

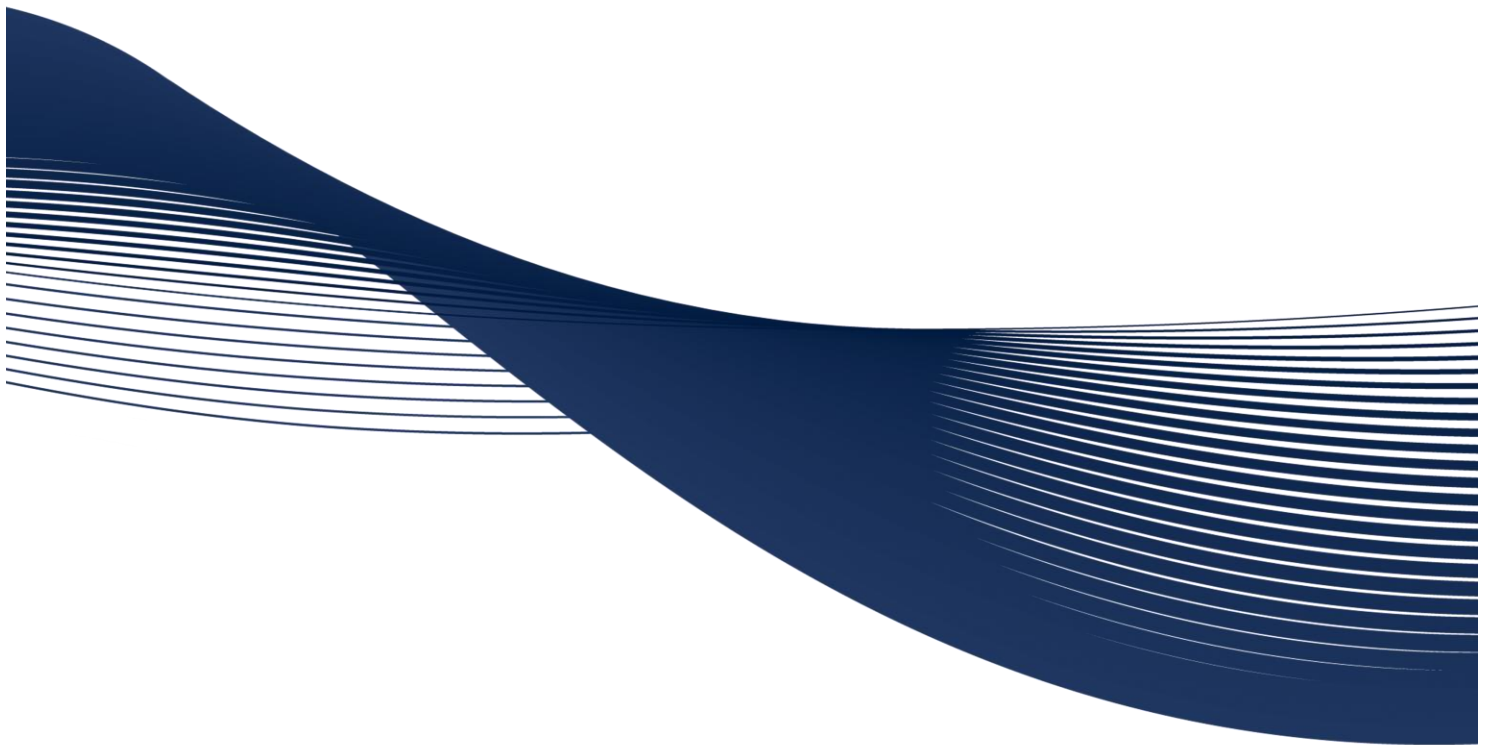
# TOWN OF HALTON HILLS



## SCHEDULE B MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT – PROJECT FILE REPORT

Halton Hills Drive Connection (Maple Avenue to Princess Anne Drive)

Project No.: T11-298



JANUARY 2016

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Project No. T11-298

**Halton Hills Drive Connection (Maple Avenue to Princess Anne Drive)  
Schedule B Municipal Class Environmental Assessment - Project File Report**

**ERRATA**

Based on Agency comments received during the 30-day review period of the Project File Report for *Halton Hills Drive Connection (Maple Avenue to Princess Anne Drive) Class Environmental Assessment (EA)*, the following revisions have been made to the document. These revisions have been implemented in the Project File Report.

Page	Original Text	New / Revised Text
11	<ul style="list-style-type: none"> <li>Mailed to First Nations, public review agencies and utility companies</li> </ul>	<ul style="list-style-type: none"> <li>Mailed to Aboriginal communities, public review agencies and utility companies</li> </ul>
11	<ul style="list-style-type: none"> <li>Members of the public on the stakeholder list, First Nations, review agencies and utility companies</li> </ul>	<ul style="list-style-type: none"> <li>Members of the public on the stakeholder list, Aboriginal communities, review agencies and utility companies</li> </ul>
13	3.4. Consultation with First Nations	3.4. Aboriginal Consultation
13	<p>Communication was established with representatives of First Nations who may have had an interest in the study area. Opportunities for participation in the study were provided through mail distribution of the notice of study commencement, public information centre and notice of study completion.</p> <p>The following Agencies, First Nations and Metis Councils were contacted:</p> <ul style="list-style-type: none"> <li>Aboriginal Affairs and Northern Development Canada</li> </ul>	<p>Communication was established with representatives of Aboriginal communities who may have had an interest in the study area. Potentially interested communities / organizations were identified by using the Aboriginal and Treaty Information System (ATRIS). Through the ATRIS system, the <b>Métis Nation of Ontario</b> was identified as an organization which may have interested in this Class EA. Opportunities for participation in the study were provided through mail and electronic distribution of the notice of study commencement, public information centre and notice of study completion. The record of Aboriginal</p>

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Page	Original Text	New / Revised Text
	Comments have not been received at time of issuance of draft report.	<p>consultation is summarized in Error! Reference source not found. below.</p> <p>&lt;see page 13 for Table 3-1&gt;</p> <p>As noted above, comments have not been received at time of issuance of the Project File Report.</p>
57 (Table 8-1)	<ul style="list-style-type: none"> <li>In the event that deeply buried archaeological remains are encountered, the Heritage Operations Unit of the Ontario Ministry of Culture should be notified immediately.</li> </ul>	<ul style="list-style-type: none"> <li>In the event that deeply buried archaeological remains are encountered, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Tourism, Culture and Sport (MTCS) will be notified immediately.</li> </ul>
57 (Table 8-1)	<ul style="list-style-type: none"> <li>In the event that human remains are encountered during construction, both the Ministry of Culture, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch should be contacted immediately.</li> </ul>	<ul style="list-style-type: none"> <li>In the event that human remains are encountered during construction, all construction activity will stop immediately and the police and coroner will be contacted immediately. Both the Ministry of Tourism, Culture and Sport (MTCS), and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch will also be contacted.</li> </ul>
57 (Table 8-1)	<ul style="list-style-type: none"> <li>No heritage features are expected to be impacted as a result of the Halton Hills Drive connection.</li> </ul>	<ul style="list-style-type: none"> <li>No cultural heritage resources are expected to be impacted as a result of the Halton Hills Drive connection.</li> </ul>
57 (Table 8-1)	N/A	<ul style="list-style-type: none"> <li>Development impacts will be more than 10m from the edge of the cemetery, and a temporary barrier will be erected around the historic cemetery and “no go” instructions will be issued for all on-site crew as a precautionary measure.</li> </ul>

Page	Original Text	New / Revised Text
57 (Table 8-1)	N/A	<ul style="list-style-type: none"><li>• Should there be any ground disturbance outside the area marked on Figure 7 of the Archaeological Report, then further archaeological assessment will be required pursuant to the recommendation.</li></ul>


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**Issues and Revisions Registry**

Identification	Date	Description of issued and/or revision
Draft Report	September 23, 2014	For Client Review
Draft Report	November 19, 2014	For Client Review
Final Report	December 12, 2014	For Agency Review
Updated Final Report	January 6, 2015	For Agency and Public Review

### **Statement of Conditions**

This Report/Study (the “Work”) has been prepared at the request of, and for the exclusive use of, the Owner/Client, and its affiliates (the “Intended User”). No one other than the Intended User has the right to use and rely on the Work without first obtaining the written authorization of Cole Engineering Group Ltd. and the Owner. Cole Engineering expressly excludes liability to any party except the intended User for any use of, and / or reliance upon, the Work.

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## Executive Summary

### Introduction

In June 2011, Cole Engineering Group Ltd. (Cole) was retained by the Town of Halton Hills to undertake a Municipal Class Environmental Assessment (EA) study for Halton Hills Drive between Maple Avenue and Princess Anne Drive. This Study was initiated to verify the need for the connection and to identify an appropriate recommendation for Halton Hills Drive. The Study was carried out in accordance with the planning and design process for Schedule 'B' projects as outlined in the Municipal Engineers Association "Municipal Class Environmental Assessment" document (October 2000, as amended in 2007 and 2011), which is approved under the *Ontario Environmental Assessment Act*.

### Background

Halton Hills Drive is a collector road that is located on the westerly edge of the community of Georgetown in the Town of Halton Hills. It currently exists as two separate sections of roadway to the east of Trafalgar Road and provides access to land uses at its north and south ends. At the north end, Halton Hills Drive extends approximately 250m southerly from Princess Anne Drive to provide access to the Bennett Health Care Centre (BHCC). At the south end, Halton Hills Drive extends approximately 150m northerly from Maple Avenue to provide access to the Town of Halton Hills Civic Centre. **Figure ES-1** provides an overview of the study area.

**Figure ES-1. Study Area**



In both the Town of Halton Hills' Official Plan (2008) and Transportation Master Plan (2011), Halton Hills Drive is shown as a connected road between Maple Avenue and Princess Anne Drive. Driving factors for the connection of this road include the provision of road network connectivity, the ability for this connection to reduce the traffic wait times associated with the at-grade rail crossing of the CNR line (Halton Subdivision) on Trafalgar Road just north of Maple Avenue and opportunities for meeting active transportation demands through the provision of cyclist and pedestrian network connectivity.

In order to fulfill the requirements of the Municipal Class EA process, this study assessed the need for connecting the north and south ends of Halton Hills Drive, verified the purpose and rationale for the undertaking, noted the environmental effects from the alternative design options, completed the required public consultation and identified a preferred alternative solution with associated mitigation procedures where required.

### **Problem and Opportunity Statement**

Based on an understanding of the Town's directives for transportation infrastructure described in its Official Plan and Transportation Master Plan, a review of the existing transportation system and the assessment of travel demands, the following problem and opportunity statements were identified.

#### **Problem Statement:**

"The road network within the study area has limited north-south network flexibility and the lack of network connectivity limits opportunities for pedestrian movement, traffic capacity, emergency service accessibility, and traffic accommodation during incidents or temporary closures."

In order to address the problem statement, alternative solutions were identified to address the following opportunities.

#### **Opportunities:**

- To support long-term development goals based on Official Plan;
- To facilitate access to public and private facilities; and,
- To address future demand on area roads and improve accessibility.

### **Stormwater Management – Alternative Solutions**

Prior to the identification of alternative solutions for Halton Hills Drive, stormwater management (SWM) alternatives were assessed as the method by which stormwater would be managed could potentially influence the Halton Hills Drive alternative solutions.

#### **Identification of Alternative Stormwater Solutions**

In order to provide a comprehensive stormwater management solution associated with a Halton Hills Drive connection, the following two (2) stormwater management alternatives were taken into consideration:



- Alternative #1: “Maintain the BHCC Pond, Provide Independent SWM Controls for Halton Hills Drive Extension” – This alternative considers both the BHCC and the Halton Hills Drive extension as individual entities in terms of stormwater management planning.
- Alternative #2: “Decommission BHCC Pond and Build Expanded SWM facility to Service Both BHCC and Halton Hills Drive Extension” – This alternative would provide a centralized stormwater management facility and would minimize the independent stormwater controls that may be required to be provided by the Halton Hills Drive extension itself.

Independent SWM controls were considered to be Low Impact Development (LID) measures and discussion with stakeholders indicated that these measures would be a viable alternative to traditional stormwater management such as ponds which were presented at the first Public Information Centre. The LIDs that were considered for this study were chosen for their suitability in handling road drainage and included:

- Enhanced Swale – similar to roadside ditches, but engineered with a stone storage layer, soil and vegetation to store and infiltrate the runoff generated from the 25 mm storm from the proposed ROW.
- Enhanced Topsoil – A layer of enhanced topsoil placed on pervious surfaces to increase infiltration capacities of stormwater runoff.
- Infiltration Gallery - stone galleries located underground along the boulevards to store and infiltrate the runoff generated from the 25 mm storm from the proposed ROW.
- Exfiltration Pipe – perforated pipe placed in a bed of filter media to provide storage for rapid runoff and provide gradual infiltration.
- Porous Pavement –Mixture of aggregate and asphalt to allow for infiltration of stormwater runoff while receiving water quality treatment.
- Permeable Pavers – Interlocking brick to allow for infiltration while effectively filtering the stormwater runoff.
- Soakaway Pit – stone filled trench designed to provide water quality treatment of stormwater runoff through infiltration. Water is stored within the voids and gradually percolates.
- Stormwater Trees – Planters placed in urban areas with an impervious bottom. Planters can retain water for 3 – 4 hours.
- Low Impact Mechanical Treatment – Mechanical units used to treat the runoff water to enhanced or advanced levels. Two proposed alternatives are:
  - Oil / grit separator (OGS) Units
  - Jellyfish Filter Units

The specific LID alternative has remained unspecified at this time as multiple alternatives can achieve the same stormwater management controls. The ultimate LID method(s) will be selected based on feasibility and acceptance by the Town and CVC.

### **Evaluation of Alternative Stormwater Solutions**

The alternative solutions were evaluated based on their ability to address the problem and opportunity statement in comparison to the outlined criteria, including stormwater management and engineering, the natural environment, socio-economic and cultural impacts and financial aspects. The overall

evaluation was conducted with input from the project team, project stakeholders and the public (consideration of the results of the Public Information Centre).

### **Preferred Alternative Stormwater Solution**

Based on the comparative evaluation, the preferred solution is **Alternative #1**, which involves maintaining the BHCC SWM pond and providing stormwater controls independently for the Halton Hills Drive extension via the use of LID SWM techniques.

### **Halton Hills Drive Connection Alternative Solutions**

The Class Environmental Assessment process requires the examination of all reasonable alternatives, in addressing the problem and opportunity statement. An evaluation methodology is used to ensure that the process is traceable and reproducible and takes into consideration technical, economic, social and environmental impacts. The following sections provide details on the development and evaluation of the alternative solutions.

#### **Design Considerations**

Prior to the identification of alternative planning solutions, three different road cross-sections were reviewed to identify the cross-section that would be most suited for a Halton Hills Drive connection. The cross-sections that were considered included the following:

- Cross-Section #1: Rural cross-section with 7.4m pavement width with no sidewalks or boulevards;
- Cross-Section #2: Urban cross-section with 12.0m pavement width with sidewalks and boulevards to match the existing Halton Hills Drive on the north end; and,
- Cross-Section #3: Urban cross-section with 14.5m pavement width with sidewalks and boulevards to match the existing Halton Hills Drive on the south end.

Cross-Section #1 was quickly eliminated as a potential cross-section as it did not fulfill the objectives of the Town's Official Plan that new infrastructure should safely and efficiently accommodate all modes of transportation. The lack of sidewalks and boulevards would not meet these criteria and would not be consistent with the existing sections of Halton Hills Drive to the north and south.

While both Cross-Section #2 and #3 accommodate all modes of transportation, the narrower pavement width of 12.0m would minimize the impact on the existing natural/terrestrial environment and would provide a more cost effective design option for Halton Hills Drive. Thus, any proposed alternative planning solutions would assume the cross-section associated with Cross-Section #2.

#### **Identification of Alternative Solutions**

In reviewing the preliminary recommendations and the problem and opportunity statement, the following alternative planning solutions for undertaking were considered.

**Do Nothing:** Maintain status quo with Halton Hills Drive existing as two disconnected road segments servicing the Bennett Health Care Centre on north Princess Anne Drive and servicing the Town's Civic Centre on the south from Maple Avenue.

- Alternative 1: Modifications to the existing northern and southern Halton Hills Drive alignments (new centreline radii) to connect the northern and southern segments. The proposed road alignment is situated to the east of the study area, adjacent to the Black Creek tributary, and incorporates modified geometry of the existing road segments. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage.
- Alternative 2: Maintains the existing northern and southern segments of Halton Hills Drive to connect the northern and southern segments. The proposed road alignment maintains/matches the existing road geometry and centreline radii of the existing road segments. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage.
- Alternative 3: Modifications to the existing northern and southern segments of Halton Hills Drive (new centreline radii) to meet TAC standards. The proposed road alignment generally connects the existing road segments with modified centreline alignment radii in keeping with TAC standards. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage.

### Evaluation of Alternative Solutions

The alternative solutions were evaluated based on their ability to address the problem and opportunity statement in comparison to the criteria listed in Section 7.2, including transportation and engineering, the natural environment, socio-economic and cultural heritage and financial aspects. The overall evaluation was conducted with input from the project team, project stakeholders and the public.

### Description of the Preferred Alternative Solution

Based on the evaluation of alternative solutions, the preliminary preferred alternative solution is **Alternative #2**: to provide a road connection between the existing two segments of Halton Hills Drive between Maple Avenue and Princess Anne Drive. There will be no modifications to the existing Halton Hills Drive segments. The lane configuration of one (1) travel lane in each direction and a sidewalk on each side of the road will be maintained to match the existing road segments. Stormwater management measures will be implemented for the road through the use of LIDs.

### Environmental Effects and Mitigation

The following potential adverse effects associated with the proposed roadway works are anticipated, along with the various mitigation measures to minimize and/or eliminate these adverse effects.

- **Temporary Construction Work** – To construct the recommended connection between the two ends of Halton Hills Drive, there is potential for temporary impacts to noise, air quality and traffic operations as a result of construction activities. These effects can be mitigated with a detailed construction plan/schedule that follows Municipal guidelines with regards to permitted hours of construction. Furthermore, a complaint resolution procedure can be prepared to

facilitate any concerns that arise during the construction process. To address potential traffic concerns, a traffic management plan can be prepared prior to construction and can include notification to adjacent land owners and placement of appropriate signage during construction.

- **Tree impacts** – The Ministry of Natural Resources (MNR) has confirmed that four (4) butternut trees are to be killed/removed to accommodate construction of the road facility and identified that a minimum of fifty (50) replacement seedlings be provided. Mitigation will include the planting of trees in a nearby location based on Halton Region’s Tree-Canopy Replacement Policy with the purpose of enhancing the function of the Significant Woodland and to mitigate impacts to the feature as a result of the road.
- **Significant Woodland** – Loss of significant woodland can be mitigated with replanting and should include native species to be determined in consultation with the CVC. To enhance the existing remaining significant woodland, identify and implement opportunities to enhance the vegetation cover immediately adjacent to the Chris Walker Recreation Trail by installing tree whips and seedlings in numerous open areas that occur along the trail.
- **Headwater drainage features** – Ensure that terrestrial linkage associated with Drainage Feature A-1 is maintained/replicated through the installation of a culvert and Drainage Features A-2 and B-2 are conserved.
- **Mitigation measures** – A complete summary of potential impacts and the mitigation measures has been prepared and is provided in **Table 8-1** of the report.

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## 1.0 Introduction

### 1.1. Background

Halton Hills Drive is a collector road that is located on the westerly edge of the community of Georgetown in the Town of Halton Hills. It currently exists as two separate sections of roadway to the east of Trafalgar Road and provides access to land uses at its north and south ends. At the north end, Halton Hills Drive extends approximately 250m southerly from Princess Anne Drive to provide access to the Bennett Health Care Centre. At the south end, Halton Hills Drive extends approximately 150m northerly from Maple Avenue to provide access to the Town of Halton Hills Civic Centre.

In both the Town of Halton Hills' Official Plan (2008) and Transportation Master Plan (2011), Halton Hills Drive is shown as a connected road between Maple Avenue and Princess Anne Drive. Driving factors for the connection of this road include the provision of road network connectivity, the ability for this connection to reduce the traffic wait times associated with the at-grade rail crossing of the CNR line (Halton Subdivision) on Trafalgar Road just north of Maple Avenue and opportunities for meeting active transportation demands through the provision of cyclist and pedestrian network connectivity.

### 1.2. Study Purpose

To verify the need for the connection and to identify an appropriate recommendation for Halton Hills Drive, Cole Engineering Group Ltd. (CEG) was retained by the Town of Halton Hills (the "Town") in June 2011 to undertake a Municipal Class Environmental Assessment (EA) study for the connection of Halton Hills Drive between Maple Avenue and Princess Anne Drive. The Study was carried out in accordance with the planning and design process for Schedule 'B' projects as outlined in the Municipal Engineers Association "*Municipal Class Environmental Assessment*" document (October 2000, as amended in 2007 and 2011), which is approved under the *Ontario Environmental Assessment Act*.

In order to fulfill the requirements of the Municipal Class EA process, this study assessed the need for connecting the north and south ends of Halton Hills Drive, verified the purpose and rationale for the undertaking, noted the environmental effects from the alternative design options, completed the required public consultation and identified a preliminary alternative solution with associated mitigation procedures where required. This report documents the planning and design process for the Class EA Study and presents the recommended alternative solution for Halton Hills Drive.

