



St. Marys Cement

Flamborough Quarry Haul Route Draft Transportation Report

Hamilton, ON

May 2009



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1. INTRODUCTION

1.1 Project Background

In 2007, St. Marys Cement retained iTRANS Consulting Inc. to undertake a haul route study for a proposed quarry in the former Township of Flamborough (now part of the City of Hamilton).

The proposed St. Marys Flamborough Quarry is situated on a 158-hectare (380 acre) site at 11th Concession Road East and Milborough Line. The property was purchased by St. Marys on June 15, 2006. St. Marys plans to extract Amabel Dolostone, a high quality stone, for use in construction, road-building and manufacturing. Proximity to the Greater Toronto Area (GTA) and the Greater Golden Horseshoe (GGH) is clearly a major asset when developing an operation involving the transportation of heavy materials.

A haul route study was initiated as part of the City of Hamilton's development review process. Given the number of review agencies involved, a separate committee was formed to coordinate the review of submitted deliverables. This committee is called the Combined Aggregate Review Team (CART). CART consists of municipal and provincial representatives, and other organizations.

The Terms of Reference ("Terms of Reference, Mountsberg Quarry Haul Route Evaluation Study") for the haul route study were developed and adopted by CART representatives, and issued to the original proponent Lowndes Holdings Inc. A copy is provided in **Appendix A**. The Terms of Reference specify that the evaluation process be consistent with the requirements of the Ontario Environmental Assessment (EA) Act. The standard EA guidelines include a comprehensive public consultation process.

A direct passage from the Terms of Reference explains the relationship between the Haul Route Evaluation Study and future environmental assessments:

Should there be a need to improve roadways to support the project (if application receives *Planning Act* and *Aggregate Resource Act* approvals), a Class EA for these improvements will likely need to be undertaken (the MEA Municipal Class EA and/or the MTO Class EA for Provincial Highways). This Haul Route Evaluation would serve to support the preferred alternatives as part of possible future EAs to fulfill Ontario EA Act requirements and possibly the *Canadian Environmental Assessment Act*.

The Haul Route Evaluation Study will present the detailed results and analysis of the overall haul route study. As required by the EA Act, a wide range of disciplines are involved in evaluating the proposed quarry.

The present report is the Flamborough Quarry Haul Route Transportation Study which concentrates on the transportation aspects of the haul route study. The Transportation Study is designed to support the requirements of the Haul Route Evaluation study as laid out by the Terms of Reference, and, in particular, to determine and evaluate alternative haul routes for the quarry. The Transportation Study defines the study area affected by transportation issues, identifies pertinent planning policies and legislation, documents supporting data, and selects and evaluates potential haul routes from the perspective of transportation.

Regarding the comparative evaluation of the alternative haul routes, the example transportation evaluation criteria provided in the Terms of Reference is shown in **Table 1-1**.

Table 1-1: Terms of Reference Example Evaluation Criteria

Criteria	Indicators
Change in road level of service	Change in road level of service/congestion
	Change in access levels for road users
	Effects on other roadways as a result of traffic diversion
Potential for change in road safety level	Potential for increase in collision frequency and severity
	Number of access points and intersections along the haul route
	Presence of other potential safety issues along the haul route (e.g. limited sight lines, steep grades, school bus routes, movement of agricultural vehicles and equipment)
Potential for impact on alternative transportation modes	Potential for conflicts with other modes of transport along the haul route

As will be discussed in Section 19, all of these criteria and indicators were utilized in the comparative evaluation of the alternative haul routes.

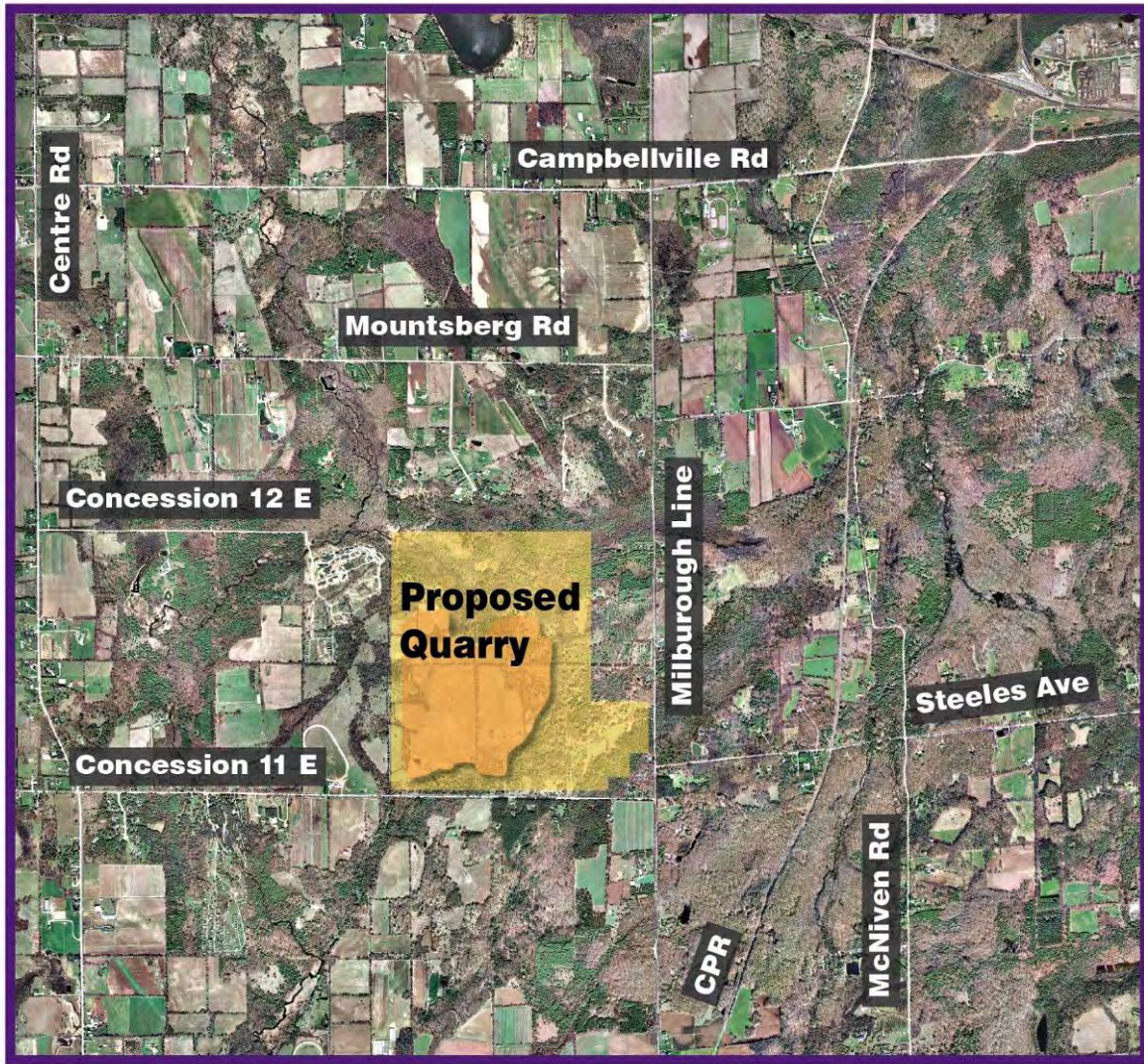
1.1.1 Description of Proposed Quarry

The proposed St. Marys Flamborough Quarry is located on the north-west corner of the intersection of Concession 11 E and Milborough Line in the City of Hamilton. The planned extraction will occur on approximately 67-hectares of the 158-hectare (380 acres) site, less than half of the property. The remaining land holdings would be outside of the proposed development area. The location of the proposed St. Marys Flamborough Quarry and the area of extraction are shown in **Exhibit 1-1**.

The site features a very thick deposit of high quality Amabel Dolostone formation. The proposed quarry footprint is designed to ensure that there is no displacement of important wetlands, watercourses, forests or significant species.

The proposed annual maximum tonnage limit for the quarry is three-million tonnes. Amabel Dolostone is the most durable aggregate material in Southern Ontario and is used in:

- Granular base in asphalt mixes and structural concrete for sidewalks, bridges, roads and streets
- Structural concrete for buildings, bridges, sidewalks, and airport runways



 Area to be extracted

Exhibit 1-1: Location of the Proposed St. Marys Flamborough Quarry

The planned excavation will be an average of 34 metres (100 feet) deep. The site will be developed and rehabilitated in stages. The volume of reserves is estimated at 60 million tonnes with a projected life of 25 to 30 years. St. Marys also owns adjacent property to the west of the proposed quarry and there is potential for future expansion of the quarry; however, there is a long term lease on the adjacent lands and it is anticipated that expansion would not be contemplated before 2020.

1.1.2 Proposal History

In 2004, when Lowndes Holdings Corporation owned the site, applications for planning approvals for a Proposed Dolostone Quarry and an amendment to the City of Hamilton Official Plan/Zoning By-Law were submitted to the City of Hamilton. Stantec Consulting was retained by Lowndes Holding Corporation to undertake a traffic impact study (TIS). The report was entitled “Lowndes Property – Traffic Impact Study,” dated August 2004.

IBI Group was retained by the City of Hamilton to undertake a peer review of Stantec’s TIS Report. In IBI’s report entitled “Lowndes Holding Corporation Proposed Quarry, Lowndes Property – Traffic Impact Study, Stantec, Peer Review Report,” dated August 2005, IBI identified a number of potential deficiencies with the TIS submitted in support of the Lowndes Property proposal.

The City of Hamilton then requested an evaluation of the preferred mode / routes to transport the aggregate material from the proposed quarry site. This request stemmed from the concern associated with the potentially large volume of truck traffic that would be generated by the Flamborough Quarry, and the impact of this traffic on the safety, and social and environmental features along the haul route(s).

The City of Hamilton developed the “Terms of Reference, Mountsberg Quarry Haul Route Evaluation Study” in April 2006, The Terms of Reference were adopted by CART representatives and issued to Lowndes and subsequently to St. Marys upon their purchase of the property. As mentioned previously, the Terms of Reference specify that the haul route study evaluation process be consistent with the requirements of the Ontario Environmental Assessment (EA) Act.

The study area identified by the Terms of Reference for the Haul Route Evaluation Study is shown in **Exhibit 1-2**. The study area is bounded by Highway 401 to the north, Guelph Line on the east, Highway 403 to the south, and Highway 6 to the west.

A number of major jurisdictions are represented in the study area: the City of Hamilton (mainly on the eastern side), Halton Region (on the west), the City of Burlington (south and south-east), and the Ministry of Transportation of Ontario (MTO) (for freeways). There are also some smaller jurisdictions: Town of Milton (north-east), Wellington County (north), and Township of Puslinch (north-west).

The large number of jurisdictions involved in the study area and the history of administrative change and amalgamations in the area complicated some of the data collection and consultation required for the study. Former jurisdictions include the former Region of Hamilton-Wentworth, and six former municipalities (the Towns of Ancaster, Dundas and Flamborough, the Township of Glanbrook, and the Cities of Hamilton and Stoney Creek).

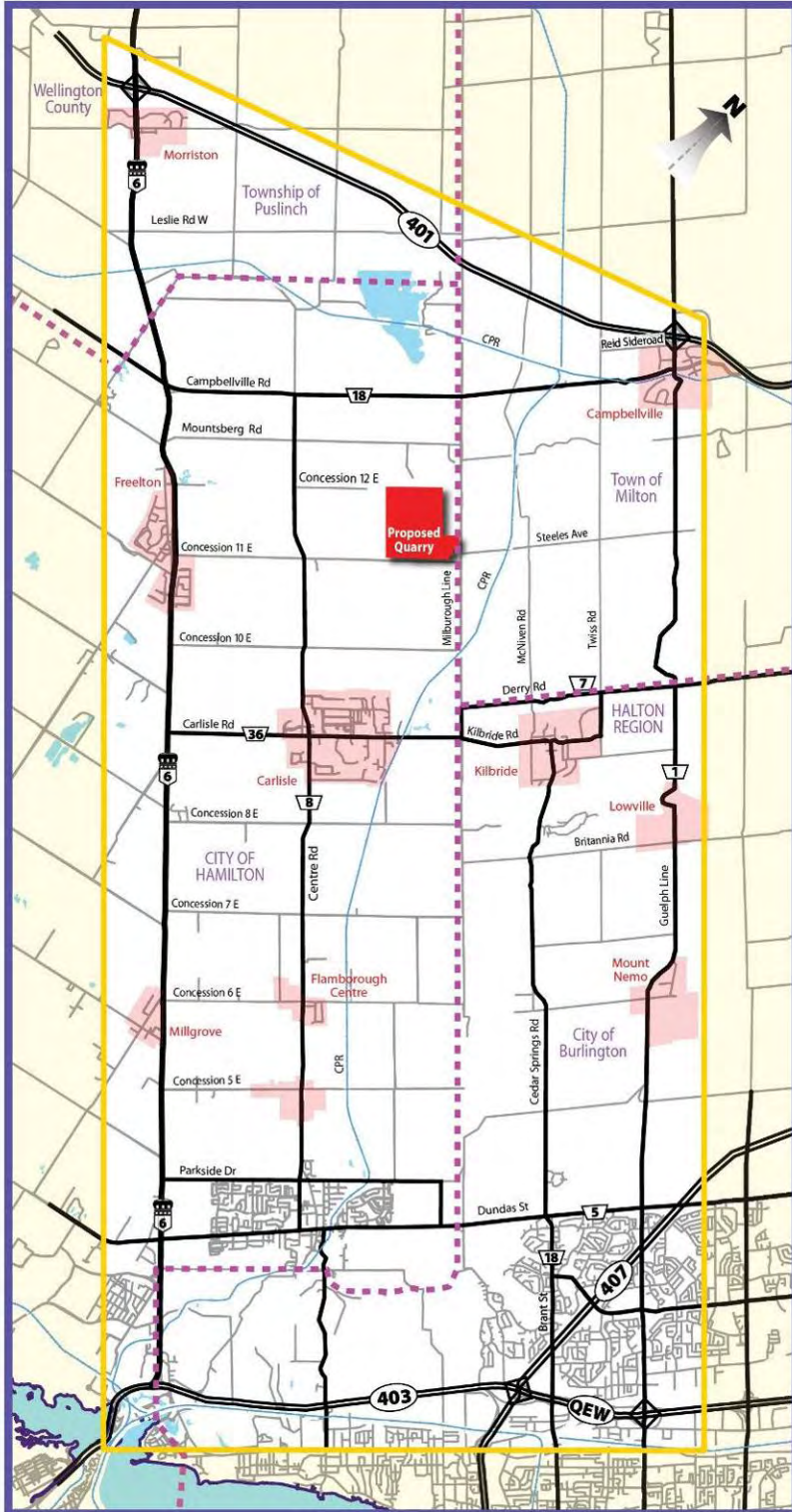


Exhibit 1-2: Study Area

2. EXISTING PROVINCIAL, REGIONAL AND MUNICIPAL POLICIES AND INITIATIVES

The Terms of Reference provided by CART require that the undertaking of the haul route assessment and comparative evaluation should include the identification of reasonable alternative routes within the study area given consideration to applicable plans and policies including municipal official plans. Therefore, the following sections briefly describe the provincial and municipal policies and associated planning documents that, where relevant, are considered in their appropriate contexts throughout the haul route study.

2.1 Provincial Policies and Initiatives

The following sections briefly introduce the following important provincial policies and initiatives:

- Provincial Policy Statement (PPS), March 2005 (**Section 2.1.1**)
- Greenbelt Plan, February 2005 (**Section 2.1.2**)
- Places to Grow Act, 2005 and Growth Plan for the Golden Horseshoe, June 2006 (**Section 2.1.3**)
- Niagara Escarpment Plan, June 2005 (**Section 2.1.4**)

2.1.1 Provincial Policy Statement (PPS)

All municipalities within the Province of Ontario are subject to the rules and regulations set out in the Provincial Planning Act. The Provincial Policy Statement (PPS) is issued under the authority of Section 3 of the *Planning Act*. The PPS came into effect in March 2005. “It applies to all applications, matters or proceedings commenced on or after March 1, 2005. In respect of the exercise of any authority that affects a planning matter, Section 3 of the *Planning Act* requires that decisions affecting planning matters “shall be consistent with” policy statements issued under the Act.”¹

The PPS also sets the policy foundation which guides development and land use within the province. The vision of the PPS states that the “long-term prosperity and social well-being of Ontarians depend on maintaining strong communities, a clean and healthy environment and a strong economy.” The Policy Statement states that transportation systems, which consist of corridors and right-of-ways and the associated transportation facilities such as cycle lanes, should be safe and energy efficient, should facilitate the movement of people and goods, and should be appropriate for addressing projected needs.

¹ Provincial Policy Statement, Ministry of Municipal Affairs and Housing, 2005

2.1.2 Greenbelt Plan

The Greenbelt Plan builds upon the policy framework set out in the PPS. The Plan was enacted in February 2005, and is an important component of the Greater Golden Horseshoe Growth Plan (**Section 2.1.3**). It provides permanent protection to the agricultural land base and the ecological features and functions occurring on the landscape. The Greenbelt Plan builds upon the ecological protection provided by the Oak Ridges Moraine Conservation Plan (ORMCP), the Niagara Escarpment Plan (NEP), the Parkway Belt West Plan, and the Rouge North Management Plan².

The study area for the proposed quarry is located within the “Protected Countryside” designation in the Greenbelt Plan. Section 4.2.1.1 of the Greenbelt Plan states “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 Resource 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:

1. It supports agriculture, recreation and tourism, rural settlement areas, resource use or the rural economic activity that exists and is permitted within the Greenbelt.
2. 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 on Ontario’s borders.”³

The proposed quarry is subject to the Aggregate Resources Act and complies with the intent of the objectives above.

2.1.3 Growth Plan for the Greater Golden Horseshoe

The City of Hamilton and the Region of Halton are located within the Greater Golden Horseshoe (GGH) which is one of the fastest growing metropolitan areas in North America. The Growth Plan for the Golden Horseshoe was adopted in June 2006 under the provisions of the Places to Grow Act, 2005. It is the first growth plan to be approved under the Planning Act. The Growth Plan is the framework for implementing the Province’s vision for developing stronger, prosperous communities by managing the growth within those communities to the year 2031. It integrates and builds upon key provincial policies and initiatives including the Greenbelt Plan and the PPS. Municipalities are required to take into consideration the policies and directives of the Growth Plan in their planning activities.

A “transportation corridor” is defined in the Growth Plan as “a thoroughfare and its associated buffer zone for passage or conveyance of vehicles or people. A transportation corridor includes any or all of the following: major roads, arterial roads, and highways for

² Greenbelt Plan, Ministry of Municipal Affairs and Housing, February 28, 2005.

³ Greenbelt Plan, Ministry of Municipal Affairs and Housing, February 28, 2005.

moving people and goods; rail lines/railways for moving people and goods; and transit right-of-way/transitways including buses and light rail for moving people.”⁴ The Growth Plan’s definition of a “transportation system” is the same as the definition in the PPS.

2.1.4 Niagara Escarpment Plan

Portions of the Flamborough Quarry Haul Route study area located within the Cities of Hamilton and Burlington are covered by the Niagara Escarpment Plan: “The Niagara Escarpment includes a variety of topographic features and land uses extending 725 kilometres from Queenston on the Niagara River to the islands off Tobermory on the Bruce Peninsula. The Niagara Escarpment Planning and Development Act established a planning process to ensure that the area would be protected. From this emerged the Niagara Escarpment Plan which serves as a framework of objectives and policies to strike a balance between development, preservation and the enjoyment of this important resource. The purpose of this Plan is to provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment.”⁵

Section 2.15 of the Niagara Escarpment Plan has the following policies related to transportation:

“The objective is to design and locate new and expanded transportation and utility facilities so the least possible change occurs in the environment and the natural and cultural landscape.

1. All new and reconstructed transportation and utility facilities shall be designed and located to minimize the impact on the Escarpment environment and be consistent with the objectives of this Plan.”⁶

The Niagara Escarpment Plan was considered, where relevant, in its appropriate context throughout the Haul Route Study.

⁴ Growth Plan for the Greater Golden Horseshoe, Ministry of Public Infrastructure Renewal, 2006.

⁵ Niagara Escarpment Plan, June 2005.

⁶ Niagara Escarpment Plan, with latest Plan Amendments (Text-only version, June 10, 2008)

2.2 Municipal Policies

Several municipal policies are relevant to the Flamborough Quarry Haul Route Transportation Study:

- City of Hamilton's Official Plan (**Section 2.2.1.1**) and Transportation Master Plan (**Section 2.2.1.2**);
- Flamborough Official Plan (**Section 2.2.2**);
- Halton Region's Official Plan (**Section 2.2.3.1**) and Transportation Master Plan (**Section 2.2.3.2**);
- Town of Milton's plan (**Section 2.2.4**);
- City of Burlington's Official Plan (**Section 2.2.5.1**) and Transportation Plan (**Section 2.2.5.2**); and
- Traffic Impact Study (TIS) guidelines of the Ontario Ministry of Transportation, the City of Hamilton, the Region of Halton, and the Town of Milton (**Section 2.2.6**).

2.2.1 City of Hamilton

2.2.1.1 Official Plan

The amalgamated City of Hamilton, which is comprised of the Towns of Ancaster, Dundas and Flamborough, the Township of Glanbrook, and the Cities of Hamilton and Stoney Creek), is in the process of developing a new Official Plan (OP). The work is being undertaken in two phases. The first phase included the development and completion of the Rural Hamilton OP. The Rural Hamilton OP was adopted by Council in September 2006. The second phase of the OP will include the development of policies and mapping for the City's Urban Area.

As shown in **Exhibit 2-1**, most of the study area falls under the City's Rural Hamilton OP.

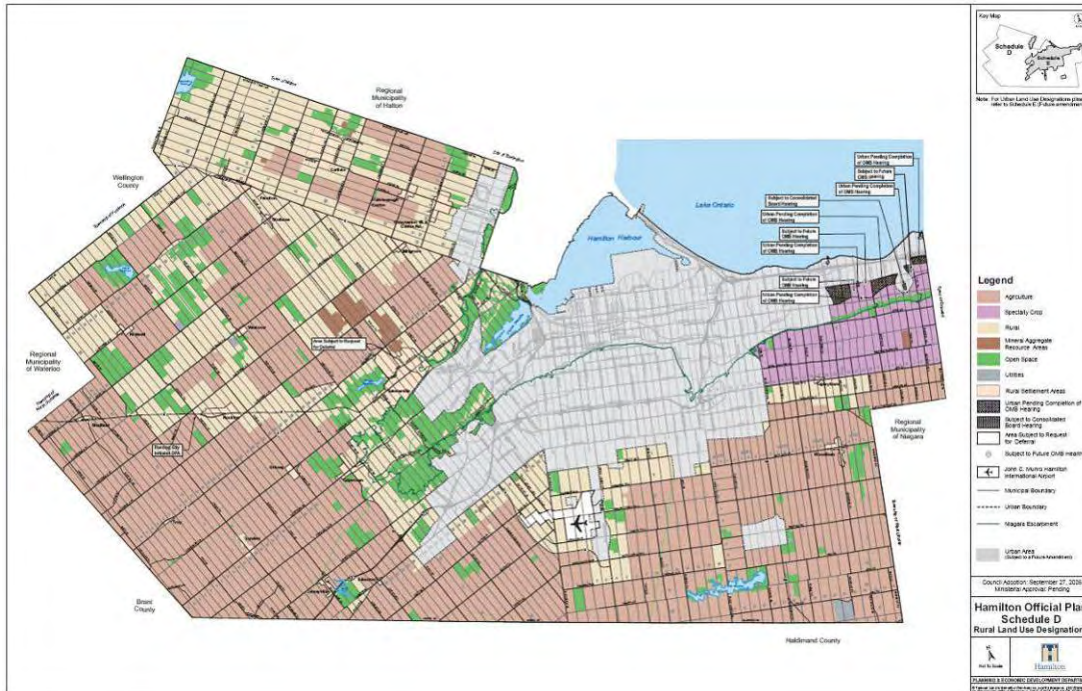


Exhibit 2-1: Hamilton Official Plan Schedule D - Rural Lane Use Designations

The role and function of the City's Official Plan is outlined in the City's Rural Official Plan, which is:

“This Plan projects a long term vision for the physical *development* of the City over the next 30 years. Its policies provide the direction for managing long term *development* to achieve social, economic and environmental objectives of the City's vision.

The Official Plan plays a large role in setting a framework of actions that will lead to the sustainable, healthy future envisioned by Vision 2020. The city and its residents aspire to have a city that has:

- Compact urban communities that provide live, work and play opportunities
- A strong rural community protected by firm urban boundaries
- Protected and enhanced environmental systems – land, air and water
- Balanced transportation networks that offer choice so people can walk, cycle, take the bus or drive and recognize the importance of goods movement to our local economy; and strategic and wise use of its infrastructure services and existing built environment

The Rural Hamilton OP provides a consistent policy framework for the rural areas of the City, replacing the rural policies and maps found in the OPs of the former municipalities. The new Rural Hamilton OP builds on provincial initiatives and concepts such as the building of strong communities set out in the PPS (**Section 2.1.1**), Greenbelt Plan (**Section 2.1.2**) and Places to Grow Act (**Section 2.1.3**). (Note: at the time of writing this report, the Rural Official Plan had not yet received final approval from the Provincial Ministry of Municipal Affairs and Housing.)

Hamilton's Rural OP is one of the key implementation mechanisms for the City's Growth Related Integrated Development Strategy (GRIDS) and other corporate initiatives, one of which is the Transportation Master Plan. The Rural OP's current transportation policies relate only to air transportation. All other transportation policies are to be included in future Amendments to the OP.

As the new Rural Hamilton OP does not include road transportation policies, and as the new Urban Area OP is under development, the study team reviewed all existing OPs for the City of Hamilton. Seven official plans are currently in effect: the Regional Level OP (for the former Region of Hamilton-Wentworth), and one OP for each of the six former municipalities.

The Region of Hamilton-Wentworth OP (HWOP) was published in June 2005. The plan's policies are based on the creation of a "Sustainable Region." The purpose of the HWOP is to direct and guide regional, municipal, and private sector decisions and actions to meet the growth of the Region to the year 2020. The plan notes that for Regional responsibilities and functions to be met, the Region needs an integrated Regional transportation system which stresses easy pedestrian, transit, bicycle and vehicular access to basic needs.

2.2.1.2 Transportation Master Plan

In May 2007, the City of Hamilton completed a city-wide study that resulted in a Transportation Master Plan (TMP). The purpose of this study was to develop policies and strategies for the City's transportation network over the next 30 years. The TMP describes the existing road network and outlines the City's cycling, pedestrian and road network strategies. Existing and future road, cycling, and pedestrian networks are discussed in **Section 12.3**.

The TMP will be used during the City's review of their Development Charges By-Law and their OP. The City will also use the TMP for capital budgeting and for the long-range strategic planning study (GRIDS).

2.2.2 Flamborough Official Plan

The study area is subject to the policies of both the HWOP and the Flamborough OP. The Flamborough OP designates the study area as “Rural.” The Flamborough Zoning By-law No. 90-145-Z zones the study area as both “A” Agricultural Zone and “CM” Conservation Management Zone.

As directed by the HWOP, the Flamborough OP provides additional specific guidance regarding policy issues such as the environment, the economy, transportation, and heritage conservation. Sections B.7.4 and B.7.5 of the Flamborough OP include very detailed and specific policies for the establishment of new pits and quarries, and for the expansion of existing pits and quarries.

With respect to transportation, Section B.7.4 of the Flamborough OP states that “When considering amendments to the Plan for the establishment of new pits and quarries or the expansion of existing operations, the following matters will be evaluated by Council: (iv) potential impacts on the transportation system.” Section B.7.5 states that “All applications for amendments to the Plan shall include the following: (vii) all entrances, exits and proposed routes to be used by associated transport.”

2.2.3 Region of Halton

2.2.3.1 Official Plan

Halton's Regional Official Plan addresses goals and objectives and fosters policies related to a wide range of topics including, but not limited to:

- The delineation of urban areas to the protection of farmlands.
- The designation of environmentally sensitive area and promotion of land stewardship.
- The promotion of the local economy development.
- Urban services such as water supply and wastewater treatment, transportation, energy and utilities.
- Human services and heritage resources.

The Plan also lays out a strategy for implementing and achieving these goals and objectives, including on-going monitoring of the effectiveness of plan policies.⁷

The Region of Halton’s 2006 OP states that in terms of transportation, the “Region's primary role is to provide broad policy directions on strategic matters such as management of land and natural resources, growth strategies, housing, economic development, water and wastewater services, solid waste management, transportation, and health and social services. Recognizing the above, the Local Municipalities are to deal with their local environments to best express their own individualities. The structuring of communities and neighbourhoods and the internal configuration of each of the Local Municipalities, for instance, are the

⁷ Halton Region Website, <http://www.halton.ca/ppw/Planning/OP/#Q2>

responsibilities of the Municipalities as long as the overall planning vision for Halton and policies of this Plan are adhered to.”⁸

2.2.3.2 Transportation Master Plan

The Region of Halton Regional Transportation Master Plan Study (HTMP) was completed in June 2004. The purpose of the TMP was to develop an integrated transportation strategy which considers all modes of transportation by the year 2021. The HTMP states that “the study provides the Region with the strategies, policies and tools needed to manage traffic safety, effectively, and cost efficiently, and to offer a range of transportation choices to meet the needs of Halton residents in conformity with the Official Plan and the Region’s Strategic Plan.” The HTMP provides guidelines, plans and strategies such as the Cycling and Pedestrian Infrastructure Plan.

“Subsequent to the completion of the HTMP (2004), the provincial government introduced “Places to Grow” impacting population and employment forecasts for the Region to 2031. Population and employment estimates are the foundation of transportation planning.”

In addition to “Places to grow”, there was a significant change in unit prices that occurred in the 2006 construction season as well as changes to the Roads Capital program as a result of development, Class Environmental Assessment studies, and detailed design. These collective changes have resulted in a need to update the Halton Transportation Master Plan Roads Capital program which would support the process to update Halton’s Development Chargers.”⁹ The Halton Transportation Master Plan update was completed in 2007.

2.2.4 Town of Milton

The Town of Milton’s Official Plan contains the policies and designations that are intended to guide development in the Town for a 20-year period. The Official Plan sets out the land use arrangement, over the entire municipality, at a broad policy level. It also expresses the goals and objectives of Milton's Town Council.¹⁰

⁸ Halton Official Plan, Part 2 Basic Position, Halton and the Local Municipalities, Section 43, No. 44, August 2006.

⁹ Report to Chair and Members of the Planning and Public Works Committee, Commissioner of Planning and Public Works, March 5, 2008, Report No. Re: PPW36-08 – Halton Region Transportation Master Plan Update (2007)

¹⁰ Town of Milton, www.milton.ca/townhall/depts/planning/policy/officialplan.htm

The Plan has the following specific purposes:

- a. To identify the context within which the Plan is being prepared
- b. To identify within the context of an underlying theme, goals and strategic approaches which can be achieved through the policies of the Plan
- c. To establish policies related to the maintenance and enhancement of the existing community structure, and the protection of its unique features, as well as the management of future change
- d. To establish policies to ensure that the level of services provided is consistent with the financial capabilities and resources of the municipality
- e. To establish, in general terms, a pattern of physical development for the Town (including land use, environmental protection areas, population density, community structure and servicing infrastructure)
- f. To guide Town Council, municipal and regional administrators, the Regional Land Division Committee and the Committee of Adjustment when administering matters such as the Zoning By-law, site plan control, development control, applications for building permits, plans of subdivision and consents
- g. To inform other levels of government of the municipal policies to provide a context for the co-ordination of their future plans and requirements with those of the Town; and,
- h. to inform the public, land owners and business owners of the municipal policies to provide a context for the determination of their future plans and requirements¹¹

The Town of Milton's transportation planning objective, as outlined in the 2001 OP, is "to promote a diverse transportation system for the entire Town and to encourage urban development which in its designs supports density and mix use, public transit, rail and interregional travel, pedestrian and bicycle transportation, in conjunction with the efficient accommodation of private automobiles and trucks." Numerous policies presented in the OP relate to transportation including transportation systems, the classification, function and design requirements of transportation facilities, and trucking.

2.2.5 City of Burlington

2.2.5.1 Official Plan

The City of Burlington OP was adopted by City Council in 1994, and was approved by the Region in 1997. Official Plan Amendment 55 was approved by the Region of Halton on January 4, 2008 and has been appealed to the Ontario Municipal Board. This amendment contains significant revisions to the text and mapping of the Official Plan and is being considered in the processing of development applications.¹²

¹¹ Town of Milton Official Plan,

¹² City of Burlington, cms.burlington.ca/Official_Plan.htm

The purpose of the Plan is to outline a long-term vision of the community and quality of life for Burlington residents through statements of principles, objectives and policies. The Plan provides policy direction to the public and private sectors on land use, development and resource management matters to guide the future planning and development of the City of Burlington towards the desired community vision.¹³

From a transportation planning perspective, the main intent of the Plan is to provide an integrated, diverse transportation system for all residents and businesses that is safe, convenient, affordable, efficient and energy-conserving while minimizing environmental impacts. The primary role of the system is to provide for the movement of people and goods safely and efficiently within the City and to adjoining areas. The transportation system is the link between land uses in the City and, as such, is an essential part of Burlington's future urban and rural structure. While the car is currently, and will continue to be in the future, the main means of transportation in the City. Its use will be balanced by other forms of transportation, particularly in the Urban Planning Area.¹⁴

2.2.5.2 Transportation Plan 2006

The City of Burlington's Transportation Plan 2006 built on the City's OP. The Transportation Plan's vision for the City of Burlington is "To provide an integrated, diverse transportation system for all residents and businesses that is safe, convenient, affordable, efficient and energy-conserving while minimizing environmental impacts. The primary role of the system is to provide for the movement of people and goods safely and efficiently within the city and to adjoining areas. The transportation system is the link between land uses in the city and, as such, is an essential part of Burlington's future urban and rural structure. Emphasis will be placed on providing infrastructure to support alternative modes of transportation including transit, cycling and walking."¹⁵

The Plan has the following main sections: Transportation Vision, Transportation Studies, Future Transportation Network, Transit, Cycling and Pedestrian Networks, Traffic Operations, and Parking.

The 2006 Transportation Plan provides a "snapshot" of the City's transportation system. The report also documents the City's Transportation Infrastructure Investment Plan to 2021. The project categories are resurfacing, reconstruction, road widening/new alignments, bicycle lanes/bicycle paths/sidewalks, traffic management/intersection improvements/transit priority, freeway interchanges, and grade separation. The Plan also presents the 2006 – 2015 Capital Budgets for the City.

¹³ City of Burlington, cms.burlington.ca/Official_Plan/Part_I/part_i_5context_of_plan.htm

¹⁴ City of Burlington, cms.burlington.ca/Official_Plan/Part_II/part_ii_3transportation.htm

¹⁵ City of Burlington Transportation Plan 2006, Draft, City of Burlington Engineering Department – Transportation Planning Section, September 2006

2.2.6 Traffic Impact Study (TIS) Guidelines

We have obtained the TIS guidelines from each of the agencies responsible for the roadways along road segments under consideration as alternative haul routes. The agencies are the Ministry of Transportation (Ontario) (MTO), the City of Hamilton, the Region of Halton, and the Town of Milton.

Our review found that Halton's TIS guidelines were the most comprehensive. The guidelines encompassed the TIS requirements of Milton and MTO. As the City of Hamilton does not have any formal guidelines, we recommended to CART that this study should follow Halton's TIS guidelines.

The City of Hamilton approved the use of Halton's TIS guidelines with the following exception. Any signal proposed within the City of Hamilton will have to meet the City's signal warrant requirements. The City of Hamilton also requested that the traffic analysis would be undertaken using Synchro v7 instead of Synchro v6 as in Halton Region's TIS guidelines. To resolve this issue, discussions were held with CART who decided that Synchro 6 would be used for this study.

It should also be noted that the Town of Milton has specific saturation flow rates for specific movements. Following discussions with Town of Milton staff, we have applied a saturation flow rate of 1,900 for shared movements at Milton intersections, as per Halton's guidelines. We have, however, used the Town of Milton's saturation flow rates for all exclusive movements at Milton intersections.

3. STUDY AREA

The study area (as recommended in the City of Hamilton's Terms of Reference) is generally bounded by Highway 401 to the north, Guelph Line on the east, Highway 403 to the south and Highway 6 to the west. It is illustrated in **Exhibit 1-2**. The following sections describe the characteristics of the transportation network in the study area in further detail.

3.1 Existing Road and Rail Network

The existing road and rail network, road jurisdiction, and road classification within the study area are illustrated in **Exhibit 3-1**, **Exhibit 3-2**, and **Exhibit 3-3**, respectively and briefly described below.

Highway 401

Highway 401 is an east-west Provincial Freeway under the jurisdiction of the Ministry of Transportation of Ontario (MTO). With three lanes in the eastbound and westbound directions, Highway 401 has a Parclo A-2 interchange at Highway 6, permitting a full range of movements.

The reconstruction of the Highway 401 and Guelph Line interchange has been recently completed. The eastbound off-ramp is now located at Reid Sideroad. The intersection of Guelph Line and Reid Sideroad is to be signalized. It should be noted that the underground wires for the signals have been installed but as of March 2008 the signals are not in operation.

The Highway 401 eastbound and westbound ramps at Highway 6 are signalized and the Highway 401 ramps at Guelph Line and Reid Sideroad are unsignalized.

Highway 6

Highway 6 is a north-south Provincial Highway under the jurisdiction of MTO. The cross section of Highway 6 varies from two to five lanes along the corridor from Highway 401 to Highway 403. The speed limit along Highway 6 also varies from 50 km/hr to 80 km/hr within the study area. The cross sections and speed limits along Highway 6 within the study area are illustrated in **Exhibit 3-1**.

Within the study area, Highway 6 is signalized at the Highway 401 ramps, Badenoch Street / Calfass Road, Carlisle Road, Concession 6E, Parkside Drive, Dundas Street, and Northcliffe Avenue / Plains Road West. The remaining intersections along Highway 6 are stop controlled on the intersecting roadways.

Centre Road

Centre Road is a north-south minor arterial road under the jurisdiction of the City of Hamilton. Centre Road consists of a two-lane rural cross section. Within the study area, the speed limit varies from 50 km/hr to 80 km/hr, as illustrated in **Exhibit 3-1**.

Centre Road is signalized at Dundas Street, Parkside Drive and Concession 5 E. The intersection of Centre Road and Carlisle Road is a four-way stop controlled intersection. The intersection of Centre Road and Campbellville Road is an unsignalized intersection with the stop control on Centre Road. All remaining intersections with Centre Street are unsignalized with the intersecting roadways being stop controlled.

Centre Road is a cautionary un-signed bike route from Concession 8 E to Carlisle Road and from Progreston Road to Concession 14 E. Cyclists may use the paved shoulder on Centre Road approximately from Parkside Drive to Concession 7 E and from Concession 8 E to Progreston Road.

Milborough Line

Milborough Line is a north-south boundary road between the City of Hamilton and the Town of Milton. Milborough Line between Steeles Avenue and Campbellville Road is under the jurisdiction of the Town of Milton.

The section of Milborough Road between Derry Road and Carlisle Road/Kilbride Road is under the jurisdiction of the Region of Halton. The sections of Milborough Line north of Campbellville Road and between Steeles Avenue and Derry Road are under the jurisdiction of the City of Hamilton. Milborough Line south of Carlisle Road/Kilbride Road is under the jurisdiction of the City of Burlington.

Milborough Line between Concession 7 E and Concession 8 E and north of Carlisle Road/Kilbride Road is a cautionary un-signed bike route.

Milborough Line is classified as a two-lane rural collector roadway, within the majority of the study area. The portion of Milborough Line between Derry Road and Carlisle Road/Kilbride Road is classified as a major arterial. South of Carlisle Road/Kilbride Road, Milborough Line is classified as a local road.

Milborough Line is stop controlled at its intersections with Campbellville Road and Carlisle Road/Kilbride Road. The intersections of Milborough Line and Steeles Avenue/Concession 11 E, Mountsberg Road, Concession 10 E, 3rd Sideroad and Derry Road are unsignalized intersections with the stop control on the intersecting roadway.

Within the study area, there are two railway crossings on Milborough Line. The Canadian Pacific (CP) Galt Subdivision railway crossing is located to the north of the Milborough Line and Campbellville Road intersection. The CP Hamilton Subdivision railway crossing is located just south of the intersection of Milborough Line and Concession 10 E. These railway crossings are controlled by lights only.

Milborough Line has a posted speed limit of 80 km/hr north of Campbellville Road. South of Campbellville Road, Milborough Line has a posted speed limit of 60 km/hr.

- Nassagaweya 1st Line Nassagaweya 1st Line is a two-lane north-south rural collector road under the jurisdiction of Town of Milton. Nassagaweya 1st Line has a posted speed limit of 60 km/hr with the exception of a small section north of Steeles Avenue which has a posted speed limit of 50 km/hr. Nassagaweya 1st Line is stop controlled at its intersection with Campbellville Road, 3rd Sideroad and Steeles Avenue. Nassagaweya 1st Line within the study area is an on-road suggested bike route, with an extra caution advisory due to the horizontal and vertical alignment or high traffic volumes between Steeles Avenue and 3rd Sideroad.
- McNiven Road McNiven Road is a two-lane north-south rural collector road under the jurisdiction of the Town of Milton with a posted speed limit of 60 km/hr. It is stop controlled at its intersections with Steeles Avenue and Derry Road. McNiven Road within the study area is an on-road suggested bike route.
- Twiss Road Twiss Road between Derry Road and Reid Sideroad is a two-lane north-south rural collector road under the jurisdiction of Town of Milton. It should be noted that this section of Twiss Road is also classified as a local road based on our discussions with municipal staff. This section of Twiss Road has a speed limit of 60 km/hr.
- South of Derry Road, Twiss Road is two-lane roadway under the jurisdiction of the City of Burlington and is classified as a minor arterial. The posted speed limit along this section of

Twiss Road varies from 60 km/hr to 70 km/hr. Twiss Road is an on-road suggested bike route south of Derry Road.

Twiss Road is stop controlled at its intersections with Steeles Avenue and Campbellville Road. The intersection of Twiss Road and Reid Sideroad is an unsignalized intersection with stop control on Reid Sideroad. The intersection of Twiss Road and Derry Road is a four-way stop controlled intersection.

The CP Galt Subdivision railway intersects Twiss Road just north of the Twiss Road and Campbellville Road intersection. This railway crossing is light and gate controlled.

Crawford Crescent

Crawford Crescent is a north-south local road under the jurisdiction of Town of Milton. Crawford Crescent has a two-lane rural cross-section at Reid Sideroad. The intersection of Reid Sideroad and Crawford Crescent is an unsignalized T-intersection with stop control on Crawford Crescent.

Guelph Line

Guelph Line is a north-south major arterial road under the jurisdiction of Halton Region. Guelph Line has a two-lane urban cross-section from Reid Sideroad to south of 2nd Sideroad, where it widens to a three-lane cross section to Dundas Street. South of Dundas Street, the cross section of Guelph Line varies from four to seven lanes. The posted speed limit of Guelph Line varies from 50 km/hr to 80 km/hr within the study area, as illustrated in **Exhibit 3-1**.

Guelph Line is signalized at its intersections with Campbellville Road, Derry Road and Dundas Street. There are also numerous signalized intersections along Guelph Line south of Dundas Street. The Reid Sideroad and Guelph Line intersection is to be signalized. The underground wires for the signals are currently installed at this location but as of March 2008 are not in operation.

The intersections of Guelph Line and the Highway 401 westbound ramp, 3rd Sideroad, Steeles Avenue, Britannia Road, Colling Road, 2nd Sideroad and 1st Sideroad are unsignalized with stop control on the east-west roadways.

CP Galt Subdivision railway crosses Guelph Line south of Campbellville Road. This railway crossing is both light and gate controlled.

Cedar Springs Road	Cedar Springs Road is a north-south minor arterial under the jurisdiction of the City of Burlington. The speed limit varies from 40 km/hr to 70 km/hr from Kilbride Street to Dundas Street. Cedar Springs Road between Dundas Street and Kilbride Road is an on-road suggested bike route, with an extra caution advisory due to the horizontal and vertical alignment or high traffic volumes north of Britannia Road.
Brant Street	Brant Street is a major arterial under the jurisdiction of Halton Region. There are numerous signalized intersections along Brant Street south of Dundas Street. The posted speed limit is 60 km/hr. Adjacent to Brant Street from the North Service Road to Upper Middle Road is a multi-use trail that is physically separated from the traveled portion of the roadway.
Waterdown Road	Waterdown Road is a north-south minor arterial road under the jurisdiction of both the City of Hamilton and the City of Burlington. The posted speed limit varies from 40 km/hr to 50 km/hr.
Badenoch Street / Calfass Road	Badenoch Street / Calfass Road is an east-west collector road under the jurisdiction of Wellington County. It has a two-lane cross-section with a posted speed limit of 50 km/hr. It is signalized at its intersection with Highway 6.
Reid Sideroad	Reid Sideroad is a two-lane rural collector under the jurisdiction of the Town of Milton. The posted speed limit is 60 km/hr from Guelph Line to just west of Crawford Road, after which the speed limit increases to 80 km/hr. Reid Sideroad is stop controlled at its intersection with Twiss Road. As of March 2008, Reid Sideroad is stop controlled at its intersection with Guelph Line.
Leslie Road West	Leslie Road West is a east-west local road under the jurisdiction of the Township of Puslinch. It has a posted speed limit of 80 km/hr and is stop controlled at its intersection with Highway 6.
Campbellville Road	Campbellville Drive is an east-west two-lane rural minor arterial road under the jurisdiction of City of Hamilton from Highway 6 to Milborough Line. It is under the jurisdiction of theTown of Milton from Milborough Line to Guelph Line. The posted speed limit along Campbellville Road is 80 km/hr from Highway 6 to just west of Centre Road where the speed limit reduces to 70 km/hr. The posted speed of 70 km/h

continues until Milborough Line where the speed limit reduces further to 60 km/hr to Twiss Road. The posted speed limit on Campbellville Road is 50 km/hr from Twiss Road to Guelph Line.

The intersections of Campbellville Road and Centre Road, Milborough Line, Nassagaweya 1st Line and Twiss Road are unsignalized with the stop control on the intersecting north-south road.

There are two railway crossings on Campbellville Road. The CP Hamilton Subdivision railway crossing is located east of Nassagaweya 1st Line, which is controlled by lights only. The CP Galt Subdivision railway crossing is located east of Twiss Road, which is both light and gate controlled.

Campbellville Road is an on-road suggested bike route from Milborough Line to east of Guelph Line.

Mountsberg Road	Mountsberg Road is an east-west local road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section with a posted speed limit of 60 km/h. It is stop controlled at its intersections with Highway 6, Centre Road and Milborough Line. Between Centre Road and Milborough Line, Mountsberg Road is a cautionary un-signed cycling route.
Concession 12 E	Concession 12 E is an east-west local road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section with a posted speed limit of 60 km/h. It is stop controlled at its intersection with Centre Road.
Steeles Avenue	Steeles Avenue is an east-west rural collector under the jurisdiction of Town of Milton. It has a two-lane rural cross-section with a posted speed limit of 60 km/h. The CP Hamilton Subdivision railway crossing on Steeles Avenue between Milborough Line and McNiven Road, is controlled by lights only.
Concession 11 E	Concession 11 E is an east-west rural collector road under the jurisdiction of City of Hamilton. It has a two-lane rural cross-section. It has posted speed limits of 50 km/h and 60 km/hr from Highway 6 to approaching Centre Road. The posted speed limit of 60 km/hr continues through the Concession 11 E and Centre Road intersection and reduces to 50 km/hr prior to its intersection with Milborough Line. Concession 11 E is stop

controlled at its intersections with Highway 6, Centre Road and Milborough Line. Concession 11 E is a cautionary un-signed bike route between Highway 6 and Centre Road.

- Concession 10 E Concession 10 E is a two-lane east-west rural collector under the jurisdiction of the City of Hamilton. The speed limit varies from 40 km/hr to 70 km/hr from Highway 6 to Milborough Line. Concession 10 E is stop controlled at its intersections with Highway 6, Centre Road, and Milborough Line. The CP Hamilton Subdivision railway crossing is located just south of the Milborough Line and Concession 10 E intersection. This railway crossing is controlled by lights only.
- Carlisle Road Carlisle Road is an east-west minor arterial road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section. The speed limit along Carlisle Road varies from 60 km/hr to 70 km/hr. The CP Hamilton Subdivision railway crossing on Carlisle Road is located to the west of Milborough Line. This railway crossing is controlled by lights only. Carlisle Road is signalized at its intersection with Highway 6. The Carlisle Road/Centre Road intersection is a four-way stop controlled intersection. Carlisle Road is a cautionary un-signed bike route between Highway 6 and Milborough Line.
- Kilbride Road Kilbride Road is a two-lane east-west rural collector under the jurisdiction of the City of Burlington. The posted speed limit varies from 60 to 70 km/hr between Milborough Line and Twiss Road. Kilbride Road is an on-road suggested bike route between Milborough Line and Twiss Road.
- Derry Road Derry Road is a two-lane east-west major arterial under the jurisdiction of Halton Region. It has a posted speed limit of 60 km/hr from Milborough Line to Twiss Road and a posted speed limit of 80 km/hr from Twiss Road to Guelph Line. Derry Road is stop controlled at its intersections with Milborough Line and Twiss Road. It is signalized at its intersection with Guelph Line. Derry Road is an on-road suggested bike route between Guelph Line and Twiss Road.
- Concession 8 E Concession 8 E is a two-lane east-west rural collector under the jurisdiction of the City of Hamilton. It has a posted speed limit of 50 km/hr just east of Highway 6. The posted speed limit increases to 60 km/hr to Milborough Line. Concession 8 E is stop control at its intersections with Highway 6 and Centre Road. The CP Hamilton Subdivision railway crossing on

- Concession 8 E is located between Centre Road and Milborough Line. This railway crossing is controlled by lights only. Concession 8 E is a cautionary un-signed bike route between Green Spring Road and Milborough Line.
- Concession 7 E Concession 7 E is a two-lane east-west rural collector under the jurisdiction of the City of Hamilton. Concession 7 E has a posted speed limit of 60 km/hr just east of Highway 6 and a posted speed limit of 70 km/hr to Milborough Line. Concession 7 E is stop controlled at its intersections with Highway 6 and Centre Road. The CP Hamilton Subdivision railway crossing on Concession 7 E is located between Centre Road and Milborough Line. This railway crossing is controlled by lights only. Concession 7 E is a cautionary un-signed bike route just west of Milborough Line.
- Britannia Road Britannia Road is a two-lane east-west collector road under the jurisdiction of the City of Burlington. The posted speed limit varies from 40 km/hr to 60 km/hr between Milborough Line and Guelph Line. Britannia Road is an on-road suggested bike route between Cedar Springs Road and Milborough Line.
- Concession 6 E Concession 6 E is a two-lane east-west collector road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section. The posted speed limit varies from 50 km/hr to 80 km/hr between Highway 6 and Milborough Line. Concession 6 E is signalized at its intersection with Highway 6. It is stop controlled at its intersection with Centre Road. The CP Hamilton Subdivision railway crossing on Concession 6 E is located between Centre Road and Milborough Line. This railway crossing is controlled by lights only. Concession 6 E is a cautionary un-signed bike route from Highway 6 to just west of Milborough Line.
- Concession 5 E Concession 5 E is a two-lane east-west collector road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section. It has a posted speed limit of 60 km/hr. It is stop controlled at its intersection with Highway 6 and is signalized at its intersection with Centre Road. The CP Hamilton Subdivision railway crossing on Concession 5 E is located between Centre Road and Milborough Line. This railway crossing is controlled by lights only.

- Parkside Drive** Parkside Drive is an east-west minor arterial road under the jurisdiction of the City of Hamilton. It has a two-lane rural cross-section. The posted speed limit varies from 60 km/hr to 70 km/hr. Parkside Drive is signalized at its intersections with Highway 6 and Centre Road. The CP Hamilton Subdivision railway crossing on Parkside Drive is located between Centre Road and Robson Road. This railway crossing is both light and gate controlled. Parkside Drive is a cautionary un-signed bike route from Highway 6 to Robson Road.
- Dundas Street** Dundas Street is an east-west major arterial road which is under the jurisdiction of both the City of Hamilton and Halton Region.
- It has a two-lane cross section and a posted speed limit of 60 km/hr between Highway 6 and Centre Road. The posted speed limit reduces to 50 km/hr and the cross section increases to three-lanes from Centre Road to Burke Street. The cross section increases to five lanes and the posted speed limit increases to 60 km/hr from Burke Street to Kern's Road. The posted speed limit increases to 80 km/hr and the cross section reduced to four and half lanes between Kern's Road and Cedar Springs Road. Between Cedar Springs Road and Guelph Line, the cross section varies from five to four lanes while the posted speed limit changes from 80 km/hr to 60 km/hr. The cross sections and speed limits along Dundas Street within the study area are illustrated in **Exhibit 3-1**.
- Dundas Street is signalized at its intersections with Highway 6, Development Access to the east of Highway 6, Hollybush Drive/ Howlandmills Drive, Riley Road, Hamilton Street, Main Street, Mill Street, Evans Road, Cedar Springs Road / Brandt Street, and Guelph Line.
- Northcliffe Avenue / Plains Road West** Northcliffe Avenue / Plains Road West are east-west roads under the jurisdiction of the City of Hamilton. They consist of two-lane rural cross-sections. Northcliffe Avenue, which is located to the west of Highway 6, is classified as a local road. Plains Road West is located to the east of Highway 6 and is classified as a collector road.

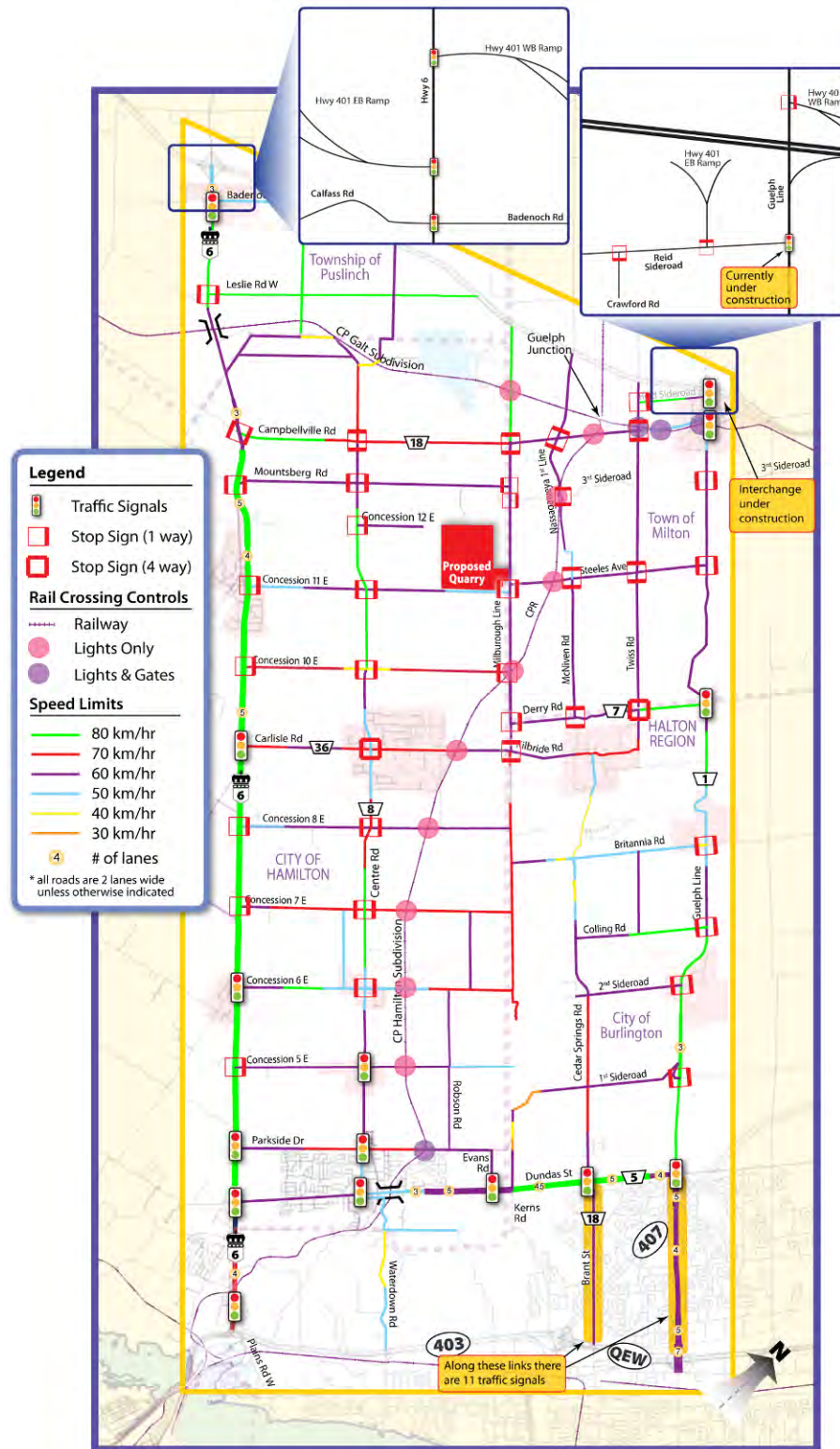


Exhibit 3-1: Existing Road and Rail Network

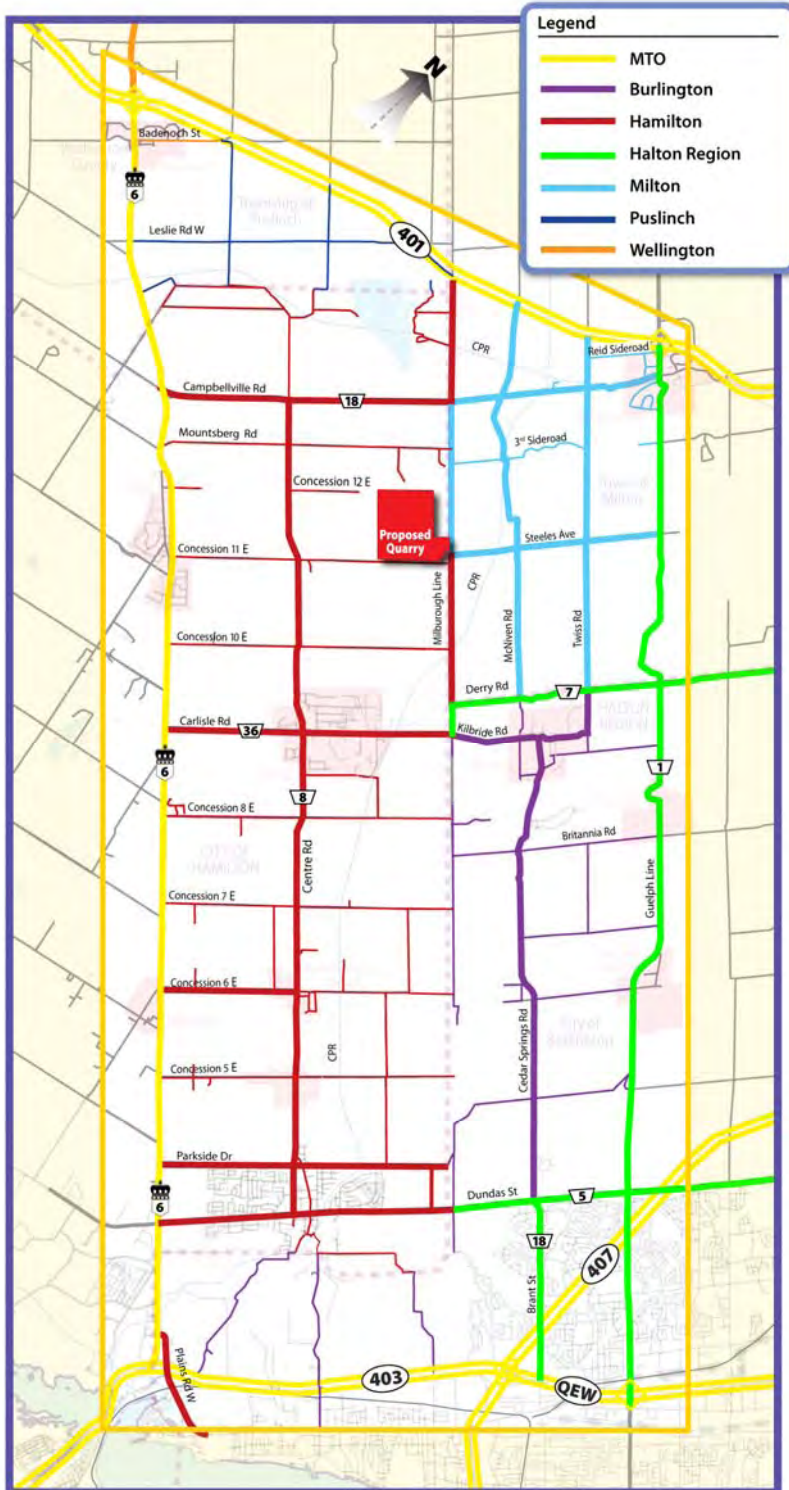


Exhibit 3-2: Road Jurisdictions

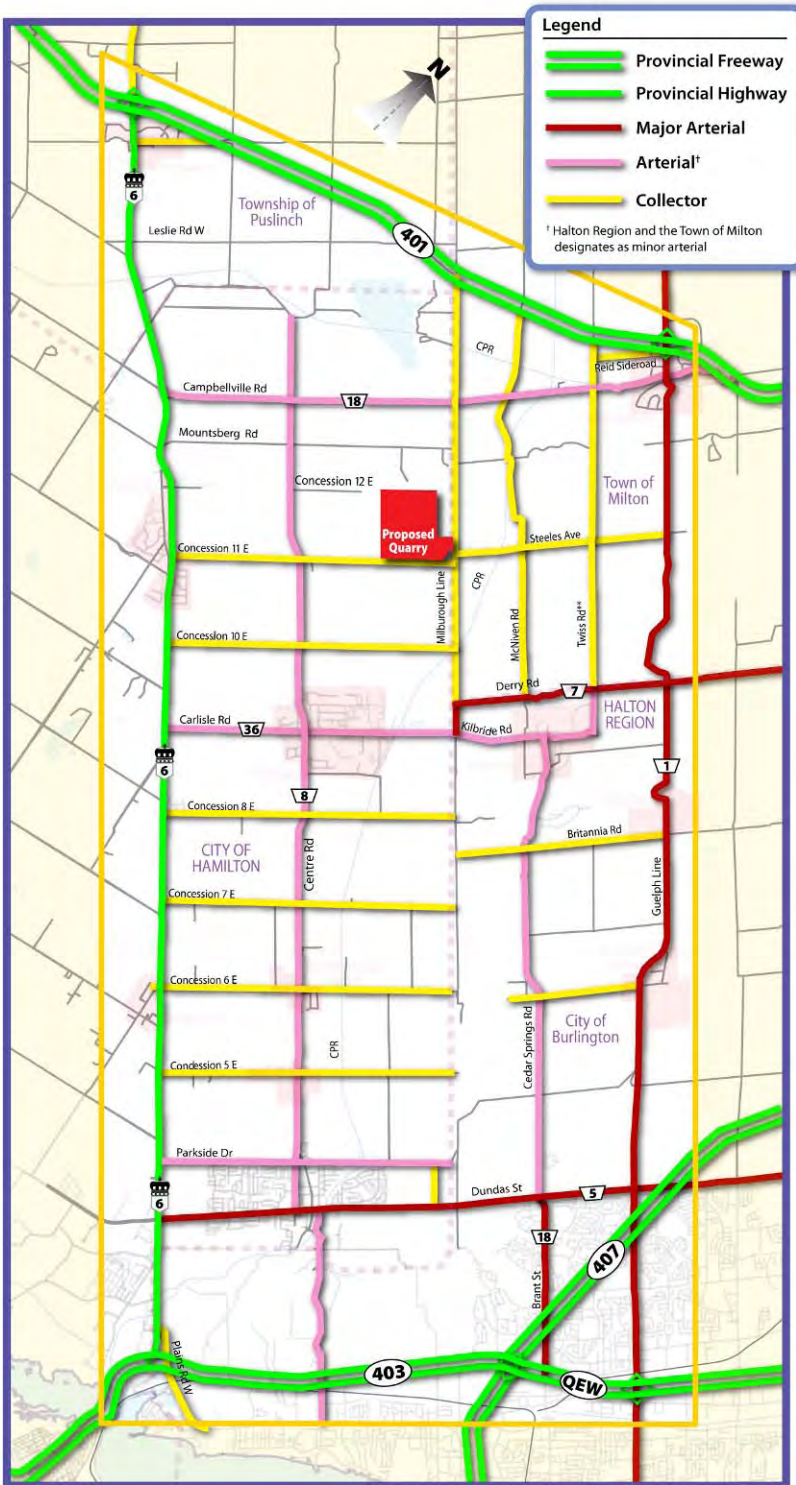
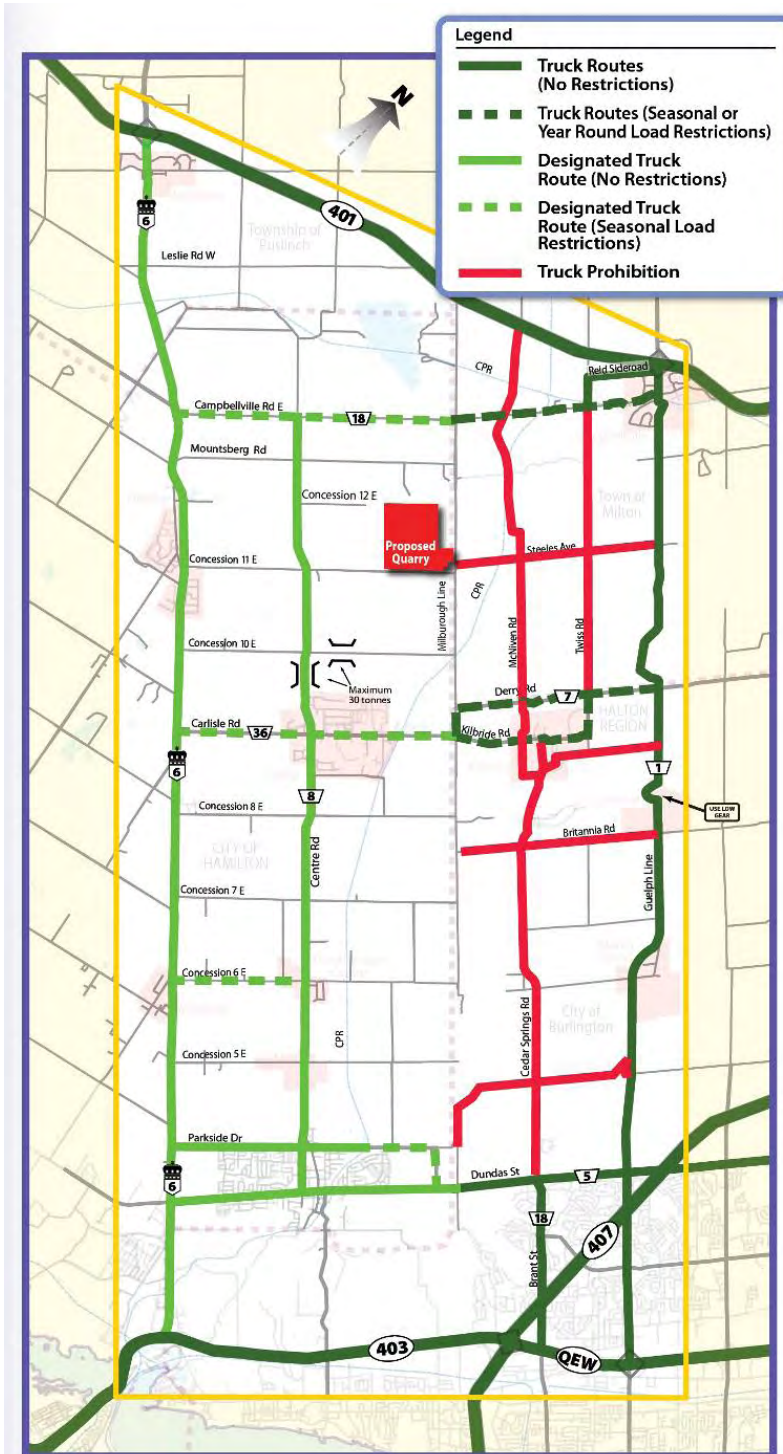


Exhibit 3-3: Road Classifications

3.2 Designated Truck Routes and Restrictions



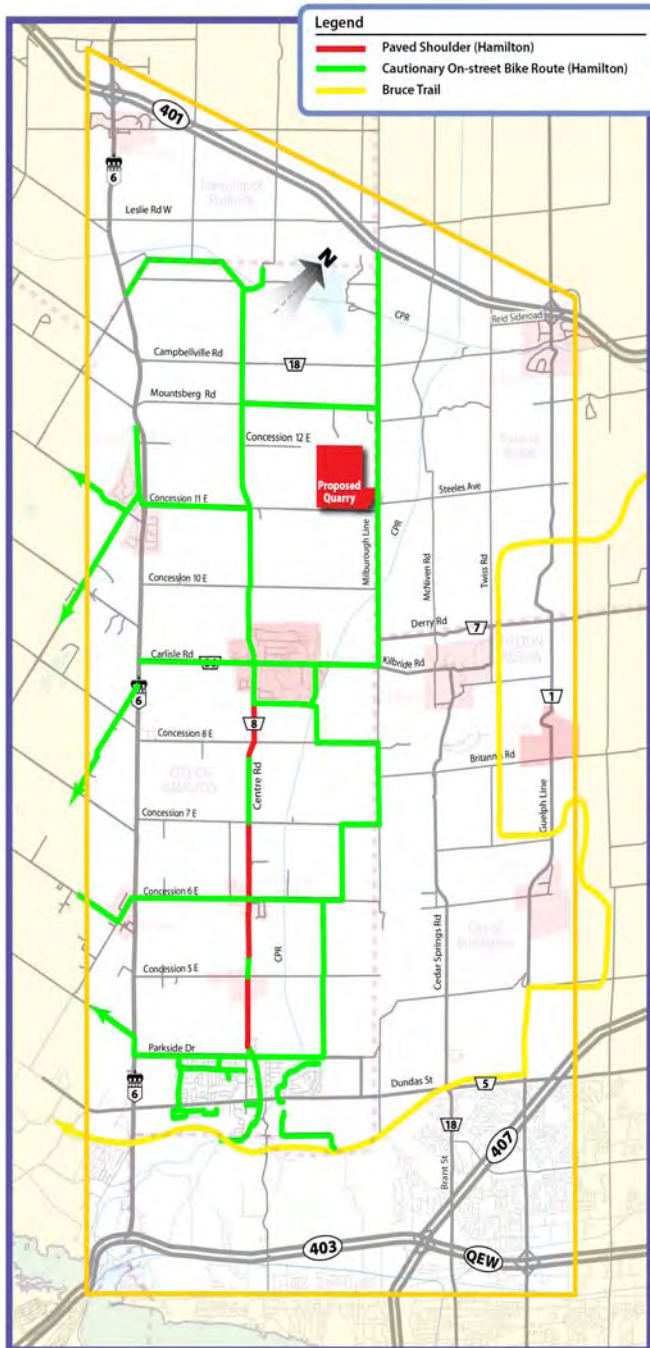
The designated truck routes and load restrictions within the study area are illustrated in **Exhibit 3-4**. This exhibit is based on information obtained from municipal staff and the Burlington Rural Truck Route Map. Trucks are restricted at most of the minor arterial roads and collector roads in the Town of Milton.

This exhibit represents the information available prior to the recent Milton Truck Restriction By-law.

Exhibit 3-4: Designated Truck Routes and Load Restrictions

3.3 Existing Cycling and Multi-use Trail Networks

3.3.1 City of Hamilton



The City of Hamilton's Existing Cycling Network within the study area consists of on-street cautionary un-signed bike routes and paved shoulders. The City's existing cycling network is illustrated in the Hamilton Bike Routes, Trails and Parks map, dated March 2008.

Cautionary un-signed routes are defined as links in the network that have mostly low to moderate traffic volumes and no dedicated cycling infrastructure.

Information on the Bruce Trail was obtained from the Ontario Trails Cycling Map, dated 2002. The Bruce Trail is the oldest and longest continuous footpath in Canada. It runs along the Niagara Escarpment from Niagara to Tobermory, spanning more than 850 km of main trail and 250 km of side trails. This trail runs through the City of Hamilton as well as Halton Region.

The City's existing cycling network is illustrated in **Exhibit 3-5**. This exhibit also illustrates the location of the Bruce Trail within the study area.

The existing multi-use path network within the City of Hamilton is also illustrated in the City's TMP. **Exhibit 3-6** illustrates the multi-use path network within the study area. It should be noted that this exhibit does not illustrate the location of the Bruce Trail.

Exhibit 3-5: Hamilton On-street Cycling Network and the Bruce Trail

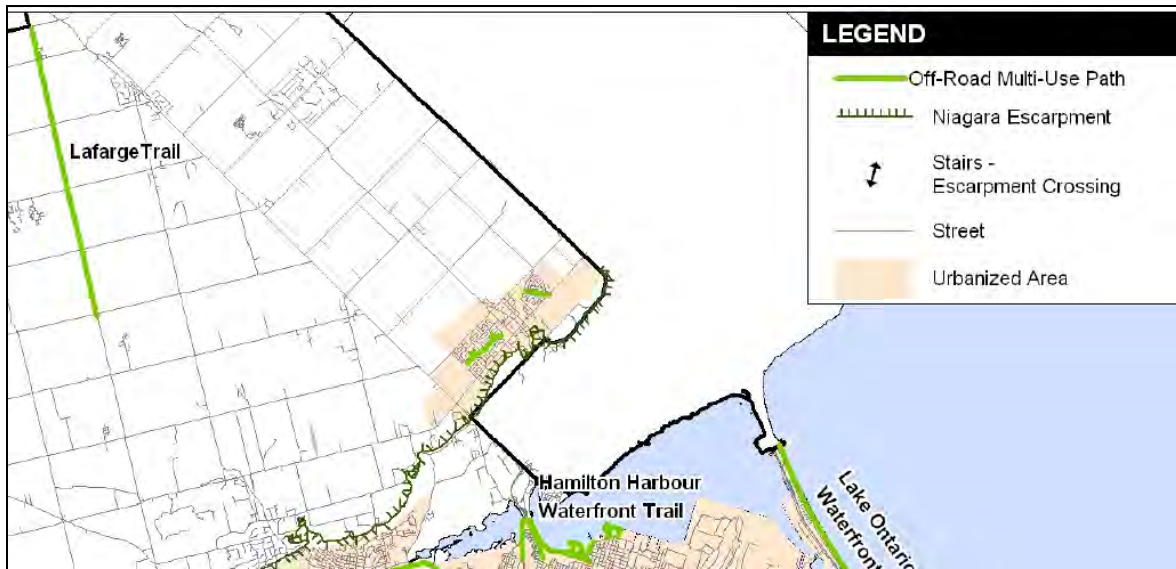
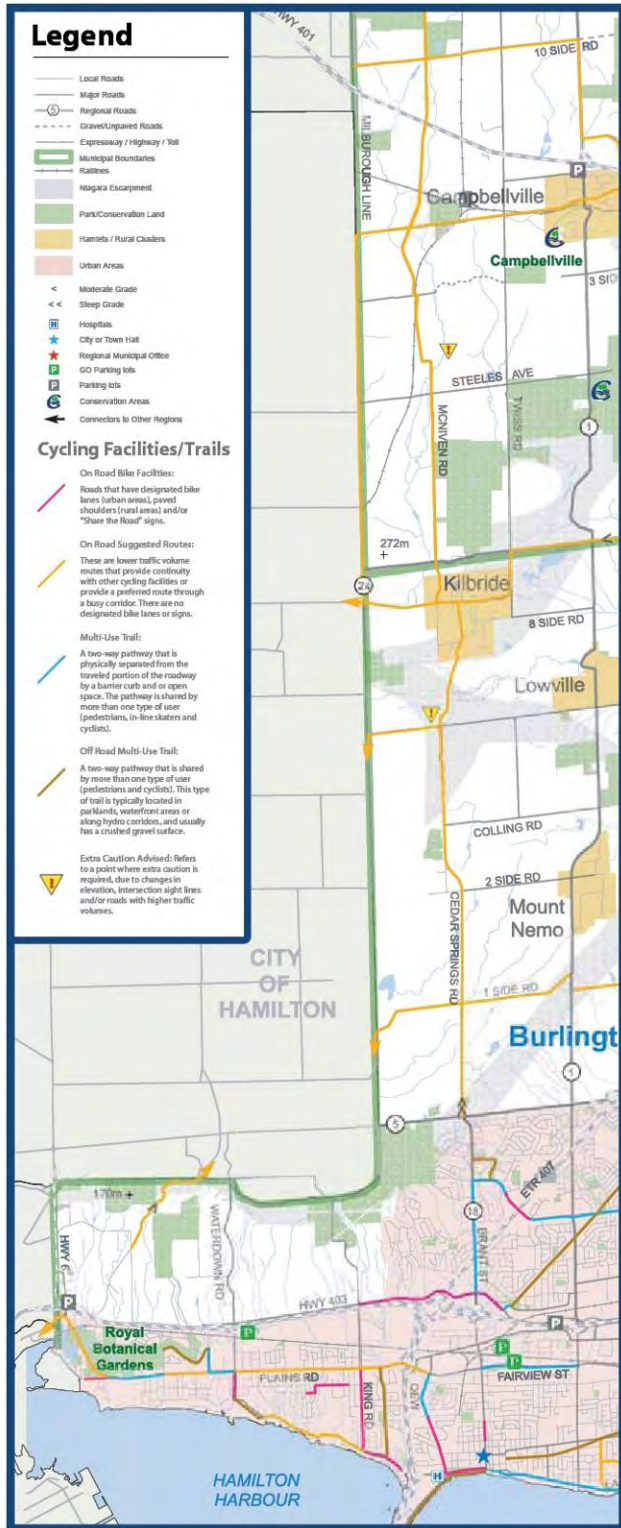


Exhibit 3-6: Hamilton's Existing Multi-Use Path Network

3.3.2 Region of Halton

The location of the existing cycling and off-road cycling facilities within the Region of Halton was obtained from the Region's 2004 Transportation Master Plan as well as the 2005 Cycling in Halton Map. The portion of the Cycling in Halton Map which illustrates the existing on road and multi-use trail network within the study area is shown in **Exhibit 3-6**. It should be noted that this exhibit does not illustrate the location of the Bruce Trail, which also runs through Halton Region. The location of the Bruce Trail is illustrated in **Exhibit 3-7**.



There are two classifications of on road cycling facilities in Halton, on road bike facilities and on road suggested routes.

On road bike facilities are located on roads that have designated cycling lanes and paved shoulder and/or "Share the Road" signs. Designated cycling lanes are provided in urban areas while paved shoulders are provided in rural areas.

On road suggested routes are on roads with lower traffic volumes that provide continuity with other cycling facilities or provide a preferred route through a busy corridor. There are no designated bike lanes or signs on road suggested routes.

Within the study area, there are a number of roads that have extra caution advisories, due to changes in elevation, intersection sight lines and/or roads with higher traffic volumes.

Exhibit 3-7: Halton's Cycling Facilities / Trails

3.3.3 Cycling Agencies

Information regarding the existing cycling network information was provided in part by the Burlington Cycling Committee, Hamilton Cycling Committee, and the City of Hamilton Traffic Engineering and Operations office.

3.3.4 Cycling Events

There are a number of cycling events held every year in the Study Area. One event in particular is the Tour de FORCE which is organized annually by Friends of Rural Communities and the Environment (FORCE). This event includes both a 50 km and 100 km cycling route and traverses many of the roads in the Study Area. The Study Area may also be used for cycling events by other groups including the Hamilton Cycling Committee, Burlington Cycling Committee, Toronto Cycling Committee, Halton Outdoors Club, Regional Niagra Cycling Committee, Oakville Cycling Club, Ontario Cycling Alliance, Bike Toronto, and MACycle Co-op, the McMaster University cycling club.

3.4 School Bus and Public Transit Routes

Exhibit 3-8 illustrates the estimated number of school buses by route as well as the daily frequency per direction. This information was provided by the Hamilton-Wentworth District School Board, the Hamilton-Wentworth Catholic School Board, the Hamilton District School Board and the Halton Catholic District School Board.

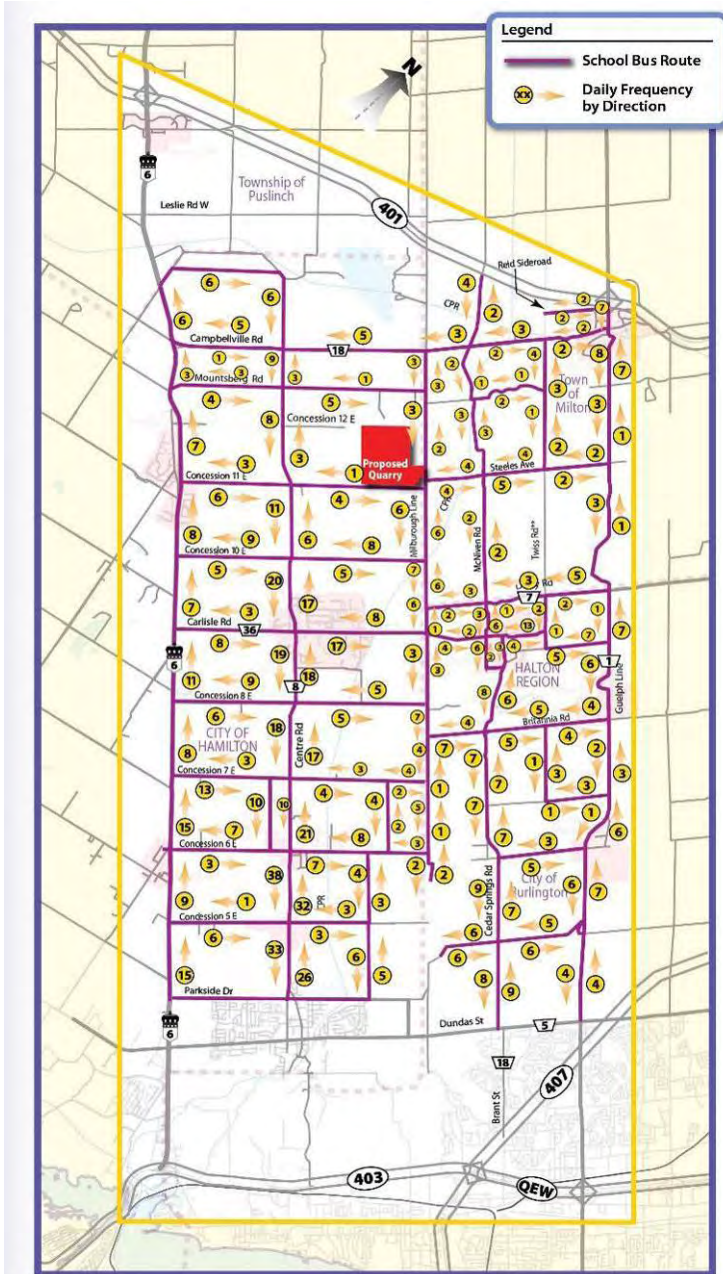


Exhibit 3-8: Estimated Number of School Buses by Route

The existing transit services within the study area are located south of Dundas Street. This section of the study area is being serviced by Hamilton Street Railway, GO Transit and Burlington Transit. The current bus routes within the study area are illustrated in **Exhibit 3-9**. The corresponding weekday AM and PM peak period headways are summarized in **Table 3-1**.