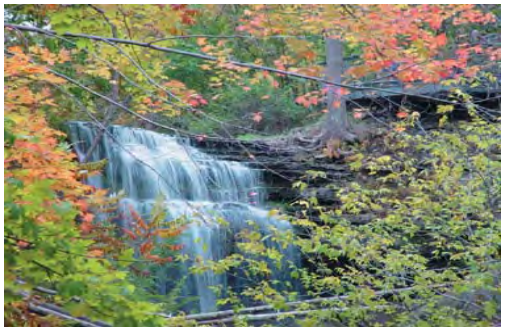

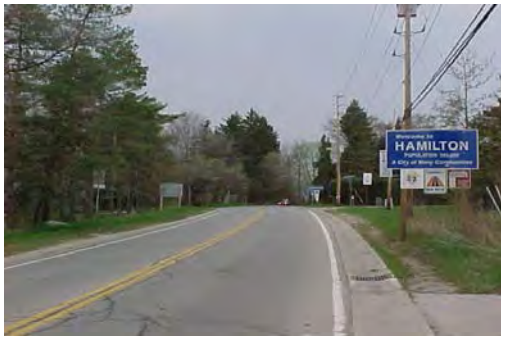

WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN PHASE 2

FINAL REPORT

February 2008

City of Hamilton
City of Burlington
Region of Halton

04-3687

Submitted by:
Dillon Consulting Limited

in association with:
Dalton Consulting
Lura Consulting

DILLON CONSULTING

Dalton Consulting Lura Consulting

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1.0 INTRODUCTION

1.1 Background

In 1992, the Council for the former Town of Flamborough approved a "Preferred Growth Strategy" to allow for the expansion of the urban area around Waterdown. The Preferred Growth Strategy recommended that Waterdown North and Upcountry Lands be placed within the urban boundary. Although, initially adopted by Town of Flamborough Council in May 1992, a revised version of OPA 28 and related Memorandum of Agreement was ultimately approved by Cabinet in June 2002 by Order in Council 1262/2002, in response to a series of appeals. Cabinet's approval of OPA 28 and the related agreement requires the completion of:

- A Class Environmental Assessment for the Dundas Waste Water treatment Plant expansion/diversion;
- A Master EA Transportation Study;
- A Waterdown South Sub-watershed Study; and,
- Secondary plans where council deems necessary.

Having identified the nature and magnitude of the expected transportation deficiencies, alternative opportunities for improvement at a strategic level were then identified by the study team to resolve them.

In September 1999, the former Town of Flamborough, the City of Burlington, the Regional Municipality of Halton, and the former Region of Hamilton-Wentworth received the *Aldershot/Waterdown Master EA Transportation Network Master Plan Report*, Volumes 1 and 2. The purpose of the study was to identify a future transportation network required to accommodate urban development in the communities of Waterdown and Aldershot. The report did not receive council approval from any of the municipalities. Seven years have passed since the submission of this report. Over this period a number of changes have taken place, including the amalgamation of the former Town of Flamborough with the City of Hamilton, an Order in Council was passed approving OPA 28 expansion of the Waterdown urban area, and a number of changes to the existing road network. This area also has a range of environmental constraints.

As a result of the time lapse and changes that have taken place, a new master plan was initiated in 2003. The master plan has been prepared to fulfill Phases 1 and 2 of the Municipal Engineers Association (MEA) Class EA for municipal projects. The same Class EA provided the overall framework that guided the planning process for this study. The Waterdown/Aldershot Master EA Transportation Network Study, July 2004, reviewed the validity of the 1999 Transportation Phase 1 Master Plan prepared by SNC Lavalin and identified a need for additional east/west and north/south capacity in the study area network once OPA 28 lands are developed.

1.2 Study Purpose

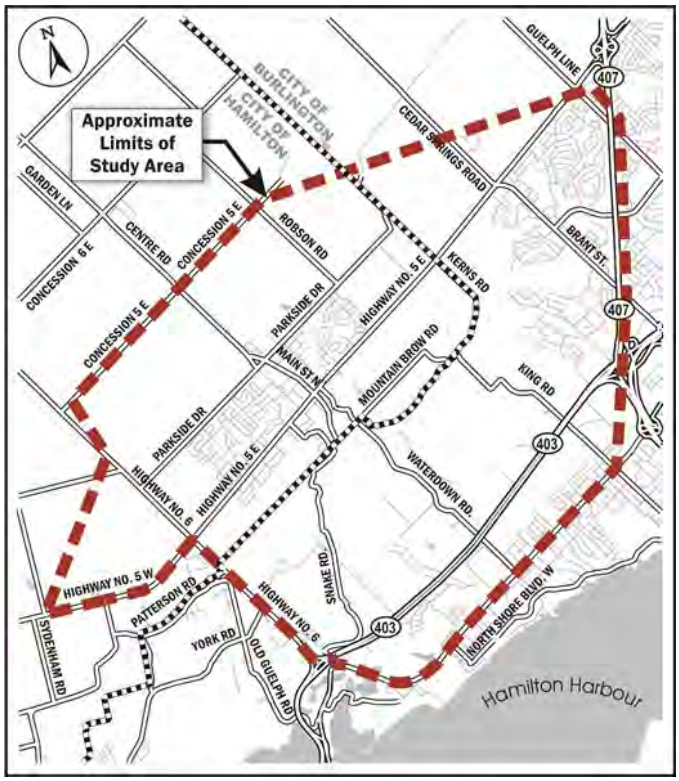
The purpose of this phase of the Waterdown/Aldershot Transportation Master Plan was to confirm the results of the Phase I work and to complete Phase 2 of the Municipal Class Environmental Assessment planning and design process.

This report builds on the previous Phase 1 work (July 2004) and describes the results of the Phase 1 update and Phase 2 work which makes recommendations to resolve the identified road capacity deficiencies.

1.3 Study Area

The study area is an irregular shape generally bounded by Concession 5 East in the north, Highway 407 in the east, Plains Road in the south; and Highway No. 6, including part of the Flamborough Business Park in the west. The limits of the study area are illustrated in ***Figure 1-1***. The study area is located both within the existing community of Waterdown in the City of Hamilton and the community of Aldershot in the City of Burlington. Although the majority of development will occur in the Waterdown community, some of the key transportation network improvements required to support OPA 28 fall outside the City of Hamilton jurisdiction.

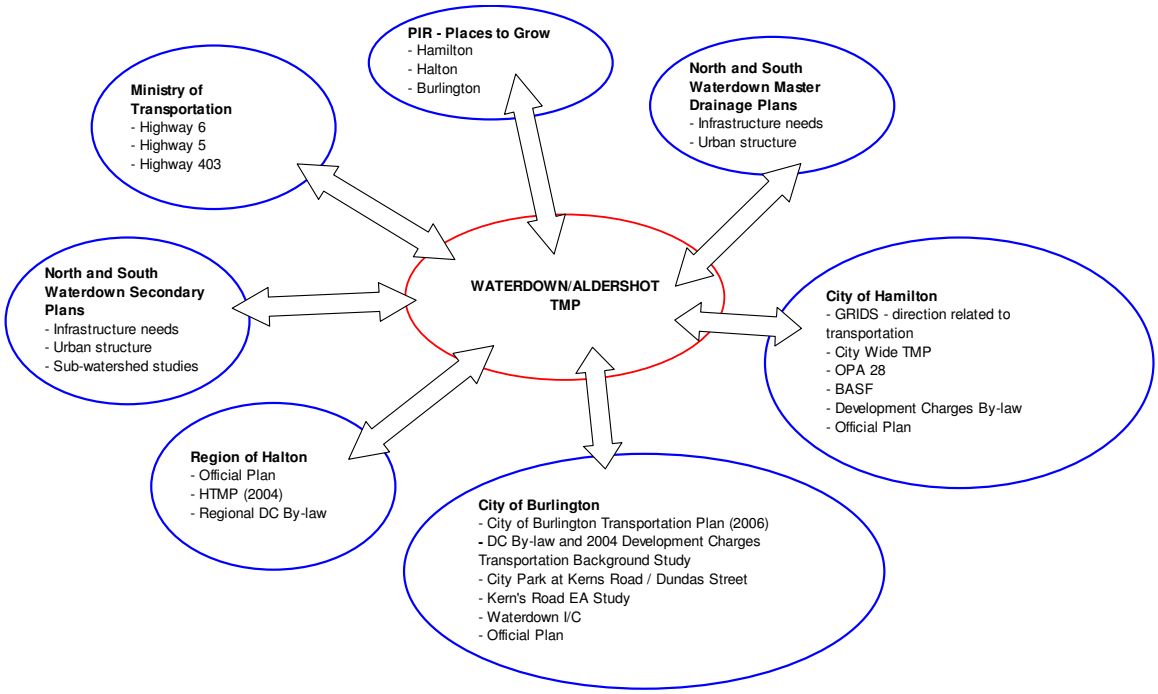
Figure 1-1 – Study Area



1.4 Study Linkages

A number of studies are currently underway or have recently been completed that will have an impact on the Waterdown/ Aldershot Transportation Master Plan. These include studies currently being undertaken by the City of Hamilton, the City of Burlington, the Region of Halton, the Province, and the Niagara Escarpment Commission. An illustration of these study linkages is presented ***Figure 1-2***.

Figure 1-2 – Study Linkages



1.5 Key Study Issues

The study contained a number of key "issues" that were identified from the outset and incorporated in the execution of the work plan. These key issues are presented below.

Strategic Transportation Planning – This study needed to provide the strategic direction to effectively plan for anticipated growth over the next twenty years. It needed to address the integrated multi-modal system the Waterdown/Aldershot community aspires to, by considering the role of all modes in a balanced transportation system. Key issues such as the implications for infrastructure requirements were addressed and these have to balance against cost and other social and environmental impacts.

Community Consultation – The most important component of the project was public consultation. The study had a strong emphasis on Community Consultation due to the sensitivity/controversy of some of the options – including impacts on residences, businesses and the escarpment. The community was kept informed and had meaningful input throughout the study process. Throughout the public consultation process, the Study Team endeavoured to carefully explain and illustrate findings and recommendations. This was accomplished with Stakeholder Advisory Committee meetings, Public Consultation Centre (PCC) presentation materials and discussions, and web pages that were rich in local context, graphic images and straightforward text.

Importance of Transit – From the team's experience in the GTA, it is clear that the current reliance on automobiles for travel during peak periods is not sustainable. With continued reliance on automobiles, roadways across much of the study area will experience substantial increases in peak period traffic volumes in the future, leading to requirements for substantial road improvements, and huge infrastructure costs. The City of Hamilton & Burlington and Region of Halton have already identified a network of inter-regional transit corridors and nodes that can be implemented in an incremental fashion along with development to meet future travel demands in a more balanced fashion, increasing travel choices for all residents and workers, and avoiding the excessive infrastructure costs associated with otherwise needed roadway improvements. The transit system will have to play a much greater role in the future to accommodate the expected increase in travel demand in and around the study area. This will require the implementation of effective transit strategies to increase transit modal split.

Affordable Plan/Cost Estimates – In order to be cost effective and efficient, the Transportation Master Plan was geared to the financial capability of the City of Hamilton, City of Burlington and the Region of Halton. That capability must be as clear as possible, as this will provide assistance in developing and staging the capital program. The first consideration in assessing affordability at this initial stage involves determining what level of capital funding can realistically be allocated annually over the long term to expand the transportation capacity for all modes. The second consideration involves providing input into the project selection process by assessing the major activities/projects from an economic perspective and determining their cost allocations with regard to Development Charges.

Innovation – Many areas of the Master Plan will follow traditional methods to support the development of future transportation priorities for systems and services within the Cities of Hamilton's and Burlington's jurisdiction. This approach is required to satisfy the requirements of the Environmental Assessment processes. The influence of transportation facilities outside the City of Hamilton's jurisdiction and boundaries will be considered at a strategic level to enable the City to productively influence the direction of Central Ontario priorities and funding decisions. The study focused on the coordination of local and inter-regional services and the integration of complementary services.

Smart Growth – The Central Ontario Smart Growth panel has developed a focus on the broad road, rail and transit issues identified in the Master Plan. An inter-regional transit strategy, land use guidelines, new freeway corridors and guidelines for environmental sustainability are all on the agenda of the panel. The Master Plan was responsive to directions from the Smart Growth planning initiatives.

Conservation Authorities – The study area is within an environmentally "rich" part of the GTA, including significant natural features such as the Niagara Escarpment, wetlands designated as "provincially significant" and environmentally sensitive areas. The Niagara Escarpment Commission and Conservation Halton have been active participants in Phase 1 and 2 of the master plan process and were key stakeholders in this study. The Hamilton Conservation Authority provided input in the later stages of the study by providing comments of the draft EA Report.

Fulfilling Class EA Requirements – The study was prepared to confirm the previous Phase 1 work and fulfill Phase 2 of the MEA Class EA planning process. In preparing a Class EA, one of the more critical issues addressed was how the evaluation of alternative improvement scenarios ("alternative solutions") was conducted. A comprehensive and traceable evaluation process was undertaken to consider the range of improvement alternatives and to prioritize system improvements within a preferred transportation network. This employed a methodology that not only assesses the differences between the improvement options under consideration, but also has the ability to address the potentially diverse views and objectives of stakeholders.

1.6 Report Outline

This report has been structured as follows:

- ***Section 1: Introduction*** – provides an overview of the purpose of this assignment and presents relevant background information;
- ***Section 2: Study Process*** – presents the MEA Class EA process, the study team that undertook this assignment and introduces the public consultation process followed throughout the study;
- ***Section 3: Identification of Problem or Opportunity (Phase 1)*** – discusses the process that led to the definition of "The Problem";
- ***Section 4: Developing a Transportation Strategy to 2021*** – presents the various alternatives considered and evaluated and presents the recommended "system" for the Waterdown/Aldershot area;
- ***Section 5: Existing Conditions*** – presents the natural, cultural and socio-economic baseline environmental conditions in the study area;
- ***Section 6: Alternative Solutions Evaluation (Phase 2) –*** describes the alternatives solutions identified to solve the transportation capacity deficiencies and the evaluation process that was undertaken to identify the preferred solutions.
- ***Section 7: Public Consultation and Communications*** – details the public consultation process of the study;

- ***Section 8: Financial Capability*** – discusses the costs of the preferred "system" and cost allocation;
- ***Section 9: Staging Plan*** – presents a staging strategy for the implementation of the recommended infrastructure improvements;
- ***Section 10: Other System Improvements*** – presents other options for consideration to improve the overall transportation system; and
- ***Section 11: Next Steps*** – suggests the action items stemming from this study.

2.0 STUDY PROCESS

2.1 Class Environmental Assessment Planning Process

The Waterdown/Aldershot Transportation Master Plan was carried out in accordance with the MEA Class Environmental Assessment for municipal projects and fulfills the requirements of Phases 1 and 2 of the five phase Class EA planning process.

Phase 1 of the Class EA process is Problem/Opportunity Identification, which was completed in July 2004. Phase 2 examines the consideration of alternative ways to solve the identified problems, giving recognition to environmental, social, economic, cost and transportation service considerations. The five phase Municipal Class EA Planning and Design Process is illustrated in ***Figure 2-1***.

The Municipal Class EA Process encourages municipalities to "prepare Master Plans to address groups of projects, an overall infrastructure system, a number of integrated systems or to co-ordinate the requirements of both the *EA Act* and the *Planning Act* through the development of long range multi-disciplinary plans".

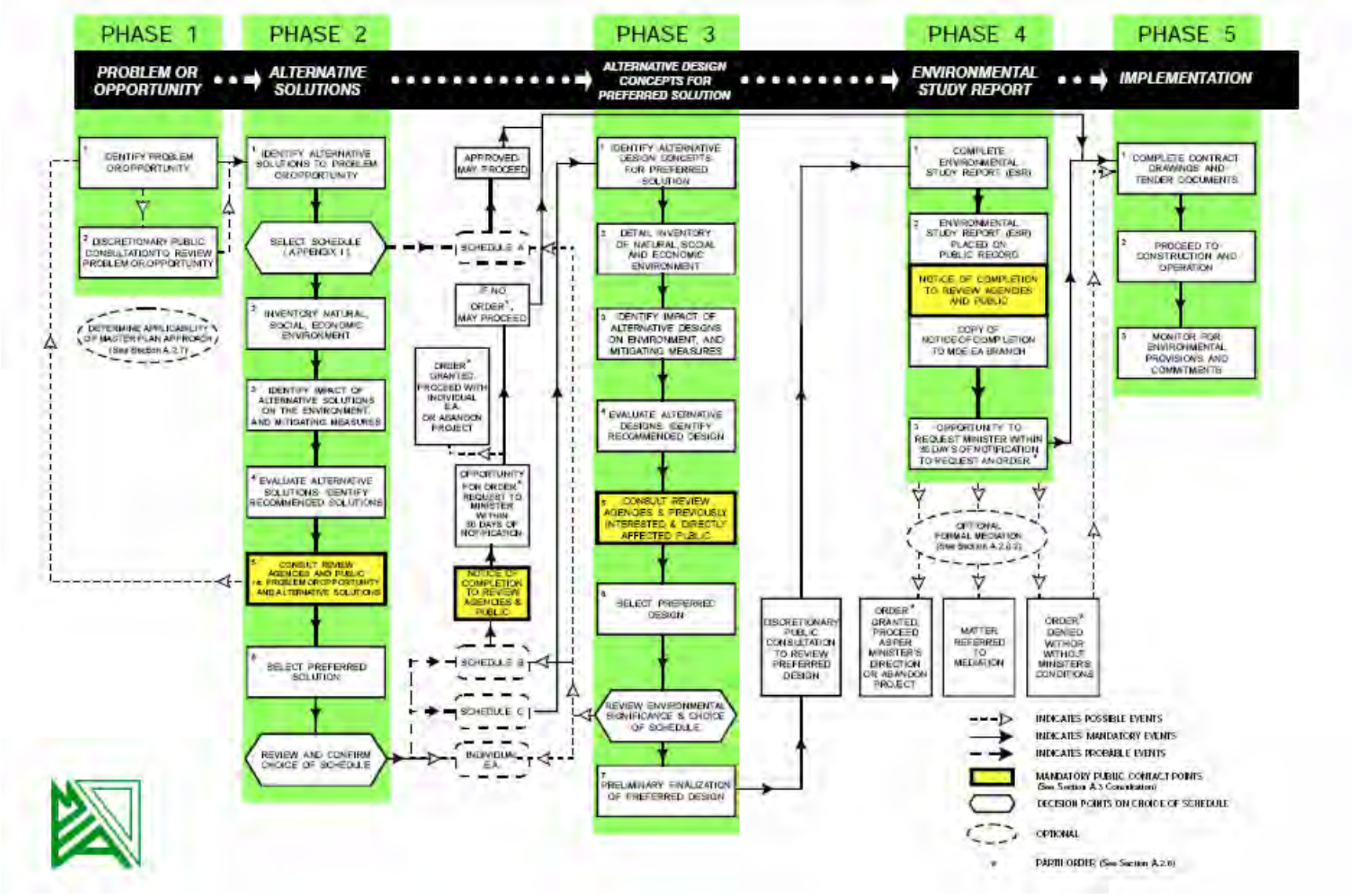
Master Plans generally consist of:

- Broad scope and usually include an analysis of the system in order to outline a framework for future works and developments. Master Plans are not typically undertaken to address a site-specific problem;
- Master Plans typically recommend a set of works which are distributed geographically throughout the study area and which are to be implemented over an extended period of time. Master Plans provide the context for the implementation of the specific projects which make up the plan and satisfy, as a minimum, Phases 1 and 2 of the Class EA process.

"Master Plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure systems or group of related projects in order to outline a framework for planning for subsequent projects and/or developments. At a minimum, Master Plans address Phases 1 and 2 of the Municipal Class EA process."[1]

[1] Municipal Engineers Association, *Municipal Class Environmental Assessment*, October 2000, as amended in 2007.

Figure 2-1 – Municipal Class EA Planning and Design Process



A number of initiatives in the Waterdown/Aldershot TMP may not require Class EA approval (such as Transportation Demand Management (TDM) strategies). However, Class EA approval will be required for the majority of the proposed roadway improvements. The type and scope of projects dictates how much of the process needs to be followed. Three different levels of transportation projects are identified each of which requires a different degree of EA investigation:

- ***Schedule A Projects*** – projects that involve minor modifications to existing facilities. Environmental effects of these projects are minimal and the projects are, therefore, considered pre-approved;
- ***Schedule A+ Projects*** – projects that also general involve minor modifications to existing facilities and are considered to be pre-approved but a municipality is required to notify the public prior to project implementation;
- ***Schedule B Projects*** – projects that involve minor expansions to existing facilities. As there is some potential for adverse environmental effects, these projects are required to proceed through a screening process including public consultation; and
- ***Schedule C Projects*** – projects that involve the construction of new facilities and/or major expansions to existing facilities. These projects must pass through the entire EA planning process outlined in the Class EA.

The road improvements recommended in this report include a mixture of the above four project types.

The approach used in conducting this Master Plan was based on a number of Class EA requirements. Key features included in this Master Plan include:

- Addresses the key principles of successful environmental planning;
- Addresses the first two phases of the Municipal Class EA;
- Allows for a coordinated process with other planning initiatives – Waterdown North, Waterdown South and Upcountry subdivisions;
- Provides a strategic level assessment of various options to better address overall system needs and potential impacts and mitigation;
- Is generally long term;
- Takes a system wide approach to planning which relates infrastructure either geographically or by a particular function;
- Recommends an infrastructure master plan which can be implemented through the implementation of separate projects; and
- Includes a description of the specific projects.

The approach followed for this Master Plan used a sufficient level of investigation, consultation, and documentation to fulfill the requirements of Phases 1 and 2 of the Municipal Class EA (June 2000). As such, through this Master Plan, the Class EA requirements from any identified Schedule B projects will have been fulfilled. Any Schedule C projects will still need to fulfill Phases 3 and 4 prior to filing an Environmental Study Report for public review. The Notice of Completion for any Schedule B projects will be filed simultaneously with the Schedule C projects, upon completion of Phase 4.

The Master Plan process that was followed conforms to "Master Plan Approach #2" in the MEA Class EA whereby Phase 1 and 2 are documented in a Master Plan Report and separate ESR's will be prepared to document Phase 3 for the Schedule C projects.

The Class EA process includes a provision for a Part II order, whereby an individual can provide a written request to the Minister of the Environment to elevate the project to a higher level of EA investigation. Requests for an order to comply with Part II of the EA Act, however, are only possible for the specific project and not the Master Plan.

2.2 Study Organization

Our approach to the study was centred on five key activities.

Project Initiation – the start up phase of the study. In this phase of the study, we finalized the details of the Study Charter, finalized the public consultation plan and developed the study web page.

The technical work on the project began as part of the **Strategic Overview** phase in September 2004. As part of this work, we undertook most of the data collection and refined the City's transportation model for the Waterdown/Aldershot area. This is also where we gained a thorough understanding of the existing transportation system and infrastructure, opportunities and constraints, financial capability of the City, and confirmed the nature of the transportation problem. In late October 2004 we held the first round of public consultation sessions. These sessions provide insight into the current conditions, and input into options and evaluation criteria that could be considered. A multi-Stakeholder Advisory Committee was formed, and provided input on these two areas. By the end of the Strategic Overview we also developed a set of "reasonable" roadway options to address the problem.

The **Analysis** phase of the study is where we began to identify, evaluate and select elements of the Waterdown/Aldershot transportation system that addressed the transportation problem in an environmentally sensitive, balanced, and multi-modal transportation plan that is financially affordable. We developed transit strategies, action plans for developing and encouraging the use of other modes, and tested a range of transportation alternatives using the transportation model. Stakeholder and public input from the Strategic Overview stage was utilized in shaping the evaluation process to ensure that their priorities and values were reflected in the evaluation of alternatives.

The **Plan Formulation** phase was where the entire plan came together. Individual components of the transportation system were combined to form networks of options for evaluation to select the preliminary plan, which is supported by a range of policies and programs. This was then subjected to a financial assessment and detailed into a staging plan. Both the stakeholders' committee and the general public had another opportunity to provide input to the evolving plan,

as the details began to get more specific, in the second round of public consultation held in April 2005. This activity also included the development of the draft documentation for the study, which was released as a draft document for public review in September 2005. In 2006, the City of Burlington conducted a review of the proposed north-south route. This review was completed in April 2007. The final document has been amended to reflect the outcome of this review.

The final phase **Confirmation & Documentation** included presentations to Committee and Council in open public sessions and the preparation of the final documentation, taking into account all of the stakeholder comments. The public was notified of the completion of the TMP Report.

The work plan for this assignment took place in two process streams as the five key activities were executed. These were:

- ***Technical Stream*** – This process dealt with the technical aspects of the study. It involved the data collection, analysis and evaluation and development of the plan; and
- ***Public Consultation Stream*** – This process involved providing and receiving input from the public and agencies on the project and incorporating this input into the technical stream.

The five key phases of this study were undertaken in a period of approximately 12 months. Each of these phases was executed as illustrated in ***Figure 2-2***.

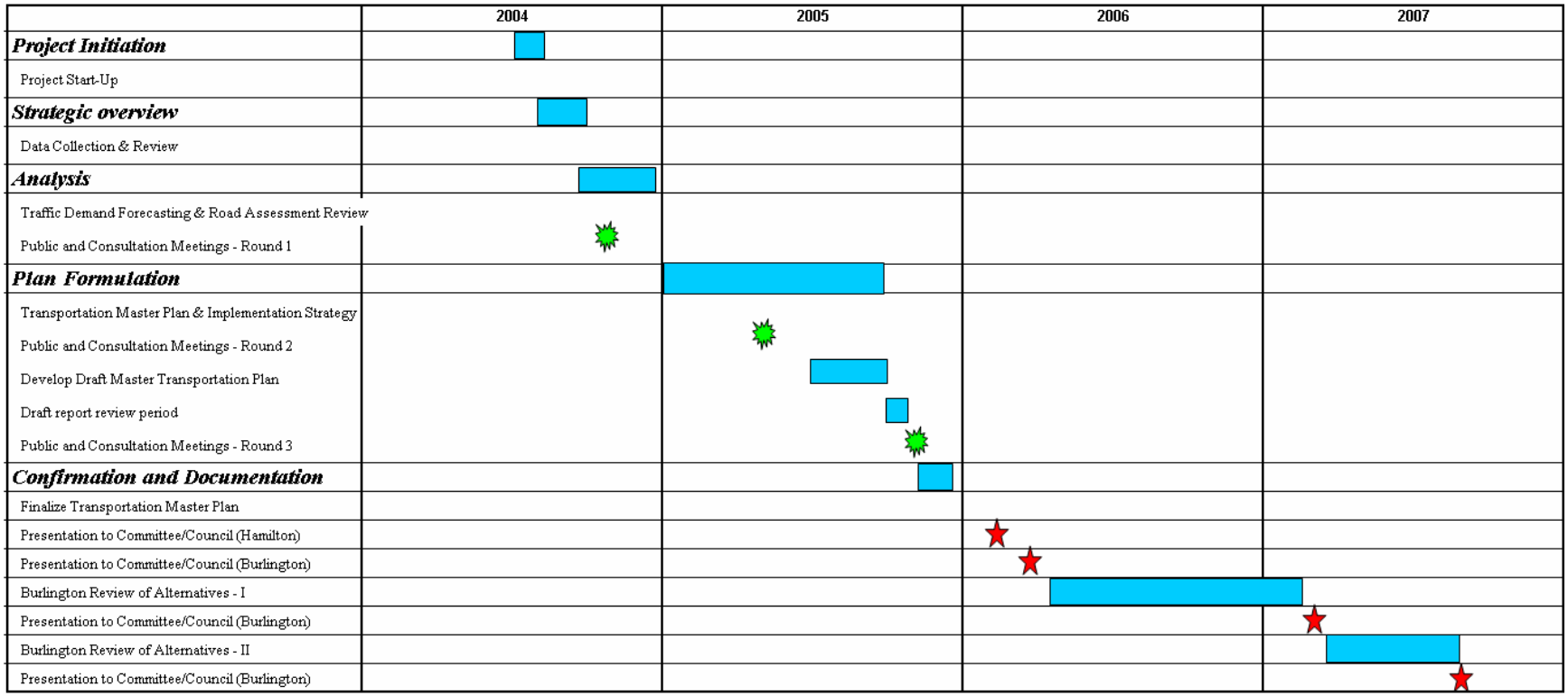
2.3 Study Team

Our core study team is made up of Dillon Consulting Limited with support from Dalton Consulting and Lura Consulting.

Dillon Consulting Limited **(Dillon)** was the prime consultant for this project and accepted corporate and contractual responsibility.

Since the inception of Ontario's Environmental Assessment Act in 1975, corporate planning and commitment has resulted in Dillon Consulting assembling, in-house, most of the disciplines necessary to carry out multi-discipline studies. These disciplines have been totally integrated with our almost 60 years of transportation planning and engineering expertise, resulting in project teams committed to working together as partners with our clients on transportation projects. Multi-discipline transportation projects are a core business for Dillon.

Figure 2-2 – Study Schedule



Lura Consulting **(Lura)** is a leading Ontario-based public communications and consultation firm with 30 years of experience delivering public involvement and community planning services. Lura has been repeatedly recognized for applying innovative consultation techniques locally, nationally and internationally for high profile issues, such as transportation planning, stormwater management, water quality, and waste disposal facility sitting. The firm has extensive experience providing public consultation and communications services in support of Environmental Assessment processes.

Dalton Consulting provided travel demand forecasting and modelling support as required for the undertaking. Dalton Consulting was on the team that developed the York Region Transportation Master Plan and worked with Dillon on the Halton and Kingston Transportation Master Plans, as well as the Pickering Growth Management Study.

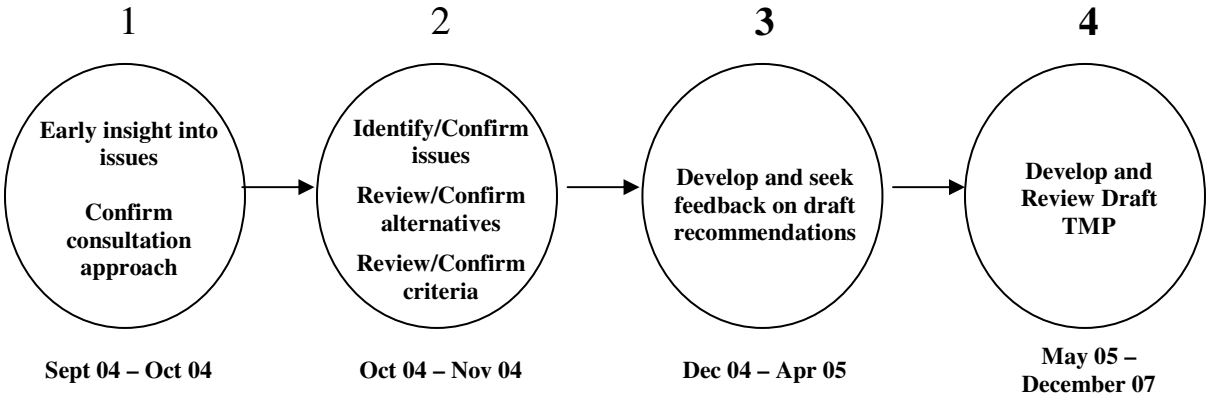
2.4 Public and Agency Consultation and Communication

As illustrated in ***Figure 2-3***, the consultation approach focused consultation and communications activities around four topic/issue areas of the project presented in Section 2.2:

1. Project Initiation;
2. Strategic Overview;
3. Analysis; and
4. Plan Formulation.

In addition to these four focused periods of consultation and communications activity, there were ongoing opportunities for agencies, members of the public and stakeholders to receive information about the project (via the project website and other communications materials, as developed), and also to provide feedback to the proponents (e.g., through phone, fax, email, mail, project website).

Figure 2-3 – Consultation and Communications Work Plan



Section 7.0 details the public consultation and communications process followed in this study.

3.0 IDENTIFICATION OF PROBLEM OR OPPORTUNITY (PHASE 1)

3.1 Waterdown/Aldershot Master EA Transportation Network Study

The Phase 1 Final Report of the *Waterdown/Aldershot Master EA Transportation Network Study* was completed on July 30th, 2004 by SNC-Lavalin. The purpose of Phase 1 was to "review all the land use and transportation network changes, either proposed or constructed, which may effect the study area conclusions and recommendations of the previous Transportation Master Plan Study undertaken by Stantec Consulting Ltd. in September 1999".

The report confirmed the need for additional east-west and north-south capacity in the Waterdown/Aldershot area due to OPA 28, stating that additional capacity was needed in each direction. The report also recommended that the next phase consider all options to provide additional capacity in the Waterdown and Aldershot areas.

3.2 Existing Population/Employment

Waterdown currently has a population of 15,000 (2001 census). The community was established in the late 1700's as a stopping point on Highway 5. The population has remained fairly stable until the early 1990s, when the community received considerable growth, almost doubling in size. Thus, the community is characterized by a combination of old and new development. The town centre is comprised of older homes and retail buildings, which is contrasted by newer residential and retail development along the outer fringe of the developed urban area.

The Flamborough Business Park is located at the intersection of Highway No. 5 and Highway No. 6. This 250-hectare employment area is intended to serve prestige industrial development for the Flamborough area. Currently, the business park has approximately 120 hectares of vacant/agricultural land, with the remainder being occupied by industrial and commercial employment uses. Existing industrial uses are concentrated in the south-east quadrant with more commercially-oriented business located on Highway No. 5.

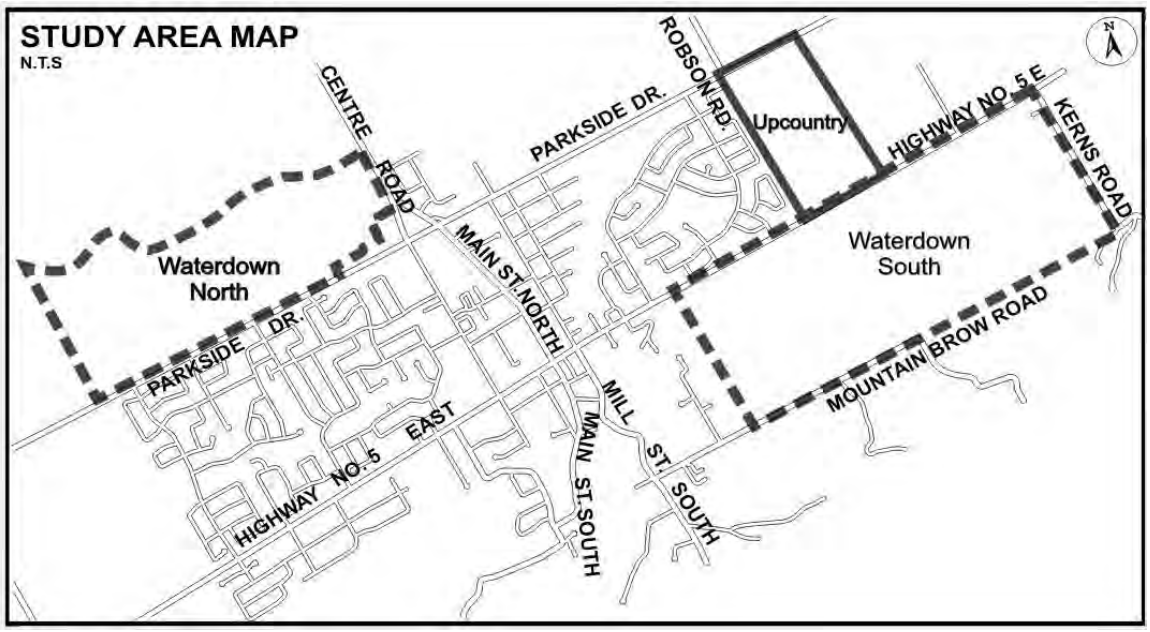
3.3 Population and Employment Forecasts

3.3.1 Waterdown

Official Plan Amendment (OPA) 28
OPA No. 28 to the Town of Flamborough Official Plan was approved by the Executive Council of the Provincial Government of Ontario on June 19, 2002, which would allow the expansion of the Waterdown urban area to accommodate residential growth to the year 2021 based on certain conditions being met. One of the conditions was the completion of a Master Environment Assessment Transportation Study.

The three main expansion areas in OPA No. 28 are Waterdown North, Waterdown South, and Upcountry Lands. These are illustrated in ***Figure 3-1***. The OPA 28 lands consist of approximately 240 hectares of gross developable residential land. The rate of development in the past has been approximately 300 building permits annually. This provides a 15 to 20 year supply of residential land if development continues at a similar rate. Population growth is expected to increase by 15,264 people upon build out. This will generate retail demand for at least 15,422 additional square meters GLA by 2024.

Figure 3-1 – Waterdown Urban Expansion Area



Upcountry Lands

The Upcountry Lands comprise of a 54 hectare land parcel located between Parkside Drive and Dundas Street, east of Robson Road. The lands are designated for residential development. Since the lands are under one ownership and have less complex environmental issues, no secondary planning is required.

Secondary Plans are required for Waterdown North and Waterdown South and are both currently in progress. OPA #28 states that *"Secondary Planning is only required where deemed necessary by Council."* In March 1996, the former Flamborough Town Council passed a resolution stating that since "Upcountry Estate" lands are under one ownership, no secondary planning is required for these lands. For this reason, only Waterdown North and South are subject to secondary planning.

Waterdown North
Waterdown North is a 121 hectare parcel of primarily agricultural land bounded by Borers Creek to the north, Centre Road to the east, Parkside Drive to the south, and the Imperial Oil Sun Canadian Pipeline easement to the west. The area has 7 property owners. Lands adjacent to Parkside Drive are designated predominantly as Mixed Use Area; the north-south portion of Borer's Creek is designated Hazard Lands. The remainder of the area is designated Urban Residential. This will represent approximately 36 percent (5,553 people) of the total population forecast of the Waterdown urban area, along with 5,575 sq m of retail space.

Waterdown South
Waterdown South is a 180 hectare parcel of primarily agricultural land bounded by Highway No. 5 to the north, Kerns Road to the east, Mountain Brow Road to the south, and Flanders Drive to the west. The area has 6 property owners. The area is designated for primarily residential purposes, with small commercial clusters. The lands are projected to accommodate 2,800 to 3,500 residential units with an average density of 35 units per net hectare (65% low density, 25% medium density, and 10% high density). The area is bisected northwest to southeast by a 30 m wide hydro corridor. The Grindstone Creek is a significant natural feature that cuts an east-west path through the northerly half of the area.

Development Applications
There are a number of approved and pending development applications within the City of Hamilton portion of the study area. The majority of these are within the Flamborough Business Park.

The eastern portion of the Business Park abutting Highway No. 6 may be developed as a major commercial centre. There is an application for a Regional Official Plan Amendment and rezoning to allow 600,000 sq. ft. of proposed retail, a 120-room hotel, and 12-pump gas bar on the northeast corner of Highway No. 6 and Highway No. 5 (Flamborough Power Centre). There is also a site plan application for approximately 550,000 sq. ft. of retail/restaurants at the southeast corner of Highway No. 6 and Highway No. 5 (Trinity Development).

Within the existing community of Waterdown, there is a preliminary proposal to permit a four story residential apartment building with a total of 56 units, located on Flamboro Street, south of Dundas Street and west of Main Street.

3.3.2 Aldershot

Aldershot is a primarily residential community located in the south-western portion of the City of Burlington. It has a population of approximately 15,000. The community has a village quality about it and is somewhat isolated from the rest of the City, with the Niagara Escarpment to the north, the QEW to the east, the Hamilton Harbour to the south, and the Royal Botanical Gardens to the west.

The Phase 1 report identified a number of development proposals that are anticipated to occur over the planning horizon of the Transportation Master Plan. These are presented in ***Table 3-1*** and illustrated in ***Figure 3-2***.

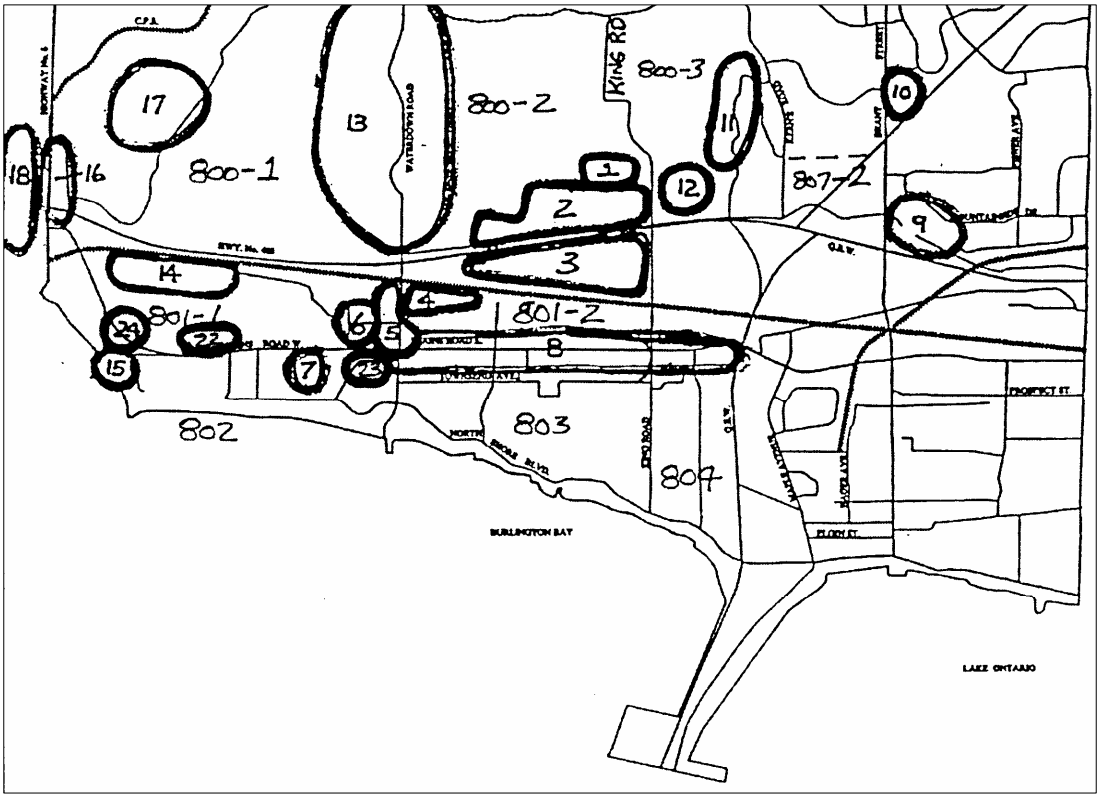
Figure 3-2 Staff at the City of Burlington have confirmed that the list of development applications presented from the Phase 1 Report in ***Table 3-1*** are still up-to-date. Only the development of the Aldershot Plaza (#23) has changed slightly. Currently, a planning study is underway with Phase approval for 266 units.

Table 3-1 – Aldershot Population and Employment Forecasts

	Development Application	Residential Units	Employment
1	Jannock Brick Plant	0	30
2	King's Forest Bus. Park	0	3,400
3	Jannock/CNR lands	0	3,500
4	Blue Circle lands	0	725
5	Waterdown Road lands	0	600
6	Howard Road lands	0	350
7	DeGroote Project	215	0
8	Plains Road lands	100	100
9	Emshih east of Costco	0	550
10	Amherst Drive	230	0
11	United Lands	100	0
12	Geofcott lands	0	400
13	Grindstone Owners	650	250
14	Garden Trails	200	0
15	Easterbrook lands	100	0
16	Bridgeview Office	0	100
17	Snake Road Cemetery	0	0
18	Dundas Pleasantview	25	0
22	West Plains	50	0
23	Aldershot Plaza	500	0
24	RBG Expansion	0	100
	Total	**2,170** *(5,880 pop.[1])*	**10,105**

[1] *approx. growth from 1999 on; *Reproduced from the Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin*

Figure 3-2 – Expected New Development within Aldershot Area



Source – Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin

3.4 Existing Major Transportation Network

The report, *Waterdown/Aldershot Master EA Transportation Network Study Phase 1, July 2004*, identified that main gateways in and out of Waterdown are currently close to or at capacity during the peak periods. The primary east-west roads in the study area include Dundas Street/Highway No. 5, Highway 403, Plains Road, and Highway 407. The primary north-south routes in the study area are Highway No. 6, Waterdown Road, and Brant Street (Regional Road 18) (see ***Figure 3-3***).

Dundas Street/Highway 5 is one of the major east-west gateways into and out of the study area. The character and jurisdiction of this road vary significantly. West of Highway No. 6, the road is under the jurisdiction of the Province of Ontario, with two travel lanes. East of Highway No. 6, Dundas Street has a 4-lane arterial road cross section, which is under the jurisdiction of the City of Hamilton. Through the Waterdown community, turning lanes are provided on the two-lane cross section with on-street parking. East of Kerns Road, Dundas Street (Regional Road 5) is under the jurisdiction of the Region of Halton and has four travel lanes.

Waterdown - Aldershot Transportation Master Plan

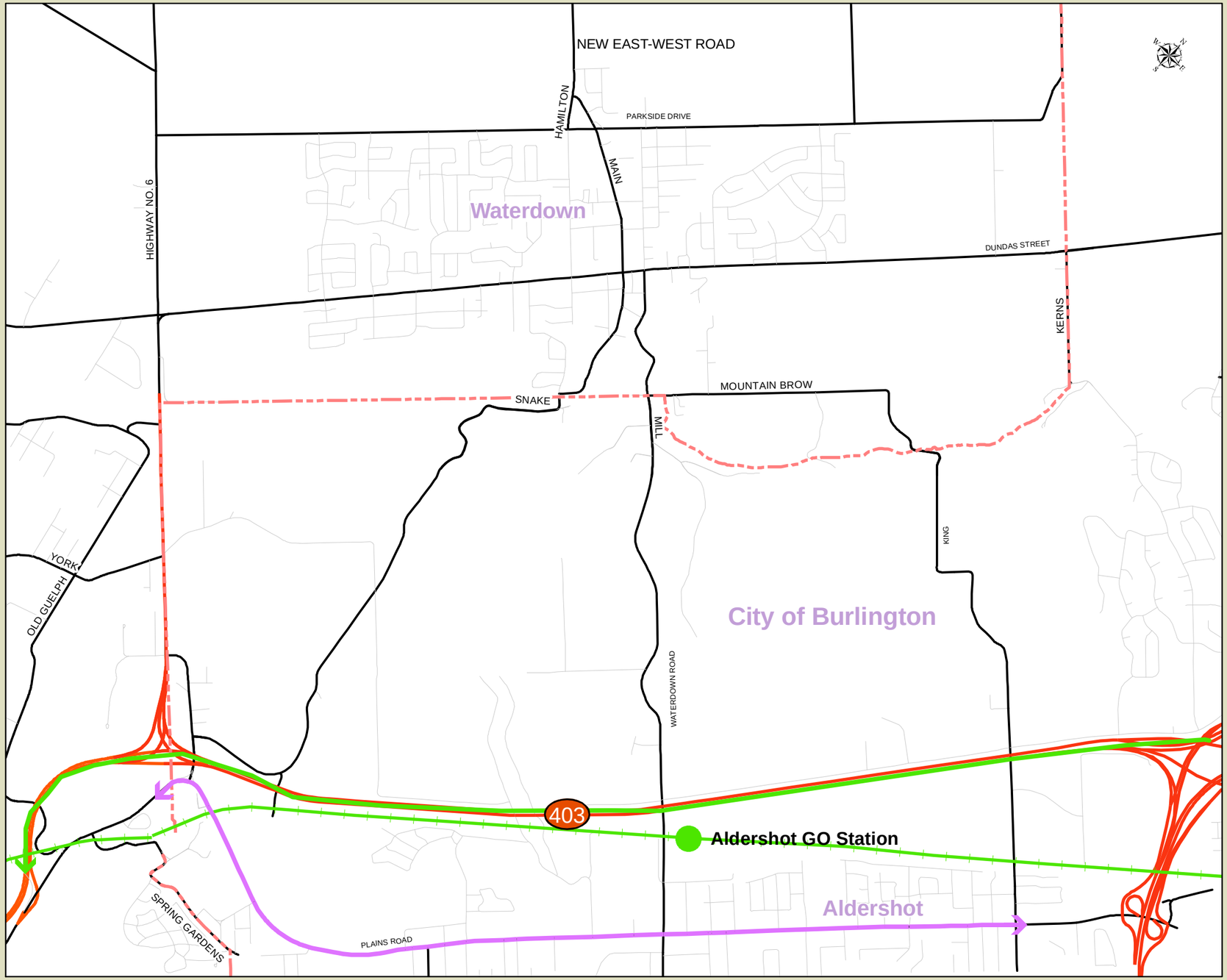


Figure 3.3: Existing Road and Transit Network

- Municipal Boundary
- GO Transit - Bus
- GO Transit - Rail
- Burlington Transit

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

DILLON CONSULTING

Highway 403 is located along the southern portion of the study area. Access to the Highway from the study area is limited to Highway No. 6 for eastbound and westbound traffic, and also Waterdown Road for westbound traffic only.

Highway No. 6 is a 4-lane major north-south gateway into and out of the area located along the western portion of the study area. The highway is planned for widening in the near-term to a 5-lane cross-section (3 lanes northbound and 2 lanes southbound) and conversion to an access controlled highway between Highway 403 and Dundas St.

Waterdown Road is another north-south gateway into and out of the study area, with connection to Highway 403 westbound and Plains Road. This 2-lane road is under the jurisdiction of the City of Burlington.

Table 3-2 illustrates the primary roadway characteristics in the study area.

Table 3-2 – Existing Primary Roadway Characteristics

Street	From	To	Official Plan Road Classification	Jurisdiction
North-South Roads				
Highway 6	Highway 403 Dundas Street East	Dundas Street East Concession 5 East	Highway Highway	Province Province
Snake Road	Highway No. 6	Main Street	Collector	Burlington
Waterdown Road/Mill Street	Plains Road Mountain Brow Road	Mountain Brow Road Dundas Street East	Arterial Arterial	Burlington Hamilton
Hamilton Street/Centre Road	Dundas Street Parkside Drive	Parkside Drive Concession 5 East	Arterial Arterial	Hamilton Hamilton
Main Street	Snake Road	Centre Street	Collector	Hamilton
Robson Road	Parkside Drive	Concession 5 East	Collector	Hamilton
King Road	North Service Road	Mountain Brow Road	Collector	Burlington
Evans Road	Dundas Street	Parkside Drive	Arterial	Hamilton
Kerns Road	North Service Road	Dundas Street East	Collector	Burlington
Brant Street/Cedar Springs Road	Highway 407 Dundas Street East	Dundas Street East North study limit	Major Arterial Arterial	Halton Region Burlington
East-West Roads				
Concession 5 East	Highway No. 6	Robson Road	Collector	Hamilton
Parkside Drive	Highway No. 6	Evans Road	Arterial	Hamilton
Highway No. 5/Dundas Street	West of Highway No. 6 Highway No. 6 Kerns Road	Highway No. 6 Kerns Road Guelph Line	Highway Arterial Major Arterial	Province Hamilton Halton Region
Mountain Brow Road	Waterdown Road	King Road	Collector	Hamilton
North Service Road	Waterdown Road	Highway 407	Arterial	Burlington
Highway 403	Highway No. 6	Highway 407	Freeway	Province
Highway 407	Highway 403	Guelph Line	Freeway (toll)	Province
Plains Road	Highway No. 6	King Road	Arterial	Burlington

3.5 Existing Transit Service

Existing transit service in the study area is limited to the Aldershot community and the Brant Hills and Tyandaga neighbourhoods in Burlington near Brant Street. The Waterdown community currently has no transit services. Presented below is a description of the transit services provided in the study area by each transit provider.

Hamilton Street Railway (HSR)
HSR currently runs no services to the Waterdown community. In December, 2001, The City carried out a Waterdown Transit Study to assess the need, and plan for the provision of transit services in the Waterdown community. The study was based on a review of existing travel patterns and a resident survey. Destinations of potential transit trips originating in Waterdown included downtown Hamilton, Burlington, Waterdown, and the Aldershot GO Station. The primary trip purpose for transit trips were shopping and social/recreational. Four transit options were assessed, which included a fixed route service from the Aldershot GO Station, a fixed route service connecting to Plains Road, a TransCab service (similar to the one operating in Stoney Creek and Glanbrook), and a Trans Link service (similar to the one operating in Dundas). The preferred option was the TransCab service. Mailed opinion surveys were sent, with 32 percent supporting the service and 68 percent of respondents not supporting the introduction of transit service.

In November 2007, the City of Hamilton adopted a Transit Service Enhancements Plan. The plan included the provision of transit service to the Waterdown community. The proposed transit route will provide transit services in the existing urban area of Waterdown (between Dundas Street and Parkside Drive, east of Highway #6). Buses would operate north-south on Waterdown Road, terminating at Plains Road, with direct service to the Aldershot GO/VIA Station. This would provide passengers with an opportunity to transfer to GO Rail and Bus services, VIA Rail service or Burlington Transit buses. Transfers from HSR to Burlington Transit are free of charge, allowing customers to travel to Downtown Hamilton, the Burlington and Appleby GO Stations and other points within Burlington. The introduction of this service is currently under review.

Burlington Transit
Burlington Transit operates Route 1 – Plains/Fairview West on the southern border of the study area. Route 1 runs along Plains Road connecting downtown Hamilton with the Burlington GO Station, with stops at Plains Road and King Road, Plains Road and Waterdown Road, and the Royal Botanical Gardens. Route 1 operates weekday service between 5:20 am and 11:55 pm at 15 minute frequencies during the peaks and half-hour to hourly frequencies during the off-peaks. Limited weekend service at 30 to 60 minute frequencies is also provided. This is the primary transit service for the Aldershot community.

Route 7 – Tyandaga North, and Route 2 – Brant North, also operate within the study area. Route 7 provides a residential feeder service from the Burlington GO Station along Kerns Road and Tyandaga Park Drive. The route operates as a GO feeder service during the weekday peak periods. Route 2 provides a service along Brant Street, between Cavendish Drive (just south of Dundas Street) and the downtown transit terminal. The service runs all day at 15 minute

frequencies during the peaks and 30 minute frequencies during the off-peaks. Saturday service is also operated on this route.

Burlington Transit previously operated rush hour service to the Aldershot GO Station via Route 5 – Francis. This service was discontinued in 2000.

GO Rail

The Aldershot GO Station is located on 1199 Waterdown Road, just south of Highway 403 in the southern part of the study area. The Aldershot GO Station provides service to the Lakeshore West GO Train and Train-Bus, connecting downtown Hamilton to Union Station in downtown Toronto. Ninety-nine percent of passengers surveyed in 2003 accessed the station by private automobile (91 percent drove and 8 percent arrived by kiss n' ride). The station has 637 parking spaces, of which 80 to 87 percent of spaces are utilized (2003 GO Transit survey).

GO Transit operates fifteen weekday eastbound GO Train trips from the Aldershot GO Station to Union Station between 5:35am and 11:08pm. During the AM peak period, five trains depart between 5:35am and 7:19am, constituting the rush hour service towards Union Station. Subsequent trips operate on roughly hourly frequencies during the midday, early afternoon and in the late evening. In the westbound direction, GO Transit operates eighteen weekday westbound GO Train trips from Union Station to Aldershot Station, between 9:44am and 1:44am. The service is generally provided at an hourly frequency throughout the day, with half hour frequencies provided between 5:24pm and 6:24pm. During other times, the GO Train is supplemented by regular Train-Bus service between Burlington GO Station and Hamilton GO Centre. In the eastbound direction, the service runs between 4:30am to 11:08pm. Westbound service arrives at Aldershot GO Station between 7:20am to 2:40am.

On Saturday's and Sunday's, the GO Train operates all day at hourly frequencies between Aldershot GO Station and Union Station. Connections to the Hamilton GO Centre are provided via the Train bus service.

GO Bus

With the exception of the Lakeshore West Train Bus, which is an extension of the GO Rail service, no GO Bus routes have existing stops within the study area. Two existing GO Bus routes pass through the study area, and provide an opportunity to further connect the study area with interregional transit services. These are:

- ***Route 15 – McMaster University Limited Service*** – this service runs express between Union Station and McMaster University with only one stop at the Burlington GO Station. The service operates only during the peak periods, peak direction on weekdays, along with limited Sunday service. Providing an additional stop at the Aldershot GO Station could provide a useful transit connection to McMaster University for Waterdown/ Aldershot residents; and
- ***Route 46 – Highway 407 West GO Bus Service*** – this service connects downtown Hamilton with York University, with stops at McMaster University, Mississauga City Centre, and Bramalea GO Station. The route operates weekday service eastbound between 5:00am and 10:35pm from downtown Hamilton and westbound service arriving

at downtown Hamilton between 7:35am and 1:15am. Both directions operate at approximately half-hour frequencies or better. Currently, the service does not stop within the study area, however, it does pass the Aldershot GO station along Highway 403. A stop for this route at the Aldershot GO Station would provide a good connection to Waterdown/Aldershot residents to Hamilton, McMaster University, and destinations along Highway 407.

VIA Rail
VIA Rail operates out of the Aldershot Station, which shares its facilities with GO Transit. Several trains depart this station each day, including:

- Toronto to London;
- Aldershot to Montreal/Ottawa;
- Toronto to Niagara Falls, Buffalo, and New York; and
- Aldershot to Toronto, Kingston, Toronto.

3.6 Existing Cycling and Pedestrian Trails

3.6.1 Cycling

Within the study area, there are a number of east-west and north-south cycling routes designated by the City of Hamilton and City of Burlington. These are illustrated in ***Figure 3-4***. Some of the major routes include Parkside Drive between Highway 6 and Robson Road, Robson Road north of Parkside Drive, Mountain Brow Road, Main Street North and Centre Road between Dundas Street and Carlisle Road (north of the study area), and Plains Road.

There exists a north-south disconnect in designated cycling routes between the communities of Waterdown and Aldershot.

3.6.2 Trails

A number of trails traverse the study area, the most notable being the Bruce Trail. The Bruce Trail is Canada's oldest and longest footpath, which provides the only public access to the Niagara Escarpment. The Bruce Trail is 782 km long, extending from Queenston on the Niagara Peninsula through Waterdown to Tobermory at the tip of the Bruce Peninsula. The trail has a number of picturesque views, scenic landscapes and 290 km of additional side trails.

Through the study area, the Bruce trail traverses the escarpment south of Dundas Street before heading north of Dundas Street and east of Kerns Road.

Another important trail that was noted is located east of Centre Road connecting the Flamborough Wetlands Park to Parkside Drive.

Waterdown - Aldershot Transportation Master Plan

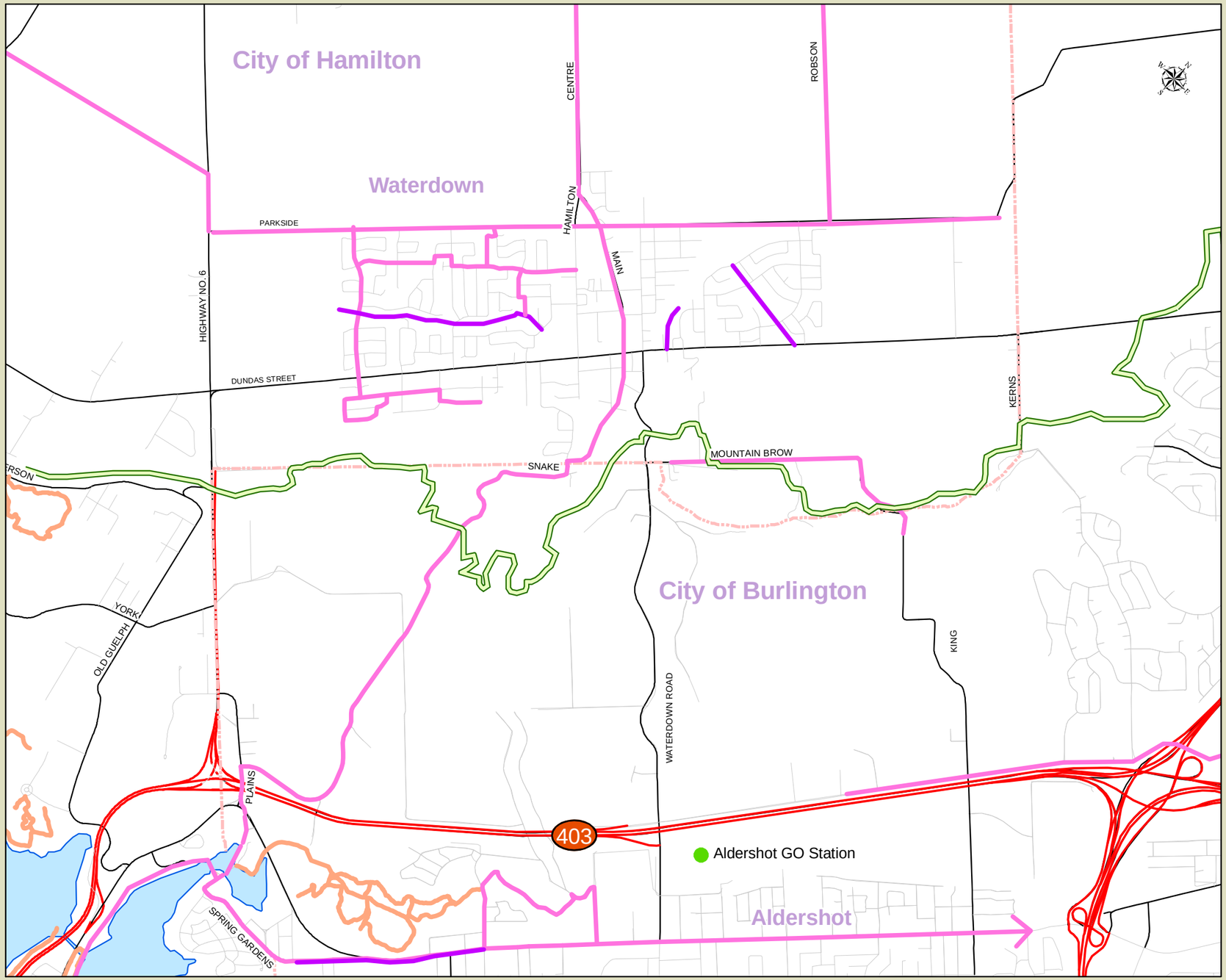


Figure 3.4: Existing Cycling and Pedestrian Trails

- Municipal Boundary
- On Street Bike Route
- Off Road Multi-Use Path
- Bruce Trail
- Other Trails

Scale

0 250 500 1,000 1,500 Meters

Map Notes

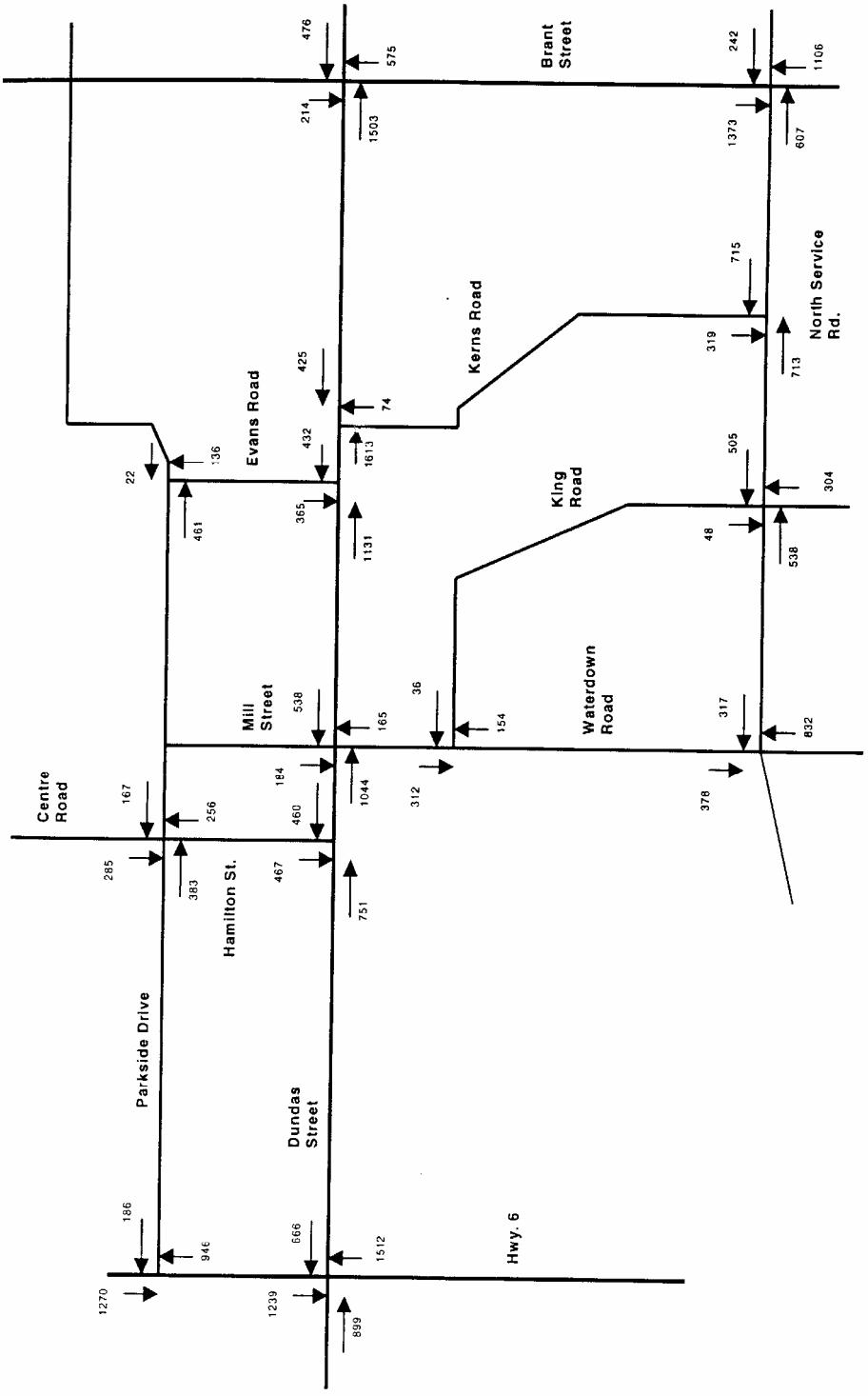
Map created by: PJK
Map checked by: DPM/CC
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

Phase 1 of the Municipal Class EA process as reported in the *Master EA Transportation Network Review of Aldershot/Waterdown (July 2004)* identified existing critical turning movements at major intersections in the study area and screenline volumes for the major road network during the AM and PM peak periods. These figures have been reproduced and are presented in ***Figure 3-5*** and ***Figure 3-6***. A review of traffic volumes was carried out using both SYNCHRO intersection analysis and SimTraffic simulation software. The results of the analysis indicate that "while most intersections are operating well, there are certain specific movements that are experiencing delays and evidence that capacity may soon be (or already has been) reached".

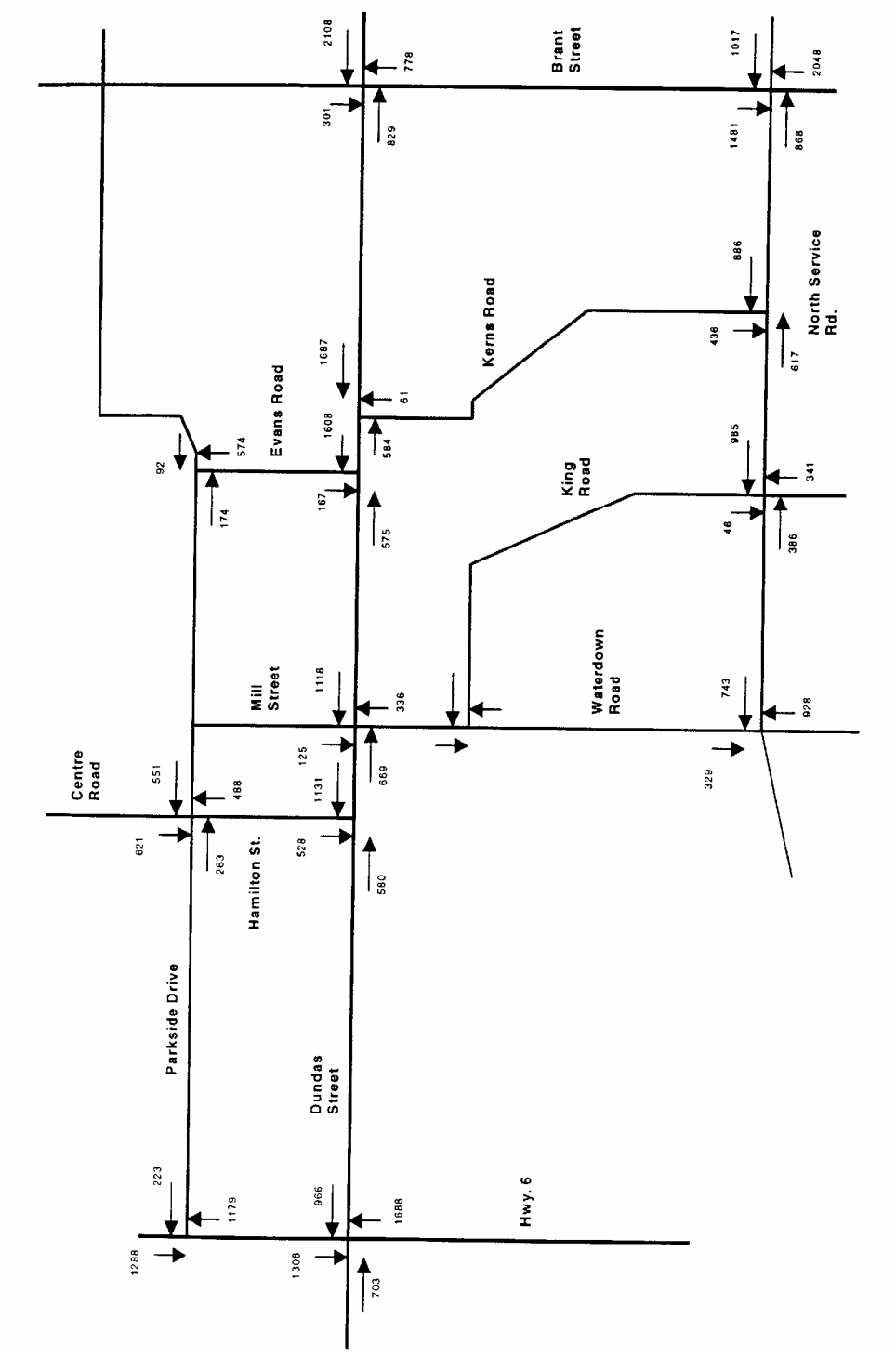
Table 3-3 (reproduced from the Phase 1 report) illustrates the congested movements at study area intersections during the AM and PM peak hour that exhibited a volume-to-capacity (v/c) ratio greater than 0.80. This is a numerical measure of the ratio between volume on a particular intersection turning movement and the available capacity to accommodate that volume. A v/c ratio greater than 0.80 generally means that critical capacity has been reached. This is represented as a high degree of congestion with long delays and queues at signalized intersections. Once a v/c ratio exceeds 1.0, this is defined as the point where the roadway section has failed, and the volume of vehicles on the roadway section has exceeded the available capacity to accommodate them. As illustrated, conditions during the PM peak hour are more congested than the AM peak hour, with a number of movements near to or at capacity.

Figure 3-5 – AM Peak Hour Traffic Volumes (2002/03)



Source – Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin

Figure 3-6 – PM Peak Hour Traffic Volumes (2002/03)



Source – Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin

Table 3-3 – Current Critical Turning Movements

Intersection	Movement	Demand volume	v/c	Average delay/veh (s)
AM Peak Hour				
Dundas St. at Mill St.	EB through/right	985 through 53 right	0.88	EBT 33.3 EBR 33.2
Dundas St. at Evans Road	SB left/right	339 left 26 right	0.83	SBL 28.0 SBR 22.5
Dundas St. at Brant St.	EB through	1214	0.92	38.8
Hwy. 6 at Parkside Dr.	SB left	144	0.83	55.4
PM Peak Hour				
Hwy. 6 at Dundas St.	WB left	432	0.85	62.8
Hwy. 6 at Parkside Dr.	SB left	155	0.83	43.1
Dundas St. at Hamilton St.	EB left	149	0.93	24.9
Dundas St. at Main St.	WB through	1040	0.89	30.9
Dundas St. at Mill St.[2]	WB through	927	0.83	56.6
Hamilton St. at Parkside Dr.	NB left	89	0.85	39.8
Dundas St. at Brant St.[3]	NB left WB left WB through	385 492 1562	1.10 1.21 0.94	NBL 233.3 WBL 335.2 WBT 56
North Service Rd. at Brant St.	EB right WB left NB left NB through	435 378 538 1376	0.85 0.82 0.93 1.03	EBR 14.6 WBL 349.7 NBL 108.0 NBT 101.7
Kerns Rd. at North Service Rd.	WB through	680	0.86	32.3
King Rd. at North Service Rd.	WB through	630	0.91	105.3
Waterdown Rd. at North Service Rd.	WB through/left	274 left 349 through	0.96	WBL 95.3 WBT 98.9

N.B. Turning movements shown with a v/c over 1.0 are likely operating at greater saturation flow rates than assumed.

[2]*There is significant recurring queuing westbound on Dundas Street in the PM peak where the 4-lane section ends approaching Mill Street, and this meters demand making the intersection appear to function, when in reality there is a capacity deficiency on Dundas Street.*

[3]*This intersection is in need of improvement by the addition of double left turn lanes (NBL, WBL). This need was also identified in the Transportation Master Plan for Regional Road 5 (Dundas Street) and 25 Corridors, undertaken by Halton Region in 1999.*

Source – Waterdown/Aldershot Master EA Transportation Network Study Phase 1 – Final Report, (July 30, 2004) SNC Lavalin

3.7 Planned Road Improvements

Highway 6
Planned road improvements in the study area include a widening of Highway 6 to five lanes (3 northbound and 2 southbound) south of Dundas Street, and the construction of an interchange at Highway 6 and Dundas Street (EA was recently completed). These improvements are being undertaken by the Ontario Ministry of Transportation (MTO). A planning study has been initiated to review the ultimate need and configuration of Highway 6 north of Highway 5/Dundas Street.

Highway 5
On Highway 5, a Preliminary Design and Environmental Assessment Study is currently underway, under the direction of the MTO that will look at the potential widening of Highway 5 west of Highway 6.

Waterdown Road and Highway 403 Interchange
The City of Burlington has carried out a Class Environmental Assessment (EA) study for improvements to the Waterdown Road/Highway 403 interchange in the City of Burlington, Regional Municipality of Halton. The study included a review of opportunities to improve the existing interchange, including the addition of an eastbound on-ramp (for eastbound traffic to enter Highway 403) and a westbound off-ramp (for westbound traffic to exit Highway 403).

The study has been carried out in accordance with the Municipal Class EA (June 2000) and also fulfilled the requirements of the Class EA for Provincial Transportation Facilities (July 2000).

The City of Burlington is planning to incorporate this project in its 2006 Capital Programme.

3.8 Study Area Transportation Network Analysis

As part of the process, a network analysis was undertaken to assess the transportation requirements for the Waterdown/Aldershot area. The analysis began with the assessment of a future "do-nothing" condition for the 2021 horizon year. The purpose of beginning here was to quantify the magnitude of the transportation problem throughout the network.

The network analysis was developed using the City of Hamilton's A.M. Peak Hour Model to determine travel demand needs and phasing between 2004-2021.

The model "runs" established the anticipated demand on the area network. The strategy then, was to determine how to best serve this demand within the conditions established through the study process.

Despite the identification of capacity deficiencies on the roadway network, the considered solutions were not limited just to roadway expansion or extensions. Rather, other strategic level alternatives that focused on the promotion of non-automobile transportation and multi-occupant vehicles were considered first.

For each of the problem areas identified in the area network by 2021, the potential for alternative roadway improvements was considered and where appropriate, alternatives were identified. The need for roadway improvements was identified taking into consideration the potential for transit, cycling, walking, and Transportation Demand Management (TDM) alternatives to help solve the problem. The roadway improvement alternatives were assessed based on a set of evaluation criteria and a preferred alternative selected for each problem area. The preferred roadway solutions for each problem area were then knitted together with the proposed transit and other considerations to form a total network "system" solution.

3.9 Modeling Process

3.9.1 Synopsis of Existing Model

The City of Hamilton Emme/2 Model was used to provide some of the initial inputs to the Waterdown/Aldershot Transportation Master Plan. The model is a transportation demand forecasting tool used by the City of Hamilton to help plan for future infrastructure requirements in the municipality. The model consists of a year 2001 road network and peak hour auto vehicle and truck trip tables for the years 2001 and 2021. The 2001 trip tables consist of expanded trip data from the 2001 Transportation Tomorrow Survey (TTS)[2] supplemented by census Place of Work – Place of Residence (POW-POR) data, for areas external to the TTS, and truck data from the 1995 Commercial Vehicle Survey (CVS). A 3 percent annual growth factor was used to obtain both the 2001 and 2021 trucking estimates. The 2021 auto vehicle trip table was obtained by "Frataring" the 2001 trip table to trip end totals obtained by applying population and employment growth factors to the 2001 trip end totals.

For the Waterdown/Aldershot TMP the trip matrices from the Emme/2 model (both 2001 and 2021) were re-balanced to revised trip end totals within the study area using standardized trip rates applied to estimates of population and employment.

There was considerable public interest in the modelling methodology and its results from residents along the east-west corridor. The Study Team and members of the public discussed the methodology and results in detail throughout the study process.

3.9.2 Waterdown Network Validation and Base Test

Revisions to Base Year (2001) Network Representation
The base year (2001) road network used in the Hamilton Emme/2 model was reviewed for accuracy within the study area and additional detail added for consistency with the zone system. Those changes included the addition of required centroid connectors and revisions to the existing ones. Based on current information received, a number of link attributes were modified to reflect the existing situation. These are presented in ***Table 3-4*** and ***Table 3-5***.

[2] TTS is a Greater Toronto Area wide transportation behaviour survey collected every five years for the purposes of understanding travel behaviour in participating municipalities.

Table 3-4 – Changes to Base Year (2001) Link Attributes

Attribute	Was	Now
Number of Lanes in each direction.		
Dundas Street – Evans Road to Kerns Road	1	2
Dundas Street – Hamilton Street to Evans Road	2	1
Lane Capacity (Vehicles per hour)		
Hamilton Street – Parkside Drive to Dundas Street	1000	800
Evans Road – Dundas Street to 4th Concession	1200	700
Cedar Springs Road – Dundas Street to No 1 Sideroad	600	800
Kerns Road – N. Service Road to Tyandaga Park Drive	900	700

Table 3-5 – Additions to Base Year (2001) Link Attributes

Link	From	To	Lane Capacity (vph)	Free Flow Speed (kph)
Snake Road	Plains Road	Main Street	500	50
Old York Road	Plains Road	Highway 6	400	50
Main Street	Dundas Street	Centre Road	500	50
Mountain Brow Road	Waterdown Road	King Road	500	50
King Road	North Service Road	Mountain Brow Road	500*	50

*Note: King Road is designated as a collector road and would typically be assigned a roadway capacity of 700 to 800 vehicles per hour/lane. Due, to the current roadway characteristics (e.g. steep grade, narrow road width) the capacity of King Rd was reduced to 500 vehicles/hour/lane. This is standard industry practice.

In addition to the changes above, deletions to Base Year (2001) link attributes included:

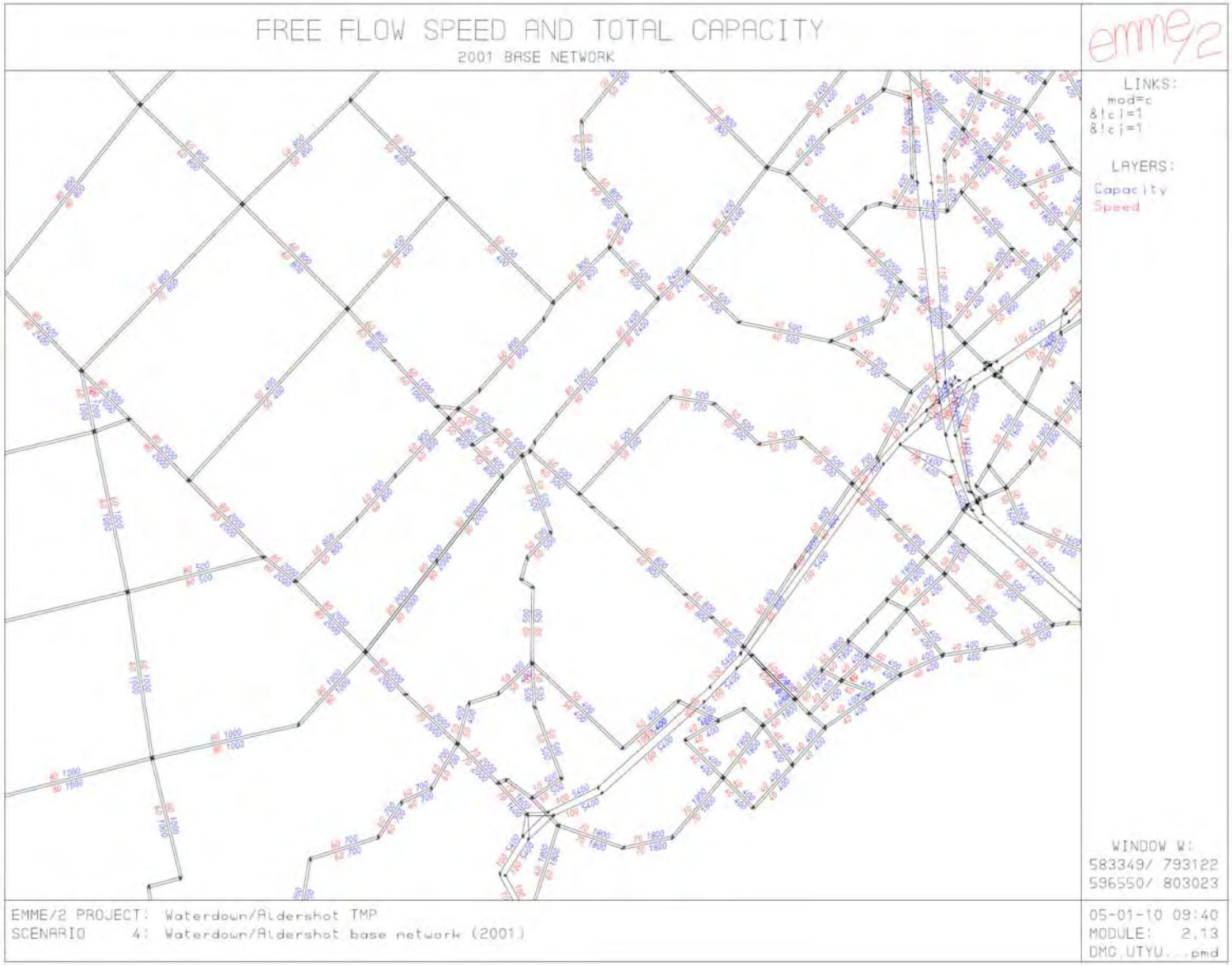
- Kerns Road north of Dundas Street; and
- Mill Street between Dundas Street and Parkside Drive.

The updated base year link attributes for the entire study area are illustrated in ***Figure 3-7***.

Volume Delay Functions

The Hamilton model uses varying levels of GTA zone aggregation to represent the areas outside the City of Hamilton together with a less detailed representation of the road network. In many cases the simulated travel demands from these large zones greatly exceed the capacity of the limited number of roads included in the network. Simulated link speeds are very close to zero in a number of areas resulting in an average a.m. peak hour trip time in excess of 200 hours for the network as a whole. To eliminate this distortion, and any possible effects it might have on trip routings within the study area, the volume delay functions have been modified to simulate free flow conditions on the network in all areas except the Cities of Hamilton and Burlington. The average simulated trip time on the network as a whole is reduced to approximately 30 minutes.

Figure 3-7 – 2001 Base Year Link Attributes



3.9.3 Trip Rates

The trip rates used in the calibration of the Hamilton model are calculated by individual zone using TTS data. The TTS sample size (5%) is not sufficient to provide statistical accuracy at that level of detail. As a result, the number of per capita peak hour trip origins varies from a low of 0 to a high of almost 7. The origin trip rates used in other models are typically in the range of 0.1 to 0.2. The trip ends for the GTA zones that make up the community of Waterdown have therefore been re-calculated using the average trip rate of 0.191 origins per capita of population and 0.293 destinations per job for all 3 zones. Average values of .123 origins per capita and .266 destinations per job were used for all the remaining zones in Flamborough. A population component was subsequently added to the destination trip rates by adding 12.5% of the population to the employment, and applying 75% of the above trip rates to the combined total. Those ratios are based on average values taken from the simplified GTA model. Adding the population component at the destination end was found to have a minimal effect on the assignment results.

3.9.4 Zone Splitting

The data used as input to the Hamilton model is mostly based on the GTA zone system developed by the DMG. The four GTA traffic zones that include the community of Watertown and the adjacent area immediately west of Highway 6 were sub-divided into the 11 sub-zones proposed in the Emme/2 model calibration report. The three zones that Aldershot consisted of in the Hamilton Emme/2 model were sub-divided into 27 sub-zones corresponding to the traffic zones used by Halton Region. To obtain the more detailed trip tables the origins and destinations from the initial trip table were split in accordance with the estimated distribution of population and employment in the sub-zones.