### 1.3. Study Area

Halton Hills Drive is located east of Trafalgar Road in the community of Georgetown in the Town of Halton Hills. It is currently two short sections of roadway, with the north end extending southerly from Princess Anne Drive for approximately 250m and terminating at a temporary cul-de-sac. This north stub acts as the main access for the Bennett Health Care Centre, located on the southeast quadrant of Princess Anne Drive and Halton Hills Drive. The south end extends northerly from Maple Avenue for approximately 150m and provides access to the Town's Civic Centre which is located on the northwest quadrant of Maple Avenue and Halton Hills Drive. If the two stub ends are connected, Halton Hills Drive would be approximately 600m in length between Maple Avenue and Princess Anne Drive. **Figure 1-1** and **Figure 1-2** show the existing north and south stubs, respectively.



**Figure 1-1: Halton Hills Drive North Leg Terminus**



**Figure 1-2: Halton Hills Drive South Leg Terminus**



In the surrounding area, existing land uses include detached residential homes, a gas bar and convenience store, a golf club, the Georgetown Hospital, a park and natural vegetated areas. Major transportation corridors include Trafalgar Road to the west, Main Street North to the east, Maple Avenue to the south and Princess Anne Drive to the north. The CNR line (Halton Subdivision) is located slightly west of Halton Hills Drive, with an at-grade crossing on Trafalgar Road just north of Maple Avenue and a grade-separated crossing on Princess Anne Drive just west of Halton Hills Drive. Chris Walker Trail, part of the Town's municipal trail network, is found to the east of Halton Hills Drive. **Figure 1-3** provides an overview of the study area.

**Figure 1-3: Study Area**



## 1.4. Class Environmental Assessment Process

This Study was carried out in accordance with the Municipal Class Environmental Assessment (EA) process, which is approved for planning and designing municipal infrastructure projects, including roads, water and wastewater, and meets the requirements of the *Ontario Environmental Assessment Act*.

**The Municipal Class EA planning and design process includes five (5) phases. The phases are shown in Figure 1-4 and are summarized as follows:**

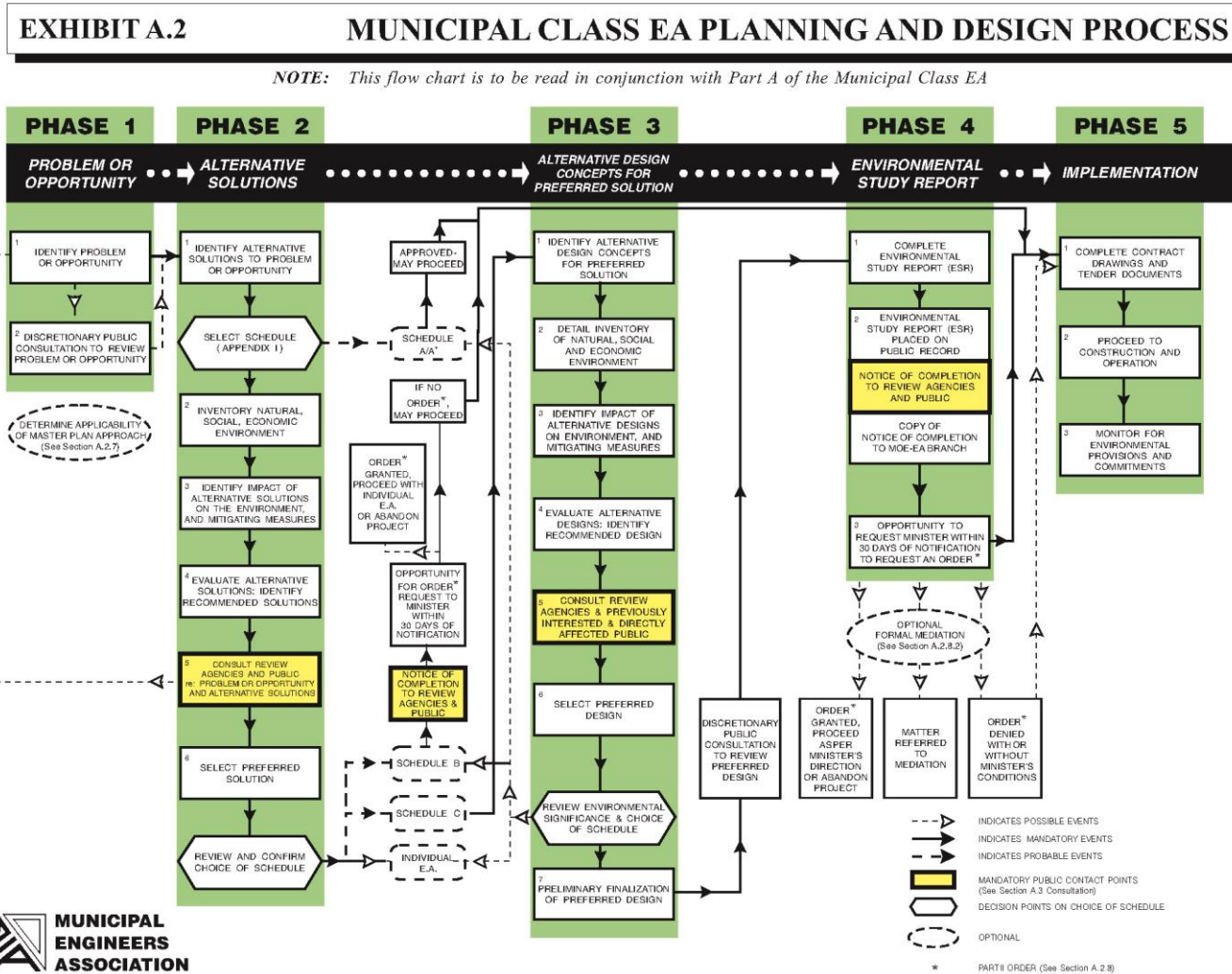
- Phase 1:** Identify the problem and/or opportunity through confirmation of the need and justification of the proposed undertaking.
- Phase 2:** Identify alternative solutions to address the problem and/or opportunity, taking into account the existing environment and input from the public and review agencies.
- Phase 3:** Examine alternative methods of implementing the preferred alternative solution (design alternatives), taking into consideration the existing environment, input from public and review agencies, anticipated environmental effects and mitigating measures.
- Phase 4:** Prepare and file an Environmental Study Report (ESR) that details the rationale, planning, design and consultation associated with Phases 1 through 3.
- Phase 5:** Proceed with the detail design, construction and operation of the facility.

The Municipal Class EA document identifies four types of projects that are required to follow the Class EA process, namely Schedule 'A', 'A+', 'B' and 'C' projects. Depending on the Schedule of the project, a combination of the above noted Phases will need to be completed. At the onset of a study, it will be necessary to determine the applicable Schedule for the project to ensure that the appropriate Phases are completed and in order to meet the requirements of the *Ontario Environmental Assessment Act*.

The four types of projects to which the Municipal Class EA process applies are described as follows:

- Schedule 'A':** These projects are generally limited in scale and have minimal adverse environmental effects. The majority of municipal road maintenance and operational activities are included in this Schedule. These projects are pre-approved and a municipality can proceed to implement them without further approval under the EA Act.
- Schedule 'A+':** The 'A+' project was introduced in the 2007 amendment of the Class EA process. These projects are also pre-approved; however, the public is advised of the project prior to implementation. The method by which the public is advised of the project will be at the discretion of the proponent.
- Schedule 'B':** These projects have the potential for some adverse environmental effects and are approved subject to a screening process, which includes direct contact with the general public and relevant review agencies. These projects generally include improvements and minor expansion to existing facilities. Schedule 'B' projects require the completion of Phases 1 and 2 of the Class EA process.

Figure 1-4: Municipal Class EA Planning and Design Process



**Schedule 'C':** These projects are considered to have potential for significant environmental effects and must complete Phases 1 through 4 of the Municipal Class EA process. These projects generally include the construction of new facilities and major expansion to existing facilities over and above a construction cost of \$2.4M.

From an understanding of the scope for the Halton Hills Drive connection, it was determined that the study could be conducted as a Schedule 'B' project as the length of the connection would be approximately 300m, construction costs would be less than \$2.4M and while there are expected environmental impacts, these can and will be mitigated as part of the Class EA process.

Upon completion of Phases 1 and 2 of the Municipal Class EA process, a Project File Report (this report) will be prepared that documents the background to the study, the problem statement, alternative solutions and design options, the public consultation process, evaluation of the alternatives, identification of a recommended alternative design concept and associated mitigation measures. The Project File Report will be filed and placed on public record for 30 calendar days for review by the public and review agencies. The public and review agencies will be notified of the availability of the Project File Report through the Notice of Completion. The Notice of Completion will advise the public and stakeholders of the location(s) where the Project File Report can be reviewed, the process by which comments may be submitted and of the right to request and submit a Part II Order.

Any concerns that cannot be resolved through discussions with the proponent (the Town of Halton Hills) can result in a request being submitted to the Minister of the Environment to require the proponent to comply with Part II of the EA Act before proceeding with the undertaking. The Part II Order provides an opportunity under the Class EA planning process for members of the public, interest groups and review agencies to request the Minister of the Environment to review the status of the project. The Minister decides whether to deny the request, refer the matter to mediation or require the proponent to comply with the Part II Order. If no Part II Order requests are outstanding by the completion of the review period, the project is considered to have met the requirements of the Class EA process.

## 1.5. Study Schedule

This study was initiated in June 2011. Initial consultation was undertaken with Credit Valley Conservation (CVC) at that time. However, due to the identification of surplus lands by the Town, the project was intermittently advanced through 2011 and 2012. The project was re-initiated in 2013 and the mandatory point of contact occurred in April 2013 at Public Information Centre (PIC) #1, where study findings and alternative solutions were presented for public and agency input and feedback. Subsequent to PIC #1, the project was put on hold again due to Town issues external to this project. The project was re-initiated again in June 2014 with the intent to complete the remaining requirements for the Municipal Class EA process and to file the Project Report.

## 2.0 Overview of Background Studies

To obtain the necessary background and understanding of the undertaking, studies completed for areas within the vicinity of the study area were reviewed. The studies and/or reports that were reviewed included the following:

### Policy Reports:

- Town of Halton Hills Official Plan (May 2008)
- Town of Halton Hills Transportation Master Plan (November 2011)
- Town of Halton Hills Cycling Master Plan (December 2010)

### Environmental Reports:

- Hydrogeologic Study Bennett Centre (January 2006)
- Georgetown West and Georgetown South Master Drainage Plan Update Study (October 1996)

### Transportation Reports:

- Bennett Health Care Centre Traffic Impact Study (October 2002)

Pertinent information obtained from the reports is summarized in the following sections.

## 2.1. Policy Reports

### 2.1.1. Town of Halton Hills Official Plan

The Town's current Official Plan (OP) was approved in 2008 by the Region of Halton and remains in effect. The purpose of the document is to provide the basis for managing growth and change to support and emphasize the Town's unique character, diversity, civic identity, rural lifestyle, natural heritage and cultural heritage to 2021. The study area is predominantly designated Civic Centre Area. Lands further to the east are within the Greenlands System. Permitted uses within this designation include multiple unit developments such as townhouses and apartment dwellings. Prior to approval of development applications within this designation, the Official Plan requires the preparation of a Comprehensive Development Plan to the satisfaction of Council. In 2010, Council adopted Official Plan Amendment No. 9. This Amendment identified the Civic Centre Area as one of the Town's key intensification areas in keeping with the direction provided by the Growth Plan for the Greater Golden Horseshoe.

One of the aspects of the Official Plan is to provide direction on infrastructure development. As noted in Section A2.8.1 the Town's goal for infrastructure is:

*"To provide infrastructure that meets the needs of present and future residents and businesses in an efficient, environmentally-sensitive, cost effective and timely manner."*

Strategic objectives relevant to transportation infrastructure were described in Section A2.8.2 as follows:

*"c) To establish an integrated transportation system that safely and efficiently accommodates various modes of transportation including trains, automobiles, trucks, public transit, cycling and walking."*

*d) To establish a street pattern within new development areas that is based on a permeable grid pattern of arterial, collector and local roads.*

*e) To ensure that the construction of all infrastructure, or expansion to existing infrastructure, occurs in a manner that is compatible with adjacent land uses and with a minimum social and environmental impact.”*

The OP provides more details related to its transportation objectives in Section F6.1 as noted below:

- “a) facilitate the safe and efficient movement of people and goods within the Town’s communities and to and from adjacent municipalities;*
- b) establish an integrated transportation system that safely and efficiently accommodates various modes of transportation including trains, automobiles, trucks, public transit, cycling and walking;*
- c) promote public transit, cycling and walking as energy efficient, affordable and accessible forms of travel;*
- d) protect transportation corridors to facilitate the development of a transportation system that is compatible with and supportive of existing and future land uses;*
- e) ensure that new roads in urban development areas are constructed safely, designed in a grid-oriented street network to help distribute car and truck traffic evenly and provide access for the future operation of an efficient public transit system;*
- f) ensure that appropriate right-of-way widths for all existing and proposed roads are provided in accordance with the Planning Act;*
- g) encourage the use of alternative development standards for roads, where appropriate;*
- h) encourage the efficient use of land along transportation corridors to maximize the use of public transit; and,*
- i) restrict development on private roads.”*

With an understanding of these objectives, it is noted that the Town’s OP identifies Halton Hills Drive as a connected road between Maple Avenue and Princess Anne Drive. In Schedule B1, which presents the Town’s functional classification of major transportation facilities, Halton Hills Drive is identified as a collector road. In Schedule B2, which presents the Town’s permitted right-of-way widths, Halton Hills Drive is identified as a road with a 26m right-of-way. Further details provided in Section F6.4.3 note that the function and design of collector should have the following characteristics:

**Function**

- Connect neighbourhoods
- Distribute traffic to and from arterials
- Provide access to adjacent land uses

**General Design Guidelines**

- Right-of-way width up to 26m
- 2 to 4 travel lanes
- On-street parking generally permitted
- Access is partially controlled

The OP also makes allowances for variations to these requirements to address safety requirements, to accommodate additional design features or infrastructure requirements (e.g., cycle lanes or turn lanes) or to implement traffic control devices (Sections F6.4.1.3 and F6.4.3). While the Halton Hills Drive road connection is displayed on Schedules B1 and B2, Section G13.4 of the OP states that the location of the roads shown are approximate and amendments to the Plan will not be required to make minor adjustments or deviations to the locations of roads, provided that the general intent of the Plan is maintained.

### **2.1.2. Town of Halton Hills Transportation Master Plan**

In November 2011, the Town of Halton Hills completed their Transportation Master Plan. This plan “developed an integrated transportation plan and associated strategies to meet transportation challenges facing the Town to the year 2031”. The Plan included a review of transportation demands on the existing and future road network and put forward recommended changes to road jurisdiction and road classification designations that had been previously identified in the Town’s Official Plan. It is noted that the proposed connection of Halton Hills Drive between Maple Avenue and Princess Anne Drive is merited under existing conditions and was incorporated into the Transportation Master Plan without any modifications.

### **2.1.3. Town of Halton Hills Cycling Master Plan**

The Town of Halton Hills Cycling Master Plan (2010) provides guidance in implementing a Town-wide cycling network and cycling supportive programs, including a recommended network of on-road and off-road cycling routes. The recommended cycling network builds upon a vision for cycling developed by the Halton Hills Cycling Committee, which states that cycling should: “be adopted and supported by residents, businesses and community organizations because the plan is developed in consultation with the public and meets the social, economic and physical needs of Halton Hills.”

The Cycling Master Plan also includes an implementation strategy to guide the Town of Halton Hills in improving its cycling network. The proposed implementation plan consists of several phases to be coordinated where possible with the Town’s plans for capital projects. Halton Hills Drive is identified in the Cycling Master Plan as a proposed on-road route.

On-road cycling facilities may include cycle tracks, bike lanes, paved shoulder bikeways, signed bike routes with enhanced edge lines or sharrows, or signed-only bike routes. The appropriate facility type will be determined through the detailed design process to fit within the preferred cross-section identified in this report.

## **2.2. Environmental Reports**

### **2.2.1. Hydrogeologic Study Bennett Centre**

This study was undertaken to identify hydrogeological considerations for the development of the proposed Bennett Health Care Centre. As noted in the document, hydrogeologic considerations included the following:

- *Documentation of existing ground water levels;*
- *Identification of ground water recharge and discharge zones;*

- *Contribution of the property to base flow in surrounding water courses;*
- *Determination of the hydrogeologic setting of the property with respect to regional features and requirements; and,*
- *Identification of storm water management techniques to maintain the ground water function at the site.*

Key hydrogeologic features of the study area were noted as follows:

- *Site stratigraphy consists of surficial topsoil and fill underlain by layers of clayey and sandy silt over glacial till.*
- *Till lies on bedrock of the Queenston Formation.*
- *The primary hydrogeologic function of the site is to provide ground water recharge.*
- *Due to the low permeability of the soils in the area, limited baseflow will be provided to the creek located on the site.*
- *A local sand to gravelly sand deposit can be found on the south end of the Phase 1 development area and on the Phase 2 development area, which may result in enhanced ground water baseflow to the creek.*

Recommendations of the study noted that the development of the site should maintain overall ground water recharge rates using appropriate infiltration systems (e.g., soak-away pits or gravel-filled trenches, underground perforated pipe system or discharge to overland flow beyond the Region's sewer easement). The proposed underground services were noted to be located above the ground water table and hence would have no impact to existing ground water flow following their implementation. In the event that the Health Centre carries forward with the development of Phase 2, the sand zone located on the south end of the Phase 1 development would need to be taken into consideration.

### **2.2.2. Georgetown West and Georgetown South Master Drainage Plan Update Study**

This study was undertaken to develop a stormwater management plan and implementation strategy within the Georgetown West and South Secondary Plan areas with a focus on protecting and enhancing the water resources in the study area. Recommendations from this study noted that the stormwater management practices for the Georgetown West area should rely on infiltration methods.

## **2.3. Traffic Assessment Reports**

### **2.3.1. Bennett Health Care Centre Traffic Impact Study**

A traffic impact analysis was undertaken for the proposed developments located to the east of the CNR line between Maple Avenue and Princess Anne Drive. Proposed developments included the following:

- The Bennett Centre to develop the block of land on the south side of Princess Anne Drive as a long-term care facility, a supportive care facility and a market rental condominium/apartment complex;



- Humberstone Properties Limited to develop the block of land located to the north and east of the existing Civic Centre at Maple Avenue as high-rise condominium units; and,
- The Town of Halton Hills to develop the block of land east of the Humberstone lands as single family dwelling units and high-rise condominium units.

This traffic impact analysis reviewed the possibility of providing a local or collector road to connect Maple Avenue to Princess Anne Drive through the noted development lands to service each of the proposed developments. The analysis reviewed adjacent existing intersection operations under existing conditions and future conditions with the traffic resulting from these proposed developments.

Results of the analysis indicate that only one of the existing intersections (Charles Street / Maple Avenue) would benefit from the extension of Halton Hills Drive from Maple Avenue to Princess Anne Drive. The study therefore recommended that a road connection between Maple Avenue and Princess Anne Drive at Halton Hills Drive is not necessary due to limited benefits to the transportation system based on a level of service analysis and potential road construction costs. It is of note that road construction cost estimates were not included as part of the study conclusions.

Subsequent to this study, the Town completed their Official Plan (2008) and their Transportation Master Plan (2011). In both these documents, the connection of Halton Hills Drive between Maple Avenue and Princess Anne Drive was identified as essential infrastructure in OP Schedule B1: Functional Classification of Major Transportation Facilities and merited under existing conditions, as noted in the TMP. As these are both Council approved documents, their recommendations supersede the recommendations from the 2002 Traffic Impact Study and provide justification for the connections of Halton Hills Drive between Maple Avenue and Princess Anne Drive.

### 3.0 Public Consultation

Public consultation is key to the success of a Municipal Class EA study and is a required component of the Municipal Class EA process. As per Schedule 'B' consultation requirements, a mandatory point of contact with the public and review agencies is required in Phase 2 of the study. The purpose of this point of contact is to present the problem/opportunity statement and alternative solutions that have been identified during the study process. The public and review agencies have the opportunity to comment on the information presented and for the Study Team to respond accordingly prior to completing the study.

The public consultation process is summarized in this section of the report.

#### 3.1. Public Consultation Schedule

As this study was carried out in accordance with the planning and design process for Schedule 'B' projects, points of contact with the public have included the Notice of Study Commencement, a Public Information Centre (PIC) and the Notice of Study Completion. Copies of the notices are included in **Appendix A**. The dates for these key milestones in the study process were as follows:

Event	Format	Date	Description/Purpose
Notice of Study Commencement and Notice of PIC #1	• Advertisement	• April 9, 2013 and April 1, 2013	• Appeared in Independent and Free Press
	• Mailing	• October 17, 2014	• Mailed to Aboriginal communities, public review agencies and utility companies
Public Information Centre #1	• Open House	• Wednesday, April 17, 2013	• To present project details, review study findings, obtain public input and address public comments and concerns.
Notice of Study Completion	• Advertisement	• January 7, 2015 and January 14, 2015	• Appeared in Independent and Free Press
	• Mailing and electronic	• January 5, 2015	• Members of the public on the stakeholder list, Aboriginal communities, review agencies and utility companies

### 3.2. Agency and Stakeholder Consultation

As part of the consultation process, various agencies, Provincial ministries and utilities were identified for engagement and contacted throughout the study process. Comments and information collected were documented. Opportunities for agency and stakeholder participation were available throughout the study process and notification was provided via the mailing of the notices of study commencement, public information centre and study completion. Agencies and stakeholders contacted as part of this study were as follows:

#### Federal Departments:

- Environment Canada
- Aboriginal Affairs and Northern Development Canada
- Department of Fisheries and Oceans

#### Utilities:

- Halton Hills Hydro
- Union Gas Ltd.
- Bell Canada
- Rogers Cable TV Ltd.

