REGIONAL MUNICIPALITY OF NIAGARA Livingston Avenue Extension Environmental Assessment

Environmental Study Report – DRAFT

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1.0 Introduction

The Regional Municipality of Niagara (the Region) retained Dillon Consulting Limited (Dillon) in 2018 to complete an Environmental Assessment (EA) Study (hereafter referred to as the Study) to establish the need and solutions for improving east-west travel capacity in West Grimsby, given the projected population and employment growth targeted for 2041 and the planned Grimsby GO Transit Station, scheduled for opening in 2021. A separate EA Study was initiated alongside this Study with a focus on Casablanca Boulevard, the Queen Elizabeth Way (QEW) interchange, and access to the GO Transit Station, titled the Casablanca Boulevard and GO Access EA (completed in March 2019).

This Environmental Study Report (ESR) describes the results of the Study. This introductory section of the ESR provides an overview of the Study purpose, definition of the Study Area, and the process followed under the Municipal Class Environmental Assessment (MCEA) for Schedule 'C' Projects. Schedule 'C' Projects generally include the construction of new facilities and major expansions of existing facilities, and require the completion of Phases 1-4 of the Class EA process.

1.1 Purpose of the Study

Two key planning studies were undertaken to inform the need for the Study, namely the Niagara Region Transportation Master Plan (TMP), which was approved by Regional Council in 2017, and a Secondary Plan for the Grimsby GO Transit Station, which was approved by Regional Council in 2018. The Grimsby GO Transit Station is proposed at the southwest corner of the intersection of Casablanca Boulevard and the South Service Road. These planning studies recommended undertaking an Environmental Assessment to confirm the need for an extension of Livingston Avenue west to Main Street West, in order to support future east-west travel through this area of West Grimsby.

The purpose of this Study is to confirm and address the long-term east-west transportation needs of the Study Area to 2041, with a view to providing adequate transportation facilities to support planned population growth and access to the future Grimsby GO Transit Station. Future local transportation needs along the area's east-west connecting roadways were assessed (excluding the QEW), related to traffic operations, future traffic capacity needs, pedestrian and cyclist access, and safety. The Study examines all modes of transportation, including active modes (walking and cycling), and also addresses engineering requirements to support the recommended improvements; including utilities, signals, illumination, and stormwater management/drainage.

In response to this Study purpose, a Municipal Class EA was undertaken to:

- Confirm the long-term east-west transportation needs in the study area;
- Assess the need and justification for the proposed Project or undertaking;
- Identify and assess potential alternatives to solve the problem;
- Identify a preferred solution to address the problem;

- Develop and assess alternative designs for the preferred solution;
- Recommend measures to mitigate any potential adverse effects.

The EA was completed to meet the Municipal Engineers Association (MEA) *Ontario Municipal Class EA* Schedule C Project requirements.

In completing the above steps, consultation with key stakeholders, regulatory agencies, Indigenous Communities and Organizations, and the general public was undertaken.

1.2 Study Area

The Study Area was established early on in the Class EA process and includes a 'Focused Study Area' boundary where any improvements to road corridors would be located. The Focus Study Area as shown in **Figure 1-1** is bounded by:

- South Service Road from Casablanca Boulevard to Oakes Rd. North;
- Main St. West from Casablanca Boulevard to Oakes Rd. North;
- Lands west of Emily Street; and
- Oakes Road North from South Service Rd. to Main St. West.

Some of the background studies (described in Section 4) were conducted for the larger Study Area to understand the existing conditions and inform the development of alternatives to address the problem, while other baseline studies concentrated on the Focus Study Area.



Figure 1-1 Study Area

1.3 Environmental Assessment Process

1.3.1 Ontario Municipal Class Environmental Assessment Process

An EA is a planning and decision-making process used to promote environmentally responsible decision-making. In Ontario, this process is defined by and finds its authority under the *Environmental Assessment Act (EA Act)*. The purpose of the *EA Act* is to provide for the protection, conservation and wise management of Ontario's environment. To achieve this purpose, the *EA Act* promotes responsible environmental decision-making and ensures that interested persons have an opportunity to comment on undertakings that may affect them. In the *EA Act*, the environment is broadly defined and includes the physical, natural, and socio-economic environment.

Five key principles of planning are outlined in the EA Act including the following:

- Consultation with affected parties early on, in and throughout the process, such that the planning process is a co-operative venture;
- Consideration of a reasonable range of alternatives, both the functionally different alternatives to the Project (known as Alternative Solutions) and the alternative methods of implementing the preferred solution (known as the Alternative Designs);
- Identification and consideration of the effects of each alternative on all aspects of the environment (i.e. natural, cultural and socio-economic environments);
- Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and
- Provision of clear and complete documentation of the planning process followed, to allow "traceability" of decision-making with respect to the Project.

This Class EA was carried out in accordance with the *Ontario Municipal Class EA* (October 2000, amended 2007, 2011 and 2015). A Class EA is an approved planning process that describes the steps that a proponent of a Municipal Project must follow in order to meet the requirements of the *EA Act*. The Class EA approach requires the evaluation of both Alternative Solutions and Alternative Designs. It includes mandatory requirements for public input and expedites smaller recurring Projects with known and mitigatable impacts.

The Municipal Class EA process includes the following five phases (this Study fulfills Phases 1-4) (**Figure 1-2**):

- Phase 1: Problem/Opportunity Identification;
- Phase 2: Identification and Evaluation of Alternative Solutions;
- Phase 3: Identification and Evaluation of Alternative Design Concepts; and
- Phase 4: Environmental Study Report Documentation.
- Phase 5: Implementation.



Figure 1-2 Municipal Class EA process

1.3.1.1 Municipal Class Environmental Assessment Project Schedules

Under the Municipal Class EA, Projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to the type of undertaking.

Projects are classified into three schedules according to their environmental significance including Schedule A/A+, B or C. The overall significance and level of potential impact of a Project determines its schedule.

Schedule "A"/ "A+" Projects are limited in scale, have minimal adverse effects and include the majority of Municipal road maintenance and operational activities. Other Projects may be included in this category such as traffic control devices, depending on their anticipated construction cost as specified in the Class EA. These Projects are generally pre-approved, and may proceed directly to Phase 5 for implementation, with the exception of A+ Projects, which require the public to be advised prior to implementation.

Schedule "B" Projects generally include improvements and minor expansions to existing facilities. These Projects have some potential for adverse environmental impacts, and consultation with those who may be affected is required. Examples of Schedule B Projects include the installation of traffic control devices, smaller road-related works, or the extension of certain types of Municipal water/wastewater infrastructure. These kinds of Projects typically require completion of a screening exercise under the Class EA process, including consultation with those who may be affected.

Schedule "C" Projects generally include the construction of new facilities and major expansions of existing facilities, and require the completion of Phases 1-4 of the Class EA process.

This Project is being carried out as a Schedule "C" undertaking. Such Projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule "C" Projects require that an Environmental Study Report (ESR) be prepared and submitted for review by the public.

The Study followed the Class EA process to ensure a thorough understanding of the Project problems and opportunities, the various alternatives and their potential environmental effects, and associated mitigation measures. As this Project is a Schedule "C" Project, Phases 1 to 4 of the Class EA were carried out as follows:

Phase 1: Problem/Opportunity Identification (Project Need/Justification) - To establish the need and justification for the Project, the Study included a review of existing and future projected roadway capacity and operational issues (for all modes of transportation). The opportunities and constraints in the context of existing plans and policies were assessed; this included a review of the Region's Transportation Master Plan with an understanding of Metrolinx's intention to develop a new GO Transit Station at Casablanca Boulevard and the South Service Road in Grimsby.

Phase 2: Identification and Evaluation of Alternative Solutions (Identify the Preferred Solution) - Considering the identified problems and opportunities, Alternative Solutions (alternative ways of solving the problem) were developed, assessed and evaluated considering environmental, socio-economic, technical and cost considerations. The Alternative Solutions were presented to the public for review and comment. Through this process a preferred solution was identified.

Phase 3: Identification and Evaluation of Alternative Design Concepts (Identify a Preferred Design) -Considering the recommended solution, alternative ways of implementing it (Alternative Designs) were then developed, assessed, and evaluated considering environmental, socioeconomic, technical and cost considerations. The Alternative Designs as well as the preferred design, identified impacts, and proposed mitigation measures were presented to the public for review and comment. Through this process a preferred design (the undertaking) was refined.

Phase 4: Environmental Study Report Documentation - The final phase of the process involved the preparation and public release of this ESR for stakeholder review and comment.

Phase 5: Implementation - Subject to the completion of the above phases, the ultimate Project can then be constructed. Detailed Design for the Project would be initiated closer to the trigger year for the need (2031).

1.3.1.2 Class Environmental Assessment Part II Order

If concerns arise during the ESR review period that cannot be resolved through discussions with the Region, a person or party may request that the Minister of the Environment, Conservation and Parks (MECP) make an order for the Study to comply with Part II of the *EA Act*. The Minister will consider the request and make one of the following decisions, with the Minister's decision being final:

- Deny the request, stating the reason for the decision;
- Deny the request with conditions,
- Refer the matter to mediation, whereby one or more appointed persons will endeavor to resolve the concern; or
- Issue what is referred to as a "Part II Order," which requires that the proponent comply with Part II of the *EA Act* and undertake the planning and design as an Individual EA. An Individual EA requires that the proponent define a planning and design process specifically for the proposed Project, and submit it to the Minister of the Environment, Conservation and Parks for approval prior to carrying out the EA.

1.3.2 Federal Impact Assessment Act, 2019

When a Project has the potential to cause environmental effects that are within federal jurisdiction, a federal Impact Assessment may be required. The Impact Assessment Act (IAA) was brought into effect on August 28, 2019, repealing the Canadian Environmental Assessment Act (2012).

The types of Projects that fall under the purview of the IAA are documented in the *Physical Activities Regulations*, also known as the Project List, that support the Impact Assessment Act. This regulation establishes clear criteria for when a Project may be subject to a federal impact assessment. Based on the Project List, the Project recommended through this Class EA (see **Sections 7 and 8**) does not require a federal impact assessment.

1.3.3 Environmental Study Report Outline

This ESR documents the process followed to identify the recommended design/undertaking and the potential environmental and socio-economic effects of the planning, design, and construction of the Project. This ESR will also document stakeholder and public consultation and engagement efforts undertaken, and any commitments to be followed during subsequent steps relating to the implementation of the recommended design/undertaking (Phase 5 of the Municipal Class EA). In particular, this ESR documents:

- The problems and opportunities being addressed;
- Alternative solutions and designs that were considered;
- A description of the preferred alternative;
- Description of existing environmental and socio-economic setting, potential effects and proposed mitigation measures;
- Public, stakeholder and Indigenous Community consultation that was undertaken; and
- Commitments to further work, consultation, and monitoring.

The ESR is organized as follows:

- Section 1 provides an introduction and purpose of the Project, the Study Area, and an overview of the applicable EA processes;
- Section 2 includes an overview of the consultation program;
- Section 3 describes the policy context for the Project;
- Section 4 provides a description of the existing transportation, infrastructure, socioeconomic, natural, cultural, and physical context in the Study Area (i.e. baseline conditions);
- Section 5 describes the projected future transportation conditions and outlines the identified Study Area problems and opportunities that have been addressed through this Study;
- Section 6 identifies the Alternative Solutions identified for the Project including their description and evaluation;
- **Section 7** describes the Alternative Designs of the recommended solution including how they were developed, rationalized and evaluated;
- Section 8 provides a description of the preferred Project design including intersections, pedestrian/cycling facilities, stormwater requirements, utilities, traffic signals, phasing, and access management;
- Section 9 presents the anticipated environmental effects and proposed mitigation measures for the preferred design; and

• Section 10 provides a description of additional considerations/future requirements prior to Project implementation, including for example permitting, implementing policies, additional consultation commitments, Detailed Design requirements, etc.

2.0 Public and Stakeholder Consultation

2.1 Consultation Overview

Stakeholder and public consultation was an integral component of the Study process. The primary purpose of the consultation program was to involve the local community, property owners potentially affected by the proposed improvements, Indigenous Communities and Organizations, government agencies, and other potentially affected stakeholders in the Study and decision-making process. There has been strong community interest in the Study process since the early stages, and opportunities were integrated throughout the Study process to obtain feedback to inform the decisions made and consider the impacts on the environment and surrounding community. The consultation activities undertaken as part of the Study are identified in **Figure 2-1**.



Figure 2-1 Study Process and Consultation Activities

Specifically, the overall objectives of the consultation program were to:

- Create general awareness of the Project to as many potentially interested stakeholders and community members as possible; and
- Generate an open and interactive approach to the planning process by creating opportunities for the public, government agencies, Indigenous Communities and Organizations and interest groups to provide Project comments and suggestions.

The following sections describe the consultation program that was undertaken for this Study. Subsequent sections of this ESR describe the input received and how it was considered in the Study. **Appendix A** contains the consultation program supporting materials, including summaries of consultation events and the feedback received.

A number of consultation activities were undertaken as part of the Study, including:

- Development of a stakeholder contact list, which was updated throughout the Study;
- Development of a subpage on the Region's website with Study updates and contact information (https://www.niagararegion.ca/Projects/livingston-ea/default.aspx);
- Project notices and mailings/emails through an E-Bulletin;
- Three Public Information Centres (PICs), the first on June 20th, 2018, the second on May 28th, 2019, and the third on January 27th, 2020;
- Two online surveys;
- Outreach to Indigenous Communities and Organizations;
- Consultation with Regional Municipality of Niagara and Town of Grimsby Elected Representatives;
- Consultation with the Town of Grimsby;
- Consultation with local and Provincial agencies; and
- Public release of this ESR.

2.1.1 Project Notices

The Notice of Study Commencement was combined with the notice for the first PIC, which was held on June 20th, 2019. The notice was hand delivered to residents in the Study Area, and circulated to those subscribed for email updates on June 14th, 2018. As a result of the public's high level of interest in the Project, PIC notices were also published in consecutive issues of local newspapers to invite attendance from residents in the Study Area. The advertisements were published on May 31st and June 14th, 2018, in Niagara This Week (Grimsby Zone).

The Notice for PIC #2, which was held on May 28th, 2019, was sent by email to the contact list on May 17th, 2019. The notice was also published in Niagara This Week (Grimsby Zone) on May 16th, 2019 and May 23rd, 2019.

The Notice for PIC #3, which was held on January 27th, 2020, was sent by email to the contact list on January 13, 2020. The notice was published in *Niagara This Week* (Grimsby Zone) on January 9, 2020 and January 16, 2020 and *Niagara News Now* January 16, 2020.

Once the Environmental Study Report is finalized, a Notice of Study Completion will be sent to the Study contact list by email and to agencies and key stakeholders by paper mail, and will be published in *Niagara This Week* and *Niagara News Now* on May 21 and May 28, 2020. The ESR will be made available for public review for 45 days, from May 21st to July 6th.

2.1.1.1 Notice of Study Completion

The filing of this ESR marks the completion of the Municipal Class EA process for the Project. One of the final steps of the Municipal Class EA process requires this ESR is to be made available for public review for a minimum period of thirty (30) calendar days through publication of the Notice of Completion. The Region has elected to extend the review period to forty-five (45) days. Project information will also be provided on the Region's website.

A copy of the report will be available for viewing at the following locations:

- Niagara Region Headquarters: 1815 Sir Isaac Brock Way , Thorold, ON, L2V 4T7; and
- Town of Grimsby Town Hall, 160 Livingston Avenue, Grimsby, ON, L3M 4G3.

Subject to comments received as a result of this Notice and the receipt of all necessary approvals, the Region intends to monitor the performance of the road network in the Study Area and proceed towards Detailed Design and construction closer to the time when the need materializes (by approximately 2031), as recommended in this ESR.

2.1.2 Agency and Municipal Engagement

Government agency consultation was a cornerstone of the Study, with multiple information sharing and stakeholder feedback meetings conducted at various points in the process. Agency consultation was initiated through the Notice of Commencement and continued with in-person and telephone communications.

Government agencies that were consulted as part of this Study include provincial ministries/agencies, the Town of Grimsby and the Niagara Peninsula Conservation Authority (NPCA). As the Study is intended to aid service to the GO Transit Station and the study area includes the QEW, Metrolinx and the Ontario Ministry of Transportation were also updated and consulted with.

The agencies contacted or met with as part of the consultation program included the following:

- Provincial Ministries and Agencies
- Ministry of Environment, Parks and Conservation;
- Ministry of Natural Resources and Forestry;
- Metrolinx; and
- Ministry of Transportation;
- Municipalities
- Town of Grimsby; and
- Regional Municipality of Niagara.
- Other Agencies
- Niagara Peninsula Conservation Authority.

A record of official email or letter correspondence with agencies is provided in Appendix A.

2.1.3 Elected Representatives Engagement

The Municipal elections for Niagara Region and Town of Grimsby Councils were held on October 22nd, 2018. Prior to the elections, elected representatives were engaged through presentations to the respective Councils by Niagara Region staff. Following the elections, presentations and meetings with elected representatives were held on the following dates:

- May 28th, 2019 at the Casablanca Winery Inn and Spa;
- September 16th, 2019 at Grimsby Council Chambers; and
- January 27th, 2020 at the Casablanca Winery Inn and Spa.

It was noted that elected representatives of the Town of Grimsby voiced their concerns about the Study and the consideration of extending Livingston Avenue, particularly with respect to the potential natural environment impacts as well as impacts to adjacent residents. These concerns are documented through letters submitted to the Region, contained in **Appendix A**. The Alternative Designs (Section 8) as well as the mitigation measures (Section 9) consider these concerns.

2.1.4 Public Engagement

The main opportunities for consultation during the Study process included:

- Three Public Information Centres;
- Two online surveys;
- Release of information on the Project's website; and
- Distribution of notices, letters, and E-Bulletin emails to mailing list subscribers at key milestones.

Comments received from in-person and email communications with the public were compiled and considered in the completion of the Study. These are documented in various sections of this ESR, according to the phase of the Study process that they pertain to. A summary record of the correspondence received is documented in **Appendix A**.

2.1.5 Engagement with Indigenous Communities and Organizations

Engagement was an important part of the consultation process. The following describes the activities that were undertaken to provide Indigenous Communities and Organizations with an opportunity to be informed about the Project and provide input. The Project team completed a search of the Aboriginal and Treaty Rights Information System (ATRIS) in developing the Indigenous Communities and Organizations contact list. Based on this search and information received, it was determined that the following communities should be consulted:

- Mississaugas of the New Credit First Nation;
- Six Nations of the Grand River Territory;
- Haudenosaunee Confederacy; and
- Métis Nation of Ontario (MNO).

These Indigenous Communities and Organizations were provided with Project notices (September 4, 2018; May 24 2019; and January 13, 2020) including the Notice of Study Commencement and PIC #1, PIC#2, and PIC#3 via email.

Following an inquiry received from the Mississaugas of the New Credit First Nation, the Stage 1 Archaeological Assessment Report was provided for review by email on November 30, 2018; no additional correspondence on this item was received. Indigenous Communities and Organizations will continue to be engaged through the Detailed Design process, including any additional archaeological investigations required for the Study.

Correspondence with Indigenous Communities and Organizations did not lead to the identification of any specific or comprehensive claims or litigation that materially affected the Project. The identified communities will be notified of the ESR release by email with a follow up by phone, and the Region is committed to working with Indigenous Communities and Organizations should any issues arise.

3.0 Policy / Planning Context

3.1 Project Planning Context

As noted in **Section 1.1**, this Study has a primary focus on providing adequate local traffic movement and transportation operations for all modes traveling east-west in the Study Area to the year 2041, and providing access to the planned Grimsby GO Transit Station, scheduled for opening in 2021. A number of conditions in the Study Area have created the impetus for the Study, including emerging medium density residential development along the North Service Road, which has created additional demand on the South Service Road, as well as a need to provide access to the lands south of the initial stage of the Grimsby GO Transit Station related to the Region lands south of the CN Rail mainline.

In reviewing and assessing the existing infrastructure and future transportation requirements of the key east-west road corridors in the Study Area, it is essential to establish a planning policy context for infrastructure expansion, considering population growth and transportation objectives in a small town context. The policy framework includes all levels of government that have influence in the Study Area, and guides strategic investment decisions to support community objectives and accommodate forecasted population and employment growth.

The assessment and evaluation of the Study Area issues and opportunities was carried out with due consideration to the policy framework, to align the ultimate set of recommended improvements and the preferred alternative as presented in **Table 3-1** with the policies and objectives of the various levels of government.

Policy/Regulatory Document	Governing Authority	Applicability to the Study – Compliance Requirement
Provincial Policy Statement(PPS, 2020)	Ministry of Municipal Affairs and Housing	Required – This document provides the high-level policy guidance on the design of complete communities and planning for major infrastructure.
Places to Grow – Growth Plan for the Greater Golden Horseshoe (Growth Plan, 2019)	Ministry of Municipal Affairs and Housing	Required – This document provides policy guidance for planning around transit stations, infrastructure planning, and natural heritage protection.

Table 3-1 Summary of Planning and Regulatory Framework for the Study

Policy/Regulatory Document	Governing Authority	Applicability to the Study – Compliance Requirement
Greenbelt Plan (2017)	Ministry of Agriculture, Food and Rural Affairs	Required – The Study Area falls within the Greenbelt Plan boundary, and this Plan provides the context for protection of agricultural lands and natural heritage, as well as the requirements for permitting infrastructure within the Greenbelt.
#CycleON - Ontario's Cycling Strategy (2013)	Ministry of Transportation	Guidance – This document provides an overview of the Ministry's vision for supporting cycling connectivity Province-wide.
Niagara Region Regional Official Plan (2014), including Regional Official Plan Amendment #13	Niagara Region	Required – The Regional Official Plan provides the policy context for Regional infrastructure planning and design, and meeting the requirements of the PPS and the Growth Plan.
Niagara Region Transportation Master Plan (TMP, 2017)	Niagara Region	Guidance – The TMP guides transportation infrastructure planning across Niagara Region to 2041, and is the basis for key considerations for improving east- west capacity in the Study Area.
Niagara Rail Service Expansion Environmental Study Report (2011)	Metrolinx	Background Study – This Study is the foundation for planning for the Grimsby GO Transit Station.
Town of Grimsby Official Plan (OP, 2012)	Town of Grimsby	Required – Policies in the Town's OP provide more detailed guidance on the land uses permitted, mobility design, and protection of natural features in the Study Area.

Policy/Regulatory Document	Governing Authority	Applicability to the Study – Compliance Requirement
Grimsby GO Transit Station Secondary Plan (2018)	Town of Grimsby	Required – The Secondary Plan provides finer grain policy guidance for the lands in the Study Area that are within the Urban Boundary for the Town.
Town of Grimsby Zoning By-laws	Town of Grimsby	Required – The Zoning By-law provides an indication of key land use elements that need to be considered in the design of infrastructure, including setbacks and natural heritage protection.
Niagara Peninsula Source Protection Plan	Niagara Peninsula Conservation Authority / Ministry of the Environment, Conservation and Parks	Required – This document highlights areas where development would be restricted.
Regional Tree and Forest Conservation By-law No. 30-2008	Niagara Region	Exempt – This By-law lays out the standards for tree protection and compensation. While municipal activities are exempt, the Region does put in place tree compensation plans for infrastructure Projects.
Climate change Projections for Ontario: An updated synthesis for policymakers and planners Climate Change Research Report CCRR-44	Ministry of Natural Resources and Forestry / MECP	Required – Projections provide more detailed guidance on the changes that are expected to occur with respect to temperature, precipitation, and frequency of storm events in the vicinity of the Study Area in order to inform the design process.

In addition to the planning and regulatory documents identified in **Table 3-1**, recent and ongoing policy directives from Provincial authorities could have a potential impact on the planning considerations for the Study. These include a market-driven approach to GO Transit Station development announced by Metrolinx on November 26th, 2018, that indicated the agency's intent

to place the development of new Station on hold until a partner could be identified to develop the GO Transit Station site for transit-oriented development uses. It is understood that based on the latest direction, there is an intent to develop the Station lands both north and south of the CN Rail mainline for the opening day of the Station in 2021.

The following sections provide an overview of the components of the policy framework highlighted in **Table 3-1**, and identify the key elements that informed the development of the Study issues and opportunities as well as the Alternative Solutions (Sections 5 to 7 of this ESR). The key elements of the Region's Transportation Master Plan (2017) and the Grimsby GO Transit Station Secondary Plan (2018) that provide the policy basis for the development of the alternatives considered in the Study are discussed.

3.2 Provincial Planning Framework

3.2.1 Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS) was issued under the authority of Section 3 of the *Planning Act* and came into effect on April 30th, 2014. An update to the PPS was released on February 28th, 2020. The PPS (2020) sets out the province's vision for how lands are settled, infrastructure is designed and built, and land and resources are managed, in order to achieve the long-term objective of livable and resilient communities. The PPS supports and promotes a range of transportation choices in and between communities, including by way of active transportation facilities. Section 3 of the *Planning Act* requires that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act.

The PPS supports and promotes healthy and active communities. This includes planning public streets to be safe, meet the needs of pedestrians, foster social interaction, and facilitate active transportation and community connectivity (Section 1.5 - Public Spaces, Recreation, Parks, Trails and Open Space of the PPS).

Planned improvements (defined as "infrastructure" in the PPS) are to be consistent with the relevant Transportation Systems and Transportation and the Infrastructure Corridors policies included in Sections 1.6.7 and 1.6.8 respectively of the PPS, as summarized below:

- Transportation Systems (Section 1.6.7)
- 1.6.7.1 *Transportation systems* should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.
- 1.6.7.2 Efficient use should be made of existing and planned *infrastructure*, including through the use of *transportation demand management* strategies, where feasible.
- 1.6.7.3 As part of a *multimodal transportation system*, connectivity within and among *transportation systems* and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries.

- 1.6.8 Transportation and Infrastructure Corridors
- 1.6.8.1 Planning authorities shall plan for and protect corridors and rights-of-way for *infrastructure*, including transportation, transit and electricity generation facilities and transmission systems to meet current and projected needs.

The PPS therefore provides a strong basis to support improving connectivity to the Grimsby GO Transit Station and identifying mechanisms to support transportation demand management, including the development of a more complete network of active transportation facilities wherever possible within the Study Area.

In addition, the PPS (2020) puts in place policies to protect natural heritage and water sources (Section 2.1 and Section 2.2), as well as the wise management of agricultural resources (Section 2.3). These policies are relevant to this Study, as there are natural heritage features and designated agricultural lands within the Study Area.

3.2.2 Growth Plan for the Greater Golden Horseshoe (2019)

The Growth Plan sets out policies to guide long range growth planning in the Greater Golden Horseshoe. The guiding principles for the plan include:

- Build compact, vibrant and complete communities;
- Support residential and employment intensification and higher densities through efficient land uses, infrastructure, and transit-oriented development;
- Provide different approaches to manage the diversity of growth; and
- Plan and manage growth to build a strong economy.

Complete communities feature a diverse mix of land uses including employment and residential, convenient access to the amenities residents' need, such as local stores, services, and public service facilities, while supporting affordable housing initiatives, active transportation, and compact built form.

The Growth Plan emphasizes using transit infrastructure as a means to shape growth and improve linkages between urban growth centres, major transit Station areas and other intensification areas. This point is highlighted for *Transit Corridors and Station Areas* which stipulates Major Transit Station Areas and intensification corridors need to be designated in municipal official plans and planned to achieve mixed-use development at transit-supportive densities.

There is a strong focus in the Growth Plan on land use and infrastructure, particularly planning for transit. The Growth Plan requires that municipal growth planning take into account the availability and location of existing and planned community infrastructure, including affordable housing and transit, supporting connectivity and reductions in automobile usage. Linkages between major Transit Station areas and surrounding residential, office, institutional, and commercial development will facilitate strategic growth and efficient transportation growth.

Natural heritage protection is an important aspect of the Growth Plan. The Natural Heritage System for the Growth Plan (2019) includes lands outside of the Study Area, south of Main St. West. The Growth Plan also directs municipalities to protect natural heritage features outside of the Natural Heritage System for the Growth Plan, consistent with the PPS.

3.2.3 Greenbelt Plan (2017)

The Growth Plan provides the framework for where and how urban growth should occur in the Greater Golden Horseshoe. The Greenbelt Plan was established to provide a parallel framework for environmental management and protection in the same general area as the Growth Plan as it applies to the environment, although there are no explicit employment or commercial land policies. The Greenbelt Plan includes the protection of lands designated under the Niagara Escarpment Plan and Oak Ridges Moraine Plan and allows for the protection and management of prime agricultural and specialty crop lands across the Greater Golden Horseshoe. **Figure 3-1** shows the limits of the protected countryside Greenbelt Area in the Town of Grimsby. Lands in the protected countryside are subject to the entirety of the Greenbelt Plan.

The lands north of Main Street West, west of Casablanca Boulevard, including the Region-owned lands are designated as Protected Countryside (Tender Fruit and Grape Lands) in the Greenbelt Plan. This designation permits infrastructure (including Transit Station) approved under the Environmental Assessment Act. Specifically, Policy 4.2.1.B of the Greenbelt Plan states that infrastructure is permitted within the Protected Countryside where "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 borders".

The characteristics of agricultural lands that fall within the Greenbelt in the Study Area are provided in **Section 4.6.2.1**. As part of this ESR, the impacts of proposed road improvements that would fall within the Greenbelt are considered.

3.2.4 #CycleON – Ontario's Cycling Strategy (2013)

The MTO released Ontario's Cycling Strategy, titled #CycleON in 2013. The Strategy was developed in partnership with a number of stakeholders, including the Region. The Strategy notes that MTO surveys of road users suggest that around 1.2 million adults in Ontario ride a bicycle daily during the spring, summer and fall, and 2.8 million ride at least once a week. As such, "Cycling generates a wide range of health, economic, environmental, and social and other benefits. These include improved personal health, reduced health care costs as a result of lower rates of chronic conditions through active living, reduced traffic congestion in urban areas, a cleaner environment and increased tourism opportunities across the province." (#CycleON, 2013).

The vision presented in the Strategy is that by 2033 cycling in Ontario is recognized, respected, and valued as a core mode of transportation that provides individuals and communities with health, economic, environmental, and social and other benefits. Five aspirational goals for the province are identified:

- Ontario is recognized as the best Canadian province for cycling and ranked among the top 10 jurisdictions worldwide for cycling;
- The built environment in most Ontario communities supports and promotes cycling for all trips under 5 km;
- Ontario's cycling environment is safe for people of all ages, striving to achieve a record of zero fatalities and few serious injuries;
- Ontario's cities and towns will have interconnected networks of safe cycling routes enabling people to cycle to work, school, home and key destinations; and
- Ontario has an integrated province-wide network of cycling routes.

The Strategy identifies the importance of partnership between MTO and local municipalities to implement the vision and goals of the Strategy.

The Strategy points to the increase in cycling tourism in Ontario, and identifies the need to support this practice in both rural and urban areas by developing a province-wide cycling network. A study by the Clean Air Partnership cited in the Strategy notes the important benefits from day-to-day spending by Ontarians who cycle in urban areas, with cyclists and pedestrians spending more money at local establishments and businesses than motorists who visit the neighbourhood

In addition, a 2015 report by the Ontario by Bike Network, *From Niche to Now: Cycle Tourism in Ontario* further highlights the growing cycling tourism sector in Ontario. The report includes the following findings from the research conducted by the organization:

- 54% of Ontarians indicated they would prefer to cycle more;
- 96% who want to cycle more said yes to more recreational cycling activities, 48% said yes to cycle tourism in Ontario; and

70% of experienced cyclists took cycling trips in Ontario vs. 30% of recreational / leisure cyclists.

3.3 Niagara Region Planning Framework

3.3.1 Niagara Region Official Plan

The Provincial Growth Plan for the Greater Golden Horseshoe identifies where and provides direction on how growth will occur amid its single- and upper-tier municipalities to a 2041 planning horizon. The Niagara Region is an upper-tier municipality located within the Provincial Growth Plan area and is responsible for the dissemination of its provincially-forecasted growth number amongst its local area municipalities. In order to appropriately accommodate forecasted growth, the Region must plan for and implement a sustainable *transportation system* that has the ability to withstand stresses associated with population growth.

This Niagara Official Plan provides for a safe and efficient *transportation system* for *multimodal* travel for all users. Objectives and policies reflect direction and recommendations outlined within the Niagara Region's Transportation Master Plan. The Region is committed to improving social equity, protecting short- and long-term economic competitiveness, and reducing greenhouse gas emissions by advancing initiatives which enable comprehensive *active transportation* networks, interconnected public transit systems, and efficient goods movement networks. The Niagara Region remains dedicated to working with its local area municipal partners, agencies, and other public entities on cross-jurisdictional transportation-related matters.

3.3.1.1 9.A General Objectives

Objective 9.A.1 Promote and support for a *multimodal transportation system* to enable the movement of goods and people of all ages and abilities to jobs, housing, school, cultural destinations, *public service facilities*, recreational and tourist opportunities, and other *major trip generators*, especially in *strategic growth areas*.

Objective 9.A.2 Reduce single-occupant vehicle trips by enhancing opportunities for residents, workers, and visitors of all ages and abilities to walk, cycle, take transit and carpool.

Objective 9.A.3 Support a connected and convenient public transit network throughout the region.

Objective 9.A.4 Create and enhance interconnected *active transportation* systems and programs.

Objective 9.A.5 Support the implementation of complete streets at regional and local levels.

Objective 9.A.6 Encourage the most cost-effective and environmentally appropriate modes of sustainable transportation to reduce greenhouse gas emissions.



LIVINGSTON AVENUE EXTENSION ENVIRONMENTAL ASSESSMENT Niagara Region

Figure 3-1

Greenbelt Plan Designations in the Study Area



Natural Heritage System Towns/Villages

1:10,000				
0	50	100	200	

ATT CRES

FARRELL

SUMAC CRT

MAP CREATED BY: GM MAP CHECKED BY: DB MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 187650

STATUS: DRAFT DATE: 2020-01-22 **Objective 9.A.7** Ensure that agricultural vehicles and equipment are accommodated within the *transportation system* where appropriate.

3.3.1.2 9.B Coordinated Transportation System Planning

Policy 9.B.1 The Niagara Region will encourage the implementation of a comprehensive *transportation system* through the co-ordination of land use planning and strategic investments in *infrastructure*.

Policy 9.B.2 The Niagara Region will work with the *Province,* agencies and local municipalities to plan for, improve, and protect the following *planned corridors* and facilities:

- a) Queen Elizabeth Way (QEW) widenings from Hamilton to Highway 406 and from McLeod Road to Mountain Road;
- b) Interchanges at Highway 406 and Third Avenue Louth, the Queen Elizabeth Way (QEW) and Glendale Avenue, and Highway 405 and Concession 6/Mewburn Road;
- c) the Niagara Escarpment Crossing;
- d) the Niagara-Hamilton Trade Corridor;
- e) the South Niagara East-West Arterial Road/Niagara Greater Toronto Area (NGTA) East Corridor;
- f) the Highway 406 extension to the South Niagara East-West Arterial Road/NGTA East Corridor; and
- g) The roads of the Niagara Parks Commission.

Policy 9.B.3 The Niagara Region, in consultation with local municipalities, will work with the Federal government, the *Province*, Metrolinx, and other stakeholders to improve linkages between the Niagara Regional Transit System and GO Transit.

Policy 9.B.4 The Niagara Region will work with Federal, Provincial and municipal governments to help strengthen the provision of an efficient and safe Provincial Highway network throughout the region.

Policy 9.B.5 The Niagara Region will ensure there is suitable transportation *infrastructure* to support the Region's growth and economic strategy.

Policy 9.B.6 The Niagara Region will ensure that transportation *infrastructure* within the boundaries of the Niagara Escarpment Plan are subject to the requirements of the Niagara Escarpment Plan policies and will be designed and located so that the least possible impact occurs on the Escarpment's scenic quality, landform, and existing environmental features.

Policy 9.B.7 The Niagara Region will work with the Niagara Parks Commission to improve linkages between the Niagara Region's *transportation system* and the Niagara Park Commission's *transportation system*.
3.3.1.3 9.C Public Transit

Policy 9.C.1 Public transit will be a priority for transportation *infrastructure* planning and major transportation investments.

Policy 9.C.2 The Niagara Region supports the expansion of public transit across the region through:

- a) Prioritizing investment in transit *infrastructure* to *strategic growth areas* to optimize return on investment and the efficiency and viability of existing and planned transit service levels;
- b) Permitting infrastructure, including municipal water and wastewater systems, on lands adjacent to or near settlement areas for uses principle or ancillary to frequent transit or higher order transit facilities;
- c) Improving linkages from nearby neighbourhoods to *major trip generators*, including: the Downtown St. Catharines *Urban Growth Centre*, locally designated *strategic growth areas*, *employment areas*, including tourism destinations, *public service facilities*, post-secondary institutions, and *major transit station areas*;
- d) Providing transit linkages within and between *settlement areas* in and outside of the Region to increase the *modal share* of transit;
- e) Improving accessibility to public transit;
- Providing park-and-ride facilities that support *multimodal* travel by offering linkages to pedestrian and transit routes, *bicycle infrastructure*, and priority spaces for carpool and car-share vehicles;
- g) Establishing fare and *transit service integration* between local agencies;
- h) Considering the role public transit plays in reducing greenhouse gas emissions; and
- i) Transit service(s) to areas that have achieved, or will be planned to achieve transit supportive residential, commercial, institutional and employment densities.

Policy 9.C.3 The Niagara Region will leverage public transit to promote *transit-supportive development.*

Policy 9.C.4 The Niagara Region will encourage the provision of *demand-responsive transit service*, where operationally and economically feasible, in local municipalities to serve low-density areas.

Policy 9.C.5 The Niagara Region supports *transit service integration* of municipal transit agencies to provide *frequent transit* service.

Policy 9.C.6 The Niagara Region will ensure *transit service integration* as part of the implementation of inter-municipal regional transit, and will work with transit operators, including the *Province* and Metrolinx, where applicable.

Policy 9.C.7 The Niagara Region will support transit investment for improved services to provide *multimodal* access to *major transit station areas* and reduce *modal share* by single-occupant vehicles.

Policy 9.C.8 The Niagara Region and its local municipalities should plan lands adjacent to or near existing and planned *frequent transit* or *higher order transit* facilities, including those within the *Greenbelt Area* where such lands have been approved through a Municipal Class Environmental Assessment, and where such lands are located within the *settlement area* boundary to:

- a) provide *transit-supportive* uses that enable opportunities for improved *transit service integration*;
- b) facilitate *multimodal* connections that encourage a more evenly distributed *modal share*; and
- c) support active transportation.

Policy 9.C.9 The Niagara Region will prioritize and expedite *higher order transit* connections to the Greater Toronto Hamilton Area (GTHA), to promote *intensification* and new employment markets.

Policy 9.C.10 The Niagara Region shall plan to ensure *higher order transit* facilities are supported by and serve adjacent *intensification areas* and new employment markets.

Policy 9.C.11 The Niagara Region will examine the feasibility of establishing a West Niagara Transit Terminal in order to facilitate *multimodal* connections within the Niagara Region and to the Greater Toronto Hamilton Area (GTHA).

Policy 9.C.12 Local municipalities shall develop secondary plans, or undertake an equivalent planning exercise with reference to the Province's Transit-Supportive Guidelines, to delineate *major transit station areas* for any confirmed or identified future potential *higher order transit* facility. These plans shall include policies that, where appropriate:

- a) support transit service integration;
- b) support the implementation of *active transportation-friendly* facilities;
- c) provide for a diverse mix of uses;
- d) prohibit land uses and a built form that would adversely affect the achievement of *transit-supportive* densities; and
- e) provide alternative *development* standards that promote *transit-supportive* uses and redevelopment.

Policy 9.C.13 The Niagara Region will work with the Province, local municipalities, and Metrolinx, where applicable, to support the integration of active transportation and public transit. Improvements may include: permitting bicycles on transit vehicles, providing bicycle racks on

buses, and providing bicycle infrastructure at and to transit facilities, public and institutional areas, and employment areas.

3.3.1.4 9.D Active Transportation

Policy 9.D.1 The Niagara Region and local municipalities will ensure that comprehensive *active transportation* networks are integrated into *transportation systems* to enable safe and convenient inter- and intra-municipal travel for *active transportation* users.

Policy 9.D.2 The Niagara Region will prioritize the implementation of the Strategic Cycling Network as identified in the Niagara Region's Transportation Master Plan to advance the implementation of the Niagara Bikeways Master Plan as shown in Schedule E2.

Policy 9.D.3 The Niagara Region will fund the implementation of the Strategic Cycling Network along Regional Roads through the Niagara Region's *public works Projects* and other funding or cost-sharing opportunities.

Policy 9.D.4 The Niagara Region will support local municipalities in implementing sections of the Strategic Cycling Network that are within their jurisdiction.

Policy 9.D.5 Local municipalities are encouraged to develop Official Plan policies which support *bicycle infrastructure* to ensure a connected and extended bicycle network within the region.

Policy 9.D.6 Local municipalities are encouraged to establish *development* standards for *transit-supportive* uses within *strategic growth areas* that achieve *compact built forms* to promote *active transportation*.

Policy 9.D.7 The Niagara Region supports the re-purpose of abandoned rail and other linear corridors, including hydro corridors, for off-road trails and recommends that local municipalities consider various means to protect and/or acquire such corridors. The Niagara Region will require early pre-consultation with relevant stakeholders, including TransCanada Pipeline or its designated representative, in the acquisition of abandoned rail and other linear corridors.

Policy 9.D.8 The Niagara Region will work with the Ministry of Transportation and other stakeholders for the provision of *active transportation* infrastructure across the QEW, 400 Series Highways, and other highways.

Policy 9.D.9 The Niagara Region will work with the Niagara Escarpment Commission, local municipalities, property owners, and other stakeholders, where applicable, to protect a continuous pedestrian route generally following the Bruce Trail along the Niagara Escarpment. The role and function of off-road-trails within the Niagara Escarpment Planning Area will be subject to the policies of the Niagara Escarpment Plan.

Policy 9.D.10 The Niagara Region will implement the recommendations of the Transportation Demand Management Study with respect to *active-transportation friendly* facilities.

Policy 9.D.11 The Niagara Region will have regard to the Niagara Region's Wayfinding Signage for Cyclists Guidelines as part of the design, refurbishment or reconstruction of Regional Roads.

Policy 9.D.12 The Niagara Region will develop guidelines for local Official Plans and Zoning Bylaws that outline minimum provisions for accommodating *active transportation-friendly* facilities in new *development*, redevelopment, and *public work Projects*.

3.3.1.5 9.E Complete Streets

Policy 9.E.1 The Niagara Region's *Complete Streets Design Guidelines* shall be used in the design, refurbishment, or reconstruction of the Niagara Region's *transportation system* to ensure the needs and safety of all road users are considered and appropriately accommodated.

Policy 9.E.2 The Niagara Region shall ensure that the Niagara Region's *Complete Streets Design Guidelines* is included as a reference document within the Request for Proposal (RFP) process for Municipal Class Environmental Assessments.

Policy 9.E.3 Local municipalities shall include policies within Official Plans that ensure that a *complete streets* approach is used in the design, refurbishment, or reconstruction of their planned or existing street network.

Policy 9.E.4 In the absence of local *complete street* guidelines, local municipalities shall refer to the Niagara Region's *Complete Streets Design Guidelines* for the design, refurbishment or reconstruction of their existing and planned local street network.

Policy 9.E.5 *Complete streets* elements within local jurisdiction shall be maintained by the *local municipality*.

3.3.1.6 9.F The Regional Road System

Policy 9.F.1 As conditions of the approval of a *development* application:

- a) The Niagara Region may acquire from the landowner land required for the *road allowance* as identified in Table 9-1 at no cost to the Region free of all encumbrance, encroachments, and improvements unless otherwise agreed to by the Region; and,
- b) The Niagara Region is to be provided with a certificate of an Ontario Land Surveyor noting that all legal survey documentation on the widened *road allowance* is in place.

Policy 9.F.2 The Niagara Region shall require the conveyance of land, at no cost to the Region, as condition of the approval of a *development* application, beyond the designated *road allowance* widths identified in Table 9-1, to accommodate items such as sight triangles, turning lanes, channelization, grade separations, traffic control devices, rapid transit, public transit facilities and rights-of-way, *active transportation* facilities cuts, fills and storm drainage requirements, as

required to meet accepted/current engineering design criteria/standards. These do not require an amendment to this Plan.

Policy 9.F.3 Land for Regional Road widenings will be required equally from both sides of the centreline of the designated Regional Road unless existing land uses, topographic features or other physical or environmental constraints necessitate taking greater widening on one side than the other.

Policy 9.F.4 The Niagara Region may acquire, at its own expense, additional land that exceeds the *road allowance* widths identified in Table 9-1, without an amendment to this Plan.

Policy 9.F.5 The Niagara Region will consider the need for noise mitigation measures to address traffic noise from Regional Roads, where required, premised on noise study recommendations per Ministry of the Environment, Conservation, and Parks guidelines for the following situations:

- a) New development adjacent to a Regional Road; or,
- b) Impact of noise generated by increased traffic on Regional Roads adjacent to established *development*.

Policy 9.F.6 As part of the *development* application process, a *road allowance* not yet owned by the Niagara Region and identified in the Niagara Region's Transportation Master Plan should be protected in the following cases:

- a) A local street that could be ultimately assumed by the Region; and,
- b) Plans for the extension of an existing road allowance.

Policy 9.F.7 The Niagara Region will have regard to the Niagara Region's Model Urban Design Guidelines, *Complete Streets Design Guidelines*, and Wayfinding Signage for Cyclists Guidelines when providing comments on *development* applications located along Regional Roads.

Policy 9.F.8 The Niagara Region will plan and protect rights-of-way for the Niagara Region's *transportation system, major goods movement facilities and corridors, active transportation* corridors and transit facilities to meet current and projected needs, while ensuring that *development* is not permitted in *planned corridors* that could preclude or negatively affect the purposes of the corridor.

Policy 9.F.9 Local municipalities, in consultation with the Niagara Region and the *Province*, shall develop official plan policies that provide protection for *planned corridors* to ensure that decisions on *development* applications will not preclude or negatively affect the use of the corridor for the purpose(s) for which it was identified.

Policy 9.F.10 The Niagara Region will encourage the co-location of linear *infrastructure* along Regional Roads, where applicable.

Policy 9.F.11 The Niagara Region will consider the separation of transportation modes within corridors.

Policy 9.F.12 As part of the construction, optimization, or expansion of transportation *infrastructure* within the Niagara Region's *agricultural area* and *natural heritage system*, the Niagara Region will require, where applicable:

- a) the preparation of an agricultural impact assessment, or equivalent analysis as part of a Municipal Class Environmental Assessment, that demonstrates that any impacts on the agricultural system have been avoided or, if avoidance is not possible, minimized, and, to the extent feasible, mitigated; and/or
- b) the preparation of an environmental impact study, or equivalent analysis as part of a Municipal Class Environmental Assessment, that demonstrates that any impacts on the *natural heritage system*, key natural heritage features, key hydrologic features and key hydrologic areas have been avoided or, if avoidance is not possible, minimized, and to the extent feasible, mitigated.

Policy 9.F.13 The Niagara Region and local municipalities shall conform to National Energy Board regulations and provisions in relation to the requirements for *development* within proximity to its pipelines and corridors.

Policy 9.F.14 The Niagara Region's transportation system will be implemented as per the recommended actions and schedules of the Niagara Region Transportation Master Plan.

3.3.1.7 9.G Transportation Demand Management

Policy 9.G.1 The Niagara Region will develop and implement a Transportation Demand Management (TDM) Study that is consistent with the recommendations of the Niagara Region's Transportation Master Plan and conforms to the Provincial Growth Plan for the Greater Golden Horseshoe.

Policy 9.G.2 Local municipalities shall develop and implement *TDM* policies to be incorporated into local official plans that are consistent with the future Niagara Region's TDM Study.

3.3.1.8 9.H Goods Movement

Policy 9.H.1 The Niagara Region, in partnership with local municipalities, will develop and implement a Goods Movement Study that is consistent with the recommendations of the Niagara Region's Transportation Master Plan and the Province's Freight-Supportive Guidelines. The Goods Movement Study will take advantage of cross-border trade opportunities, including the Foreign Free Trade Zone, support employment activity, and maximize the use of the Gateway Economic Zone and Gateway Economic Centre.

Policy 9.H.2 The Niagara Region and its local municipalities will ensure the protection of lands adjacent to or near major goods movement facilities and corridors, including those outside of *settlement areas* and/or within the *Greenbelt Area* for the expansion of *infrastructure* and uses ancillary to that of the principle major goods movement facility and/or corridor use while:

- a) requiring a Municipal Class Environmental Assessment to demonstrate the need and alternative options for the infrastructure required for the expansion;
- avoiding specialty crop areas, and other prime agricultural areas in that order of priority, unless need has been demonstrated and it has been established that there is no reasonable alternative for the location of the infrastructure as determined through the applicable Municipal Class Environment Assessment;
- c) avoiding, or where avoidance is not possible, minimizing and mitigating adverse impacts to the agricultural system or other sensitive land uses vulnerable to encroachment; and
- d) requiring an agricultural impact assessment during instances where infrastructure or uses are proposed within, adjacent to, or near the Greenbelt Area or agricultural system.

Policy 9.H.3 The Niagara Region and its local municipalities will ensure that *development* of lands adjacent to or near *major goods movement facilities and corridors* will be compatible with goods movement function of those facilities and be designed to avoid, mitigate or minimize negative impacts on and from the facilities and corridors.

Policy 9.H.4 The Niagara Region will support the implementation of a *multimodal transportation system*, which accommodates the movement of goods, where identified through the Goods Movement Study.

Policy 9.H.5 The Niagara Region will work with the *Province*, local municipalities, agencies, and transportation service providers to implement a *transportation system* which is able to accommodate agricultural vehicles and equipment, where appropriate.

Policy 9.H.6 The Niagara Region will continue to advocate for highway capacity improvements to address inter-regional and international trade related demands for the purposes of goods movement.

Policy 9.H.7 The Niagara Region will consider, where possible, the protection of abandoned rail corridors for future *freight-supportive* activity.



Figure 3-2 Regional Structure .

3.3.2 Niagara Region Transportation Master Plan (2017)

The Region's Transportation Master Plan (TMP), How We Go (approved July, 2017), sets out a strategic vision for transportation in the Niagara Region to 2041, and illustrates how effective transportation can enhance the quality of life for residents. As Section 6.0 of the TMP states, "The transportation network should promote healthy communities where all residents, regardless of age or ability, enjoy a high quality of life. Residents will have a wide range of options available to them for getting around and meeting their daily needs including accessing goods, services, employment and recreation by alternate travel modes (i.e., walking, cycling, public transit and the automobile)." Overall, the TMP establishes a long-term transportation vision to ensure that future transportation needs are addressed through development of pedestrian and cycling facilities, rapid and conventional transit, and the integration of roads and highways within the Regional transportation network.

The goals of the TMP include, in summary:

- Integrate transportation and land use;
- Support economic development;
- Enhance multi-modal connectivity;
- Improve options for sustainable modes of transportation;
- Maintain and improve efficiency of the goods movement network;
- Promote the development of healthy communities; and
- Develop a realistic yet innovative blueprint for implementation.

The TMP also outlines challenges and opportunities for improvement for the Region's transportation network. With 760 km of cycling facilities, the TMP indicates that there are many gaps and discontinuities within the active transportation network, recommending a need for increased connectivity in cycling infrastructure.

There is also a low level of transit coverage throughout the Region, as travel patterns do not align with administrative boundaries, and much of the Region's land area is rural, complicating transit coverage. Most of the road network is found to be adequate, but improvements are recommended with regard to connections to the provincial highway network, most critically the QEW. Overall, the TMP recommends that the Region's transportation system become more responsive to the complexities of travel demands of its residents through better connections locally, regionally, and externally.

The following are recommended strategies from the TMP that are relevant to this Project:

 Plan and design all Regional Road Projects identified in the Road Capital Plan, including repaving, using a Complete Streets approach, designing roads to be universally accessible, safe and comfortable for all users;

- Invest in active transportation facilities and supporting infrastructure to promote active lifestyles and healthy communities;
- Strengthen core transit services and provide transit connections to all of its local municipalities through a combination of fixed-route and demand-responsive transit, using existing and emerging technologies to improve efficiency and cost-effectiveness, to support growing demand for inter-municipal travel and inter-regional transit services; and
- Accommodate future growth in travel through strategic network capacity increases and address operational improvements at key constraints. It is recommended that the Region continue to advocate for highway capacity improvements to address inter-regional and international trade and tourism-related demands, including a new trade corridor connecting Niagara to Hamilton and the international border.

The integration of the strategies of the TMP as policies within the ROP helps the Region plan effectively for future growth, while also supporting progress towards its other goals such as reductions in greenhouse gas emissions, improving social equity, and promoting healthier lifestyles.

Within the Focused Study Area, the only major transportation Project included in the TMP is a potential extension of Livingston Avenue westwards to Main Street West/Oakes Road North, which is recognized as a Regional Capital Road Project. The Regional Road expansion is intended to provide a connected road network that better accommodates economic demands, tourism demands and travel for Niagara residents.

A number of technical papers were developed to support the TMP that are of relevance to the Study, including the Strategic Cycling Network and the Complete Streets Design Guidelines which are reviewed in the following sections.

3.3.2.1 Strategic Cycling Network (2017)

One of the supporting elements of the Region's TMP (2017) is the Strategic Cycling Network (SCN) that identifies the key corridors across the Region to be improved with cycling infrastructure in order to provide a more complete network of cycling lanes in key areas. The ROP was updated to integrate the SCN into Schedule E2 (September 2017). **Figure 3-3** shows an excerpt from Schedule E2 of the ROP, indicating that Casablanca Boulevard, the North Service Road, Livingston Avenue, and Main Street West are identified as being part of the network.



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Figure 3-3 Excerpt from Schedule E2 of the Regional Official Plan: Strategic Cycling Network



Focused Study Area

Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)

Study Area

Strategic Cycling Network (Niagara Region, 2017)

- Local Road
- Arterial Road
- ----- Highway
- Railway (CN)
- Water Body



MAP DRAWING INFORMATION: ESRI IMAGERY (2013), MNRF

MAP CREATED BY:SFG / LK MAP CHECKED BY: CV MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N



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3.3.2.2 Complete Streets Design Guidelines (2017)

The Niagara Region Complete Streets Design Guidelines were developed to support the Region's TMP (2017). This document provides guidance on the aspirational vision for Regional Roads, with the intent noted in Section 1.2 of the Guidelines being to create "a coordinated family of complete streets" across the Region. As Regional Roads are designated as Arterials under the ROP, the guidelines set forth design criteria with a hierarchy of typologies that takes into account the form, function, and surrounding environment of the roads. The six typologies are:

- 1. Main Street;
- 2. Urban General (Narrow);
- 3. Urban General (Wide);
- 4. Transitioning;
- 5. Hamlet; and
- 6. Rural.

The typical planned Right-of-Way for each of these Complete Street Typologies forms the basis for the streetscape elements that are recommended. The Guidelines present demonstrations and typical cross sections for each of the typologies.

The roads in the Study Area which are proposed to be improved were compared against the typologies in the Guidelines (**Table 3-2**). The associated design guidance and streetscape elements in the Guidelines for each road corridor segment were considered in the development of the Alternative Designs and the preferred design (**Section 7** and **Section 8** of this ESR, respectively).

Road Segment	Road Typology	Function
The South Service Road (Casablanca Boulevard to Industrial Drive)	Urban General (Wide)	Major urban arterial with adjacent high density commercial/retail development
Livingston Avenue (Casablanca Boulevard to west of Emily Street)	Hamlet	Local community road with adjacent low density residential
Hunter Road (the South Service Road to Main St. West)	Hamlet	Local community road with adjacent low density residential
Main St. West (Casablanca Boulevard to Oakes Road North)	Rural	Efficient movement, primarily for private and goods movement vehicles, along with recreational cycling facilities

Table 3-2: Complete Streets Typologies for Roads in the Study Area

3.4 Other Relevant Documents/Plans

3.4.1 Niagara Rail Service Expansion Environmental Study Report (2011)

In 2010, Metrolinx undertook an EA to assess the need and potential locations for GO Transit Stations across Niagara. The resulting Niagara Rail Service Expansion Environmental Study Report (April, 2011) identified the Casablanca Boulevard GO Transit Station as the preferred location for GO Rail service to Grimsby. The EA was completed in accordance with GO Transit's Class EA document, dated December 2003 (as amended August 2005). The approval of the 2011 ESR created the impetus for the Region to undertake the development of the Grimsby GO Transit Station Secondary Plan (2018) as part of the Niagara GO Hub and Transit Stations Study (NGHTSS) which was undertaken by the Region from 2016 to 2018.

Metrolinx has developed a Functional Design concept for the GO Transit Station indicating a plan to provide 197 parking spaces on the north side of the Station Area site north of the CNR mainline, and is undertaking Detailed Design of the GO Transit Station site.

3.4.2 Town of Grimsby Official Plan (2012)

The Town of Grimsby's Official Plan (OP, approved May 12, 2012) aligns with the ROP to establish a cohesive policy framework for the upper and lower tier municipalities. The focus of the Town's OP is to manage future growth compatibly with its designated land uses, protect and enhance its natural heritage features, promote economic development, and coordinate planning policies with various levels of government to ensure consistency in planning for Grimsby to 2031.

The Town's OP outlines a strategic direction for future growth and development in Grimsby, which is implemented through the policies of the Plan. The vision is focused on long-term growth, wellbeing of residents, healthy communities, increased employment and economic development, and attainable and affordable housing, all while preserving the Town's roots in agriculture as a farming community. The following vision statement in **Section 2.1** is relevant to the current Study:

"Transportation choices will be improved with an efficient and connected road network and a future public transit service anchored on Downtown and potential future GO Transit service along the QEW and/or the railway corridor."

Section 2.2 outlines the guiding principles for the strategic direction of the OP. The following are relevant transportation-related principles that were taken into consideration throughout this Study:

- Promote an urban structure that is less dependent on cars, and encourages alternative modes of transportation such as public transit, cycling, and walking.
- Develop and maintain a transportation system that will provide for the safe, convenient and efficient movement of people and goods while providing a variety of transportation options.

Section 5.0 outlines the Town's transportation vision, goals, objectives, and implementation policies. The goals focus on the provision of alternative modes of transportation and encouragement of their use. The following are relevant transportation-related policies in the Town's OP that were taken into consideration throughout this Study, with references to the relevant section of the OP provided in brackets:

- The Town will encourage the efficient movement of people and goods (Section 5.4.1.6);
- Consideration shall be given, where appropriate, to reducing the number of driveways along Regional arterial roads through the provision of service roads, shared driveways, and common off street parking areas (Section 5.4.3.3);
- The following future road connections are planned: Connect Livingston Avenue from its current terminating point west of Emily Street, to Regional Road No. 81. The proposed intersection configuration would encourage the use of Livingston Avenue as an east-west corridor and mitigate congestion on Main Street West. An Environmental Assessment is required for the future Livingston Avenue road extension, and is currently underway as a separate study (Section 5.4.7.1);
- Road rights of way facilitate transportation and transit networks, pedestrian and bicycles connections, opportunities for vistas and view corridors, pedestrian amenity areas, as well as space for utilities and services (Section 5.6.1); and
- This Plan will ensure the integration of cycling opportunities with the Niagara Wine Route and the Niagara Region Bicycle Network (Section 5.6.3.3).

Section 12.4.4.v outlines the Livingston Avenue Extension to be determined "depending on the evolution of traffic patterns in the area". The policy further states "The Region has maintained this

as an opportunity for improving east-west connectivity and providing relief to the congested South Service Road. The Region should protect for this opportunity in the secondary plan in the event that it is required over the long term. The Region may also need to consider protecting the option for a second access point off of Livingston Avenue. Given the sensitive environment in this area, the road extension would undergo an Environmental Assessment and will be ecologically designed to minimize impact on the woodlot and its habitat and hydrology."

With respect to the land uses in the area, Schedule B-1 of the Town's OP identifies the general intent for the lands in the Study Area, with more specific detail provided in the Grimsby GO Transit Station Secondary Plan. Land use designations and their definitions outlined in the Town's OP are listed below and shown on **Figure 3-4**.

- Residential Mixed Use (Section 9.20) The lands designated as residential/mixed use area are ideal locations for a mixture of residential, convenience retail, service commercial, and prestige employment uses. It is the intent of the Town to promote the development/redevelopment of the lands designated as residential/mixed use area for higher density, transit supportive and mixed use developments that take advantage of the attributes of their physical location;
- Employment Area (Section 9.20) Means areas designated in an official plan for clusters of business and economic activities including, but not limited to, manufacturing, warehousing, offices, and associated retail and ancillary facilities;
- Agricultural (Section 9.20) Means the growing of crops, including nursery and horticultural crops; raising of livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry; maple syrup production; and associated on-farm buildings and structures, including accommodation for full-time farm labour when the size and nature of the operation requires additional employment. Agricultural uses include value retention uses required to make a commodity saleable (i.e. corn dryer, washing, sorting, packing and packaging);
- Parks and Open Space (Section 3.8) The lands designated Parks and Open Space are intended to include publically owned lands, Town parks and some privately owned lands which are free of major buildings or structures. Permitted uses on lands designated Parks and Open Space include passive and active recreational uses, conservation uses, cemeteries and public infrastructure;
- Transit Station Area (Section 12.0) The Grimsby GO Transit Station Secondary Plan area is intended to create a vibrant, mixed use node that provides for a full range of uses, improves active transportation connectivity, ensure a high quality design for the gateway station area, improve streetscapes, develop new public spaces and provide appropriate transitions to residential neighbourhoods; and
- Rural Area (Section 9.20) Means lands in the rural area which are located outside settlement areas and which are outside prime agricultural areas.



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Figure 3-4 Town of Grimsby Official Plan-Schedule B-I Land Uses



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3.4.3 Grimsby GO Transit Station Secondary Plan (2018)

To support the Provincial investment in high order transit, Niagara Region undertook the GO Hub and Transit Stations Study (completed in 2018) for four future GO Transit Stations across the Region (Grimsby, Lincoln, St. Catharines, and Niagara Falls). The intent of the Study was to prepare the lands for transit-oriented development and growth while ensuring direction for high quality urban design. The Study included the preparation of planning and design tools, including Secondary Plans (under Section 17 of the Planning Act) for the lands in and around the Stations, which included urban design guidelines and implementation/phasing guidance.

The purpose of the Grimsby GO Transit Station Secondary Plan was to provide the vision and planning policy framework that will guide future transit-oriented development and redevelopment in the Grimsby GO Transit Station Area. The plan provides long range policy for land use (**Figure 3-5**); transportation including walking, cycling, and road infrastructure; municipal infrastructure improvements; urban design and public realm improvements; and, implementation tools and a monitoring program. The Plan was adopted by Town of Grimsby Council as Amendment No.6 to the Town's Official Plan on February 20, 2018, and approved by Region Council on May 3, 2018.

The Secondary Plan designates the following land uses within the Study Area:

- Agricultural Speciality Crop Areas: In addition to the uses permitted in Agriculture Specialty Crop Area, the area identified by 'Transit Station Area' overlay may also be used for a Transit Station and related accessory uses, in accordance with the 2011 Niagara GO Rail Expansion Environmental Study Report.
- **Employment Office:** The planned function is to provide a vibrant mix of transitorientated employment and commercial development in higher density built form in proximity to established business/industrial uses and existing and planned higher order transit infrastructure.
- **Mixed Use High Density:** This designation is to provide opportunities for commercial, office, and institutional uses on the ground floor to help frame and animate the street.
- **Rural Area:** The purpose of this designation is to preserve prime agricultural land for a wide variety of agricultural uses and promote, protect and maintain the farming industry for future generation.
- Environmental Conservation Area: This feature includes significant woodlands, significant wildlife habitat, significant habitat of species of concern, regionally significant life science ANSIs, other evaluated wetlands, significant valley lands, savannahs and tall grass prairies, alvars and publicly-owned conservation lands.
- Environmental Protection Area: This feature includes provincially significant wetlands, provincially and regionally significant Life Science ANSI's, fish habitat, and significant habitat of threatened and endangered species.

3.4.4 Town of Grimsby Zoning Regulations

The Town of Grimsby Zoning By-law 14-45 (as amended), Schedules 3,4,10 and 11 illustrate the Zoning that applies to the immediate Project area. The applicable Schedules can be found in **Appendix E.** The following summary provides an overview of the applicable zoning regulations for the Study Area:

- On the west side of Casablanca Boulevard, where Livingston Avenue extends to a small cluster of residential homes connecting to Rosedale and Emily Street is zoned as Rural Area (RU). East of Hunter Road, surrounding Geddes Street and Elmer Street, is another section zoned Rural Area (RU);
- A majority of lands west Casablanca Boulevard to west of Hunter Road are zoned Specialty Crop (SC). An overlay of Environmental Conservation (EC) represents the significant woodlot. Another overlay of Environmental Protection (EP) runs north-south through the Speciality Crop zone, representing the key hydrologic feature;
- Further west towards Oakes Road, the land is zoned Public Open Space (O2).
- A plot of land to the east off of Oakes Road, and another plot north off of Main Street, near Hunter Road is zoned Institutional (I); and
- The area south of the QEW exit ramps and north of Casablanca Boulevard is zoned Service Commercial (CS). Further west, the lands are zoned General Employment (GE).



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Figure 3-4 Grimsby GO Transit Station Secondary Plan-Schedule G Land Use Plan (2018)



Utility Area

150 75

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3.4.5 Niagara Peninsula Source Protection Plan (2013)

Under the authority of the *Clean Water Act, 2006 (Ontario Regulation 287/07),* the Niagara Peninsula Source Protection Committee (SPC) established a Source Protection Plan Working Group (SPPWG) to develop a Source Protection Plan (SPP, 2013) derived from the Niagara Peninsula Conservation Authority and the Ministry of the Environment guidance. Municipalities have a critical role in implementing the SPP, as they are responsible for the delivery of municipal drinking water and land use planning. As a result, much of the implementation of the SPP must be incorporated into the municipal planning processes. Municipalities are therefore responsible for bringing Official Plans and Zoning By-laws into conformity with the policies contained in the SPP.

The identification of threats to Municipal drinking water intakes is a key step to source water protection. A threat is an existing or potential land use activity that has the potential to impact water quality or the quantity of water that is used as a source for Municipal drinking water. The Ministry of Environment, Conservation and Parks prescribes 21 types of activities considered as drinking water threats, which can be found in the Niagara Peninsula SPP. Further description of potential effects of the undertaking as it relates to groundwater is described in Section 4.2 of the SPP.

The Niagara Region Official Plan identifies "Intake Protection Zones" (Schedule H), which is based on the findings of the Niagara Peninsula SPP. As explained in the Plan, Intake Protection Zones are areas of land and water where drainage run-off could directly impact water quality at Municipal drinking water intakes. The evaluation found there to be significant threats related to land uses associated with water treatment plants within the Region. The ROP outlines policies for the water treatment sites, along with implementation and monitoring procedures.

As shown on **Schedule PA** of the Niagara Peninsula SPP, the Study Area is not designated as an "Intake Protection Zone."

3.4.6 Regional Tree and Forest Conservation By-law No. 30-2008

The Niagara Peninsula Conservation Authority is responsible for administering and enforcing the By-law on behalf of the Region. The intent is to ensure that where tree cutting occurs, it is carried out in accordance with Good Forestry Practices.

The By-law provides for the establishment of an Advisory Committee by the Niagara Peninsula Conservation Authority. It is to be a technical advisory committee and is to review and provide advice on matters of tree and forest conservation as requested by the Authority. The Committee is to include, at a minimum, representatives of the local municipalities, the Niagara North and Niagara South Federations of Agriculture, the Niagara Woodlot Association, and the logging industry.

The selective cutting or removal of individual trees within woodlands is provided for but in most cases a permit is required, although the By-law does contain certain exemptions. Exemptions to

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the By-law do not apply to trees cut or removed "by a municipality for activities or matters undertaken for municipal purposes". Nonetheless, the Region undertakes tree compensation practices where tree removal is required for construction of municipal infrastructure.

3.4.7 Climate Change Projections for Ontario: An updated synthesis for policymakers and planners (2015)

As there is a waterway in the Study Area, climate change will also be considered. In this report, the MECP/MNRF present climate change projections from the Intergovernmental Panel on Climate Change's fifth Assessment Report which are summarized for the province of Ontario. Projected changes in climate are described under three representative concentration pathways (i.e., low, medium, and high) for the three main drainage basins in Ontario: Hudson Bay, Nelson River (northwestern Ontario), and Great Lakes Basin and the five Great Lakes sub–basins (Lake Superior, Lake Huron, Lake Erie, Lake Ontario, and the Ottawa River). In each basin, projected mean annual, summer, and winter temperatures and total annual, summer, and winter precipitation are shown for three 30-year time periods: 2011–2040 (the 2020s), 2041–2070 (the 2050s), and 2071–2100 (the 2080s). Results of studies in which past observed climate trends were reviewed are also included to allow comparisons between past and future trends.

Precipitation is projected to be more variable across the climate scenarios. The province could experience up to 240 mm more precipitation annually than historical levels. However, the Hudson Bay Basin may experience little change in precipitation, while the Nelson River and the Great Lakes Basins may experience drier summers (up to 60 mm less than historical levels by the 2080s in both basins, under the highest pathway). All three basins are likely to experience more precipitation in the winter; the largest increase in precipitation may be as much as 158 mm above historical levels, and is projected to occur in the Great Lakes Basin by the 2080s.

Within the Great Lakes Basin, temperature changes are projected to be largest in the northern portions of the basin. Mean annual air temperatures will increase the most in the Lake Superior sub-basin, ranging from 3.2 to 8.3 °C above historical levels by the 2080s, and lowest in Lake Erie, ranging from 2.8 to 7.2 °C above historical levels for the same time period. In all sub-basins and across the climate scenarios, winter warming will exceed summer warming. Projected precipitation patterns also indicate an annual increase across all five sub-basins, with the highest potential increases in Lake Superior sub-basin. Summers are projected to be drier basin-wide. Winter precipitation is likely to change more dramatically than summer precipitation, where the greatest change is projected in the Lake Huron sub-basin, averaging up to 85.2 mm above historical levels by the 2080s.

4.0 Existing Conditions

This Section provides a description of baseline conditions for the identified Study Area (See **Section 1.2**). The baseline conditions were considered in the development of alternatives and assessment of effects as described further in this ESR.

The Transportation Assessment as well as the Socio-Economic Environment and Physical Environment studies undertook a broader look at the complete Study Area, while the remaining studies were more closely aligned to the Focus Area identified on **Figure 1-1**.

For purposes of clarity, the descriptions provided in this Section are generally targeted towards the Focus Area, and baseline conditions are described for the following topic areas:

- Transportation and Infrastructure (Section 4.2);
- Drainage and Stormwater Management Conditions (Section 4.3);
- Socio-Economic Environment (Section 4.4);
- Physical Environment (Section 4.6);
- Natural Environment (Section 4.6); and
- Cultural Heritage Environment (Section 4.7).

4.1 Existing Conditions Summary

This section provides an overview of the existing conditions for each of the key topic areas that are further detailed in **Sections 4.2 to 4.7**.

4.1.1 Transportation and Infrastructure

The transportation infrastructure within the study area experiences traffic congestion and queuing issues during peak travel periods particularly on the South Service Road, as summarized in **Section 4.2**. This Study is particularly concerned with east-west movement through the Study Area; however, the intersections with north-south corridors are also considered, and the transportation assessment conducted included all main transportation corridors in the larger Study Area.

Additional information on the transportation and infrastructure systems in the Study Area is provided in **Section 4.2**.

4.1.2 Drainage and Stormwater Management

Drainage in the Focused Study Area is supported by varying infrastructure, with roadside ditches along Main Street West and along the South Service Road. There are significant flows from the lands west of the current westerly terminus of Livingston Avenue, due to downflows from the Niagara Escarpment. A watercourse runs south to north between Emily Street and Hunter Road. The watercourse collects stormwater runoff from the study area and directs it toward Lake Ontario, flowing under the QEW. Additional information on the drainage conditions in the Study Area is provided in **Section 4.3**.

4.1.3 Socio-Economic Environment

The existing population base for the Town of Grimsby is currently at approximately 28,000 persons, and is anticipated to increase to over 33,000 by 2021, and to over 37,000 by 20411. The majority of development applications are located north of the QEW, within the Winston Neighbourhood Secondary Plan area.

The key employment sectors in the Study Area include Healthcare, Education, Manufacturing, and Retail Trade. In addition, there are agricultural uses south of the CN Rail corridor as well as some tourism-related services in the northern portion of the Study Area. There are a number of established residences along Livingston Avenue west of Casablanca Boulevard, along Hunter Road, and along Main Street between Casablanca Boulevard and Oakes Road North. The main commercial corridor in the area is the South Service Road, which features big box retail establishments as well as larger service commercial enterprises.

There are no First Nation Reserves in the Study Area. The Indigenous Communities and Organizations identified in this geography included: the Six Nations of the Grand River, Mississaugas of the New Credit First Nation, Haudenosaunee Confederacy, and Metis Nation of Ontario.

Additional information on the socio-economic environment in the Study Area is provided in **Section 4.4**.

4.1.4 Physical Environment

The Study Area is located in the Lake Iroquois Plain, which is comprised mostly of permeable sand. Depths of groundwater generally vary between 4.0 metres (m) and 6.0 metres (m) were observed from geotechnical survey. Additional information on the physical environment in the Study Area is provided in **Section 4.5**.

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¹ Hemson Consulting Ltd., Greater Golden Horseshoe Growth Forecasts to 2041, Technical Report, November 2012.

4.1.5 Natural Environment

This section provides an overview of the natural environmental and heritage features included in the Focused Study Area based on biophysical inventories completed in 2018 and 2019. A more detailed description is provided in **Section 4.6**.

Fisheries and Aquatic Habitat

There is one watercourse (unnamed) in the Focused Study Area, associated with the Irish Grove Woodlot located west of the current terminus of Livingston Avenue. The watercourse's headwaters are located approximately 1 km south of the Focused Study Area, and flows north, ultimately discharging into Lake Ontario. At various points, the watercourse flows through corrugated steel pipe (CSP) culverts. The field investigations conducted as part of the natural heritage assessment for the Focused Study Area identified that the watercourse is suitable for fish habitat.

Terrestrial Resources

There are four woodland features in the Focused Study Area (Figure 4-5):

- Woodland A;
- Woodland B;
- Woodland C; and
- Woodland D (Irish Grove Woodlot).

Of these, the largest is Woodland D, also conventionally known to residents in Grimsby as the Irish Grove Woodlot. A Tree Inventory along the Livingston Avenue right-of-way was undertaken, including the segment passing through Woodland D. Ecological Land Classification (ELC) surveys and three-season botanical assessments were completed for each of the natural features within the Focused Study Area. A total of 14 natural ecological communities were identified based on the ELC results, while 133 botanical species were documented within the Focused Study Are. No botanical Species at Risk (SAR) or Species of Conservation Concern (SCC) were observed. Of the total 364 trees inventoried within the Livingstone Avenue right-of-way greater than 10 cm diameter at breast height (DBH), 25 of the trees (or 6.9 %) were assessed as being in poor condition (1 Wild Black Cherry and 24 ash trees); also, 81 of the trees (or 22.3%) were assessed as dead (73 ash trees, 3 Sugar Maple, 3 Large-tooth Aspen and 2 Eastern Hop-hornbean).

SAR include species listed as Endangered and/or Threatened under the provincial *Endangered Species Act, 2007* (ESA). SCC are defined as species listed as Endangered and/or Threatened under the federal *Species at Risk Act, 2002* (SARA), but not under the ESA; species that are provincially rare/tracked (i.e. have a Sub-national (provincial) Rank of S1 – Critically Imperilled, S2 – Imperilled or S3 – Vulnerable); and/or are designated as Special Concern under the ESA.

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Breeding Bird Surveys

Breeding Bird Surveys (BBS) were completed in order to establish quantitative estimates of bird abundance in suitable habitat types within the Focused Study Area. Surveys were not completed within Woodland A due to its more remote location and given that impacts to the feature were not anticipated based on the proposed alternatives.

A total of 54 bird species were observed during breeding bird surveys. Of the 54 species observed, three are considered SAR and two are considered SCC:

- Eastern Meadowlark (Sturnella magna) Threated;
- Bank Swallow (Riparia riparia) Threatened;
- Barn Swallow (Hirundo rustica) Threatened;
- Red-headed Woodpecker (Melanerpes erythrocephalus) Special Concern; and
- Eastern Wood-pewee (Contopus virens) Special Concern.

Of the SCC observed within the Focused Study Area, both were observed within Woodland D. No SAR were observed in association with woodlands.

Incidental Wildlife

A range of wildlife was incidentally observed during the field investigations; however, none of the species incidentally observed are considered SAR or SCC. Incidental wildlife observations included:

- Green frog (Lithobates clamitans);
- White-tailed Deer (Odocoileus virginianus);
- Raccoon (Procyon lotor);
- Eastern Cottontails (Sylvilagus floridanus); and
- Red Squirrel (Sciurus vulgaris).

Species at Risk

Based on the field investigation results, the woodlands within the Focused Study Area have the potential to provided SAR bat roosting habitat. No botanical SAR were observed within the Focused Study Area. Of the SAR birds (Eastern Meadowlark, Bank Swallow and Barn Swallow) observed within the Focused Study Area, both Bank Swallow and Barn Swallow were observed as flyovers, while Eastern Meadowlark was observed within the fallow field east of Woodland D.

Significant Wildlife Habitat

Preliminary results suggest that the Focused Study Area provides the following Significant Wildlife Habitat (SWH) as per the Eco-Region 7E Criterion Schedule (MNRF, 2015):

Livingston Avenue Extension Environmental Assessment – Environmental Study Report –DRAFT • Significant Wildlife Habitat for Special Concern Species (Eastern Wood-pewee and Redheaded Woodpecker).

The preliminary results also suggest that the Focused Study Area has the potential to provide Candidate SWH, including though not necessarily limited to, the following:

- Land bird Migratory Stopover Area;
- Bat Maternity Colonies;
- Raptor Wintering Area;
- Amphibian Breeding Habitat (woodland); and
- Special Concern and Rare Wildlife Species.

The aforementioned Candidate SWHs were included in instances where seasonal surveys were not completed in order to infer the habitat was absent. In addition, although targeted bat habitat surveys were not completed, the woodlands within the Study Area have the potential to support SAR bats.

4.1.6 Cultural Heritage

A review of the Focused Study Area confirmed that there are seventeen cultural heritage resources consisting of fifteen built heritage resources (BHR) and two cultural heritage landscapes (CHL) within or adjacent to the Focused Study Area.

The identified cultural heritage resources in the study area include fifteen residences (BHRs 1-15), one laneway (CHL 1), and one orchard (CHL 2), as well as one property with an Ontario Heritage Trust Conservation Easement (BHR 14), and seven listed properties in the Town of Grimsby's Municipal Heritage Register.

Additional information on the cultural and archaeological heritage environment in the Study Area is provided in **Section 4.7**.

4.2 Transportation and Infrastructure

This section provides a summary of the baseline information for the following components of the existing transportation system in the Study Area:

- Existing Road Network;
- Existing Geometry and Traffic Controls;
- Active Transportation Facilities;
- Collision History;
- Corridor Operation and Level of Service (LOS);
- Transit Operation;
- Student Transportation Services;
- Structures/Crossings; and
- Utilities.

More information is provided on each component below. **Appendix B** includes the Transportation Assessment Report, which provides a detailed technical analysis of the transportation system including an assessment of projected future traffic demands and capacities.

In summary, key issues identified related to the movement of all transportation modes through the area as identified on **Figure 4-1**. The primary issue for east-west vehicle movement is on South Service Road between Industrial Drive and Casablanca Boulevard. Other modes of transportation are limited by the following constraints:

- The active transportation network is limited to sidewalks located along the west side of the QEW bridge, the east side of Casablanca Boulevard, and the east side of the South Service Road, as well as sidewalks and cycling lanes on Livingston Avenue east of Casablanca Boulevard; and
- Transit service within the Study Area is limited to GO Bus Route #12 and school bus service along Casablanca Boulevard.

These issues are further explored in the following sections. It should be noted that while this Study is focused on the needs of east-west travel through the Study Area, the transportation analysis builds upon that completed for the Casablanca Boulevard and GO Station Access EA Study, as the two corridors intersect. The preceding study examined the transportation needs in the vicinity of Casablanca Boulevard in light of the forecasted development in Grimsby and the opening of the GO Transit Station to the west of the intersection of Casablanca Boulevard and South Service Road.



Figure 4-1: Existing Traffic Conditions along Key Arterial Roads in the Study Area

The Casablanca Boulevard and GO Station Access EA Study found sufficient strategic and operational transportation issues resulting from the future development in the area to recommend widening of both Casablanca Boulevard (from South Service Road to Main Street West) and South Service Road (from Industrial Drive to Casablanca Boulevard). The EA for this work has been approved and detailed design is being completed.

4.2.1 Existing Road Network

The characteristics and existing operating conditions of the main roads in the vicinity of, and connecting to the Study Area are described below:

Livingston Avenue (Regional Road 512) is an east-west arterial street that runs eastwards from Casablanca Boulevard and then terminates where Main Street East begins (past RR12 Christie

St/Mountain St, Grimsby). The 2018 annual average daily traffic (AADT²) of Livingston Avenue to the east of Casablanca is 10,900. Livingston Avenue has a two-way left-turn lane and painted cycling lanes in both directions near Casablanca Blvd. The posted speed limit is 50 km/h. Sidewalks are provided on both sides of Livingston Avenue east of Casablanca Boulevard. Traffic flows via a single lane, with a left turning lane in the centre at the Casablanca Boulevard and Livingston Avenue intersection; a channelized right turn exists with a yield sign.

To the west of Casablanca Boulevard, A 30.5m Livingston Avenue Right-of-Way (ROW) runs westwards past the pavement terminus, to meet Oakes Road/Main Street West. Although only a short segment has been built out to the west of Casablanca Boulevard, there exists buried water and sewer servicing in this right-of-way (**Figure 4-1**). The lands abutting Livingston Avenue in this segment are single family homes, many with driveway access to Livingston Avenue.

Planned improvements as documented in the Casablanca Boulevard and GO Station Access EA (2019) include:

- A signalized intersection at Casablanca Boulevard and Livingston Avenue to control traffic in all directions;
- Improvements to Livingston Avenue west of Casablanca Boulevard to extend this roadway slightly west of its current terminal to east of the Irish Grove Woodlot, to provide access to the Region-owned lands and south side of the proposed GO Transit Station; and
- Addition of active transportation facilities (sidewalks and cycling lanes) on both sides of this section of Livingston Avenue.

Main Street West (Regional Road 81) is a minor arterial street running east-west from Hamilton, through Downtown Grimsby and further east to St. Catharines. The AADT (2017) for Main Street West is 7,000 to the west of Casablanca Boulevard and 7,600 to the east of Casablanca Boulevard. Through the study area, Main Street West has a two-lane cross-section, with paved shoulders and a posted speed limit of 70 km/h between Oakes Road and Hunter Road, 60 km/h between Hunter Road and Casablanca Boulevard, and 50km/h to the east of Casablanca Boulevard. A sidewalk is provided on the north side through the study area. From Casablanca Boulevard to the east, Main Street West runs along the bottom of a steep slope. Lands along Main Street West are developed with backing single family homes on the north side and fronting single family homes on the south side. West of Casablanca Boulevard, Main Street West curves to the north, and development along the road is mostly sparse single family residential, with

² AADT= Average Annual Daily Traffic: total volume of vehicular traffic for a year divided by 365 days; gives a general indication of how busy the road is.

several parcels used for agriculture or industrial use. Main Street West is also known as Regional Road 81, but will be referred to simply as Main Street West for the purposes of this report.

South Service Road is a two-lane minor arterial road that provides access to a significant amount of big box commercial development (highway rest area, car dealers, grocery, home improvement, fast food) and light industrial / warehousing uses within the study area. AADT (2017) on the South Service Road was 6,700 and 4,100 to the east and west of Casablanca Boulevard, respectively. As with the North Service Road, the South Service Road runs parallel to the QEW along essentially its whole length within the Niagara Region. Auxiliary turning lanes are provided in the vicinity of major commercial properties and at major intersections (e.g., Casablanca Boulevard). Within the study area, no sidewalks or cycling infrastructure are provided along the South Service Road.

Oakes Road is a two-lane collector street running north-south from south of Main Street West to Winston Road, north of North Service Road. AADT (2017) for Oakes Road is 1,000 vehicles. A sidewalk is provided on the east side between Main Street West and the CN Rail Grimsby Subdivision. Several single family homes front onto Oakes Road between Main Street West and the CN Rail Grimsby Subdivision. Additionally, Smith Public School, a Kindergarten to Grade 8 School, fronts onto Oakes Road North just south of the rail line. The rail crossing at the Grimsby Subdivision has crossing gates. North of the Grimsby Subdivision to the QEW, adjacent lands are largely undeveloped, with the exception of an industrial development south of the QEW. Oakes Road has a grade-separated crossing over the QEW, with multi-family residential development to the east on the north side of the QEW.

Hunter Road is a two-lane collector street running north-south from Main Street West to South Service Road. AADT (2017) for Hunter Road is 1,000 vehicles. There are no sidewalks, and ditches are present on both sides, leading pedestrians to walk on the pavement. Lands along Hunter Road are developed with fronting single family residential homes at the south towards Main Street West. Further north to the Grimsby Subdivision, adjacent lands are undeveloped. The rail crossing at the CNR Grimsby Subdivision has crossing gates. Lands north of the Grimsby Subdivision to South Service Road are developed with industrial and commercial land uses.

Figure 4-2 illustrates the existing road network, lane configurations at intersections, and traffic control at intersections under existing conditions.



Figure 4-2: Existing Road Network

4.2.1.1 Active Transportation Infrastructure

Active transportation encompasses a range of non-motorized modes of travel, including walking and cycling. The main walking infrastructure in the Study Area are the aforementioned sidewalks along the arterial as well as local rural streets. Additionally many neighborhoods include paths connecting streets across green spaces.

Dedicated cycling infrastructure in the Study Area is limited to the cycling lanes on Livingston Avenue east of Casablanca Boulevard. Main Street West has shoulders at least 1.0 m wide in all sections, with widths of over 2.0 m in many sections, which provides some on-road infrastructure for cyclists, especially given the connectivity of the corridor between the City of Hamilton to the west and the City of St. Catharines to the east.

4.2.1.2 Transit Service and Infrastructure

There is currently no local transit operating in the Study Area. GO Transit operates a GO Bus transit loop on the north side of the South Service Road, integrated with an MTO-owned carpool lot located on the northwest corner of the Casablanca Boulevard and the South Service Road intersection. GO Bus Route 12 provides service between Niagara Falls and Burlington where it connects to the GO Train. The GO Bus operates on weekdays between 4:54 AM and 12:24 AM with service approximately every 30-45 minutes during peak periods. The route operates primarily along the QEW and uses Casablanca Boulevard and the South Service Road. Buses use a bus loop off of the South Service Road to turn around and access the Casablanca Boulevard/QEW interchange. The bus loop connection with the South Service Road is not signalized.

4.2.2 Traffic Data

Traffic data for the Study Area was analysed to determine the existing issues related to traffic operations and queuing. Niagara Region provided traffic count data to use for the analysis in two forms:

- 8-hour turning movement counts (TMC) all TMCs were collected on Wednesday, May 9, 2018
- 24-hour Automated Traffic Recorder data (ATR) collected between May 5 and May 10, 2018

Figure 4-3 illustrates the existing traffic volumes used for the analysis. **Appendix B** contains the full traffic counts.

In addition, traffic signal timing and phasing plans were received from Niagara Region for applicable intersections within the Study Area. Dillon's previous work in the area (Transportation Assessment for the Niagara GO Hub and Transit Stations Study, 2017) also included field visits in the Study Area, which informed the understanding of existing conditions and issues.

Figure 4-3 Existing Traffic Volumes





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4.2.3 Corridor Operations

Under existing conditions, the road network in the Study Area generally operates well during nonpeak periods (and when there are no emergency conditions on the QEW adjacent to the Casablanca Boulevard interchange). The intersection of the South Service Road and Casablanca Boulevard is approaching capacity, with longer queues in the PM Peak Hour than in the AM Peak Hour (**Table 4-1** and **Table 4-2**).

Intersection Name	Control	# Vehicles Entering Intersection	Intersection Average (Weighted by Movement and Volume)			Critical Movement			Overall	
	Туре		Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	LOS
Casablanca Blvd & North Service Rd	Sig.	670	5.6	39.5	16.5	12.5	NBR	80.5	30.0	В
Casablanca Blvd & North Ramp Terminal	TWSC	1,187	1.9	11.9	2.8	0.2	WBL	50.1	11.6	-
Casablanca Blvd & South Ramp Terminal	TWSC	1,558	0.0	0.4	0.6	0.1	EBL	15.7	13.6	-
Casablanca Blvd & S Service Rd	Sig.	1,948	58.8	125.2	38.0	30.1	NBR	267.2	42.3	D
Casablanca Blvd & Livingston	TWSC	876	6.4	37.6	10.2	6.6	WBR	56.4	18.6	-
Casablanca Blvd & Main St W	TWSC	756	0.5	11.2	2.4	0.3	SBR	38.2	9.8	-
S Service Rd & Industrial Dr	TWSC	757	0.6	12.2	3.2	0.2	SBT	40.1	9.8	-
S Service Rd & Hunter Rd	TWSC	540	0.1	3.1	1.2	0.1	NBL	18.6	7.3	-
Hunter Rd & Industrial Dr	TWSC	259	0.5	9.9	2.5	0.1	WBR	20.2	5.0	-
Hunter Rd & Livingston Ave	TWSC	128	0.0	0.0	0.0	0.0	None	0.0	0.0	-
Hunter Rd & Main St W	TWSC	688	0.1	7.6	0.9	0.1	EBL	19.8	2.3	-
Main St W & Oakes Rd N	TWSC	764	0.4	7.3	2.2	0.1	SBR	30.4	7.6	-

Table 4-1 Existing Conditions Operational Assessment Results: AM Peak Hour

Table 4-2 Existing Conditions Operational Assessment Results: PM Peak Hour

Intersection Name	Control	# Vehicles	Intersection Average (Weighted by Movement and Volume)				Critical Movement			Overall
	Туре	Intersection	Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	LOS
Casablanca Blvd & North Service Rd	Signalized	809	14.7	67.8	22.8	17.6	NBR	124.8	35.3	С
Casablanca Blvd & North Ramp Terminal	TWSC	1,529	1.8	13.9	2.8	0.3	WBL	52.6	11.1	-
Casablanca Blvd & South Ramp Terminal	TWSC	1,850	40.0	67.1	30.2	23.8	EBR	241.7	120.0	-
Casablanca Blvd & S Service Rd	Signalized	2,243	49.5	117.2	52.2	41.7	NBR	220.1	43.2	D
Casablanca Blvd & Livingston	TWSC	831	0.3	21.8	1.6	0.3	SBL	50.4	2.7	-
Casablanca Blvd & Main St W	TWSC	732	0.2	12.3	1.6	0.2	SBR	26.0	7.2	-
S Service Rd & Industrial Dr	TWSC	905	1.7	17.9	5.4	0.7	SBL	41.4	12.5	-
S Service Rd & Hunter Rd	TWSC	537	0.0	0.4	0.3	0.0	NBR	15.4	7.5	-
Hunter Rd & Industrial Dr	TWSC	285	0.2	10.0	2.6	0.2	WBR	19.7	4.4	-
Hunter Rd & Livingston Ave	TWSC	146	0.0	0.0	0.0	0.0	None	0.0	0.0	-
Hunter Rd & Main St W	TWSC	733	0.1	10.9	0.9	0.1	EBL	17.2	0.9	-
Main St W & Oakes Rd N	TWSC	783	0.2	3.2	1.1	0.1	SBR	28.5	7.2	-

*The maximum queue listed in the table may be related to a blocked condition at an adjacent movement

4.2.4 Collision History

The Region provided data on the collision history for regional/municipal roads within and adjacent to the Study Area. **Table 4-3** which follows, indicates there were a total of 59 collisions in the South Service Road corridor between 2013 and 2018. As per the information received from the Region on March 10, 2020, for the Intersection of Casablanca Boulevard and the South Service Road (53% of the total collisions), 10 out of the 31 collisions reportedly involved vehicles travelling to/from the South Service Rd. The second most occurrence of accidents is at the intersection of Industrial Drive and the South Service Road (19%). The following highlights were obtained from the Region's available data.

	Impact Type						
Location	Angle	Sideswipe	Turning Movement	Rear End	SMV/ Other	Unspecified	Total
Hunter Rd @ S. Service Rd	2	0	2	0	1	0	5
S. Service Rd Btwn. Hunter Rd & Industrial Dr	2	0	0	0	0	0	2
Industrial Dr @ S. Service Rd	9	1	0	0	1	0	11
S. Service Rd Btwn. Industrial Dr & Casablanca Blvd	0	1	0	0	0	0	1
Casablanca Blvd @ S. Service Rd	1	2	4	22	1	1	31
S. Service Rd Btwn. Casablanca Blvd & Roberts Rd	1	2	1	0	2	0	6
Roberts Rd @ S. Service Rd	0	0	0	1	2	0	3
Total	15	6	7	23	7	1	59

Table 4-3:	Collision	History	2015 -	2020

4.2.5 Utilities

Existing utilities pertinent to this Study are located along the following corridors:

- The Livingston right-of-way from the east end of the Irish Grove Woodlot westerly to Main Street/Oakes Road;
- Main Street from Casablanca Boulevard westerly to Main Street/Oakes Road;
- South Service Road from Hunter Road to Industrial Boulevard;
- Hunter Road from the Livingston right-of-way northerly to South Service Road; and
- Main Street/Oakes Road.

Utility owners in the general Study Area include the following that may be encountered along the above corridors:

- Bell Canada;
- Cogeco Cable;
- Enbridge Gas Distribution;
- Enbridge Pipelines Inc.;
- Grimsby Power Incorporated;
- Group Telecom;
- Hydro One;
- Niagara Peninsula Energy Inc.;
- Niagara Regional Broadband Network;
- Ontario Power Generation;
- Niagara Region;
- Rogers;
- Town of Grimsby; and
- TransCanada Pipelines.

Of particular note, the Town of Grimsby installed a 250 mm (10 inch) sanitary sewer within the Regionally-owned Livingston Avenue right-of-way from Hunter Road easterly through the Irish Grove Woodlot extending to east of Casablanca Boulevard; a water line was also installed in this corridor from Hunter Road westerly.

4.3 Drainage and Stormwater Management Conditions

4.3.1 Roadway Drainage Conditions

Figure 4-4 presents the existing drainage catchment areas for the Study Area. The catchment areas consist primarily of agricultural, forest, and residential land uses. The agricultural land extends between Oakes Road North and Emily Street, and from the escarpment to the CN tracks. The CN tracks run west and east along the northern boundary of the agricultural land. The Niagara escarpment, located to the south of the Study Area is mainly comprised of forested area. Residential land use is concentrated primarily at the eastern limit of the Study Area toward Casablanca Boulevard, and along Hunter Road towards the centre of the Study Area. The stormwater runoff for the catchments flows south to north and, ultimately, outlet to Lake Ontario. There are two existing drainage features identified. There is one unnamed watercourse located in the agricultural land between Emily Street and Hunter Road, which appears to form at the base of the escarpment, under the QEW and outlets to Lake Ontario.


	CATCHMENT BOUN MAJOR OVERLAND	IDARY FLOW ARROW
Livingston EA	DRAINAGE AREA L COEFFICIENT)	ABEL(AREA ID/AREA/RUNOFF PROJECT NO. 18-7650 FIGURE NO.
-		4-4

4.4 Socio-Economic Environment

The assessment of baseline socio-economic conditions completed for the Study Area included a review of governing documents such as The Town of Grimsby's Official Plan (OP), data collected through site reconnaissance activities, desktop study and background reviews of existing conditions, and input received through public and stakeholder consultation.

The socio-economic environment section provides baseline information on the following features:

- Land Use;
- Population and Demographics;
- Economic Activities, Employment and Labour Force;
- Tourism and Recreation;
- Indigenous Communities and Organizations; and
- Community Services.

4.4.1 Existing Land Uses

A description of existing land use within the Study Area is provided below from north to south, with a focus on the land uses adjacent to the east-west transportation corridors: the South Service Road, Livingston Avenue, and Main Street West. For a description of natural features (e.g. wooded areas) please refer to **Section 4.5**.

South Service Road: West of Casablanca Boulevard

The South Service Road is the main commercial street in the Study Area. Large format and service commercial uses such as RONA and the Real Canadian Superstore are located along South Service Road, as well as gas Stations, restaurants and car dealerships. The Casablanca Boulevard/QEW interchange is located between the North and South Service Roads. This area also includes the existing GO Bus stop (Photo 4-1) and MTO Carpool lot on the north side of the South Service Road. On southwest corner of the intersection of South Service Road and Casablanca Boulevard is an undeveloped plot reserved for the future location of the GO Transit Station (Photo 4-2).



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Photo 4-1: Existing GO Bus Loop on South Service Road



Photo 4-2: Site of the Planned Grimsby GO Transit Station (east side of South Service Road approaching Casablanca Boulevard)

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Livingston Avenue: West of Casablanca Boulevard

Along Livingston Avenue west of Casablanca Boulevard, there is a small neighbourhood of residential homes. West of Emily Street in this area is the Region-owned parcel identified as the 'West Niagara Transit Terminal' in the Grimsby GO Transit Station Secondary Plan The lands south of the CN Rail Corridor and west of Casablanca Boulevard are outside of the Town's Urban Boundary and within the Greenbelt, designated as Protected Countryside (Tender Fruit and Grape Lands).

Beyond where Livingston Avenue currently terminates (just west of Emily Street), the existing Livingston Avenue servicing right-of-way continues through the southern segment of the Irish Grove Woodlot (Photo 4-3), which is designated as an Environmental Conservation Area in the Town of Grimsby Official Plan, and crosses a watercourse which is designated as Environmental Protection Area. Utilities/municipal roadways are a permitted land use within these designated areas.

Beyond the woodlot, the servicing in the right-of-way continues westward through non-active agricultural lands to intersect with Hunter Road and then Oakes Road North, where the right-of-way passes just south of the Smith Public School.



Photo 4-3 View of Region-owned lands between Livingston Avenue and the CN Rail corridor (looking north from Livingston Avenue), and beyond to the Irish Grove Woodlot.

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Draft: May 2020

Main Street West: West of Casablanca Boulevard

Main Street West (Regional Road 81) is a rural arterial road which continues west through Grimsby and becomes Highway 8, connecting to the City of Hamilton (Photo 4-4). This corridor is abutted on both sides by residential, agricultural, and institutional uses, along with a limited number of service commercial establishments such as auto servicing centres. Views looking to the south of the corridor feature the Niagara Escarpment.

There are a number of properties with built or cultural heritage significance (**Section 4.7**) adjacent to Main Street West along both sides of the corridor. These lands are outside the Town's Urban Boundary, and therefore feature limited new development.

The Christ Our Saviour Lutheran Church is located at 448 Main Street West, and is the only church in the Study Area. North of the intersection of Main Street West and Oakes Road is the Smith Public School, the only school in the Study Area.



Photo 4-4 View along Main Street West, west of Casablanca Boulevard

4.4.1.1 Current Development Applications

As of March 20, 2020 the Town of Grimsby have indicated that there are a limited number of development applications pending that are situated within the Project Study Area.

4.4.2 Population and Demographics

With a current population of 27,314, the Town of Grimsby is one of the fastest growing municipalities in the Niagara Region (Statistics Canada, 2016). Statistics Canada's most recent data indicates that Grimsby's population growth increased by 7.9% between 2011 and 2016. Grimsby's growth rate is currently greater than the Ontario average, which stands at 4.6%. Within the Study Area, population and employment growth forecasts were based on land use concepts identified in the Grimsby GO Transit Station Secondary Plan (2018). Based on this Plan, population growth is forecasted to increase by 2,189 individuals by 2021.

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The Town has an approximate total of 8,195 families in private households, nearly half of which consist of two persons. Based on 2016 data from Statistics Canada, Grimsby has a total of 10,380 occupied dwellings (Statistics Canada, 2016). The two largest age cohorts in Grimsby are ages 0-14 consisting of approximately 4,750 individuals and age 65+ consisting of 5,265 individuals (Statistics Canada, 2016).

The majority of Grimsby's population derive from European origin. A total of 22,655 individuals of European origin were identified in Grimsby making up nearly 82% of the total population (Statistics Canada, 2016). The most popular language spoken in Grimsby is English, with 26,925 (98% of the population) identifying as fluent speakers and 1,630 (5% of the population) who identify as French/English bilingual.

4.4.3 Economic Activities, Employment and Labour Force

Grimsby has grown over the past decade serving as a midpoint between Hamilton and St. Catharine's. Due to Grimsby's proximity to the QEW and resulting ease of vehicle access from the GTA, industries have access to a large and well-educated labour pool. The local labour force in Grimsby is currently approximately 14,710 workers. **Table 4-5** below indicates the top four major employment sectors in Grimsby (Statistics Canada 2016).

Reported by the Town of Grimsby's socio-economic profile a high number of residents travel daily to larger urban centres through Niagara, Hamilton and the Greater Toronto Area (Grimsby Socio-economic profile, 2016).

Industry	Number of people employed within industry	Percentage of Total Population					
Healthcare	1,805	12%					
Education	1,335	9%					
Manufacturing	1,765	11.9%					
Retail Trade	1,595	10.8%					

Table 4-5 Largest Labour Markets in Grimsby

According to the Grimsby Economic profile, "small offices, home office and knowledge-based industry are all growing industrial sectors in Grimsby. Professional services are available through a variety of financial, educational, accounting, communications, and transportation and health care firms." The Grimsby Chamber of Commerce and Downtown Improvement Area promotes member businesses, and maintains strong links with other regional and provincial Chambers (Grimsby Socio-Economic profile, 2016).

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The mix of light industrial and economic opportunities in Grimsby falls into what would be typical for many municipalities in Ontario. A majority of the population earn their income in a field relating to or centering on healthcare, retail, and manufacturing. With respect to the Study Area, a majority of the employment opportunities are retail-based and located on either side of Casablanca Boulevard between the North Service Road and the South Service Road. According to the population and growth assumptions of the Niagara GO Hub and Transit Station Study, an increase of over 400 jobs is anticipated by 2021.

Historically, the Niagara Region has been an important centre for agritourist attractions based on viticulture (grape harvesting). However, several areas of the Region including Grimsby have experienced a decrease in the number of orchards as the land area once used for crops shifted towards residential development between the 1950's and 1980's (Remax Realty, 2017). Specialty Crop (Tender Fruit and Grape Lands) are located within the Greenbelt west of Casablanca Boulevard and south of the CN Rail Corridor. The lands immediately west of Casablanca Boulevard north of Livingston Avenue are fallow, with a Woodlot occupying some of the land further west. There are some active agricultural operations south of Livingston Avenue as well as further west.

4.4.4 Tourism and Recreation

With its scenic location between the Niagara Escarpment and the edge of Lake Ontario, the Town of Grimsby offers a number of recreational areas including beaches, parks and recreational trails, community centres, and wineries which offer tours.

A few of the tourism related services in the Study Area include the Casablanca Hotel and a Super 8 hotel along the North Service Road on the west side of the corridor, and the Niagara Gateway Tourist Information Centre located along the South Service Road to the west of Casablanca Boulevard. The Great Lakes Waterfront Trail runs along the Lake Ontario waterfront, at the northern edge of the Study Area. An emerging mixed-use area along the North Service Road includes a number of restaurant and retail establishments.

4.4.5 Community Services

The Study Area is comprised of commercial, retail, and residential uses; however there are few community amenities within the Study Area boundary. Just west of the Study Area is the Grimsby Town Hall offices (160 Livingston Avenue), and the Peach King Centre (162 Livingston Avenue), a recreational and community hub operated by the Town of Grimsby. School Bus Services:

The Niagara Student Transportation Services (NSTS) plans, administers, and manages student transportation services for both the public school board (DSBN) and the catholic school board (NCDSB) within the Niagara Region. According to the NSTS, there are 14 bus routes that use Casablanca Boulevard between the hours of 7:07a.m to 8:34 a.m. These bus routes service a total of 7 different schools in the morning. In the late afternoon there are 15 Routes that access Casablanca Boulevard between 1:55p.m to 3:34 p.m., servicing 8 different schools. According to



the NSTS, these routes have a combined 10 stops along Casablanca Boulevard, including Vine Road, Livingston Avenue, and James Street. These routes include "house stops" to service special needs students on Vine Road.

4.4.6 Indigenous Communities and Organizations

A review of the Aboriginal and Treaty Rights Information System (ATRIS) indicated that the closest reserve lands are approximately 43 kilometres (km) southwest of the Study Area, belonging to the Six Nations Grand River Territory where both the Mississaugas of the New Credit First Nation and the Haudenosaunee Confederacy are located. The nearest Metis Nation of Ontario is approximately 30 kilometres (km) southeast of the Study Area.

Based on the above, engagement was undertaken with the following communities as described further in **Section 2.1.6**.

- Six Nations of the Grand River;
- Mississaugas of the New Credit First Nation;
- Haudenosaunee Confederacy; and
- Metis Nation of Ontario.

4.5 Physical Environment

4.5.1 Physiography

According to the Physiography of Southern Ontario (Chapman and Putnam, 1984) the Study Area is located within the Lake Iroquois Plain physiographic region. The Lake Iroquois Plain is comprised mostly of permeable sands and extends for a distance of approximately 300 kilometres (km) around the western part of Lake Ontario, from the Niagara River to the Trent River. It lies between the Lake Ontario shore and the Lake Iroquois bench. Lake Iroquois was a glacially-dammed lake which formed during the regional deglaciation approximately 12,500 years ago. The bedrock geology consists of a sequence of ancient rock beds or strata, originating over 500 million years ago as marine sediments in a warm shallow inland sea.

4.5.2 Bedrock and Soils

Immediately to the south of the Study Area is the Niagara Escarpment. This rock-hewn feature sits between 30 to 50 metres (m) above the Iroquois Plain. The area between the Niagara Escarpment and Lake Ontario is characterized by heavy textured, low permeability red clay. The heavy clay soils shed water easily and dry out rapidly, thus containing little organic matter. Sandy soils overlying the red clay subsoils occur in greater abundance along Casablanca Boulevard.

The soft Queenston red shale constitutes the principal bedrock below the Niagara Escarpment and on the Lake Iroquois Plain. The multiple thick layers of marl, clay, sand and the petrified remains of salt water organisms characterize the bedrock geology. Relatively soft and easily



eroded, these rock layers yielded a great deal of material to the glaciers that ultimately influenced the fertility and water-holding capacities of the soils.

A geotechnical investigation was undertaken by GeoPro Consulting Limited as part of this Project (report provided in **Appendix F**).

4.5.3 Groundwater

Groundwater conditions were observed during and on completion of drilling in the open boreholes undertaken for this Study. No freestanding groundwater was encountered in any of the boreholes on completion of drilling. It should be noted that the groundwater could fluctuate seasonally and could be expected to be somewhat higher during the spring months and in response to major weather events. Depths of groundwater of between 4.0 to 6.0 metres (m) are common where groundwater was found during the drilling program. No boreholes were completed along the Livingston Avenue right-of-way, as there is existing sewer and water lines buried in the right-of-way. Although no groundwater was observed during drilling, the Study Area is within an area of groundwater recharge, with one groundwater well located on Hunter Road associated with the landscaping business, with a maximum depth of 11.3 m. It was installed in 1953. Refer to **Figure 4-5** for the location of the groundwater well located within the Study Area.



Figure 4-5: Groundwater Well Locations



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4.6 Natural Environment

This section provides a summary of natural environment baseline conditions and includes a summary description of:

- Fisheries and Aquatic Habitat;
- Terrestrial Resources; and
- Species at Risk.

In developing the description of baseline conditions, a variety of data sources were considered including provincial data sets from Ministry of Natural Resources and Forestry (MNRF), Municipal Official Plans, Niagara Peninsula Conservation Authority (NPCA) data, and field surveys completed within the Focused Study Area. Further details are contained in the Aquatic and Terrestrial Natural Features Report included as **Appendix G**.

4.6.1 Fisheries and Aquatic Habitat

The Focused Study Area is located within the NPCA designated Lake Ontario South Shore subwatershed and the Niagara Peninsula Source Protection Area (NPSP; NPCA, 2004 and NPCA, 2013). The drainage basin of the sub-watershed covers approximately 40% of the Niagara Peninsula Source Protection Area, and has a drainage area of 598 kilometres (km)² (NPCA 2012; NPCA 2013). The northern portion of the Focused Study Area (Casablanca Boulevard/QEW Interchange) is located within the floodplain of Lake Ontario Tributary 39; floodplain mapping for this tributary is currently being completed by the NPCA.

A review of base mapping provided by the NPCA indicate that there are two regulated watercourses located within the Focused Study Area (NPCA, 2018); however, field investigations confirmed the presence of a single permanent watercourse. The watercourse is associated with Irish Grove Woodlot (Woodland D), just west of the current westerly terminus of Livingston Avenue (**Figure 4-6**). This feature's headwaters are located more than 1 km south of Focused Study Area and flows north, ultimately discharging into Lake Ontario. Results from the aquatic assessment indicate that the watercourse is a permanent stream, has the potential to provide fish habitat, and appears to have been straightened with typical flat morphology and areas of riffle and run. Clay was the dominant substrate with sections of boulder, gravel and sand substrate with occasional silt also observed.

The bankfull dimensions of the channel were approximately 3.0 m wide and 1.5 m deep. The wetted width and depth were approximately 1.5 m and 0.30 m respectively. Signs of erosion were evident along both banks as there were steep areas with exposed and erodible soil. In stream cover was sparse and consisted of boulders, in-stream and overhanging woody debris and vascular macrophytes. The majority (e.g. 90-100%) of the stream was shaded and aquatic macrophytes consisted of cattails (*Typha* sp.) and watercress (*Nasturtium officinale*). The latter species suggests evidence of groundwater input into the watercourse. The adjacent riparian community consisted of forest to the east and west.

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On the downstream end of the property, the watercourse passes through a box culvert at the railway crossing. On the upstream end, the watercourse passes through a CSP used as an agricultural crossing. Further upstream and outside of the Focused Study Area, the watercourse passes through multiple CSPs and the water levels appeared low with dense vegetation growing in the streambed.

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FILE LOCATION: I:\GIS\187650 - Casablanca & Livingstone EA\mxd\Figure 1 Environmental Assessment Study Area.mxd

LIVINGSTON AVENUE EXTENSION **ENVIRONMENTAL ASSESSMENT** Niagara Region

FIGURE 4-5 Natural Heritage Features



Watercourse ---- CNR Rail Line --- Hydro Line

> ANSI, Life Science Woodland



MAP CREATED BY: GM MAP CHECKED BY: DB MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 187650

STATUS: DRAFT DATE: 2018-10-22

4.6.2 Terrestrial Resources

Land-uses in the Focused Study Area are primarily residential and agriculture, with commercial business along the South Service Road. There are a number of natural heritage features located within the Study Area. The Niagara Section Escarpment Life Science Area of Natural and Scientific Interest (ANSI) located immediately south of the Focused Study Area (MNRF, 2018) is not impacted by this EA. The natural heritage features are shown on **Figure 4-5**.

Numerous sources were consulted to characterize baseline conditions. These are summarized below.

Ministry of Natural Resources and Forestry

An Information Request was sent to the MNRF Guelph District Office on August 30th, 2018. Comments received from the MNRF (September 26th, 2018) indicated that none of the following significant natural features are located within the Focused Study Area:

- Wildlife Concentration Areas;
- Areas of Natural and Scientific Interest (ANSI); and
- Provincially Significant Wetlands (PSW).

No unevaluated, locally significant and/or provincially significant wetlands (PSW) are located within the Focused Study Area.

NHIC Database records (i.e. 1 kilometres (km) data squares 17PH1284, 17PH1285, 17PH1383, 17PH1384 and 17PH1385 that intersect with the Focused Study Area) indicate there are no potentially significant vegetation communities within the Focused Study Area (MNRF, 2018). Furthermore, no significant vegetation communities were identified during the field studies completed within the Focused Study Area.

Niagara Peninsula Conservation Authority

An information request was sent to the NPCA on August 30th, 2018. The response (received on November 5th, 2018) was consistent with information provided by MNRF, confirming that there are no PSWs or other natural heritage features (e.g., woodlands, ANSIs, etc.) known to occur within the Focused Study Area.

NPCA online mapping indicates that the Focused Study Area falls within lands designated as Significant Groundwater Recharge Areas, and areas of Highly Vulnerable Aquifer (NPCA 2018). NPCA outlines planning guidelines for Significant Groundwater Recharge Areas and Highly Vulnerable Aquifer areas in the *Policies, Procedures and Guidelines for the Administration of Ontario Regulation 155/06 and Land Use Planning Policy Document* (2011). These planning guidelines shall be adhered to in the development of alternatives for the Study Area.

Local Municipal and Regional Official Plans were also consulted to characterize baseline conditions along the corridor. These are described below.

Niagara Region Regional Official Plan – Natural Systems

The Niagara ROP outlines the Core Natural Heritage System containing environmental features and functions of special importance to the Region's ecosystem. Schedule C of the ROP maps these features. The Core Natural Heritage System consist of the following:

- Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;
- Potential Natural Heritage Corridors connecting the Core Natural Areas;
- The Greenbelt Natural Heritage and Water Resources System; and
- Fish Habitat

Based on review of Schedule C, as well as the potential for the watercourse associated with woodland D to provide fish habitat, woodland D is identified as Environmental Conservation Area. In addition, woodland D meets the ROP criteria for woodland significance.

Development and site alteration within the Core Natural Heritage System is subject to both the Healthy Landscape Policies in Chapter 7.A of the Niagara ROP, as well as the Core Natural Heritage Policies within the ROP.

Town of Grimsby Official Plan – Natural Systems

Section 4.0 of the Town of Grimsby's OP outlines policies for Environmental Management and Sustainability, specifically containing policies to protect Grimsby's ecological health and environmental sustainability. Appendices 1 through 5 of the OP map these features (**Appendix E**). Within the Focused Study Area, Appendix 1 to 4 of the OP identifies the watercourse associated with woodland D as a stream/fish habitat, in addition to being a Key Hydrologic Feature. No other significant Natural Heritage Features are mapped in Appendices 1 to 4 of the OP.

Appendix 5 of the Town's OP indicates that the majority of the Focus Area falls within an area of High Aquifer Vulnerability. Within this area, certain types of uses related to manufacturing, managing or storing hazardous materials would be restricted in order to avoid contamination of surface water which could in turn affect groundwater quality. Section 4.2.7 and Section 10.2.2.4 of the Town's OP identifies these uses, none of which apply to the potential transportation infrastructure expansion.

Mapping in Schedules G and K of the Town's OP identify the Irish Grove Woodlot (Woodland D) as Environmental Conservation Area, and the watercourse associated with it as an Environmental Protection Area.

Results of Field Investigations

Field investigations to confirm background information were completed within the Focused Study Area on June 8th, July 3rd, August 7th, and October 23rd, 2018, and on August 26th and September 4th, 2019. The Focused Study Area primarily consists of anthropogenic areas in association with urban and rural developments. Observations of vegetation communities made during the field investigations were consistent with background information provided in agency feedback received from submitted Information Requests and MNRF and NPCA online mapping (MNRF 2018; NPCA 2018).

Detailed information pertaining to the field investigations are presented in the following sections.

4.6.2.1 Ecological Land Classification

Vegetation communities were assessed using Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998) to identify and assess potential natural heritage features within the Study Area. During the field investigations, vegetation was characterized using ELC in order to classify and map ecological communities to the vegetation level. The ecological community boundaries were determined through the review of aerial photography and then further refined during field investigations. ELC was completed for the Study Area during field investigations on August 7, 2018.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 hectares (ha) in size before it is defined. Based on the composition of vegetation communities within the Focused Study Area, patches of vegetation less than 0.5 ha or disturbed/planted vegetation were described, provided they clearly fit within an ELC vegetation type.

A total of 14 natural ecological communities were observed within the Focused Study Area during the ELC survey, in addition to 11 cultural communities (i.e. agricultural, industry and residential) (**Figure 4-7**). The ELC natural ecological communities observed within the Focused Study Area are summarized below in **Table 4-4** per woodland.



REGIONAL MUNICIPALITY OF NIAGARA LIVINGSTONE EA

FIGURE 4-7 ECOLOGICAL LAND CLASSIFICATION AND BREEDING BIRD SURVEY LOCATIONS

Study Area

Breeding Bird Survey Location

Watercourse

CNR Rail Line

--- Hydro Line

Ecological Land

I. CGL 4 - Recreational 2. CV - Constructed (Church) 3. CVC_I - Business Sector 4. CVI_I - Transportation 5. CVR_1 - Low Density Residential 6. CVR_4 - Rural Property 7. CVS_I - Education 8. FODM2-2- Dry – Fresh Oak – Hickory Deciduous Forest 9. FODM4-2- Dry - Fresh White Ash - Hardwood Deciduous Forest 10. FODM5-3 - Dry – Fresh Sugar Maple – Oak Deciduous Forest 11. FODM5-5 - Dry – Fresh Sugar Maple – Hickory Deciduous Forest 12. FODM7-2 - Fresh-Moist Green Ash Lowland Forest 13. FODM7-4 - Fresh – Moist Black Walnut Lowland Deciduous Forest 14. FODM9-4 - Fresh – Moist Shagbark Hickory Deciduous Forest 15. MAMM1-2- Cattail Graminoid Mineral Meadow Marsh 16. MEMM3 - Dry - Fresh Mixed Meadow Ecosite (Cultural) 17. MEMM3 - Dry - Fresh Mixed Meadow Ecosite 18. MEMM3 - Dry - Fresh Mixed Meadow Ecosite / THDM2-4- Gray Dogwood Deciduous Shrub Thicket 19. OAG- Open Agriculture (Fallow Field) 20. OAGMI - Annual Row Crops 21. OAO - Open Aquatic (Pond) 22. SAGM2 - Orchard 23.THDM2-11 - Hawthorn Deciduous Shrub Thicket 24.THDM2-4- Gray Dogwood Deciduous Shrub Thicket 25.THDM2-6 - Buckthorn Deciduous Shrub Thicket 26. Unmaintained Grassy Area 27.WODM5 - Fresh - Moist Deciduous Woodland

1:8,000

0 50 100 200

MAP CREATED BY: GM/SFG MAP CHECKED BY: DB MAP PROJECTION: NAD 1983 UTM Zone 17N



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		Woodlands				
ELC Code		А	В	С	D	
Natural Comr	nunities					
FODM2-2	Dry-Fresh Oak-Hickory Deciduous Forest	•	•	•	•	
FODM4-2	Dry - Fresh White Ash - Hardwood Deciduous Forest	•	•	•	•	
FODM5-3	Dry – Fresh Sugar Maple – Oak Deciduous Forest	•	•	•	•	
FODM5-5	Dry – Fresh Sugar Maple – Hickory Deciduous Forest	•	•	•	•	
FODM7-2	Fresh – Moist Green Ash - Hardwood Lowland Deciduous Forest Type	•	•	•	•	
FODM7-4	Fresh – Moist Black Walnut Lowland Deciduous Forest	•	•	•	•	
FODM9-4	Fresh – Moist Shagbark Hickory Deciduous Forest	•	•	•	•	
MAMM1-2	Cattail Graminoid Mineral Meadow Marsh	Small	l communi north of	ty (<0.5 ha Woodlanc	a located I B)	
МЕММЗ	Dry - Fresh Mixed Meadow Ecosite	•	•	•	•	
MEMM3 / THDM2-4	Dry – Fresh Mixed Meadow Ecosite / Gray Dogwood Deciduous Shrub Thicket	•	•	•	•	
THDM2-11	Hawthorn Deciduous Shrub Thicket	•	•	•	•	
THDM2-4	Gray Dogwood Deciduous Shrub Thicket	•	•	•	•	
THDM2-6	Buckthorn Deciduous Shrub Thicket	•	•	•	•	
WODM5	Fresh - Moist Deciduous Woodland Ecosite	•	•	•	•	

Table 4-4 Livingston EA Focused Study Area – Ecological Land Classification

Portions of Woodlands A and D were dominated by mid-aged to mature ash species with evidence of Emerald Ash Borer (EAB) infestation. As a result, ash species were observed as snags (i.e.

dead / dying) or in severe health decline. As previously mentioned, of the total 364 trees within the right-of-way above 10 cm DBH, 25 trees (or 6.9 %) were assessed as being in poor condition (1 Wild Black Cherry and 24 ash trees); with 81 trees (or 22.3%) were assessed as dead (73 ash trees, 3 Sugar Maple, 3 Large-tooth Aspen and 2 Eastern Hop-hornbean).

Although a natural ecological community, the trees associated with the FODM4-2 Dry - Fresh White Ash - Hardwood Deciduous Forest community were very young and were growing over raised hummocks which is indicative of recent plantings/cultivation. It is likely that this area was disturbed in the recent past.

4.6.2.2 Botanical Assessment

Spring (June 8), summer (August 7), and fall (October 23) botanical surveys were conducted over the course of 2018, using wandering transects to determine species presence, richness and abundance. Species nomenclature is based on the Ontario Plant List (Newmaster et al., 1998).

A total of 133 botanical species were documented within the Focused Study Area. Of the 133 species, eight could not be identified to species. Of the remaining 125 species, 80 are listed as *Secure* or *Apparently Secure* (i.e. SRank of S5 and/or S4) in the province. The remaining 45 species are listed as non-native, status unknown or not suitable targets for conservation activities (i.e. SRank of SE, SU or SNA).

Based on the results from the three season botanical assessments, no SAR and/or SCC were observed.

4.6.2.3 Tree Inventory

A tree inventory was conducted for the Livingston Avenue right-of-way on August 26 and September 4, 2019. The tree inventory was conducted in accordance with policies of the NPCA's Regional Tree and Forest Conservation By-law (No. 30-2008). In accordance with the By-law, trees with a diameter at-breast-height (DBH) of 10 cm or over were inventoried. Information collected during the inventory included DBH size, species, and general condition of the trees surveyed, along with their georeferenced location (**Figure 4-7**). Table 4-5 provides an overview of the tree species encountered, along with their DBH range categories.

Common Name	Scientific Name	10-20 DBH	21-30 DBH	31-40 DBH	41-50 DBH	51-60 DBH	61-70 DBH	Total
American Basswood	Tilia americana	14	3					17
American Elm	Ulmus americana	1						1
Bitternut Hickory	Carya cordiformis	6	1		1			8
Black Walnut	Juglans nigra	18	6	4				28
Bur Oak	Quercus macrocarpa	10			1		1	12
Cockspur Hawthorn	Crataegus crus-galli	1						1
Crab Apple	Malus sargentii	3						3
Eastern Cottonwood	Populus deltoides ssp. deltoides				1			1
Eastern Hop- hornbeam	Ostrya virginiana	8						8
Eastern White Pine	Pinus strobus	2	1					3
Green Ash	Fraxinus pennsylvanica	119	4	1				124
Large-tooth Aspen	Populus grandidentata	17	4	2		1		24
Little-leaf Linden	Tilia cordata	2	2					4
Manitoba Maple	Acer negundo	1						1
Northern Red Oak	Quercus rubra	5	3	2				10
Norway Maple	Acer platanoides				1			1
Null	Null	1	1					2
Paper Birch	Betula papyrifera	1						1
Peach-leaved Willow	Salix amygdaloides			1				1

Table 4-5 Tree Inventory Results by Species and Size

Common Name	Scientific Name	10-20 DBH	21-30 DBH	31-40 DBH	41-50 DBH	51-60 DBH	61-70 DBH	Total
Scotch Pine	Pinus sylvestris	1						1
Shagbark Hickory	Carya ovata	7	5	6	1			19
Silver Maple	Acer saccharinum	1			2			3
Sugar Maple	Acer saccharum	54	7	2	1			64
Sweet Cherry	Prunus avium	1						1
Trembling Aspen	Populus tremuloides		1					1
White Ash	Fraxinus americana	6				1		7
White Oak	Quercus alba						1	1
White Poplar	Populus alba	3	3	2	1			9
Wild Black Cherry	Prunus serotina	5	1	2				8
	TOTAL	287	42	22	9	2	2	364
	% TOTAL	78.85%	11.54%	6.04%	2.47%	0.55%	0.55%	



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FIGURE 4-7 Tree Inventory for the Livingston Avenue Right-of-Way through Woodland D

Surveyed Tree by DBH (Diameter at Breast Height)

•	10 - 20 cm
•	21 - 30 cm
•	31 - 40 cm
•	41 - 50 cm
•	51 - 60 cm
•	61 - 70 cm
—	Project Footprint
	Sanitary Sewer Excavation Extent
	Parcel Boundary
	Watercourse
_	CNIP Pail Line

*Trees illustrated herein are \geq 10 cm diameter at breast height (DBH).

	1:2,200			
0	25	50	100 m	
				N
				W-C

MAP CREATED BY: GM MAP CHECKED BY: DB MAP PROJECTION: NAD 1983 UTM Zone 17N



PROJECT: 187650 STATUS: DRAFT DATE: 2020-01-14

4.6.3 Breeding Bird Surveys

A total of 10 point-counts were completed (**Figure 4-6**). Breeding bird surveys were not completed within Woodland A, given that impacts to the feature were not anticipated based on the proposed alternatives.

A total of 54 bird species were observed during breeding bird surveys. Of the 54 species observed, three are considered SAR and two are considered SCC:

- Eastern Meadowlark (Sturnella magna) Threated.
- Bank Swallow (*Riparia riparia*) Threatened.
- Barn Swallow (*Hirundo rustica*) Threatened.
- Red-headed Woodpecker (*Melanerpes erythrocephalus*) Special Concern.
- Eastern Wood-pewee (Contopus virens) Special Concern.

Of the SCC observed within the Focused Study Area, both were observed within woodland D. None of SAR were observed in association within any of the woodlands.

4.6.4 Incidental Wildlife

During the 2018 field investigations, the following species were observed concurrent with either ELC, botanical, aquatic and/or breeding bird surveys:

- Green frog (Lithobates clamitans);
- White-tailed Deer (Odocoileus virginianus);
- Raccoon (Procyon lotor);
- Eastern Cottontails (Sylvilagus floridanus); and
- Red Squirrel (Sciurus vulgaris).

None of the aforementioned species are considered SAR and/or SCC.

4.6.5 Species at Risk

Feedback received from the MNRF Guelph District (September 26, 2018) included a list of 34 SAR that have the potential to occur within the Town of Grimsby; this list was reduced through completing a review of secondary source information, including NHIC database records of the Focused Study Area. In total, 14 SAR and 5 SCC were determined to have the potential to occur within 1 kilometres (km) of the Focused Study Area. The resulting list included species specifically identified by comments provided by the MNRF as having the potential to be impacted within the Focused Study Area.

A habitat assessment was completed for the Focused Study Area to determine which SAR have the potential to be impacted by the proposed Livingston Ave extension. This was done by identifying species habitat requirements and comparing those to the conditions and ELC communities observed within the Focused Study Area, as well as the 2018 botanical and breeding bird survey results. The assessment determined that habitat requirements for the following six SAR and three SCC that have the potential to be present in the Focused Study Area:

- Little Brown Myotis (Endangered);
- Northern Myotis (Endangered);
- Tri-colored Bat (Endangered);
- Barn Swallow (Threatened);
- Eastern Meadowlark (Threatened);
- Bobolink (Threatened);
- Red-headed Woodpecker (Special Concern);
- Eastern Wood-pewee (Special Concern); and
- Monarch (Special Concern).

Results of the assessment are presented in **Appendix G.** None of the aforementioned species have regulated habitat under *Ontario Regulation 242/08* therefore no permits are required.

In the event the Project has the potential to impact Barn Swallow, Eastern Meadowlark and/or Bobolink habitat, the Project can be registered under Section 23.5 (Barn Swallow) or Section 23.6 (Bobolink, Eastern Meadowlark) of Ontario Regulation 242/08 of the Endangered Species Act (ESA, 2007), respectively. So long as the Project is registered, and the conditions in the regulation are followed, the Project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA.

It is recommended that MECP be consulted in advance of the Detailed Design stage of the Project to determine targeted survey requirements in support of potential permitting and approvals under the ESA (e.g. potential SAR bat habitat displacement).

4.6.5.1 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) are types of natural heritage features that are identified for protection by provincial policy. They consist of wildlife habitats, including vegetation communities, that are ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or a Natural Heritage System. SWHs are identified on the basis of ELC communities using applicable criteria specific to a region.

In order to identify SWH within the Focused Study Area, ELC communities were compared to those listed in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF, January 2015). Based on the field investigation results, the Study Area provides the following SWH as per the Eco-Region 7E Criterion Schedule (MNRF, 2015):

• Significant Wildlife Habitat for Special Concern Species (Eastern Wood-pewee and Redheaded Woodpecker).

Based on field investigation results the Focused Study Area also has the potential to provide Candidate SWH, though not necessarily limited to, the following:

- Land bird Migratory Stopover Area Significant Wildlife Habitat;
- Bat Maternity Colonies Significant Wildlife Habitat;
- Raptor Wintering Area Significant Wildlife Habitat;
- Amphibian Breeding Habitat (woodland) Significant Wildlife Habitat; and
- Special Concern and Rare Wildlife Species.

The aforementioned Candidate SWHs were included in instances where seasonal surveys were not completed in order to infer the habitat was absent (e.g., amphibians, leaf-off/acoustic surveys for bats, etc.).

4.7 Cultural Heritage

The following section provides baseline information for:

- Built and Cultural Heritage Resources; and
- Archaeological Resources.

A more detailed description of cultural heritage resources and archaeological conditions are provided in the technical reports in **Appendix H** and **Appendix I** respectively.

4.7.1 Built and Cultural Heritage Resources

Archeological Services Incorporated (ASI) was contracted by Dillon to undertake a Cultural Heritage Resource Assessment (available as **Appendix H**). The results of ASI's study indicated that there were seventeen cultural heritage features identified within and/or adjacent to the Focused Study Area. The cultural heritage resources include fifteen built heritage resources (BHR) and two cultural heritage landscapes (CHL) (**Figure 4-9**).



Of the fifteen BHR's identified in ASI's report, fourteen of them were identified as residences, along Main Street West, and one religious building at 448 Main Street West. In addition two CHL's were identified. One laneway at 482 Main Street West and an Orchard at 500 Main Street West.

Based on the completion of the cultural heritage resource checklist, the Focused Study Area has been screened for built and cultural heritage resources.

4.7.2 Archaeological Resources

Archaeological Services Inc. (ASI) was contracted by Dillon to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Study. The Stage 1 Report is available in **Appendix H**.

Results of the property inspection indicated that some of the lands within the Focused Study Area are previously undisturbed and are overgrown or inhabited by woodlands, constraining ploughing and therefore require test pits to determine the archaeological potential (as illustrated on Figure 12 of the report in **Appendix H**).

The Stage 1 Archaeological Assessment determined that there are three previously registered archaeological sites located within one kilometre of the Study Area, although there are none located in the Focused Study Area. Extension of Livingston Avenue to the sides of the existing Livingston Avenue corridor right-of-way would be in previously undisturbed lands, and would therefore merit a Stage 2 Archaeological Assessment prior to the Detailed Design stage.

5.0 Identifying the Problems/Needs/Opportunity

Phase I of the Municipal Class EA process involves the identification of the problem and/or opportunity to be addressed by the EA. The identified problems/opportunities highlighted in **Section 5.1.1** which provided the justification or need for the undertaking were determined through consideration of the following factors:

- The Project planning context including relevant Municipal planning policies (Regional and Town of Grimsby), and other related studies including multi-modal transportation plans;
- The existing multi-modal transportation network including traffic volumes and capacities, intersection operations and existing collision data, pedestrian and cycle use, etc. (Section 4.1);
- Review of roadway safety including collision data, with particular consideration given to cyclists and pedestrian movements;
- Projected future transportation demands; and
- Stakeholder input.

5.1 Summary of Problems/Needs/Opportunity

The Study was conducted with the intent to provide for the long term transportation needs of the community. The Region's TMP (2017) identifies the 2041 horizon year as the basis for planning for forecasted growth in population and traffic needs across Niagara. The Study therefore aims to consider the future needs of the community to 2041. In addition to assessing the existing conditions, 2041 was applied as the long-term horizon year in the traffic modelling and technical analysis undertaken to confirm the need and justification for improvements to the Study Area road corridors. As the Grimsby GO Transit Station is anticipated to open in 2021, this was taken as the forecasting year to determine the problems/needs/opportunity in the short term.

Considering the results of the existing conditions review and the traffic forecasting work that was completed for 2021 and 2041 horizon years, the key problems and opportunities for the Casablanca Boulevard corridor are described as follows.

Identified Problems

The key issues identified for the key east-west Regional Road corridors in the Study Area to the year 2041 are summarized below by road corridor:

- South Service Road between Casablanca Boulevard and Hunter Road (Figure 5-1);
- By 2041, it is assumed that the recommended improvements to the South Service Road as identified in the Casablanca Boulevard and GO Station Access EA are in place, namely widening between Casablanca Boulevard and Industrial Drive to add two additional lanes of traffic (one in each direction) and a turning lane for westbound travellers turning into the GO Transit Station from the South Service Road; and
- Even with these improvements in place, it is anticipated that the South Service Road will be at or over capacity between Hunter Road and Casablanca Boulevard, due to motorists accessing the commercial services along this corridor as well as the GO Transit Station.



Figure 5-1 Roadway Problems (2041) Identified: South Service Road west of Casablanca Blvd

- Main Street West between Casablanca Boulevard and Oakes Road North (Figure 5-2):
- By 2041, it is anticipated that there will be limited new development along Main Street West, and that this corridor will continue to perform well from a traffic perspective. Some of the key issues that have been identified include;
- Lack of dedicated cycling facilities; and
- Limited ability to attract traffic from the South Service Road to reduce congestion on that corridor.



Figure 5-2: Roadway Problems (2041) Identified: Main Street West, west of Casablanca Blvd

- Livingston Avenue west of Emily Street (Figure 5-3):
- As recommended in the Casablanca Boulevard and GO Access EA, it is anticipated that by 2041 Livingston Avenue would have been extended west from its current terminating point just west of Emily Street to provide access to the south side of the GO Transit Station.
- This section of Livingston Avenue passes through a low density residential community. While traffic is expected to increase as a result of GO Transit Station traffic during peak travel periods in the morning and evening, it is is expected to flow well with only minor impacts to property access.



Figure 5-3: Roadway Problems Identified: Livingston Ave

Identified Opportunities

The key opportunities identified for improvements to supporting east-west travel capacity in the Study Area include opportunities to:

- Implement the policies and direction of the relevant plans and studies for the Study Area road corridors (as identified in Section 3.0);
- Improve active transportation opportunities by providing dedicated space for all users, and reducing the vehicle demand on existing roadways;
- Reduce congestion on the South Service Road and provide more long-term traffic management on this corridor by diverting traffic not destined for the commercial establishments on this corridor;
- Support access to the GO Transit Station and Downtown Grimsby; and
- Improve safety along the corridor.

5.1.1 Problem and Opportunity Statement

Considering the above, the problem/opportunity statement for the Project is identified as follows:

The Project is to examine both short and long-term transportation needs and opportunities. Anticipated near term (2021) related problems include: poor traffic operations along sections of existing east-west roadways including the South Service Road; constraints to accessing Downtown Grimsby; and providing necessary access to the planned GO Transit Station on the South Service Road. Long-term (2041) roadway capacity deficiencies have been identified for east-west movement through the Project area, therefore, there is a need for additional east-west capacity in the form of one arterial lane in each direction, between Casablanca Boulevard and Hunter Road. Also to be examined are opportunities to support the Region's active transportation objectives by providing pedestrian and cycling facilities, and to explore the potential to improve transportation network resiliency, connectedness and directness to the Grimsby downtown core. The following sections provide more detail on the technical work and analysis that informed the identification of the problems/needs/opportunity and the development of the above problem statement.

5.2 Existing Traffic Volumes

Niagara Region provided traffic count data to use for the analysis in two forms:

- 8-hour turning movement counts (TMC) all TMCs were collected on Wednesday, May 9, 2018; and
- 24-hour Automated Traffic Recorder data (ATR) collected between May 5 and May 10, 2018.

Figure 5-4 illustrates the existing traffic volumes used for the analysis. **Appendix B** contains the full traffic counts.

In addition, traffic signal timing and phasing plans were received from Niagara Region for applicable intersections within the study area. Dillon's previous work in the area (Niagara Go Hub and Transit Stations Study, 2017) also included field visits in the study area, which informed the understanding of existing conditions and issues in the study area.



Figure 5-4: Existing Traffic Volumes

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5.3 Travel Demand Forecasts

Travel demand forecasts were created through examination of existing traffic volumes and forecast growth within the long term horizon (2041). Growth of travel in the study comprises three (3) components:

- Regional activity that passes through the study area;
- Local development; and
- Future GO Transit Station activity.

Forecasting was completed for the 2021 and 2041 horizon years. The following describes forecasting work completed for the 2041 horizon year. Details of the forecasting work for 2021 and 2041 are described in **Appendix B**.

5.3.1 Background Growth

Background traffic growth was forecast by accounting for population and employment growth within the Study Area and regional growth outside the Study Area.

5.3.1.1 Within Study Area – Development Related Growth

Within the Study Area, population and employment growth forecasts were based on land use concepts developed for 2041 as part of the Niagara GO Hub and Transit Station Study (NGHTSS). The population and employment forecasts were then converted to auto trips using auto trip generation factors. The auto trip generation factors were taken from Niagara Region's regional travel demand forecasting model.

5.3.1.2 Regional Growth

To account for regional growth in areas surrounding the Study Area, Niagara Region's regional travel demand forecasting model was reviewed to determine an appropriate compound annual growth rate (CAGR) to apply to auto traffic travelling through the Study Area. The CAGR was applied to traffic on roadways crossing the Study Area boundary, such as the North Service Road, the South Service Road, Main Street West, etc.

Table 5-1 summarizes the 2041 development and background growth assumptions and theresultant traffic volume growth.

Type of Growth	Growth Assumptions	Traffic Volume Growth		
Within Study Area +4,750 population +1,870 employment		+899	+1,393	
Regional growth 2.4% CAGR (AM Peak Hour) 1.5% CAGR (PM Peak Hour)		+1,448	+1,004	
Total		+2,347	+2,397	

Table 5-1 2041 Development and Background Growth

5.3.2 GO Transit Station Traffic

In the NGHTSS, "base" and "high" ridership forecasts were developed for the 2041 horizon. The NGHTSS used the high ridership forecast since it was "beneficial as a sensitivity test to better assess the risks associated with unclear future influences with the potential increase to GO ridership". To be consistent with the NGHTSS, the high ridership forecast was applied for the 2041 horizon.

By 2041 it was assumed that a GO Transit Station south parking lot would also be in operation along with the north parking lot. The north Station access was assumed to be the primary access. For the AM peak hour, the north parking lot was assumed to be 85% filled before the south parking lot began to be used. For the PM peak hour, the north parking lot was assumed to empty before the south parking lot. **Table 5-2** summarizes the assumed GO Transit Station auto traffic forecasts for the 2041 horizon. It should be noted that the AM and PM Peak Hour forecasts for trips into the GO Transit Station from the South Service Road access exceed the total number of parking spaces planned for the site (based on the 2018 Metrolinx Functional Site Plan). It is expected that a number of these would be drop-off trips, and that once the parking spaces are filled, any additional parking demand may be met by other adjacent parking facilities.

	2041 Horizon				
Station Access		AM Peak Hour		PM Peak Hour	
	Out	In	Out	In	
North Station Access (South Service Road)	130	306	345	169	
South Station Access (Livingston Avenue)	6	99	59	13	
Total	136	405	404	182	

Table 5-2 GO Transit Station Auto Traffic Forecasts (2041)

5.3.3 Traffic Volumes

The forecast trips for the study area as assigned to the road network were used for both the strategic and operational capacity assessments. The strategic assessment compares the forecast volumes for critical sections of roadways to the carrying capacity of the section to identify deficiencies. The operational assessment reviews the performance of individual intersections in order to identify specific geometric and operational deficiencies. **Figure 5-5** illustrates the 2041 forecasted traffic volumes for Study Area intersections assuming no new roads are constructed or extended.

5.3.4 Pedestrian and Cycling Facilities

Due to the emerging development on the North Service Road and in the Winston Neighbourhood Secondary Plan Area, as well as the opening of the GO Transit Station by 2021, pedestrian and cyclist volumes are anticipated to significantly increase in the Study Area. In line with the Region and Town of Grimsby's strategic direction to support and encourage non-vehicle travel modes (as detailed in Section 3), a complete network of sidewalks and cycling lanes are expected to be needed along the Regional Roads in the Study Area to meet the demand for safe and accessible active transportation facilities into the future as seen on **Figure 5-6 (**2041 Pedestrian Volume Forecast), and **Figure 5-7** 2041 (Cycling Volume Forecast).



Figure 5-5: 2041 Traffic Volume Forecasts

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Figure 5-6: 2041 Pedestrian Volume Forecasts

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← 80 (75) 45 (60) →

← 25 (40) 30 (45)→

← 50 (30)

20 (35) →

← 25 (15) 15 (25) →





Figure 5-7: 2041 Cycling Volume Forecasts

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	← 20 (15)	
	10 (10)→	-
	↑ 15 (20)	
	↑ 15 (20)	
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5.4 Strategic Operational Assessment

The 2041 strategic analysis was a component of the technical transportation assessment that considered volume to capacity (v/c) ratios at the link level at several 'screenlines'. A screenline refers to an imaginary line drawn on the map as part of the traffic modelling exercise, to help understand how different types of transportation improvements would compare on the basis of traffic count data.

Traffic volumes at the screenlines were taken from the forecast 2041 peak hour volumes, which in turn are based on the population growth forecast for the Study Area and surrounding community. The capacity of the transportation network to accommodate future traffic was considered on the basis of the existing road network, and also assumed that the recommendations from the Casablanca Boulevard Class EA for improvements to the South Service Road have been implemented by 2041. As the evening (PM) peak hour travel showed the highest volumes for the Study Area, this time period was used to provide an illustration of the traffic conditions in 2041. **Appendix B** contains the full screenline calculations. **Figure 5-8** shows the results of the analysis for the screenlines crossing the east-west streets.



Figure 5-8: 2041 Screenline Analysis – East-West Travel The following points outline the findings from the east-west corridors:

- East of Hunter Road, the screenline is at capacity (v/c of 0.87), with the North Service Road and South Service Road operating with v/c ratios of 0.97 and 1.10 respectively.
- West of Casablanca Boulevard, the screenline is operating at capacity (v/c of 0.85) Travel demand is weighted towards South Service Road and North Service Road with both facilities at their practical maximum capacity (v/c of 0.95 and 0.97, respectively).
- East of Casablanca Boulevard, the screenline was shown to be approaching capacity with a v/c ratio of 0.84 with South Service Road operating at over capacity conditions (v/c of 1.17).
- West of Roberts Road, the Screenline operates during the PM peak hour with a v/c of 0.63. It is noted that, during the AM peak hour, the westbound volume on Livingston Avenue was shown to exceed a v/c ratio of 1.0.

The screenlines east of Casablanca Boulevard are operating within capacity, with a couple of isolated issues. The screenlines west of Casablanca Boulevard are operating at capacity, with the South Service Road operating at or over capacity in the medium (2031) to long term (2041).

5.5 Road Network Alternatives

The alternatives described below were developed to address issues identified during the strategic assessment to address east-west capacity constraints:

- Alternative 1 includes extending Livingston Avenue from the current termination to near Oakes Road North, where it intersects with Main Street West. This alternative also includes resurfacing Hunter Road (between the Livingston Avenue extension and South Service Road) and introducing signalization at the intersection with South Service Road. (Known as Alternative 5 in the Environmental Study Report)
- Alternative 2 extends the widening of South Service Road from Industrial Drive to west of Hunter Road. The intersection of South Service Road and Hunter Road was also signalized. (Known as Alternative 4 in the Environmental Study Report)
- Alternative 3 widens Main Street West from Oakes Road to Casablanca Boulevard. (Known as Alternative 3 in the Environmental Study Report)

Figure 5-9 illustrates the changes for Alternatives 1, 2, and 3 when compared to the existing road network. The traffic signal at the GO Transit Station north parking lot is assumed to be present for all alternatives.



Figure 5-9: Alternatives 1, 2, 3 Changes

5.6 Operational Assessment

The microsimulation analysis identified the following discussion topics:

- South Service Road;
- Main Street West;
- Livingston Avenue Extension; and
- Active Transportation.

Appendix B contains the full traffic modelling (Vissim) results. Summary tables are presented in the sections below to discuss specific study area issues.

5.6.1 South Service Road

The analysis of the South Service Road operations assumed that the improvements recommended in the Casablanca Boulevard and GO Station Access EA will be in place by 2041. These improvements include widening of the South Service Road between Casablanca Boulevard and Industrial Drive to the full extent of the right-of-way. As the improved roadway would be at a total of six lanes at the intersection of Casablanca Boulevard and the South Service Road, in addition to cycling lanes and sidewalks on both sides of the road, there are no additional opportunities to widen this section of the corridor.

The various traffic scenarios tested therefore included different configurations to widen the South Service Road further west of Industrial Drive, and to test if different intersection arrangements at Hunter Road would improve traffic flow.

The results indicated that there was no comparative improvement to the traffic congestion on the South Service Road resulting from improvements to this corridor alone. The time horizon by which the travel delays are expected to materialize is approximately 2031.

5.6.2 Main Street West

The potential for widening of Main Street West to reduce congestion on the South Service Road and improve east-west capacity to 2041 was tested for a range of scenarios. The improvements to Main Street West included an additional lane of traffic in each direction (east and west), as well as cycling lanes on both sides of the corridor.

The widening of Main Street West was not found to attract a significant proportion of travelers from the South Service Road, resulting in limited improvement to traffic congestion. The overall benefit to east-west capacity as a result of widening this corridor was minimal, and largely focused on the intersection of Casablanca Boulevard and Livingston Avenue, where the intersection level of service improved only slightly.

5.6.3 Livingston Avenue Extension

The extension of Livingston Avenue from just west of Casablanca Boulevard to just east of Oakes Road North will provide some potential travel time savings for drivers moving through the area. In particular, for those with the option to avoid the congestion on the South Service Road on the section between Industrial Drive and Casablanca Boulevard. **Figure 5-10** shows the average travel times across the major road segments in the study area in the 2041 PM Peak Hour.



Figure 5-10: Major Segment Travel Times – 2041 PM Peak Hour

The cumulative effect of the slower travel speeds along South Service Road for vehicles passing through the area, primarily the segment between Industrial Drive and Casablanca Boulevard, contributes to a significantly slower travel time through the area, which makes the Livingston Avenue Extension more attractive for those not destined to the commercial uses along South Service Road or heading north to the QEW. This illustrates the utility of the Livingston Avenue Extension to function as a relief valve for congestion along South Service Road, where drivers not destined for the local businesses or to the interchange with QEW can choose a faster, more reliable route through the area.

The figure also shows that South Service Road to the west of Industrial Drive operates adequately in absence of the extension (though there are some benefits). The operational issues, as illustrated by the slower speeds, occur mainly to the east of Industrial Drive. The addition of a lane on South Service Road to the west of Industrial Drive would not provide any benefit to the observed issues. This would simply deliver more vehicles into the slower sections and exacerbate the issue. An extension of Livingston Avenue, therefore, acts as an important

option for drivers to avoid the problematic section of South Service Road between Industrial Drive and Casablanca Boulevard.

For each individual traveller along these routes there is a travel time advantage of 75 seconds along the Livingston Avenue Extension between the two logical routing options when travelling from west to east from the Hunter Road / South Service Road intersection to the Casablanca Boulevard / Livingston Avenue intersection. This allows drivers wishing to pass through the study area (e.g., heading to Downtown Grimsby) to avoid the congestion on the section of South Service Road between Industrial Drive and Casablanca Boulevard. This also provides greater resiliency in the network if / when there are incidents causing significant congestion on South Service Road on this same section.

The orientation of the southern east / west roads (Main Street West, Livingston Avenue Extension) also provide advantages for drivers travelling eastbound through the study area with a destination of points to the east of the study area (e.g., Downtown Grimsby), as Main Street West travels much further south starting just east of Oakes Road. As shown in the figure, there are advantage of 45 seconds to a minute when travelling between the intersections of Main Street/Livingston Extension and Casablanca Boulevard/Livingston Extension.

These travel time savings may seem small but to individuals they are significant as they occur on a daily basis and can be the equivalent of a full traffic signal cycle, and on an annual basis for all road users can add up to 1,000's of hours of travel time savings (an approximate estimate based on the hourly volume demand estimate for two peak hours, a.m. and p.m., forecast over a year would result in over 10,000 hours saved). Based on the forecasted volumes entering and exiting the study area to/from the west via South Service Road and Main Street West to the east of Casablanca Boulevard, there is a potential travel market of approximately 440-530 vehicles in the peak hours that could divert to Livingston Avenue.

The orientation of the southern east/west roads (Main Street West, Livingston Avenue Extension) also provide advantages for drivers travelling eastbound through the study area with a destination of points to the east of the study area (e.g., Downtown Grimsby), as Main Street west travels much further south starting just east of Oakes Road. The Livingston Avenue extension would also provide travel time savings for these drivers as well, as it provides a more direct route.

Table 5-3 summarizes the results of the analysis. During the AM and PM peak hour, the 2041 analysis shows the potential for an extension of Livingston Avenue to divert traffic from the South Service Road.

	Cantal	# Veh.	(We	Int. ighted by N	Avg. ⁄Ivmt. and '	Vol.)	Critica	al Movem	ient	Overall
Alt	Turne	Entering	Avg.	Max	Total	Stopping		Max	Avg.	Int.
	туре	Int.	Queue	Queue	Delay	Delay	Mvmt	Queue	Delay	LOS
			(m)	(m)	(sec)	(sec)		(m)	(s)	
Casablanca Blvd & S	Service Ro	ł								
2041 Do Nothing	Sig.	2724	104	144	66	48	NBR	267	50	E
2041 Base	Sig.	3369	67	153	55	43	NBT	267	82	E
2041 Alt 1	041 Alt 1 Sig. 3		23	98	28	22	NBR	130	34	С
Casablanca Blvd & Liv	vingston A	lve								
2041 Do Nothing	TWSC	1077	13	50	22	14	SBL	65	3	-
2041 Base	Sig.	1322	49	101	39	21	WBR	132	72	D
2041 Alt 1	Sig.	1714	39	96	29	13	WBR	132	39	С
Hunter Rd & Livingsto	on Ave									
2041 Do Nothing	TWSC	296	0	0	0	0	None	0	0	-
2041 Base	TWSC	224	0	0	0	0	None	0	0	-
2041 Alt 1	TWSC	630	2	28	8	1	WBT	44	14	-
Oakes Rd & Livingsto	n Ave									
2041 Alt 1	TWSC	635	0	5	3	0	WBL	23	8	-

Table 5-3 Livingston	Avenue Extension	Analysis Results
J		,

	Control	# Veh.	(We	Int. ighted by N	Avg. ⁄Ivmt. and	Vol.)	Critica	al Moverr	ent	Overall
Alt	Type	Entering	Avg.	Max	Total	Stopping		Max	Avg.	Int.
	Type	Int.	Queue	Queue	Delay	Delay	Mvmt	Queue	Delay	LOS
			(m)	(m)	(sec)	(sec)		(m)	(s)	
Casablanca Blvd & S S	Service Rd	1								
2041 Do Nothing	Sig.	2848	122	161	92	71	NBR	267	78	F
2041 Base	Sig.	3765	52	126	47	37	SBR	162	6	D
2041 Alt 1	Sig.	3505	41	122	36	27	SBT	179	40	D
Casablanca Blvd & Liv	ingston A	ve								
2041 Do Nothing	TWSC	942	14	79	34	24	SBL	117	8	-
2041 Base	Sig.	1400	7	68	12	6	SBR	101	2	В
2041 Alt 1	Sig.	1854	20	112	22	15	EBR	163	37	С
Hunter Rd & Livingsto	on Ave							_		
2041 Do Nothing	TWSC	222	0	0	0	0	None	0	0	-
2041 Base	TWSC	176	0	0	0	0	None	0	0	-
2041 Alt 1	TWSC	762	9	50	14	2	EBT	96	28	-
Oakes Rd & Livingsto	n Ave									
2041 Alt 1	TWSC	597	0	14	3	0	WBL	27	9	-

It can be seen from **Figures 5-11** to **5-13** that an extension of Livingston Avenue to Hunter Road attracts a modest amount of vehicles. Comparatively, an extension further to Oakes Road increases the diverted volume by 3-4 times as compared to the extension to Hunter Road, in the range of 215 to 270 vehicles bi-directionally during the peak hours. The main purpose of the extension to Oakes Road is to attract motorists destined for Casablanca Boulevard and those travelling further east on Livingston Avenue towards Downtown Grimsby. The Livingston Avenue

PM Peak Hour

extension would provide distance and time savings for these motorists, which makes this an attractive option.

Based on the forecasted volumes entering and exiting the study area to/from the west via South Service Road and Main Street West to the east of Casablanca Boulevard, there is a potential travel market of approximately 440-530 vehicles in the peak hours that could divert to Livingston Avenue. **Figures 5-11, 5-12, and 5-13** show the turning movement volumes in the vicinity of Livingston Avenue in three conditions: No extension, Extension to Hunter Road, and Extension to Oakes Road. (Note: the volumes in the figures differ from the potential maximum market as some vehicles are lost / gained during the model assignment routing process).



Figure 5-11: Livingston Avenue Peak Hour Turning Volume – No Extension



Figure 5-12: Livingston Avenue Peak Hour Turning Volume – Extension to Hunter Road



Figure 5-13: Livingston Avenue Peak Hour Turning Volume - Extension to Oakes Road North

5.6.3.1 Hunter Road Analysis

The Livingston Road Extension, both full and partial, will result in increased volumes on Hunter Road. **Figure 5-14** shows the traffic routing potential for traffic to/from the west that will use Hunter Road in the future. With the implementation of the GO Transit Station but without Livingston Avenue Extension, the majority of trips originating from the west and travelling to and from the station will use Hunter Road to move between Main Street West and South Service Road to access the station, as illustrated by the red route in **Figure 5-14**.

With the full extension of Livingston Avenue Extension to Oakes Road North/Main Street West, diverted volume will occur at the access to Livingston Avenue near Oakes Road, providing more direct access to the southern entry point to the GO Transit Station and an alternate route to the northern entry point, as illustrated by the green route in **Figure 5-14**. Any vehicles still requiring to travel further north to South Service Road will therefore be on the section of Hunter Road between Livingston Avenue and South Service Road. As well, South Service Road volume that diverts to Livingston, not necessarily to the GO Transit Station, will also result in increased volumes on Hunter Road, between Livingston Ave and South Service Road (blue route).

A full extension allows vehicles to avoid passing through the residential area on Hunter Road to the south of Livingston Avenue (the yellow area in **Figure 5-14**). A partial extension to Hunter will result in Main Street volumes returning to the original route (red).

As shown previously in **Figures 5-12** and **Figure 5-13**, the extension of Livingston Avenue will result in an increase in volume on Hunter Road during the peak hour between the Livingston Extension and the South Service Road. The remainder of traffic on the road is expected to be largely local traffic accessing the residences in the area.



Figure 5-14 Hunter Road – Alternate Routings

5.6.4 Active Transportation Assessment

The following discusses active transportation considerations in the Focused Area. **Figure 5-6** and **Figure 5-7** presented earlier show the forecasted pedestrian and cyclist activity relative to areas with high auto activity. These forecasts provide the foundation for a further examination of the potential for future active transportation demand.

The Town has set policy goals for increasing the mode share for active transportation users as the area develops. To achieve these goals, it will be necessary that the Town, Niagara Region, Metrolinx, and MTO collaborate as necessary to provide a considered, safe, and efficient network of sidewalks, cycling infrastructure, and multi-use pathways integrated with the GO Transit Station and the community to enable an increase in active transportation mode share.

The Grimsby GO Transit Station Secondary Plan presents a network of on-road cycling infrastructure and multi-use pathways that can be used to accomplish this goal and provide significant improvements to the overall comfort, safety, and continuity of active transportation infrastructure in the station area, as shown in **Figure 5-15**. Improvements to active transportation in the area will be one portion of a transportation demand management (TDM) plan for the station area, which should also include local transit improvements and other incentives to curb single-occupant automobile travel. TDM will be a significant factor in reducing the growth in automobile

travel and assist in slowing the rate of investment in automobile infrastructure, which is costly both to build and maintain in the long term.





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- Major Gateway
- Major Streetscape Improv

- xisting Active Transportation

- Potential GO Station Locatio
- **Environmental Protection Area**
- Parks and Open Space
- **Transit Station Area**
- Secondary Plan Limits

SCHEDULE K **Urban Design Improvements -**

5.7 Future Transportation Operations

Table 5-4 shows the operations of the road network when the forecasted volume for 2041 is applied to existing roadway and intersection geometry. As can be seen in the table, significant operational issues exist in both peak hours and in the PM peak hour in particular for the 2041 horizon year. In addition, as the analysis was performed via a Vissim microsimulation model, issues of congestion and queuing at critical points will reduce traffic on downstream links which makes their performance look better than if the vehicles were able to access the intersections in a free flow manner.

As noted previously, the critical area of concern is on the South Service Road between Industrial Drive and Casablanca Boulevard.

	Int. Avg. Contr # Veh. (Weighted by Mvmt. and Vol.)							Critical Movement			
Alt	ol Type	Entering Int.	Avg. Queue	Max Queue	Total Delav	Stoppin g Delav	Mvmt	Max Queue	Avg. Delav	Int. LOS	
			(m)	(m)	(sec)	(sec)		(m)	(s)		
Casablanca Blvd & North Service Rd	Sig.	1563	7	57	12	7	NBR	95	11	В	
Casablanca Blvd & North Ramp Terminal	Sig.	2269	11	67	13	10	WBL	149	26	В	
Casablanca Blvd & South Ramp Terminal	Sig.	2812	6	57	8	4	EBR	91	33	Α	
Casablanca Blvd & S Service Rd	Sig.	3369	67	153	55	43	NBT	267	82	E	
Casablanca Blvd & Livingston	Sig.	1322	49	101	39	21	WBR	132	72	D	
Casablanca Blvd & Main St W	TWSC	997	1	17	3	0	SBR	33	9	-	
S Service Rd & Industrial Dr	TWSC	1343	2	32	6	1	WBL	44	5	-	
S Service Rd & Hunter Rd	TWSC	912	1	10	3	1	NBL	42	13	-	
Hunter Rd & Industrial Dr	TWSC	522	1	18	3	0	WBR	33	6	-	
Hunter Rd & Livingston Ave	TWSC	224	0	0	0	0	None	0	0	-	
Hunter Rd & Main St W	TWSC	881	0	9	1	0	EBL	25	3	-	
Main St W & Oakes Rd N	TWSC	905	0	10	2	0	SBR	33	8	-	
South Service Road & GO North Access	Sig.	2173	36	129	18	11	WBT	149	13	В	
Livingston Avenue & GO South Access	TWSC	101	0	1	1	0	SBL	9	5	-	

Table 5-4: Forecasted Road Operations in 2041: AM and PM Peak Hour

Transportation Assessment - 2041 Base - Weekday PM Peak Hour

	Contr	# Veh.	(Weig	Int. hted by	Avg. Mvmt. a	nd Vol.)	Critio	al Move	ment	Overall
Alt	ol	Entering	Avg.	Max	Total	Stoppin		Max	Avg.	Int.
	Туре	Int.	Queue	Queue	Delay	g Delay	Mvmt	Queue	Delay	LOS
			(m)	(m)	(sec)	(sec)		(m)	(s)	
Casablanca Blvd & North Service Rd	Sig.	1790	18	80	20	13	NBR	115	17	С
Casablanca Blvd & North Ramp Terminal	Sig.	2653	6	59	9	6	WBL	145	25	Α
Casablanca Blvd & South Ramp Terminal	Sig.	3025	76	146	30	15	EBR	505	135	С
Casablanca Blvd & S Service Rd	Sig.	3765	52	126	47	37	SBR	162	6	D
Casablanca Blvd & Livingston	Sig.	1400	7	68	12	6	SBR	101	2	В
Casablanca Blvd & Main St W	TWSC	1021	1	27	3	1	EBL	50	4	-
S Service Rd & Industrial Dr	TWSC	1211	38	96	70	37	EBT	128	127	-
S Service Rd & Hunter Rd	TWSC	854	1	12	3	2	EBR	18	2	-
Hunter Rd & Industrial Dr	TWSC	452	0	10	3	0	WBT	30	10	-
Hunter Rd & Livingston Ave	TWSC	176	0	0	0	0	None	0	0	-
Hunter Rd & Main St W	TWSC	923	0	17	1	0	EBL	30	2	-
Main St W & Oakes Rd N	TWSC	941	0	3	1	0	SBR	27	7	-
South Service Road & GO North Access	Sig.	2069	35	114	20	13	WBT	132	11	В
Livingston Avenue & GO South Access	TWSC	69	0	13	5	0	SBL	15	5	-

5.8 Timing of Improvements

As the Town of Grimsby and the surrounding area develop and major projects are completed (e.g., opening of the GO Transit Station) there will be breakpoints where deficiencies in the transportation network will manifest and become clear. Given this, there are three clear stages over which the transportation network must be improved to ensure that mobility is maintained within the study area. These are described briefly below:

Opening of the Grimsby GO Transit Station – 2021

The opening of the GO Transit Station will have significant and immediate effects on the operation of the local road network, resulting in significant changes in daily travel patterns and time of travel decisions by local residents and others that find value in the new rail service. Resolution of these future issues requires immediate attention. This will involve the execution of the recommendations in the Casablanca Boulevard and GO Transit Station Access EA (2018). As discussed earlier in this document, these improvements were assumed to be part of the base roadway network for this analysis.

Livingston Avenue Extension – 2031

With a functioning GO Transit Station and continued development of the area, congestion issues on the South Service Road will become more pronounced by 2031. To address the forecast traffic demands, the Livingston Avenue extension corridor capacity will be need to be constructed by 2031 to address capacity, mobility needs and operating issues in the broader east-west corridor.

6.0 Alternative Solutions

Phase 2 of the Municipal Class EA process involves the development of 'Alternative Solutions' to address the needs, opportunities, and problem for the Study (as previously summarized in **Section 5.0**). 'Alternative Solutions' are different ways of potentially solving the problem or addressing an opportunity. **Section 6.1** provides a description of the Alternative Solutions that were considered, **Section 6.2** describes public consultation activities that were undertaken in regards to the Alternative Solutions, and **Section 6.3** and **Section 6.4** present the evaluation results of these alternatives. **Section 6.5** provides the overall evaluation and conclusion on the Preferred Alternative solutions.

6.1 Identification of Alternative Solutions

This section provides an overview of each of the Alternative Solutions that were considered.

6.1.1 Alternative Solution #1: Do Nothing/Status Quo

The *EA Act* requires the consideration of the "Do Nothing" or base case scenario. The Do Nothing alternative is included to identify for comparison purposes what would happen if no further action was taken to improve the east-west transportation conditions in West Grimsby. This Alternative assumes that the Casablanca Boulevard and the South Service Road improvements recommended in the Casablanca Boulevard and GO Station Access EA (**Figure 6-1**) have been implemented and are in-place by 2021. As such Alternative Solution #1 represents the future baseline condition.

6.1.2 Alternative Solution #2: Transportation Demand Management

Transportation Demand Management (TDM) measures include a wide range of policies, programs, services and products that influence how, why, when, and where people travel to make travel behaviors more sustainable. The emphasis of TDM strategies is to reduce the overall demands on the transportation network, shift demands to non-peak times, and to encourage the use of other modes of transportation.

This study recognizes the importance of promoting and implementing TDM initiatives, including key policy tools such as the design of complete streets, as supported by the Region's TMP. Typical TDM measures included as part of other Alternative Solutions include, as examples:

- New active transportation facilities such as bike lanes (on or off-road) and sidewalks;
- Charging for car parking;
- Priority parking spaces for carpools;
- Discounted transit passes;
- Bike racks;
- Change-room and shower facilities for cyclists; and

• Telecommuting programs and flexible work hours.

The key advantage of this alternative is that it may help to improve traffic flow in the corridor (through reduction in vehicles during peak periods). For TDM to be effective, several different measures would likely need to be implemented, and there may be some limitations as to the extent to which some of these measures would be applicable or effect change on the corridor.



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6.1.3 Alternative Solution #3: Widen Main Street West

As part of the improvements to Main Street West, it was assumed that one additional through lane in each direction (east and west) in addition to cycling paths and sidewalks from Casablanca Boulevard to Oakes Road North would be implemented. A preliminary layout was developed to determine the potential footprint of the road widening through this corridor (**Figure 6-2**). The objective of the layout was to avoid property takings as much as possible. As the existing road is not in the centre of the right-of-way, it would be necessary to rebuild the existing roadway lanes to largely avoid property acquisition.

6.1.4 Alternative Solution #4: Widen the South Service Road

The improvements to the South Service Road were assumed to include one through lane in each direction added west of Industrial Drive to Hunter Road. East of Industrial Drive, no additional widening was considered practical beyond the widening recommended in the Casablanca Boulevard and GO Station Access EA, which provided a six-lane roadway (including auxiliary turning lanes) in this section (**Figure 6-1**). Further widening of this section of the South Service Road would be very difficult to implement from a property impact perspective (i.e., potential impacts to the GO Transit Station and MTO lands), given that the 6 lane widening expected to be completed by approximately 2021 utilizes the entire existing right of way. Further widening was therefore only considered west of Industrial Drive.

To support this alternative, it was assumed that Hunter Road would also need to be improved between Main Street West and the South Service Road. These improvements would be within the existing roadway right-of-way, and would include 3.75 m travel lanes in each direction and paved 1.5 m shoulders as per the Region's Complete Street Design Guidelines for a rural road.

6.1.5 Alternative Solution #5: Extend Livingston Avenue

For this Alternative, it was assumed that an extension of Livingston Avenue would begin where the Casablanca Boulevard and GO Transit Station Access EA portion of the Livingston Avenue extension ended, just east of the Irish Grove woodlot. For purposes of the transportation modelling and evaluation of alternative solutions, a conceptual roadway was assumed to follow the existing right-of-way currently owned by the Region, extending to Oakes Road North.

A preliminary layout for the extension was developed (**Figure 6-3**) including its connection with Main Street West. To support this alternative, Hunter Road would also need to be improved (pavement resurfacing) for a distance of 700 m north from the new Livingston Avenue/Hunter Road intersection to the South Service Road.



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6.2 Consultation Input on Alternative Solutions

The first Public Information Centre (PIC) for the Study was held in tandem with the Casablanca Boulevard and GO Station Access EA on June 20th, 2018. At this session, information was presented on the Study and input collected on the potential Alternative Solutions to be considered. The Region received feedback that the scope of the Study should consider the broader east-west connectivity context, and give due consideration to all potential alternatives.

The Alternative Solutions along with the evaluation results were presented for discussion with the public at the second PIC. The following discussion provides a summary of the feedback heard and considered in the evaluation of Alternative Solutions.

6.2.1 Public Consultation Centre #2

The second Livingston Avenue Extension EA PIC held on Tuesday, May 28, 2019. At this event, draft results on baseline environmental conditions and results of the transportation forecasting work were presented to the public for feedback across three main theme areas: Natural Heritage, Transportation, and Cultural, Archaeological, and Socio-Economic considerations. A copy of the display boards is provided in **Appendix A**.

Key input from the public comments received during this event included:

Natural Heritage:

- Natural environment and wildlife was a major concern noted by some residents. Concerns were around the loss of woodlot trees, wildlife and habitat, impacts to migration patterns, impacts related to climate change, and the irreversibility of impacts. The Irish Grove Woodlot was a key focus of concern, particularly with respect to tree removal and habitat impacts;
- It was suggested by some residents that the Region should extend Livingston Avenue in order to provide transportation connectivity, and compensate for impacts to tree removal by replanting trees in another location or create a public park or conservation area;
- Stormwater management in the Focused Study Area was raised as an existing and potential future concern;
- There was a perception that the potential extension of Livingston Avenue would have a significant impact on the environment while providing only a modest contribution, if any, to the transportation problem. Some residents commented that the Region should improve existing roads to support needed capacity, rather than build a new road through an environmentally sensitive area; and
- The impacts to the woodlot and potential mitigation was considered to be a key component of future consultation.

Transportation Assessment:

- The intersections of a potential extension of Livingston Avenue with Hunter Road and Main Street West/Oakes Road North were discussed, including the potential feasibility of a roundabout at these intersections;
- There were concerns raised about the intersection of Hunter Road and Main Street West, and a suggestion that the roadway should be widened at the northwest corner;
- Some residents noted that an extension of Livingston Avenue is necessary for future eastwest traffic flow, and it could help alleviate traffic on Main Street West, in addition to supporting access to the GO Station;
- There will be better access to emergency services if the extension is complete, as it provides more routes. There is a need to have capacity for emergency vehicles to transport people from the west side of Grimsby to the hospital;
- Suggestion that the intersection of Casablanca Boulevard and Main Street West needs to be a 3-way stop as red light runners will cause accidents;
- Suggestion to consider adding a new road along the train tracks from Hunter Road to Casablanca Boulevard;
- Questions were raised about the future growth Projections for Grimsby, and whether an
 extension of Livingston Avenue is necessary to support future traffic demand. Conversely,
 some residents commented that Grimsby already has traffic issues and when the GO
 Station is built there will be extreme traffic jam issues, and were supportive of additional
 east-west capacity in the form of the Livingston Avenue extension;
- Suggestion to design for an improved streetscape should the Livingston Avenue Extension be carried forward as the Preferred Solution;
- Concerns were raised by local residents regarding increased traffic on current dead end residential streets, namely Emily Street and Rosedale Street, if an extension of Livingston Avenue were carried forward; and
- Comment that the extension of Livingston Avenue to Oakes Road is necessary as it will allow for Wheeltrans, GO buses, vehicles, bicycles and pedestrian safety.

Cultural Archaeological Heritage and Socio-Economic Assessment:

- Concern about the property value of homes on Emily Street and a suggestion that the city should purchase them;
- Concerns were raised about potential impacts to the baseball field at the Smith Public School where the Livingston Avenue right-of-way meets Oakes Road North;
- A comment was made that completing the Livingston Extension would bring presence to the built heritage resource (BHR) homes; and
- There were concerns regarding the value of the heritage trees on Main Street West, if this corridor were to be widened.

The concerns raised were integrated into the development of the evaluation criteria for the Alternative Solutions, and those pertaining to the Alternative Designs and impact mitigation were carried forward to that stage of the Study (see **Sections 7, 8,** and **9** of this ESR).

6.3 Alternative Solutions Evaluation and Selection of Preferred Solution

The evaluation of the five Alternative Solutions described in **Section 6.1** was based on a set of evaluation criteria structured around five main criteria groupings as shown in **Table 6-1**. The evaluation results are presented in **Table 6-2**.

Criteria Group	Criteria
	Ability to address future east-west roadway capacity requirements
	Ability to enhance GO Transit Station access
	Ability to improve road network flexibility and redundancy/resiliency
Transportation	Ability to improve local community accessibility, continuity and directness to/from downtown Grimsby
	Ability to address safety issues
	Ability to provide safe and efficient Active Transportation
Natural Environment	Potential for removal and disturbance effects to terrestrial and aquatic habitat
Engineering	Potential for significant roadway design challenges
	Potential for loss of residential/business property
Socio-Economic and	Potential for disruption effects to residences
Cultural Environment	Potential for improved street corridor character
	Potential for impacts on cultural heritage/ archaeological resources
	Potential for loss of agricultural land
Cost	Relative capital cost estimate

Table 6-1 Alternative Solutions Evaluation Criteria



Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Widen Main Street West	Alternative 4 – Improve the South Service Road	Alternative 5 – Extend Livingston Avenue to Oakes Road North/Main St. West
	Less Preferred	Less Preferred	Moderately Preferred	Less Preferred	Preferred
Ability to improve road network flexibility and redundancy/resiliency	Does not provide new network capacity and therefore does not improve the area network's flexibility/redundancy. (Beyond those recommended in the Casablanca Boulevard EA).	Does not provide new network capacity and therefore does not improve the area network's flexibility/ redundancy.	While improvements to Main Street may improve network performance, because of the out of way travel for the primary travel patterns and the fact that trips would then have divert back to congested routes, this alternative provides limited benefit in terms of redundant capacity or network flexibility.	Improvements to South Service Road provide limited improvements to network performance. As such, and as an existing congested facility the improvements provide no benefit in terms of redundant capacity or network flexibility.	This alternative provides new corridor capacity that connects the network to downtown Grimsby via Livingston Avenue east of Casablanca Avenue. This alternative provides redundancy/reliliancy for: emergency services, capacity during QEW emergency detour periods, capacity during construction or incident events on other east-west roadways. This capacity provides an alternative route for network users, thereby improving the flexibility of the network to address user routing choice. A westerly terminus point at Oakes Road maximizes the effectiveness of the facility as an E-W alternative for longer distance trips.
Ability to improve local community accessibility, continuity and directness to/from downtown Grimsby	Least Preferred Does not provide improved east-west opportunity for travel to/from the Grimsby downtown area for the local community.	Least Preferred Does not provide improved east-west opportunity for travel to/from the Grimsby downtown area for the local community.	Moderately Preferred While improvements to Main Street capacity would provide some accessibility benefit, given its current alignment to the south, it would not lead to improved network continuity or directness to/from downtown Grimsby. As well, given the constraints of the Main Street corridor east of the study area, It would not improve the level of network choice for users,	Uses Preferred While improvement to South Service Road capacity would provide some accessibility benefit, given its northerly alignment in the corridor, it would not lead to improved network continuity or directness to/from downtown Grimsby. As well, It would not improve the level of network choice for users, particularly during peak periods (commuter peaks, summer	Preferred The extension of Livingston to Oakes Road provides for a new gateway into the downtown from the west and a more direct/shorter connection with better capacity than existing Main Street. This alternative maximizes the level of network choice for users, including longer distance trips, particularly during peak periods (commuter peaks, summer tourist
			particularly during peak periods when congestion on N-S connecting roadways is likely.	tourist activity, and QEW Emergency situations) when congestion on E-W roadways and N-S connecting roadways is prevalent.	activity, and QEW Emergency situations) when congestion on E-W roadways and N-S connecting roadways is prevalent.

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Widen Main Street West	Alternative 4 – Improve the South S Road
	Least Preferred	Least Preferred	Moderately Preferred While improvements to Main Street will result in a	Less Preferred Improvements to South Service Road, b
Ability to address safety issues	opportunity for improved safety in the network. (Beyond those recommended in the Casablanca Boulevard EA).	reduced, active transportation persons in the corridor increase. Without associated changes in the network environment (i.e. design improvements), the alternative does not provide any opportunity for improved user safety in the network.	favourable operating environment for Main Street itself, the alternative is not likely to result in a significant diversion of traffic. Therefore, it is not expected to lead to material improvements in safety over the broader network (i.e. the more congested South Service Road and Casablanca corridors.	improvements to South Service Road be Industrial Drive and Casablanca Boulevard expected to result in significant improvem safety levels on South Service Road. The of condition on South Service Road between Station access and Casablanca Boulevard Station Activity) will continue to be signifi- strained during peak periods, resulting in a environment with significant vehicle/vehicd vehicle/active mode conflicts.
	Least Preferred	Least Preferred	Preferred	Less Preferred
Ability to provide safe and efficient Active Transportation	Does not provide opportunity for improved active transportation. (Beyond those recommended in the Casablanca Boulevard EA).	Does not provide opportunity for improved active transportation.	Provides improved active transportation facility and opportunities.	Length of improved active transportation degree of connectiveness with the act transportation system is less than Alterna and 5.
NATURAL ENVIRON	IMENT			



Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Widen Main Street West	Alternative 4 – Improve the South Service Road	Alternative 5 – Extend Livingston Avenue to Oakes Road North/Main St. West
Potential for removal and disturbance effects to terrestrial and aquatic habitat.	No impact to natural habitat features.	Some measures have potential for limited impact to natural habitat (e.g. from new cycle path) but these are expected to be minimal and through design, impacts are expected to be largely avoided.	Potential for impact to natural features (street trees along Main Street.) as a result of improvements to other roadways.	There are few natural features along South Service Road. Minimal impact to manicured grass.	Would result in removal of and impacts to natural heritage features, including removal of a portion of the Irish Grove woodlot. Additional impacts include impacts to wildlife habitat, impacts to the watercourse.
ENGINEERING/ROAD	DDESIGN				
Potential for significant roadway design challenges	No engineering/construction required.	Infrastructure improvements not expected to be significant.	The existing roadway would need to be rebuilt to keep improvements within the existing right of way. Some complexity related to existing utilities and storm water run-off. Potential for traffic delays and detouring during construction.	Some complexity related to existing utilities and storm water run-off. Potential for traffic delays and detouring during construction. Improvements to Hunter Road would be anticipated to support access to Main Street West.	As this is a greenfield route, complexities are expected to be minimal. Minimal traffic delay and detouring would be required during construction. There are some design complexities related to the tie in with Main Street. It is expected that through careful design that the road can be tied into Main Street to ensure that design standards can be met and that impacts on utilities and private property is minimized.
SOCIO ECONOMIC					
Potential for loss of residential/business property	No potential for property loss.	No potential for property loss.	Road improvements can largely be made within the existing road right of way. Minimal to no loss of property anticipated.	It is anticipated that the widening proposed (note that the only widening considered practical is beyond the widening recommended in the Casablanca Boulevard and GO Station Access EA due to severe property constraints) can largely be accomplished within the existing road right of way. Some minor amounts of frontage from commercial properties could be required.	No loss of residential/ business properties as the extension is located within the existing right of way owned by the Region. The connection of the new route to Main Street will require some property and the intersection with Oakes Road may also require property.
Potential for disruption effects to residences	No potential for disruption to residences.	No potential for disruption to residences.	Potential for additional disruption (e.g. noise) to residents along Main Street from additional traffic volumes attracted to the roadway due to additional lanes. About 35 residences potentially affected.	While there are no residences along South Service Road, vehicles would be attracted to use Hunter Rd more which could lead to increased disruption to residents that are located along it.	Potential for traffic related disruption effects to residents in the subdivision just east of Hunter Road., if the alignment follows the existing right-of-way owned by the Region. With this alignment, the edge of road would be about 10-13 m from fence line of two residences and approximately 45 m from the fence line for 8 residences. Would also attract more traffic to the existing section of Livingston Avenue on west side of Casablanca that has residences along it. A noted benefit is that the extension could potentially result in a reduction in traffic volumes along Main St which has a high number of residences along it.

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Widen Main Street West	Alternative 4 – Improve the South Service Road	Alternative 5 – Extend Livingston Avenue to Oakes Road North/Main St. West
Potential for improved street corridor character	No opportunity for streetscape improvements.	Depending on the alignment and TDM measures, some opportunity for streetscape improvement (e.g. through new bike pathways).	Opportunity for streetscape improvements to Main Street with introduction of pathways and landscaping.	Opportunity for streetscape improvements to South Service Road with introduction of pathways and landscaping.	As this is a new road extension, it provides an opportunity to implement Complete Street design elements.
Potential for impacts on cultural heritage/ archaeological resources	No impacts	Some measures have potential for limited impact to archaeological features (e.g. from a new cycle path) but these are expected to be minimal and through design, impacts are expected to be largely avoided.	Road improvements would impact lands which have archaeological potential. There are several properties with cultural heritage significance along the corridor that would be impacted by widening.	Affected lands have been previously disturbed; potential for impact is low to none.	Road improvements would impact lands which have archaeological potential. There are also heritage properties at the intersection of Oakes/Main Street West where the intersection with a Livingston Avenue Extension would need to be carefully aligned to avoid property impacts.
Potential for loss of agricultural land	No loss of agricultural land.	No loss of agricultural land.	Minimal to no potential for loss of agricultural land.	Minimal to no potential for loss of agricultural land.	The Livingston Avenue corridor is designated in the Official Plan as a transportation corridor with existing underground services and as such, the long term intent of this land is not for agricultural purposes.
COST					
Relative capital cost estimate	No capital cost	Low cost assuming the cost of AT facilities is associated with other alternatives.	Highest cost due to road improvement length and need to rebuild existing lanes. Rebuilding of existing road lanes would be required to keep improvements in the right of way and to avoid property acquisition. Lower O&M cost as compared to Alternative 4 and 5 as improves an existing road.	Moderate cost due to shorter length of South Service Road improvements plus basic improvements to Hunter Road as compared to Alternative 3 and 5. Lower O&M cost as compared to Alternative 5 as improves an existing road and does not involve new road construction.	Higher construction cost than alternatives 1, 2 and 4 due to greatest length of new road and cost need for Hunter Rd improvements (pavement resurfacing) from the new Hunter Road/Livingston Avenue to South Service Road. Intersection. Additional O&M costs would also result due to new road section.

6.4 Summary of Alternative Solutions Evaluation

The following section summarizes the results of the evaluation, with an at-a-glance overview provided in **Table 6-3**.

6.4.1 Transportation

Under the Transportation criteria group the following criteria were considered:

- Ability to address future east-west roadway capacity requirements;
- Ability to enhance GO Station access;
- Ability to improve road network flexibility and redundancy/resiliency;
- Ability to improve local community accessibility, continuity and directness to/from downtown Grimsby;
- Ability to address safety issues; and
- Ability to provide safe and efficient Active Transportation.

The evaluation results draw on the traffic forecasting modelling that was completed for the Study, including for horizon years 2021 and 2041.

The results of the evaluation indicate a clear preference for Alternative #5: Extension of Livingston to Oakes Road North/Main Street West, as it is the only alternative that is preferred for all six transportation criteria. It is also the only Alternative that fully addresses the forecasted east-west capacity problem, and provides benefits associated with network redundancy/resiliency, connectedness and flexibility.

6.4.2 Natural Environment

This criteria group is primarily concerned with potential impact on existing natural features in the study area. The following criteria was considered:

• Potential for removal and disturbance effects to terrestrial and aquatic habitat.

The alternative that would have the most impact to natural features is Alternative #5: Extension of Livingston to Oakes Road North/Main Street West. The feature of most significance is the crossing of the Irish Grove woodlot located just to the east of Hunter Road. Impacts to this woodlot were a concern expressed by many at the May 2019 PIC and previously.

Alternative #5 is least preferred for this criteria group. The extension of Livingston would result in removal of a portion of the Irish Grove woodlot, which meets the Region's criteria for a Significant Woodland, per the Regional Official Plan. Approximately 6,950 m2 of natural habitat would be removed (about 7% of the total woodlot) by the road footprint and an additional 16,250 m2 ha (16% of the total woodlot) would be isolated from the remaining woodlot if the roadway followed the existing right of way owned by the Region. While the Livingston Avenue Extension would likely be extended within the existing right-of-way owned by the Region and includes a buried sewer line, it has grown over with vegetation and many trees.

An inventory of existing trees within the right-of-way that passes through the Irish Grove woodlot was undertaken in 2019 by an arborist. It was determined that the majority of tree species with the potential to be removed within the right-of-way are common to southern Ontario. Most of the trees in the right-of-way can be considered "small or young" as a result of their size (i.e., under 10 cm DBH). The "small or young" species consist of: Sugar Maple (*Acer saccharum*), Shagbark Hickory (*Carya ovata*) Green Ash (*Fraxinus pennsylvanica*), White Ash (*Fraxinus americana*), Black Walnut (*Juglans nigra*), Large-tooth Aspen (*Populus grandidentata*), American Basswood (*Tilia americana*) and American Elm (*Ulmus americana*) saplings.

Based on the tree inventory results, a total of 2,085 live trees may require potential removal within the right-of-way. Of the total trees, 1,184 trees are below 10 cm DBH and 1.34 m in height, while 537 trees are less than 10 cm DBH but greater than 1.34 m. The remaining 364 trees are greater than 10 cm DBH, of which 40 (or 11%) are equal to, or greater than, 30 cm DHB; the largest of which is 70 cm DHB.

With the exception of ash species (green/white) the majority of the other trees inventoried were in good to fair condition with only minor health issues or defects. The majority of ash species greater than 10 cm DHB within the right-of-way were either dead or in decline, having visible signs of the EAB. Dead ash, also referred to as snags, have the potential to provide SAR bat roosting habitat; subject to their state of decay. Similarly, the removal of Shagbark Hickory may be of significance as this species has the potential to provide SAR bat roosting habitat due to its natural growth form which produces large amounts of loose or exfoliating bark.

Removal of ash trees may be required outside of the right-of-way if it is determined that construction has the potential to impact a significant amount of a trees root zone (>30%) or that they will pose a potential hazard during or after construction. Through best management practices and careful facility design, the number of tree removals reported here has the potential to be reduced. To that end, a hazard assessment conducted by a certified TRAQ arborist from ISA, is recommended for the trees in the right-of-way and those adjacent, as there is the potential for the dead/decaying ash trees to cause damage/injury or death to construction crew members and/or equipment. If the ash trees are infested, typically they will start showing symptoms within 6 months starting with thinning of leaves followed by woodpeckers feeding on the bark in search of the larvae. As the tree dies, it will produce many epicormic branches which are small suckers. Within the year, the tree will start to dry out, and branches will die and fall off during storms. The decision to remove a tree is based on where it is located, and if it has the potential to cause property damage or hit people. If this threat is real, then the trees should be removed.

The Livingston Avenue Extension alternative would require the crossing of a small watercourse which could result in some impacts to aquatic habitat, particularly during construction. To mitigate impacts to the woodlot, the road would be designed to minimize the

removal of the more significant trees and a tree replanting program undertaken to compensate for the loss of trees. Aquatic habitat impact mitigation measures would include, for example, standard stormwater management and erosion control measures. Mitigation will be detailed out as part of impact assessment work in the Study.

6.4.3 Socio-Economic

This criteria considers potential for impact on existing residences and businesses and examines potential for improvements to street character. The following criteria were considered:

- Potential for loss of residential/business property;
- Potential for disruption to residences;
- Potential for improved street corridor character;
- Potential for impacts on cultural heritage/archaeological resources; and
- Potential for loss of agricultural land.

Note that, based on conceptual plans, it is expected that the improvements/new roadway extension works can be contained within the existing rights of way. As such, only minor property impacts are expected for all alternatives.

Excluding the Do Nothing or TDM, which have no negative social impacts other than not addressing future congestion, Improvements to the South Service Road (Alternative #4) was considered most preferred for this criteria group as there are no residential properties along it and the existing businesses are not considered to be sensitive to increased road traffic volumes.

The Livingston Extension (Alternative 5) would bring the roadway in proximity to residences located to the east of Hunter Road. Two residential properties would be located about 13 m from the edge of the new roadway and 8 residential properties (back of fence) would be about 45m from the edge of the roadway. While the separation of residences from the roadway is fairly substantial, there could be a change in noise levels for these residents (to be confirmed during alternative designs evaluation). For these reasons Alternative 5 was considered to be less preferred.

In recognition of the study area characteristics and the alternatives, the criterion of most importance when considering socio-economic impacts is the potential for residential disruption effects (both construction and during operations). As the section of Main Street under consideration has a large number of residences located along it (about 35), the widening of this roadway (Alternative 3) has the potential for the greatest disruption effects to existing residents. It is therefore considered to be least preferred for this criterion group.

6.4.4 Engineering/Road Design

In this criteria group one criterion was considered:

• Potential for significant roadway design challenges

Alternatives #3, #4 and #5 all involve some amount of road works and are considered to be more complicated than Alternatives #1 or #2. Of the three alternatives that involve road works, Alternative 3 (Main Street) and Alternative 5 (Livingston Extension to Oakes) are least preferred as they are longer corridors. With Alternative 3 the existing roadway would need to be rebuilt to keep improvements within the existing right of way, with some substantial complexity related to existing utilities and storm water run-off and the potential for traffic delays and detouring during construction. Alternative 5 is less complicated but requires the design to tie the road back to a section of Main Street that is on an existing curve.

6.4.5 Cost

In the cost criterion group, the following criterion was considered:

• Relative capital cost estimate and O&M Costs.

For the three alternatives involving road improvements the following approximate road lengths will need to be constructed (Alternative 5) or re-constructed (Alternatives 3 and 4):

- Alternative #3: Improvements to Main Street 1800 m;
- Alternative #4: Improvements to South Service Road 500 m (Industrial to Hunter) plus basic roadway improvements to Hunter Rd from Main Street north to South Service Road (1,100 m); and
- Alternative #5: Livingston Avenue Extension to Oakes Road/Main Street West 1250 m plus basic roadway improvements (pavement resurfacing) to Hunter Rd from Livingston Extension intersection north to South Service Road. (700 m).

Costing for these Alternative Solutions was developed on a relative basis considering the length of the improvement, expected complexities (e.g. impacts on utilities) and the amount of new road surface required. For the three alternatives involving road improvements, Alternative 3 (Main Street) is considered the most costly as it is the longest road section with a need to re-build the existing road entirely within the existing road corridor with complexities associated with existing utilities, drainage, entrances and property. Alternative 5 (Livingston Extension), is next costly including the need for pavement resurfacing a section of Hunter Road. Alternative 4 (South Service Road) is the least costly alternative that involves roadway upgrades.

6.5 Overall Alternatives Comparison

To compare the alternatives, the Transportation Criteria group was first considered as it is focused on the extent to which the alternatives address the problem/opportunity statement. While they have low impact and cost, the Do Nothing and TDM on its own do not address the problem statement and as a result, were not considered further. Of the remaining alternatives, all involve improvements to either existing east-west roads or the extension of Livingston Avenue. Further, the Livingston Avenue Extension alternative and the SRR improvement
alternative would also require pavement resurfacing improvements to Hunter Road (either a section of it or its full length). Regarding the two widening alternatives, (South Service Road or Main Street) there are concerns in regards to the extent that the improvements would address the problem. Further improvements to South Service Road beyond the Casablanca EA preferred alternative east of Industrial Drive is not considered practical and therefore this alternative cannot address the capacity deficiency as vehicles attracted to this corridor would be delayed due to the traffic activity around the Go Station. Furthermore, improvements to South Service Road would not provide additional roadway redundancy/resiliency to help manage incidents/delays/closures on other E-W roadways such as the QEW and would not improve E-W connectivity and directness into the Grimsby Downtown core.

Similarly, with a Main Street widening, a significant volume of traffic would not be attracted to the roadway as the east-west demands lie further to the north. As such, there would be unused capacity with these improvements, and even if volumes were attracted to the corridor, congestion would result east of Casablanca which would remain as a two lane road. This constraint would limit the ability to improve east-west movement though the corridor. And, similar to South Service Road, an improved Main Street would not achieve other objectives such as network redundancy and improved connectedness/directness. Main Street also has a high number of residences along it and while significant property acquisition is not anticipated, there would be increased disruption effects with increased vehicle traffic volumes.

The extension of Livingston would provide network redundancy/resiliency for: emergency services, capacity during QEW emergency detour periods, and additional capacity during construction or incident events on other roadways. It provides an alternative route for network users, thereby improving the flexibility of the network to address user routing choice. It also provides for a new gateway into the downtown from the west, enhances active transportation linkages and results in a more direct/shorter connection to downtown than Main Street. This alternative maximizes the level of network choice for users including longer distance trips particularly during peak periods when congestion on N-S connecting roadways is likely.

The Livingston Extension solution is not without some challenges including the removal of a section (7%) of the woodlot within the Region owned corridor and separating an additional 16% south of the main privately owned Irish Grove woodlot. While the woodlot is within specialty crop zoning, it is also has an overlay zone "Environmental Conservation Area" and is considered to be a "significant woodland" by the NPCA and contains significant wildlife habitat based on completed surveys. The Livingston extension would also require the crossing of a small creek, and would bring a new roadway in proximity to residents that may experience disruption effects (e.g. noise). The impacts to the woodlot, particularly the removal of larger trees, can be partially minimized through careful route planning and facility design and the loss of trees compensated through a tree planting program. This will be examined as part of next steps – alternative designs evaluation and impact assessment.

As Alternative 5 – Livingston Extension, is the only alternative that fully solves the long term transportation problem, it is the recommended alternative solution and is recommended to be carried forward into the preliminary design stage to confirm the alignment and identify appropriate mitigation and impact management measures to potentially avoid or reduce

adverse effects. The acceptability of any remaining or residual net adverse effects including the potential effects described previously, are to then to be examined to confirm this alternative as the recommended undertaking.

Agency discussions including with the MNRF and the NPCA, are to occur to gain their input in regards to the impacts associated with the road extension through the Irish Grove woodlot. Future stakeholder comments will also be considered in the next phase of the work (development of the preferred alternative).

Alternative Solution		Evaluation Summary
Alternative #1 – Do Nothing	Carry Forward SHORT TERM	Addresses the problem/opportunity in the short term (till approximately 2031).
Alternative #2 – Transportation Demand Management	Combine with Other alternatives, namely Alternative #1 and Alternative #5	
Alternative #3 - Widen Main Street West between Casablanca Boulevard and Oakes Road North	Do Not Carry Forward	This alternative does not address the problem/opportunity
Alternative #4 – Improve the South Service Road west of Industrial Drive	Do Not Carry Forward	This alternative does not address the problem/opportunity
Alternative #5 – Extend Livingston Avenue to Oakes Road North/Main Street West	Carry Forward APPROX. 2031	This alternative addresses the problem/opportunity, but is not expected to be needed until approximately 2031.

Table 6-3 Summary of Alternative Solutions Evaluation

Considering the results of the Alternative Solutions evaluation, it was determined that the preferred solution would include a combination of TDM measures, roadway operations improvements and additional roadway lanes through a phased approach of implementing Alternatives #1 and #2 in the immediate term and Alternatives #2 and #5 in the longer term,

once the need for additional roadway capacity materializes. Alternative Designs were developed for Alternative #5 as presented in the next section (**Section 7**) of this ESR.

7.0 Alternative Designs

7.1 Approach to Alternative Designs Development and Evaluation

As previously described in **Section 6.0** of this ESR, the preferred alternative solution was rationalized to include:

- The extension of Livingston Avenue from the end of the planned Livingston extension as approved in the Casablanca Boulevard and GO Station Access Environmental Assessment Environmental Study Report (approximately 14.0 m east of the Irish Grove Woodlot) to a new intersection with Main Street West in the general vicinity of Oakes Road (refer to Figure 7-1);
- Pavement improvements to Hunter Road from the new intersection with the Livingston Avenue Extension northerly to the South Service Road; and
- New active transportation facilities.

This section describes the Alternative Designs that were developed and evaluated to select the preferred design for the undertaking. The Alternative Designs represent alternative methods of implementing the preferred solution, including, for example, routing alignment alternatives and various roadway configurations.

Alternative designs were developed and evaluated using a range of criteria and in consideration of: the baseline conditions in the general vicinity of the alternatives, design issues and constraints identified with the preferred alternative solution, and public and stakeholder feedback received during the consultation process. Alternative designs were developed for each of the following Project components:

- East-end Alignment Alternatives (East of Hunter Road);
- Cross-section alternatives through the Irish Grove Woodlot;
- Cross-section alternatives west of the Irish Woodlot to Oakes Road; and
- West End Alignment/Intersection Alternatives.



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The design alternatives were assessed and compared against a comprehensive set of evaluation criteria (refer to **Table 7-1**).

Criteria Group	Criteria
-	Potential for changes to traffic operations, delay and capacity
Iransportation	Potential for changes to traffic and public safety levels
	Potential for opportunities to support transit use
	Ability to provide safe and efficient active transportation
	Potential for removal of vegetation and terrestrial wildlife habitat
	Potential for effects to vegetation and terrestrial habitat
Natural Environment	Potential for effects on fish and aquatic habitat/water quality
	Potential for effects on species at risk
	Potential for fragmentation of wildlife habitat
	Potential for effects on wildlife movement
Engineering/Road Design	Potential for roadway design challenges/complexities
,	Ability to address drainage and stormwater management requirements
	Potential for loss of residential/business property
Socio-economic	Potential for disruption to residences/businesses.
Environment	Potential for improved street corridor character
	Potential for loss of agricultural land.
	Potential for change in community character
Archaeological and Built	Potential for impact to registered archaeological sites and areas of archaeological potential.
Heritage Resources	Potential to impact registered cultural heritage properties and properties of cultural interest.
	Potential for improved street corridor character
Cost	Relative capital costs and Operations and Maintenance Costs

Table 7-1: Alternative Designs Evaluation Criteria

Some adjustments were made to the criteria to reflect the specific alternative designs under consideration and their potential impacts. No ranking or weighting of the criteria were undertaken. In rationalizing the differences among the alternatives, the magnitude of the impact/benefit was considered as well as the potential availability of impact management measures to reduce the significance of negative effects.

7.2 East-end Alignment Alternatives

This section describes the consideration of alternative alignments east of Hunter Road which includes alignments through the Irish Grove woodlot.

7.2.1 Background

Livingston Avenue was originally extended from Casablanca Boulevard to west of Emily Street in the late 1950's. In the mid-1970's the right-of-way (ROW; width of 100 feet or 30.5 m) was acquired for a Livingston Avenue extension from just west of Emily Street to Main Street/Oakes Road (a distance of approximately 1500 m) including the section through the Irish Grove Woodlot. In 1979 the Town of Grimsby constructed a sanitary sewer line in the Livingston Avenue corridor from Hunter Road to east of Casablanca Boulevard. An approximate 10 m strip of land in the woodlot was cleared for this installation. Approximately 3,500 m² of the woodlot was cleared for sewer installation.

Through Niagara Region's Casablanca Boulevard and GO Station Access Environmental Assessment (Casablanca EA), completed in March 2019, the eastern section of the further extension of Livingston Avenue was selected as the preferred alternative to provide access to the Region's property associated with the Region-owned parcel identified as the "West Niagara Transit Terminal" in the Grimsby GO Transit Station Secondary Plan. This approved alternative extended Livingston Avenue further by approximately 210 m to within approximately 11 m of the eastern edge of the Irish Grove Woodlot (refer to Figure 7.1). The future western end of Livingston Avenue as approved in the Casablanca EA represents the match point for the assessment of further extension to the west that was completed as part of this Livingston Avenue Extension EA.

7.2.2 Woodlot Alignment Alternatives

East of Hunter Road through the Irish Grove woodlot, three general alignment alternatives were considered (refer to **Figure 7-2**):

- Alignment 1: Centred on the Region owned Livingston Avenue road allowance;
- Alignment 2: North of the Region owned Livingston Avenue road allowance; and
- Alignment 3: South of the Region owned Livingston Avenue road allowance (assumed to be along the south edge of the woodlot).

Alignment 1 would utilize the existing 100 foot (30.5 m) Region owned right-of-way that passes through the southern portion of the existing Irish Grove Woodlot. This existing right-of-way contains a 250 mm (10 inch) sanitary sewer that was constructed in 1979.

Alignment 2 would establish a new road corridor to the north of the Region's existing right-ofway, south of the CN Rail line. A northern corridor could not avoid the woodlot, likely requiring an alignment passing through, near the centre of the woodlot.

Alignment 3 would establish a new road corridor along the south edge of the woodlot, north of the residential properties along Geddes Street. Of note is that with either of the new road

corridor alternatives the existing Region right-of-way would likely remain to ensure access to the existing sanitary sewer. Relocating this sewer was considered inappropriate due to the cost involved.



Figure 7-2 East-end Alignment Alternatives

The evaluation of the three alternative alignments through the woodlot was based on a set of evaluation criteria structured around six criteria groupings as shown in **Table 7-1**.

Alignment 1 (existing Region Right-of-Way) was selected as the preferred location for the new road through the woodlot (refer to Table 7-2, Woodlot Alternative Alignment Evaluation Summary). It is the preferred alignment alternative for all of the evaluation criteria groups. With respect to the **Transportation** criteria group, Alignments 1 and 3 are preferred as they result in the most direct routes, with Alignment 2 establishing a longer, curvilinear alignment.

For the Natural Environment criteria group, with respect to the criterion "Potential for removal of vegetation and terrestrial wildlife habitat", for Alignment 1, a portion (i.e. 3500m2) of vegetation and terrestrial wildlife habitat were previously impacted/disturbed as a result of the previous corridor created in support of the sanitary sewer construction within the Region's right-of-way. This was confirmed based on the results of the 2019 Tree Inventory of the Regions right-of-way (**Section 5.6.2.3**). As such, for this alignment, a smaller area of previously undisturbed woodland would be required. In comparison, Alignments 2 and 3 would require the removal of a greater amount of previously undisturbed vegetation and its associated wildlife habitat(s) (i.e. approximately 30 m along the full width of the corridor).

In regards to effects on remaining vegetation, each of the Alignment Alternatives have the potential to indirectly effect vegetation (e.g. tree root damage from clearing for trees outside of the road right-of-way, road salt, etc.) as well as wildlife habitat (e.g. habitat encroachment, reduced habitat effectiveness, etc.). Alignment 3 is slightly preferred over Alignments 1 and 2 given that the south side of its alignment includes previously disturbed lands (i.e. agricultural, residential development), resulting in only one side of the roadway having a potential impact on remaining vegetation. Overall, based on the potential for removal of, and effects to, vegetation and wildlife habitat, Alignment 1 is preferred given its association with a previously disturbed infrastructure corridor.

Each of the Alignment Alternatives intersect the same watercourse (i.e. aquatic habitat) at the east end of the woodlot. The Alternatives were assessed based on their potential to effect special wildlife functions (e.g. connectivity, thermoregulation, etc.), biodiversity and overall integrity and quality of the watercourse. Each of the Alignments were assessed as having the same potential effects on the watercourse.

Similarly, based on the results from the 2018 and 2019 field investigations, the woodlot has the potential to provide SAR bat habitat (**Section 4.6.5**). Tree snags (i.e. dead/dying trees), cavity trees and trees with loose pealing bark have the potential to support SAR bat roosting habitat; each of the aforementioned were observed during field investigations. Although the 2019 Tree Inventory was completed for the Region's right-of-way only, no botanical and/or SAR birds were observed in association with the woodlot during 2018 field investigations (**Section 4.6.5**) As a result, each of the alignments were assessed as having the same potential effects on SAR bat habitat.

With respect to potential fragmentation of wildlife habitat, Alternative 3 would have the least impact given that a greater area of contiguous woodland would remain intact. Alternatives 1 and 2 would require bisecting the woodlot, therefore reducing the overall amount of contiguous woodland/wildlife habitat. The watercourse associated with the woodlot is likely to serve as the main north-south wildlife movement corridor. Although each of the Alternatives intersect the watercourse, Alternative 3 is preferred over Alternatives 1 and 2 in regards to wildlife movement given that a greater area of contiguous woodland would remain intact.

Considering the above assessment and relative rankings for each of the Natural Environment criteria, Alignment 1 was considered the preferred, Alignment 2 is less preferred and Alignment 3 is least preferred.

Regarding Socio-economic considerations, Alignments 1 and 2 are preferred as Alignment 3 would be close to residential development and potentially result in greater disturbance effects to residents (e.g. greater noise effects).

Alignment 1 is preferred for the Archaeological and Built Heritage criteria as the other two alternatives would involve establishing new corridors with greater potential for encountering archaeological resources.

Given that the Alignment Alternatives will all allow for the establishment of standard alignments with similar engineering and road design elements they were rated the same for the Engineering/Road Design criteria.

From a Cost perspective, Alignment 1 is slightly preferred as it will involve similar construction costs but not require the ongoing maintenance of two corridors (although historical maintenance practices seem to have been minimal).

Table 7.2 provides a summary of the preference rankings for the alignments alternatives for each criteria group. As described above and presented in Table 7.1, Alignment 1 is preferred for each of the six criteria groups and is therefore considered as the preferred alignment.

Criteria Group	Alignment 1– Existing Region Corridor	Alignment 2 – New Northern Corridor	Alignment 3 – New Southern Corridor
Transportation	Preferred	Less Preferred	Preferred
Natural Environment	Preferred	Not Preferred	Less Preferred
Engineering/Road Design		Equal	
Socio-economic Environment	Preferred	Preferred	Less Preferred
Archaeological & Built Heritage Resources	Preferred	Less Preferred	Less Preferred
Cost	Preferred	Less Preferred	Less Preferred
OVERALL SUMMARY	Preferred	Not Preferred	Less Preferred

Table 7-2: Woodlot Alternative Alignment Evaluation Summary

7.3 Alternative Design Cross Sections through the Woodlot

7.3.1 Background

The *Niagara Region Complete Streets Design Guidelines (June 2017)* were used as the starting point in determining the appropriate road standards to consider for Livingston Avenue within the Irish Grove Woodlot. These Guidelines identify six street typologies for Regional roads:

- Main Street;
- Urban General (Narrow);
- Urban General (Wide);
- Transitioning;
- Hamlet; and
- Rural.

Based on its role within the transportation network, the Livingston Avenue Extension was initially considered to be classified as a rural typology, located primarily within the Region's agricultural and natural areas. The primary function of such roads is to move private and goods movement vehicles. However, these roads should also include recreational cycling facilities (for example, a paved shoulder or multi-use path) and may also accommodate transit. The edges of rural roads should include drainage swales. A road designated with rural typology can have varying right-of-way widths (20 m to 36 m+) depending on the number of travel lanes. They serve rural areas and connect communities across the Region. The focus is vehicular movement and goods movement as well as supporting rural cycling through wide, paved shoulders. Opportunities to accommodate both pedestrians and cyclists on multi-use pathways or trails along the corridor edge can be pursued where part of the regional cycling and pedestrian network.



Figure 7-3 Components of a Road Classified with Rural Typology

Figure 7-3 illustrates the components and dimensions of a typical rural typology street, taken from the *Niagara Region Complete Streets Design Guidelines (June 2017).* The following elements are typical:

- Rural cross-section;
- Paved shoulder for cycling;
- Sidewalks where it passes through a Hamlet or Village;
- Street trees only in Hamlet or Village;
- Wide lane widths;
- Access control not necessary;
- Pedestrian crossing at signalized intersections;
- No on-street parking except in Hamlet or Village;
- Transit in mixed-traffic;
- Primary goods movement corridor; and
- Landscaping includes buffer planting, naturalized drainage swales, street planting.

This was the starting point in the identification of the required elements and dimensions of the road's cross section through the woodlot. Since these elements define the footprint of impact within the woodlot, a series of alternatives were developed to determine if any adjustments are appropriate to minimize the impact footprint. This involved the consideration of using an urban road standard to reduce the width of the road and grading disturbance. A design speed

of 60 km/h (posted speed of 50 km/h) was assumed, similar to Livingston Avenue east of Casablanca. Basic road lanes of 3.5 m were used.

Three basic cross section alternatives were developed (refer to Figure 7-4):

- Cross Section #1: Rural Road with Multi-Use Path on North Side of the Road;
- Cross Section #2: Urban Road with Multi-Use Pathway on the North Side; and
- Cross Section #3: Urban Road with On-Road Bike Lanes and Sidewalk on North Side.

An urban treatment with local storm sewer will allow for a narrower road footprint by reducing the need for full drainage ditches along both sides of the road (replaced by more basic, shallower drainage swales in Cross Section 2 and 3). Cross Section 1 incorporates the Region's complete street's standard rural treatment with 1.50 m paved shoulders and a north side, on road 4.5 m multi-use path. With Cross Section 2, the on-road pathway was replaced in favour of a north-side 3.0 m multi-use pathway. The 3.0 m multi-use pathway represents the minimum suggested practical width as per the Transportation Association of Canada's Geometric Design Guide for Canadian Roads. Cross Section 3 contains 1.8 m on-road bike lanes (each direction) and a north side 1.8 m sidewalk. The north side was selected to position pedestrians on the side of the future transit facilities west of Emily Street.

Within the 30.5 m wide road right-of-way the options have the following impact footprints:

- Cross Section 1 25 m;
- Cross Section 2 19.0 m; and
- Cross Section 3 20.8 m.



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Additional road features may be necessary outside of the above roadway footprints to accommodate any utilities (e.g. hydro) and street lighting poles and perhaps stormwater management facilities. Although the pedestrian demand along this corridor is expected to be quite low, pedestrians are accommodated on multi-use pathways in Cross Sections 1 and 2. With Cross Section 3, it is recommended that a 1.8 m north-side sidewalk be protected for.

Cross Section 3 (Urban Road with On-Road Bike Lanes and Sidewalk on North Side) was selected as the preferred cross section for the new road through the woodlot (refer to Table 7-3, Alternative Design Cross Sections through the Woodlot Evaluation Summary). It provides the best balance for reducing the amount of existing woodlot vegetation requiring removal (just slightly more than Cross Section 2) while achieving the best level of service offered to pedestrians and cyclists.

With regards to the Transportation criteria, no difference was identified with respect to the movement of traffic or traffic safety. Cross Section 3 is recommended as it provides a higher level of service to cyclists and pedestrians with both on-road bike lanes and a north-side sidewalk; while Cross Section 1 provides only a single, multi-use, minimal width path on the north side. The provision of on-road bike lanes is consistent with what is provided on Livingston Avenue further to the east and into Town and on Main Street west of Oakes Road North. Cross Section 2 with a narrow multi-use path and no on-road bike lanes was not preferred from a transportation perspective, due to the lower level of service offered to cyclists and pedestrians. In addition, providing an urban cross section is consistent with existing Livingston Avenue to the east and on Main Street to the west.

Cross Sections 2 and 3, with their narrower footprints, have the potential for lower impacts to existing vegetation and trees in the woodlot and are therefore preferred with respect to the Natural Environment criteria.

The overall impacts to adjacent properties as well as potential for noise, agricultural land impacts, and cultural and archaeological heritage impacts were all considered to be balanced across all three Cross Section alternatives.

With respect to the Engineering and Road design criteria, Cross Section 1 was considered preferred over the other cross section alternatives due to incorporating basic rural road elements inherent with a rural roadway (standard road ditches – no storm sewers). The introduction of urban road elements with Cross Sections 2 and 3 will lead to design complexities and introduce the requirement for special drainage considerations (road base drainage, less opportunities for stormwater storage). Cross Section 1's rural cross section is also considered to be the less expensive option (no curbs and gutters/storm sewer) to construct and operate/maintain.



Table 7-3: Alternative Design Cross Sections through the Woodlot Evaluation Summary

Of note is that comments on these cross section alternatives that were provided at the January 2020 public information centre indicated, overall, a general preference for Cross Section 3 from those that put a comment on the design alternative display board. Results from the online survey where the public was asked to indicate an option preference as road user (i.e. *Which of the alternatives would make you feel safe and comfortable as a motorist, cyclist and pedestrian*?) suggest a preference for Cross Section 3 by pedestrian and cyclists as shown in the following results:

- Cross Section 1:
 - Favoured by 27% of motorists
 - o Favoured by 20% of cyclists
 - Favoured by 19% of pedestrians
- Cross Section 2
 - Favoured by 26% of motorists
 - Favoured by 21% of cyclists
 - Favoured by 15% of pedestrians
- Cross Section 3
 - Favoured by 47% of motorists
 - Favoured by 58% of cyclists
 - Favoured by 66% of pedestrians

Additional input received from the on-line survey indicated the following:

- The width of the road was considered to be either important or very important by 67% of respondents;
- The speed limit of the road was considered to be either important or very important by 73% of respondents;
- Providing sidewalks on both sides of the road was considered to be either important or very important by 34% of respondents;
- Providing sidewalks on one side of the road was considered to be either important or very important by 68% of respondents;
- Providing bike lanes on both sides of the road was considered to be either important or very important by 40% of respondents;
- Providing a multi-use pathway for cyclists and pedestrians on one side of the road was considered to be either important or very important by 53% of respondents;
- Mitigation of impacts to natural heritage was considered to be either important or very important by 56% of respondents; and
- Mitigation of impacts to adjacent property owners was considered to be either important or very important by 52% of respondents.

7.4 Alternative Design Cross Sections – Woodlot Westerly

Having established Cross Section 3 as the preferred design cross section through the woodlot, it is recommended that this treatment be also extended west of Hunter Road (although the rural treatment of Option 1 could be considered). Adopting Option 3 will provide corridor consistency to the east and the west. Main Street, west of Oakes Road is an urban road with curbs and gutters with on-road bike lanes in each direction.

7.5 West-End Alignment/Intersection Options

Four west-end alignment/intersection options were developed and evaluated (refer to **Figures 7-5 to 7-8**):

- Intersection 1 Livingston Avenue as the Through Road (Main Street Tying in at a T-Intersection);
- Intersection 2 Main Street as the Through Road (Livingston Avenue Tying in at a T-Intersection);
- Intersection 3 Northern Roundabout; and
- Intersection 4 Southern Roundabout.

The evaluation was done in two steps. The roundabout alternatives were reviewed as the initial review to determine their general feasibility and potential for increased impacts relative to the other alternatives. Niagara Region routinely assesses the potential for the introduction of roundabouts at all new signalized intersection. They are considered to result in a reduction in vehicle idling with less gas is being burned into the atmosphere than a standard intersection. In addition to emission reduction, fuel consumption is reduced by as much as 30 per cent. From a safety perspective, all vehicles travel in the same direction, never crossing paths. This reduces the number of serious crashes. Slower speeds also give drivers more time to react and make decisions. Roundabouts are considered have the potential for calming traffic and speed in neighbourhoods and can provide a 30 to 50 per cent increase in traffic capacity.

However, based on the degree of existing residential and commercial land use in the immediate area, Intersections 3 and 4 were screened out from further consideration for the following reasons:

Impact to property and business access - there are several private and commercial entrances at the west end that would have to be accommodated in or near to the roundabouts. Achieving safe property access with sufficient sight-lines allowing for adequate motorist reaction time would be difficult. Intersection 3 impacts a major, extended driveway access to a private property that is located at the centre-point of the roundabout and would result in confining existing business and residential access to a number of properties off of the remnant portion of bypassed Main Street. The southern roundabout (Intersection 4) for the most part eliminates the concern with the major extended driveway but creates safety issues related to a number of south side property entrances off of Main Street in the vicinity of the roundabout.

• Property requirements – the Northern Roundabout (Intersection 3) requires significant private property. The Southern Roundabout (Intersection 4) can generally be accommodated within existing Region property.

Step 2 of the evaluation involved comparing Intersections 1 and 2. Intersection 1 was selected as the preferred option. Refer to Table 7-4, Alternative West-end Alignment/intersection Options Evaluation Summary for a summary of the evaluation rationale.

From a Transportation perspective Intersection 1 is preferred over Intersection 2 as it will result in new Livingston Avenue as the through road. This is considered preferential as it supports the role of Livingston Avenue as the new connection to the GO Station and downtown Grimsby, supplanting Main Street in this role.

Intersection 1 is also preferred from an Engineering perspective as it can tie into existing Main Street West seamlessly and does not require a left turn lane at the connection to old Main Street. Alternatively, Intersection 2 would require the widening of old Main Street West to accommodate a new left turn lane to Livingston Avenue. Livingston Avenue access to the commercial operations on the south side of Main Street can be achieved with a driveway extension north to the new road approximately mid-block between the Main Street connection intersection and Oakes Road.

The two alternatives were considered equal from a Natural Environment, Archaeological/ Built Heritage Resources and Cost perspective. In regards to Social considerations, the advantage of Alternative 2 in regards to less impact on access to Main St. driveways, was not considered to offset the advantages of Intersection 1.

Intersection 2 is preferred under the socio-economic category due to its minimal impact to existing entrances along Main Street. Costs and impacts to Archaeological & built heritage resources are considered essentially equal.



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ALTERNATIVE 1 - LIVINGSTON AVE AS THE THROUGH ROAD (MAIN STREET TYING-IN AT A T-INTERSECTION)

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NOTES/LEGEND 1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES / SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND S BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AN ALL LIABILITY FOR DAMAGE TO THEM. 2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.







LIVINGSTON AVENUE EXTENSION CLASS ENVIRONMENTAL ASSESSMENT

ALTERNATIVE 2 - MAIN STREET AS THE THROUGH ROAD (LIVINGSTON AVE TYING-IN AT A T-INTERSECTION)

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ALTERNATIVE 3 - NORTHERN ROUNDABOUT

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Criteria Group	Intersection 1 – Livingston as the Through Road	Intersection 2 – Main Street as the Through Road	Rationale
Transportation	Preferred	Less Preferred	Intersection 1 will result in new Livingston Avenue as the through road. This is considered preferential as it supports the role of Livingston Avenue as the new connection to the GO Station and downtown Grimsby, supplanting Main Street in this role.
Natural Environment	Eq	ual	Minimal natural environmental features exist in this general area. