native to Ontario • Hardy, tolerant of urban conditions
Gts	14	*Gleditsia triacanthos*	Skyline Honeylocust	60		• Tolerant of salt and urban conditions • Yellow fall colour
Pv	31	*Prunus virginiana*	Chokecherry		150	• Native to Ontario • White flowers in spring • Fruit attracts birds
Qm	17	*Quercus macrocarpa*	Bur Oak	60		• Native to Ontario • Hardy, tolerant of urban conditions
Qr	18	*Quercus rubra*	Red Oak	60		• Native to Ontario • Hardy, tolerant of urban conditions
Coniferous Trees						
Pp	111	*Picea pungens*	Colorado Spruce		200	• Hardy, tolerant of salt and urban conditions
Pa	25	*Pinus strobus*	White Pine		200	• Native to Ontario
Shrubs						
Am	90	*Aronia melanocarpa*	Black Chokeberry		60	• Native to Ontario • White flowers in spring • Good fall colour • Fruit attracts birds
Cr	34	*Carnus racemosa*	Gray Dogwood		60	• Native to Ontario • White flowers in spring, purplish fall colour • Fruit attracts birds
Po	16	*Physocarpus apulifolius*	Ninebark		60	• Native to Ontario • White flowers in spring • Tolerant of salt and drought
Ra	43	*Rhus aromatica*	Fragrant Sumac		60	• Native to Ontario • Good fall colour • Tolerant of salt and drought • Good for slope stabilization
Rr	30	*Rosa rugosa*	Rugosa Rose		60	• Ornamental flowers and rose hips • Tolerant of salt and drought
Sa	61	*Symphoricarpos albus*	Snowberry		60	• Native to Ontario • Hardy, drought tolerant
Vt	7	*Viburnum trilobum*	High Bush Cranberry		80	• Native to Ontario • White flowers in spring • Good fall colour • Fruit attracts birds

7.1.10 Services

Potential conflict with the 400 m watermain in the vicinity of the proposed bridge alignment needs to be determined during the detail design phase. Refer to **Appendix E** for the location of the watermain.

7.1.11 Construction Staging

Since the bridge approaches will be constructed in a dedicated empty corridor no traffic staging is required for this construction phase except for a minor staging for resurfacing the intersections. However, the construction of the bridge central pier and abutments will require an elaborate staging of the traffic on Highway 400. This traffic staging needs to be detailed during the detail design phase and approved by MTO.

7.1.12 Cost Estimate

As per the details in **Table 7-2**, the total capital cost of the project is approximately $7.8M.

Table 7-2: Cost Estimate

Bridge Structure	$4,500,000
Road Approaches	$1,334,000
Illumination	$150,000
Utility Relocations	$150,000
Traffic Signals Adjustments	$150,000
Landscaping	$250,000
Subtotal	$6,534,000
Contingency 20%	$1,307,000
Total	**$7,841,000**

7.2 Transit

A review of future transit system improvements was completed. It is expected that the proposed North Maple Community Bridge will provide communities on both sides of Highway 400 access to enhanced transit services outlined in the City of Vaughan OPA 600.

7.3 Pedestrians and Cyclists

A review of planned or proposed cycling pathway improvements was completed. The proposed North Maple Community Bridge will improve the overall transportation efficiency of the road network serving Block 33 community by shortening travel times, improving emergency response services, providing additional pedestrian facilities and offering access to enhanced transit systems and bicycle networks.

7.4 Future Road Network and Connectivity

The connection of America Avenue and Canada Drive is expected to result in changes in travel patterns for the Block 33 residents. It will improve the multi-modal connectivity of the two communities on either side of Highway 400 (Block 33 East and West), and if built, it will alleviate existing and future congestion in the broader east-west corridor. As noted in the traffic assessment, the traffic volumes on the bridge are estimated at 330 and 485 vehicles in the AM and PM peak hour, respectively. On the America Avenue east approach to John Deisman Boulevard, the traffic volumes are estimated at approximately at 140 and 160 vehicles in the AM and PM peak hour, respectively. On the Canada Drive west approach to Cityview Boulevard, the traffic volumes are estimated at approximately at 240 and 200 vehicles in the AM and PM peak hour, respectively (see **Appendix D** for the study area transportation study, including future traffic estimates).