#### Provincial Ministries:

- Ministry of Environment and Climate Change
- Ministry of Aboriginal Affairs
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Tourism and Culture
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources
- Ministry of Transportation

#### Agencies and Authorities:

- Halton Region
- MMM Group Ltd.
- Credit Valley Conservation
- Conservation Halton
- Halton Hills District School Board
- Halton Hills Catholic School Board
- Halton Hills French Catholic School Board

All comments received from the agencies and associated responses are documented in **Appendix B**.

### 3.3. PIC #1 – Phase 2 Alternative Solutions

A Public Information Centre (PIC) for the Halton Hills Drive Connection Class Environmental Assessment Study (Maple Avenue to Princess Anne Drive) was held on Wednesday, April 17, 2013 in the Council Chambers at the Town of Halton Hills Civic Centre (1 Halton Hills Drive) between 6:00 p.m. and 8:00 p.m. Attendees were presented with background information, existing and future conditions, the problem and opportunity statement, alternative solutions, proposed evaluation criteria and next steps. Display panels were presented in an open house format where attendees were encouraged to ask questions and provide comments to the project team.

Attendees were asked to sign-in and were invited to fill in comment forms at their convenience within a two week time frame. Sixty-seven (67) members of the public signed in at the PIC. Representatives from the Town of Halton Hills and Cole Engineering were in attendance to answer questions and provide information to the public.

A summary of the comments that were received at and subsequent to the PIC is as follows:

1. Concur with connecting Halton Hills Drive between Maple Avenue and Princess Anne Drive
  - Connection would be beneficial to emergency response vehicles, expected development in area, increased pedestrian safety, improved accessibility, decrease wait times at the at-grade rail crossing on Trafalgar Road, improve congestion and speeding concerns on Princess Anne Drive and Charles Street and support the Town's Official Plan.

- With the implementation of this alternative, consideration should be given to only allow emergency vehicles with access between Maple Avenue and Princess Anne Drive to eliminate the potential for cut-through/bypass traffic from Trafalgar Road, to limit development, to prohibit truck use, to provide traffic control measures at both ends of Halton Hills Drive, to facilitate pedestrian usage of the road through traffic calming measures and/or pedestrian overpasses, to introduce a lower posted speed limit.

2. Concur with the “Do Nothing” alternative

- Drawbacks to connecting Halton Hills Drive between Maple Avenue and Princess Anne Drive include: bypass traffic, increased speeds leading to safety concerns for seniors from the Bennett Health Care Centre, impacts to the natural environment, improvements should be made on Trafalgar Road as opposed to Halton Hills Drive, impacts associated with noise, air-quality, health and well-being of residents, egress concerns, impacts to property values, impacts to existing land uses and the natural environment.

3. Other comments

- Preference that the Town’s surplus property remain undeveloped.

These comments have been documented as part of the consultation process and where applicable, have been addressed in the design of the recommended alternative solution or through noted mitigation measures included as part of this Project File Report. The display panels and a summary of all comments received at PIC #1 are documented in **Appendix C**.

### 3.4. Aboriginal Consultation

Communication was established with representatives of Aboriginal communities who may have had an interest in the study area. Potentially interested communities / organizations were identified by using the Aboriginal and Treaty Information System (ATRIS). Through the ATRIS system, the **Métis Nation of Ontario** was identified as an organization which may have interested in this Class EA. Opportunities for participation in the study were provided through mail and electronic distribution of the notice of study commencement, public information centre and notice of study completion. The record of Aboriginal consultation is summarized in **Table 3-1** below.

**Table 3-1: Record of Aboriginal Consultation**

Organizations / Communities contacted	Name / Title	Date Contacted	Method of Contact	Communications
Metis Nation of Ontario	General Contact	October 17, 2014	Mail/email	No response
Metis Nation of Ontario	General Contact	February 9, 2016	Email	No response
Metis Nation of Ontario (Toronto Office)	Department of Lands, Resources, & Consultations	February 15, 2016	Phone	No response

As noted above, comments have not been received at time of issuance of the Project File Report.

## 4.0 Existing Study Environment

To understand the context associated with the Halton Hills Drive connection, a description of the existing and future conditions for the study area has been prepared in the subsequent sub-sections. In particular, this section of the report focuses on identifying the socio-economic, natural and transportation conditions for the study area based on available background reports and additional studies undertaken to supplement the requirements of review agencies and the Municipal Class EA process. The scope of the additional studies ensured that the Town would be provided with sufficient information to identify, evaluate and compare alternative solutions.

### 4.1. Socio-Economic Environment

#### 4.1.1. Population and Employment

The Town's Transportation Master Plan (TMP) assumed population and employment forecasts from Halton Region's Best Planning Estimates of Population, Occupied Dwelling Units and Employment 2011-2013 Research Paper (March 2011). In 2011, the Town's population was approximately 58,400 of which 66% was estimated to be located in Georgetown. The Town's 2011 employment was approximately 24,000 with 49% of the employment located in Georgetown.

2031 forecasts indicate that the Town's population is anticipated to increase to approximately 90,100 or an approximate 54% over 20 years. The Town's employment is anticipated to increase to approximately 42,100 or an approximate 75% over 20 years. The majority of the population growth is expected to occur in Georgetown while the employment growth will be experienced in the 401/407 employment lands.

#### 4.1.2. Existing and Future Land Uses

The study corridor is located in the community of Georgetown, which has the largest urban area in the Town. Schedule A3 of the Town's OP indicates that Halton Hills Drive is located within land uses designated as Civic Centre Area. Within the vicinity of the study corridor, the following planned land uses can also be found:

- Medium Density Residential Area located within a Residential Policy Area to the west of the study corridor;
- Greenlands A, Greenlands B, Major Parks and Open Space to the east of the study corridor;
- Major Institutional Area to its north; and,
- Private Open Space to its south.

Beyond the immediate areas adjacent to the study corridor, the land use plans are for Low Density Residential areas.

#### 4.1.3. Archaeology and Cultural Heritage

In 2008, the Regional Municipality of Halton prepared a Master Plan of Archaeological Resources. Figure 2: Historic Features indicates that there are no historic structures, historic homesteads or historic settlements within the study area. Figure 3: Cemeteries indicates that there is a cemetery within the study area to the west of the proposed alignments for Halton Hills Drive. Further discussions with the Town have identified the cemetery as the Trafalgar Road Pioneer Cemetery which is located on the

Humberstone properties within the study area but outside of the Halton Hills Drive alignment. It is identified as an inactive heritage cemetery in the Town's Cemeteries report (February 2014).

It is of note that the Town commissioned a Stage 2 Archaeological Assessment (AA) of the cemetery lands in 1999. The Stage 2 AA was undertaken by Archaeological Services Inc. (ASI). Findings from this investigation noted that there is no archaeological concern with regard to pre-contact aboriginal artifacts or settlement patterns. However, it was determined that a cemetery was located at this site and should be registered. A letter was prepared that summarized study findings and is attached in **Appendix D1**.

Subsequent to these studies, the Town commissioned ASI to undertake a combined Stage 1 & 2 archaeological assessment for this study in 2015 to verify previous findings. The Stage 1 study confirmed that there is a historic cemetery within the study area and that those lands should be protected and avoided from any impacts proposed by the project. It was also noted through the Stage 1 study that parts of the study area were identified as having archaeological potential. A Stage 2 study, which was comprised of test pit surveys at 5m intervals, was conducted to confirm the presence of archaeological resources. No archaeological resources were identified during the Stage 2 study and as a result, the Halton Hills Drive Stage 2 study area no longer requires any further archaeological assessment. These findings are attached in **Appendix D2**. If the proposed work extends beyond the current study area, further archaeological assessment needs to be conducted to determine archaeological potential on the new lands.

## 4.2. Natural Environment

The study area was identified as being located within an Urban Area and adjacent to Key Features of a Natural Heritage System (Halton Region Official Plan (2006), Map 1G) that consisted of the watercourse (Black Creek tributary) and a Provincially Significant Wetland (Hungry Hollow Wetland). Thus, to comply with Halton Region requirements when contemplating development or site alteration, including public works, within 120m of a Natural Heritage System, an Environmental Impact Assessment (EIS) was undertaken by Beacon Environmental as part of this study with the detailed report included in **Appendix E**. A scoped Environmental Review for the Woodlands within the Civic Centre Area was also undertaken concurrently and the detailed report is included in **Appendix F**. Details pertaining to the existing natural environment as noted in both reports are provided below.

### 4.2.1. Terrestrial Resources

#### ***Vegetation Communities***

A total of eight (8) vegetation communities were found within and/or adjacent to the study corridor. These communities were mapped and described according to the Ecological Land Classification (ELC) system for southern Ontario, which involved delineating vegetation communities on an aerial photograph of the property, recording all plant species in each community and ranking the dominant plant species in each vegetation strata (canopy, sub-canopy, understory and ground layers). The delineation of the vegetation communities is shown in **Appendix E (Figure 3)**. A review of these vegetation communities indicated that the study corridor can be found mainly in ELC Unit 1 and ELC Unit 3. These vegetation communities are described in further detail as follows.

#### ***ELC Unit 1: Black Walnut Cultural Woodland (CUW1-A)***

The canopy and sub-canopy of this vegetation community is comprised primarily of mid-age to mature Black Walnut, White Ash and White Elm. The shrub layer varies from being very dense to vary sparse

within this vegetation community and is comprised primarily of Common Buckthorn and Staghorn Sumac. Ground cover density is relatively high and is comprised primarily of Wild Black Current, Inserted Virginia-creeper, Red Raspberry and Riverbank Grape.

*ELC Unit 3: Dry-Moist Old Field Meadow (CUM1-1)*

This community is dominated by Awnless Brome, Kentucky Bluegrass in association with Canada Thistle and Tall Goldenrod. A sparse shrub layer was also present along the edge of this community that was comprised of Staghorn Sumac, Common Buckthorn and Manitoba Maple.

**Significant Woodland**

The study area traverses, or is in close proximity to woodland areas as identified in the Halton Region Official Plan as part of the Natural Heritage System, and in the Halton Hills Official Plan and Greenlands A and Greenlands B designations. These woodland areas can be divided into two parts, namely a northern woodland and a southern woodland, with the remainder of the area consisting of a regenerating field that does not meet the ROP definition of a woodland. Field review suggests a distinction in tree age, and health quality between the northern and southern woodlands, especially to the west of the proposed Halton Hills Drive connection.

The northern woodland (1.19 ha) is located north of the pioneer cemetery to approximately 70m west of the Chris Walker Trail. It contains limited good quality, mature, black walnut, red ash, black cherry and white elm trees. Many trees within the northern woodland were heavily impacted by the 2013 ice storm, as well as by the presence of invasive shrubs, vines and flowers. The northern woodland is not contiguous with the Greenlands A and B/ Natural Heritage System designated lands as it is separated by more than 70m. Due to its size of less than 2ha the northern woodland does not meet the Region's size criterion. Based on this analysis, the northern woodland does not meet any of the criteria to be defined as a Significant Woodland under the Regional Official Plan.

The southern woodland (8.64 ha) is located south of the pioneer cemetery, extends northeast across the Chris Walker Trail to Princess Anne Drive. The trees here are generally more mature with numerous black walnut trees. This woodland is considered to be contiguous with the greater Greenlands A and B/ Natural Heritage System across the Chris Walker Trail since the gap is less than 20 metres. As such, the southern woodland meets the Regional definition of Significant Woodland.

**Flora**

A total of 88 plant species were recorded on the subject property. The majority are common species that are native to Ontario (Ranked S5 by the Natural Heritage Information Centre). A total of 27 Exotic species were identified.

**Provincially Significant Wetland**

Hungry Hollow Wetland is a Provincially Significant Wetland (PSW) located in the study area along the northeast edge of the proposed alignment. This PSW is associated with the Hungry Hollow Ravine which is an Environmentally Significant Area (ESA) located south of the study area.

**4.2.2. Breeding Birds**

Twenty eighty species of birds were recorded on the subject property, the majority of which were breeding or suspected to be breeding. All of the species recorded are commonly associated with habitat

types present on the subject property. The most numerous breeding species were American Goldfinch, Song Sparrow, American Robin, Black-capped Chickadee and Red-winged Blackbird.

No species recorded are considered as Species at Risk by the governing bodies at the national (COSEWIC) or provincial (COSSARO) levels.

Two species listed as area-sensitive species by MNR were recorded on the subject property: Pine Warbler and American Redstart. In Ontario, the Pine Warbler typically breeds in coniferous or mixed forests that are dominated by Jack Pine, Red Pine or White Pine. However, based on the MNR's description of a habitat for area sensitive species, the study area has no habitat for area-sensitive species.

#### **4.2.3. Aquatic Resources**

Two tributaries of Black Creek were identified in the study area. One of the tributaries, referred to as Tributary 1, flows through the Hungry Hollow PSW adjacent to the study area while the other tributary, referred to as Tributary 2, flows along the western boundary of the study area. Two headwater drainage features were also identified in the study area and are shown in **Appendix E (Figure 3)**.

#### ***Habitat Assessment***

Both the tributaries were assessed for potential habitats. Tributary 1 provides a mix of run/riffle and pool habitat throughout its course adjacent to the study area. The watercourse traverses through a wooded feature before entering a cattail marsh. It then flows underneath Maple Avenue prior to entering a golf course pond. North of Maple Avenue, complex in-stream habitat is present; however, as the watercourse is forced to flow beneath Maple Avenue, the existing structures act as barriers to fish passage for almost 120m. Tributary 2 flows through a deciduous forest along the western boundary of the study area. It then enters a large CSP culvert under Maple Avenue that leads to the golf club on the south side of Maple Avenue.

#### ***Fish Community***

Fish community information was gathered from the Black Creek Subwatershed Study completed in 2009 by Credit Valley Conservation. The only species captured in the Black Creek tributary was Brook Trout and was confirmed through correspondence with the CVC. Spawning has been identified but the data cannot be obtained digitally. Brook Trout are provincially ranked as S5, an indication that they are secure, common and abundant in Ontario. They hold no ESA or COSEWIC status in Ontario and are noted to be generally abundant and tolerant to environmental or anthropogenic stresses.

The habitat investigations of the Black Creek tributary have shown that there is no suitable habitat for Redside Dace. The main factors preventing Redside Dace habitation include the number of barriers that prevent fish from travelling upstream and minimal overhanging vegetation available in the forested canopy. The makeup of the stream (run and riffles) is not preferred by the Redside Dace. Correspondence with the MNR has confirmed the absence of any Species at Risk.

#### ***Headwater Drainage Features***

The two headwater drainage features were assessed to determine applicable treatment for these features. Drainage Feature A is located to the south of the study area near Maple Avenue. The assessment recommended that the upstream reaches (Drainage Feature A-1) be maintained/replicated



as a terrestrial linkage while the downstream reaches (Drainage Feature A-2) be conserved. Drainage Feature B is located to the north of the study area along the existing trail. The assessment recommended that no management is required for the upstream reaches (Drainage Feature B-1) and that the downstream reaches (Drainage Feature B-2) be conserved.

#### 4.2.4. Species at Risk

A screening letter from the MNR (August, 2014) indicated that there were no Species at Risk (SAR) in the vicinity of the study area. However, a previous letter (January 2012) had identified Redside dace, Milksnake and Snapping Turtle in the vicinity of the study area. Detailed field studies had also identified the presence of Butternut trees within the study area. A review of information from the Atlas of the Breeding Birds of Ontario (ABBO) and previous documentation also identified some avian SAR within the vicinity of the study area.

To eliminate any concerns associated with the potential for SAR in the vicinity of the study area, the likelihood of each of these species occurring within the study area was assessed by comparing their preferred habitat with the habitats identified by the field investigations. A total of twelve (12) potential SAR were reviewed of which one (1) was noted to have a confirmed habitat in the study area and four (4) others were noted to have potentially suitable habitats within the study area.

Seven (7) Butternut trees were found within the vicinity of the study corridor. An independent Butternut Health Assessment was undertaken for these trees with results being submitted to the MNR for their review. Preliminary findings noted that four of these trees are retainable and three are non-retainable (no compensation required). Review by the MNR of the Butternut Health Assessment has confirmed that, as part of the extension of Halton Hills Drive, the four (4) Category 2 (retainable) butternut trees, as identified in Figure 3, Appendix E, may be killed (i.e., tree number 3, 4, 5 and 6). It was also noted that the appropriate compensation is to be provided for the removal of each of the trees as documented in MNR's letter attached in **Appendix G**.

Four other SAR (i.e., Milksnake, Snapping Turtle, Eastern Wood-Pewee and Wood Thrush) were noted to have the potential for a suitable habitat in the study area; however, as there are no anticipated impacts to their habitat locations based on an understanding of the approximate placement of the study corridor, the species were not identified during field reviews and/or opportunities for habitation were not evident, impacts to these four SAR's have not been noted.

#### 4.2.5. Geomorphological Conditions

A geomorphological assessment was undertaken as part of this study to evaluate potential hazard of the proposed road connection and associated infrastructure as it will run parallel to a tributary of Black Creek and its valley system and to determine the meander belt width. The detailed report is included in **Appendix H** with pertinent details highlighted in this report.

The underlying geology in this region is Flamborough till plain composed of boulder glacial till or sand and gravel over Queenstone shale bedrock. The glacial till in this area has low permeability with an unconfined groundwater table that lies within several metres of the ground surface. This creates inputs of water into the creek flowing toward the south from the Northeast end of the block.

It was noted that the proposed road alignments are not at risk of channel migration or erosion.

#### **4.2.6. Stormwater Management**

The study area contains 3.30 ha of partially developed land, the Bennett Health Care Centre (BHCC), and 8.60 ha of mostly undeveloped land, which contains a portion of the Halton Hills Civic Centre. Site drainage is predominantly southwest to northeast and is divided into five (5) pre-development drainage areas as illustrated in the Stormwater Management Brief, included in **Appendix I**. All drainage is directed (mostly overland) towards a tributary of Black Creek located to the northeast of the study area.

Most of the study area consists primarily of dense vegetation and small trees with some open long grassed areas. Two (2) natural headwater drainage features are found within the study area; however, they were identified as drainage ditches with intermittent flows rather than watercourses. There is no external drainage entering the study area.

##### **Quantity Control**

Quantity control is currently provided for the study area by the Georgetown West Stormwater Management Embankment. The original drawing for the embankment is included within the Stormwater Management Brief in **Appendix I**. All existing drainage patterns will be maintained.

##### **Quality Control**

Currently, the 5-year flows from the BHCC are conveyed via storm sewers and swale to an existing stormwater management (SWM) pond. As per the Stormwater Management Report for the Bennett Health Care Centre prepared by Trafalgar Engineering Ltd. in 2006, this pond was designed to provide Enhanced Level quality control for the BHCC, assuming fully developed conditions. The remaining study area, which is presently mostly undeveloped, does not contain quality controls.

##### **Erosion Control**

The BHCC SWM pond was designed to provide erosion control by exhibiting an approximately 24-hour drawdown time using an orifice plate. The remainder of the study area does not currently contain any erosion controls.

##### **Water Balance and Soils**

A Hydrogeologic Study for the BHCC was prepared by Terraprobe in 2006. The hydrogeologic analysis concluded that the BHCC is mostly underlain by clayey and sandy silt over a glacial till. Boreholes closer to the road extension area (e.g. BH14, BH19, BH20, BH-Road3) generally exhibited silty sand to clayey silt till soils.

The Hydrogeologic Study also conducted a water balance assessment of the BHCC site. It was determined that the natural soils do not allow for high recharge rates and therefore the goal for proposed conditions will be to best maintain groundwater recharge rates based on the properties of the natural soils.

A Geotechnical Investigation was completed by Frontop Engineering Limited on October 29, 2014. Five (5) boreholes were drilled along the proposed road alignment to determine the natural soils in the area. Silty-sand was experienced in all boreholes below the fill and topsoil layers, with trace amounts of gravel. Water was experienced in BH2, BH3, BH4 and BH5 ranging from 3.9m to 4.6m below existing grade. BH3, located at the middle of the proposed road, included a piezometer to measure the static groundwater elevation, which was found to be 3.9m below existing grade resulting in an elevation of 255.81m. Groundwater monitoring is advised to obtain more accurate data for groundwater elevation.

Estimated coefficients of permeability at BH2 and BH5 were predicted within the Geotechnical Investigation and ranged from  $10^{-3}$  –  $10^{-5}$  cm/sec. These coefficients correspond to an infiltration rate of 30 – 75 mm/hour. As per MOE recommendation, a minimum soil infiltration rate of 15mm/hour is to be present for the use of infiltration practices. Therefore, the natural soils appear suitable for proposed infiltration techniques from a permeability perspective.

More details pertaining to stormwater management of the study area are included in the Stormwater Management Brief included in **Appendix I**.

### 4.3. Transportation System

As part of the needs and justification component of the Municipal Class EA process, a separate traffic study was undertaken to assess existing and future transportation conditions along the study corridor and within the surrounding study area. The report is included in **Appendix J** with highlights included in the following sections.

#### 4.3.1. Existing Conditions

##### Roads

The existing road network for the study area is illustrated in **Figure 4-1** and described as follows.

**Halton Hills Drive** is discontinuous road situated between Maple Avenue and Princess Anne Drive. The two existing sections of Halton Hills Drive have two-lane cross sections with left and right turn lanes. The intersections with Princess Anne Drive and Maple Avenue are unsignalized. There are no posted speeds along the existing sections; therefore, a regulatory speed limit of 50 km/h would apply.