The existing 2021 trip table produced by the model is based on that finer zone system but the procedure and factors used in the sub-division of the GTA zones are not included in the documentation. The 2001 trip table has not been sub-divided nor has the population and employment data on which the forecasts are based. The existing 2021 trip table has therefore been re-aggregated to the GTA zones and a new set of factors developed to sub-divide the three GTA zones in Waterdown plus the GTA zone immediately to the West. The factors represent approximations of the existing and anticipated split in population between the sub zones as shown in ***Table 3-6***.

Table 3-6 – Split in Population

GTA Zone	Hamilton Zone	2001 Split	2021 Split	Area of Planned Development
2630	2630	.3	.4	
	2673	.7	.6	
2631	2631	.9	.6	
	2676	.05	.2	
	2696	.05	.2	
2632	2632	.1	.5	Waterdown South
	2674	.2	.1	
	2675	.7	.4	Upcountry
2633	2633	.05	.25	Waterdown North
	2671	.15	.12	
	2672	.8	.63	

The above factors are applied after the a.m. peak hour trip table after the trip distribution process has been completed. The same factors are used for origins and destinations.

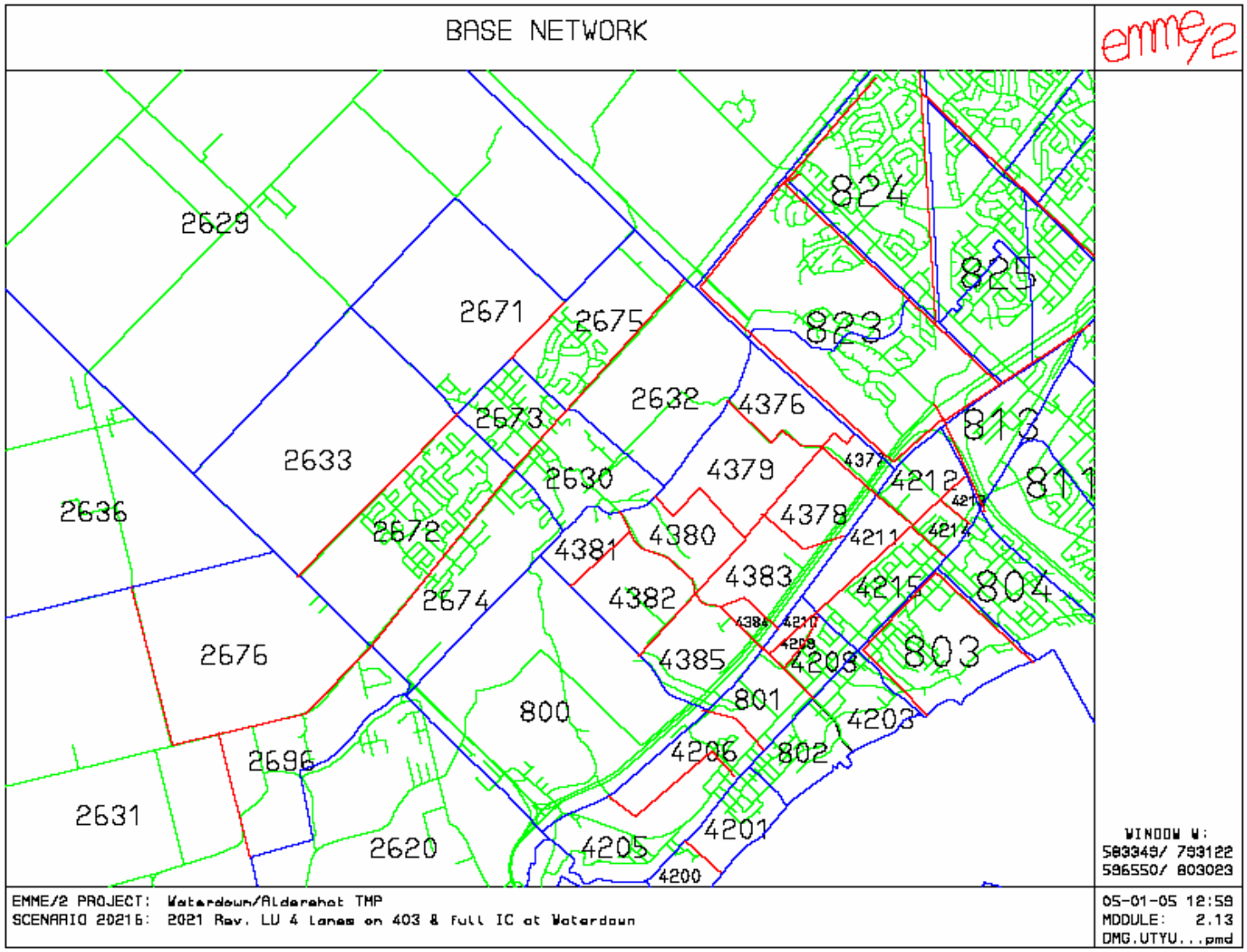
Figure 3-8 illustrates the zones used in the modelling process. The blue lines in the figure represent the GTA zone boundaries while the red lines represent the sub-divided (or aggregated) zones used for the Waterdown/Aldershot model simulation.

3.9.5 Land Use Forecasts

There are some significant differences in the land use growth forecasts relative to those used in the Halton Region Transportation Master Plan and the Highway 6 Study; the most significant difference being the employment numbers for the City of Toronto. All three studies used approximately the same number (1.719 million) for the year 2021 but the Hamilton model uses 1.636 million as its base compared to 1.454 million in the Halton Region model. As a result of this difference in the base, the Hamilton model shows less growth in Toronto's employment (5%) than in population (13%). In the other two studies, Toronto's employment is projected to grow at a faster rate than its population. Analysis of the original 2001 and 2021 trip tables produced by the Hamilton model shows no increase in the number of a.m. peak hour auto driver trips inbound to Toronto. The number of outbound trips increases by 30,000. A change of that magnitude could well have a ripple effect in the trip distribution that extends as far as the Hamilton boundary affecting the projected traffic volumes on both the QEW and Highway 403.

For the purpose of this analysis this difference was not adjusted, yielding a more conservative approach.

Figure 3-8 – Transportation Modeling Zone Map



3.9.6 Screenline Deficiencies

A comparison of simulated traffic volumes and capacity across a number of screenlines[3] indicates the following deficiencies in road capacity. The simulated volumes are for the a.m. peak hour. It can be expected that p.m. peak hour volumes in the reverse direction will be higher by 0% to 30%. Volume to capacity (v/c) ratios in excess of 0.85 is an indicator of potential problems.

2001 Network
This simulation indicates that:

- There is an existing capacity deficiency on Dundas Street east of Hamilton Street in the centre of Waterdown;
- Highway 403 is at, or close to, capacity; and
- Main Street north of Dundas Street is near capacity but the simulated volume is driven by the location of the centroid connector for zone 2673. There is spare capacity on adjacent Hamilton Street and on parallel local streets not included in the network representation.

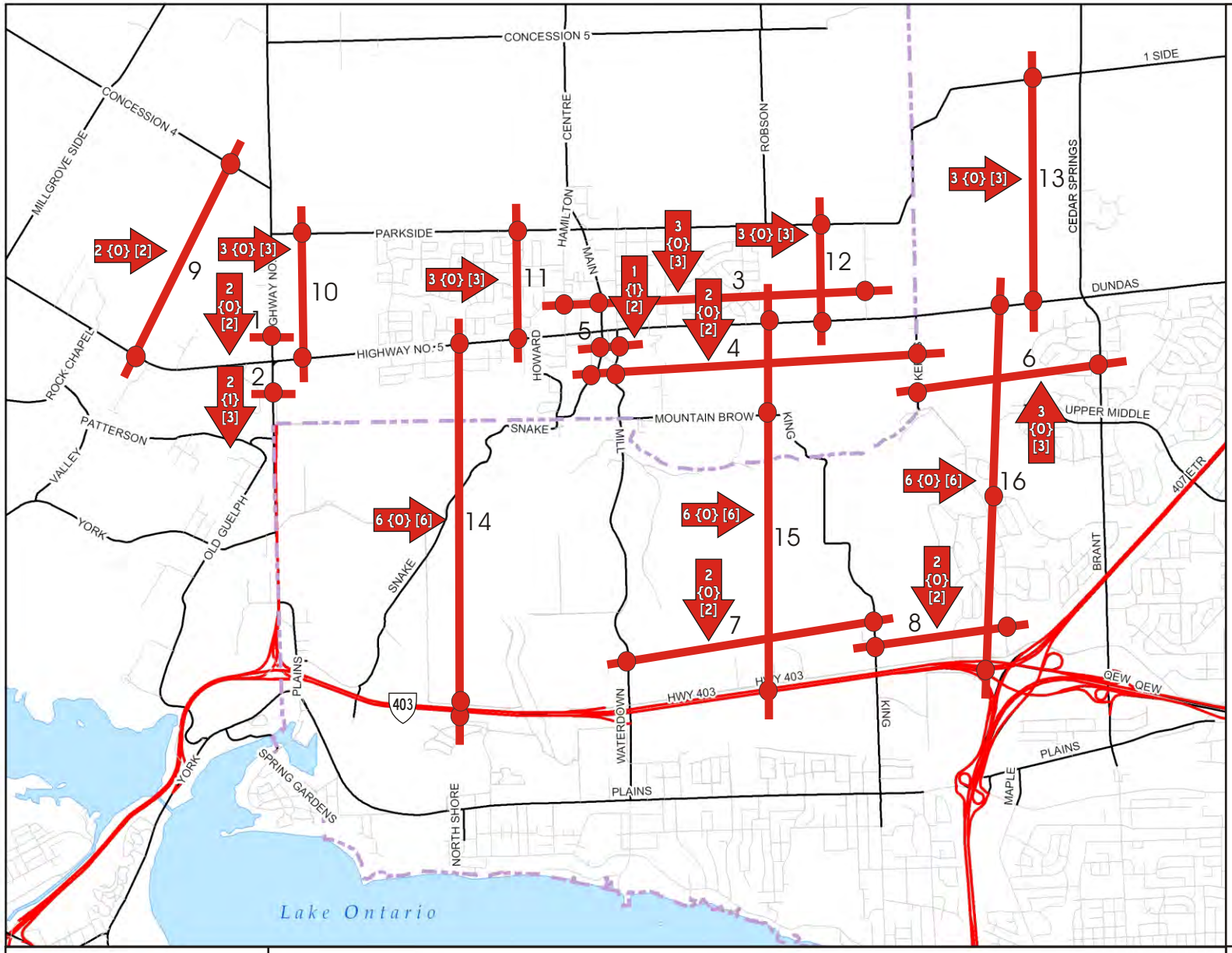
2021 Do Nothing (2001 Network)
This simulation indicates:

- Dundas Street through the centre of Waterdown is significantly over capacity;
- Dundas Street is also at, or over, capacity both East and West of Brant Street in Burlington;
- Highway 403 is over capacity. It should also be noted that the simulated volume on Highway 403 is highest west of Highway 6. Three previous studies (IBI, Halton TMP and Highway 6) all show p.m. peak hour volumes well in excess of 3-lane capacity;
- The simulated volume on Main Street is marginally higher than for 2001, but the same comments apply;
- Highway 6 is at, or above, capacity immediately south of Dundas Street; and
- Mill Street (Waterdown Road) is at, or above, capacity immediately south of Dundas Street.

2021 With full interchange at Waterdown Road & Highway 403
Relative to the 2021 Do Nothing scenario, the addition of a full interchange with Waterdown Road on Highway 403 results in an increase in simulated traffic volumes on Mill Street south of Dundas Street (already at or over capacity) with slight reductions in traffic volumes on Dundas Street east of Mill Street and on Highway 6 south of Dundas Street (not significantly).

The screenline deficiencies of each of the above screenings are illustrated in ***Figure 3-9*** to ***Figure 3-11***.

[3] A screenline is an imaginary line defined in the network that captures a broad corridor through which traffic flows



Legend:

- Freeway (403)
- Arterial / Local Road (Brant St.)
- Municipal Boundary
- Screenline
- Existing Lanes {Additional Arterial Lanes Required} [Total Lanes Required] (e.g. 3 {1} [4])

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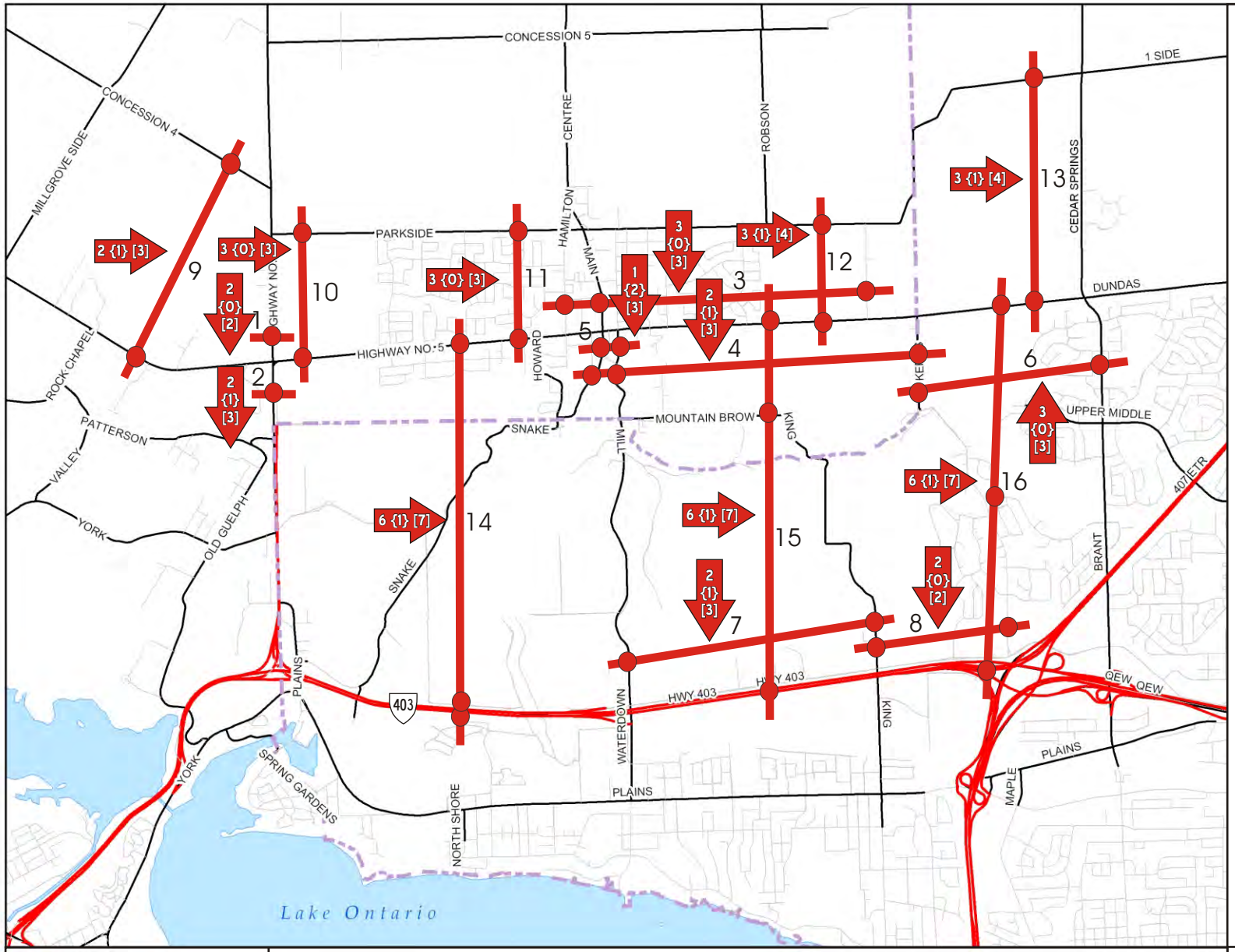
Screenline Deficiencies
2001 Network

Waterdown / Aldershot Transportation Master Plan

Figure 3.9

Not to Scale

September 2007



Legend:

- 403 — Freeway
- Brant St. — Arterial / Local Road
- Municipal Boundary
- Screenline
- 3 {1} [4] — Existing Lanes {Additional Arterial Lanes Required} [Total Lanes Required]

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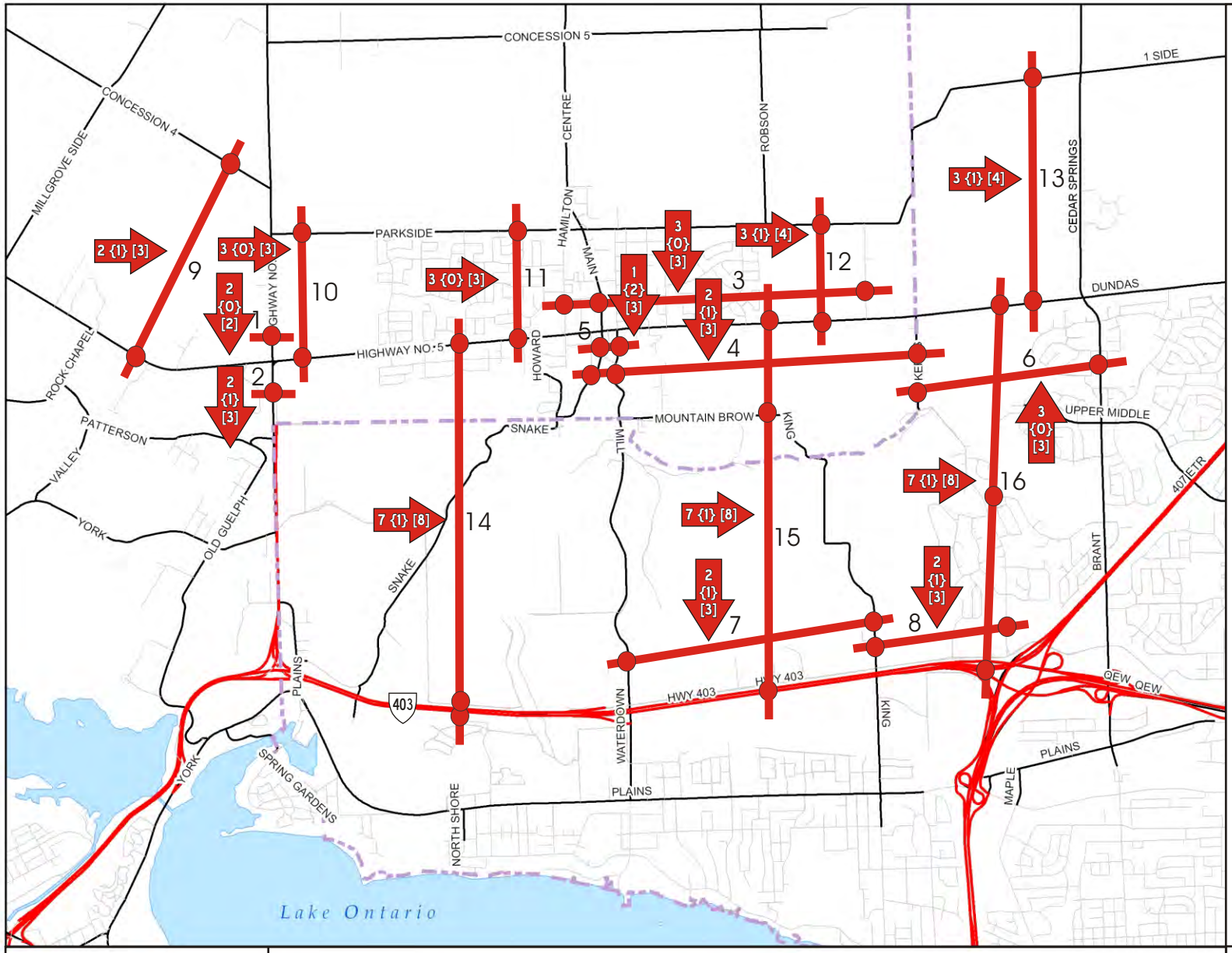
Screenline Deficiencies
2021 Do Nothing (2001 Network)

Figure 3.10

Not to Scale

Waterdown / Aldershot Transportation Master Plan

September 2007



Legend:

- Freeway (403)
- Arterial / Local Road (Brant St.)
- Municipal Boundary
- Screenline
- Existing Lanes {Additional Arterial Lanes Required} [Total Lanes Required] (e.g. 3 {1} [4])

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Screenline Deficiencies

2021 with Full Interchange at Waterdown Road / Highway 403 and 8 Lanes on Highway 403

Waterdown / Aldershot Transportation Master Plan

Figure 3.11

Not to Scale

September 2007

3.10 "The Problem"

The report "Master EA Transportation Network Review of Aldershot/Waterdown" July 2004 was undertaken to "review all the land use and transportation network changes, either proposed or constructed, which may affect the study area conclusions and recommendations of the previous Transportation Master Plan Study undertaken by Stantec Consulting Ltd. in September 1999. The report concluded *"based on the current network choices available, the main conclusion that can be drawn from these results is that both additional east-west capacity and north-south capacity is required for the study area around the Village of Waterdown and depending on what configuration this network would take further improvements would likely be required in Burlington to receive this additional traffic, e.g., North Service Road widening…As this ultimately concludes, the next phase of this Master EA update has to analyze all potential north-south and east-west network improvement options in various combinations that could potentially cater to these very high traffic demands stemming from the future development of Waterdown and Aldershot"*.

North/South Demand
The demand forecasting model developed by the City of Hamilton used for this study forecasts conditions for the A.M. time period. Therefore, based on the character of the study area (i.e., mostly low density residential development) the peak direction of travel will generally be the southbound direction.

Two analyses were undertaken in this study to confirm "The Problem" identified in Phase 1 of the Class EA process. These were:

1. ***Screenline Analysis*** – an imaginary line defined in the network that captures a broad corridor through which traffic flows; and
2. ***"Bottom Up" Approach*** – a "building block" analysis that works from current conditions and adds anticipated traffic from growth.

The north/south screenline analysis evaluated the combined demand and capacity of key north/south links. Links that cannot service this demand for design or operations reasons were not accounted for in the evaluation (i.e., Snake Road and Kerns Road).

As presented in ***Figure 3-11***, the screenline analysis reveals a deficiency in the southbound direction. For planning purposes, a v/c greater than 0.85 is considered "critical" in this analysis. Other AM models use 0.80 as the critical v/c but a more conservative approach was used in this analysis, thus "triggering" system capacity improvements at more congested levels. PM based models use a critical v/c of 0.90.

Taking an approach separate from the transportation demand forecasting tool, a "bottom up" analysis was undertaken to determine any significant north/south deficiencies.

Current estimates for growth within OPA 28 indicate approximately 6,500 new homes will be built by 2021.

The Phase 1 report identified that outbound trips from Waterdown Road are distributed as follows:

Internal (within Waterdown)	25.0%
To Hamilton	20.4%
To West Burlington	2.9%
To Downtown Burlington & Niagara Region	5.9%
To Halton, Peel and East	33.4%
To Milton, Brampton and North Mississauga	3.7%
To Guelph, Waterloo	4.3%
To West along Highway 5	4.4%
Total	100%

The distribution can be aggregated as follows:

East along Dundas Street	20.4%
North along Highway 6	4.3%
Southwest along Highway 6 and Highway 5	24.8%
South and Southeast	25.5%
Internal	25.0%
Total	100%

Therefore, 50.3% of the trips will need to travel along one of the roads that make up the south study area screenline.

6,500 homes x 0.77 trips/home	=	5,005 trips
@ 75% outbound trips	=	3,754 trips
Less 10% for alternate modes	=	3,378 trips
Times 50.3% (southbound)	=	1,699 trips

Using "current" roadway volumes, the existing system has the following available capacity:

Link	Capacity	Volume	Reserve
Highway 6	2,000	1,780	220
Waterdown Road	800	378	422
King Road	500	48	452
Brant Street	2,000	1,373	627
Total	5,300	3,579	1,721

Therefore, if no other growth in traffic were to occur – only traffic generated by OPA 28, there would still be a north/south deficiency in the study area network south of Dundas Street. However, traffic will grow (i.e., as families mature, there will be more cars per household). If one considers a marginal growth of 1% per year to 2021, then the system will require to meet an additional 572 vehicles, which, when added to the unserved demand for OPA 28 equates to the equivalent of one arterial lane.

Therefore, regardless of the approach undertaken to estimate the demand of traffic to 2021, there is a clear conclusion that a north/south deficiency will exist, hence "The Problem" identified in the report, *Waterdown/Aldershot Master EA Transportation Network Study, July 2004*, is confirmed by the work undertaken in this study.

Further considerations of this problem are:

- The need to have a non-congested system to permit reasonable transit operations competitive with the automobile;
- If improvements are not made, the growth in traffic will find its way onto Kerns Road, Tyandaga Park Drive and Snake Road, which already have their share of traffic operational issues (i.e. infiltration of through traffic); and
- The analysis has been undertaken for the A.M. peak, which generally has less traffic on the network, hence the findings provide a "best case" scenario.

East/West Demand
The analysis undertaken to evaluate deficiencies in the east/west direction followed the same approach as undertaken for the north/south conditions.

The east/west screenline analysis evaluated the combined demand and capacity of **key** east/west links. Links that cannot accommodate the demand for design or operations reasons were not accounted for in the evaluation (i.e., Mountain Brow Road).

The screenline analysis revealed deficiencies east of Mill Street in the eastbound direction. Given there are only two roadways servicing this demand (Dundas Street and the QEW), the findings were not surprising.

Deficiencies were also found west of Highway 6 along Highway 5 and Concession 4. These deficiencies will be addressed by the MTO under upcoming assignments.

The link analysis determined a need for one more lane of capacity east of Mill Street.

The "bottom up" analysis revealed the following:

6,500 homes x 0.77 trips/home	=	5,005 trips
@ 75% outbound trips	=	3,754 trips
Less 10% for alternate modes	=	3,378 trips
Times 20.4% (eastbound)	=	689 trips

Current roadway volumes consume the current network capacity as follows:

Link	Capacity	Volume	Reserve
Parkside Drive	800	461	339
Dundas Street	1,000	1,131	---
Total	1,800	1,592	339

Therefore, if no other growth took place except for OPA 28, there would still be a deficiency in the system. If background growth is considered, then an additional 254 vehicles (based on assumed growth rate of 1% per year of 2006 volumes until 2021) must be accommodated in addition to the unserved demand from OPA 28, equating to one arterial lane.

The east/west deficiency identified in the *Waterdown/Aldershot Master EA Transportation Network Study, July 2004*, report is confirmed by the analysis undertaken in this study.

4.0 DEVELOPING A TRANSPORTATION STRATEGY TO 2021

In the preparation of a transportation strategy to the year 2021, emphasis was placed on the development of this strategy based on the principles identified through the master plan process. In defining the needs for the Waterdown/Aldershot area, it is important to note that roadway improvements were identified in combination with other modes of travel including transit, cycling, walking, and transportation demand management.

4.1 Alternative Solutions to Support OPA 28

A number of possible transportation solutions to resolve the road capacity problem were initially identified including:

- Do-nothing;
- Improved public transit;
- Transportation demand management; and
- New roadway capacity.

Attempts were made to solve as much of the problem as possible through non-roadway solutions such as improved public transit and Transportation Demand Management (TDM) measures. These solutions are considered preferred (by the project team and participants to this study) as they result in less reliance on the automobile and result in less environmental effects. The following describes how these possible solutions were considered.

4.1.1 Do-Nothing

The Ontario EA Act requires the consideration of the "do-nothing" scenario. The do-nothing would mean that there would be no improvements to transportation infrastructure in the study area although transportation demand would increase as a result of new land development. The impact of the "do-nothing" on the transportation system was modelled.

A "Do-nothing" modeling scenario was tested that placed the 2021 traffic demands on the roadway using the existing (2001) roadway network and modal splits. Without any road modifications or reductions in modal split (proportion of non-vehicle travel methods) or auto occupancy, peak period traffic on primary corridors in Waterdown will reach critical capacity by 2021 with the development of the OPA 28 lands.

The model shows an increase in both east-west and north-south congestion. Congestion is measured by the volume to capacity (v/c) ratio. This is a numerical measure of the ratio between volume on a particular roadway segment (determined through the Emme 2 transportation model) and the available capacity to accommodate that volume. Generally, a v/c ratio greater than 0.85 indicates critical capacity has been reached. Critical capacity is defined as the point where a transportation facility's ability to accommodate a moving stream of people or vehicles in a given period of time has been reached. This is represented as a high degree of congestion with long

delays and queues at signalized intersections. Once a v/c ratio exceeds 1.0, this is defined as the point where the roadway section has failed, and the volume of vehicles on the roadway section has exceeded the available capacity to accommodate them.

East-west traffic will continue to be concentrated on Dundas Street, which will exceed capacity east of Main Street with a peak hour v/c ratio reaching up to 1.33 in the peak direction. Parkside Drive, east of Robson Road, will also reach a point of critical capacity during the peak periods, with a v/c of 0.95 during the AM peak hour in the peak direction. Links to Dundas Street and Brant Street from Parkside Drive (Evans Road and No. 1 Side Road) will also be operating at or near capacity. In Burlington, Highway 403 and much of Plains Road will also operate at or near capacity in the peak direction during peak hours.

North-south traffic outside of Waterdown relies on four primary connections to Highway 403/Baseline Road: Highway 6, Waterdown Road, King Road, and Brant Street. In the do-nothing scenario, all four roads will operate at or near capacity in the peak direction during the peak periods. Sections of Highway 6, Waterdown Road and King Road will operate beyond capacity, with a v/c ratio of 1.12, 1.18 and 1.02 respectively. This scenario would result in significant traffic congestion.

Another scenario was modelled based on Road improvements to Highway 403 and changes in modal split and travel demand. The scenario assumed a full interchange at Waterdown Road at Highway 403, the widening of Highway 403 from 6 to 8 lanes, the introduction of transit service in Waterdown, resulting in an overall 5 percent reduction in automobile trips, and the introduction of transportation demand management initiatives, further reducing automobile trips by 5 percent (to arrive at a total 10 percent reduction in trips). With these initiatives, congestion issues still continue on the majority of the corridors described above.

4.1.2 Improved Public Transit

Although there are currently no transit services within the Waterdown area, local and interregional transit services exist in the community of Aldershot and adjacent to the study area. The following describes existing transit services by service providers in and adjacent to the study area:

1. **Hamilton Street Railway (HSR)** does not operate transit services in the community of Waterdown although a future extension may be possible. In November 2007, the City of Hamilton adopted a Transit Service Enhancements Plan. This plan included transit enhancements to Waterdown. The Waterdown enhancement will provide bus service for the urban portion of Waterdown situated between Dundas Street and Parkside Drive, east of Highway #6. Buses would operate north-south on Waterdown Road, terminating at Plains Road, with direct service to the Aldershot GO/VIA Station. Customers will be able to transfer to GO Rail & Bus services, VIA trains or Burlington Transit buses. Transfers from HSR to Burlington Transit are free of charge, allowing customers to travel to Downtown Hamilton, the Burlington and Appleby GO Stations and other points within Burlington. Improvements to inter-modal integration and cross-boundary transit services are strategies that can encourage ridership growth.

2. **Burlington Transit** does not operate services in Waterdown, but does operate some service in Aldershot and adjacent to the study area:
   a) Route 1 – Plains/Fairview West operates along Plains Road connecting downtown Hamilton with the Burlington GO Station, with stops at Plains Road and King Road, Plains Road and Waterdown Road, and the Royal Botanical Gardens.
   b) Route 7 – Tyandaga North operates a residential feeder service from the Burlington GO Station along Kerns Road and Tyandaga Park Drive.
   c) Route 2 – Brant North operates a service along Brant Street, between Cavendish Drive (just south of Dundas Street) and the Burlington downtown transit terminal.

3. **GO Transit** operates GO Rail and Bus service on or parallel to Highway 403. Services include:
   a) Lakeshore West GO Train operates fifteen eastbound trains throughout the day from the Aldershot GO Station (located on Waterdown Road, just north of Plains Road) during the AM peak period, and eighteen westbound trains during the PM peak period. During other times, the GO Train is supplemented by regular Train-Bus service between Burlington GO Station and Hamilton GO Centre.
   b) Route 46 – Highway 407 West GO Bus service connects downtown Hamilton with York University, with stops at McMaster University, Mississauga City Centre, and Bramalea GO Station, operating along Highway 403/407. Currently, the service does not stop in the study area.
   c) Route 15 – McMaster University Limited Service operates express between Union Station and McMaster University with only one stop at the Burlington GO Station. Currently, the service does not stop within the study area.

4. **VIA Rail** operates out of the Aldershot Station, which shares its facilities with GO Transit. Several trains depart this station each day, including Toronto to London, Aldershot to Montreal/Ottawa, Toronto to Niagara Falls, Buffalo, and New York; and Aldershot to Toronto, Kingston, Montreal.

   Several transit opportunities are currently being examined to provide transit service in Waterdown and increase the transit mode split for both local and interregional trips. These include:

   1. **Create Interregional Terminal at Aldershot GO Station** – the area has a significant amount of interregional transit service, however, it lacks an appropriate connection to Waterdown. The Aldershot GO Station would provide a good terminus for feeder services with connections to GO Rail, GO Bus, Burlington Transit, and VIA Rail.
      a. As an initial step, provide a starter transit service beginning in 2008 (as outlined by the HSR) to/from the Aldershot GO Station to the existing urban area of Waterdown. The terminus at the Aldershot GO Station will provide a local bus connection to GO Rail and VIA Rail services. As ridership levels increase and the community grows, the service should be extended to the new development areas and the service levels increase to help meet modal split targets.

b. Reroute Burlington Transit Route 1 – Plains/Fairview West to connect to Aldershot GO Station. This will provide direct access to downtown Hamilton and the Burlington GO Station for Waterdown residents.
c. With the construction of a Waterdown Road ramp at Highway 403, discuss opportunity for GO Transit to reroute the Highway 407 GO Bus to stop at the Aldershot GO Station, providing a direct connection to stops along Highway 407 between York University and McMaster University.

2. **Extend Interregional Dundas Service** – The Halton Transportation Master Plan identified opportunities to provide interregional transit service along Dundas Street, connecting downtown Hamilton to Toronto. Through Waterdown, this service is anticipated to provide 15-minute headways during the peak on Dundas Street, and south on Highway 6.

3. **Extension of Burlington Transit Routes** – opportunities exist to extend transit services from Burlington into Waterdown. These include:
   a. Extend Burlington Transit Route 7 – Tyandaga- North on Kerns Road to Waterdown South area.
   b. Extend Burlington Transit Route 2 Brant – Northwest along Dundas Street providing a direct downtown Burlington service for Waterdown residents.

Given the above transit opportunities, it was assumed that a transit mode split of 5% could be achieved in the study area. This mode split was assumed in the transportation capacity modeling work.

As improved public transit in the study area can solve some of the transportation problem, it was retained as part of the overall solution. As it is not possible to solve the entire transportation problem through improved transit, other possible solutions are required.

4.1.3 Transportation Demand Management (TDM)

Transportation Demand Management strategies attempt to delay, defer or even eliminate the need for significant capital investment in new transportation infrastructure by:

- Influencing auto demands in the commuter peak periods;
- Promoting walking and cycling as alternatives to travel by private auto; and
- Promoting public transit and ride sharing as alternatives to travel by private auto.

As part of the Transportation Master Plan process, TDM policies will be identified that could:

- ***Eliminate trips*** – through appropriate land use planning and tele-working initiatives;
- ***Reassign trips*** – by encouraging the use of less congested corridors;
- ***Reduce peak period trips*** – investigating opportunities to shift schedule start and end time of major employers;
- ***Link trips*** – by mixed used land-use planning, thereby promoting walking between activities;

- ***Increase transit use*** – through service and fare enhancements; and
- ***Increase vehicle occupancy*** – through ridesharing organizations.

It was assumed that TDM measures could reduce road capacity demand by 5 percent and therefore was assumed to be included as part of the overall solution. As it is not possible to solve the entire transportation problem through TDM measures combined with improved public transit, other possible solutions are required.

4.1.4 New Roadway Capacity

The City of Hamilton Emme/2 Model was used to provide initial inputs to the Waterdown/ Aldershot TMP. Dillon reviewed the transportation model to 2021 as documented in the Phase 1 Report, and updated the model based on current population and employment estimates.

The initial step was to establish a 2021 "do nothing" scenario to confirm the need for road capacity improvements. Through this process, it was determined that additional north-south and east-west road capacity was needed to accommodate growth up to 2021.

The approach considered all modes of travel to solve the transportation problem prior to increasing the capacity on the road network. This included transit, Transportation Demand Management (TDM), cycling and walking. A 2021 "do nothing" scenario was modelled which conservatively reduced single occupant automobile travel in the study area by up to 15 percent through increased transit use and use of Transportation Demand Management measures. This 15 percent decrease in automobile use also did not solve the north-south or east-west transportation capacity deficiency.

Several corridor alternatives were considered in the evaluation to provide the needed capacity to accommodate the development proposed in the OPA 28 lands in Waterdown. Each corridor alternative assumed a 5 percent transit model split and an additional 5 percent reduction in vehicle trips due to Transportation Demand Management (TDM) measures. Corridor alternatives were grouped into east-west alternatives and north-south alternatives for evaluation purposes.

A prescreening of corridor alternatives was conducted based on their ability to solve the transportation capacity problem. Alternatives that did not solve the problem (where 2021 screenline v/c continued to be greater than 0.85) were screened from further consideration. These include:

- Road improvements on Kerns Road between Dundas Street and North Service Road;
- Widening of Brant Street, between Dundas Street and the QEW;
- Widening of No. 1 Sideroad between Evans Road and Cedar Springs Road;
- Widening of Dundas Street to 4 lanes between Highway 6 and Brant Street (we did include a 4-lane/6 lane Dundas Street widening option); and
- Improving King Road on its own (with no improvement to Waterdown Road).

The King Road 2-lane option was screened because an improved 2-lane King Road on its own does not solve the road capacity problem. Also considered was the potential widening of King Road to 4 lanes. However, a 4 lane King Road would also not solve the problem as:

- Traffic, as demonstrated in the transportation model, would only be drawn to King Road when Waterdown Road was entirely clogged with congestion;
- King Road does not provide a direct route to Highway 403 via the Waterdown Road interchange; and
- Less efficient connection to the Aldershot Transit Station.

As a result of this prescreening exercise, three north-south options and four east-west road improvement options were identified as being able of solving the roadway capacity deficiencies and are presented in ***Table 4-1***.

The three north-south options and four east-west options are presented in ***Figure 4-1*** and ***Figure 4-2***.

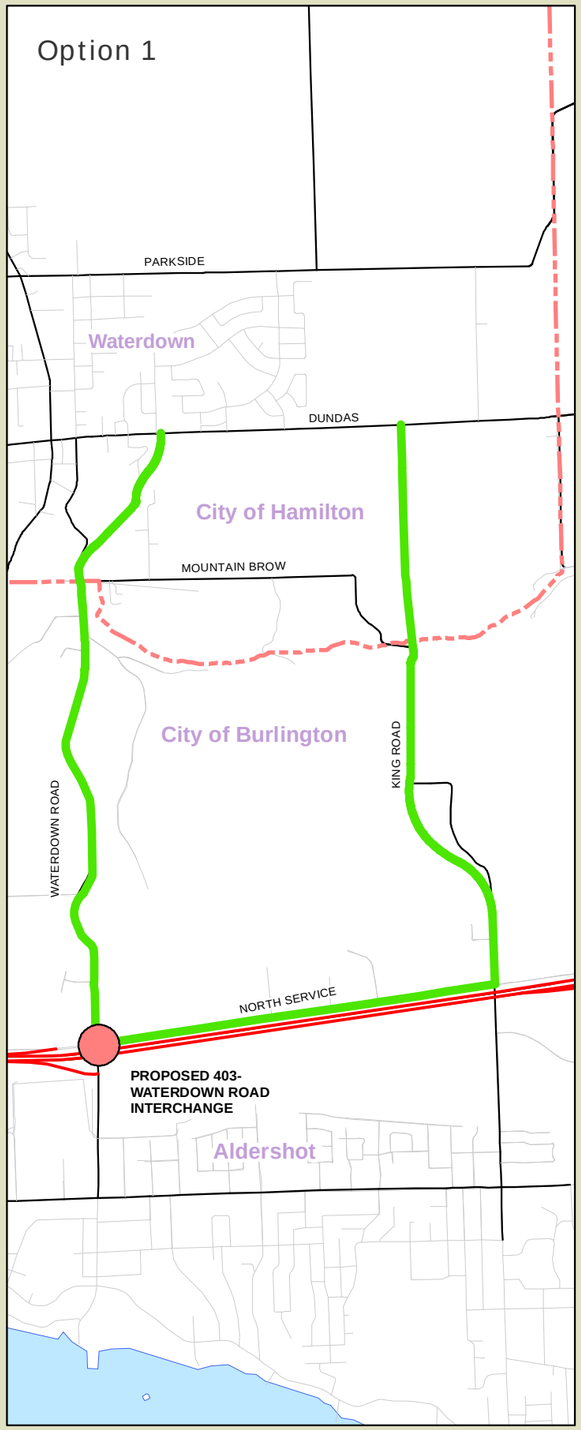
The road improvement alternatives were developed as "corridors" and should not necessarily be considered as the specific routes. As well, it may be possible to reduce the ROW widths for a number of roadway sections and thus, reduce the level of "footprint" effects. The specific route and required ROW will need to be identified as part of future Class EA/road design work.

Table 4-1 – Alternative Road Improvement Options

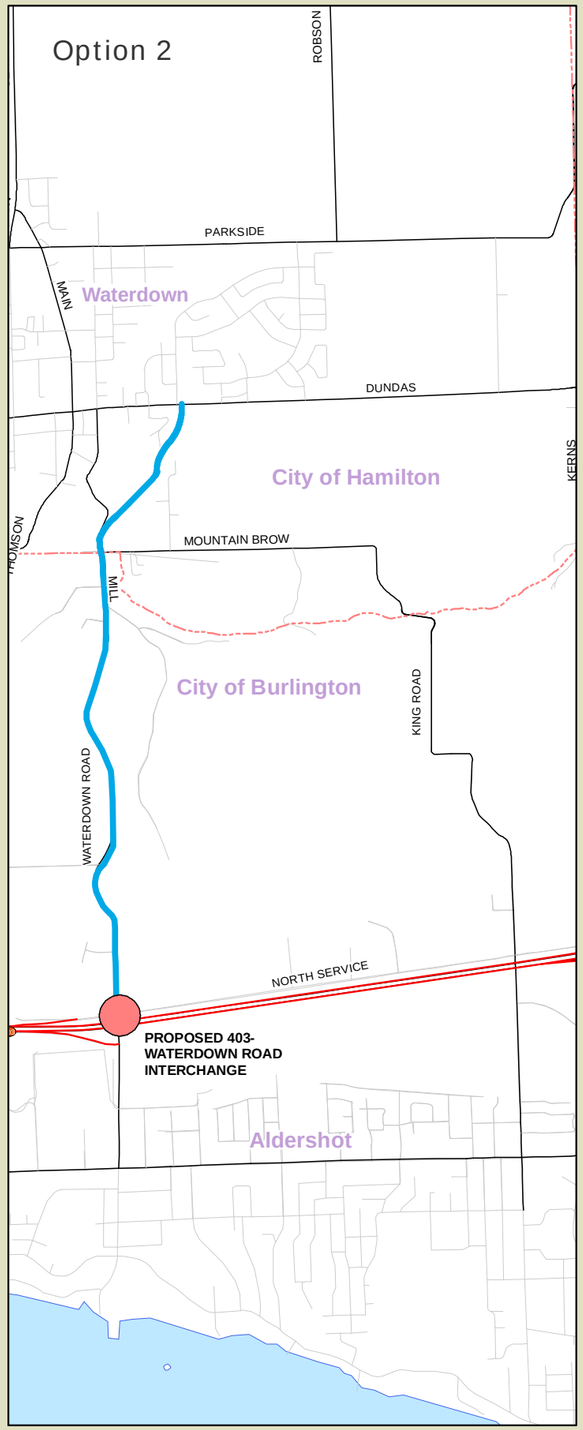
Option	Road Options Description	ROW Needs[4]
North-South Alternatives		
Option 1 – King/Waterdown Road Geometric Improvements (Both 2 lane roads)	• Geometric improvements to Waterdown Road from Highway 403 to Dundas Street (maintain as 2 lanes) • New Waterdown Road ROW north of Mountain Brow Road • King Road requires two sections of new ROW (2 lanes) with geometric improvements to sections of the existing King Road and an extension to Dundas Street. • Widening of North Service Road between King Road and Waterdown to 4 lanes	42-80 m (for both King & Waterdown)
Option 2 – Waterdown Road Widening & Geometric Improvements	• Geometric improvements and widen Waterdown Road to 4 lanes from Highway 403 to Dundas Street • New Waterdown Road ROW north of Mountain Brow Road • King Road remains as a 2-lane roadway. • No improvements to North Service Rd.	50-80 m
Option 3 – King Road Geometric Improvement & Waterdown Road Widening	• Widen Waterdown Road to 4 lanes (no geometric improvements) • New Waterdown Road ROW north of Mountain Brow Road, King Road requires two sections of new ROW • King Road requires two sections of new ROW (2 lanes) with geometric improvements to sections of the existing King Road and an extension to Dundas Street. • Widening of North Service Road between King Road and Waterdown Road	42-80 m (for both King (& Waterdown)
East-West Alternatives		
Option 1 – New North Road	• New north road with 2 lanes • New North Link "By-pass" from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road	26-32 m
Option 2 – Parkside Drive Widening	• Widen Parkside Drive to 4 lanes • Parkside Drive from Dundas Street West at Rock Chapel Road to Dundas Street East, east of Evans Road	30-43 m
Option 3 – Dundas Street Widening	• Widening of Dundas Street to 4-lanes from Rock Chapel Road to Highway 6 at 30m ROW, to 6-lanes from Highway 6 to Berry Hill Avenue at 43m ROW, to 4-lanes from Berry Hill Avenue to a point just east of Pamela Street at 30m ROW, and to 6-lanes from just east of Pamela Street to Dundas Street, east of Evans Road at 36m ROW	30–39 m (urban cross section)
Option 4 – Parkside Drive Widening & New North Road	• Starting at the west, new 2-lane North Link "By-pass" ROW from Dundas Street West at Rock Chapel Road continuing as a new northern "by-pass" ROW, then swinging south past Centre Road to connect with Parkside Drive east of Churchill Avenue. Widening Parkside Drive to 4 lanes to Evans Road. Then a new connecting link from a point east of Evans Road heading south to connect with Dundas Street	26-43 m

[4] The RoW widths assumed for the purposes of the evaluation were based on applicable road standards and the general characteristics of the existing roadways. It was anticipated that RoW width may be reduced through the implementation of specific road treatments (e.g. retaining walls). This would be investigated in subsequent study phases. In any event, all options were treated equally in this regard.

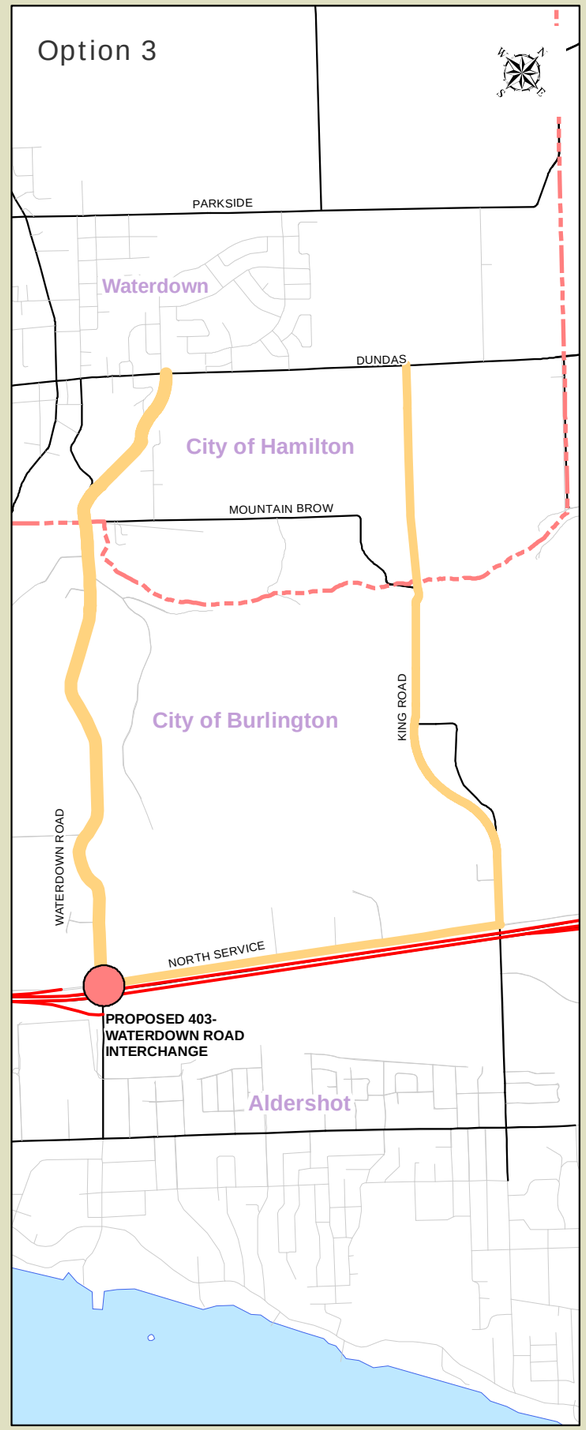
Option 1



Option 2



Option 3



Waterdown - Aldershot Transportation Master Plan

Figure 4.1: North/South Roadway Improvement Options

- Municipal Boundary

Option 1
- King & Waterdown Rd geometric improvements, no widening

Option 2
- Waterdown Rd widening to 4 lanes & geometric improvements

Option 3
- Waterdown Rd widening 4 lanes & King Rd geometric improvements

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

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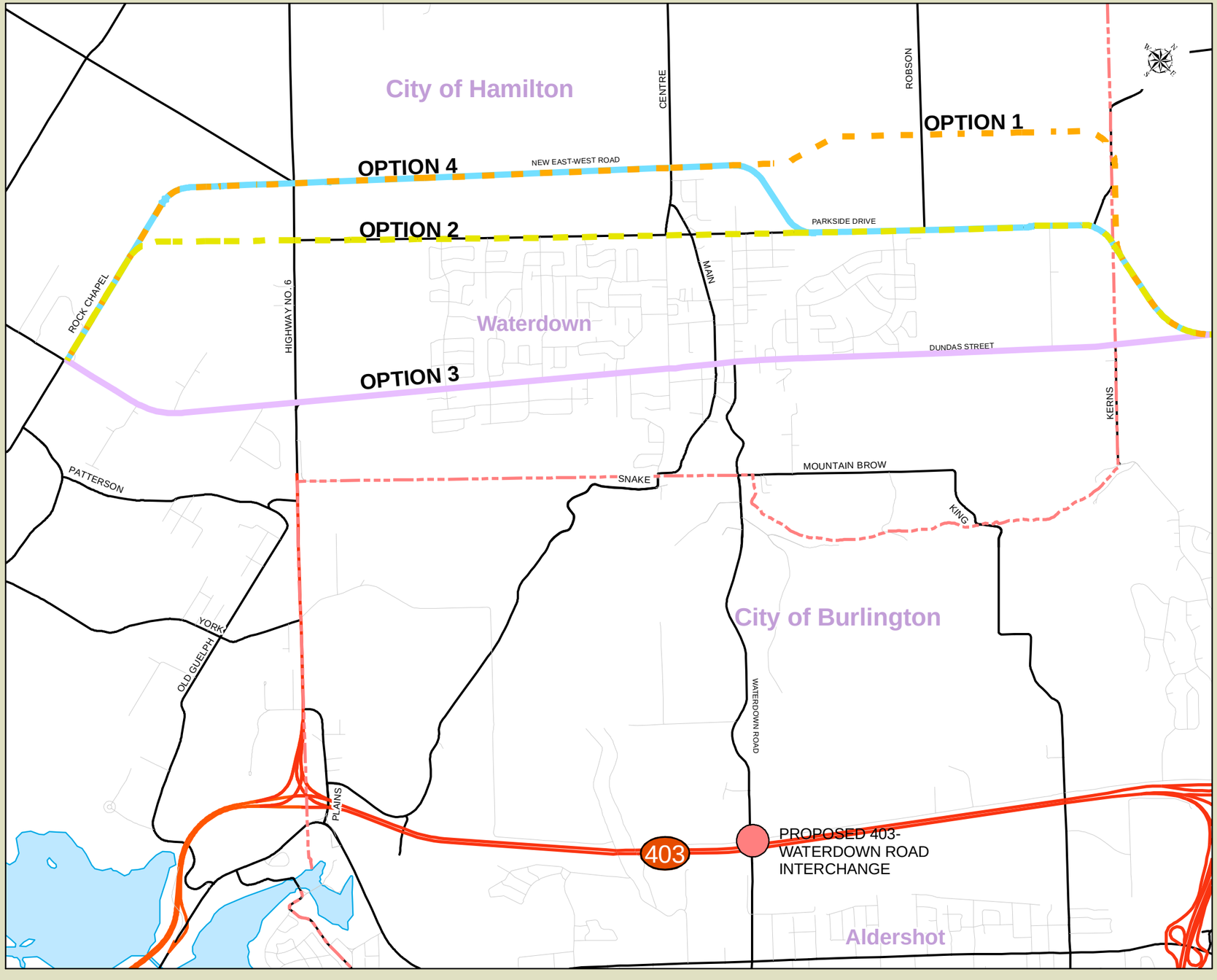


Waterdown - Aldershot
Transportation Master Plan

Figure 4.2: East/West Roadway Improvement Options

- Municipal Boundary

East-West Corridor

- Option 1 - New north road
- Option 2 - Parkside Rd. widening
- Option 3 - Dundas St. widening
- Option 4 - Parkside Rd. widening (partial) & new north road (partial)

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

5.0 EXISTING CONDITIONS

5.1 Introduction

The baseline environmental conditions in the study area were considered in the process to develop and evaluate solutions to the identified transportation problem. ***Figure 5-1*** illustrates the environmental conditions and constraints in the study area. More detailed environmental information including field surveys will be undertaken in Phase 3 of the Class EA process. Much of the existing community of Waterdown, as well as the Upcountry and Waterdown South developments fall under the jurisdiction of the Niagara Escarpment Commission. The area is guided by the Niagara Escarpment Plan, an environmental land use plan that looks to protect, conserve and promote sustainable development to ensure that the Niagara Escarpment will remain a natural environment for future generations.

5.2 Greenbelt Plan

The Greenbelt Act, 2005 was enacted in February, 2005 which authorized the preparation of the Greenbelt Plan, 2005 (approved in February, 2005). The Greenbelt Plan identifies where urbanization should not occur in order to provide permanent protection of the agricultural land base and the ecological features and functions occurring in the Greenbelt Plan Area. That Area includes all of the Niagara Escarpment Plan Area as well as the Oak Ridges Moraine Conservation Plan Area and the Protected Countryside. The policies of the Niagara Escarpment Plan are the policies of the Greenbelt Plan for the Niagara Escarpment Plan Area.

The Protected Countryside lands identified in this Greenbelt Plan are intended to enhance the spatial extent of agriculturally and environmentally protected lands currently covered by the NEP and the ORMCP, while at the same time improving linkages between these areas and the surrounding major lake systems and watersheds. Collectively, the lands in these three plans form the Greenbelt. The Protected Countryside is made up of an Agricultural System and a Natural System, together with a series of settlement areas.

The Agricultural System is made up of specialty crop, prime agricultural and rural areas. The Natural System identifies lands that support both natural heritage and hydrologic features and functions. Both systems maintain connections to the broader agricultural and natural systems of southern Ontario.

The settlement areas, identified as Towns/Villages and Hamlets, vary in size, diversity and intensity of uses and are found throughout the Protected Countryside.

The Greenbelt covers a large portion of the Study Area, stretching from northern Hamilton south-east to Highway 403 in Burlington. All of the area within the Greenbelt that is not covered by the Niagara Escarpment Plan is designated as Protected Countryside in the Greenbelt Plan. ***Figure 5-2*** details these designations.

Waterdown - Aldershot Transportation Master Plan

Figure 5.1: Environmental Conditions and Constraints

- Municipal Boundary
- Provincially Significant Wetland
- Area of Natural or Scientific Interest
- Environmentally Sensitive Area
- Local Wetland
- Woodlot
- Other Natural Habitat
- Niagara Escarpment

City of Hamilton
City of Burlington
Waterdown
Waterdown North
Waterdown South
Upcountry
Parkside Drive Woodlot Candidate ESA
Parkside Drive Wetland Complex
Loggies Creek Swamp
Mill Grave South Woodlot ESA
"Centre Rd Woodlot" Candidate ESA/PSW
Lake Medad Valley Swamp
Lake Medad Valley Swamp
Waterdown North Wetlands ESA
Highview Swamp
Old Nelson Quarry
King City Quarry
Clappison Escarpment Woods ESA
Grindstone Creek ESA
Waterdown Escarpment Woods ESA
Sassafras-Waterdown Woods ESA
Sassafras Woods ESA
Borer's Falls Road Chapel ESA
Bridgeview Valley ESA
Cootes Paradise
Hamilton Harbour
Borer's Creek
Grindstone Creek
Highland Creek
Indian Creek
CONCESSION 5
PARKSIDE
HIGHWAY NO. 5
HIGHWAY NO. 6
DUNDAS
1 SIDE
UPPER MIDDLE
MOUNTAIN BROW
SNAKE
KING
PLAINS
VALLEY INN
SPRINGS GARDENS
OLD GUELPH
YORK
MAPLE
WATERDOWN
HAMILTON
MAIN
HOWARD
THOMSON
CENTRE
ROBSON
KERNS

Scale

0 0.5 1 Kilometers

Map Notes

Map created by: PJK
Map checked by: DPM
Date modified: September 18, 2007
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

DILLON CONSULTING

Waterdown - Aldershot Transportation Master Plan

Figure 5.2: Greenbelt Area And Niagara Escarpment Area

City of Hamilton

Greenbelt

Waterdown

City of Burlington

Aldershot

PARKSIDE
CENTRE
HAMILTON
ROBSON
MAIN
HIGHWAY NO. 5
HIGHWAY NO. 6
MOUNTAIN BROW
KERNS
MILL
KING
OLD GUELPH
SNAKE
WATERDOWN
VALLEY INN
PLAINS
403
QEW

Municipal Boundary

Urban Area

Greenbelt Plan Designations

Greenbelt Plan Area

Niagara Escarpment Plan Designations

Escarpment Plan Area

Escarpment Natural Area

Escarpment Protection Area

Escarpment Rural Area

Protected Countryside
Niagara Escarpment

Scale

0 0.5 1 Kilometers

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

Section 4.2 of the Greenbelt Plan discusses infrastructure within the Greenbelt. Following is an excerpt from the plan with regards to infrastructure:

"4.2 INFRASTRUCTURE

Infrastructure is important to economic well-being, human health and quality of life in southern Ontario and the Greenbelt.

*There is already extensive local and regional **infrastructure** within the Greenbelt to serve its settlements, agricultural and resource sectors and the rural economy. Existing **infrastructure** must be maintained and new **infrastructure** will be needed to continue serving existing and permitted land uses within the Greenbelt.*

*In addition, major **infrastructure** serving national, provincial and inter-regional needs traverses the Greenbelt. It is also anticipated that new and/or expanded facilities will be needed in the future to serve the substantial growth projected for southern Ontario.*

4.2.1 General Infrastructure Policies

For lands falling within the Protected Countryside, the following policies shall apply:

1. *All existing, expanded or new infrastructure subject to and approved under the **Canadian Environmental Assessment Act**, the **Environmental Assessment Act**, the **Planning Act**, the **Aggregate Resources Act**, the **Telecommunications Act** or by the National or Ontario Energy Boards, or which receives a similar environmental approval, is permitted within the Protected Countryside, subject to the policies of this section and provided it meets one of the following two objectives:*
    a) *It supports agriculture, recreation and tourism, rural settlement areas, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or*
    b) *It serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate **infrastructure** connections among urban growth centres and between these centres and Ontario's boarders.*
2. *The location and construction of **infrastructure** and expansions, extensions, operations and maintenance of **infrastructure** in the Protected Countryside, are subject to the following:*
    a) *Planning, design and construction practices shall minimize, wherever possible, the amount of the Greenbelt, and particularly the Natural Heritage System, traversed and/or occupied by such **infrastructure**;*
    b) *Planning, design and construction practices shall minimize, wherever possible, the **negative impacts** and disturbance of the existing landscape, including, but not limited to, impacts caused by light intrusion, noise and road salt;*

*c) Where practicable, existing capacity and coordination with different **infrastructure** services is optimized so that the rural and existing character of the Protected Countryside and the overall urban structure for southern Ontario established by Greenbelt and any provincial growth management initiatives are supported and reinforced;*

*d) New or expanding **infrastructure** shall avoid **key natural heritage features** or **key hydrologic features** unless need has been demonstrated and it has been established that there is no reasonable alternative; and*

*e) Where **infrastructure** does cross the Natural Heritage System or intrude into or result in the loss of a **key natural heritage feature** or **key hydrologic feature**, including related **landform features**, planning, design and construction practices shall minimize **negative impacts** and disturbance on the features or their related functions, and where reasonable, maintain or improve connectivity."*

The full text for the Greenbelt Plan can be found in:
www.mah.gov.on.ca/userfiles/HTML/nts_1_22087_1.html.

5.3 Niagara Escarpment Plan

The Niagara Escarpment includes a variety of topographic features and land uses extending 725 kilometres from Queenston on the Niagara River through the Waterdown area to the islands off Tobermory on the Bruce Peninsula. It contains a number of significant geological and ecological features, is a source of some of southern Ontario's prime rivers and streams, and is a principal outdoor recreation area. The Niagara Escarpment was approved as a Biosphere Reserve on February 8, 1990 by the Bureau of the United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and Biosphere (MAB) program.

The Niagara Escarpment Planning and Development Act was established to provide a planning process to ensure that the area is protected. The Niagara Escarpment Plan was developed based on this Act, which serves as a framework of objectives and policies to strike a balance between development, preservation and the enjoyment of the Escarpment.

The Niagara Escarpment Plan cuts through Waterdown in an east-west fashion and then heads north through Hamilton and Halton Region. The portion of the Study Area that is covered by the Plan is primarily located within the City of Hamilton, although there are several areas where the Plan crosses into Burlington. Details are also provided in ***Figure 5-2***.

The Niagara Escarpment Plan has six land use designations, which are:

- Escarpment Natural Area;
- Escarpment Protection Area;
- Escarpment Rural Area;
- Mineral Extraction Area;

- Escarpment Recreation Area; and
- Urban Area.

5.4 Other Planning Studies

In addition to the Greenbelt Plan and the Niagara Escarpment Plan, several other plans and policies were considered in the development and evaluation of transportation alternatives as part of the Phase 2 work as described below:

North Aldershot Interagency Review and Burlington Official Plan

The North Aldershot Interagency Review (NAIR) was undertaken to prepare a land use concept for North Aldershot and an implementation strategy. Various government agencies were represented in the NAIR. A final report was released in May 1994. The purpose of the NAIR was to determine the appropriateness of current plans and policies in the area, recommend a land use plan and strategy for implementation and address government jurisdiction issues. The NAIR produced policies related to Waterdown Road that were in turn incorporated into the City of Burlington's Official Plan (OPA 197) which included:

"aa) The following additional policies shall apply in the North Aldershot Planning Area

(i) measures will be considered on Waterdown Road to discourage increasing volumes of through traffic so as to strengthen its local road function;

(ii) traffic calming measures will be considered on Waterdown Road;

(iii) construction of major new roads and upgrading of existing roads will be limited;

(iv) new public roads will be built to rural standards;

(v) crossing of land designated as Environmental Protection Areas by new areas will be restricted; and

(vi) a Master Transportation Study Environmental Assessment will be undertaken to evaluate north-south and east-west traffic movements in the North Aldershot Planning Area, which may result in the need to further amend this plan."

Because of NAIR some members of the public felt that any improvements to Waterdown Road should be excluded. It was the view of the study team that the NAIR recommendations and resulting OP policies were not grounds on their own to exclude Waterdown Road from consideration for improvement. The NAIR work was undertaken prior to OPA 28 and as such, the demands on the north-south road network changed considerably since the report was prepared. It was the view of the study team to be inclusive and not exclusive and let the EA process decided what the best solutions are to solving the identified transportation capacity problem. Further more, the NAIR recommendations identify the need to undertake a Master Transportation Study EA and recognize that there could be the need to further amend the plan.

It is noted that the NAIR study is over 17 years old, as such, planning policies and environmental conditions as referenced within it may have changed.

Hamilton Official Plan

At the time that the WATMP was initiated, the *Hamilton-Wentworth Official Plan* (2003) and the T*own of Flamborough Official Plan* were considered. Land use designations as well as transportation/transit policies were recognized as part of the EA planning process. Also considered were the results of the *Waterdown South Secondary Plan Study* and the *Waterdown North Secondary Plan Study.*

Provincial Policy Statement

In the identification of the alternative new/improved roadways, regard was given to the Provincial Policy Statement, particularly relating to the protection of natural features such as provincial significant wetlands.

South Waterdown Sub-Watershed Study

The overall purpose of the South Waterdown Subwatershed Study is to develop a management plan for the features and functions of those portions of the Grindstone Creek, Falcon Creek, Indian Creek and Hager-Rambo Creek watersheds that are potentially affected by urban development of the South Waterdown lands. The study is intended to inform planning decision-making (including the preparation of a South Waterdown Secondary Plan) so that changes in land use are compatible with natural systems.

The South Waterdown Subwatershed is being conducted in three stages. In Stage 1, the six sub watersheds of the study area were characterized through a review of background literature and field investigations. In Stage 2, the study team completed a detailed analysis of the potential impacts of the urban development of the South Waterdown lands and develop a management strategy to ensure that the critical elements of the component watersheds are protected. In Stage 3, an implementation and monitoring plan will be developed to describe how management strategies developed in Stage 2 will be implemented. At the time of this report the Subwatershed project team was finalizing the Stage 2 Report and commencing Stage 3 work.

5.5 Natural Environment Features

5.5.1 Terrestrial

The study area is within the deciduous forest region. Much of the natural vegetation has been cleared for agriculture and development in the study area, however, the area contains many large wetlands on top of the escarpment, wooded escarpment slopes as well as wooded creek ravines below the escarpment. Many of the valley slopes are heavily wooded and support hardwood forest cover which provides habitat for Carolinian and prairie savannah species.

The study area contains many significant areas that have been designated as such by either the Ministry of Natural Resources, the conservation authority or the municipality. These include

provincially significant wetlands, environmentally sensitive areas (ESAs), and areas of natural or scientific interest (ANSIs). These significant areas are displayed on ***Figure 3-4***.

Millgrove South Woodlot ESA (also known as Logies Creek Swamp) is located on the southwest side of Highway No. 6. This 77 hectare forested natural area serves as the headwaters of two streams and provides habitat for significant species. This site is considered significant because it serves an important hydrological function and provides habitat for significant species. The forested natural area includes Silver Maple and White Elm dominated swamps as well as Sugar Maple-Beech and Trembling Aspen- White Ash upland areas. There is also a dugout pond, a cattail-Joe-Pye-Weed marsh and cultural meadows. Significant species observed at the site include Broad Beech Fern and Ebony Spleenwort. The ESA includes the Logies Creek Wetland Complex, which is a non-provincially significant wetland complex, made up of 10 individual wetlands, composed of two wetland types (91% swamp and 8% marsh). The ESA is bordered by agricultural fields and strip residential development along the peripheral roads.

Waterdown North Wetlands ESA is located immediately above the community of Waterdown. This 236 hectare area consists of small swamps along Grindstone Creek which help regulate stream flow and maintain water quality in Grindstone Creek above the Niagara Escarpment. The site is considered significant because it serves an important hydrological function. The swamps at this site are a part of the Lake Medad Valley Swamp Complex and include a wide range of species, predominantly broadleaf. In addition to the swamps, the ESA also includes upland wooded areas, cultural meadow and a spruce plantation. The ESA is surrounded by cleared agricultural lands and fragmented by railway and hydro corridors.

Clappison's Escarpment Woods ESA is located south of Highway No. 5 between Highway No. 6 and Thompson Drive. This 76 hectare area encompasses a 2.6 km segment of the Niagara Escarpment and is part of the continuous greenbelt of natural areas along the Escarpment. The ESA is dominated by vertical bedrock exposures of the Niagara Escarpment. The area includes the King City Quarry, which has been designated as an Earth Science ANSI. Vascular plant species richness is amongst the highest in Halton Region and the ESA includes rare species such as perfoliate bellwort, sundrops and American columbo. The area is a source of seepage springs for intermittent tributaries to the lower Grindstone Creek. Land use surrounding the area includes agriculture, rural residential, industrial, and suburban developments.

Medad Valley ESA is located northeast of Waterdown. This 500 hectare forested natural area provides habitat for various rare and uncommon wildlife species. The Medad Valley is considered significant because it serves important hydrological and ecological functions, it includes significant earth science features and it provides habitat for significant species. Lake Medad is within this ESA and much of the area has been designated as provincially significant wetland. The area is the headwaters of the Grindstone and Bronte Creeks. There are groundwater infiltration zones which support the provincially significant wetland as well as the flow in the headwater streams. The ESA contains extensive upland and lowland forests that are relatively undisturbed and provide habitat for nationally, provincially and regionally rare species. The area is also used as a deer wintering range and is a natural corridor for wildlife movement. Adjoining land uses are primarily agricultural.

Grindstone Creek Valley ESA is located in the northwest corner of Waterdown South. This 150 hectare area is comprised of the steep-sided valley of Grindstone Creek as it descends the Niagara Escarpment and crosses the south slopes. The area encompasses provincially significant bedrock exposures and supports many rare and uncommon plant species. The area is considered to be one of the top botanical sites in Halton Region, is excellent for nesting or migrating birds and contains many rare species. The area is also designated as a Life Science ANSI. The ESA provides a continuous wooded linkage between Hamilton Harbour and the Niagara Escarpment. The Grindstone Creek falls have been designated as a locally significant earth science ANSI, while the valley itself has been designated as a provincially significant earth science ANSI. The ESA serves as a major zone of groundwater discharge. The present land use consists primarily of floodplain and hazard lands. Residential areas in the community of Waterdown abut the northern portion of the valley, and Waterdown Road and the CPR railway cross the escarpment. Boundaries and buffers of this ESA are being confirmed through the Waterdown South Subwatershed Study.

Borer's Falls-Rock Chapel ESA is located southwest of the study area. This 330 hectare area includes a southeast-facing, forested segment of the Niagara Escarpment. The area provides a habitat to many significant species. The Borer's Falls – Rock Chapel study area is considered a significant natural area because it serves an important ecological function both as part of the Niagara Escarpment corridor and by providing a key link between Cootes Paradise and the Escarpment. The ESA also contains old growth forest (eastern white cedar) along the escarpment face which is provincially significant. The ESA contains many rare species, including many prairie/savannah and Carolinian species.

Bridgeview Valley ESA is a deep, narrow and steep-sided ravine running south from the escarpment that contains a tributary of Grindstone Creek. The east bank has maturing maple, oak and hickory forest in the south and hemlock in the north. Carolinian habitat and rare species are also present in the ESA The ESA is considered significant due to the presence of rare species such as yellow mandarin and pignut hickory. It is also significant because the area contributes to maintaining surface water quality.

The **Waterdown Escarpment Woods ESA** is located south of Waterdown South, across Mountain Brow Road. This ESA forms a 3.5 km link along the Niagara Escarpment. The ESA is considered significant because it serves an important ecological function in providing linkages along the escarpment, the area contains significant biotic communities, it provides habitat for rare species and is along the Niagara Escarpment. Moraine and limestone pavement areas in the ESA, on the escarpment plateau act as groundwater recharge areas. Above the escarpment the vegetation diversity is high and includes a broadleaf upland forest, a broadleaf swamp, and successional communities. Along the escarpment rim, the White Cedar-Red Oak community is significant. Only a narrow area of field and powerlines separate this ESA from the provincially significant Sassafras Woods. These two areas together create a very complete cross-section of the natural biotic community associated with the Niagara Escarpment.

The **Sassafras Woods ESA** is located adjacent to the Waterdown Woods ESA in Halton Region east of Waterdown Road and north of Highway 403. It supports a secondary growth hardwood forest with an overstory of white pine. This is one of the few remaining woodlots of this type that once covered most of the region south of the escarpment. The area has been designated as a Carolinian site. Sugar maple is dominant with shagbark hickory, witch hazel, American hornbeam and red oak well represented. It is one of the top botanical sites in Halton and has been designated as a Life Science ANSI.

Highview Swamp is a non-provincially significant wetland complex made up of two individual wetlands. Both wetlands are swamp forest.

The Parkside Drive Wetland Complex includes a large tract of wooded area north of Parkside Drive. This area encompasses portions of Borer's Creek and its headwaters. The southern most extension of this area is perpendicular to the proposed alignment and includes forest and wetland community types. The main ecological community in this area is deciduous swamp with a small area of mineral marsh. Additionally, a small red oak forest is found at the south of this site. The southerly extension of this ESA is mainly associated with Borer's Creek and the riparian zone surrounding it.

The **"Centre Road Woodlot"** (east of Centre Road) is a candidate ESA. The area was not considered as a PSW based on the 2004 MNR revaluation of the Logies Creek - Parkside Drive PSW. This feature is important though because it provides linkages between natural features to the east (Lake Mead Valley Swamp) and to the west (Parkside Drive Wetland Complex) as well as two existing ESAs: the Millgrove South Woodlot ESA and the Waterdown North Wetlands ESA. The area is dominated by Swamp vegetation communities, particularly Ash deciduous swamps.

5.5.2 Aquatic Features

The main watersheds in the study area are Borer's Creek and Grindstone Creek, however Falcon Creek, Indian Creek, and Hager Creek are also present.

Borer's Creek and Grindstone Creek watersheds both cross the Niagara Escarpment. Grindstone Creek enters Hamilton Harbour directly whereas Borer's Creek enters Cootes Paradise. Both watersheds contain falls.

Throughout both Borer's Creek and Grindstone Creek watersheds, agricultural practices and residential, commercial and industrial development have resulted in tributaries contaminated with sewage effluent, eroded soil and sediment and chemical runoff. The Hamilton Harbour Remedial Action Plan was initiated in 1986 to address this environmental degradation in the Harbour including key areas like Cootes Paradise and lower Grindstone Creek.

Originating in Flamborough, Grindstone Creek drains an area of 90 km^2, making it one of the main tributaries discharging to the northwest part of Hamilton Harbour. Grindstone Creek supports a warmwater fish community above the escarpment and a significant coldwater fish community bellow the escarpment.

The falls along both the Grindstone Creek and Borer's Creek represent an absolute barrier to upstream fish migration, however the lower reaches provide habitat for fish species that make their way up from Hamilton Harbour. Rainbow trout, a coldwater fish species, migrate into Grindstone Creek and spawn below the Waterdown Falls. Groundwater discharge to the creek in that location provides the cold temperatures required by this species and results in that area's formal designation as "coldwater fish habitat".

Through the consultation process, stakeholders and members of the public have provided valuable knowledge about the environmental conditions in the study area.

5.6 Socio–Economic Environment

5.6.1 Existing Land Use

The study area includes the communities of Waterdown within the City of Hamilton and the North Aldershot area within the City of Burlington. The built-up area of Waterdown extends south from Parkside Drive to just below Dundas Street (Highway 5) to the edge of the Niagara Escarpment. Highway 6 and Evans Road define the western and eastern boundaries of the community. North of Parkside Drive, land use is primarily agricultural with scattered rural residences. Most of the built-up area of Waterdown consists of single-family dwellings. The 2001 population of Waterdown was about 15,000 people representing a growth rate of 28.9% from 1996.

This downtown area is unique as it contains several historic buildings contributing to a "village" type character. Commercial land use within Waterdown is focused along Dundas Street (in the Village area), which includes a number of retail commercial uses. Many of these buildings are located quite close to Dundas Street. Other commercial lands are located along Hamilton Street North that runs between Dundas Street and Parkside Drive. There is considerable and recent "big box" development on Hwy 5 towards Clappison Corners.

North Aldershot, which is part of the City of Burlington, is much more rural in nature and extends north of Highway 403 to the Burlington/Hamilton municipal boundary. Much of North Aldershot is contained within the areas of the Parkway Belt West Plan, the Greenbelt Plan Area, and the Niagara Escarpment Plan. The area somewhat serves as a "rural separator" between Waterdown to the north and the built-up areas of Burlington south of Highway 403. The estimated population of North Aldershot is 15,000 with much of this population being located in the eastern portion of the study area from just west of Kerns Road to Brant Street. Rural residential development is also found along the Waterdown Road corridor.

Commercial land uses are focused along the south limits of North Aldershot including "big box" commercial development at the Brant Street Highway 403/QEW interchange.

5.6.2 Cultural Environment

Cultural Heritage

The Village of Waterdown was developed in the late 1700's/early 1800's around a sawmill on Grindstone Creek, which provided power to the Village. Industrial development continued around the Smokey Hollow area, which included dams, raceways, sawmills, gristmills, flourmills, woollen mills, foundries and tanneries. By 1841 the village population reached 165 people and was incorporated as a village in 1841. The Village name reflected its proximity to the Grindstone Creek waterfall over the edge of the Escarpment. Many of the historic buildings within Waterdown and in the larger study area still exist and have been preserved. Of particular note is the historic downtown area of Waterdown, which provides a village like commercial area. Heritage buildings in the City of Hamilton have been inventoried and are documented in the 2002 report "Hamilton's Heritage, Inventory of Buildings of Architectural and/or Historical Interest". As well, for some of the northern portions of the Study Area, the historical landscapes have been characterized as documented in the City of Hamilton 2004 report "Cultural Heritage Landscape Study".

The City of Burlington has inventoried historic properties as well and has developed an Internet based information system which provides information on designated and non designated properties of historical interest. It is noted that there exists a few historic properties along Waterdown Road in North Aldershot.

During the next phase of work, in areas of road improvements works, historic properties/buildings will be inventoried, mapped and considered in the design and assessment of the proposed road works.

5.6.3 Archaeology

Lands within the study area contain varying levels of archaeological potential. The study area is expected to contain both pre-contact and contact period resources. For those sections of the study area that are contained within the City of Hamilton, archaeological potential and registered sites have been inventoried as documented in the City of Hamilton 2004 report "The Archaeological Study for Growth Related Integrated Strategy" as part of the GRIDS initiative. Recognizing that the evaluations undertaken as part of this TMP were conducted at the "road corridor level", archaeological potential was not assessed at this time. In future phases of the Class EA work for the recommended "Schedule C" projects, it will be necessary to identify and take into account both known/registered sites and sites of med/high potential.

6.0 ALTERNATIVE SOLUTIONS EVALUATION (PHASE 2)

6.1 Evaluation Criteria

To guide the assessment and evaluation of the alternative road improvement solutions, a set of evaluation criteria and indicators were developed. The evaluation criteria were organized on the basis of the following five criteria groups that represent the broad environmental components or areas of concern that the evaluation was based on:

- ***Natural Environment*** – addresses the potential for effects to natural environmental features (terrestrial and aquatic);
- ***Social Environment*** – addresses the potential for effects to people, community features and cultural features;
- ***Economic Environment*** – addresses the potential for effects to business and economic development activity;
- ***Cost*** – addresses the capital cost of the alternative; and
- ***Transportation Service*** – addresses the level of improved transportation service that the alternative provides.

Under each of the criteria groups several criteria were developed. The criteria identify the specific components of the environment potentially affected by the proposed road improvement alternatives. For each criterion, one or more indicators were developed that were used to measure potential effect. A total of 39 indicators were developed and considered in the evaluation. ***Table 6-1*** presents the criteria and indicators that were considered in the evaluations.

Table 6-1 – Evaluation Criteria & Indicators

Criteria Group	Criteria	Indicators
Natural Environment	Potential for impact on terrestrial features	Area of provincially significant wetland removed (ha)
		Area of core ANSIs removed *(not including provincially significant wetland)* (ha)
		Area of edge ANSIs removed *(not including provincially significant wetland)* (ha)
		Area of core ESAs removed *(not including provincially significant wetland)* (ha)
		Area of edge ESAs removed *(not including provincially significant wetland)* (ha)
		Length of corridor adjacent to ESAs & ANSIs *(on both sides of new road corridor)* (m)
		Area of other woodlots removed (non ESA/ANSI) (ha)
		Area of wetland removed (ha)
		Area of other natural habitat removed (ha)
		Number of new Niagara Escarpment crossings
	Potential for Impact on aquatic features	Number of watercourses crossed

Table 6-1 – Evaluation Criteria & Indicators

Social Environment	Potential for impact on residents	Number of residences displaced
		Number of residences within 25 m of the corridor *(widening of existing road)*
		Number of residences within 25 m of the corridor *(new road corridor)*
		Number of residences within 25-50 m of the corridor (widening of existing road)
		Number of residences within 25-50 m of the corridor (new road corridor)
		Number of residential properties required
		Area of residential properties required (ha)
	Potential for community character impacts	Length of route through existing residential communities (km)
	Potential for impact on community/recreation features	Number of community/recreation features displaced (e.g., schools, churches, parks, etc.)
		Number of community/recreation features within 25 m of the corridor
		Number of community/recreation features within 25-50 m of the corridor
	Potential for impact on cultural features	Number of cultural features removed
		Number of cultural features within 25 m of the corridor
Economic Environment	Potential for impact on business enterprises	Number of businesses displaced
		Number of businesses within 25 m of the corridor
		Number of businesses within 25-50 m of the corridor
		Number of commercial properties required
		Area of commercial properties required (ha)
	Potential for impact on downtown core business area	Length of route through downtown core business areas (m)
	Potential for impact on future land use	Area of land designated for development removed (ha)
	Potential for impact on agricultural land	Area of agricultural land designated for agriculture/rural removed (ha)
Cost	Capital Cost (million $)	Estimated capital cost
Transportation Service	Change in Level of Transportation Service	Critical screenline volume/capacity ratio
		Mean network speed
		Average network volume/capacity ratio
	Change in Safety Levels	Number of residential property access points
		Number of commercial property access points
		Number of roadway access points

The following presents some commentary about the criteria/indicators:

- For the criterion, "potential impact on terrestrial features", a distinction was made on whether the area of the removed feature (e.g., an ESA) is from the "core" or "edge" of the feature. The rationale being that a core effect is more significant as it would result in the splitting of a feature that could affect the ecological functioning of that feature;

- Also for the above criterion, natural features were distinguished on the basis of the type of feature and its level of importance as supported through provincial, regional and local policies/plans (e.g., provincially significant wetlands were assigned the highest importance);
- With respect to the social environment, the number/type of features within 0-25 m and 25-50 m of the roadway were identified as a representative of potential disruption effects (e.g., noise, visual, air quality); and
- The cost criterion/indicator accounts for the capital cost for building the road and an estimated land cost. In costing the various routes, it was assumed that Highway 6 would be crossed at grade for all options.

As a measure of transportation safety, the number of access points along a route was identified. In areas where the corridor passes through lands designated for new development, an estimate of access points was made based on available land use concepts.

The purpose of this evaluation was to identify broad distinctions among the alternatives being considered. The potential for effects were identified based on conceptual level right-of-way (RoW) requirements. In the next Phase of the EA, more detailed assessments will be undertaken that will include fieldwork and the delineation of a more refined RoW for each of the selected routes.

6.2 Evaluation of Alternative Solutions

6.2.1 Evaluation Method Overview

As all of the east-west options could be combined with any of the north-south options, it was determined the north-south alternatives could be compared independently of the east-west alternatives. As a result, two separate evaluations were conducted. The evaluations were conducted on the basis of the evaluation criteria/indicators, the collected data and the relative importance of the criteria/indicators.

Since all road improvement options were considered capable to solve the transportation problem, the option that was identified to have the least overall impact were considered as the preferred option. The approach to select the preferred east-west options and preferred north-south option involved the following three steps:

- ***Step 1*** – Determine the relative importance of the evaluation criteria groups/criteria;
- ***Step 2*** – Determine the Simple Additive Weighting (SAW) scores; and
- ***Step 3*** – Considering the SAW scores and the data/impact levels, rationalize the selection of the preferred option(s).

It is noted that the Stakeholder Advisory Committee was involved throughout this process and the results made available for public review and comment.

Step 1 – Criteria Importance Levels

To establish the relative importance of the criteria/indicators, a criteria ranking/weighting exercise was undertaken with members of the Stakeholder Advisory Committee and members of the public on February 10, 2005. To assist in the exercise, the workshop attendees were provided with the range of data for each indicator. With this information, they were then asked to provide a relative ranking of the criteria groups and criteria and to assign a numerical weight (out of 100 points). Recognizing that the north-south alternatives and east-west alternatives pass through areas with different environmental characteristics, the participants were asked to develop criteria rankings/weightings for each of the two sets of alternatives to be evaluated. The criteria/indicator rankings and weights that were provided by the participants are presented in ***Table 6-2*** and ***Table 6-3***.

For the most part, the criteria weights as provided by the workshop participants were used in the evaluations. Some adjustments were made considering the range of effects associated with each indicator (e.g., the economics criteria group weight for the north-south alternatives was lowered as there are few businesses to be affected by all alternatives). The weight was redistributed to the other criteria groups. The weight value assigned to each indicator was completed by the consultant and was based on: the importance of the features being affected, the potential magnitude of effect and the potential for mitigation.

Step 2 – Simple Additive Weighting Runs

The comparative evaluation process was assisted through the use of the Simple Additive Weighting (SAW) method. The SAW method is useful to help condense large data sets. As each of the alternatives was to be assessed against a large number of environmental considerations, which were all measured on a quantitative (i.e., numerical) basis, the SAW method was considered as an appropriate evaluation method. In addition to the data considered, the SAW results are influenced by the assigned weights (importance levels) to the criteria/indicators considered. The main value of the SAW method is that it can highlight the key differences among the alternatives to assist in decision making.

The SAW approach can give the impression of a high level of detail/precision in the analysis, as it reduces all the inputs/considerations down to a single number. As the alternatives were conceptual in nature, many of the effects could be expected to be reduced through future design work. **As such, the purpose of this was to help identify broad distinctions among the alternatives to assist in the decision to select the preferred alternatives.** Ultimately, to select the preferred alternatives, the SAW results were considered along with reasoned argument that considered the trade-offs among the alternatives (see Step 3).

The exhibits included in ***Appendix A*** present the SAW results for all of the evaluations that were conducted. The tables are organized as follows:

- ***Tables A1 & A2*** – East-west options SAW runs;
- ***Tables A3 & A4*** – Eastern connections options SAW runs;
- ***Tables A5 & A6*** – Waterdown/King options SAW runs; and
- ***Tables A7 & A8*** – Waterdown Road North options SAW runs.

Table 6-2 – North-South Corridor Alternative Evaluation Criteria Ranking and Weighting Summary

Criteria	Summary of Ranking and Weighting - All who attended					
	Ranks (1 through 5)					Weighting
	1	2	3	4	5	
Natural Environment Summary	**8**	**13**	**1**	**0**	**0**	**29.3**
Potential for impact on terrestrial features	19	3	0	0	0	**15.8**
Potential for impact on aquatic features	8	14	0	0	0	**13.5**
Social Environment Summary	**13**	**6**	**2**	**1**	**0**	**30.2**
Potential for impact on residents	18	4	0	0	0	**12.8**
Potential for community character impacts	7	9	5	1	0	**7.4**
Potential for impact on community/ recreation features	4	6	9	3	0	**5.8**
Potential for impact on cultural features	1	3	12	6	0	**4.4**
Economic Environment Summary	**0**	**2**	**13**	**4**	**3**	**16.4**
Potential for impact on business enterprises	5	9	6	1	1	**4.4**
Potential for impact on downtown core business area	10	5	2	5	0	**4.7**
Potential for impact on future land use	5	6	5	6	0	**3.6**
Potential for impact on agricultural land	6	6	5	4	0	**3.6**
Cost Summary	**2**	**1**	**1**	**6**	**11**	**10.5**
Capital Cost	0	0	0	0	0	**10.0**
Transportation Service Summary	**1**	**1**	**4**	**10**	**5**	**13.6**
Change in Level of Transportation Service	9	9	1	1	0	**6.5**
Change in Safety Levels	15	5	0	0	0	**7.6**

Summary of Ranking and Weighting - SAC Members						
	Ranks (1 through 5)					Weighting
	1	2	3	4	5	
5	**5**	**1**	**0**	**0**	**30.5**
10	1	0	0	0	18.4
3	8	0	0	0	12.2
7	**3**	**0**	**1**	**0**	**29.0**
9	2	0	0	0	12.2
4	4	2	1	0	7.9
0	4	5	2	0	5.1
0	2	6	3	0	3.8
0	**1**	**5**	**3**	**2**	**16.5**
4	2	3	1	1	4.9
2	4	2	3	0	3.7
2	3	3	3	0	3.7
4	2	2	3	0	4.2
1	**0**	**1**	**2**	**6**	**9.5**
0	0	0	0	0	9.5
0	**1**	**4**	**3**	**2**	**14.5**
4	5	0	1	0	6.7
8	2	0	0	0	7.9

1 Note: Data in the Ranks columns (1 through 5) represents the frequency of the response to the ranking of the evaluation criteria (i.e.7 of the SAC members thought the Social Environment Criteria was the most important component of the evaluation for the North-South Corridors). The last column in each table represents an average weighting of the evaluation criteria taken from responses from the Stakeholder Advisory Committee and other public participants at the SAC meeting.

Table 6-3 – East-West Corridor Alternative Evaluation Criteria Ranking and Weighting Summary

Criteria	Summary of Ranking and Weighting - All who attended						Summary of Ranking and Weighting - SAC Members					
	Ranks (1 through 5)					Weighting	Ranks (1 through 5)					Weighting
	1	2	3	4	5		1	2	3	4	5	
Natural Environment Summary	**7**	**10**	**1**	**1**	**1**	**26.6**	**4**	**6**	**1**	**1**	**0**	**28.0**
Potential for impact on terrestrial features	14	4	0	1	0	**14.0**	8	2	0	1	0	**15.9**
Potential for impact on aquatic features	7	11	1	0	0	**11.6**	2	8	1	0	0	**12.2**
Social Environment Summary	**14**	**5**	**0**	**1**	**0**	**32.1**	**10**	**2**	**0**	**0**	**0**	**31.0**
Potential for impact on residents	15	2	1	1	1	**14.2**	9	1	1	0	1	**15.0**
Potential for community character impacts	5	10	3	2	0	**7.6**	2	6	2	2	0	**6.4**
Potential for impact on community/ recreation features	1	9	7	3	0	**4.8**	0	6	3	3	0	**3.9**
Potential for impact on cultural features	2	6	9	3	0	**6.0**	1	3	6	2	0	**5.8**
Economic Environment Summary	**2**	**3**	**12**	**2**	**1**	**18.3**	**1**	**2**	**7**	**1**	**1**	**18.6**
Potential for impact on business enterprises	6	12	2	0	0	**5.6**	5	6	1	0	0	**6.4**
Potential for impact on downtown core business area	9	4	6	1	0	**6.1**	5	1	5	1	0	**5.3**
Potential for impact on future land use	2	8	6	4	0	**3.7**	1	4	4	3	0	**3.4**
Potential for impact on agricultural land	4	5	7	4	0	**3.4**	1	5	3	3	0	**3.6**
Cost Summary	**2**	**1**	**1**	**3**	**12**	**10.0**	**1**	**0**	**1**	**1**	**8**	**9.7**
Capital Cost	0	0	0	0	0	**0**	0	0	0	0	0	**9.7**
Transportation Service Summary	**1**	**2**	**4**	**9**	**3**	**13.0**	**1**	**0**	**3**	**5**	**2**	**12.7**
Change in Level of Transportation Service	9	8	1	0	0	**6.6**	6	5	0	0	0	**6.2**
Change in Safety Levels	8	9	1	0	0	**6.7**	6	4	1	0	0	**6.5**

The SAW method involved the following:

Data Standardization – As the data set involves varying scales of data, the data had to be standardized so that the data range for each indicator was on a common scale. If the data were not standardized, then those indicators that have higher valued numbers would result in higher impact scores when multiplied by its respective weight, which would bias the evaluation. The data standardization methods used converted all of the data to a scale of "0 to 1". Two different standardization methods were used including:

Standardization Method #1 $\quad \dfrac{\textbf{Raw Score}}{\textbf{Sum of all Scores}}$

Standardization Method #2 $\quad \dfrac{\textbf{Raw Score}}{\textbf{Max Score}}$

Data Score Determination – After standardizing the data, the standardized data (for each indicator) was then multiplied by the corresponding indicator weight to arrive at a "weighted indicator score". The weighted indicator scores were then summed to arrive at a "total weighted score" for each road improvement option (shown at the bottom of the table). The total weighted scores for each road improvement option could then be used to compare the options. The data presented in the tables are "costs" or impacts, in that the higher the number, the less preferred the alternative is. Therefore, the road improvement option with the lowest total weighted score (least amount of impact) is considered preferred.

Where there was no data recorded for an indicator or where the same level of cost/impact is associated with each option, that indicator was not considered in the evaluation and no weight was assigned to that indicator (as it will not help to distinguish among the options).

Step 3 – Rationalization of Preferred Option
The SAW results, along with the actual data, were then considered to rationalize the selection of the preferred options. In the evaluations, there was no alternative that was identified as being preferred for all criteria groups. Each option has a range of advantages and disadvantages. Through a qualitative discussion, which reviewed the tradeoffs among the alternatives, an argument was then presented to select the preliminary technically preferred corridors.

The following sections presents the Step 3 results.

6.2.2 East-West Alternative Comparison Results

The four east-west road improvement options that were compared are shown in ***Figure 6-1***.

Waterdown - Aldershot Transportation Master Plan

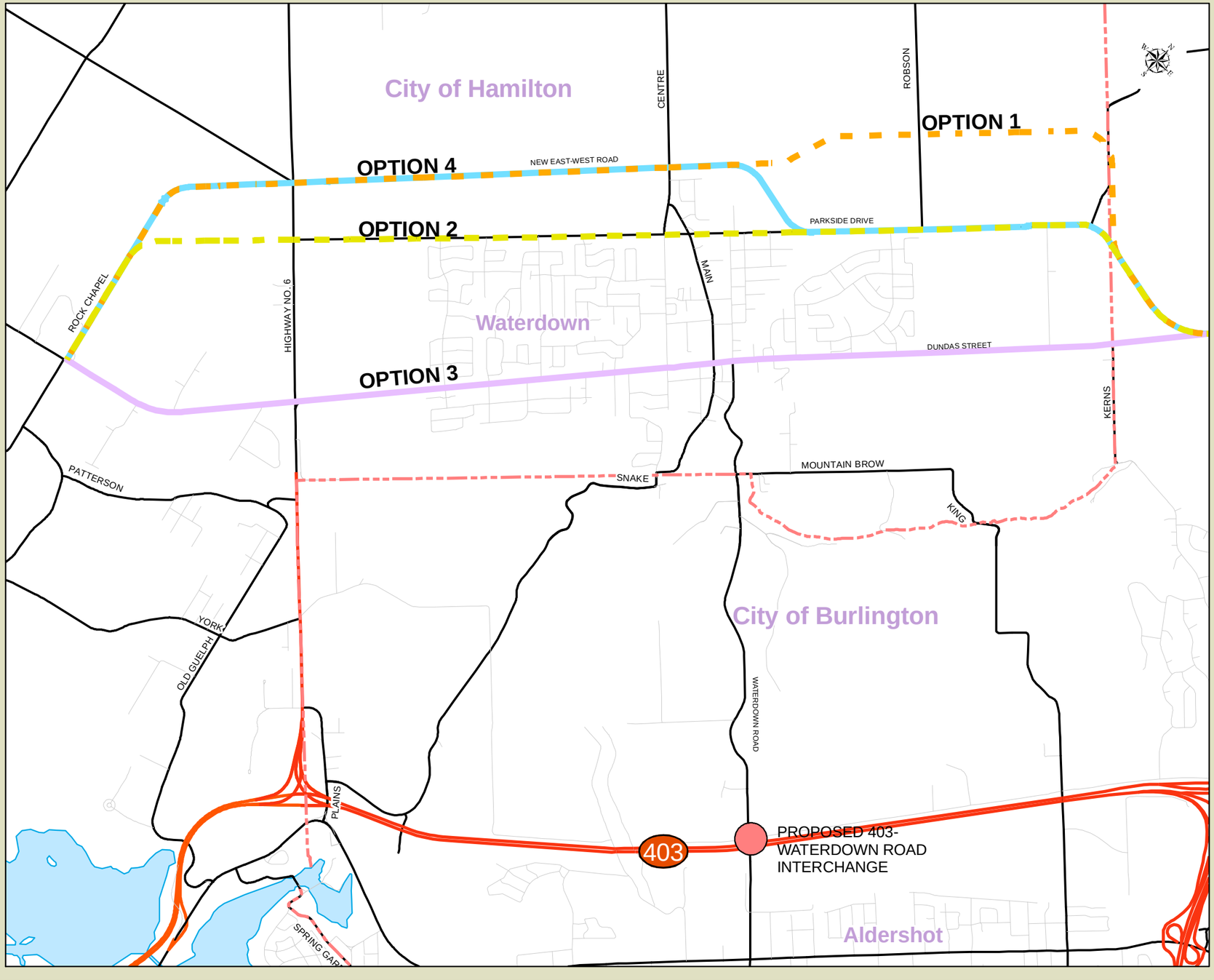


Figure 6.1: East/West Roadway Improvement Options

- Municipal Boundary

East-West Corridor

- Option 1 - New north road
- Option 2 - Parkside Rd. widening
- Option 3 - Dundas St. widening
- Option 4 - Parkside Rd. widening (partial) & new north road (partial)

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

Tables A1 and ***A2*** included in ***Appendix A*** present the SAW runs for this comparison. The weighted scores ranged from 20.08 and 30.73 points (Data Standardization Method #1) and 47.69 to 55.76 points (Data Standardization Method #2). The option with the lowest score is preferred as it is shown to have the less impact/cost. Under both runs, Option 4 (New North Road Hybrid) had the lowest impact score (most preferred). This option involves the widening of the eastern section of Parkside Drive and then extending northward between Robson Road and Centre Road to a new east-west northern "green-field" road.

To confirm the selection of Option 4 as the preferred on the basis of the SAW procedure, the differences among the options (considering the collected data), were reviewed through a reasoned argument approach as presented below. It was on the basis of the rationalization below that Option 4 was selected as the preferred alternative.

Natural Environment
As can be expected, Option 4 (New North Road Hybrid Option) has greater natural environmental effects than the more urban options (Option 2 - Parkside and Option 3 - Dundas) but has less natural environmental impacts than Option 1 – Northern Route. A key advantage of Option 4 over Option 1 is that it results in much less provincially significant wetland being affected, less ESA removed (edge area), less "other woodlot removed, fewer number of watercourses crossed, and less length of route adjacent to ESA/ANSIs. As the ESA removal effects are edge habitat, it may be possible to avoid/minimize these effects through the routing of the roadway. Thus a key advantage of Option 4 is that it avoids many of natural features removal effects associated with Option 1.

Social Environment
Option 4 is only slightly less preferred than Option 1 (New North Road) for the social criteria group, as it has more residences within 25 m of the roadway (53 vs. 0). Option 4 is clearly preferred over the Dundas and Parkside options with far fewer residents being displaced and much fewer residences within 25 m of the ROW that would mean less disruption effects to residents. As well, Option 4 is expected to result in less community effects as it passes through a much shorter distance of existing residential areas as compared to Options 2 and 3. A key advantage of Option 4 is that it avoids much of the built up areas along Parkside by swinging north before Centre Road, which is an area that has much residential development.

Economic Environment
This criteria group considered effects to existing commercial areas, loss of agricultural land and loss of developable lands. There tended to be tradeoffs among the options for all these criteria. As can be expected, Option 3 – Dundas Street has the potential for the greatest effect with 12 businesses displacements and the greatest number of businesses within 25 m that could be disturbed. It was therefore the least preferred for this criteria group. The remaining options were all relatively close. Option 4 and 1 have similar effects and scored second to Option 2 (Parkside) which is considered to have the lowest economic effects. Economic effects associated with Option 1 and 4 include the loss of agricultural land and loss of land designated for future development. As the greatest weight was assigned to the criteria considering effects to existing businesses and effects on the downtown core, the "northern" options tended to be preferred for

this criteria group. A key advantage of Option 4 is that it avoids any effects to the Waterdown downtown core area.

Cost
Both capital and land cost were considered. On this basis the costs ranged from $28 million (Dundas Street) to $14.9 million (New North Road). Option 4 was the second least expensive at $18.2 million.

Transportation Service
All options considered were considered capable of solving the transportation service deficiency problem. Some options did provide greater service capacity than others. Also considered were safety levels, which considered the number of access points along the roadways. For the northern route which is to pass through a large tract of land designated for future development, an estimate of future access points was made based on available land use plans. Option 2 and 3 were considered to be least preferred, in part due to the large number of access routes along these roadways, which would make them less safe than Options 1 and 4. Option 4 was considered slightly less preferred than Option 1 due to existing residential access points along Parkside.

East – West Route Conclusions
Based on the above, it is recommended that Option 4 (Hybrid North Route) be selected as the preferred for the following reasons:

- That it avoids the most significant natural environmental effects associated with Option 1. There would be no removal of core ANSI or ESA areas and minimal loss (0.2 ha) of provincial significant wetlands. Removal of natural habitat is limited to edge areas and more detailed routing work should be able to lessen these effects;
- Option 4 has the least number of residential and business displacements;
- Option 4 largely avoids existing residential and business areas. There would be no impact on the downtown core area of Waterdown;
- The additional cost of Option 4 is only slightly more expensive than the cheapest (Option 1). Option 4 is significantly less expensive than Option 2 and 3. The options that require a road widening would be more expensive than a new "green field" route because it is assumed that a complete reconstruction of the widened road would be required. The existing infrastructure and utilities would likely not be salvageable and would need to be replaced;
- Option 4 will provide a higher level of service and is considered to be a safer alternative than the more urban options; and
- Option 4 also can serve as a by-pass to move truck traffic out of the Waterdown downtown area.

It is noted that significant concern was raised by a group of residents along Parkside Dr. regarding the selection of Option 4, which would involve the widening of a portion Parkside Dr. An alternative alignment suggested by the Parkside Dr. Residents Group was also considered in this study and is discussed in more detail in Section 7.6.4 of this report.

6.2.3 Hybrid Option – Dundas to Parkside Connection Options

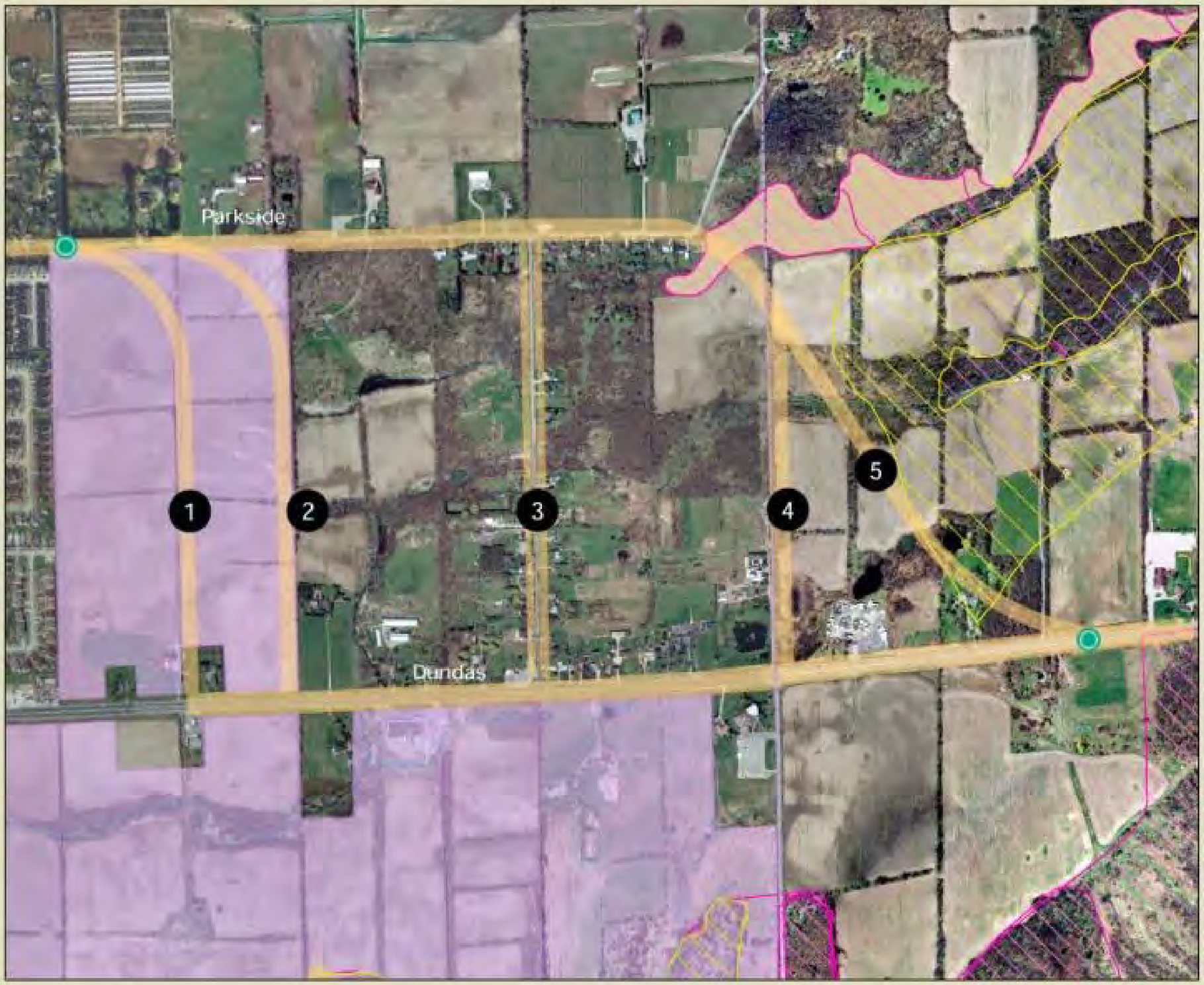
When the alternative east-west options were first identified, there existed a number of possible routes to connect Dundas Street to Parkside Drive for the "Northern", "Parkside" and "Hybrid" options. To simplify the east-west route evaluation, the same representative connection route was identified /used for these three options. Recognizing that the Hybrid Parkside/Northern option (Option 4) was selected as preferred, the next step was to confirm the route to connect Dundas Street with Parkside Drive. ***Figure 6-2*** illustrates the 5 connection route options that were identified.

Tables A3 and ***A4*** included in ***Appendix A*** present the evaluation results for the Dundas/Parkside connection options. Each table utilizes a different data standardization method. The data standardization method utilized is noted in each table as a footnote to the table.

Based on Data Standardization Method #1, the five alternatives scored from 13.55 to 26.40 points and with the second data standardization method, the alternatives scored from 36.83 to 51.19 points. In both cases, Option 2 had the lowest score and thus was preferred. The following rationalizes the selection of Option 2 as preferred.

Data Discussion
From a natural environment perspective, Option 2 was ranked second most preferred with its only impact being the removal of 0.64 ha of "other woodlot". With respect to the social environment, Option 2 was preferred as: it results in minimal displacement (only 2 residences); there are few residents in the vicinity of the alignment (and thus minimal disruption effects); and there will be no removal of built heritage features. Option 2 was also preferred from the perspective of the economic environment as it results in minimal effects on businesses and requires relatively minimal land designated for development and agricultural land. From a cost perspective, Options 1 and 5 are less expensive than Options 2, 3, and 4. Option 2 is least preferred from a transportation perspective. However, the difference among the options in regards to transportation was identified to be minimal and all options can address the problem.

Conclusion
The disadvantage of Option 2 in regards to transportation and being of higher cost than two of the options was not considered to offset all its other advantages as noted above. As such, Option 2 was identified to have the lower overall impact and was identified as the preferred option to connect Dundas Street with Parkside Drive (as part of the preferred Hybrid Option to resolve the east-west problem).



Waterdown - Aldershot
Transportation Master Plan

Figure 6.2: Dundas/Parkside
Connection Route Options

- Area of Natural or Scientific Interest
- Environmentally Sensitive Area
- Route Option
- Provincially Significant Wetland
- Locally Significant Wetland
- Future Development Area
- Beginning/End of Route Option

Scale

0 100 200 400 Metres

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

DILLON CONSULTING

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.

6.2.4 North-South Alternative Comparison Results

Three route options with various configurations of improvements to Waterdown Road and King Road were considered in this evaluation including:

- ***Option 1*** – Waterdown Road (geometric improvements)/King Road extension/North Service Road improvements;
- ***Option 2*** – Waterdown Road (widen to 4 lanes and geometric improvements); and
- ***Option 3*** – Waterdown Road (widen to 4 lanes (no geometric improvements)/King Road extension/North Service Road improvements.

It is noted that under Options 1 and 3, improvements to North Service Rd are required as capacity constraints would still occur on Waterdown Rd. Under Option 2, there would be no capacity constraints on Waterdown Rd., as such, the demand on North Service Road is reduced and no improvements are warranted.

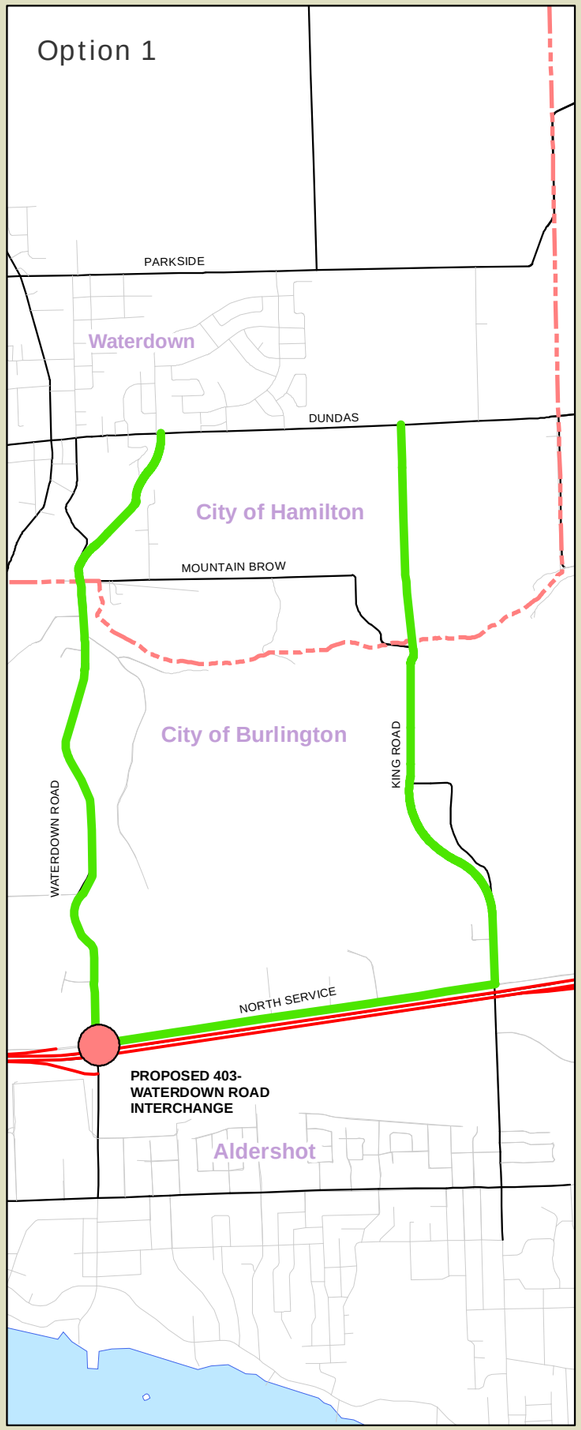
Figure 6-3 shows these options and ***Figure 6-4*** and ***6-5*** show in greater detail the proposed ROWs for Waterdown and King Roads. ***Tables A5*** and ***A6*** in ***Appendix A*** present the SAW evaluation results for the north-south corridor alternatives. Again, it is noted that where there was no data recorded for an indicator or where the same level of effect is associated with all the alternatives, that indicator was no longer considered in the evaluation and no weight was assigned to that indicator.

Under Data Standardization Method #1, the total weighted scores ranged from 22.75 to 40.77 and for the second standardization method, the scores ranged from 57.84 to 96.83. Under both standardization methods, Option 2 (Waterdown Road 4 lanes) was considered as preferred, and by a fairly large degree.

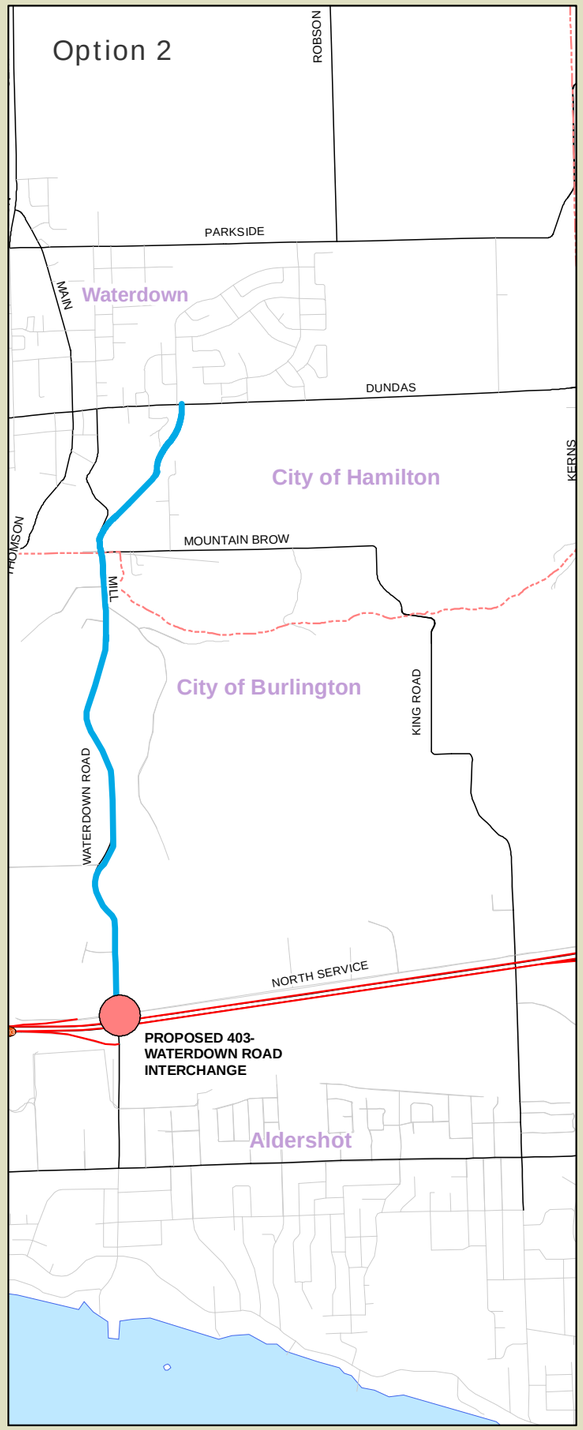
To confirm the selection of Option 2 as the preferred on the basis of the SAW procedure, the differences among the options (considering the collected data), were reviewed through a reasoned argument approach as presented below. It was on the basis of the rationalization below that Option 2 was selected as the preferred alternative.

Natural Environment
The key advantage of Option 2 is that it avoids the substantial natural environmental effects of Options 1 and 3 as a result of the King Road extension (including ANSI and ESA core areas). Environmental effects associated with Waterdown Road can be lessened by moving the widening to the west side of the road to avoid effects on the ANSI/ESA lands to the east of Waterdown Road (Sassafras Woods) and rerouting the new northern extension section to along Mountain Brow Road (See Section 6.5). Option 2 also results in substantially less watercourse crossings.

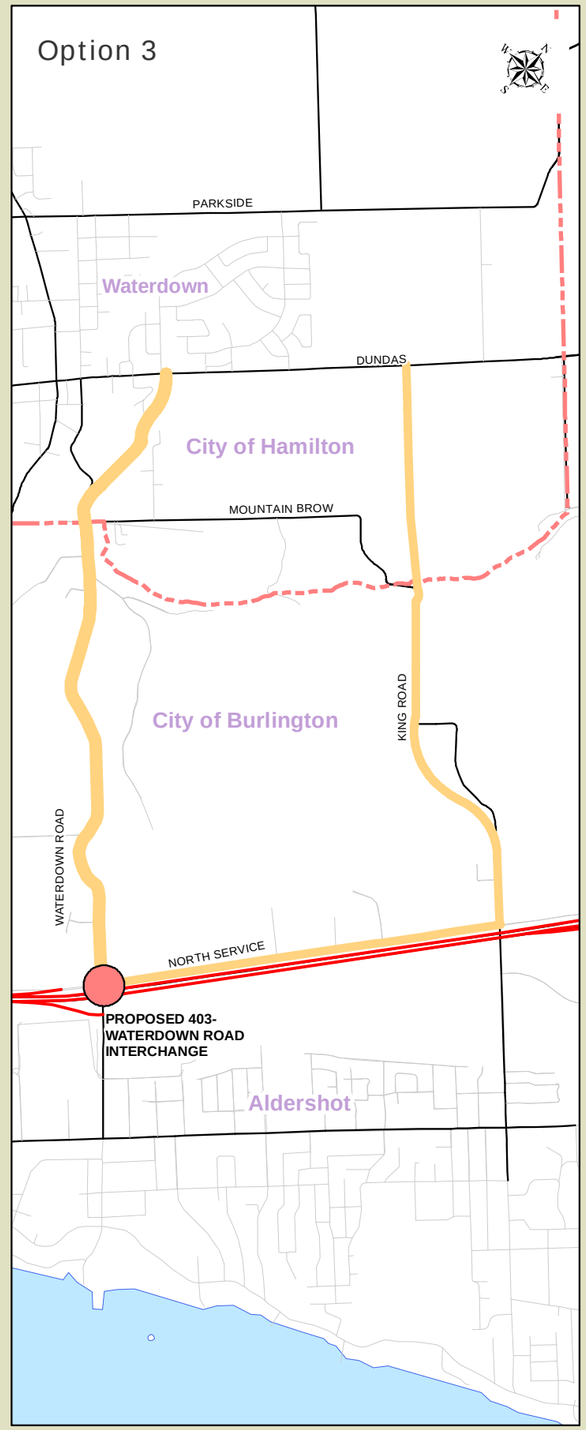
Option 1



Option 2



Option 3



Waterdown - Aldershot Transportation Master Plan

Figure 6.3: North/South Roadway Improvement Options

Municipal Boundary

Option 1

King & Waterdown Rd geometric improvements, no widening

Option 2

Waterdown Rd widening to 4 lanes & geometric improvements

Option 3

Waterdown Rd widening 4 lanes & King Rd geometric improvements

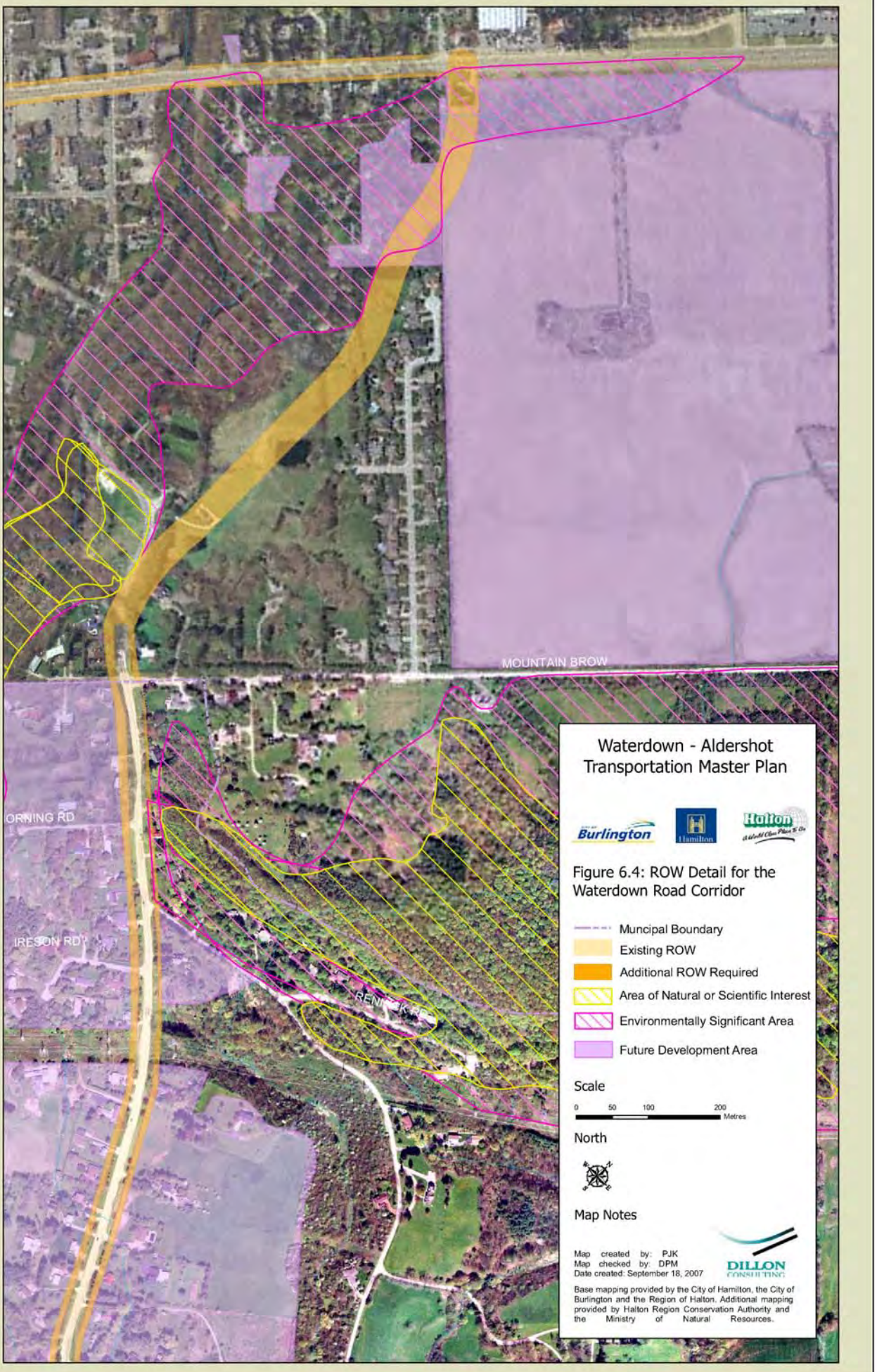
Scale

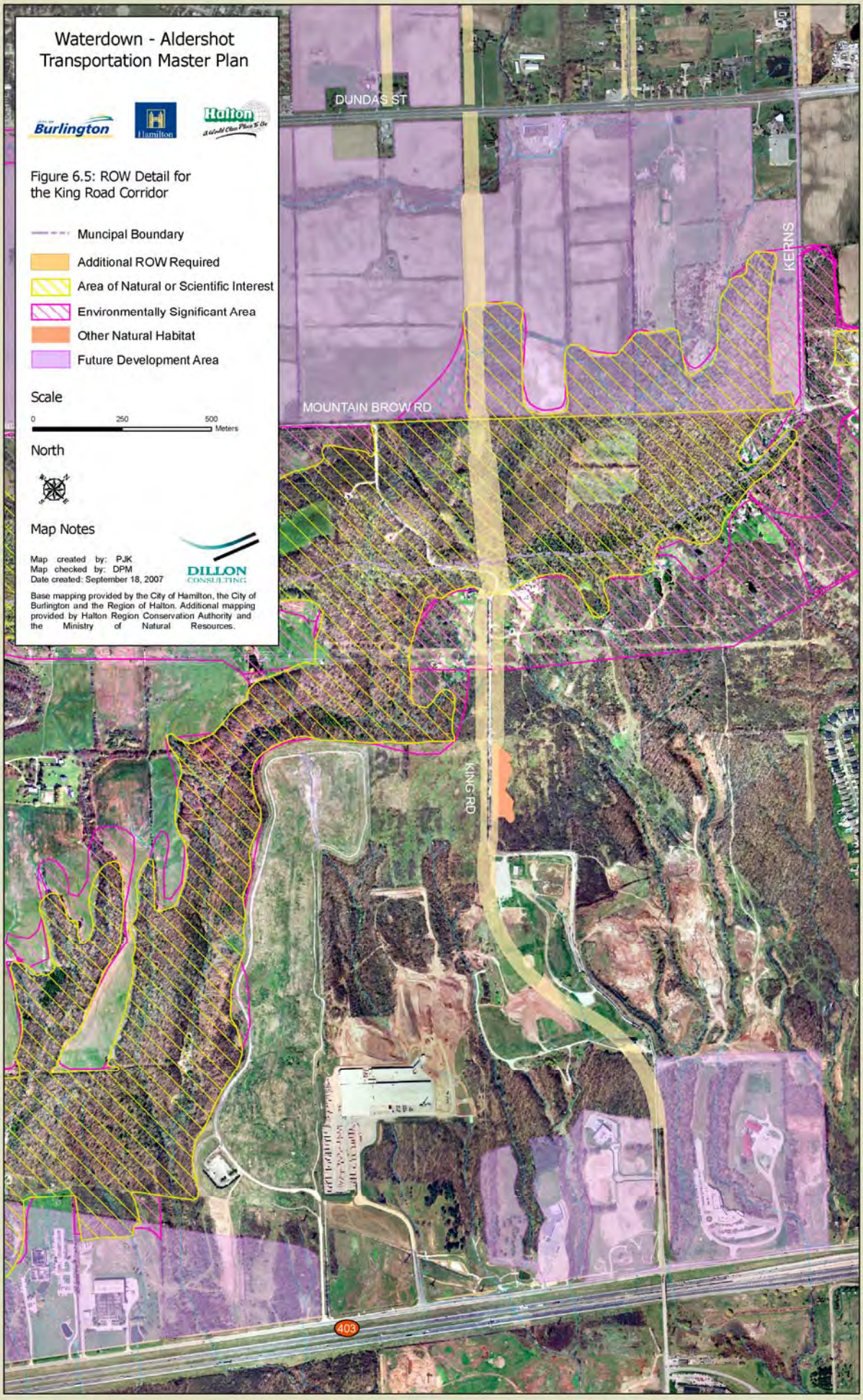
0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.


MOUNTAIN BROW
ORNING RD
IRESON RD
Waterdown - Aldershot
Transportation Master Plan
Burlington
Hamilton
Halton
Figure 6.4: ROW Detail for the
Waterdown Road Corridor
Muncipal Boundary
Existing ROW
Additional ROW Required
Area of Natural or Scientific Interest
Environmentally Significant Area
Future Development Area
Scale
0 50 100 200
Metres
North
Map Notes
Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007
DILLON
CONSULTING
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.


Waterdown - Aldershot
Transportation Master Plan
Burlington
Hamilton
Halton
Figure 6.5: ROW Detail for
the King Road Corridor
Muncipal Boundary
Additional ROW Required
Area of Natural or Scientific Interest
Environmentally Significant Area
Other Natural Habitat
Future Development Area
Scale
0
250
500
Meters
North
Map Notes
Map created by: PJK
Map checked by: DPM
Date created: September 18, 2007
DILLON
CONSULTING
Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority and the Ministry of Natural Resources.
DUNDAS ST
MOUNTAIN BROW RD
KERNS
KING RD
403

Social Environment
The difference among the options on the basis of the social environment was found to be relatively small as all three options involved some improvement to Waterdown Road, which contained most of the social features. Option 2 has the advantage of affecting fewer community features. However, Option 3 had a slightly lower score and was thus preferred due to fewer residences being displaced from the narrower ROW requirements.

Economic
Generally all the options have low economic effects with no businesses displaced and minimal agricultural land removed. Option 2 had a slightly lower score (fewer businesses within 25 m and 50 m) and was therefore preferred.

Cost
Costs of the roadways ranged from a low of $14 million (Option 2) to $24 million (Options 1 & 3). As Option 2 was the least expensive, it was considered as preferred.

Transportation
All options are able to solve the transportation problem. Based on the assessment criteria that considered capacity and safety/access issues, Options 1 and 3 were considered slightly ahead of Option 2, largely because by improving both Waterdown and King Road, more total capacity is provided. What these criteria did not consider was that although there is more overall capacity, the demand is projected more towards Waterdown Road and less towards King Road such that Waterdown Road is over-utilized and the "extra" capacity on King Road is under-utilized. Thus from a capital investment point of view, the road works required for extra capacity on King Road are not used effectively and efficiently. The additional travel on King Road is slightly greater but in proportion to the percent increase in capacity.

North – South Routes Conclusion
The advantages of Option 2 (which was ranked preferred on the basis of the SAW evaluation) include: much lower natural environment effects, lower economic effects and least cost. The options were considered to be fairly equal with respect to the social environment (as all three options involve some amount of improvement to Waterdown Rd. and result in similar social impacts). Although Option 2 was considered slightly less preferred from a transportation perspective, it could address the capacity problem. For these reasons, Option 2 was considered as preferred.

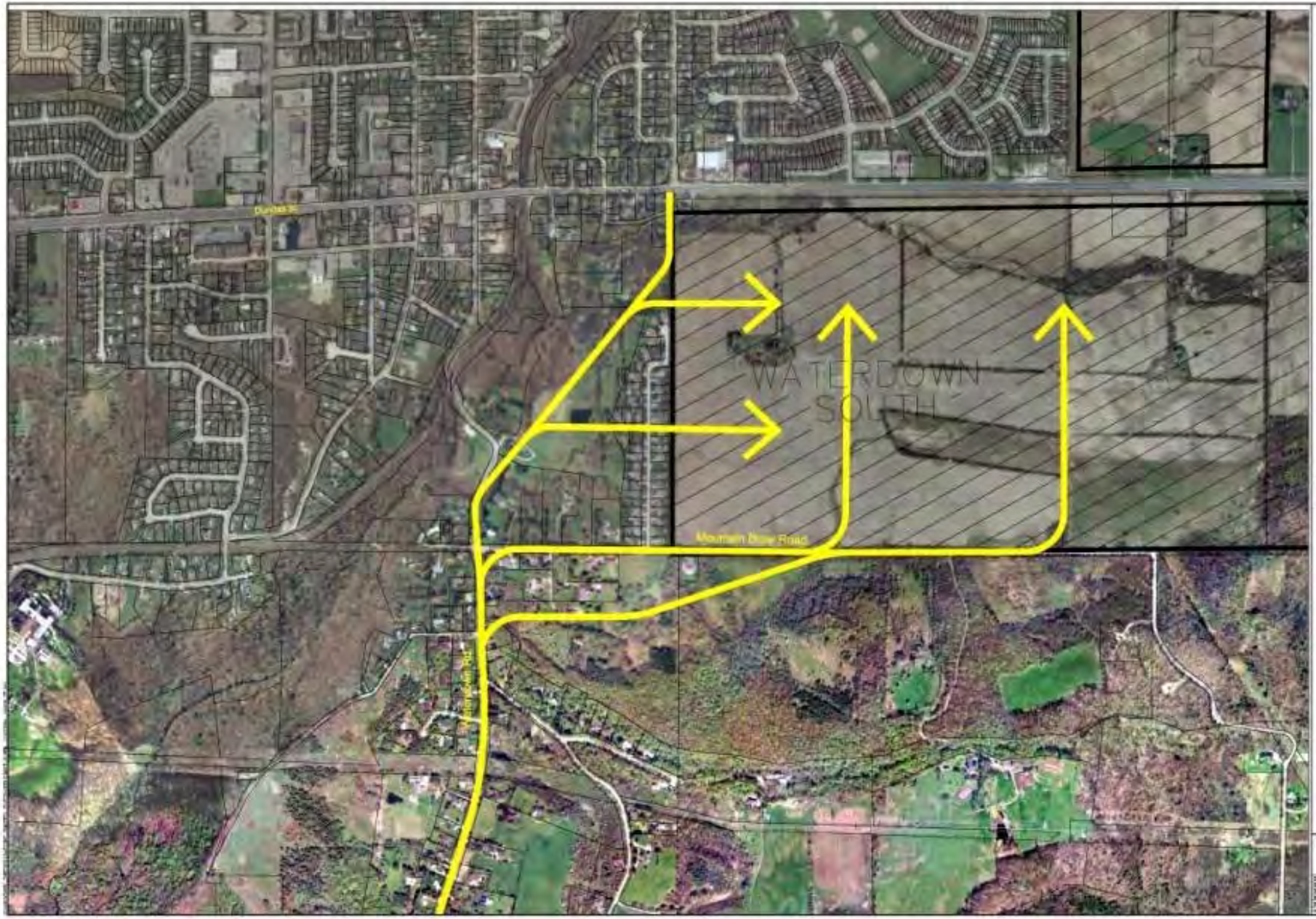
6.2.5 North Waterdown Road Comparisons

The preferred option of widening Waterdown Road to 4 lanes (Option 2) includes a new road extension north of Mountain Brow Road. The impacts to the natural features in this area (that is associated with the Grindstone Creek ESA) were identified to be of concern to the local community. Thus, alternative alignments to this road extension alignment were considered. One alternative alignment was identified which involves the widening of Mountain Brow Road east of Waterdown Road then extending a new road ROW north to Dundas Street through the OPA 28 future development lands.

The original Western Alignment was then evaluated against this new alignment (Eastern Alignment) (with both options originating at Waterdown Road/Mountain Brow Road and ending at Dundas Street). ***Figure 6-6*** shows the general alignment of these two options. ***Tables A7*** and ***A8*** included in ***Appendix A*** present the results of the evaluation. For both data standardization methods, the new alignment (Option B - widen Mountain Brow Road and then extend north to Dundas Street) was overwhelming identified as preferred. It has fewer natural environmental effects, fewer social effects and is least cost. There is also fewer existing access points associated with Option B and is thus preferred from a traffic safety perspective.

As a result of this evaluation, a general alignment through the South Waterdown Secondary Plan area was identified to connect Mountain Brow Rd and Dundas St. The location of this roadway link through the secondary plan area was established by giving regard to the function of this road (transit service, access for Waterdown South development, and transportation demand). Modeling scenarios determined that as the link was located further east, the level of roadway use would decrease as the demand on this road is from existing Waterdown and the planned Waterdown South development. A "loop" road connecting the E/W road corridor with the N/S road corridor was not found to be efficiently used due to the distribution of traffic. Hence the proposed location of the link road within the secondary plan area is considered to be most efficient.

The exact alignment of this roadway is to be determined through future Class EA Phase 3 work.


Dundas St
WATERDOWN SOUTH
Mountain Brow Road
Hamilton
Burlington
Halton
FIGURE 6.6
WATERDOWN ROAD/
DUNDAS STREET
LINK OPTIONS
Map Features
Potential Alignments
Waterdown Urban Expansion Areas
FOR DISCUSSION PURPOSES ONLY
Data Sources
Scale
DILLON
WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN
WATERDOWN ROAD/DUNDAS STREET LINK OPTIONS

6.3 The Preferred Road Improvement Solution

Based on the assessment and comparative evaluation work as described in the previous sections of this report, the preferred road improvement solution was identified as:

North-South Solution

- Geometric improvements and widen Waterdown Road to 4 lanes from Highway 403 to Mountain Brow Road;
- Widen eastern section of Mountain Brow Road to 4 lanes east of Waterdown Road to the new north-south Waterdown Road ROW; and
- New Waterdown Road ROW north of Mountain Brow Road to connect with Dundas Street through the OPA 28 future development lands.

In addition, the City of Burlington has determined that King Rd. cannot be left in its current condition due to road safety concerns. As such, to keep it open, some amount of road/operational improvements or closure to through traffic may be necessary (See Section 10.0 for further discussion regarding this).

East-West Solution

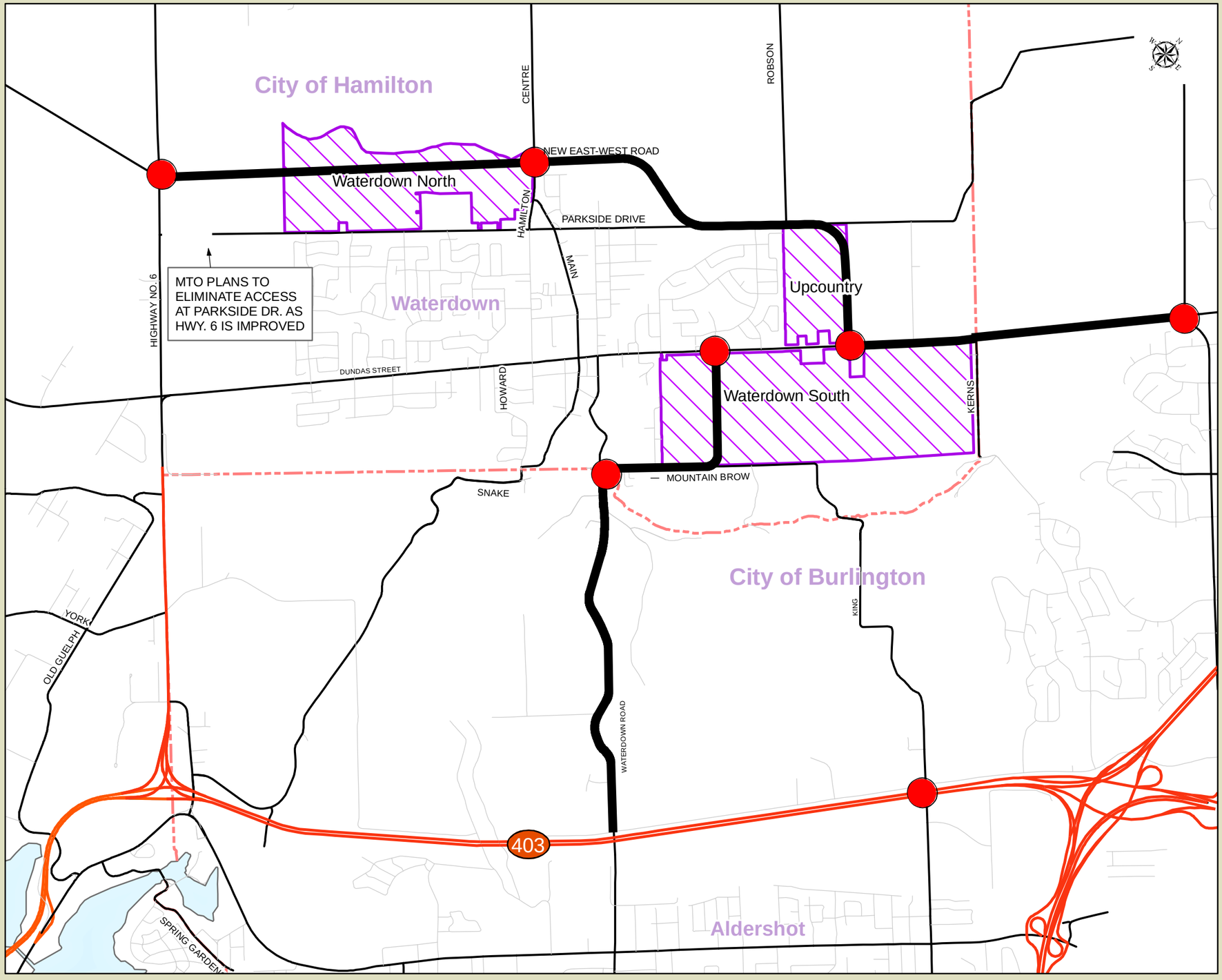
- Starting at the west, a new 2-lane North Link at 26 to 32 m ROW from Highway 6 continuing eastward as a new northern link;
- The ROW then swings southeast past Centre Road to connect with Parkside Drive east of Churchill Avenue;
- Widening Parkside Drive to 4 lanes (30-32 m ROW) to the eastern edge of the "Upcountry" development block;
- New north-south ROW along the eastern edge of the "Upcountry" development block between Parkside Drive and Dundas Street; and
- Dundas Street widening to six lanes from the new north-south ROW connection point to Brant Street.

The east/west options had a western terminus in the west limit of the study area. This terminus is consistent with previous transportation analyses undertaken in the study area, provided for appropriate roadway continuity and connectivity and made provisions for needs to the year 2031 which, although initially part of this assignment, still needs to be evaluated once the population and employment estimates are developed under the "GRIDS" study.

However, in reviewing the transportation demand to 2021 (the current planning horizon for this study), it is evident that the east/west roadway link west of Highway 6 cannot be justified at this time.

Therefore, the preferred east/west solution should have a western terminus at Highway 6. However, once 2031 data becomes available, the need for the extension of this roadway segment west to Highway 5 should be re-evaluated.

Therefore, taking into account the above comment, the preferred road improvement solution is shown on ***Figure 6-7***.



Waterdown - Aldershot Transportation Master Plan

Figure 6.7: Preferred Road Improvements for the Waterdown/Adlershot Transportation Master Plan

- Municipal Boundary
- Preferred Corridor
- OPA No.28 Lands

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

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6.4 Summary of Transportation Solutions for the Waterdown/Aldershot Area

From the analysis undertaken in Phase 2 of the Municipal Class EA Process for the Waterdown/Aldershot TMP the "Problem" identified in Phase 1 – lack of east/west and north/south capacity can be addressed by:

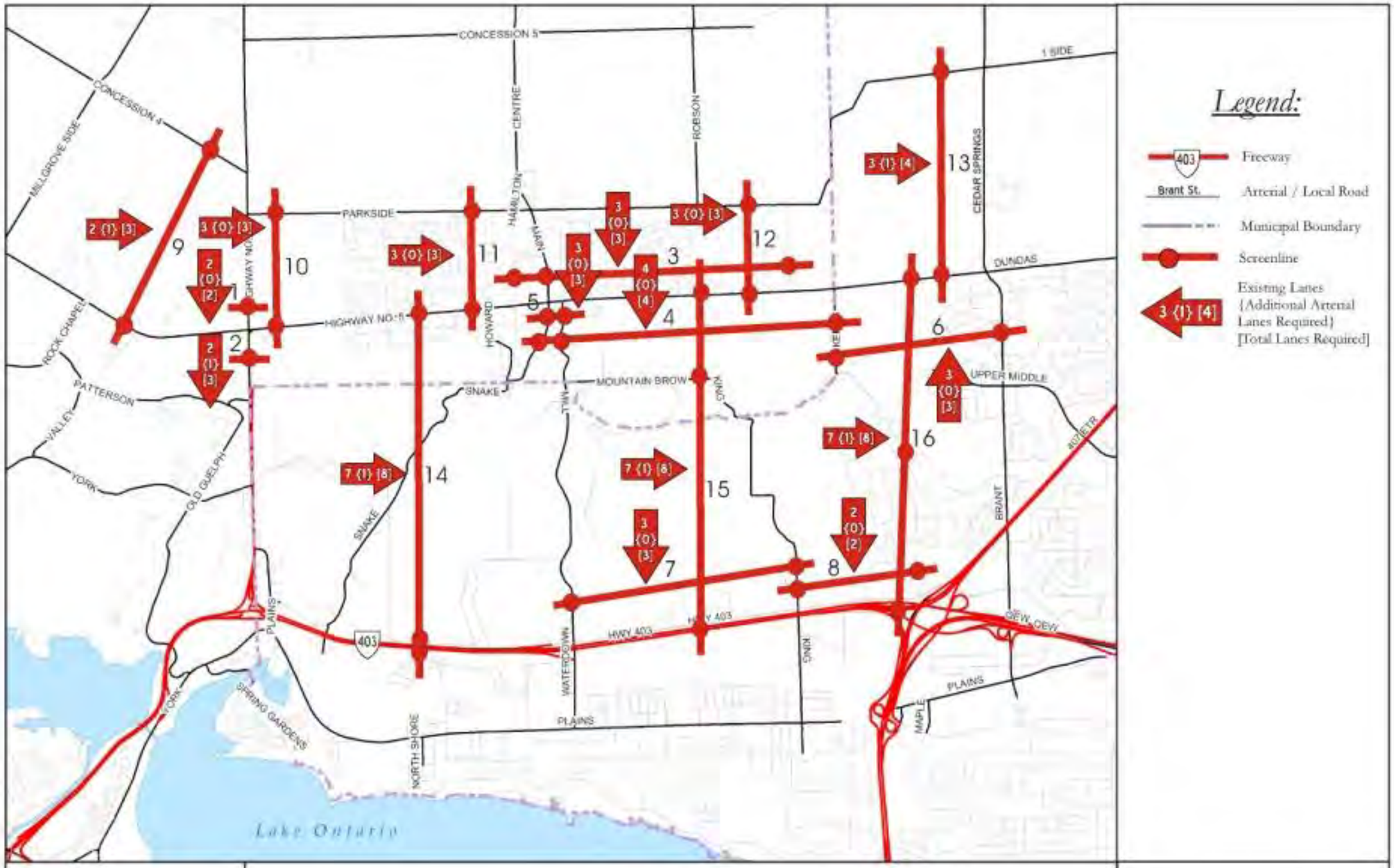
1. Implementing the necessary transit service and transportation demand management measures to achieve a 10% reduction in single occupant automobile travel; consistent with the City-wide TMP TDM Policies and City-wide TMP Transit Services Strategy;
2. Constructing a new east/west roadway generally between Parkside Drive and the greenbelt boundary from Highway 6 dropping to Parkside Drive just west of Robson Road, and then following Parkside Drive to a new roadway along the east boundary of the Upcountry development area;
3. A north/south widening of Waterdown Road between Highway 403 and Mountain Brow Road, the widening of Mountain Brow Road to a new north/south link joining this road with Dundas Street, through the Waterdown South Secondary Plan area;
4. Widening Dundas Street between the "new link" and Brant Street to a six-lane cross-section – or some other way to provide additional east/west capacity in this area;
5. Implementing, in addition to the above specific improvements and operating targets, the City-wide Walking and Cycling Policies to increase awareness and promote these modes of transportation;
6. Widening of Highway 403 west of the Freeman Interchange. Note that this solution is not with the mandate of the municipal partners, but within the mandate of the Province; and
7. Further assessment regarding the form of improvement needed to address safety concerns associated with King Rd.

The City-wide policies referenced above are presented in ***Appendix B***.

With these improvements, the preferred system will operate as follows:

	2021 Modelled Capacity	2021 Modelled Volume	v/c
Critical North/South Screenline			
Waterdown Road north of North Service Road	1,800	1,500	0.83
King Road north of North Service Road	500	446	0.89
Total	2,300	1,946	0.85
Critical East/West Screenline			
Dundas Street west of New Link	2,000	1,711	0.86
Parkside Drive	1,800	1,198	0.65
Total	3,800	2,889	0.76

Some areas of the network will still operate at poor levels of service – modelled volume-to-capacity ratio greater than 0.85, as illustrated in ***Figure 6-8***.



Legend:

- Freeway (403)
- Arterial / Local Road (Brant St.)
- Municipal Boundary
- Screenline
- Existing Lanes {Additional Arterial Lanes Required} [Total Lanes Required] — e.g. 3 {1} [4]

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Screenline Deficiencies

2021 Land-use on Preferred Network

Waterdown / Aldershot Transportation Master Plan

Figure 6.8

Not to Scale

September 2007

6.4.1 Waterdown Road/Mountain Brow Road Preliminary Design

The selection of Waterdown Road/Mountain Brow Road as the preferred north/south corridor generated considerable concern from residents fronting on these roadways or living close to the corridor. Therefore, preliminary designs have been undertaken to illustrate a potential "alternative design" for this corridor, recognizing that alternative detailed designs will be developed and assessed as part of future Phase 3 & 4 of the Municipal Class EA Process.

Figure 6-9 to ***Figure 6-14*** present one alternative design for this corridor. This design is not meant to prejudice the future Phases 3 and 4 work. It is presented to demonstrate one way to address concerns expressed through the public consultation process.

This particular concept:

- Minimizes property impacts;
- Minimizes the displacement of homes in the vicinity of Waterdown Road/Mountain Brow Road; and
- Provides the necessary capacity to accommodate forecasted traffic by the year 2021.

What this highlights is that as the level of detail increases in future phases of the Class EA process, some of the impacts can be mitigated through detailed route selection and design treatments.

6.5 Review of Preferred Solution – 4-Lane Waterdown Road Recommendation

Due to concerns regarding the proposed improvements to Waterdown Road that were expressed by residents along Waterdown Road at the Community Development Committee meeting of April 1, 2006, the City of Burlington presented a new option in December 2006 that would involve the addition of only one centre lane along Waterdown Road (to make it 3 lanes) and improvements to King Road. The City of Burlington retained a transportation consultant to prepare a plan/profile for this option which was provided to the Dillon study team in October 2006 and which formed the basis of the improved King Road alternative.

To confirm the suitability of this new option proposed by Burlington (3-Lane Waterdown/improved King Road), a comparative evaluation of this new option against the Waterdown/Aldershot Transportation Master Plan recommended north-south improvement option (4-lane Waterdown) was undertaken. The following documents the results of the evaluation.

6.5.1 Proposed 3-Lane Waterdown Road Option

This option, proposed by the City of Burlington, involves the following:

- Improvements to King Road extending from North Service Road to a connection point with Mountain Brow Road. (2 lanes total);
- The addition of one lane to Waterdown Road from the North Service Road to Mountain Brow Road (3 lanes total) as well as the addition of a lane to Mountain Brow Road to the point where it would connect with the new north-south road through the Waterdown South secondary plan area; and
- 2 additional lanes through the secondary plan area to convert the planned collector road into an arterial road to allow a connection between Mountain Brow (4 lanes total) (same as the 4-Lane Waterdown option).

The 3-lane Waterdown Rd option had an assumed RoW width for Waterdown Rd of 27 m, whereas for Mountain Brow Road, a RoW width of only 20 m is available. This 20 m RoW on Mountain Rd. was deemed wide enough to fit an extra lane.

The City of Burlington has also indicated that should Waterdown Road be widened to 4-Lanes then King Road could not be left in its current condition due to expected increased traffic volumes on it. As such, King Road would require road bed reconstruction/ resurfacing. Although these improvements would remain with the current road bed footprint (and would result in no environmental impacts) there would be a cost associated with this improvement. As such, the cost of this improvement (estimated to be about $2 million) was added to the total cost of the 4-Lane Waterdown option in the evaluation.

The Burlington proposed option reflects a higher level of design detail than the conceptual design that was developed for the original options evaluation that was undertaken in Stage 2 of the Class EA.

6.5.2 Evaluation of 3-Lane Waterdown Road Option

The recommended Stage 2 solution (widening Waterdown Road to 4 lanes plus the widening of Mountain Brow Road and the extension of a new roadway though the Waterdown South lands) was compared against the new option as proposed by Burlington.

The same evaluation criteria/indicators as previously used were utilized in this evaluation. Data was primarily based on the GIS data layers/mapping previously used. Some changes were required to the criteria and indicator weights (although the criteria group weights remained unchanged). This was required because in the previous evaluations for a few of the criteria/indicators there was no difference identified among the options and as such, no weight was assigned to these criteria/indicators. Whereas for this evaluation, there is now a difference in the data for these criteria/indicators and as such, some amount of weight had to be reassigned to these criteria/indicators (the total weight of the criteria group remained unchanged though).

Tables A9 and ***A10*** in ***Appendix A*** present the evaluation results. The evaluation results based on the previously used criteria group weights (runs were undertaken for two different data standardization methods) indicate that the 4-Lane Waterdown option is preferred (the lower the overall score indicates a lower overall impact/cost). The following highlights the major differences among the options:

- ***Natural Environment*** – Clear preference for 4-lane Waterdown as it would result in the removal of less amounts of natural habitat (ANSI and ESAs) than the improved King Road option;
- ***Social Environment*** – Clear preference for the 3-lane Waterdown/King option as fewer impacts to residents (property takings) along Waterdown Road (road improvements largely stay within the existing RoW) (although we could expect the same if not greater traffic disturbance effects due to high congestions levels with a 3-lane Waterdown Road option);
- ***Economic*** – Preference to 3-lane Waterdown due to greater planned land use/agriculture effects associated with the 4 lane widening of Waterdown Road;
- ***Cost*** – Preference to the 4-Lane Waterdown which is about $4 million less expensive that the 3-Lane Waterdown/King option; and
- ***Transportation Service*** – Clear preference for 4-lane Waterdown as it provides a higher level of service and a higher overall average network speed. The 4-lane Waterdown option solves the transportation problem whereas the 3-lane Waterdown/Improved King Road option does not solve the problem, as it does not include geometric improvements and as such does not substantially improve the capacity of the roadway.

Also to be considered are the criteria groups weights which when originally developed, it was assumed that all the options being evaluated would more or less solve the transportation problem. As such, the level of difference among the options for Transportation Service was minimal and thus a relatively low level of weight was assigned to the Transportation Service Criteria Group (14 out of 100 pts.). With this evaluation, given the large difference in the extent to which these two options solve the problem, it would be appropriate to assign a much higher amount of weight to this criteria group now. If this was to occur, the 4-lane Waterdown Option would emerge as being even more preferred.

As well, the evaluation does not reflect other effects associated with high traffic congestion levels along Waterdown Road that would result with the 3-lane Waterdown Road Option which would include access difficulties from residential properties and greater air emissions from congested traffic.

Finally, it is understood that agencies such as Halton Conservation and the NEC would not be supportive of improvements that would require substantial widening of the King Rd. road bed.

Based on the evaluation that was undertaken, from an overall environmental assessment perspective, the proposed 3-Lane Waterdown/Improved King Road option is not a superior option over the 4-lane Waterdown Road option that was recommended through the Stage 2 work. **As such, we recommend that the 4-Lane Waterdown option should remain as the preferred option.** Based on a preliminary detailed design for the 4-Lane Waterdown option (which was

not reflected in this evaluation) that many of the impacts can be significantly reduced by narrowing the widened road footprint. For example, based on the design work conducted to date, the 18 residential displacements reported in the evaluation table, can likely be reduced to say 5 or 6 displacements. Subsequent conceptual design work has confirmed this (see next section) and which will be further refined in Phase 3 EA work.

The results of this evaluation were presented to Burlington Council on May 1, 2006 as discussed in *Section 7.4.2* of this Report.

6.5.3 Refinement of the Evaluation

The above evaluation involved the comparison of the 4 Lane Waterdown Road option (at a conceptual level of design detail with a much wider footprint than would likely be required) to the Burlington option (at a more refined level of design). Subsequent to the presentation of above evaluation results to Burlington Council, a more refined design for the 4-Lane Waterdown option was developed. To confirm its selection as the preferred option, it was considered prudent to compare the more refined 4-Lane Waterdown option to the Burlington proposed 3-Lane Waterdown Road/King Road option as presented above. Some comments on the refined design are as follows:

- For the Burlington proposed 3-Lane Waterdown Road/Improved King option, it was assumed that the road improvement can be accommodated within the existing Waterdown Road RoW which would result in zero residences being removed. This is a change over the December 06 evaluation where the overlaying of the original Burlington 3-Lane design resulted in 16 residential displacements. It was assumed that the 3-Lane Waterdown Road option could be accommodated within the RoW;
- The Burlington 3-Lane Waterdown Road option includes bicycle lanes whereas the 4-Lane option does not. The additional RoW width along Waterdown Road for the 4-lanes over 3-lanes ranges from 0 to 7 m;
- Both options include the same amount of improvement (2 additional lanes) to the new Waterdown South "secondary plan" road between Dundas Street and Mountain Brow Road;
- Cost for the 4-Lane Waterdown Road option were updated (and have increased) to reflect: the cost to resurface King Road; the inclusion of the cost for the secondary plan road widening; and the use of a more refined methodology to determine property costs;
- The cost for the 3-Lane Waterdown/Improved King Road Option was put into 2002 dollars. Costs were compared on the basis of the same "dollars", the 4-Lane Waterdown Road option was costed on the basis of 2002 unit prices; and
- Impact data scores were updated to reflect the more refined designs as well as some reinterpretation of the data (e.g. only agricultural land that is designated as such in the OP was considered).

Evaluation Results

The results of the updated comparative evaluation are presented in ***Tables A11*** and ***A12*** in ***Appendix A***. The same evaluation criteria/indicators were used. In comparison to the original evaluation of options, some changes were required to the criteria and indicator weights (although the criteria group weights remained unchanged). This was required because in the previous evaluations, there was no difference identified among the options for a few of the criteria/indicators. Therefore, no weight was assigned to these criteria/indicators. Whereas for this evaluation, there is now a difference in the data for these criteria/indicators.

The evaluation results based on the previously used criteria group weights (runs were undertaken for two different data standardization methods) indicate that once again the 4-Lane Waterdown Road option is preferred (the lower the overall score indicates a lower overall impact/cost). The following highlights the major differences among the options:

- ***Natural Environment*** –Clear preference for 4-lane Waterdown as it would result in the removal of less amounts of natural habitat (ANSI and ESAs) than the improved 3-Lane Waterdown/Improved King Road option;
- ***Social Environment*** – Difference between the options is shown now to be somewhat reduced with only a slight preference to the 4-Lane Waterdown Road option (any residential displacements associated with the 3-Lane Waterdown option would make this option less preferred);
- ***Economic*** – No real difference among the two options;
- ***Cost*** – No real difference among the two options (although the cost of 4-Lane Waterdown Road would be reduced by about $2 million if the King Road resurfacing cost is no longer included); and
- ***Transportation Service*** – Clear preference for 4-Lane Waterdown Road option as it provides a higher level of service and a higher overall average network speed. The 4-lane Waterdown Road option solves the transportation problem whereas the 3-Lane Waterdown/Improved King Road option does not solve the problem.

Based on this revised comparative evaluation of these two options, which reflects a higher level of road design detail for both options, there is an even stronger preference for the 4-Lane Waterdown Road option over the Burlington proposed 3-Lane Waterdown Road/Improved King Road option. The 4-Lane Waterdown Road option is clearly preferred with respect to the Natural Environment and Transportation Service criteria groups and there is now little difference with respect to Social Environment, Economic Environment and Cost criteria groups.

6.6 Additional Suggested New East-West Roadway Alternatives

Alternative options/modifications to the preferred new east-west roadway corridor were also suggested by the public. The consideration and evaluation of these options is discussed in Section 7.6.4 of this Report.

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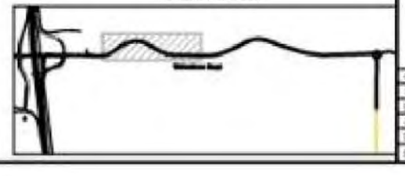
WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN

FIGURE 6.8 - CONCEPTUAL DESIGN FOR WATERDOWN ROAD CORRIDOR IMPROVEMENTS

STATION 10+000 TO 10+525

PLATE 1

SHEET INDEX



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DATE: JUNE 20, 2005
PROJECT No. 04-3687

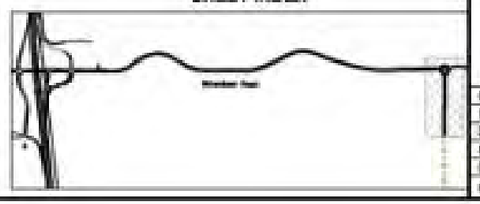
WATERDOWN/ALDERSHOT
TRANSPORTATION MASTER PLAN

FIGURE 6.10 - CONCEPTUAL DESIGN FOR
WATERDOWN ROAD CORRIDOR IMPROVEMENTS

STATION 10+525 TO 11+375

PLATE 2

SHEET INDEX



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PROJECT No. 04-3687	

WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN

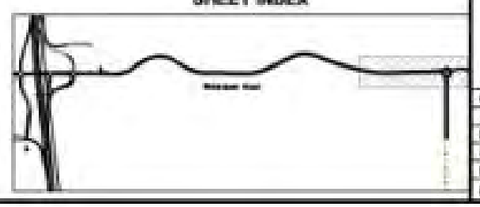
FIGURE 6.13 - CONCEPTUAL DESIGN FOR WATERDOWN ROAD CORRIDOR IMPROVEMENTS

STATION 12+725 TO 13+452

PLATE 5

EXAMPLE ROUNDABOUT TREATMENT FOR WATERDOWN/MOUNTAIN BROW INTERSECTION ALTERNATIVE TREATMENTS TO BE ASSESSED.

SHEET INDEX



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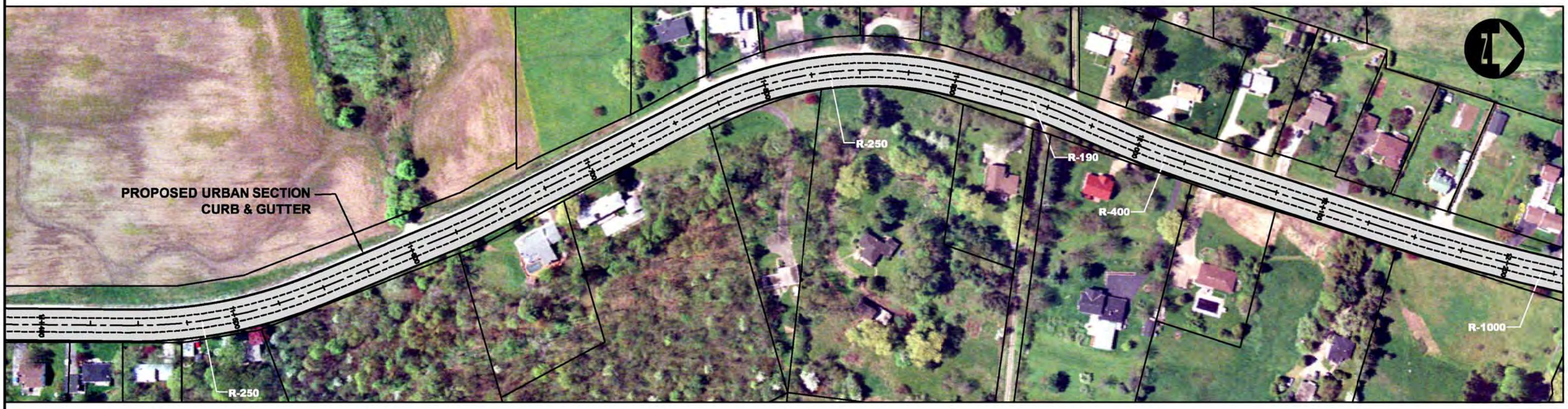
PROJECT No: 04-3687

WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN

FIGURE 6.12 - CONCEPTUAL DESIGN FOR WATERDOWN ROAD CORRIDOR IMPROVEMENTS

STATION 12+250 TO 13+100

PLATE 4



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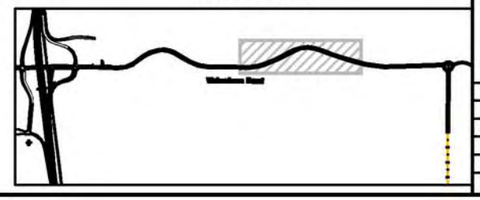

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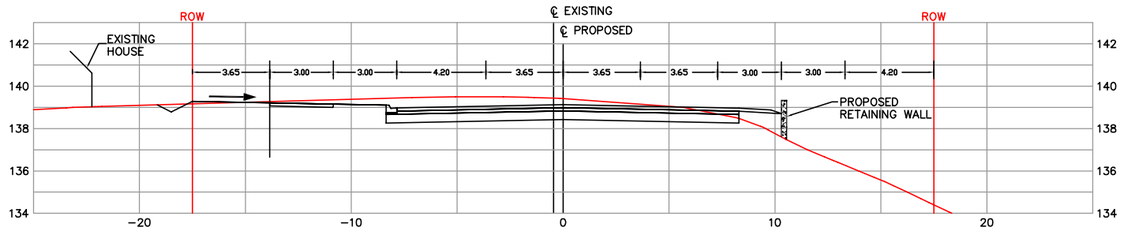
PROJECT No. 04-3687	

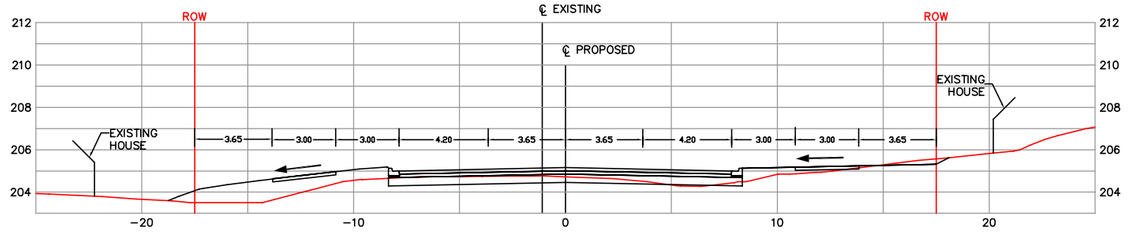
WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN

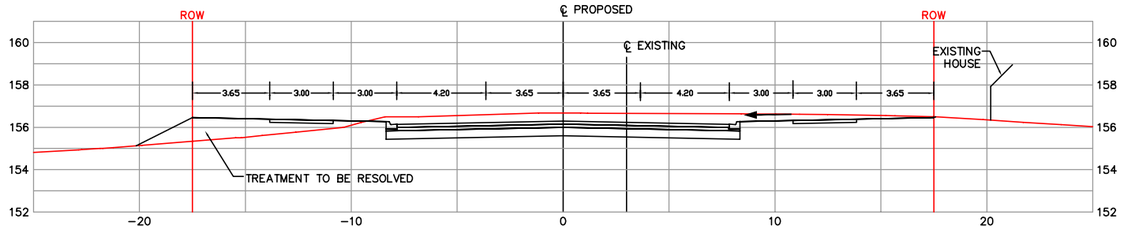
FIGURE 6.11 - CONCEPTUAL DESIGN FOR WATERDOWN ROAD CORRIDOR IMPROVEMENTS

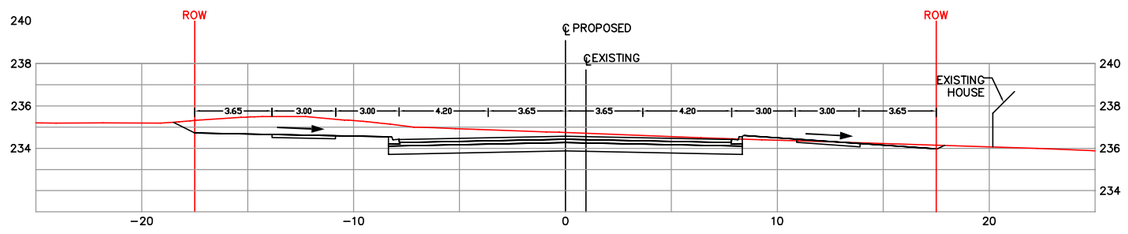
STATION 11+375 TO 12+225

PLATE 3









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PROJECT No. 04-3687	

WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN

WATERDOWN ROAD TYPICAL CROSS SECTIONS AT CONSTRAINT AREAS

Figure 6.14

G:\cad\043687 Aldershot\LDD→Waterdown\dwg\Profiles-Cross Sections.dwg 9/1/2005 11:42:28 AM EST

7.0 PUBLIC CONSULTATION AND COMMUNICATIONS

Public consultation and communications is an important part of the work undertaken in the Waterdown-Aldershot Transportation Master Plan. First, the interests and concerns of the public and stakeholders need to be understood and taken into account. Second, important local knowledge can be identified that can contribute to an improved planning process. Finally, since the proposed solutions involve the disbursement of taxpayer funds, residents, businesses and agencies need to contribute their ideas and knowledge to the eventual outcome.

This section:

- Outlines the objectives that were established at the outset of the study and the strategies deployed relating to public consultation and communications during the development of the TMP;
- Describes the public consultation and communications program that was conducted during its development;
- Summarizes the outcomes of the process; and,
- Evaluates the effectiveness of the process.

For detailed information on the issues raised, responses provided (by the Study Team), minutes from Public Information Centres and Stakeholder Advisory Committee meetings, and submissions from members of the public, government agencies and other stakeholder groups, please see ***Appendix C***.

7.1 Approach to the Development of the Public Consultation and Communications Plan

At the outset of the study process, a Public Consultation and Communications Plan was prepared. This Plan can be found in the Study Charter (September 2004). The Cities of Hamilton, Burlington and the Region of Halton, along with representatives of the consulting team participated in executing the Plan. The following outlines the objectives of the Plan.

Objectives of the Public Consultation and Communications Activities

- **Clearly communicate** the purpose and focus of the Transportation Master Plan (TMP);
- **Provide the Big Picture context**, including explaining the relationship between the TMP and the range of other activities and plans that are linked to it (including those activities and/or plans that have recently been completed, are currently underway, or are proposed);
- **Provide Focused Discussions, by clearly** identifying the focus of the consultations at various stages of Phase 2, including those decisions which are 'on the table' and those which either have already been decided or are outside the scope of this process;
- **Share information** with, and **seek feedback** from, targeted stakeholders and the public regarding development of the TMP;

- Implement a consultation and communications program that has the **flexibility to respond** to changing project and stakeholder needs;
- **Demonstrate to local elected officials and the public** the Study Team's commitment to meaningful public consultation and effective communications; and,
- Meet Municipal Class EA consultation requirements, as well as consultation requirements of the project partners, including the City of Hamilton, the City of Burlington and the Region of Halton.

To successfully achieve the consultation and communications objectives, the following strategies were deployed:

- Get and keep people engaged;
- Correctly identify target stakeholder groups;
- Have contact early and often;
- Provide clear, concise, relevant information – as early as possible;
- Demonstrate how ideas from previous consultations have been/will be considered;
- Time and focus public engagement and consultation activities to match decision milestones in the TMP technical work plan;
- Manage meetings for maximum effectiveness;
- Provide several mechanisms to provide information and collect feedback (meetings, web-site, internet, email, fax, mail, phone, personal contact); and,
- Demonstrate how feedback will be/was considered.

7.2 Key Study Messages

At the outset of the TMP process, a number of key messages were identified to guide the process. These key messages are identified below and separated into 'process' messages, and 'content' messages.

Process Messages

- The study is a joint project being led by the following partners: City of Hamilton, the City of Burlington and the Region of Halton.
- The Phase 2 TMP study is following the Municipal Engineers' Association Class Environmental Assessment Process.
- The study is guided by a Steering Committee that, in addition to the above partners, also includes the Ontario Ministry of Transportation, Conservation Halton, the Hamilton Conservation Authority and the Niagara Escarpment Commission.
- Public consultation is an essential component of the project. This will be achieved through the establishment of a Stakeholder Advisory Committee, three rounds of Public Information Centres, individual meetings and communications.

Content Messages

- City of Hamilton Official Plan Amendment 28 (OPA 28) approves residential development and limited commercial and retail growth in Waterdown. This Amendment was directed by an Ontario Cabinet decision (2002).
- Development plans have been proposed to the City of Hamilton, however, these cannot be implemented until transportation alternatives are identified and a Transportation Master Plan is completed.
- The approved development includes approximately 6,500 new residential units and limited commercial/retail. The residential development will support an additional estimated population of approximately 15,000 people, with about half of the units planned for north of Highway 5 and the other half south of Highway 5.
- Based on previous studies (and to be confirmed through this project), transportation infrastructure is required to support the new development, particularly to move people east, west, and south to places of employment.
- The project is looking at a full range of options on how to address transportation demand, including: improving existing infrastructure (roads and bridges) and constructing new infrastructure, implementation of public transit, provision and improvement of cycling and pedestrian infrastructure, and promotion of transportation demand management.

7.3 Public Consultation and Communications Activities

The Waterdown-Aldershot TMP was undertaken to meet the Municipal Engineer's Association Class EA process. For Phases 1 & 2, there is only one mandatory point of public contact where the public is invited to comment on the selection of the preferred alternative solution.

The project partners undertook a public engagement process that exceeded the formal public notice and consultation requirements of the Class EA process. Additional notices/events included:

- Pre-consultation stakeholder identification and discussions;
- A project initiation notice;
- Notices to attend three rounds of Public Information Centres;
- Three rounds of Public Information Centres;
- Formation of a Stakeholder Advisory Committee, and holding four meetings; and,
- Issuing of interim study reports for public review.

It is noted that a fourth round of PICs are planned for Winter 08 to present the final TMP and to initiate the Phase 3 Class EA work for the applicable road projects recommended in the TMP.

The consultation approach focused consultation and communications activities around four study stages:

1) Confirm Approach to the Study;
2) Review and Confirm Issues, Alternatives and Criteria;
3) Develop and Seek Feedback on Alternatives; and
4) Develop and Review Draft Transportation Master Plan (two drafts – 2006, and 2007)

In addition to these four focused periods of consultation and communications activity, there were ongoing opportunities throughout the process for members of the public and stakeholders to receive information about the project (via the project website and other communications materials, as developed), individual meetings with members of the study team, and also to provide feedback to the project partners (e.g. through phone, fax, email, mail, and the project website).

Figure 7-1 depicts the technical work plan, and the public consultation. It demonstrates the integration between the two activities.

In addition to the above consultation activities, due to the considerations regarding the proposed North-South route by the City of Burlington (undertaken from 2006-2007) the following additional activities were to be undertaken:

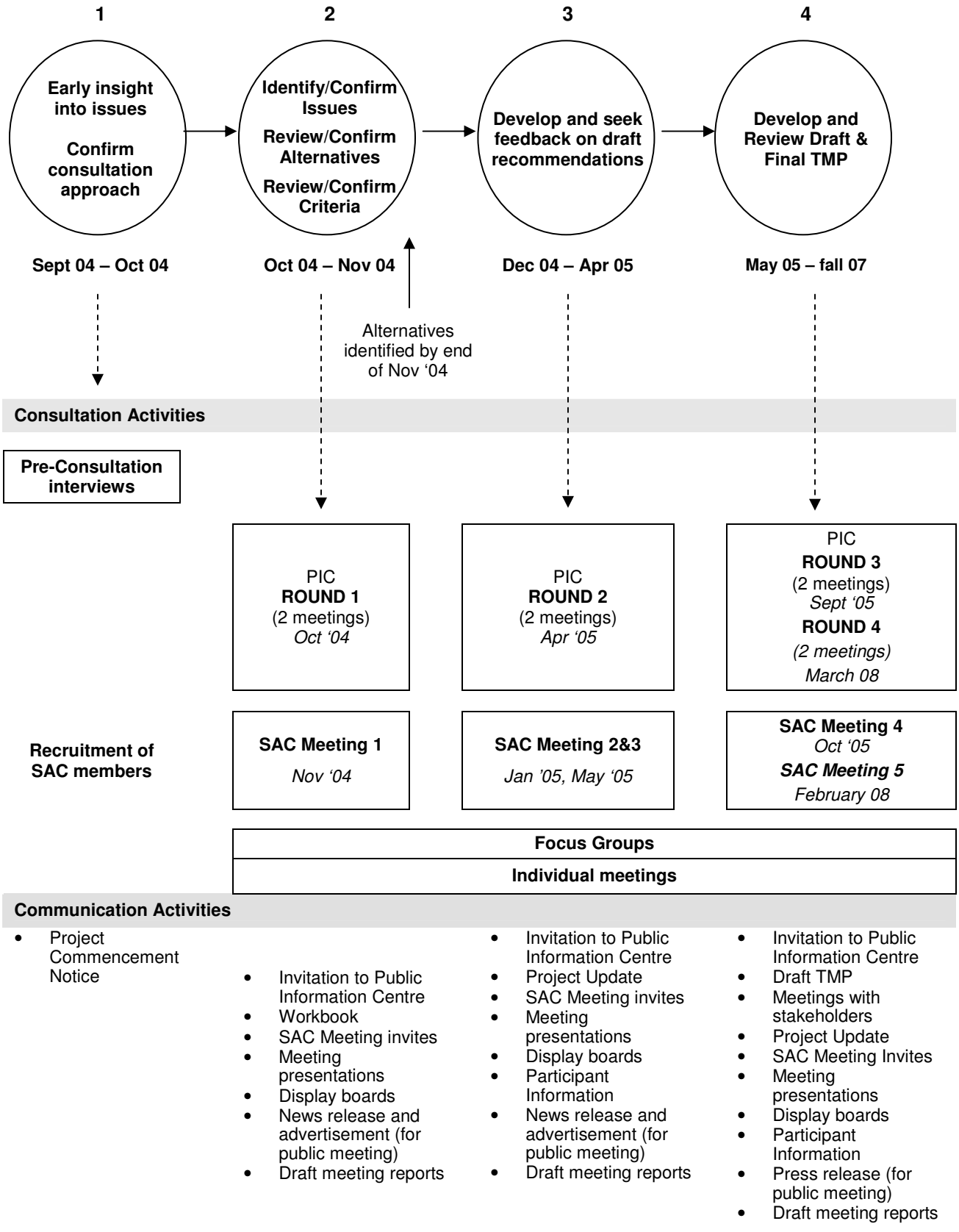
a) Any changes to the initial Draft Phase 2 report are presented and discussed with the public; and,
b) Discussions take place with the stakeholders and the public regarding the work plans for the upcoming study phases.

In response to the above, the following activities are planned for Winter 2008:

- Release of a study "Path Forward" document;
- Communications with the study's extensive mailing list;
- Newsletter;
- Public Information Centre (at two locations);
- A final meeting of the Stakeholder Advisory Committee.

Also planned are consultations with First Nations and government agencies.

Figure 7-1 – Work Plan Overview



7.3.1 Communications Activities

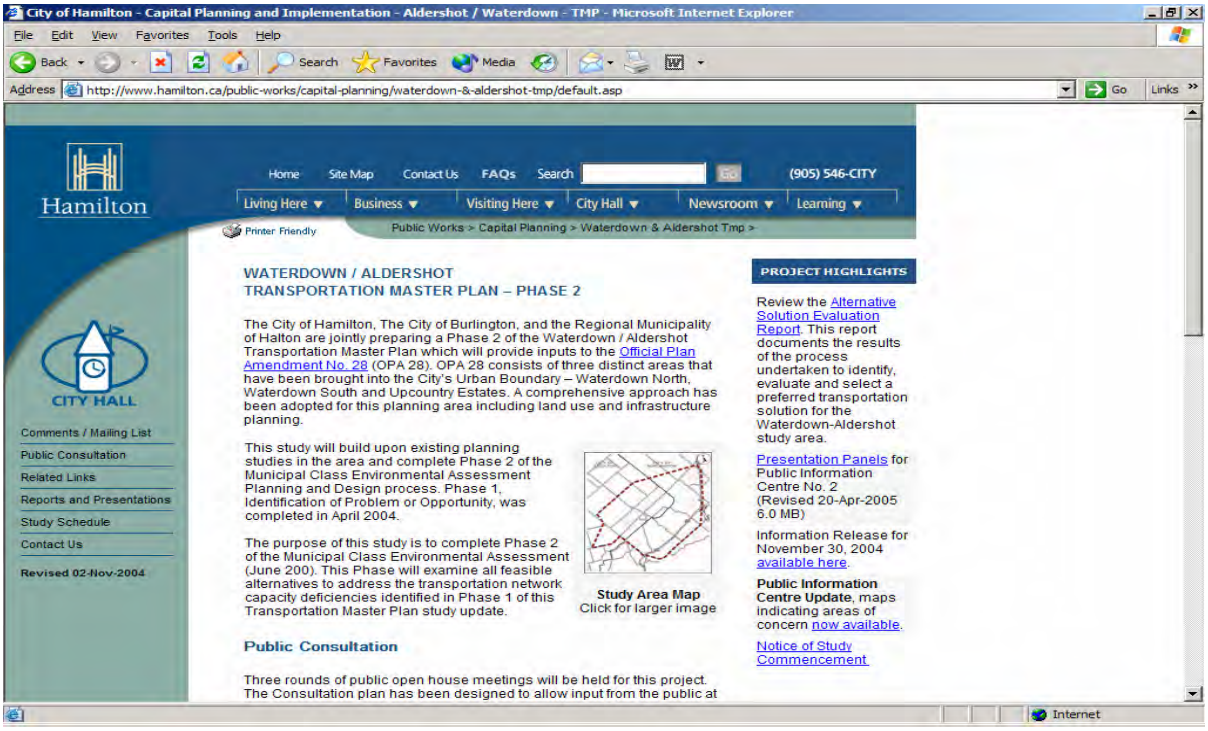
An effective communications program creates awareness of a project and opportunities for involvement and participation. It should also provide information in a clear, concise way that enables the public and stakeholders to understand the issues that need to be addressed, and the different considerations that influence the decision-making process. The following communications activities were undertaken though-out this study:

Notice of Study Commencement
A Notice of Study Commencement was published in early October 2004 in conjunction with the notice of the first Public Information Centre. The Notice informed the public that the study would consider all options to provide additional capacity in the overall transportation network to accommodate the deficiencies identified in Phase 1, including 'Do Nothing'. It also invited public participation and comments at any time during the study process. This Notice is located in ***Appendix C1***.

Study Web Page
A study web page was developed in the project initiation phase of the study. The purpose of the web page was to provide the public-at-large with the most up-to-date information available on the study progress, act as a medium for the exchange of information (i.e., the ability to download reports, presentation materials, etc…) and provide a source for comment/input. The web page was located at:

www.hamilton.ca/WaterdownTMP

Figure 7-2 – Study Web Page



E-Mail, Verbal and Written Communications

Throughout the study, members of the Study Team, municipal officials from each of the three partners' organizations, and politicians were available to receive information, obtain input and ensure that responses were provided.

Consultation Communications

At various stages throughout the study, communications materials were developed to assist consultation activities, including:

- Presentations at consultation events;
- Display boards at consultation events;
- Pre-meeting notification/invitations (through ads and e-mail communications to the study mailing list);
- Post-meeting communication (including posting of draft minutes on project website);
- Study website updates;
- Presentations to Council (to City of Hamilton and City of Burlington);
- Media coverage;
- Media releases; and,
- Steering Committee Meetings.

7.3.2 Consultation Activities

Public Information Centres (PICs)

Public Information Centres – Issues, Alternatives and Criteria – Round 1

This first set of public consultation activities took place on October 24 and 26, 2004 in Aldershot and Waterdown, respectively. Approximately 57 people signed in at the Aldershot meeting and 71 in Waterdown.. This round of consultation covered the following information:

- Purpose of the Transportation Master Plan;
- Background to the Study;
- Official Plan Amendment 28 – City of Hamilton;
- Municipal Class EA Planning and Design Process;
- Recommendations from 1999 Stantec Study;
- Purpose and recommendations from Phase 1 Study;
- Key Study Components/Schedule;
- Suggested approaches and potential alternatives for the Transportation Master Plan;
- Criteria for Evaluation/Area Constraints;
- Existing and Potential Transportation Systems; and,
- Next Steps.

Participants reviewed study area maps, identified priority areas for protection (or of concern) and participated in discussions around issues, options and evaluation criteria to be considered in the development of the Transportation Master Plan.

PIC presentation materials and a summary of the meetings are provided in ***Appendix C2***.

Public Information Centres – Presentation of Proposed Solutions – Round 2

The second round of public consultation took place on April 20 and 21, 2005 in Aldershot and Waterdown, respectively. Approximately 204 people signed in at Aldershot and 198 people in Burlington. This round of consultation covered the following information:

- Purpose of this round of Public Consultation;
- "Recap" - Background to the Study;
- Official Plan Amendment 28 – City of Hamilton;
- Municipal Class EA Planning and Design Process;
- Recommendations from 'Phase 1';
- Environmental Assessment Undertaken as part of Phase 2;
- Preferred Transportation Network and Supporting Policies; and,
- Next Steps.

These two meetings were designed in a "town hall" format, to first present the proposed solutions, and secondly, to enable members of the public to share their concerns and obtain answers to questions from the study team. Prior to the meetings, the Study Team held an open house, presented information on display panels, and was available to answer questions.

PIC presentation materials and a summary of the meetings are provided in ***Appendix C2***.

Public Information Centres – Review Draft Transportation Master Plan – Round 3

The third round of public consultation took place on September 26 and 27, 2005, in Waterdown and Aldershot, respectively. Approximately 350 people signed in at the two meetings. This round of consultation covered the following information:

- Presentation of the Draft Transportation Master Plan;
- Discussion of community issues; and,
- Next Steps.

PIC presentation materials and a summary of the meetings are provided in ***Appendix C2***.

Public Information Centres - Presentation of Final Phase 2 Transportation Master Plan - Round 4

A fourth round of public consultation will take place to complete the consultations on Phase 2 in March 2008. These PICs will also engage participants in discussions around the Phase 3 and 4 work planning and consultation activities. Documentation of these meetings will be prepared and form part of the public record as part of the Phase 3 and 4 reporting.

Stakeholder Advisory Committee

The Waterdown-Aldershot Transportation Master Plan Stakeholder Advisory Committee (SAC) was formed to obtain input from community stakeholders on all stages of the development of the TMP. Its mandate was to provide a forum for in-depth discussion of project issues with a representative group of interested citizens and stakeholders. In particular its role was to:

- Provide a balanced, inclusive discussion and advisory forum for community members and stakeholders;
- Review and provide comments on draft documents produced through the review process;
- Provide a forum for the discussion of issues, opportunities and solutions; and,
- Discuss other relevant matters that the Project Team refers to the Stakeholder Advisory Committee for feedback.

The Stakeholder Advisory Group reported through the TMP Project Team to the City of Hamilton, City of Burlington and the Region of Halton.

Meetings

The SAC held five meetings in total during the study period. The following lists the SAC meetings that were held during the course of the TMP study *(Note that the final October 07 meeting is still to be held).*

SAC Meeting	Meeting Topics
SAC Meeting #1 November 2004	Role of the Stakeholder Advisory Committee Background to the Transportation Master Plan Summary of Public Meeting Advice Review of Transportation Alternative Solutions/Functional Plans SAC Advice on Transportation Alternative Solutions/Functional Plans
SAC Meeting #2 January 2005	Review and Advice on Evaluation Criteria to be used in evaluating alternatives, and selecting preferred transportation network solution(s)
SAC Meeting #3 May 2005	Review recommended alternative solutions/functional plans Review recommended transportation network solution(s), programs and policies
SAC Meeting #4 October 2005	Review of Draft Transportation Master Plan
SAC Meeting #5 February 08 (planned)	Review of Final Transportation Master Plan

Membership

To ensure a balanced representation, the Stakeholder Advisory Committee was initially comprised of representatives from:

- Local Community –Waterdown North;
- Local Community – Waterdown South;
- Local Community – Aldershot;
- Senior Citizen Organization representative;
- Youth Organization representative;
- Community at Large – Waterdown (2);
- Community at Large – Aldershot (2);
- Environment Organizations – Hamilton, Burlington and Halton;
- Business Organizations – Waterdown and Aldershot;
- Recreation and Tourism (2);
- Councillor Rick Craven, City of Burlington;
- Councillor Margaret McCarthy, City of Hamilton;
- Developer;
- Cycling Committee;

- Education;
- Hamilton Transit Users Group; and,
- Safety Organization.

After the second meeting, two additional member groups were added: The Bruce Trail Association, and the Waterdown South Residents' Association.

The SAC's Terms of Reference and Meeting Notes are presented in ***Appendix C3***.

7.4 Presentations to Councils/Agencies

Throughout the Phase 2 planning period, the Project Steering Committee kept members of Council and government agencies informed about the study.

7.4.1 Presentation to the City of Hamilton Council

The Draft Phase 2 Waterdown-Aldershot Transportation Master Plan was presented and endorsed by City of Hamilton Council at its meeting of March 1st, 2006. The Council resolution authorized the City, in conjunction with the City of Burlington and the Region of Halton, to proceed with Phase 3, 4 and 5 of the Waterdown/Aldershot Transportation Master Plan Study.

7.4.2 Presentations to the City of Burlington Council

At its May 1st, 2006 meeting of Council, Burlington Council directed staff and the project team to review a 3-lane Waterdown Road/Improved 2-lane King Road option. The option was in response to concerns that the City of Burlington staff and members of the public raised over the ability of the existing King Road alignment across the escarpment to safely handle the additional traffic generated from the OPA No. 28 development. A consultant was retained by the City of Burlington to provide an independent review of the existing King Road alignment and develop a functional plan for the 3-lane Waterdown Road/Improved 2-lane King Road option.

An evaluation of the 3-lane Waterdown Road/Improved 2-lane King Road option and the recommended 4-lane Waterdown Road option was conducted by Dillon Consulting based on the evaluation criteria, weighting, and process used in the Phase 2 Waterdown-Aldershot Transportation Master Plan. The evaluation of the 4-lane Waterdown Road option included the estimated cost to reconstruct King Road to improve the condition of pavement surface. The evaluation results based on the previously used criteria group weights indicated that the 4-lane Waterdown Road option is preferred.

In July 2007, the City of Burlington approved the expansion of Waterdown Road with a number of conditions and authorized staff to proceed with Phase 3 of the Master Plan process. The City of Burlington Council resolution was as follows:

THAT the findings of the Phase 2 Waterdown/Aldershot Transportation Master Plan Study Report from Dillon Consulting be received; and

THAT the Director of Engineering be directed to proceed with Phases 3 and 4 of the Waterdown/Aldershot Transportation Master Plan in conjunction with the City of Hamilton and Region of Halton, subject to the following conditions:

(i) *THAT Phase 3 of the Waterdown/Aldershot Transportation Master Plan Study evaluate options for a phased implementation of the 4-lane Waterdown Road that would include an initial 3-lane option as illustrated in Figure 1 of Engineering Department Report E-42/07, dated June 6, 2007 along with additional transportation considerations and/or design modifications as follows:*

- *Increased road width only from 13.3 meters to 14.2 meters (i.e. minimum road width to accommodate 4-lanes)*
- *Inclusion of a multi-use off-road pathway up to 4.0 meters on one side of the road only*
- *Detailed evaluation of a counter-flow traffic control option utilizing 3-lanes to provide increased peak hour capacity in order to delay for as long as feasible, or possibly eliminate the need to reconfigure Waterdown Road to four lanes; and*
- *THAT Hamilton implement a viable public transportation system with a utilization experience of 5% to service the OPA 28 lands at 80% build out; and*

ii) *THAT prior to build-out of the OPA 28 lands, defined as not greater than 6,500 units, the City of Burlington undertake a separate Environmental Assessment (EA) Study pertaining to the reconfiguration of Waterdown Road to four lanes from Hwy. 403 to Mountain Brow Road; and*

(iii) *THAT this study have a steering committee and a stakeholder group to include at least three residents of Waterdown Road representing three separate families; and*

(iv) *THAT Phase 3 of the Waterdown/Aldershot Transportation Master Plan Study evaluate detailed alternatives and confirm a preferred design allowing King Road to remain open as a two lane roadway as illustrated in Figure 2 of Engineering Department Report E-42/07, dated June 6, 2007; and*

(v) *THAT a cost-sharing agreement with the City of Hamilton for the north-south road improvements be finalized to the satisfaction of the Director of Engineering, City Treasurer and City Solicitor and that the Director of Engineering report back to Council for final approval when an agreement is reached; and*

(vi) *THAT priority be given to the Phase 3 work required to fully address all of the detailed design questions raised by Waterdown Road residents including, but not limited to, confirmation of the road alignment, impacts to individual properties and land acquisition requirements; and*

THAT the Director of Engineering report back to Council on the Phase 3 preferred design alternative for Waterdown Road and King Road as part of consideration and approval of the Phase 4 Waterdown/Aldershot Transportation Master Plan Environmental Study Report; and

THAT the Director of Planning be directed to initiate an amendment to the Burlington Official Plan to clarify the policies relating to Waterdown Road and distribute such draft amendment to residents of Waterdown Road in a timely fashion.

7.4.3 The Region of Halton

As a Project Partner, Halton Region was actively consulted throughout the project and provided input into the generation and evaluation of options. Halton Region's Council resolution regarding the Master Plan recommendations was as follows:

1. *THAT Regional Council endorse the preferred East-West solution (including the widening of Dundas Street) identified in the Phase 2 Waterdown/Aldershot Transportation Master Plan as outlined in Report No. PPW65-07.*
2. *The Regional Council endorse a North-South solution identical to that contained in the City of Burlington resolution, more particularly:*

    a. *THAT Regional Council endorse the City of Burlington's position that Phase 3 of the Waterdown/Aldershot Transportation Master Plan Study evaluate options for a phased implementation of the 4-lane Waterdown Road that would include an initial 3-lane option as illustrated in Figure 1 of Engineering Department Report E-42/07, dated June 6, 2007 along with additional transportation considerations and/or design modifications as follows:*

        i. *Increased road width only from 13.3 meters to 14.2 meters (i.e. minimum road width to accommodate 4-lanes)*
        ii. *Inclusion of a multi-use off-road pathway up to 4.0 meters on one side of the road only*
        iii. *Detailed evaluation of a counter-flow traffic control option utilizing 3-lanes to provide increased peak hour capacity in order to delay for as long as feasible, or possibly eliminate the need to reconfigure Waterdown Road to four lanes; and*
        iv. *That Hamilton implement a viable public transportation system with a utilization experience of 5% to service the OPA 28 lands at 80% build out; and*

    b. *AND FURTHER THAT Regional Council endorse the City of Burlington's position that prior to build-out of the OPA 28 lands, defined as not greater than 6,500 units, the City of Burlington undertake a separate Environmental Assessment (EA) Study pertaining to the reconfiguration of Waterdown Road to four lanes from Hwy. 403 to Mountain Brow Road; and*

    c. *AND FURTHER THAT Regional Council endorse the City of Burlington's position that Phase 3 of the Waterdown/Aldershot Transportation Master Plan Study evaluate detailed alternatives and confirm a preferred design allowing King Road to remain open as a two lane roadway as illustrated in Figure 2 of Engineering Department Report E-42/07, dated June 6, 2007; and*

3. *THAT the Regional Clerk forward a copy of Report No. PPW65-07 to the City of Burlington, City of Hamilton, Niagara Commission, and Conservation Halton.*

7.4.4 The Niagara Escarpment Commission (NEC)

Throughout the study, the NEC provided input into the generation and evaluation of options. The NEC supports the expansion of Waterdown Road as the preferred north-south solution. The NEC was represented on the Steering Committee for this project.

7.4.5 The Ministry of Transportation (MTO)

MTO was a member of the project Steering Committee and attended some of the meetings. MTO was also met with separately to discuss their concerns that related primarily to the Waterdown Road/Hwy 403 interchange and the future intersection of the new east-west road with Hwy 6.

7.4.6 Conservation Halton and Hamilton Conservation Authority

The Halton and Hamilton Conservation Authorities were members of the Steering Committee. Consultation was undertaken with these agencies to obtain input on study process, background information, and draft documents. Their interests in the project related primarily to the potential for effects to natural features.

7.4.7 The Ministry of the Environment (MOE)

Meetings were held with the Ministry of the Environment (MOE) in March 2006 to present the study to them and again in February 2007. In October 2007, City of Hamilton staff met with MOE EA Branch representatives in response to the MOE being contacted by members of the public regarding their concerns about the TMP study process and EA elevation (Part II Order) requests. Although the MOE does not typically get involved with the review of Master Plans, given the high level of interest/concern with the project, the project proponents requested the MOE to review the Phase 2 report and findings.

7.5 First Nations Consultation

First Nation communities are being contacted to confirm their interest in the results of the Phase 2 work and involvement in future Phase 3 and 4 work.

The following First Nations are being contacted:

- Six Nations of the Grand Council;
- Mississaugas of the New Credit; and
- Huron-Wendat First Nation.

In addition to these individual First Nations, contact is also being made with higher level organizations such as:

- The Department of Indian and Northern Affairs;
- The Metis Nation of Ontario;
- The Chiefs of Ontario;
- Ontario Secretariat of Aboriginal Affairs (OSAA); and
- Ministry of Attorney General.

Through these contacts, First Nations are being advised on the Phase 2 recommendations and their input sought on level of interest on future Phase 3 EA work.

7.6 Community Issues and Results of the Consultation and Communications Program

At the outset of the study an 'issues and responses' database was developed. All issues, ideas, options, and concerns, obtained from all sources, were documented in the database. Members of the Study Team provided individual responses to issues raised by members of the public, outside of the formal meeting process. These responses are also documented in the database.

The database will continue to be used and updated in subsequent stages of this project.

A summary of the issues and responses can be seen in ***Appendix C***. The following is an overview of issues and ideas raised or brought forward by members of the public and stakeholders throughout the process.

7.6.1 Consultation on Issues, Alternatives and Criteria

Public Consultation – Round 1

Two Public Information Centres and two Stakeholder Advisory Committee meetings were held during round 1.

Public Information Centres

Approximately 130 people attended the two Public Information Centres held in late October 2004. At these meetings, the Study Team presented the results of the Phase 1 study, identified a number of options for consideration, and requested input on a number of evaluation criteria to be used in the study.

Concern and anxiety was expressed at both meetings regarding the status and results of previous work (the Stantec study), the position of the City of Burlington regarding whether or not the Waterdown Road option could be supported, if selected, and concern over the decision relating to the Official Plan Amendment.

Attendees participated in workshops to both comment on advantages and disadvantages of potential alternatives raised from previous work, and to identify criteria that could be used in assessing and evaluating proposed solutions. ***Table 7-1*** provides a summary of the issues raised at both Public Information Centres.

Table 7-1 – Summary of Input Received on Issues, Alternatives and Criteria – Public Consultation Round #1

General Observations	• Very thorough analysis of advantages and disadvantages, comprehensive • Similarities in the advantages and disadvantages identified for each option
Input on North South and East West Options	**Advantages for Existing Routes included**: • Less impact than new routes; • In some cases, improvements needed anyway; • Access to transit and GO; • Reductions in current bottlenecks. **Disadvantages included**: • Impacts on existing communities; • Intrudes on environmentally significant areas; • Need to maintain character of rural areas; • Increases in current bottlenecks. **For new routes or extended routes, advantages included**: • Less impact on existing community. **Disadvantages included**: • Impacts on escarpment and green space; valued areas.
Other Options	• Transit • Alternative North/South road connecting King Road and North Service Road. or Highway 403 to Dundas Street • Improve Aldershot GO then plan transit • Reverse traffic direction in rush hours • Use Brant Street as major North/South route • Link to Mid-Peninsula highway plan
Input on Criteria/Factors	• Load criteria in favour of transit – link to public transit, access to GO • Protect natural areas and environmentally sensitive areas • Improve density to support transit • Reduce impact on existing community • Maintain integrity as viable Town-village • Consider maintenance costs of new roads, vs. existing roads • Air Quality • Public safety; emergency planning • Need to reduce traffic in congested areas • Consider economic impact on taxpayers

SAC Meeting #1

On November 23, 2004, the first meeting of the Stakeholders' Advisory Committee was convened. The SAC reviewed its Terms of Reference and work plan, received a presentation from the Study Team on progress to date, and participated in a discussion with the Study Team on possible alternatives. The Study Team presented a draft "Alignment Map" showing new or proposed roadways. This map was posted on the study website in December 2004.

Stakeholders raised a variety of issues and ideas, additional options, and commented on various options. In particular, concerns were expressed about the Official Plan Amendment and how much growth would occur, the destination of traffic to be serviced by the proposed road options, the need for alternative modes of transportation, in particular local transit in the Village of Waterdown and bicycle lanes.

SAC Meeting #2

On February 10, 2005, the Stakeholders Advisory Committee convened its second meeting. In addition to sitting members, about 13 members of the public registered, however approximately 20 attended. The SAC heard a delegation from a representative from the Waterdown South Residents' Association. The purpose of the second SAC meeting was to review a "short listed" group of alternative transportation solutions, provide advice on the ranking and weighting of various evaluation criteria, and to identify issues of concern to the Study Team. Members of the public participated in the evaluation exercise.

The Study Team presented two remaining north-south options – Waterdown Road and King Road. Both Brant Street and Kerns Road had been eliminated from further consideration. A number of issues and questions were raised including the consideration of no north-south option, the need for cost sharing between Hamilton and Burlington, and the protection of "23 acres" of green lands north of Mountain Brow Rd/Waterdown Rd.

A summary of the input received from the SAC on the importance of various criteria is presented in ***Table 7-2*** below. A value of "1" represents the highest priority, while "4" represents the lowest priority.

Table 7-2
SAC Criteria Importance Rating

Criteria	North-South Corridors	East-West Corridors
Natural Environment	2	2
Social Environment	1	1
Economic Environment	4	3
Cost	3	3
Transportation Service	4	3

7.6.2 Consultation on Preferred Alternatives

Public Consultation – Round 2

Two Public Information Centres and one Stakeholder Advisory Committee meeting was held during round 2.

Public Information Centres

Two Public Information Centres were held in Aldershot and Waterdown in April 2005. The purpose of these meetings was to present the proposed solutions. Over 500 people attended both meetings. The meeting included a presentation of the results of the study so far, and the floor was opened to questions.

Table 7-3 is a summary of Issues and Concerns raised by participants at those meetings.

SAC Meeting #3

The third meeting of the SAC was held on June 9, 2005. In addition to sitting SAC members, approximately 40 members of the public were in attendance. For the first half hour of the meeting, the SAC heard from members of the public about their concerns regarding the options.

SAC members discussed the proposed Waterdown Road option and explored a number of issues with the Study Team

Table 7-3 – Summary of Issues and Concerns Regarding the Preferred Alternatives – Public Consultation Round 2

General	• Majority of participants attending both meetings were from the Waterdown Road area. • Majority of participants from both of the meetings are opposed to the North-South option to widen Waterdown Road. • Some participants from both meetings felt that both options, North-South and East-West appear to solve the problem, are cost effective, and provide for the least impact on residents. • Some participants did not receive notification of the meetings.
Key Issues and Concerns	• The proposed widening of Waterdown Road is creating a great deal of anxiety and opposition in the community. • There is a need for creative solutions to the problem. • Many people support the North-South option of widening King Road to four lanes, using creative designs, despite the environmental impacts. • Most people indicated that the development of Waterdown Road/Mountain Brow Road is not an acceptable option since there is greater social impact than the King Road option. Concern that impact on people is preferred over impact on environment, flora and fauna. • Some people supported the Waterdown Road option, and indicated that the option to widen King Road has too many environmental impacts. • Social impact – anxiety and concern expressed about acquisitions along Waterdown Road as details about the specific alignments are not yet available. • Basis for the assessment – Concern expressed that documentation was not available on how the screening and evaluation process was conducted. Report needs to be reviewed and discussed by the public before decisions are made. • The plan for public transit needs to be significantly strengthened. Residents use cars to get to and from Waterdown. Need to integrate the need for better public transportation in a much stronger way – not just the GO train. • Concern that the East-West route might encourage traffic on Highway 6. • Road safety – Enforce reasonable speed limits on busy roads; prevent winter accidents by designing the road appropriately. • Safety of hikers and cyclists on the Bruce Trail needs to be a priority. • Traffic could reach capacity on King Road even if Waterdown Road is expanded. • Connect N/S and E/W routes; this will reduce traffic congestion on Highway 5 and 6. • Development is not welcome in Waterdown, concerns surrounding OPA28. Politicians encouraged to lobby for the revocation of OPA28. • Protect environmentally sensitive areas and wildlife. Many participants support the decision to protect “23 acres”. • Concerns that truck traffic will increase and continue to move through residential areas. • Need to continue to involve local residents in the planning process, it was suggested that another round of public meetings are held prior to final study recommendations being made. • Concern about the health and safety of the children, schools need to be built to accommodate for growth. • Hamilton Hydro may have plans to install hydro lines along Parkside Drive. • Participants would like to receive more information about the project.

7.6.3 Consultation on the Draft Phase 2 Transportation Master Plan Report

Public Consultation Round 3
In conjunction with the release of the Draft Phase 2 TMP Report, two Public Information Centres were convened (September 05), and one Stakeholder Advisory Committee meeting.

Public Information Centres
About 350 people registered at the two Public Information Centres held on September 26 and 27 20005. At these meetings, participants expressed considerable concern about the proposed north-south and east-west solutions. The following is a summary of the issues raised at both public information centers.

- Concern that the Study Team's proposals will not solve the problem;
- Opposition to the proposed east-west route on the basis of cost, environmental impact to wetlands and ESAs, and lack of evaluation of other alternatives;
- Opposition to proposed north-south route on the basis of social impact, heritage district disruption, lack of access for emergency vehicles; proposed alignment will not deter traffic from Waterdown Road north of Mountain Brow Road; lack of comprehensive analysis of alternative, including King Road and, Brant Street;
- Opposition to OPA 28, and proposed densities, including encouragement to local politicians to continue to fight it. Suggestion made that densities be capped, thus negating the need for this study;
- Overall disheartenment over growth plans and lack of participation opportunities;
- Overall concern over low cost estimates for both routes - estimates considered misleading;
- Proposals that trucks should be prohibited from the new east-west route;
- Real estate values have diminished since this TMP study;
- Continued concerns that the transit options are not robust enough, and do not provide adequate incentives for encouraging commuters to use transit instead of cars;
- Request was received for a new environmental assessment process, to consider all alternatives rigorously, or in any event, to have this process peer reviewed at this time;
- A number of inconsistencies and errors in the draft TMP were brought to the attention of the study team; and,
- Overall concern over the cost to the taxpayer, and emphasis placed on the developer paying the full costs of the road and necessary services.

At these meetings, two new alternatives were presented for consideration, along with requests for detailed analysis of King Road vs. Waterdown Road, consideration of Brant Street (for north-south route options) and consideration of Dundas Street widening for the east-west route.

Stakeholder Advisory Committee Meeting #4
The fourth stakeholder advisory meeting also included a half an hour at the beginning of its meeting to hear from members of the public. One presentation was received. At this meeting SAC members provided roundtable comments on their response to the Draft report. The focus was on:

- Transit options, and the need for more focus on these options;
- Need for dedicated cycling lanes;
- Concerns over OPA 28, growth and density of future development;
- Concerns over proposals to close Mill Street and King Street; and,
- Study could implement more carefully the recommendations on the studies referenced in the appendices to the TMP, and include focus on Burlington.

After the PICs and SAC meetings, a number of briefs, submissions and written comments were received by the study team.

All comments have been documented in the 'issues and responses' database.

7.6.4 Assessment of Alternative Corridor Options Proposed by the Public

The study team received two corridor alternatives to the recommended east-west route, that were proposed by members of the public. These alternatives were reviewed to assess their appropriateness as reasonable and feasible alternatives to the recommended roadway options. These include:

1. **New Dundas Street Option** – this option is a proposed modification of the recommended new east-west option (Option 3). The option would involve the use of Dundas St. (Hwy 5) to accommodate the additional road capacity needs. Dundas Street between Hamilton Road and the bridge just east of Mill Street would not need to be widened, and the additional capacity required along Dundas Street could be accomplished through the removal of parking lanes and prohibiting left turning movements during the peak periods. This option was reviewed by the Study Team, but was determined not to solve the transportation problem. The study team met with the individual who presented this option to explain the rationale for not considering it further. A detailed response to this suggested option was also provided which is contained in ***Appendix C5*.**

2. **New North Road Option** – this option is a proposed modification of a section of the Option 1 (New North Road) that would involve shifting south a section of the alignment that is to the east of Mill Street south (about halfway between the Option 1 route and Parkside Drive) to avoid environmentally significant areas. The shifting of the alignment to the south would however result in impacts to two business properties though (OPTA Minerals and Connon Nursery). This option was suggested as an alternate to improving Parkside Drive even through Parkside Dr is an identified arterial roadway and road right-of-way had been set aside for future widening. This option was evaluated with the other east-west alternatives described in this report. The evaluation resulted in this new alternative coming in second to the preferred alternative using one data standardization method, and being tied for first place in using a second data standardization method (See ***Appendix C5***). As such the difference among the two alternatives on the basis of the evaluation criteria was shown to be small.

However, it is noted that the high costs of business displacement (an industrial waste materials processing facility and a nursery) were not included in the evaluation as the original evaluation criteria were not designed to take this level of business impacts into account. This is a significant consideration missing from this evaluation. A follow-up meeting with the industrial facility (Opta Minerals Inc.) in Summer 2007 confirmed that the development of a roadway through their facility would result in significant effects to their operations as it would remove lands that are used for their processing. They were unsure as to whether they could continue to operate at this location should a road pass through their lands.

With the consideration of the expected high costs associated with the displacement of 1, possibly two businesses, it was expected that the evaluation results would favour the original decision to widen Parkside Dr. The study team met with the North East Parkside Drive Residential Community representatives (who suggested this option) to explain the evaluation results. A detailed response to this suggested option was also provided which is contained in ***Appendix C5***.

Despite the above, the City of Hamilton has agreed to review the decision to widen Parkside Dr. in more detail and consider alternate feasible routing options as part of the future Phase 3 Class EA work. This work will be undertaken with the input of the community and affected businesses in the area. The steps to be undertaken include:

- Discuss the alternate (to widening of Parkside Dr.) roadway alignment with residents and neighbouring businesses;
- Determine the costs of property acquisition (and possibly business relocation) that would arise from the implementation of an alternative alignment; and
- Determine the feasibility/acceptability of an alternative alignment. If justified, proceed to evaluation of this option against the preferred Parkside Dr. alignment option.

7.7 Evaluation of Consultation Program

Monitoring and evaluation of the public consultation and communications program implementation is an important responsibility that was implemented on an ongoing basis throughout the project. Typical tools used by our team to facilitate our assessment of the success of the program included:

- Short feedback forms at public events that seek input on the effectiveness of the consultation approach;
- Ongoing documentation of process-related feedback and suggestions received throughout the process; and
- Regular check-in with members of the Steering Committee.

The following section provides a summary of how effective the consultation and communications plan was in achieving specific objectives. In addition, issues and suggestions are provided for future stages and other Class Environmental Assessments that may be undertaken by partner organizations.

Get and keep people engaged: The study had numerous opportunities for public input, with eight public meetings held, and five SAC meetings. However, given the nature of this project, members of the affected public have suggested that more meetings would have been useful.

Correctly identify target stakeholder groups: Target stakeholder groups were identified early on in the study. After the October 2004 PIC, an additional group was formed. Two additional members were added to the SAC to reflect these interests. However, the "representativeness" of the SAC has been questioned by some participants. The SAC was intended to broadly reflect the variety of transportation interests resident in the partnering municipalities. The participation of stakeholders was valued and appreciated by the Study Team. There appears to be interest in continuing the SAC process in subsequent stages, but perhaps at a more local level.

Have contact early and often: Communications occurred during Phase 2 on a scheduled basis according to the study work plan. Increased communications activities occurred when the corridors and preferred solutions were presented (commencing December 2004 and increasing throughout the remainder of the study period). The volume of input from members of the public was tremendous. Increased resources could be allocated to this activity in future phases and in future studies. In particular, a web-based consultation mechanism could be established that would enable the sharing of input and responses to a broad group of interested people.

Provide clear, concise, relevant information – as early as possible: The study team received advice that it could have prepared a status report at each stage of the work plan. While presentations were posted on the web site, improvements in the timing of web postings and access to input from government review agencies would have been helpful to participants.

Demonstrate how ideas from previous consultations have been/will be considered: At each public event, this issue was discussed. However, given that different people attended different meetings, communications of these matters could have been improved with a Q and A section on the study web site.

Time and focus public engagement and consultation activities to match decision milestones in the TMP technical work plan: Input was received and considered on an ongoing basis throughout the study. Discussions at formal meetings were focused on the relevant stage of the study plan, and community requirements. Suggestions from members of the public were considered and incorporated into the study where possible.

Manage meetings for maximum effectiveness: The Town Hall design for the second and third round of public information centres was an effective way of receiving input. In addition, members of the public who did not wish to speak in public provided comments through written comment forms and briefs. SAC meeting #2 received a large attendance from members of the general public, who may have believed the purpose of the meeting to be a PIC. As such,

effective meeting management was a challenge and adjustments were made to subsequent meetings.

Provide several mechanisms to provide information and collect feedback (web-site, internet, email, fax, mail, phone, personal contact): Numerous mechanisms were provided and proved successful. Some delays in responses to issues were experienced between February and May and further efforts should be taken to ensure quick turnaround in the future. A Customer Service Protocol has been developed to assist with this issue in subsequent phases.

Demonstrate how feedback will be/was considered: Members of the Study Team worked closely with the public at specific stages in the study, and communications were established on a regular basis. The issue/response matrix documents all issues, and responses, and is attached in the Appendix.

Recommendations for future phases:

- Consider establishing a web-based dialogue, and ensure that adequate resources are provided to maintain and support it;
- Ensure that correspondence from members of the public is responded to within a specified time period;
- Provide adequate resources to enable meetings with affected members of the public when required;
- Consider a newsletter/flyer to provide frequent updates to affected members of the public as new information becomes available. Include information on timing of decisions, and mechanisms for participation;
- Consider establishing two Neighbourhood Advisory Committees (North-South and East-West), inviting existing members to continue should they wish, and adding members of the public, through an open, advertised approach. Ensure that at a minimum, five families with a Waterdown Road address are included.
- Consider holding community-neighbourhood-resident meetings to discuss study findings as the project progresses; and,
- Continue to convene PICs before significant decisions are made.