The proposed bridge will improve the overall transportation efficiency of the road network serving the Block 33 community by shortening travel times, improving emergency response services, providing additional pedestrian facilities and offering access to enhanced transit systems and bicycle networks. This opportunity is consistent with

the City's Official Plan, offers better access to community amenities and promotes sustainable multi-modal transportation options contributing to the reduction of vehicle emissions.

8. Anticipated Impacts and Proposed Mitigation Measures

It is recognized that the proposed construction of the North Maple Community Bridge with preferred alternative design concepts **2B** and **3A** with the extension of the provision for 1.5 m bike lanes through both approaches to the bridge will result in minor impacts on the existing environment. In order to address the effects, the following approach was taken:

1. **Avoidance**
   The first priority is to prevent the occurrence of negative effects (i.e., adverse environmental effects) associated with the implementation of an alternative;
2. **Mitigation**
   Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate mitigation measures to eliminate or reduce to some degree, the negative effects associated with implementing the alternative; and,
3. **Enhancement/Compensation**
   In situations where appropriate mitigation measures are not available, or significant net adverse effects will remain following the application of mitigation, enhancement or compensation measures may be required to counterbalance the negative effect through replacement in kind, or provision of a substitute or reimbursement.

The following mitigation measures are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further confirmed and developed during detailed design. **Table 8-1** provides a detailed assessment of the potential impacts associated with the project and the recommended mitigative measures required to reduce these effects.

This section provides a detailed list of specific commitments to be carried forward to Phase 5 of the Municipal Class EA process - Implementation. It is recommended these mitigation measures presented become part of the contract package so that contractors are aware of the requirements prior to tendering. The City of Vaughan will work with the Ministry of the Environment, Toronto and Region Conservation Authority, and other authorities, during detail design and prior to the start of construction to ensure that the proposed works are acceptable and to obtain required permits.

Environmental monitoring will be combined with construction supervision to include periodic site visits and inspections throughout the course of the work (e.g. confirm the proper placement and maintenance of all erosion and sediment control measures).

Table 8-1: Proposed Mitigation Measures

Factor	Potential Impacts	Potential Mitigation
Traffic Management	During construction there may be temporary disruptions to traffic on: • America Avenue • John Deisman Boulevard • Canada Drive • Highway 400 Alterations to traffic patterns post-construction.	**During Detail Design:** • Develop requirements for potential traffic disruption signing to be in place during construction. • Review need for traffic calming measures. **Prior to Construction:** • Undertake notification to area residents and businesses. • Erect signs advising of traffic disruptions. **During Construction:** • Relocate heavy equipment travel routes away from residential roads, if possible. **Post Construction:** • Monitor traffic patterns and compare against EA estimates.
Noise	Disruption to residences and businesses.	**During Detail Design:** • Construction noise constraints will be incorporated into contract documents. • Construction activities throughout the project will conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. **Prior to Construction:** • Develop reactive complaint resolution procedure for responding to complaints resulting from construction. **During Construction:** • Comply with MOE noise limits, and local noise control by-laws. • Use construction equipment that meets the requirements of the MOE Construction Equipment Publication (NPC 115). • Prevent unnecessary noise and vibration by maintaining equipment in proper operating condition, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts. • Restrict use of equipment to the minimum necessary to perform the specified work. Do not allow excessive idling. • Monitor complaints resulting from construction. • Arrange for a post construction building condition survey to be undertaken.
Air Quality	Potential for decrease in localized air quality due to construction dust.	**During Construction:** • Apply water and dust suppressants during construction to protect air quality due to dust, as needed • During construction, vehicles/machinery and equipment should be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
Erosion and Sedimentation	Potential for erosion and sedimentation.	**During Detail Design:** • Develop erosion and sedimentation control strategy. **During Construction:** • Implement and monitor the erosion and sedimentation control strategy, including appropriate phasing to avoid impacts to Cold Creek north of the study area. • Any areas disturbed by construction will be restored and stabilized as soon as practically possible.
Wildlife and Migratory Birds	Disruption to wild life habitat and migration patterns.	**During Detail Design:** • Complete Species at Risk surveys. • Confirm Migratory Bird Nesting season **During Construction:** • Require contractor to avoid disturbance of any migratory birds found nesting in the project area during the peak breeding season; - Removal of trees to be performed outside this period. - Prevent bird nesting on bridge during construction and remove any nests after this period.
Waste Management and Control of Inadvertent	Potential inadvertent spill of hazardous materials during construction.	**During Construction:** • Store all oils, lubricants, fuels and chemicals in secure areas.

Table 8-1: Proposed Mitigation Measures

Factor	Potential Impacts	Potential Mitigation
Spills		• Contact appropriate regulatory agencies in event of a spill to the environment.
Landscaping and Vegetation Protection	Physical damage and loss of vegetation/trees for material management and construction activities	**During Detail Design:** • Finalize Landscaping Plan to address possible tree removals and streetscape enhancement. • Construction restrictions and maintenance practices such as the following should be considered for tree protection during development of the contract specifications: • If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. • No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction. - If work will take place near trees, tree protection fencing shall be erected and maintained to protect the tree and root zone. Tree protection fencing requirements shall be illustrated in construction drawings and should be in place and approved by the consultant prior to any construction activity on site. - No activity shall be allowed within the tree protection fence area. Equipment shall not be driven over root zones, no materials shall be stockpiled near trees, and foot traffic shall be limited especially during rainy periods when soil is more prone to compaction. • A construction work plan will be developed which designates locations for stockpiling of soils and other materials including fuel. Prior to commencement of construction, the limits of protection areas will be delineated and fenced to avoid inadvertent intrusion of machinery or other activities such as stockpiling of excess material **During Construction:** • Restrict removal of trees to work areas specified in construction contract • Fence areas of retained trees prior to construction commencement, and prohibit entry of equipment and materials within fenced areas until final grading and landscaping is completed.
Archaeology	Loss or disruption to archaeological resources.	**During Detail Design:** • Confirm MTCS clearance of site. **During Construction:** • No excavations shall take place within the study area prior to the Ministry of Tourism, Culture and Sport (Heritage Operations Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied. • Should previously unknown or unassessed deeply buried archaeological remains be uncovered during construction; - Cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario *Heritage Act*. • The office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146) should be contacted immediately. Any person discovering human remains must immediately notify the office of the Heritage Operations Unit, Ministry of Tourism and Culture (416-314-7146), the police or coroner, and the Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Government Services (416-326-8404).

8.1 Permits and Approvals

The North Maple Community Bridge project is subject to various regulatory approvals including EA requirements under Ontario's *Environmental Assessment Act.* The Canadian *Environmental Assessment Act* (CEAA) was not triggered for this project.

Following successful completion of the Class EA process documented in this ESR prepared under the Municipal Class EA, all requirements will have been met. Other approval requirements will be addressed for the project during detail design which may include:

- *Ontario Heritage Act* requirements for Archaeological Clearance; and
- Health and safety requirements during construction under Ontario's *Occupational Health and Safety Act*;
- Potential permits from the Toronto and Region Conservation Authority (TRCA) relating to drainage if applicable;
- Ministry of Environment relating to drainage;
- Municipal approvals (i.e., site screening) if applicable; and
- Potential notification/permissions from respective utilities with facilities in the area.

It should also be noted that water takings in Ontario are governed by the Ontario *Water Resources Act* (OWRA) and the Water Taking Regulation (O.Reg. 387/04). A Permit to Take Water (PTTW) is required for construction dewatering, if needed for water volumes greater than 50,000 L per day. Based on the current regulation, a Category 2 application requiring a technical review of the proposed water taking by a qualified person would be needed if volumes exceed the above amount. Further information and specific details will be determined during detailed design. However, it is not anticipated that this will be required.

The detailed design of the North Maple Community Bridge requires MTO approval with the corresponding corridor encroachment permits. The City will need to enter in a cost-sharing agreement with MTO.