**Maple Avenue** is an arterial road under the jurisdiction of Halton Region. Within the study area, Maple Avenue has a two-lane cross section with left turn lanes at major intersections. The posted speed is 50 km/h.

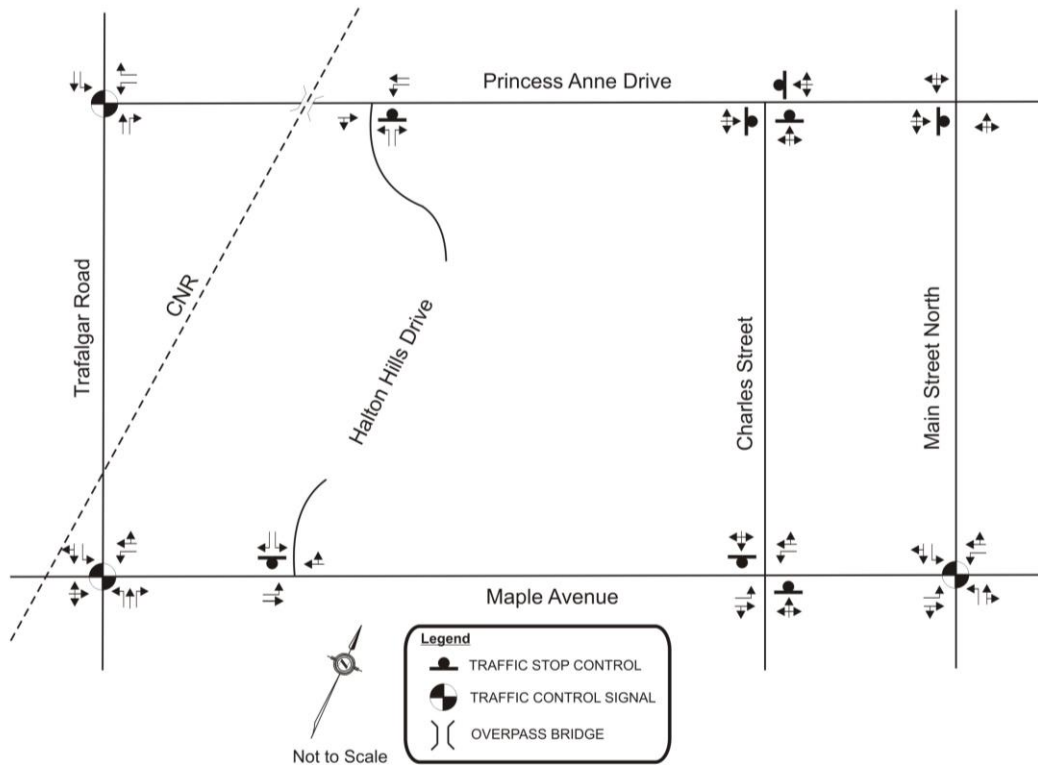
**Princess Anne Drive** is a Town of Halton Hills collector road. Within the study area, Princess Anne Drive has a two-lane cross section with left turn lanes at major intersections. There are no posted speeds along Princess Anne Drive; therefore, a regulatory speed limit of 50 km/h is assumed.

**Trafalgar Road** is an arterial road under the jurisdiction of Halton Region. The posted speed is 60 km/h. Within the study area, Trafalgar Road has a rural two-lane cross-section with signalized intersections at Maple Avenue and Princess Anne Drive. At Maple Avenue, separate left and right turn lanes are provided in the northbound direction and a left turn lane is provided in the southbound direction. At Princess Anne Drive, a right turn lane is provided in the northbound direction and a left turn lane is provided in the southbound direction.

In this western section of the Georgetown urban area, infrastructure development is constrained by the north-south CNR line, a Black Creek tributary and the Georgetown Fairgrounds. As a result, there are a minimal number of north-south roads in the existing transportation road network. The north-south road network within the study area consists of two Regional arterials, Trafalgar Road to the west and Main Street North to the east, both of which are located at the boundaries of the study area. There is one additional north-south road, Charles Street, which connects Maple Avenue to Princess Anne Drive. However, Charles Street is located approximately 1.1 kilometres east of Trafalgar Road or 300 metres west of Main Street North and is classified as a local road. The review of the existing transportation

system shows that the existing road network lacks north-south connectivity and provides potential limitations to pedestrian movements, emergency service accessibility, traffic operations during incidents or temporary closures and overall traffic capacity.

**Figure 4-1: Existing Road Network**



**Railway Crossings**

The CNR line (Halton Subdivision), which has two tracks, intersects Trafalgar Road at-grade approximately 100m north of Maple Avenue. The at-grade crossing is controlled with flashers and control arms. The at-grade crossing was noted to be a cause for concern as delays/queues would be experienced on Maple Avenue due to limited flexibility in the road network and unavailability of an alternate route when the at-grade crossing is in operation.

**Transit**

The Town of Halton Hills does not currently operate local transit service. However, GO Transit provides commuter rail service from its Georgetown GO station, which is located approximately 2 kilometres east of the study area.

**Active Transportation**

Active transportation by definition is any form of self-propelled, non-motorized mode of transportation that uses human energy such as walking, cycling, in-line skating, jogging, skiing, etc.

Sidewalks can be found on the west side of the south leg and on both sides of the north leg of Halton Hills Drive. Sidewalks are separated from the travelled roadway by a buffer of approximately 2.5 metres. There are sidewalks on both sides of Princess Anne Drive and on the north side of Maple Avenue. Sidewalks are not provided on Trafalgar Road.

There are no existing designated cycling facilities along the roads within the study area. However, the Chris Walker Trail is situated to the east of the proposed Halton Hills Drive study area corridor. Furthermore, the Town’s Cycling Master Plan (Figure EX-2) identifies Halton Hills Drive as a Proposed On-Road Route.

#### 4.3.2. Existing Traffic Operations

##### Travel Demand

Traffic volumes for the study area were provided by Halton Region and estimates of traffic volumes from Halton Hills Drive at both Maple Avenue and Princess Anne Drive were taken from available traffic studies as referenced in **Table 4-1**.

**Table 4-1: Summary of Traffic Data**

Data Type	Location	Count Dates	Source
TMC	Maple Avenue / Halton Hills Drive	October 2002	Bennett Health Care Centre TIS
TMC	Princess Anne Drive / Halton Hills Drive	October 2002	Bennett Health Care Centre TIS
TMC	Maple Avenue / Trafalgar Road	April 28,2010	Accu-Traffic Inc.
TMC	Princess Anne Drive / Trafalgar Road	April 28,2010	Accu-Traffic Inc.

Traffic volumes on Halton Hills Drive are currently low, as they are limited to traffic accessing the Town’s Civic Centre to the south and the Bennett Health Care Centre to the north. Volumes between 250 and 350 are noted during both the AM and PM peak periods.

Approximately 600 peak hour, peak direction trips are noted on Trafalgar Road, the existing parallel north-south road west of Halton Hills Drive. Daily two-way traffic volumes along Trafalgar Road within the study area reach about 6,000 vehicles per day.

##### Levels of Service

The capacity of an arterial road is typically determined through an assessment of the capacity of the road link between intersections relative to the volumes on the road links and the operation of the intersections (or other constraints). Conditions are evaluated during morning and evening peak hours.

Peak hour link capacity is a function of the “saturation flow” determined by the spacing of vehicles (typically 2 seconds per vehicle) and the ability of the road link to feed and process traffic. Typically, link capacity assumptions are in the order of 900 vehicles per hour for arterial roadways and 500-700 vehicles per hour for collector roads. Consequently, the current PM peak hour volumes for north-south traffic on Trafalgar Road indicates that there is existing reserve capacity in the corridor.

**Table 4-2** summarizes the intersection levels of service and volume to capacity ratios for the signalized Trafalgar Road intersections.

**Table 4-2: Existing Signalized Intersection Operations**

Intersection	Existing Traffic Conditions			
	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Trafalgar Road / Princess Anne Drive	0.68	B	0.39	B
Trafalgar Road / Maple Avenue	0.50	B	0.46	B

Notes: LOS – Level of Service v/c – Volume to Capacity

A level of service of D or better is generally considered acceptable for operations. The analysis in **Table 4-2** suggests that existing signalized intersections are operating with sufficient capacity and adequate levels of service.

**Rail Crossing Levels of Service**

Traffic operations on Trafalgar Road and at the Trafalgar Road/Maple Avenue intersection are hindered by train activity. Trains crossing Trafalgar Road at the at-grade crossing just north of Maple Avenue result in vehicles queuing on Trafalgar Road and Maple Avenue and impeding movements at the Trafalgar Road/Maple Avenue intersection. Based on an assessment of the exposure index (the product of daily road and rail traffic), which measures the level of interaction and conflict, the existing traffic control measures at the at-grade crossing are acceptable for the existing annual average daily traffic (AADT) on Trafalgar Road.

**Access Management**

The Halton Hills Drive corridor currently provides access to the Town’s Civic Centre (two access points) and Bennett Health Care Centre (3 access points). Currently, there are no specific signs or lane markings defining turn lanes on Halton Hills Drive, as these are the primary destinations for the street.

**4.3.3. Existing Policy Directives**

The connection of Halton Hills Drive between Maple Avenue and Princess Anne Drive is identified in both the Town’s Official Plan (2008) and its Transportation Master Plan (2011). This connection is considered as essential infrastructure and is merited under existing conditions as it is required to connect neighbourhoods, distribute traffic to and from arterials and also provide access to adjacent land uses. The existing and future conditions review for the Town through its Master Planning process further confirmed the need for this connection. In addition to providing connectivity, this connection also improves emergency routing opportunities and allows for emergency vehicles to bypass potential traffic queues on Trafalgar Road and/or Maple Avenue resulting from the at-grade rail crossing on Trafalgar Road. While this road connection is mandated under existing conditions, a future conditions analysis was also undertaken to confirm and support this recommendation.

**4.3.4. Future Conditions**

To determine the future need for the connection of Halton Hills Drive, travel demand forecasts were prepared for this study for the 2021 and 2031 planning horizons.

**Population and Employment Growth**

Population and employment forecasts are required to aid in the determination of future travel demand/future traffic volumes on the road network within the study area. The Halton Hills Transportation Master Plan (TMP) provided estimates of Town and Regional population and employment growth. The projected growth is consistent with the provincially mandated targets as directed through the Growth Plan. These land use changes will result in higher levels of activity in the Town and contribute to increased traffic levels. Travel demand forecasts prepared for the TMP indicated that trip making would double by the year 2031, relative to the base year 2006, with the majority of the trips remaining within the Town (more than 50%) and the majority of trips being made by automobile (more than 80%). Based on these assumptions, base traffic volumes were increased to reflect these growth assumptions.

**Future Levels of Service – No Improvements to Halton Hills Drive**

The model forecasting exercise in the TMP was premised on a number of planned and committed Regional and Provincial works. Growth within the study area is anticipated to be in the order of 2% per year, consistent with the overall growth within the Town and the degree of internal trips.

Signalized intersection analysis on Trafalgar Road, which runs parallel to Halton Hills Drive, for both 2021 and 2031 are summarized in **Table 4-3** and **Table 4-4** respectively.

**Table 4-3: 2021 Signalized Intersection Operations – Existing Road Network**

Intersection	2021 Traffic Conditions			
	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Trafalgar Road / Princess Anne Drive	0.56	B	0.47	B
Trafalgar Road / Maple Avenue	0.63	C	0.56	B

Notes: LOS – Level of Service, v/c – Volume to Capacity

**Table 4-4: 2031 Signalized Intersection Operations – Existing Road Network**

Intersection	2031 Traffic Conditions			
	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Trafalgar Road / Princess Anne Drive	0.68	B	0.65	D
Trafalgar Road / Maple Avenue	0.79	C	0.75	C

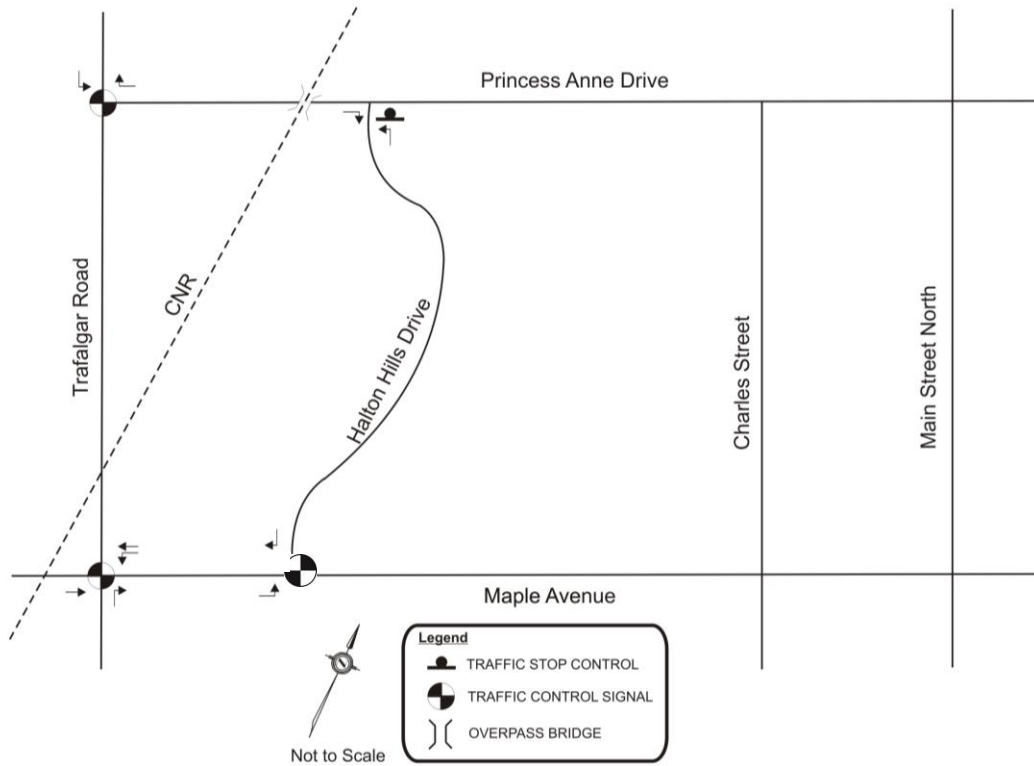
Notes: LOS – Level of Service, v/c – Volume to Capacity

By 2031, the forecast traffic volumes on Trafalgar Road in the northbound direction in the PM peak hour will be operating in a congested state (LOS E/F) between Maple Avenue and Princess Anne Drive. This delay and congestion will be compounded as a result of the at-grade rail crossing. In order to alleviate potential queuing concerns on Trafalgar Road at Maple Avenue, it is recommended that a road connection be provided east of the CNR line to provide alternate north-south road network opportunities and relieve the congestion on Trafalgar Road.

**Future Levels of Service – Provide Halton Hills Drive Connection**

With the connection of the two existing segments of Halton Hills Drive, traffic will have the opportunity to find alternative routes to avoid the Trafalgar Road / Maple Avenue intersection. This alternative routing may reduce delays and queues that will be experienced at the at-grade rail crossing. **Figure 4-2** illustrates the future road network, with the new connection.

**Figure 4-2: Future Traffic Routing**



Based on reports undertaken within the neighbourhood (i.e., Bennett Health Care Centre TIS), up to 25% of traffic travelling from the east on Maple Avenue and utilizing Charles Street as an alternate north south corridor to Trafalgar Road may be potentially diverted to the proposed Halton Hills Drive Connection<sup>1</sup>. It has been assumed that the traffic traveling in the reverse direction would produce a similar pattern.

As forecast traffic volumes on Trafalgar Road are expected to reach capacity by 2031, the provision of a road connection could potentially improve the operations of the study area intersections as traffic redistributes itself due to the provision of network flexibility. Intersection analyses for the study corridor in 2021 and 2031 are summarized in **Table 4-5** and **Table 4-6**.

<sup>1</sup> Traffic Impact Study – Bennett Health Care Centre (October 2002)



**Table 4-5: 2021 Signalized Intersection Operations – New Road Connection**

Intersection	2021 Traffic Conditions			
	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Trafalgar Road / Princess Anne Drive	0.54	B	0.46	B
Trafalgar Road / Maple Avenue	0.64	B	0.54	B

Note: LOS – Level of Service, v/c – Volume to Capacity Ratio

**Table 4-6: 2031 Signalized Intersection Operations – New Road Connection**

Intersection	2031 Traffic Conditions			
	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Trafalgar Road / Princess Anne Drive	0.66	B	0.64	D
Trafalgar Road / Maple Avenue	0.39	B	0.72	C

Note: LOS – Level of Service, v/c – Volume to Capacity Ratio

With the implementation of the Halton Hills Drive connection, the levels of service experienced at the signalized intersections are slightly improved and northbound vehicles on Trafalgar Road experience improved operating conditions in the morning peak hour. Afternoon peak hour operations on Trafalgar Road are still operating in congested conditions. However, the new road connection provides additional north-south network flexibility for vehicles, pedestrians and cyclists and also improves traffic capacities, emergency service accessibility and provides alternatives during incidents or temporary closures.

**Recommended Improvements**

By 2031, the forecast traffic volumes on northbound Trafalgar Road will be operating in congested conditions in the PM peak hour between Maple Avenue and Princess Anne Drive. The delay and congestion experienced on Trafalgar Road will be expounded as a result of the operation of the at-grade rail crossing. To alleviate the congestion, provide additional capacity and improve intersection operations, connecting Halton Hills Drive is recommended from a transportation flexibility and needs perspective. As part of the future traffic analysis, a traffic signal was assumed at the intersection of Halton Hills Drive and Maple Avenue; however, further analysis needs to be undertaken subsequent to the construction and operation of Halton Hills Drive to determine whether traffic signals will be warranted at either intersection with Halton Hills Drive (i.e., Halton Hills Drive/Princess Anne Drive and Halton Hills Drive/Maple Avenue).

**4.4. Utilities and Other Services**

There are no existing utilities along the proposed Halton Hills Drive connection. Halton Region has a sanitary trunk sewer to the east of the proposed corridor location, alongside the multi-use path. However, any changes to Halton Hills Drive will have no impact to it.

## 5.0 Problem Statement and Opportunities

The Town of Halton Hills' planning documents have clearly stated the need for the road connection of Halton Hills Drive between Maple Avenue and Princess Anne Drive. In Schedules B1 and B2 of its Official Plan (2008), Halton Hills Drive is identified as a continuous collector road between Maple Avenue and Princess Anne Drive with the expectation that it will connect neighbourhoods, distribute traffic to and from arterials and provide access to adjacent land uses (Function of a collector road, OP Section F6.4.3). The Town also completed a Transportation Master Plan (TMP) study in 2011 that reviewed the future network and roadway classifications presented in its Official Plan. The TMP recommendations were in support of this road connection.

A transportation system review and a travel demand review were also undertaken as part of this study. From a systems perspective, it was observed that under the existing road configuration, vehicles on Maple Avenue would experience delays and queues extending from Trafalgar Road as a result of the at-grade CN rail crossing just north of Maple Avenue on Trafalgar Road. Vehicles have limited opportunities to avoid the at-grade crossing as the nearest north-south road that could provide an alternate to Trafalgar Road is Charles Street, which is more than 1km to the east of Trafalgar Road; however, Charles Street is a local road whose functionality is not to carry through traffic. Comments received from residents on Charles Street have also indicated that there are vehicles that utilize Charles Street as a bypass street to avoid the at-grade crossing. Thus, the existing configuration of the road network does not provide flexibility to its road users and results in unnecessary delays and bypass traffic on a local road. Furthermore, the lack of flexibility hinders emergency response vehicles as there are no alternate route choices. The travel demand review also indicated that the provision of the Halton Hills Drive connection would improve the operating levels of service at the existing signalized intersections and potentially reduce the cut-through traffic on Charles Street.

Based on an understanding of the Town's directives for transportation infrastructure described in its Official Plan and Transportation Master Plan, a review of the existing transportation system and the assessment of travel demands, the following problem statement was identified and presented to the public and review agencies at the Public Information Centre. It is noted that no comments were received regarding the problem statement.

### **Problem Statement:**

"The road network within the study area has limited north-south network flexibility and the lack of network connectivity limits opportunities for pedestrian movement, traffic capacity, emergency service accessibility, and traffic accommodation during incidents or temporary closures."

In order to address the problem statement, alternative solutions will be identified to address the following opportunities.

### **Opportunities:**

- To support long-term development goals based on Official Plan;
- To facilitate access to public and private facilities; and,
- To address future demand on area roads and improve accessibility.

## 6.0 Alternative Solutions - Stormwater Management

The Class Environmental Assessment process requires the examination of all reasonable alternatives, in addressing the problem and opportunity statement. The stormwater management alternatives are assessed prior to the road alignment alternatives, since the stormwater management solution would have a greater impact on the road alignment, than the road alignment would have on the stormwater management solution.

An evaluation methodology is used to ensure that the process is traceable and reproducible and takes into consideration technical, economic, social and environmental impacts. The following sections provide details on the development and evaluation of the alternative solutions for stormwater management for the extension of Halton Hills Drive.

### 6.1. Identification of SWM Alternative Solutions

At the re-initiation of the Class EA study in June 2014, a meeting held with stakeholders (Halton Region and Credit Valley Conservation) indicated that consideration should be given to Low Impact Development (LID) measures as an alternative to traditional stormwater management such as ponds which were presented at the first Public Information Centre. The centralized pond was rendered not suitable for this project as the Humberstone Lands are to be controlled separately. Additionally, at the re-initiation meeting, CVC concluded that only the area of the proposed ROW and the Bennett Health Care Centre were to be incorporated into the SWM analysis. The area to be controlled by the previously proposed pond has now been reduced to below 5 ha, and therefore is no longer feasible.