In general, the participation throughout the development of the TMP has resulted in valuable local knowledge and information. This knowledge has, and will be taken into account in future phases of the study.

8.0 FINANCIAL CAPABILITY

Having established a transportation strategy to the year 2021, the next critical step is to define its cost and funding source(s).

A Capital Expenditure Plan for the Waterdown/Aldershot network to 2021 has been developed as part of this master plan study. The plan is divided into:

- Road Widening/New Alignments;
- Transit Costs (Capital and Operations);
- New Intersections/Traffic Management; and
- New/Improved Interchanges with Provincial Freeways.

Costing is based on benchmark costs and typical cross-sections. The benchmark costs contain normal engineering and construction contingency allowance. Benchmark costs were developed for the north/south and east/west preferred solutions.

The funding for the capital expenditure plan is shared among Existing Development ("Non-Growth" - current tax base) and the anticipated development ("Growth").

Most new construction will be funded by "Growth" via development charges, however, deductions for benefit to existing development are made.

For road widenings and new alignments, growth will be allocated 100% of the costs after deducting costs for repaving existing lanes. If the widening is over a major structure, the estimated rehabilitation cost of the existing structure will be deducted as a benefit to existing development.

The Plan also includes projects in the Traffic Management category. These projects are primarily intersection improvements involving new turning lanes (or lengthening of existing turning lanes) and perhaps signalization. To recognize that the traffic management projects will produce smoother riding surfaces, geometric improvements and may update signal technology, a 5% deduction will be applied to projects at existing intersections as a benefit to existing development.

8.1 Capital Costs – Reconstruction and New Widening/New Alignments

The preferred "system" for the study area contains one widening of an existing roadway and one new alignment, for the north/south and east/west options respectively. The north/south option is estimated to cost $18.2 million and the east/west is estimated to cost $12.6 million, as detailed in ***Appendix D***.

8.2 Capital and Operating Costs – Transit Strategy

Based on the service plan presented in this study, the annual operating costs and capital costs were estimated to provide local transit service into Waterdown as illustrated in ***Figure 8-1***. Several assumptions were used in this cost estimate:

- Bus purchase cost is $450,000;
- HSR would need to purchase required buses for peak period service;
- Hourly operating cost of $72.55;
- Six hours of peak service per day, including reverse routing;
- Weekday service between 5:45 am and 10:30 pm;
- 45 minute cycle length per trip (including dwell time); and
- No weekend service (although not costed, the need for this service will be determined through more detailed operational studies).

Based on these assumptions, ***Table 8-1*** illustrates the projected annual operating cost and capital cost for the 2021 local Waterdown weekday transit service.

Table 8-1 – 2021 Local Waterdown Transit Operating and Capital Cost

Routes (Assume Two-way Service During Peak Periods)	Capital Costs			Annual Operating Cost		
	Buses Required	Bus Purchase	Total	Daily Bus Hours	Hourly Cost*	Annual Cost
Route 1 (Peak and Off-peak)	3	$450,000	$1,350,000	34.2	$72.55	$624,705
Route 2 (Peak Period Reverse Route)	3	$450,000	$1,350,000	18.0	$72.55	$272,514
Total	**6**		**$2,700,000**	**52.2**		**$897,219**

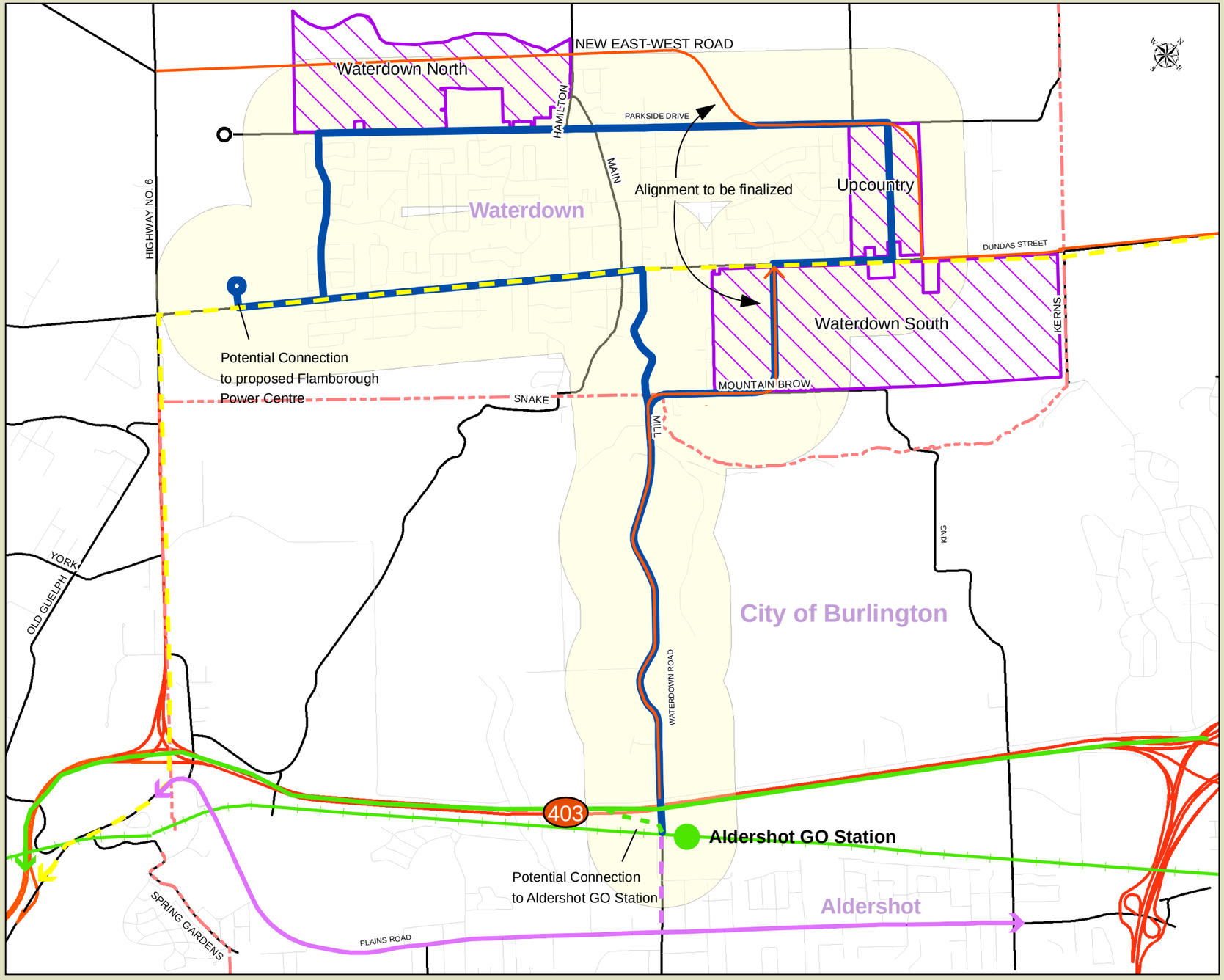
* Based on 2003 Operating Data

As a first step, the introduction of a starter transit service to the existing Waterdown community (proposed by the HSR for 2008) will require an annualized operating cost of $343,000. Two additional buses would also be required to provide the service, at a cost of $880,000.

The transit recommendations in this TMP are primarily operational improvements and would be considered as Schedule A projects under the MEA Class EA. As a result, no additional EA related work would be required for these transit initiatives.

8.3 New Intersections/Traffic Management

Within the context of this study, Dillon undertook some intersection analyses by making best efforts to forecast turning movements for the 20-year horizon. Recognizing that using a long range regional model to do this is not a precise exercise, we undertook preliminary intersection operations analyses at key study area intersections based on model output and other adjustments, as illustrated ***Figure 8-1***.



Waterdown - Aldershot Transportation Master Plan

Figure 8.1: Conceptual Waterdown Transit Strategy

- Municipal Boundary
- GO Transit - Road
- GO Transit - Rail
- Burlington Transit
- Halton Region Transportation Master Plan Proposed Transit Service
- New Alignment
- OPA No.28 Lands
- Proposed Waterdown Transit Route

2 - Way Peak Service
1 - Way Off Peak Service

Connections to Lakeshore West GO Train service, VIA Rail, and potential connections to Burlington Transit Plains Road Bus and Highway 407 GO Bus at Aldershot GO Station.

- Route Service Area Coverage (500m)

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date created: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

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Waterdown - Aldershot
Transportation Master Plan

Figure 8.2: Study Area Intersections
Operational Analysis

Scale

0 250 500 1,000 1,500
Meters

Map Notes:

Map created by: PJA
Map checked by: DPM
Date created: September 19, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

Based on this review, intersection improvements will be required as presented in ***Table 8-2***.

Table 8-2 – Study Area Intersection Improvements

Intersection	Improvement	Estimated Cost (Millions)
Dundas Street/Brant Street	Intersection Improvements / Auxiliary lanes (Dual westbound left)	$0.94 M
Dundas Street/New Link	New intersection and signals	$1.2 M
East-West Link/Highway 6	New intersection and signals	$1.2 M
East-West Link/Centre Road	New intersection and signals	$0.6 M
Waterdown Road/Mountain Brow Road	Roundabout or traffic control signal	Included in costs presented in Section 7.1
King Road/North Service Road	Auxiliary lanes (westbound right turn)	$0.238 M
	Total	**$4.178 M**

In addition to the "infrastructure" costing presented above, the City should budget $250,000 for "traffic management" measures such as transit priority signals or queue jump lanes, to be determined at a more detailed stage of analysis. More detailed analysis will be undertaken as part of future Class EA work which may update the improvement type and cost estimate.

8.4 New/Improved Interchanges with Provincial Freeways

As discussed earlier in this report, the City of Burlington has negotiated with the MTO to improve the interchange of Waterdown Road at Highway 403. The costing and allocation was presented by City staff to Community & Corporate Services Committee on June 20, 2005. The total cost of the improvements is approximately $9 million, which will be shared by MTO and the City of Burlington.

8.5 Summary of Costs and Allocation

The project presented above, their estimated costs and the allocation of these costs is presented in ***Table 8-3***. These costs will be updated in subsequent required EA and design work for each of these specific projects.

8.6 Cost Allocation by Municipality

Discussions between the City of Hamilton and the City of Burlington on this matter are ongoing and will be documented under separate cover.

Table 8-3 – Estimated Costs and Allocation

Project	Category				Estimated Cost	Allocation % (1)			Allocation $$		
	Road Widening/ New Alignment	Transit	New Intersections/ Traffic Management	New/ Improved Interchanges		Growth	Non-Growth	Other	Growth	Non-Growth	Other
CAPITAL											
1 . New east/west link	✔				$ 14,015,000	100%			$ 14,015,000	$ -	
2 . Widening of Waterdown Road between Highway 403 and Mountain Brow Rd	✔				$ 13,100,000	95%	5%		$ 12,445,000	$ 655,000	
3 . Widening of Mountain Brow Rd / New link between Mountain Brow Rd and Dundas Street	✔				$ 5,100,000	98%	2%		$ 4,998,000	$ 102,000	
4 . Widening Dundas Street between the "new link" and Hamilton/Halton boundary to a six-lane cross-section	✔				$ 3,500,000	95%	5%		$ 3,325,000	$ 175,000	
5 . Widening Dundas Street between the Hamilton/Halton Boundary and Brant Street to a six-lane cross-section (2)	✔				$ 10,040,000	75%	25%		$ 7,530,000	$ 2,510,000	
6 . Dundas/Brant Intersection (2)			✔		$ 940,000	50%	50%		$ 470,000	$ 470,000	
7 . Dundas/New Link Intersection			✔		$ 1,200,000	95%	5%		$ 1,140,000	$ 60,000	
8 . East/West Link/Highway 6 Intersection			✔		$ 1,200,000	95%	5%		$ 1,140,000	$ 60,000	
9 . East/West Link/Centre Street Intersection			✔		$ 600,000	95%	5%		$ 570,000	$ 30,000	
10 . King Road/North Service Road Intersection			✔		$ 1,438,000	97%	3%		$ 1,408,000	$ 30,000	
11 . Traffic Management			✔		$ 250,000	95%	5%		$ 237,500	$ 12,500	
				Total =	$ 51,383,000				$ 47,278,500	$ 4,104,500	$ -
TRANSIT											
12 . Transit - Capital (4)		✔			$ 2,700,000	TBD	TBD		TBD	TBD	
TOTAL					**$ 54,083,000**				**$ 47,278,500**	**$ 4,104,500**	

(1) The growth/non-growth allocation has been estimated based on the transportation assessment. This may be refined as part of the Development Charges update review process
(2) Included in the Halton Region Development Charge
(3) A component of this is included in the Burlington Development Charge
(4) Transit operating costs not included in the estimated cost

9.0 STAGING PLAN

The staging plan presents the timelines when the recommended infrastructure improvements must be in place to support the forecasted growth. The current network can accommodate approximately 500 new units before reaching capacity. Therefore, improvements are required to accommodate the other 6,000 units to be developed in OPA 28 and no additional development over an initial 500 new units should take place until the recommended improvements in this TMP have been implemented.

At a growth rate of 500 units per year (based on current construction industry estimates), OPA 28 lands will be built out by 2018. Therefore, the infrastructure must be in place before this time.

As population and employment grows within the study area, infrastructure must be built when the need arises so as to accommodate the demand. Thus, the roadway improvements must be staged in a timely fashion so that they are built to accommodate growing traffic demand, and alleviate traffic congestion. The staging plan analysis evaluated the roadway network adjacent to the three areas of OPA 28 (Waterdown South, Upcountry, and Waterdown North) and estimated the infrastructure needed as each area develops, being cognizant that the infrastructure improvements should be in place prior to the growth.

In terms of staging the various roadway improvements and measures identified through the strategies plans and guidelines, a preliminary staging plan has been developed based on the four planning horizon years evaluated in the TMP.

The staging plan is presented by major strategy.

Implement Prior to:	**2006**	**2011**	**2016**	**2021**
North/South				
Widen Waterdown Road to 4 lanes between Highway 403 and Mountain Brow Road		X		
Mountain Brow Road improvements between Waterdown Road and link to Dundas Street		X		
Widen Mountain Brow Road between Waterdown Road and link to Dundas Street		X		
East/West				
New 2-lane East/West corridor between Centre Road and Highway 6		X		
New 2-lane East/West corridor between Centre Road and Parkside Drive		X		
Widen Parkside Drive to 4 lanes between East/West Corridor and link to Dundas Street		X		
New 2-lane North/South link to between Parkside Drive and Dundas Street		X		
Widen Dundas Street to 6 lanes from North/South link to Brant Street[1]			X	

[1] *Coordination required with Halton Region as the Region has this section programmed for widening to six lanes by 2020.*

The staging plan is illustrated in ***Figure 9-1***.

Waterdown - Aldershot Transportation Master Plan

Figure 9.1: Major Infrastructure Improvement Staging Plan

City of Hamilton

City of Burlington

Waterdown

Waterdown North

Waterdown South

Upcountry

New East-West Road

Parkside Drive

CENTRE

HAMILTON

MAIN

HIGHWAY NO. 6

DUNDAS STREET

SNAKE

MOUNTAIN BROW

KERNS

KING

WATERDOWN ROAD

YORK

OLD GUELPH

403

2

4

6

Municipal Boundary

OPA No.28 Lands

2011

2016

2021

Number of Lanes

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date modified: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

10.0 OTHER SYSTEM IMPROVEMENTS

Further discussion is provided in this section on issues of broader interest to the City of Hamilton, the City of Burlington and the Region of Halton. We are also introducing specific network improvements for further consideration. These matters do not solve "the problem" on their own but in looking at the entire network, present opportunities for improvement.

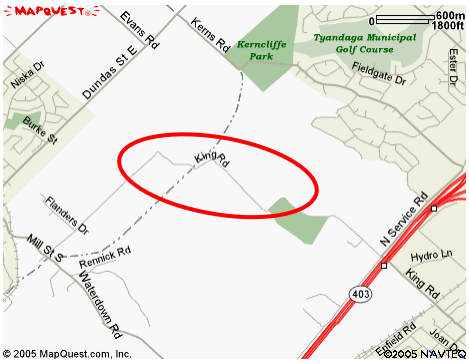
Main Street Closure

As part of public input from Phase 1 and through this study, a request was made that Main Street North be closed at the northern limits with the intersection of Centre Road. The reason for this request is concern about traffic from the future Waterdown North area infiltrating through this established neighbourhood.

The level of transportation analysis undertaken in this Phase 2 of the EA process is strategic and too broad to determine if this specific link would/is required to keep the overall transportation system operating at adequate levels of service. In terms of the overall network function, it would be preferred that traffic from/to Waterdown North travel along Parkside Drive and the new east/west link as these would provide more direct flow to/from the east and south. At the strategic level, closing Main Street North at Centre Road would not appear to hinder the system operation, however, a detailed traffic operations analysis and resident survey/consultation should be undertaken prior to finalizing such a decision.

King Road

Through this Master Plan, Waterdown Road/Mountain Brow Road was identified as the preferred north/south alternative to accommodate the additional road traffic capacity that is expected to be generated through growth in Waterdown.



The City of Burlington (through Council Resolution) has requested that improvements to King Rd be considered to allow it to remain open as a 2-lane roadway. There are safety concerns associated with King Rd. in its current condition should it be subject to additional traffic use (which are likely as a result of the OPA #28 developments). Currently this road has very sharp curves and steep grades that limit its throughput capacity. Although major improvements to the road way geometry are expected to result in significant environmental impacts within the Escarpment, there may be some level of improvement that could be done that would result in acceptable impacts to the NEC and Halton Conservation.

It is recommended that the following work be undertaken in regards to King Rd:

- Investigate the feasibility/acceptability of improvements deemed necessary to keep King Rd open as a two lane roadway as per City of Burlington Council Resolution; work with the NEC and Halton Conservation in making this determination;
- If it is deemed that the level of improvement required to keep King Rd open as a two lane roadway would result in unacceptable environmental impacts, examine other options such as operational improvements (e.g. designate as a one-way roadway with the road direction alternating with the peak period) or road closure; and
- Work with the Waterdown South Secondary Plan urban designers to ensure the internal roadway system for this secondary plan area does not promote the flow of traffic to/from King Road (e.g. few access points, left-turn restrictions).

Public feedback on this matter in the third round of public consultation was generally in favour of keeping King Road open.

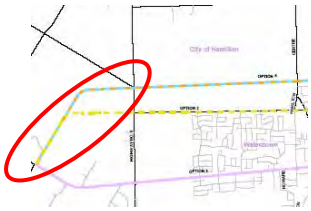
Depending on the decided course of action for King Rd, it may be necessary to undertake Class EA Phase 3 and 4 work for the roadway. In any event, the public is to be consulted in the decision making process.

New East/West Road at Highway 6

The intersection of the east/west link to Highway 6 was placed at a distance of 1.7 kilometres from the intersection of Highway 6 with Dundas Street/Highway 5. This distance is the same as that between Dundas Street/Highway 5 and the future York Road Interchange. In the interim stages, it is envisioned that the Highway 6/East-West Hybrid intersection would be at-grade, operating with traffic control signals. As the Ministry of Transportation progresses with its access control initiatives on Highway 6 north of Dundas Street/Highway 5, this at-grade intersection can be converted to a partial interchange.

New East/West Road West of Highway 6

The modeling analysis undertaken in Phase 2 did not support the need for the extension of the east/west link west of Highway 6. Therefore, at this time, a specific link cannot be recommended. However, once the City develops its 2031 forecasts, there may be a need for such a link. Therefore, the protection for a corridor between Highway 5 and Highway 6 should be further studied before any redevelopment is allowed in these lands.



Kearns Road

The City of Burlington is carrying out a Class EA study to review Kern's Road between Dundas Street and Bonfield Court. The overall goal of this study is to review this section of Kern's Road to determine what options and alternatives are appropriate to address existing and future issues related to cut-through traffic, vehicle speeds and road safety. In addition to a history of neighbourhood concerns, two new factors have the potential to increase traffic in the area. First and foremost, is the OPA 28 development in Waterdown that has the potential to generate traffic that may use Kern's Road and Dundas Street. A number of options for Kern's Road are being considered including Do Nothing, a southbound restriction at the escarpment crossing and full closure at the escarpment crossing.

Cycling and Pedestrian Trails

Other potential trails in the Waterdown area include the Imperial Oil and Sun Canadian Pipeline Easement located along the western boundary of Waterdown North. This pipeline provides an opportunity to create a north-south pedestrian/trail linkage connecting Waterdown North with the existing residential neighbourhoods and the Bruce Trail to the south. Opportunities for additional trails are presented in ***Figure 10-1***.

Niagara to GTA Transportation Corridor

The Ministry of Transportation – Ontario (MTO) completed the Niagara Peninsula Transportation Needs Assessment Study in May 2003, which recommended a new Mid-Peninsula Highway. The study is a component of the MTO's long range planning program to improve transportation through Ontario's international gateways and highway corridors. This corridor is now referred to as the Niagara to GTA Transportation Corridor. This is a proposed facility linking Fort Erie with Hamilton.

The Ministry of Transportation has initiated a new "Full Environmental Assessment" for this project in early 2005. The implementation of this facility is expected to be beyond the 2021 planning horizon of the Waterdown/Aldershot TMP.

GTA Ferry Services

A concept is being promoted in the GTA, which is of importance to Hamilton/Burlington/Halton – a Hover Craft service proposed to connect St. Catharines, Hamilton, Mississauga, Pickering and Oshawa. U.S. sites are also proposed. This service plans a 25 minute trip between Hamilton and Toronto. The implementation date has not been determined. The benefit from such a service would be the removal of some "through" traffic. The City of Hamilton/Burlington and the Region of Halton should monitor and support, in principle, these and other initiatives that remove vehicular trips from the Hamilton/Burlington/Halton roadway network.

Province of Ontario Provincial Transportation Strategy

A Provincial Transportation Strategy is being developed by MTO in conjunction with the province's Growth Management Plan to address growth challenges over the next 30 years. The Strategy will provide the basis for integrating land use and transportation planning decisions, identifying strategies for the future development of inter-regional and multi-modal highway corridors that support the growth management objectives and infrastructure investment priorities identified in the Growth Management Plan.

Greater Toronto Transportation Authority (Metrolinx)

The Province has established the Greater Toronto Transportation Authority (now known as Metrolinx) under the chair of former City of Burlington Mayor Robert McIsaac as an important part of their transportation vision. Metrolinx will play an important part of this strategy by providing a balanced, effective, sustainable regional transportation framework in the GTA that will implement the Provincial vision for a stronger Ontario built around stronger communities, a vibrant economy, a healthy environment and a high quality of life.

Waterdown - Aldershot Transportation Master Plan

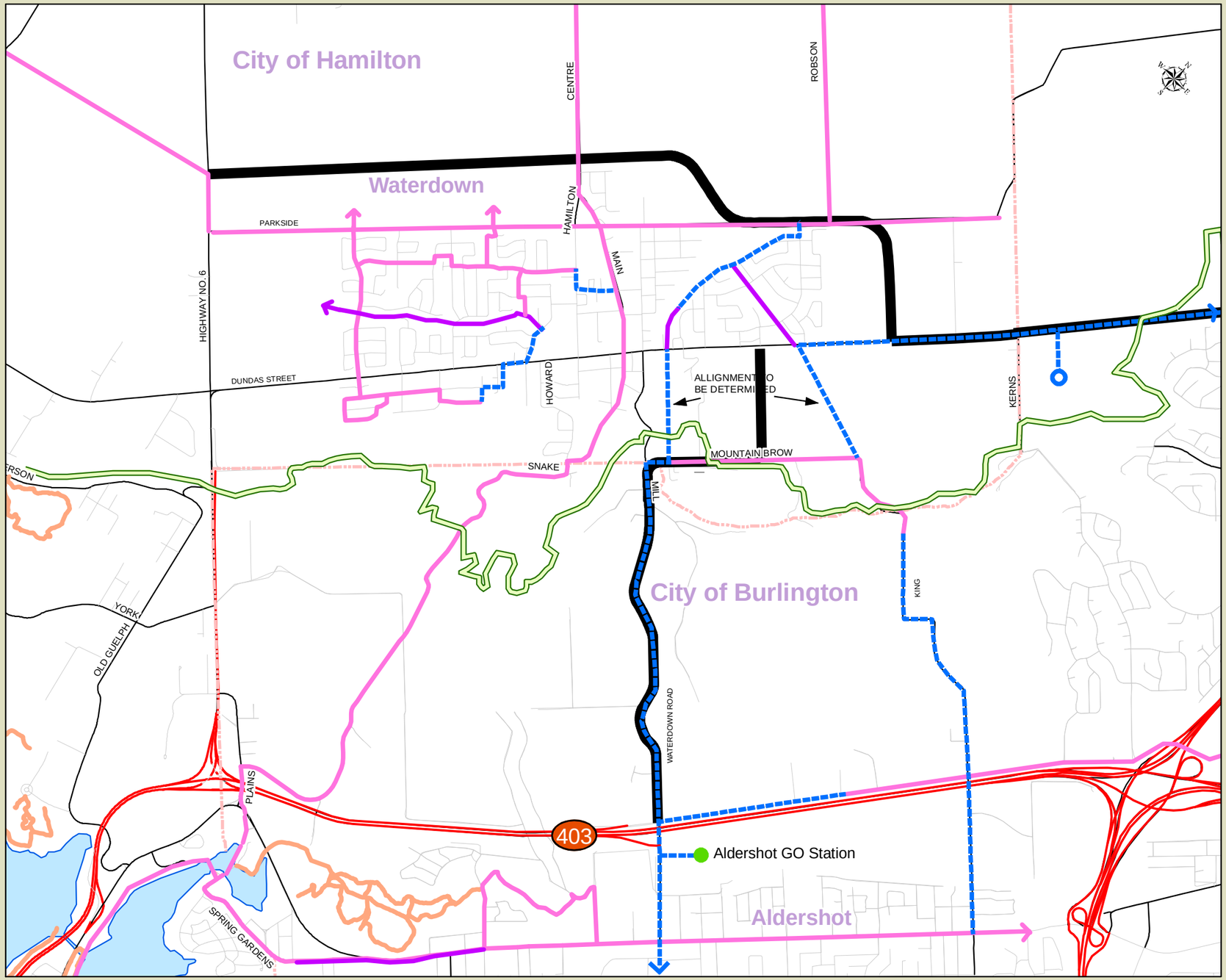


Figure 10.1: Potential Future Cycling and Pedestrian Routes

- Municipal Boundary
- On Street Bike Route
- Off Road Multi-Use Path
- Bruce Trail
- Other Trails
- Opportunities for the Cycling and Trail System
- Preferred Corridor

Scale

0 250 500 1,000 1,500 Meters

Map Notes

Map created by: PJK
Map checked by: DPM/CC
Date modified: September 18, 2007

Base mapping provided by the City of Hamilton, the City of Burlington and the Region of Halton. Additional mapping provided by Halton Region Conservation Authority.

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11.0 NEXT STEPS

In terms of the future steps for the TMP, there is a need for immediate attention to some aspects of the plan and a need to identify "tracking" measures for the longer-term implementation needs. More specifically, some of the recommendations in the TMP strategies, plans and guidelines will require further coordination, study, analysis and/or design.

The following future steps (***Table 11-1***) simply note the "next" step in the process for the short, medium and long term.

Table 11-1
Implementation Schedule

Time Frame	Principal Municipality		
	City of Hamilton	City of Burlington	Region of Halton
Short Term (0 to 5 years)			
• Undertake Phases 3 to 5 of the Municipal Class Environmental Assessment Planning and Design Process for the preferred north/south option – the Widening of Waterdown Road/Mountain Brow Road Corridor between Highway 403 and Dundas Street	X	X	
• Undertake Phases 3 to 5 of the Municipal Class Environmental Assessment Planning and Design Process for the preferred east/west option – the "hybrid" alignment between Highway No. 6 and Dundas Street	X		X
• Review road and/or operations improvement options for King Rd.	X	X	
• Evaluate opportunities to implement TDM measures in Waterdown/ Aldershot	X	X	X
• Undertake transit operation's analyses to confirm appropriate infrastructure/plant to service the Waterdown/Aldershot area	X	X	
• Undertake operational analyses of Main Street Waterdown to determine the feasibility of closing this roadway at Centre Road	X		
• Continue to participate in GTA-wide and MTO transportation planning initiatives	X	X	X
• Construct the interchange improvements at Highway 403 and Waterdown Road	X	X	
• Liaise with the MTO regarding the widening of Highway 403 from the Freeman Interchange to Highway 6	X	X	X
Medium Term (5 to 10 years)			
• Continue to participate in GTA-wide and MTO transportation planning initiatives	X	X	X
• Liaise with the MTO regarding the widening of Highway 403 from the Freeman Interchange to Highway 6	X	X	X
• Undertake transit operation's analyses to confirm appropriate infrastructure/plant to service the Waterdown/Aldershot area	X	X	

Table 11-1
Implementation Schedule

Time Frame	Principal Municipality		
	City of Hamilton	**City of Burlington**	**Region of Halton**
Long Term (10+ years)			
• Widen Dundas Street to six-lanes from Brant to the intersection with the East/West Hybrid link	X		X
• Continue to participate in GTA-wide and MTO transportation planning initiatives	X	X	X
• Liaise with the MTO regarding the widening of Highway 403 from the Freeman Interchange to Highway 6	X	X	X
• Undertake transit operation's analyses to confirm appropriate infrastructure/plant to service the Waterdown/Aldershot area	X	X	

GLOSSARY
Glossary of Transportation Planning Terminology

GLOSSARY OF TRANSPORTATION PLANNING TERMINOLOGY

The following are terms used throughout the Waterdown/Aldershot Transportation Master Plan (TMP). These terms are a collection of typical terms used in numerous transportation planning exercises throughout North America.

AADT (Annual Average Daily Traffic) - Data used to represent the amount of traffic occurring on roads. AADT is collected annually for various segments of roadway by the road authority.

Access - Refers to the ability to reach or connect to a roadway.

Access Management - Techniques of transportation infrastructure management intended to: reduce congestion and accident rates, lessen need for highway widening, conserve energy, and reduce pollution. Examples include; limiting entrance and exit of traffic on highways, use of medians and turn lanes, placement and timing of signals, as well as implementation of supportive local by-laws and policies.

Accessibility(1) - (1) The extent to which facilities are barrier free and useable by disabled persons, including wheelchair users. (2) A measure of the ability or ease of all people to travel among various origins and destinations.

Accessibility(2) - Ability to reach a destination or use a facility or service without being impeded by physical or other barriers due to auditory, visual, mobility, or cognitive disabilities.

Alternative Modes (of Transportation) - The term "mode" is used to refer to and distinguish from each other the various forms of transportation, such as automobile, transit, ship, bicycle and walking. Alternative mode refers to any mode other than single occupant vehicle.

Arterial - A major street or highway. It is a general term, which includes expressways, major and minor arterial streets' and provincial highways having regional continuity. It is a road intended to move a relatively large volume of traffic at medium to high speeds.

Bicycle (or "Bike") - A vehicle propelled by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term also applies to three- and four-wheeled human-powered vehicles, but not tricycles for children.

Bicycle Facilities - A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, bike lanes, paved shoulders and wide outside lanes.

Bicycle Lane ("Bike Lane") - A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bicycle Path ("Bike Path") - See Shared Use Path Bicycle System. A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational signage. Bicycle systems should establish a continuous routing, but may be a combination of any and all types of bikeways.

Bikeway - A generic term for a road, street, or path that in some way is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. This term can be used interchangeably with "bicycle facility".

Capacity - The volume of vehicles the road was designed to carry in a unit of time, such as an hour; can also be applied to transit or bicycle/pedestrian paths.

Collector - A street or highway that provides for traffic movement between major streets and local street. It is a road intended to collect traffic from local streets and land-access roads

Community - A physical or cultural grouping of stakeholders with common interests created by shared proximity or use. Community can be defined at various levels within a larger context (e.g., neighbourhood, city, or region).

Commute Alternatives - Carpooling, vanpooling, transit, bicycling, walking, and telecommuting. Also includes any alternative work-hours program.

Commute - A repetitive home-to-work or work-to-home trip.

Commuter - Person who travels regularly between home and work or school.

Congestion - Recurrent congestion is defined as a condition lasting for 15 minutes or longer where travel demand exceeds design capacity. That typically means freeway speeds were 50 km/h or less during peak commute periods on a typical incident-free weekday. "Non-recurrent" congestion is defined as backups caused by special circumstances, such as accidents, stalled vehicles, sporting events, etc. The consequences of congestion are longer and less predictable travel times.

Consultation - When one party confers with another identified party and, prior to taking action(s), considers that party's views.

Corridor - A geographic area that is defined by major roads and rail facilities, and major flows of travel. Transportation corridors are identified for the purpose of analyzing the patterns and flows of traffic between origins and destinations.

Centroid - the "centre" of a traffic zone in modelling. The two data systems, the street system (network) and the zone system (socio-economic data), are interrelated through the use of "centroids." Each zone is portrayed on the network by a point (centroid) which represents the weighted center of activity for that zone. A centroid is connected by a set of links to the adjacent street system. That is, the network is provided with a special set of links for each zone which connects the zone to the street system. Since every zone is connected to the street system by

these "centroid connectors," it is possible for trips from each zone to reach every other zone by way of a number of paths through the street system.

Demand Management - A set of strategies that promote increased efficiency of the transportation system by influencing individual travel behaviour.

Frataring – The fratar model is a trip distribution model. This model accepts an O-D trip table and allows the application of growth factors to be applied to either or both ends of a trip interchange. The growth factors for the external station generally relate to the population, employment, and tourist growth of the region served by the road the external station is on. The growth factors of the internal analysis units generally relate to the residential, commercial, and industrial growth in the analysis unit. For the analysis units which have zero trip ends in the "base" year but will have activity in future years, modellers determine the most likely trip interchanges and so adjust the input trip table before applying the growth factors.

Ferryboat - Vessel, generally a steam or diesel-powered conventional ferry vessel, for carrying passengers and/or vehicles over a body of water; may also be a hovercraft or other high speed vessel.

Freeway - A multilane divided highway without traffic signals and with limited opportunities for access and egress.

Greenway - A corridor of undeveloped land, usually in an urban area, which is set aside or used for conservation and/or recreation. Greenways can also serve as pedestrian and bicycle facilities for recreation and transportation. In this region, the term is often used to mean a Shared Use Path, rather than the more complete definition of greenway.

HCM (Highway Capacity Manual) - published by the Transportation Research Board (TRB), the HCM outlines fundamental information and computational techniques on the quality of service and capacity of highway facilities.

Headway - The scheduled time interval between any two revenue vehicles operating in the same direction on a route. Headways may be LOAD driven, that is, developed on the basis of demand and loading standards or, POLICY based, i.e., dictated by policy decisions such as service every 30 minutes during the peak periods and every 60 minutes during the base period.

High-Occupancy Vehicle (HOV) lane - A lane designated for the exclusive use of high-occupancy vehicles, such as carpools, vanpools, other ridesharing modes, and buses.

Home-based Work Trip Attractions - Home-based work trip attractions describes the trips made by commuters from their homes to their place of work.

Human Environment - The surroundings in which people conduct their lives, including built and natural environments, as well as cultural resources.

Impacts - The effects of a transportation project, including (a) direct (primary) effects; (b) indirect (secondary) effects; and (c) cumulative effects.

Intelligent Transportation System (ITS) - A system that uses modern electronic, communication and control technologies to provide travelers with better information on traffic condition, provide vehicles with safety equipment and improve the transportation infrastructure. Also includes technologies that identify, monitor, or control vehicles.

Intelligent Vehicle Highway System (IVHS) - Intelligent Vehicle Highway Systems are technological innovations developing or applying electronics, communications and information processing technologies to improve the efficiency and safety of surface transportation systems. Such technology may include systems that alert authorities to emergency situations, on-board navigation systems for vehicles, electronic collection of tolls and transit fares, traffic management centers that can adjust speed limits, traffic signals and road access and electronic monitoring of vehicles.

Intermodal - The term "mode" is used to refer to and distinguish from each other the various forms of transportation, such as automobile, transit, ship, bicycle and walking. Intermodal refers specifically to the connections between modes.

Intermodal Planning - Planning that reflects a focus on connectivity between modes as a means of facilitating linked trip making.

Land Use - The purpose for which land or the structures on the land are being utilized; for example: commercial, residential, retail.

Level of Service (LOS) - This is a qualitative or quantitative measure used to characterize the operating conditions of a transportation service, as perceived by its users. Most commonly applied to traffic operations, where designations go from A (best) to F (worst). Summarizes transportation operating conditions. It is usually used to describe a section of road or an intersection as experienced by drivers, but can also be applied for users of other modes of transportation. A system of indicating delay at signalized intersections, which is graded on a letter scale from A to F, generally outlined by the HCM as: A <= 10 sec, B = 10-20 sec, C = 20-35 sec, D = 35-55 sec, E = 55-80 sec, F > 80sec.

Liveable Community - A neighbourhood, community or region with compact, multidimensional land use patterns that ensure a mix of uses, minimize the impact of cars, and promote walking, bicycling and transit access to employment, education, recreation, entertainment, shopping and services.

Local Roads - Provide access to private property or low volume public facilities.

Local Service - A type of operation that involves frequent stops and consequent low speeds, the purpose of which is to deliver and pick up transit passengers as close to their destinations or origins as possible. Transit service involving many stops and low operating speeds with the purpose of picking up or delivering passengers as closely as possible to origins and destinations.

Long Range Objectives - A long-term (20-25 years) general end that is achievable and marks progress toward a goal.

Measures of Effectiveness (MOE) - Parameters describing the quality of service provided to drivers, passengers, and pedestrians. Speed, delay, passenger loadings, and transit vehicle travel time could be examples. Qualitative rankings such as Level of Service and On-Time Performance would be based on these measures.

Mobility - Refers to the ability to travel along a highway facility.

Mode - Any one of the following means of moving people or goods: aviation, bicycle, highway, paratransit, pedestrian, pipeline, rail (commuter, intercity passenger and freight), transit, space and water. A way people or goods get from one place to another, such as using cars and trucks, freight and passenger trains, walking, bicycling, and riding buses.

Mode Split - Mode split is the percentage of trips taken by each of the possible modes of travel (auto, transit, bicycle, walking). Mode split does not refer to the number of trips, but rather to the proportion of people that use each of the various modes of transportation. It also describes the process of allocating the proportion of people using modes. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using public transportation.

Multi Modal - Refers to the availability of multiple transportation options, especially within a system or corridor. A multi-modal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, foot, or even a computer modem.

Multi Modal Planning - Planning that reflects consideration of more than one mode to serve transportation needs in a given area.

Natural Environment - The surroundings not made by humans within which the transportation system operates. This includes both physical and ecological aspects, including traditional cultural resources.

Non-Motorized Travel - Travel accomplished by cycling or walking.

Pedestrian - One who walks or journeys on foot; a walker.

Preservation - Actions taken to protect existing natural and human environments, investments and mobility options.

Public Meeting/Consultation - a formal or informal event designed for a specific issue or community group where information is presented and input from community residents is received.

Quality of Life - This classification includes work which is designed to enhance the environment associated with, or impacted by, transportation improvements. Program categories within this classification include transportation enhancements, noise walls, landscape, air quality, signs, wetland mitigation, and rest areas.

Rapid Transit - Rail or bus transit service operating completely separate from all modes.

Right-of-Way - The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian. A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

Roadway - A general term denoting a public way intended for vehicular use.

Shared Use Path - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the roadway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.

Short Range Objective - A short-term (5-10 years), specific, measurable, intermediate end that is achievable and marks progress toward a goal.

Shoulder - The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses. In rural areas, this portion may also be used for bicycle and pedestrian travel.

Sidewalk - The portion of the street or highway right-of-way designated for preferential or exclusive use of pedestrians.

Signed Shared Roadway (Signed Bike Route) - A shared roadway that has been designated by signing as a preferred route for bicycle use.

Single-Occupant Vehicle (SOV) - A vehicle containing only the driver and no other passengers.

Stakeholder Advisory Committee (SAC) - A representative group of stakeholders that provided direction to the Waterdown/Aldershot TMP.

Stakeholders - Individuals and groups with an interest in the outcomes of policy decisions and actions.

Sustainability - Meeting the needs of the present without compromising the ability to meet the needs of the future.

TAC (Technical Advisory Committee) - This was a committee that represented the government agencies within and adjacent to the study area, as part of the Waterdown/Aldershot TMP.

Transit - Generally refers to urban passenger transportation service, local in scope, provided to the public along established routes with fixed or variable schedules at published fares.

Transportation Demand Forecasting Model - A demand-forecasting model is a tool for representing and analyzing the major ways people get around. Usually this tool is a software package, which incorporates a road network, land use data, and a mathematical formula to distribute and route trips. The model is calibrated to existing traffic counts. Then it can be used to forecast traffic and test the effect of changes in the road network.

Transportation Management Association (TMA) - Transportation Management Associations are groups of businesses, which develop transportation demand management (TDM) measures in order to reduce the need for commuter parking. Measures may include carpool matching services, transit subsidies, shuttle vans, etc. By working as a group, TDM measures are more effective.

Transportation Master Plan - A long-range document that identifies facilities and programs that should function as an integrated transportation system and includes a financial plan that demonstrates how the long-range plan can be implemented. The plan must show that the current system can be operated and maintained over the long-term, as well as recommend capital expansion projects to be constructed.

Transportation Planning - A collaborative process of examining demographic characteristics and travel patterns for a given area. This process shows how these characteristics will change over a given period of time, and evaluates alternatives for the transportation system of the area and the most expeditious use of funding. Long-range planning is typically done over a period of twenty years; short-range programming of specific projects usually covers a period of three to five years.

Transportation System Management - Techniques for increasing the efficiency, safety, capacity, or level of service of a transportation facility without increasing its size. Examples include, but are not limited to, traffic signal improvements, traffic control devices including installing medians and parking removal, channelization, access management, ramp metering, and restriping for high occupancy vehicle (HOV) lanes. TSM is a combination of low-cost strategies that use a total approach to transportation system management. The goal is to shift emphasis from expanding capacity to making better use of existing transportation systems.

Travel Demand Management (TDM) - TDM is a combination of strategies or actions whose goal is to encourage travelers to use alternatives to driving alone. TDM strategies may be developed for a single work site, specific corridor, or area.

Travel Time - The time it takes to travel door-to-door.

Vehicle Kilometres of Travel (VKT) - The sum of all the kilometres traveled by vehicles (not people) in a specified amount of time.

Vision - A description of the future physical appearance and qualities of a community.

Volume - The number of vehicles that actually pass through a given kilometre of road in a unit of time such as a day; can also be applied to transit or bicycle/pedestrian paths.