Upon confirming some potentially sensitive environmental features in the study area, it was determined that incorporation of LIDs would be beneficial in limiting the environmental disturbance area of the stormwater management solution. In addition, the confirmation of quantity control provided by the West Stormwater Management Embankment meant that LIDs could potentially meet all of the stormwater criteria required for the road extension.

Thus, further review of the use of LID alternatives was undertaken to be able to derive a more comprehensive set of SWM solutions. The LIDs which were short listed and assessed because of their suitability for the site included:

- Enhanced Swale – similar to roadside ditches, but engineered with a stone storage layer, soil and vegetation to store and infiltrate the runoff generated from the 25 mm storm from the proposed ROW.
- Enhanced Topsoil – A layer of enhanced topsoil placed on pervious surfaces to increase infiltration capacities of stormwater runoff.
- Infiltration Gallery - stone galleries located underground along the boulevards to store and infiltrate the runoff generated from the 25 mm storm from the proposed ROW.
- Exfiltration Pipe – perforated pipe placed in a bed of filter media to provide storage for rapid runoff and provide gradual infiltration.
- Porous Pavement –Mixture of aggregate and asphalt to allow for infiltration of stormwater runoff while receiving water quality treatment.
- Permeable Pavers – Interlocking brick to allow for infiltration while effectively filtering the stormwater runoff.

- Soakaway Pit – stone filled trench designed to provide water quality treatment of stormwater runoff through infiltration. Water is stored within the voids and gradually percolates.
- Stormwater Trees – Planters placed in urban areas with an impervious bottom. Planters can retain water for 3 – 4 hours.
- Low Impact Mechanical Treatment – Mechanical units used to treat the runoff water to enhanced or advanced levels. Two proposed alternatives are:
  - Oil / grit separator (OGS) Units
  - Jellyfish Filter Units

For the purposes of evaluation of the alternatives, the concept of the use of LIDs will remain more general as a variety of similar LID techniques could be used to achieve the same stormwater targets.

In terms of providing a comprehensive stormwater management solution associated with the extension of Halton Hills Drive, the following two (2) alternatives for stormwater management of the study area were developed and evaluated:

- Alternative #1: “Maintain the BHCC Pond, Provide Independent SWM Controls for Halton Hills Drive Extension” – This alternative considers both the BHCC and the Halton Hills Drive extension as individual entities in terms of stormwater management planning.
- Alternative #2: “Decommission BHCC Pond and Build Expanded SWM facility to Service Both BHCC and Halton Hills Drive Extension” – This alternative would provide a centralized stormwater management facility and would minimize the independent stormwater controls that may be required to be provided by the Halton Hills Drive extension itself.

For each of the alternatives, it is proposed that the drainage area west of the proposed road extension, including the Humberstone lands, be passed freely through proposed culverts along the two natural ditch drainage features. The Town’s Civic Centre lands’ storm outlet will continue to discharge in approximately the same location to the southern natural drainage ditch feature. Therefore, any post-development drainage area which will not include the road extension itself will continue to drain as in existing conditions.

To determine the more suitable of the two (2) alternatives, a number of evaluation criteria were identified and a method to evaluate these criteria was developed. The evaluation criteria were based on the ability of the alternative to meet Provincial, Regional and Municipal stormwater management requirements, as well as impacts to the environment, society and the economy. Using the evaluation criteria, the advantages and disadvantages of each alternative solution were discussed. The evaluation criteria and the associated assessment of each of the alternative solutions are described subsequently.

## **6.2. Evaluation of SWM Alternative Solutions**

### **6.2.1. SWM Evaluation Criteria**

The Class Environmental Assessment process requires the examination of alternative methods of implementing the preferred solution by considering design alternatives. Evaluation criteria were developed in order to assess the design alternatives, given the range of existing conditions within the study area and the planned road extension. This section of the report provides a discussion and evaluation of the design alternatives considered for the Halton Hills Drive Connection specifically in terms of stormwater management.

The evaluation of the design alternatives required the development of evaluation criteria and the formulation of a methodology to evaluate these criteria. The evaluation criteria were developed based on impacts to stormwater management, as well as impacts to the environment, society, economy and the financial impacts of the alternative. The development of indicators was based on the initial findings of the study area corridor. The evaluation criteria and indicators used in the assessment of the design decisions are shown in **Table 6-1**.

**Table 6-1: Evaluation Criteria for SWM Options**



<p><b>Stormwater Management/Engineering</b></p> <ul style="list-style-type: none"> <li>▪ Ability to meet design guidelines</li> <li>▪ Constructability &amp; accessibility</li> <li>▪ Engineering best practices / Innovation</li> </ul>	<p><b>Socio-economic and Cultural Impacts</b></p> <ul style="list-style-type: none"> <li>▪ Residential impacts (Air quality, noise etc.)</li> <li>▪ Requirement of Easements</li> <li>▪ Visual/aesthetics, streetscape</li> </ul>
<p><b>Natural Environment</b></p> <ul style="list-style-type: none"> <li>▪ Vegetation</li> <li>▪ Encroachment into environmental buffers</li> <li>▪ Groundwater</li> <li>▪ Aquatic habitat</li> </ul>	<p><b>Financial Aspects</b></p> <ul style="list-style-type: none"> <li>▪ Operating costs</li> <li>▪ Capital costs</li> <li>▪ Property Acquisition</li> <li>▪ Utility relocation</li> <li>▪ Impact on future development</li> </ul>



**6.2.2. Evaluation of Alternative SWM Solutions**



Alternative solutions were evaluated based on addressing the problem and opportunity statement in comparison to the criteria listed in the previous section, including stormwater management and engineering, the natural environment, socio-economic and cultural impacts and financial aspects. The overall evaluation was conducted with input from the project team, project stakeholders and the public (consideration of the results of the first Public Information Centre).

Following the evaluation process, a recommendation of the SWM alternatives was made which would be carried forward to the next phase as part of the preferred solution. The evaluation, criteria and results of the alternative solutions are presented in **Table 6-2**.

**Table 6-2: Evaluation of Stormwater Management Alternatives**

Criteria	Measures	Alternative 1	Alternative 2
<i>A principle or standard by which something may be judged or decided.</i>	<i>Dimensions, quantity, or capacity as ascertained by comparison with a standard.</i>	<ul style="list-style-type: none"> <li>Keep BHCC pond</li> <li>Provide independent SWM controls (LID) for Halton Hills Drive connection</li> </ul>	<ul style="list-style-type: none"> <li>Decommission BHCC pond</li> <li>Build new expanded facility to service both BHCC and Halton Hills Drive connection</li> </ul>
<b>Stormwater Management / Engineering</b>			
Design Guidelines	Ability to meet design guidelines	<ul style="list-style-type: none"> <li>Quantity and quality control requirements will be met for the BHCC and for the Halton Hills Dr. extension</li> <li>Retention of the first 5 mm of rainfall will remain on site, therefore meeting erosion control criteria. Erosion protection to be placed at outlets as necessary, pending LID selection.</li> <li>Soil type allows for infiltration and groundwater recharge</li> </ul>	<ul style="list-style-type: none"> <li>Quantity and quality control requirements will be met by one centralized SWM facility.</li> <li>Centralized SWM facility to be designed to achieve water balance and erosion control requirements.</li> </ul>
Constructability & Accessibility	Minimizes construction requirements and facilitates access to the SWM measure	<ul style="list-style-type: none"> <li>Construction impacts can be minimized as the LID technique could be implemented at the same time as road construction</li> <li>Must ensure LID measure chosen has adequate separation from the groundwater table; various configurations should be considered</li> </ul>	<ul style="list-style-type: none"> <li>Construction is feasible but may be constrained by several environmental factors due to creation of a footprint larger than the existing pond.</li> <li>Accessibility may depend on the selected road alignment.</li> <li>Additional access would be required for the new SWM facility.</li> </ul>
Engineering Best Practices / Innovation	Maximizes opportunities to incorporate engineering best practices/innovative methodology	<ul style="list-style-type: none"> <li>Utilizing space within ROW for Low Impact Development (LID) techniques to minimize footprint of SWM infrastructure.</li> <li>More innovative approach using newer stormwater management techniques depending on LID approach chosen.</li> </ul>	<ul style="list-style-type: none"> <li>SWM facility would be designed as per current guidelines and engineering best practices to meet up to date criteria.</li> <li>Typical approach used throughout the 1980's and 1990's.</li> </ul>
<b>Summary of Stormwater Management / Engineering Evaluation</b>			

Criteria	Measures	Alternative 1	Alternative 2
<b>Socio-Economic</b>			
Residential Impacts	Minimizes adverse effects on local residents (i.e., noise, air, water quality, safety)	<ul style="list-style-type: none"> <li>Minimal residential impacts from LID methods can be installed during road construction. Any noise/air/water quality concerns would be related to the construction of the general road construction.</li> </ul>	<ul style="list-style-type: none"> <li>Black Creek may be more susceptible to sediment loading during construction of new pond, pending accurate set-up and monitoring of construction ESC measures.</li> <li>Additional construction closer to Bennett Health Centre resulting in higher potential for noise impacts</li> </ul>
Requirement of Easements	Minimizes requirements to provide easements	<ul style="list-style-type: none"> <li>No requirement of easements for SWM purposes</li> </ul>	<ul style="list-style-type: none"> <li>Potential requirement of easement at boundary of Bennett Health Care Centre and Town of Halton Hills property for SWM purposes</li> </ul>
Visual Aesthetics (streetscape)	Minimizes physical impacts on visual/aesthetics and streetscape	<ul style="list-style-type: none"> <li>Streetscape may be visually more appealing considering a wider boulevard</li> <li>BHCC pond was constructed on a temporary basis and may not be visually appealing</li> </ul>	<ul style="list-style-type: none"> <li>Potential for new SWM facility to be more aesthetically pleasing than the existing pond due to designing as per current criteria and providing more natural landscaping.</li> </ul>
Impact on Future Development	Supports future development and is consistent with future land use plans	<ul style="list-style-type: none"> <li>Would require future development to provide its own SWM quality and water balance controls.</li> </ul>	<ul style="list-style-type: none"> <li>A new, expanded facility could be sized (expanded further) to accept drainage from other future development.</li> </ul>
<b>Summary of Socio-Economic Evaluation</b>			

Criteria	Measures	Alternative 1	Alternative 2
<b>Natural Environment</b>			
Vegetation	Minimizes adverse effects on local vegetation	<ul style="list-style-type: none"> <li>Minimal impacts on surrounding vegetation from LID implementation as they will utilize ROW area, depending on alternative chosen</li> <li>LID techniques to be added during road construction and therefore no direct impact on vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Existing vegetation in close proximity will be impacted by construction of the expanded facility</li> <li>Expansion of the SWM facility is expected to encroach into the black walnut cultural woodlot</li> </ul>
Encroachment into Environmental Buffers / Boundaries	Minimizes impacts to existing environmental buffers/boundaries	<ul style="list-style-type: none"> <li>Floodlines and meanderbelt widths are not constraints for this concept.</li> <li>Encroachment into environmental boundaries is not a concern for the stormwater management works independently</li> </ul>	<ul style="list-style-type: none"> <li>The proposed expanded SWM facility may encroach into 'Significant Woodlot' lands</li> <li>Floodlines and meanderbelt widths are not constraints for this concept.</li> </ul>
Groundwater	Minimizes adverse effects on the water table level and groundwater recharge potential	<ul style="list-style-type: none"> <li>Inclusion of LIDs into the ROW would promote infiltration of the runoff from the ROW, while providing quality treatment, pending LID selection</li> <li>Groundwater table elevation to be considered with LID selection to protect groundwater quality; minimum separation between LID and groundwater must be considered</li> </ul>	<ul style="list-style-type: none"> <li>SWM facility to be designed to meet required water balance criteria for groundwater recharge</li> </ul>
Aquatic Habitat	Minimizes adverse effects on local aquatic habitat	<ul style="list-style-type: none"> <li>No impact on aquatic habitat expected due to provision of quality controls and general setback from the creek.</li> </ul>	<ul style="list-style-type: none"> <li>Increase risk of negative impacts on aquatic habitat from the nature of construction being in close proximity to existing creek</li> <li>When operating normally and maintained properly, the SWM facility can provide adequate treatment of runoff as to not cause an impact on the aquatic environment.</li> </ul>
<b>Summary of Natural Environment Evaluation</b>			



Criteria	Measures	Alternative 1	Alternative 2
<b>Financial</b>			
Operating Cost	Minimizes operating costs	<ul style="list-style-type: none"> <li>Routine inspections of LID methods are required increasing the operating costs, but pending LID alternative chosen</li> <li>Seasonal vacuum with filter may be necessary</li> <li>Maintenance is more stringent during the first few years to ensure good operation</li> </ul>	<ul style="list-style-type: none"> <li>Increase in operating costs for Town for SWM facility maintenance, similar to existing pond operating costs</li> <li>Operating costs dependent on SWM facility alternative selected</li> </ul>
Capital Costs	Minimizes capital cost	<ul style="list-style-type: none"> <li>Capital costs will be slightly higher than just the road construction costs.</li> <li>Capital costs are dependent on LID approach selected.</li> </ul>	<ul style="list-style-type: none"> <li>Capital costs will be higher than Alternative #1 due to working within more environmentally constrained area and constructing a larger SWM facility.</li> </ul>
Property Acquisition	Minimizes need for property acquisition	<ul style="list-style-type: none"> <li>No property acquisition is anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No property acquisition is anticipated.</li> </ul>
Utility Relocation	Minimizes need for utility relocation	<ul style="list-style-type: none"> <li>No utility relocation anticipated</li> </ul>	<ul style="list-style-type: none"> <li>No utility relocation anticipated</li> </ul>
<b>Summary of Financial Evaluation</b>			
<b>OVERALL EVALUATION</b>		<ul style="list-style-type: none"> <li>Meets current SWM guidelines</li> <li>Alternative provides most value (benefits for cost)</li> <li>Limits footprint / impact to surrounding natural areas.</li> <li>Uses engineering best practices to meet SWM guidelines</li> <li>Potential for improved aesthetics</li> </ul> <div style="text-align: center;"></div>	<ul style="list-style-type: none"> <li>Meets current SWM guidelines</li> <li>Increased residential and environmental impacts from construction within a fairly large area.</li> <li>Highest anticipated capital costs</li> <li>Can be sized to account for future development</li> <li>Improved aesthetics</li> </ul> <div style="text-align: center;"></div>
<b>RECOMMENDATION</b>		<b>PREFERRED</b>	<b>NOT PREFERRED</b>

The following criteria were also considered, however no significant differences were found between these Design Concepts.

**Social, Economic and Cultural Impacts**

- Commercial / Industrial Impacts
- Institutional Impacts
- Archaeological & Heritage Resources
- Support of Existing Land Use, Policies and Development Plans

**Transportation Service**

- Transit Operations and Accessibility
- Alignment of the proposed road
- Accommodation of Pedestrians and Cyclists (on-road)
- Access for Emergency Vehicles
- Ability to Accommodate Municipal Services

### 6.2.3. Preferred Alternative SWM Solution

The preferred design alternative solution is the alternative that best meets all project criteria. The chosen design alternative must meet the outlined design guidelines in order to be approved and implemented. Additionally, the superior alternative must have minimal impacts on the natural environment, socio-economic and cultural settings.

Based on the comparative evaluation, the preferred solution is **Alternative #1**, which involves maintaining the BHCC SWM pond and providing stormwater controls independently for the Halton Hills Drive extension via the use of LIDs. Alternative #1 has been carried forward as the preferred solution and is discussed in more detail in **Section 8.2**.

**Alternative #2** was not recommended due to its potential to disturb the vegetation (potentially the Significant Woodlot) by expanding the existing pond footprint and its financial implications.

## 7.0 Alternative Halton Hills Drive Solutions

The Class Environmental Assessment process requires the examination of all reasonable alternatives, in addressing the problem and opportunity statement. An evaluation methodology is used to ensure that the process is traceable and reproducible and takes into consideration technical, economic, social and environmental impacts. The following sections provide details on the development and evaluation of the alternative solutions.

### 7.1. Design Considerations

Prior to the identification of alternative planning solutions, three different road cross-sections were reviewed to identify the cross-section that would be most suited for a Halton Hills Drive connection. The three cross-sections that were considered included the following:

- Cross-Section #1: Rural cross-section with 7.4m pavement width with no sidewalks or boulevards, as shown in **Figure 7-1**;
- Cross-Section #2: Urban cross-section with 12.0m pavement width with sidewalks and boulevards to match the existing Halton Hills Drive on the north end, as shown in **Figure 7-2**; and,
- Cross-Section #3: Urban cross-section with 14.5m pavement width with sidewalks and boulevards to match the existing Halton Hills Drive on the south end, as shown in **Figure 7-3**.

Cross-Section #1 was quickly eliminated as a potential cross-section as it did not fulfill the objectives of the Town's Official Plan that new infrastructure should safely and efficiently accommodate all modes of transportation. The lack of sidewalks and boulevards would not meet these criteria and would not be consistent with the existing sections of Halton Hills Drives to the north and south.

While both Cross-Section #2 and #3 accommodate all modes of transportation, the narrower pavement width of 12.0m would minimize the impact on the existing natural/terrestrial environment and would provide a more cost effective design option for Halton Hills Drive. Thus, any proposed alternative planning solutions would assume the cross-section associated with Cross-Section #2.

Figure 7-1: Halton Hills Drive Cross-Section #1 – Rural

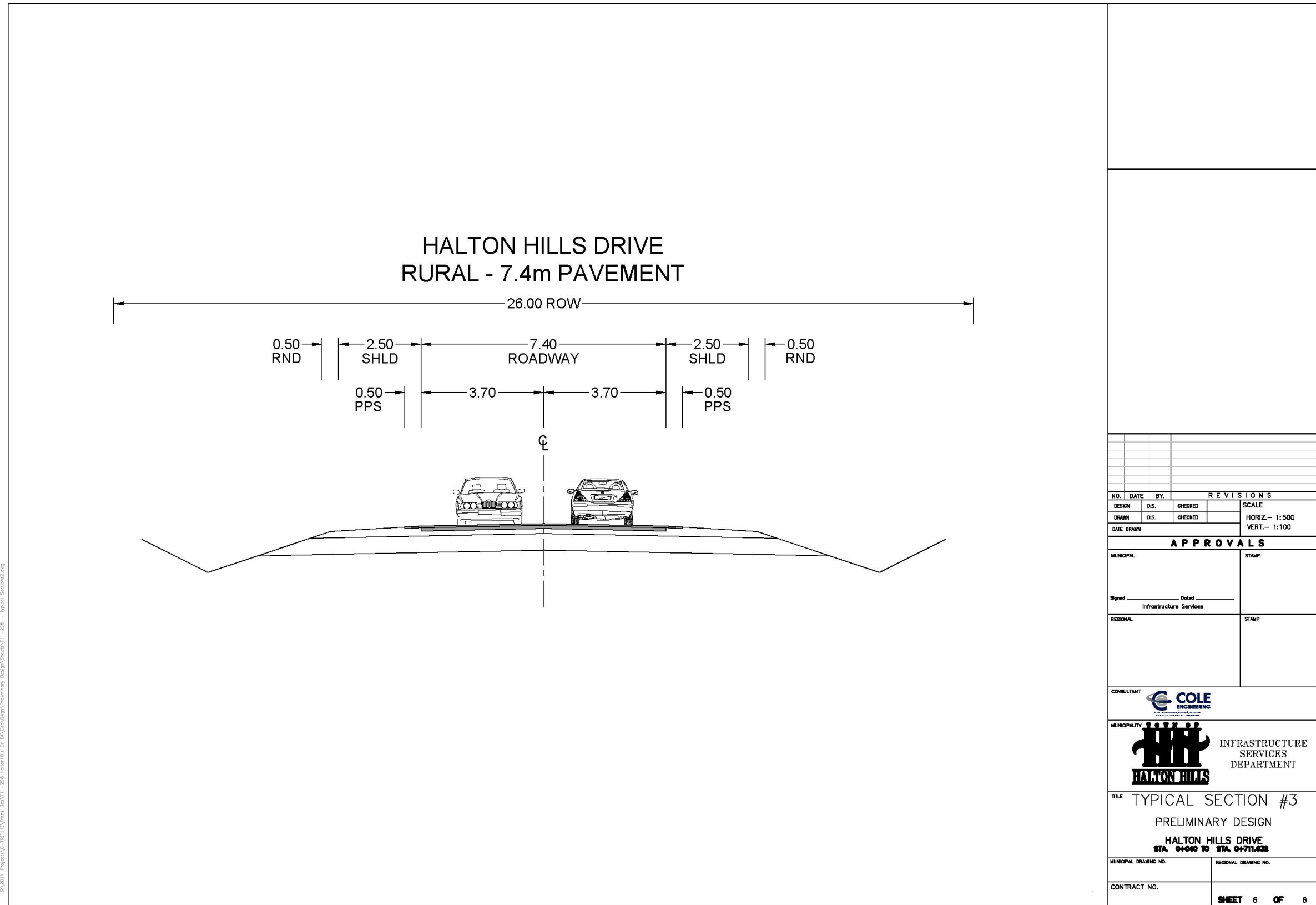


Figure 7-2: Halton Hills Drive Cross-Section #2 – Urban (12.0m)

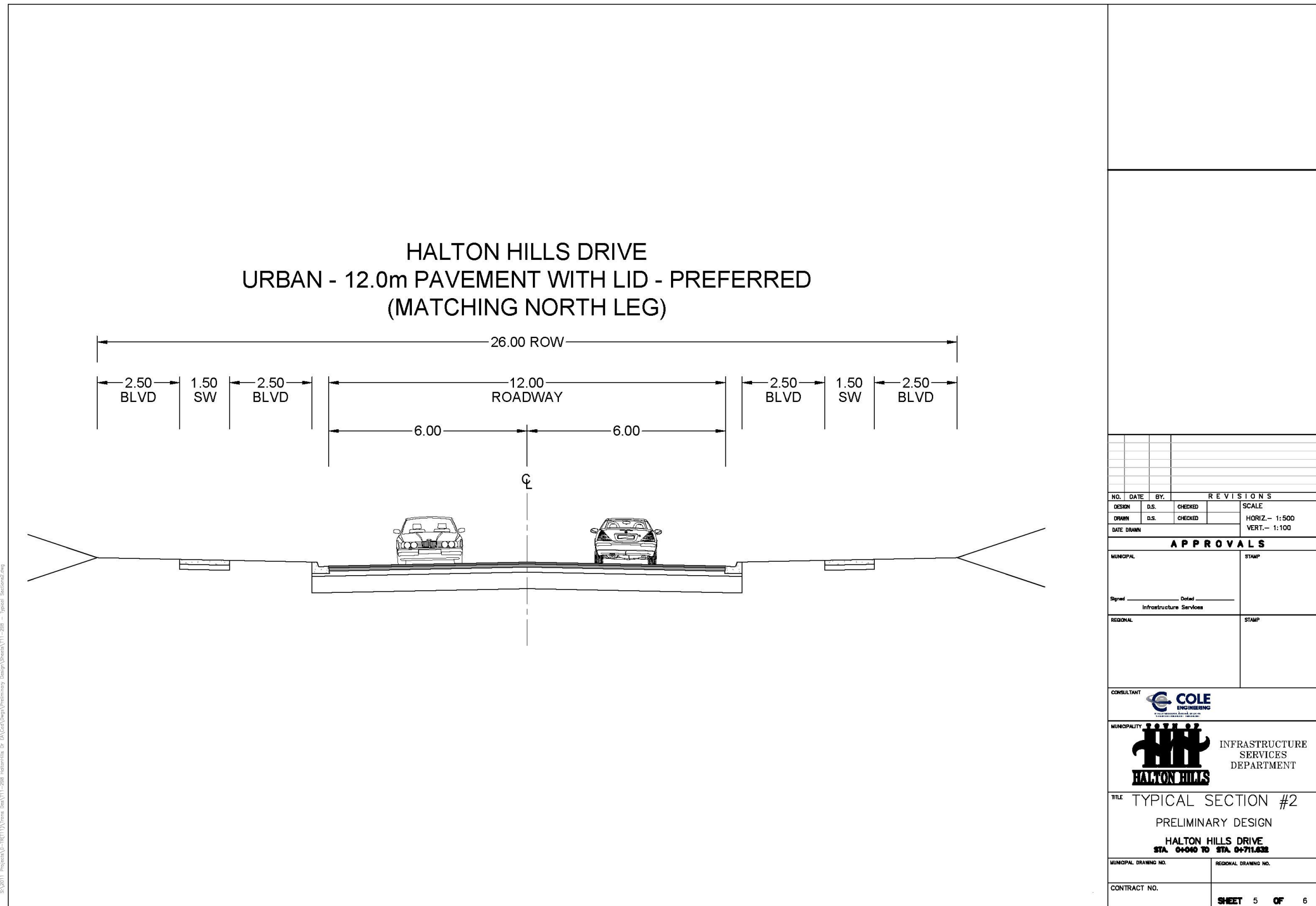
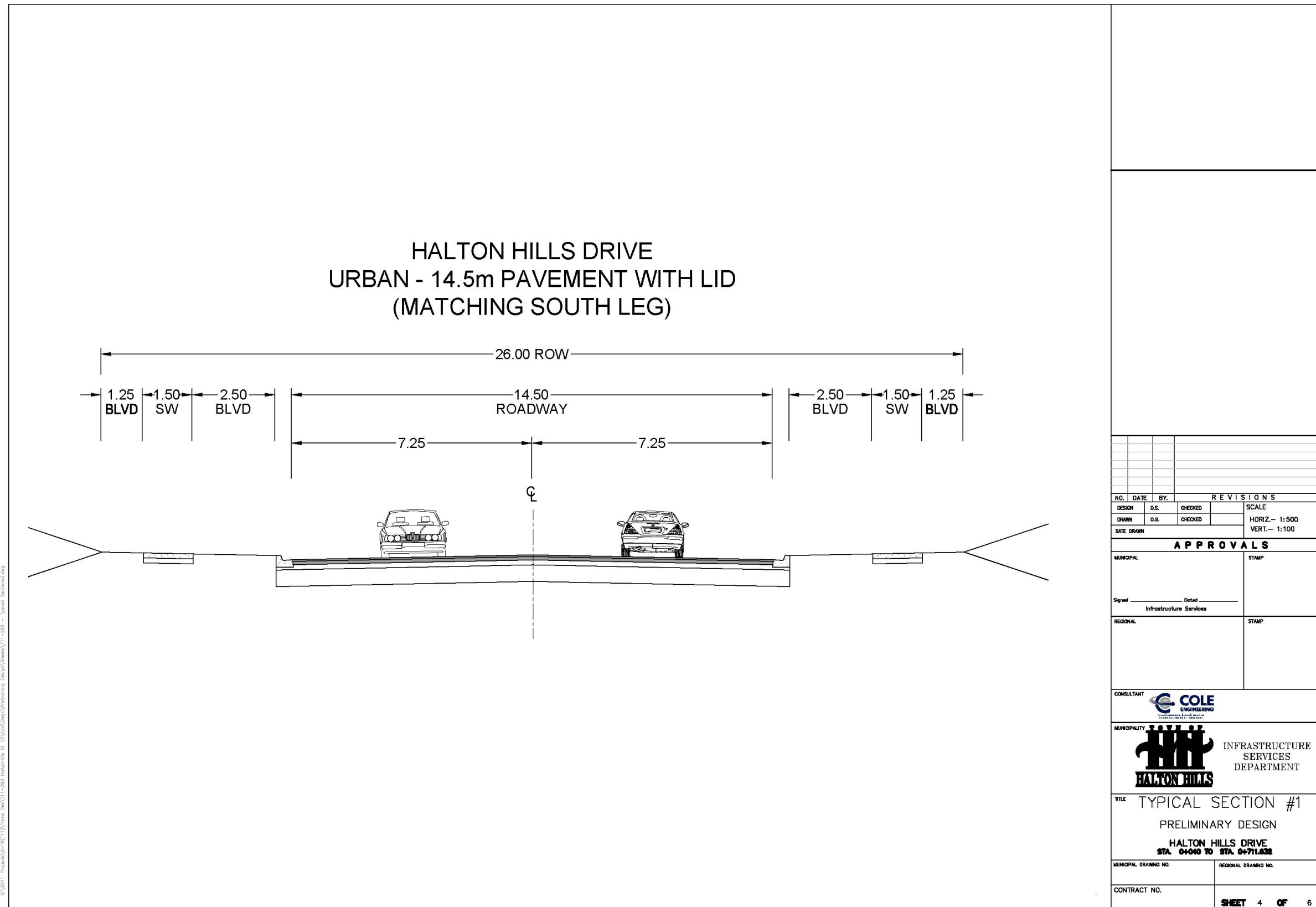


Figure 7-3: Halton Hills Drive Cross-Section #3 – Urban (14.5m)



## 7.2. Identification of Alternative Solutions

In reviewing the preliminary recommendations and the problem and opportunity statement, the following alternative planning solutions for undertaking were considered.

**Do Nothing:** Maintain status quo with Halton Hills Drive existing as two disconnected road segments servicing the Bennett Health Care Centre on the north end off of Princess Anne Drive and servicing the Town's Civic Centre on the south end off of Maple Avenue.

**Alternative 1:** Modifications to the existing northern and southern Halton Hills Drive alignments (new centreline radii) to connect the northern and southern segments. The proposed road alignment is situated to the east of the study area, adjacent to the Black Creek tributary, and incorporates modified geometry of the existing road segments. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage, as shown in **Figure 7-4**.

**Alternative 2:** Maintains the existing northern and southern segments of Halton Hills Drive to connect the northern and southern segments. The proposed road alignment maintains/matches the existing road geometry and centreline radii of the existing road segments. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage, as shown in **Figure 7-5**.

**Alternative 3:** Modifications to the existing northern and southern segments of Halton Hills Drive (new centreline radii) to meet TAC standards. The proposed road alignment generally connects the existing road segments with modified centreline alignment radii in keeping with TAC standards. This alternative maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage, as shown in **Figure 7-6**.

In evaluating the suitability of alternative planning solutions to address the problem statement, a number of evaluation criteria were identified and a method to evaluate these criteria was developed. The evaluation criteria were based on impacts to transportation, as well as impacts to the environment, society and the economy. Using the evaluation criteria, where applicable, the advantages and disadvantages of each alternative planning solution were discussed. The evaluation criteria and the associated assessment of each of the alternative planning solutions are described subsequently.

Figure 7-4: Alternative 1

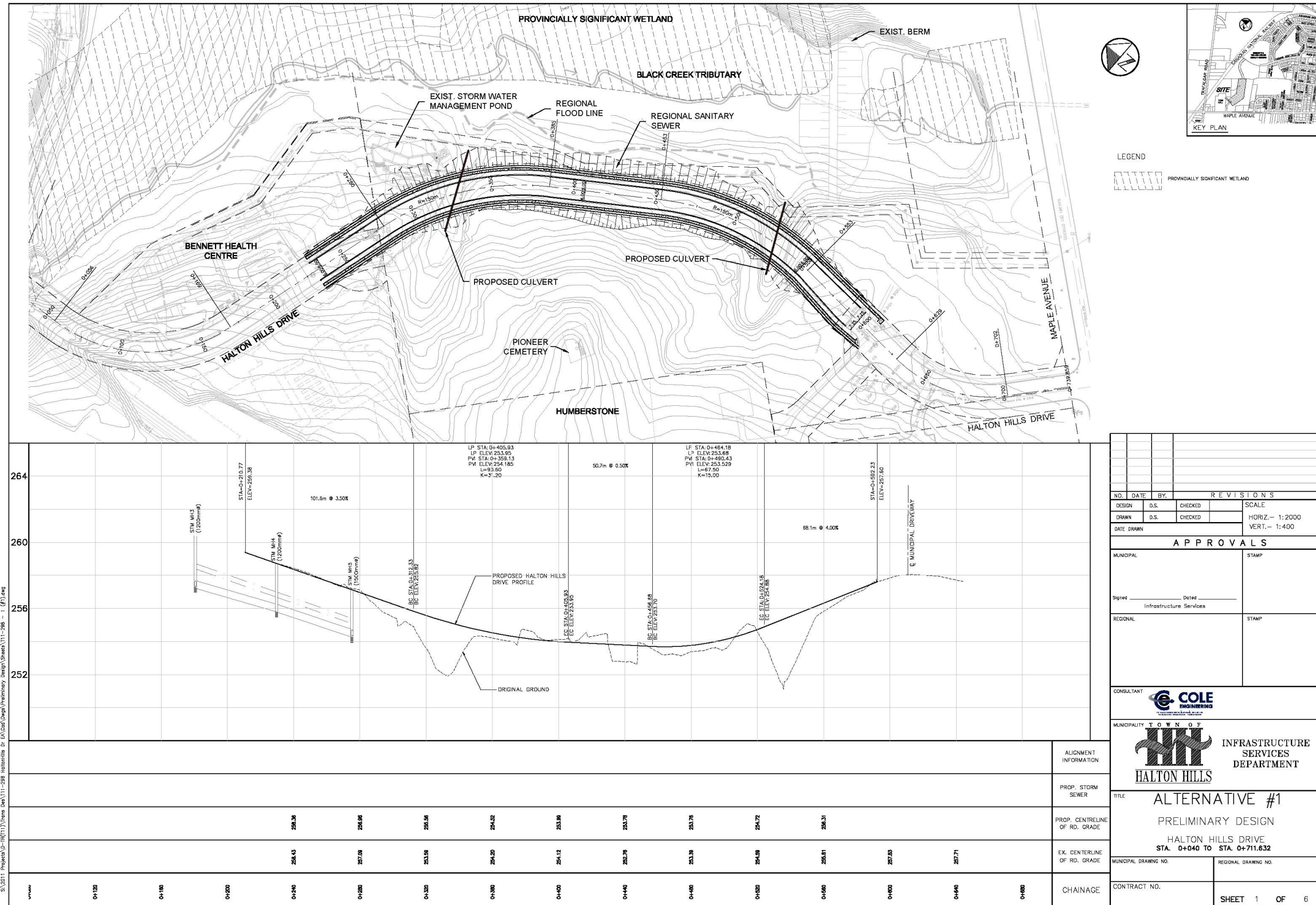




Figure 7-5: Alternative 2

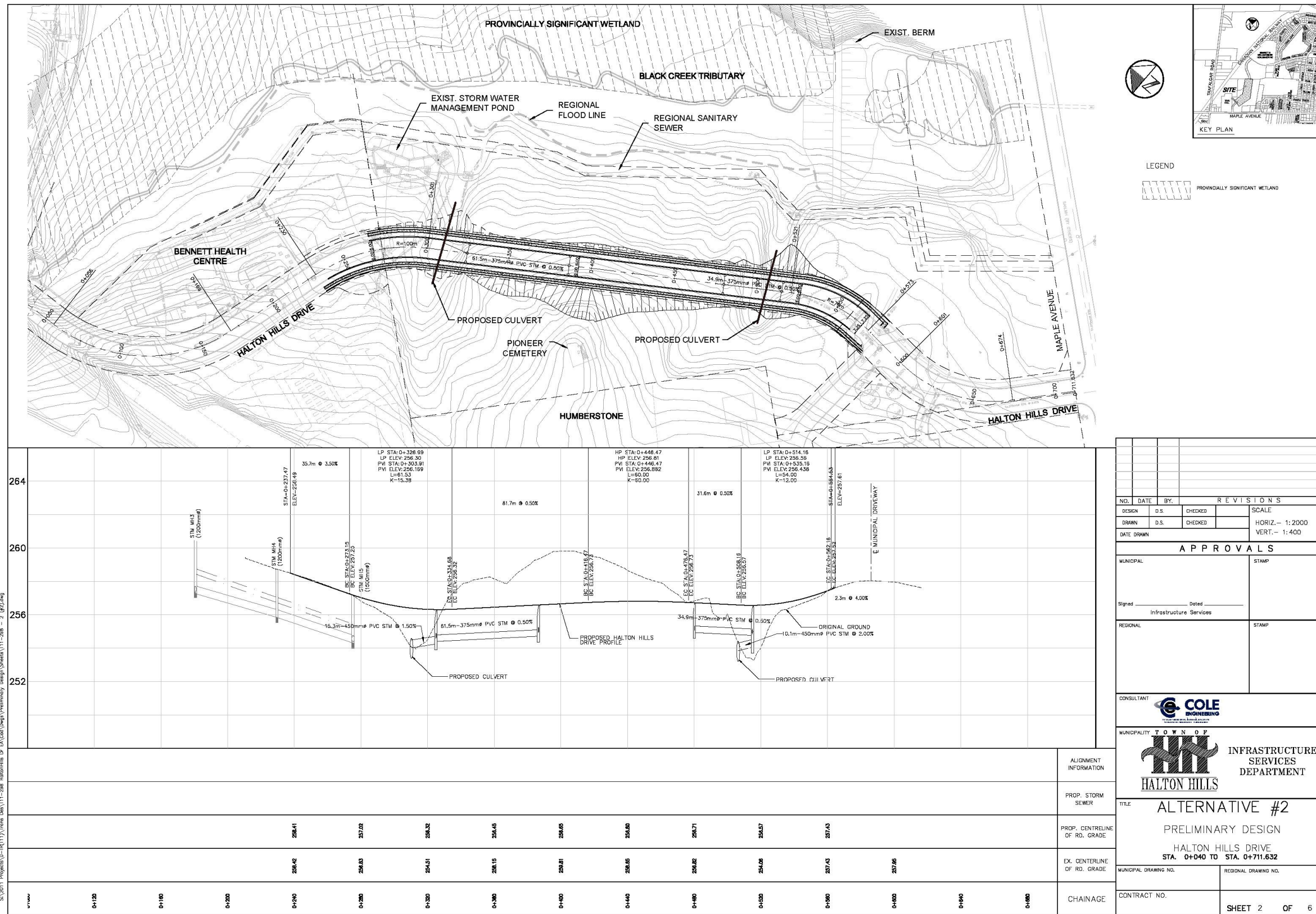
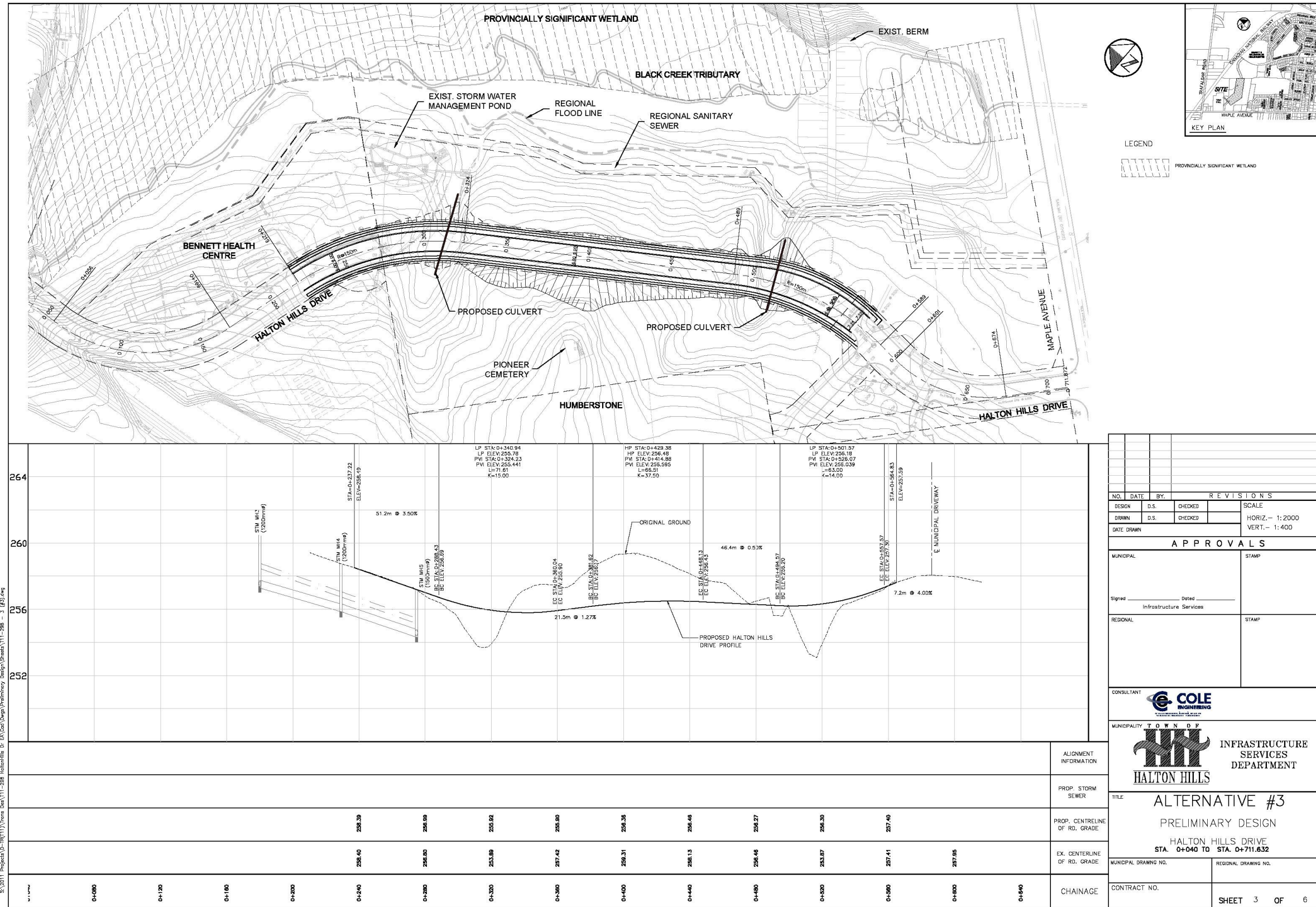


Figure 7-6: Alternative 3



The evaluation criteria used to assess the alternative planning solutions are shown in **Table 7-1**.

**Table 7-1: Alternative Planning Solutions Evaluation Criteria**

<p><b>Financial and Engineering</b></p> <ul style="list-style-type: none"> <li>▪ Utility relocation</li> <li>▪ Capital costs</li> <li>▪ Operation and maintenance costs</li> <li>▪ Property acquisition</li> <li>▪ Accommodation of future municipal services</li> </ul>	<p><b>Socio-economic Impacts</b></p> <ul style="list-style-type: none"> <li>▪ Archaeological/Cultural Heritage</li> <li>▪ Businesses</li> <li>▪ Residential</li> <li>▪ Visual/aesthetics and streetscape</li> <li>▪ Noise</li> <li>▪ Air Quality</li> </ul>
<p><b>Transportation Service</b></p> <ul style="list-style-type: none"> <li>▪ Network connectivity</li> <li>▪ Network operations</li> <li>▪ Traffic safety</li> <li>▪ Pedestrian and cyclists</li> <li>▪ Emergency services response</li> </ul>	<p><b>Natural Environment</b></p> <ul style="list-style-type: none"> <li>▪ Surface and groundwater</li> <li>▪ Aquatic habitats</li> <li>▪ Natural heritage features</li> <li>▪ Vegetation communities</li> <li>▪ Rare or threatened species</li> </ul>

### 7.3. Evaluation of Alternative Solutions

The alternative solutions were evaluated based on its ability to address the problem and opportunity statement in comparison to the criteria listed in the previous section, including transportation and engineering, the natural environment, socio-economic and cultural heritage and financial aspects. The overall evaluation was conducted with input from the project team, project stakeholders and the public (i.e., based on comments received at PIC #1).

Following the evaluation process, a recommended planning alternative solution was identified, which would be carried forward as the preferred alternative solution. The evaluation and results of the evaluation of the alternative solutions are presented in **Table 7-2**.





### 7.4. Preferred Alternative Solution





Based on the detailed comparative evaluation, **Alternative 2: Connect Halton Hills Drive with no modifications at existing stub ends** was recommended to be carried forward as the preferred alternative solution.





The **Do Nothing** alternative was not recommended as it did not meet the Town’s policy and planning objectives as outlined in both the Official Plan and the Transportation Master Plan nor does it provide network connectivity/flexibility.

While both **Alternatives 1** and **3** are similar in many ways to the preferred alternative solution, they both have a greater length than Alternative 2 resulting in higher capital costs and also the need to remove a larger amount of existing vegetation, property impacts and reconstruction of existing segments of Halton Hills Drive. Therefore, they were not put forward as the recommended alternative solution.

**Table 7-2: Evaluation of Alternative Solutions**

Criteria	Measures	Do Nothing	Alternative 1	Alternative 2	Alternative 3
<i>A principle or standard by which something may be judged or decided.</i>	<i>Dimensions, quantity, or capacity as ascertained by comparison with a standard.</i>	<ul style="list-style-type: none"> <li>Maintains status quo</li> <li>Halton Hills Drive is maintained as two disconnected road segments</li> </ul>	<ul style="list-style-type: none"> <li>Connects the northern and southern segments of Halton Hills Drive</li> <li>Modifies sections of the existing northern and southern segments of Halton Hills Drive with new centerline radii</li> <li>Road alignment is situated to the east of the study area, adjacent to the Black Creek Tributary, and incorporates modified geometry of the existing road segments</li> <li>Incorporates Stormwater Management LID Techniques along Halton Hills Drive to provide quality control for roadway drainage</li> <li>Maintains the existing Stormwater Management Pond for the Bennett Health Centre.</li> </ul>	<ul style="list-style-type: none"> <li>Connects the northern and southern segments of Halton Hills Drive</li> <li>Maintains existing northern and southern segments of Halton Hills Drive with the new road connection maintaining / matching the existing road geometry and centerline radii of the existing road segments.</li> <li>Road alignment is to be a direct connection between the existing segments</li> <li>Incorporates Stormwater Management LID Techniques along Halton Hills Drive to provide quality control for roadway drainage</li> <li>Maintains the existing Stormwater Management Pond for the Bennett Health Centre.</li> </ul>	<ul style="list-style-type: none"> <li>Connects the northern and southern segments of Halton Hills Drive</li> <li>Modifies sections of the existing northern and southern segments of Halton Hills Drive with new centerline radii to meet TAC standards</li> <li>Road alignment generally connects the existing road segments with modified centerline alignment radii in keeping with TAC standards</li> <li>Incorporates Stormwater Management LID Techniques along Halton Hills Drive to provide quality control for roadway drainage</li> <li>Maintains the existing Stormwater Management Pond for the Bennett Health Centre</li> </ul>
<b>Financial and Engineering</b>					
Utility Relocation	Minimizes need for utility relocation	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>No impacts</li> </ul>
Capital Costs	Minimizes capital costs	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>Highest capital costs due to the longest road length (370m) and the need for reconstruction / modification to existing Halton Hills Drive segments</li> </ul>	<ul style="list-style-type: none"> <li>Lowest capital costs through the use of the shortest road length (305m) and no reconstruction / modification to the existing Halton Hills Drive segments</li> </ul>	<ul style="list-style-type: none"> <li>Moderate capital costs due to increased road length (360m) and the need for reconstruction / modification to existing Halton Hills Drive segments</li> </ul>
Operation and Maintenance Costs	Minimizes operation and maintenance costs	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>Operating costs are anticipated to be similar for all alternatives</li> </ul>	<ul style="list-style-type: none"> <li>Operating costs are anticipated to be similar for all alternatives</li> </ul>	<ul style="list-style-type: none"> <li>Operating costs are anticipated to be similar for all alternatives</li> </ul>
Property Acquisition	Minimizes need for property acquisition	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>Moderate property requirements resulting in removal of existing multi-use trail</li> </ul>	<ul style="list-style-type: none"> <li>No impacts</li> </ul>	<ul style="list-style-type: none"> <li>Minor property requirements near Bennett Health Care Centre</li> </ul>
Accommodation of Future Municipal Services	Maximizes opportunities for accommodation of future municipal services i.e. watermain, sanitary services	<ul style="list-style-type: none"> <li>Future municipal services cannot be accommodated</li> </ul>	<ul style="list-style-type: none"> <li>Road alignment will impact the Region's sanitary trunk sewer located to the east of the road alignment</li> <li>There is an existing manhole located within the proposed road alignment</li> </ul>	<ul style="list-style-type: none"> <li>Accommodation of future municipal services is anticipated to be equal for Alternatives 2 and 3</li> </ul>	<ul style="list-style-type: none"> <li>Accommodation of future municipal services is anticipated to be equal for Alternatives 2 and 3</li> </ul>
<b>Summary of Financial and Engineering Evaluation</b>					

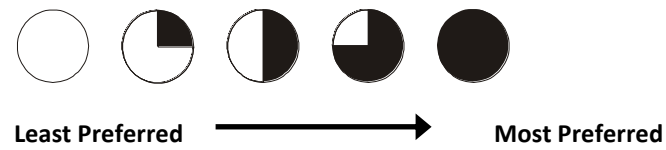
Criteria	Measures	Do Nothing	Alternative 1	Alternative 2	Alternative 3
<b>Socio-Economic</b>					
Archaeological/Cultural Heritage Resources	Minimizes number of heritage features affected and provides opportunities to enhance built heritage and cultural features	<ul style="list-style-type: none"> <li>No impacts as status quo maintained.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to the Pioneer Cemetery as it is located to the west of the proposed road alignment</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to the Pioneer Cemetery as it is located to the west of the proposed road alignment</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to the Pioneer Cemetery as it is located to the west of the proposed road alignment</li> </ul>
Businesses	Minimizes adverse physical effects on local businesses	<ul style="list-style-type: none"> <li>Increased traffic on Maple Avenue and Princess Anne Drive could potentially hinder access/egress from the Town's Civic Centre</li> </ul>	<ul style="list-style-type: none"> <li>Provides increased accessibility to the Town's Civic Centre</li> </ul>	<ul style="list-style-type: none"> <li>Provides increased accessibility to the Town's Civic Centre</li> </ul>	<ul style="list-style-type: none"> <li>Provides increased accessibility to the Town's Civic Centre</li> </ul>
Residential	Minimizes adverse physical effects on local residences	<ul style="list-style-type: none"> <li>Limits access opportunities to potential development adjacent to Town's Civic Centre (Humberstone lands)</li> <li>No bypass traffic adjacent to the Bennett Health Care Centre</li> </ul>	<ul style="list-style-type: none"> <li>Provides alternate access opportunities to the Bennett Health Care Centre and any new development</li> <li>Potential for bypass / through traffic adjacent to Bennett Health Care Centre and Town Civic Centre</li> <li>Decreases bypass traffic on Charles Street that resulted from the at-grade crossing on Trafalgar Road</li> </ul>	<ul style="list-style-type: none"> <li>Provides alternate access opportunities to the Bennett Health Care Centre and any new development</li> <li>Potential for bypass / through traffic adjacent to Bennett Health Care Centre and Town Civic Centre</li> <li>Decreases bypass traffic on Charles Street that resulted from the at-grade crossing on Trafalgar Road</li> </ul>	<ul style="list-style-type: none"> <li>Provides alternate access opportunities to the Bennett Health Care Centre and any new development</li> <li>Potential for bypass / through traffic adjacent to Bennett Health Care Centre and Town Civic Centre</li> <li>Decreases bypass traffic on Charles Street that resulted from the at-grade crossing on Trafalgar Road</li> </ul>
Visual/Aesthetics and Streetscape	Minimizes physical impacts on visual/aesthetic and streetscape	<ul style="list-style-type: none"> <li>Maintains status quo</li> </ul>	<ul style="list-style-type: none"> <li>Provides opportunity for streetscaping</li> </ul>	<ul style="list-style-type: none"> <li>Provides opportunity for streetscaping</li> </ul>	<ul style="list-style-type: none"> <li>Provides opportunity for streetscaping</li> </ul>
Noise	Minimizes adverse effects of noise as a result of roadway functions	<ul style="list-style-type: none"> <li>Increase in traffic on Maple Avenue and Princess Anne Drive may result in some noise increases</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of noise impacts</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of noise impacts</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of noise impacts</li> </ul>
Air Quality	Minimizes adverse effects on air quality and potential vehicle exhaust emissions	<ul style="list-style-type: none"> <li>Increased congestion and related emissions on Maple Avenue and Princess Anne Drive</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of air quality</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of air quality</li> </ul>	<ul style="list-style-type: none"> <li>No difference between design concepts in terms of air quality</li> </ul>
<b>Summary of Socio-Economic Evaluation</b>					

Criteria	Measures	Do Nothing	Alternative 1	Alternative 2	Alternative 3
<b>Transportation</b>					
Transportation Planning Policies	Supports the Town's policy documents (e.g., Official Plan, Transportation Master Plan)	<ul style="list-style-type: none"> <li>Does not meet Official Plan direction</li> </ul>	<ul style="list-style-type: none"> <li>Meets Official Plan guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Meets Official Plan guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Meets Official Plan guidelines</li> </ul>
Network Connectivity	Maximizes network route alternatives and its ability to support existing and future land uses	<ul style="list-style-type: none"> <li>Does not provide optimal network connectivity as vehicles from Halton Hills Drive only have one access/egress point</li> </ul>	<ul style="list-style-type: none"> <li>Provides additional network connectivity and network flexibility between Maple Avenue and Princess Anne Drive</li> </ul>	<ul style="list-style-type: none"> <li>Provides additional network connectivity and network flexibility between Maple Avenue and Princess Anne Drive</li> </ul>	<ul style="list-style-type: none"> <li>Provides additional network connectivity and network flexibility between Maple Avenue and Princess Anne Drive</li> </ul>
Network Operations	Minimizes travel delay while maximizing the efficient movement of people within the corridor	<ul style="list-style-type: none"> <li>Potential to experience longer delays at adjacent signalized intersections on Trafalgar Road</li> <li>Potential for longer delays on Trafalgar Road and Maple Avenue due to increases in future traffic and the at-grade rail crossing on Trafalgar Road</li> <li>Improved conditions on Charles Street for accommodation of cut through traffic</li> </ul>	<ul style="list-style-type: none"> <li>Improved level of service operations at the adjacent signalized intersections on Trafalgar Road as a result of traffic redistribution and network flexibility</li> <li>Provides alternate road network opportunities to bypass the at-grade crossing on Trafalgar Road</li> <li>Improved conditions on Charles Street for accommodation of cut through traffic</li> </ul>	<ul style="list-style-type: none"> <li>Improved level of service operations at the adjacent signalized intersections on Trafalgar Road as a result of traffic redistribution and network flexibility</li> <li>Provides alternate road network opportunities to bypass the at-grade crossing on Trafalgar Road</li> <li>Improved conditions on Charles Street for accommodation of cut through traffic</li> </ul>	<ul style="list-style-type: none"> <li>Improved level of service operations at the adjacent signalized intersections on Trafalgar Road as a result of traffic redistribution and network flexibility</li> <li>Provides alternate road network opportunities to bypass the at-grade crossing on Trafalgar Road</li> <li>Improved conditions on Charles Street for accommodation of cut through traffic</li> </ul>
Traffic Safety	Maximizes opportunities for safety measures to reduce collisions and potential conflicts between vehicles, pedestrians and cyclists	<ul style="list-style-type: none"> <li>Potential for increased safety issues associated with traffic growth</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Improved geometrics within the proposed segment of Halton Hills Drive via increase alignment radii</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Existing geometrics maintained within the proposed segment of Halton Hills Drive</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Improved geometrics within the proposed segment of Halton Hills Drive via increase alignment radii</li> </ul>
Pedestrians & Cyclists	Sustains or improves the safety, accessibility, mobility, and efficiency of active transportation modes	<ul style="list-style-type: none"> <li>Potential for pedestrian and cyclist issues associated with traffic growth and transportation network gaps</li> <li>Potential for increased safety issues associated with traffic growth.</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced.</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Alternate routes provided for pedestrian and cyclist network flexibility.</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced.</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Alternate routes provided for pedestrian and cyclist network flexibility.</li> </ul>	<ul style="list-style-type: none"> <li>As vehicles are redistributed on the road network, vehicle and pedestrian / cyclist interactions can potentially be reduced.</li> <li>Increased interaction between pedestrians and vehicles on Halton Hills Drive</li> <li>Alternate routes provided for pedestrian and cyclist network flexibility.</li> </ul>
Emergency Services Response	Provides alternate network routing to allow for efficient emergency response times	<ul style="list-style-type: none"> <li>Potential traffic congestion may extend response times</li> <li>Potential for increased delays on Trafalgar Road at the at-grade rail crossing and limited alternate route choice for emergency response vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Provision of alternate road connectivity may potentially reduce emergency response vehicle wait times and contribute to alternate route choices for the responder.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of alternate road connectivity may potentially reduce emergency response vehicle wait times and contribute to alternate route choices for the responder.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of alternate road connectivity may potentially reduce emergency response vehicle wait times and contribute to alternate route choices for the responder.</li> </ul>
<b>Summary of Transportation Evaluation</b>					

Criteria	Measures	Do Nothing	Alternative 1	Alternative 2	Alternative 3
<b>Natural Environment</b>					
Storm Water Management	Minimizes adverse effects on existing storm water management measures and meets quantity and quality control requirements	<ul style="list-style-type: none"> <li>Maintains status quo</li> </ul>	<ul style="list-style-type: none"> <li>Meets SWM guidelines / requirements</li> <li>Contributes to baseflows</li> <li>Modifications to existing facilities are not required from a SWM perspective</li> <li>The new road segment will impact the existing SWM pond location</li> </ul>	<ul style="list-style-type: none"> <li>Meets SWM guidelines / requirements</li> <li>Contributes to baseflows</li> <li>Modifications to existing facilities are not required from a SWM perspective</li> </ul>	<ul style="list-style-type: none"> <li>Meets SWM guidelines / requirements</li> <li>Contributes to baseflows</li> <li>Modifications to existing facilities are not required from a SWM perspective</li> </ul>
Headwater Drainage Features	Minimizes adverse effects on existing natural drainage features	<ul style="list-style-type: none"> <li>Maintains status quo</li> </ul>	<ul style="list-style-type: none"> <li>Alignment intersects the drainage / terrestrial features; however, connectivity will be retained through the inclusion of culverts at these features</li> <li>Removal of weak terrestrial linkage provided by Drainage Feature A</li> </ul>	<ul style="list-style-type: none"> <li>Alignment intersects the drainage / terrestrial features; however, connectivity will be retained through the inclusion of culverts at these features</li> <li>Removal of weak terrestrial linkage provided by Drainage Feature A</li> </ul>	<ul style="list-style-type: none"> <li>Alignment intersects the drainage / terrestrial feature; however, connectivity will be retained through the inclusion of culverts at these features</li> <li>Removal of weak terrestrial linkage provided by Drainage Feature A</li> </ul>
Aquatic Habitats	Minimizes adverse effects on local aquatic habitat	<ul style="list-style-type: none"> <li>No effects on aquatic habitat</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts to the watercourse may occur during construction; however, any concerns with sedimentation and erosion will be controlled and managed through appropriate control measures</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts to the watercourse may occur during construction; however, any concerns with sedimentation and erosion will be controlled and managed through appropriate control measures</li> </ul>	<ul style="list-style-type: none"> <li>Potential impacts to the watercourse may occur during construction; however, any concerns with sedimentation and erosion will be controlled and managed through appropriate control measures</li> </ul>
Natural Heritage Features	Minimize adverse effects on local natural heritage features	<ul style="list-style-type: none"> <li>No effect on adjacent natural heritage features</li> </ul>	<ul style="list-style-type: none"> <li>No effect on adjacent natural heritage features.</li> </ul>	<ul style="list-style-type: none"> <li>No effect on adjacent natural heritage features.</li> </ul>	<ul style="list-style-type: none"> <li>No effect on adjacent natural heritage features.</li> </ul>
Vegetation Communities	Minimizes adverse effects on local vegetation	<ul style="list-style-type: none"> <li>No effect on vegetation communities</li> </ul>	<ul style="list-style-type: none"> <li>Removal of approximately 7,580 m<sup>2</sup> of terrestrial vegetation.</li> <li>Removal of approximately 3,290 m<sup>2</sup> of significant woodland.</li> <li>Section of significant woodland to the west of the road alignment will be orphaned and no longer be considered part of the significant woodland. However, the vegetation is cultural, overall age is young, the condition of the trees have been compromised with invasive species in some areas and there is a high degree of structural limb damage all leading to limited biological and genetic richness in areas.</li> </ul>	<ul style="list-style-type: none"> <li>Removal of approximately 5,590 m<sup>2</sup> of terrestrial vegetation.</li> <li>Removal of approximately 3,720 m<sup>2</sup> of significant woodland.</li> <li>Section of significant woodland to the west of the road alignment will be orphaned and no longer be considered part of the significant woodland. However, the vegetation is cultural, overall age is young, the condition of the trees have been compromised with invasive species in some areas and there is a high degree of structural limb damage all leading to limited biological and genetic richness in areas.</li> </ul>	<ul style="list-style-type: none"> <li>Removal of approximately 5,750 m<sup>2</sup> of terrestrial vegetation.</li> <li>Removal of approximately 3,630 m<sup>2</sup> of significant woodland.</li> <li>Section of significant woodland to the west of the road alignment will be orphaned and no longer be considered part of the significant woodland. However, the vegetation is cultural, overall age is young, the condition of the trees have been compromised with invasive species in some areas and there is a high degree of structural limb damage all leading to limited biological and genetic richness in areas.</li> </ul>
Rare or Threatened Species	Minimizes adverse effects on local rare or threatened species	<ul style="list-style-type: none"> <li>No effect on rare or threatened species</li> </ul>	<ul style="list-style-type: none"> <li>Removal of two non-retainable butternut trees within road alignment</li> <li>As the trees are non-retainable, they can be removed without compensation</li> </ul>	<ul style="list-style-type: none"> <li>Removal of two non retainable a butternut trees within road alignment</li> <li>Possible impact to two retainable butternut trees within road buffer zone requirement</li> <li>Compensation is required for the two retainable butternut trees</li> </ul>	<ul style="list-style-type: none"> <li>Removal of two non retainable a butternut trees within road alignment</li> <li>Possible impact to two retainable butternut trees within road buffer zone requirement</li> <li>Compensation is required for the two retainable butternut trees</li> </ul>

Criteria	Measures	Do Nothing	Alternative 1	Alternative 2	Alternative 3
Summary of Natural Environment Evaluation					
OVERALL EVALUATION		<ul style="list-style-type: none"> <li>Lack of network connectivity with minimal access for land uses</li> <li>Transportation objectives are not met</li> <li>Status quo maintained for the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Incurs greatest capital cost</li> <li>Requires greatest amount of vegetation removal</li> <li>Meets transportation objectives</li> </ul>	<ul style="list-style-type: none"> <li>Incurs lowest capital cost of the three alternatives</li> <li>Meets transportation objectives</li> </ul>	<ul style="list-style-type: none"> <li>Incurs second greatest capital cost</li> <li>Meets transportation objectives</li> </ul>
RECOMMENDATION		NOT PREFERRED	NOT PREFERRED	PREFERRED	NOT PREFERRED

Legend:





## 8.0 Recommended Design, Environmental Effects and Mitigation Measures

### 8.1. Design Constraints

#### 8.1.1. Agency Comments

Agencies provided input to the development of the design of the preferred solution through their comments. A summary of their comments included the following:

##### **CVC comments:**

- SWM measures to meet requirements in the updated CVC document and consideration be given for LID measures.
- SWM analysis should incorporate the drainage area associated with the road ROW and the Bennett Health Care Centre.
- Verify that quantity control is provided via a recently constructed berm located to the south of the project limits.
- SWM plan needs to meet four main criteria: flooding, erosion, water quality and water balance.
- Prepare a Meander Belt Width and Hazard Assessment as part of this study.
- Clarify value of the proposed road in term of impacts on the environment.
- Investigate LID alternatives feasibility in terms of soil conditions and groundwater elevation. Conduct groundwater monitoring to obtain seasonal high water table elevation. Provide a list of LID alternatives acceptable to the Town.
- Provide a treatment train approach for quality control.
- Clarify how each alternative will achieve quality, water balance and erosion criteria.
- Confirm the stability of the existing embankment and that it provides adequate quantity control.
- GeoMorphix Hazard Assessment Report to be finalized.
- Provide discussion on all road alignment alternatives and their impacts on the Significant Woodland and natural heritage features. Include evaluation on minimization and mitigation measures.
- Alternatives to consider total reduction of Significant Woodland removal.
- Compensation for significant woodland removal to be identified. Identify proposed restoration plan to mitigate impacts.
- Consider wildlife crossings as a mitigative measure.
- Consider different road designs to reduce impacts.
- Include a cost analysis for the construction of the preferred alternative.

##### **Halton Region comments:**

- Design of the road needs to ensure that the Region's buffer requirements and mitigation of impacts to Significant Woodlots are met.
- The area of the significant woodlands should be accurately identified and illustrated on a constrained map.
- Impacts of reducing woodlands area needs to be analyzed. Options to minimize and mitigate these impacts to be elaborated on. Also provide reduced area of woodlands.
- Natural heritage system enhancement opportunities to be investigated.

It is noted that these comments were taken into consideration during the evaluation and preliminary design preparation of the preferred alternative solution.

### 8.1.2. Key Considerations

With the identification of Alternative #2 as the recommended alignment for the Halton Hills Drive connection, the alignment was further reviewed to ensure that potential impacts would be minimized. Key considerations included:

- *Natural features:* The road alignment was placed at a location that would maximize the separation from the tributary of Black Creek and the ESA.
- *Significant woodland:* The road alignment took into consideration the existing significant woodlands and minimized impacts as best possible. The resulting alignment impacts 3,720 m<sup>2</sup> of significant woodland. The section of woodland to the west of the road alignment no longer be considered part of the significant woodland (approximately 4,100 m<sup>2</sup>).
- *Terrestrial habitat:* The road alignment also minimizes the terrestrial habitat being impacted with potential removal of 5,590 m<sup>2</sup> of terrestrial vegetation and four Butternut trees.
- *Grading requirements:* Road geometrics were designed based on a 50km/h design speed and a posted speed of 40km/h as opposed to the typical design speed of 60km/h. This lower speed restriction allows the recommended alignment to track existing ground and limits grading impacts.
- *Archaeological/cultural features:* The recommended alignment of the road connection allows the road to shift and avoid the location of the historic cemetery. The current placement of the road allows for minimal impacts to the natural features to the east and the cultural heritage feature to the west.
- *Stormwater management:* The recommended alignment maintains the existing stormwater management pond for the Bennett Health Care Centre and incorporates LID techniques along Halton Hills Drive to provide quality control for roadway drainage. It minimizes the requirement for property as a new stormwater management pond is not required. The stormwater management design has excluded the Humberstone lands and the future expansion of the Bennett lands as the Town will be imposing site plan controls for quality purposes.
- *Social environment:* The provision of sidewalks is included in the recommended cross-section of the new road connection due to the planned zoning for the area (i.e., employment and high density). The sidewalks would also provide the most direct pedestrian connection to and from the Town buildings, the proposed development north of the Town Hall and also for the Bennett Health Centre. Specific design elements will be further revisited at the detailed design stage.

## 8.2. Recommended Design – Stormwater Management

As was determined in Section 6.2.3, the preferred alternative for stormwater management design is Alternative #1 - to maintain the BHCC stormwater management pond and to control the Halton Hills Drive extension for water quality, erosion and water balance using local LID techniques. The specific LID alternative not be specified at this time as multiple alternatives could provide the same controls. The

stormwater management design criteria and plans for the preferred solution are summarized below. A Stormwater Management Brief for the preferred alternative is included in this report as **Appendix I**.

### 8.2.1. Design Criteria

The stormwater management solution should meet the Province of Ontario standards as set out in the MOE 2003 Stormwater Management Planning & Design ("SWMPD") Manual as well as local SWM and drainage standards, including the following:

- **Quality Control:** Stormwater should be treated to Enhanced Protection Level (Level 1) as defined in the MOE SWMPD Manual;
- **Erosion Control:** Minimum on-site retention of the first 5mm of a rainfall event; and,
- **Water Balance:** Water balance must be maintained by maximizing infiltration throughout the site and by not diverting or extracting groundwater from natural features.

It has been confirmed that quantity control is not required for this project (this study area) since the quantity control is provided by the Georgetown West Stormwater Management Embankment located downstream. In addition to the above noted criteria, the solution must comply with the objectives of the following studies:

- *Georgetown West and Georgetown South Master Drainage Plan Update Study* by Philips Planning and Engineering Limited, October 1996; and,
- *Draft Black Creek Subwatershed Study – Phase I Characterization Report*, by Credit Valley Conservation, June 2011.

The proposed stormwater management strategy complies with the recommendations of the *Master Drainage Plan Update* and *Subwatershed Study* in terms of not requiring quantity flood control, providing Level 1 Enhanced water quality treatment and providing lot level source controls for erosion control.

### 8.2.2. Design Plans

A Stormwater Management Brief was completed for this project to describe existing drainage conditions and to propose the stormwater management solution for future conditions in more detail. The Stormwater Management Brief is included in **Appendix I** and the stormwater infrastructure has been incorporated into preliminary design of the preferred alternative solution. The following recommendations and conclusions are summarized from the brief:

- Stormwater quality, erosion, and water balance controls are required for the construction of the Halton Hills Drive extension;
- There is no stormwater quantity control required, as it is already provided by the downstream Georgetown West Stormwater Management Embankment;
- The proposed LID techniques will provide Enhance Level quality control for the road extension;
- The Bennett Health Care Centre pond was designed to provide quality control based on its fully developed condition and will thus remain as existing;

- To meet erosion criteria and to minimize erosion potential in general, the LID facilities were designed to retain frequent events of 5 mm or less;
- The stormwater management system on the Halton Hills Drive extension will include catchbasins, LID facilities, and overflow storm sewers;
- The storm sewers were designed to convey the 5-year storm event;
- Water balance will be achieved by maintaining infiltration and by conveying overflow into its respective natural drainage feature as in existing conditions; and,
- Connectivity of the natural drainage features will be maintained by providing culvert crossings.

### **8.3. Recommended Design – Halton Hills Drive Connection**

#### **8.3.1. Design Criteria**

The design of the Halton Hills Drive connection should reflect accepted engineering practice as identified in the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC) and the Town of Halton Hills design standards and practices, where possible. However, consideration was given to minimize the impact to the existing environment or to maintain existing road geometrics. In such instances, TAC guidelines may not have been maintained. The following design criteria were used in developing the preliminary Preferred Alternative:

##### Horizontal Alignment:

- The proposed horizontal alignment will maintain the existing northern and southern segments of Halton Hills drive and the associated geometry.
- The existing 100m radii located at the northern end of Halton Hills Drive will be maintained and integrated into the proposed northern segment of the new road connection. The Town should consider implementing a posted speed of 40km/h (design speed of 50km/h) on Halton Hills Drive to address the existing curve deficiency on Halton Hills Drive.
- The existing 80m radii located at the southern end of Halton Hills Drive will be maintained and integrated into the proposed southern segment of the new road connection. The Town should consider providing a posted speed of 40km/h (design speed of 50km/h) on Halton Hills Drive to address the existing curve deficiency on Halton Hills Drive.
- Due to the existing geometry of Halton Hills Drive the sight distance for the roadway cannot be met with a posted speed of 50km/h. In order to provide adequate sight distance on the future Halton Hills Drive, the Town should consider providing a posted speed of 40km/h in order to meet sight distance requirements along the new segment.

##### Vertical Alignment:

- The proposed vertical alignment will maintain the existing northern and southern vertical configurations of Halton Hills Drive and implement minimum K Values for a design speed of 50km/h (posted 40km/h). A minimum K Value of 7 and a 0.5% minimum gradient for segments between vertical curves has been applied to the proposed vertical alignment for Halton Hills Drive.

Halton Hills Drive is designated as a collector road. The design speed of 50km/h will be utilized for roads with posted speeds of 40km/h (TAC).

### 8.3.2. Design Plans

Based on the evaluation of alternative solutions, the preliminary Preferred Alternative is to provide a road connection between the existing two segments of Halton Hills Drive between Maple Avenue and Princess Anne Drive. There will be no modifications to the existing Halton Hills Drive segments. The lane configuration of one (1) travel lane in each direction and a sidewalk on each side of the road will be maintained to meet the existing road segments. The inclusion of appropriate on-road cycling facilities will be determined through detailed design. Stormwater management measures will be implemented for the road only through the use of infiltration galleries to control the water quality, erosion and water balance. **Appendix K** provides a detailed plan of the Preferred Alternative.

It is of note that at the time of detail design, a review should be undertaken to assess whether traffic signals are warranted at the intersections of Halton Hills Drive/Princess Anne Drive and Halton Hills Drive/Maple Avenue and to review the need for underground infrastructure associated with traffic signals and/or mid-block pedestrian crossings.

### 8.3.3. Preliminary Cost Estimate

The preliminary estimated construction cost for the recommended alternative solution for Halton Hills Drive is approximately **\$1.3 – \$1.5 million**. The fees do not include utility relocations or property costs, which will be confirmed during the detail design stage.

## 8.4. Implementation

### 8.4.1. Timing of Improvements

Based on the policy objectives identified in both the Official Plan and the Transportation Master Plan, it is recommended that the Halton Hills Drive connection be completed under existing conditions.

### 8.4.2. CVC Permits

A permit will be required under CVC's Ontario Regulation 160/06 Development; Interference with Wetlands and Alteration to Shorelines and Watercourses Regulations will likely be required for the works.

### 8.4.3. Recommended Mitigation

Inherent in the consideration of potential changes to existing conditions associated with the construction of a new road, is the significance of any impacts and the extent to which these impacts may be mitigated. Significance is related to importance in a local, regional, provincial or national context, and importance, relative to other identified sensitive areas and issues. This section examines the anticipated environmental effects and mitigation measures for the relevant components of the natural, socio-economic and cultural environments for the preferred alternative solution. A summary of the anticipated impacts and proposed mitigation measures is included in **Table 8-1**.

**Table 8-1: Summary of Anticipated Impacts and Proposed Mitigation Measures**

Factor	Anticipated Impact	Proposed Mitigation
<b>Natural Environment</b>		
Vegetation and Vegetation Communities	<ul style="list-style-type: none"> <li>Removal of 5,590m<sup>2</sup> of terrestrial habitat, namely the Black Walnut Cultural Woodland.</li> <li>Removal of 3,720 m<sup>2</sup> of significant woodland with approximately 4,100 m<sup>2</sup> of woodland being orphaned to the west of the road connection.</li> <li>Potential interference with breeding bird activity and loss of forms of wildlife habitat.</li> </ul>	<p><b>During Detailed Design</b></p> <ul style="list-style-type: none"> <li>Ensure road alignment minimizes impacts to wildlife habitats as best possible within given constraints.</li> <li>Provide a 10m buffer to the significant woodland line as identified in the Woodland Review.</li> </ul> <p><b>Prior to Construction</b></p> <ul style="list-style-type: none"> <li>Undertake a tree inventory and prepare a preservation plan during detail design. <b>Mitigation:</b> planting trees in a nearby location based on Halton Region’s Tree-Canopy Replacement Policy with the purpose of enhancing the function of the Significant Woodland and to mitigate impacts to the feature as a result of the road.</li> <li>To limit interference with breeding bird activity, clearing of vegetation should occur outside of breeding bird season, which is generally between mid-April and late-July, in southern Ontario. <b>Mitigation:</b> If this timeframe is unavoidable, or if birds are suspected of nesting outside this timeframe, an ecologist should undertake detailed nest searches immediately prior (within two days) to site alteration to ensure that no active nests are present.</li> <li>Discuss tree cutting permits with a Region of Halton tree bylaw official and ensure minimal impacts to the orphaned woodland.</li> </ul> <p><b>During and/or Post Construction:</b></p> <ul style="list-style-type: none"> <li>To enhance the existing remaining significant woodland, identify and implement opportunities to enhance the vegetation cover immediately adjacent to the Chris Walker Recreation Trail by installing tree whips and seedlings in numerous open areas that occur along the trail.</li> <li>Prepare a woodlot management plan for those portions of woodlot that will remain after the completion of the Halton Hills Drive connection and any planned development.</li> <li>Improve the overall health and safety of the trees within the study through hazard tree removal/health improvement, including monitoring for the presence of emerald ash borer, buckthorn removal and garbage removal.</li> <li>Loss of significant woodland can be compensated through replanting in areas east of the Chris Walker Trail, but if the recommended amount of compensation cannot be accommodated on-site, additional off-site restoration and enhancement locations that will contribute to the function of the Regional Natural Heritage System may be considered. It is anticipated that locations outside of the Civic Centre Area (CCA) designation will need to be considered for compensation in addition to on-site locations within the CCA.</li> <li>Replanting should include native species to be determined in consultation with the CVC.</li> </ul>
Headwater Drainage Feature	<ul style="list-style-type: none"> <li>Potential requirement to manage/treat these two features as a result of the new road connection</li> </ul>	<ul style="list-style-type: none"> <li>Drainage Feature A-1 is a weak terrestrial linkage which will be removed following construction of the road; however, this linkage can be maintained through the installation of a culvert.</li> <li>Drainage Features A-2 and B-2 need to be conserved and potential and applicable conservation measures will need to be considered.</li> </ul>
Rare or Threatened Species	<ul style="list-style-type: none"> <li>Four retainable Butternut trees considered to be killed, harmed or taken.</li> </ul>	<p><b>During Detailed Design:</b></p> <ul style="list-style-type: none"> <li>Prepare a detailed planting plan and provide to Halton Region and/or CVC for review to ensure that species are common, native and complement the adjacent natural area.</li> </ul> <p><b>Prior to Construction</b></p> <ul style="list-style-type: none"> <li>The butternut health assessment confirmed that two butternut trees within the road alignment are considered to be retainable and would need to be removed. It was also recommended that the additional two retainable butternut trees within close proximity to the new road alignment also be removed. These four (4) retainable trees are identified as tree #3, 4, 5 and 6 in Appendix E, Figure 3. <b>Mitigation:</b> Following MNR review, it was noted that the four (4) trees can be killed/removed and the required compensation was noted to be a minimum of fifty (50) replacement seedlings (Appendix G). Furthermore, the ESA regulation for Butternut requires that deciduous trees and shrubs of other native species be planted in equal numbers to the planted Butternut trees. It is of our understanding that new seedlings cannot be planted within 100m from a highway consisting of two or more lanes in either direction. It is recommended that plantings be located in a more isolated area such as a park/greenspace.</li> </ul>
Fisheries and Aquatic Habitat	<ul style="list-style-type: none"> <li>Potential impacts to aquatic species and habitat through sedimentation during construction.</li> <li>Potential impacts to aquatic species through stormwater discharge resulting in thermal impacts.</li> </ul>	<p><b>Prior to Construction</b></p> <ul style="list-style-type: none"> <li>Implement an appropriate ESC plan as the Black Creek tributary was classified as coldwater with a Brook Trout population.</li> <li>Stormwater management techniques recommended by this study meet CVC guidelines.</li> </ul>

Factor	Anticipated Impact	Proposed Mitigation
<b>Natural Environment cont'd</b>		
Soil Removal and Contaminants	<ul style="list-style-type: none"> <li>▪ Potential for erosion and sediment-laden runoff entering wetlands, watercourses and forested areas adjacent to the work area.</li> </ul>	<p><b>During Construction</b></p> <ul style="list-style-type: none"> <li>▪ No disturbance is allowed within the creek valley and PSW;</li> <li>▪ A sediment control plan should be prepared for the construction phase of the development and approved by CVC, prior to the start of construction works and to the standard of <i>Erosion and Sediment Control Guideline for Urban Construction (December 2006)</i>;</li> <li>▪ Prior to site preparation (clearing, grubbing, grading), the limit of the work area should be fenced with temporary erosion and sediment control (ESC) fencing (paige wire fence fitted with filter cloth);</li> <li>▪ Stockpiled soils should be contained with sediment fencing;</li> <li>▪ All ESC measures should be regularly inspected throughout the construction period. If measures are found to be ineffective, the Contractor should immediately make changes in order to control erosion and sediment runoff;</li> <li>▪ Temporary ESC measures should be maintained and kept in place until all work completed and soils are sufficiently covered and stabilized. Exposed soils shall be stabilized as soon as possible through re-vegetation using native species other appropriate methods;</li> <li>▪ Prepare a spill response plan for works in or near the watercourse and PSW and take necessary actions and notify appropriate personnel in the event of a spill (identification of local MOE office);</li> <li>▪ Undertake works during the summer low flow period;</li> <li>▪ Do not operate equipment in areas where the contract does not require work in the river or on the banks; and,</li> <li>▪ Store construction material, excess material, construction debris, and empty containers outside the creek floodplain.</li> </ul>

**Table 8-1: Summary of Anticipated Impacts and Proposed Mitigation Measures (Continued)**

Factor	Anticipated Impact	Proposed Mitigation
<b>Social / Environmental</b>		
Traffic Management	<ul style="list-style-type: none"> <li>During construction there may be temporary disruptions to traffic on:                             <ul style="list-style-type: none"> <li>Maple Avenue</li> <li>Princess Anne Drive</li> <li>Halton Hills Drive</li> </ul> </li> <li>Changes in traffic patterns post-construction and requirement for traffic signals</li> </ul>	<p><b>During Detail Design:</b></p> <ul style="list-style-type: none"> <li>Develop a traffic management plan if required or identify requirements for potential traffic disruption signing to be in place during construction.</li> </ul> <p><b>Prior to Construction:</b></p> <ul style="list-style-type: none"> <li>Undertake notification to area residents and businesses.</li> <li>Erect signs to advise of traffic disruptions.</li> </ul> <p><b>During Construction:</b></p> <ul style="list-style-type: none"> <li>Relocate heavy equipment travel routes away from residential areas if possible.</li> </ul> <p><b>Post Construction:</b></p> <ul style="list-style-type: none"> <li>Monitor traffic patterns to assess the need for signalized traffic control at the intersections of Halton Hills Drive/Maple Avenue and Halton Hills Drive/Princess Anne Drive. If required, undertake a licence plate survey to determine if bypass traffic is a major concern.</li> </ul>
Land Use and Socio-Economic Impacts	<ul style="list-style-type: none"> <li>Temporary impacts to the Bennett Health Care Centre and the Town's Civic Centre</li> </ul>	<ul style="list-style-type: none"> <li>The majority of the work will be done beyond the existing stub ends of Halton Hills Drive. There may be a few instances where access the Health Care Centre or Civic Centre may be disrupted (e.g., movement of construction related vehicles, etc.); however, access will be maintained or appropriate detours will be implemented to ensure access to the two facilities is provided.</li> <li>Timing of construction activities can be coordinated to mitigate many of these impacts. Construction activities should not have significant impacts on the access to these two land uses.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>The proposed road works on Halton Hills Drive, namely the new road, may result in an increase in noise levels along the corridor.</li> <li>The proposed construction of the Halton Hills Drive connection will result in a temporary increase in noise levels in the area.</li> </ul>	<p><b>During Detail Design:</b></p> <ul style="list-style-type: none"> <li>Noise controls are recommended during construction. Measures should be in conformance with the Town of Halton Hills by-laws and incorporated into the tender document.</li> </ul> <p><b>Prior to Construction:</b></p> <ul style="list-style-type: none"> <li>Develop a complaint resolution procedure to respond to any complaints regarding noise during construction.</li> </ul> <p><b>During Construction:</b></p> <ul style="list-style-type: none"> <li>Timing of construction activities can be coordinated to mitigate noise levels during the construction of the improvements. Construction activities will conform to the Town's municipal noise by-laws taking into consideration time of day, proximity, size of equipment and type of operation.</li> <li>Monitor complaints as required.</li> </ul> <p><b>Post Construction:</b></p> <ul style="list-style-type: none"> <li>If required, undertake a noise analysis if concerns are still relevant.</li> </ul>
Archaeology, Heritage and Cultural Resources	<ul style="list-style-type: none"> <li>No impacts are anticipated.</li> </ul>	<p><b>During Construction:</b></p> <ul style="list-style-type: none"> <li>In the event that deeply buried archaeological remains are encountered, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Tourism, Culture and Sport (MTCS) will be notified immediately.</li> <li>In the event that human remains are encountered during construction, all construction activity will stop immediately and the police and coroner will be contacted immediately. Both the Ministry of Tourism, Culture and Sport (MTCS), and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch will also be contacted.</li> <li>No cultural heritage resources are expected to be impacted as a result of the Halton Hills Drive connection.</li> <li>Development impacts will be more than 10m from the edge of the cemetery, and a temporary barrier will be erected around the historic cemetery and "no go" instructions will be issued for all on-site crew as a precautionary measure.</li> <li>Should there be any ground disturbance outside the area marked on Figure 7 of the Archaeological Report, then further archaeological assessment will be required pursuant to the recommendation.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Reduced air quality during construction.</li> </ul>	<ul style="list-style-type: none"> <li>To minimize reduced air quality due to dust, apply a non-chloride dust suppressants during construction.</li> </ul>
Safety	<ul style="list-style-type: none"> <li>Safety for pedestrian and cyclists upon completion of the road connection.</li> <li>Increased travel speeds could be less safe for pedestrians.</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrians are provided with sidewalks on both sides of Halton Hills Drive.</li> <li>Posted speed will be consistent with Town standards for a collector road.</li> <li>The existing off-street trail located to the east of the Halton Hills Drive connection is still available for pedestrians and cyclists who do not want to travel in mixed traffic.</li> </ul>



Factor	Anticipated Impact	Proposed Mitigation
<b>Social / Environmental</b>		
Streetscaping / Urban Design	<ul style="list-style-type: none"><li>▪ Reduced aesthetics.</li></ul>	<ul style="list-style-type: none"><li>▪ While terrestrial vegetation will be removed to accommodate the road connection, there will be opportunities for streetscaping, consistent with the Town's landscaping guidelines.</li><li>▪ Streetscaping details will be determined during detail design.</li></ul>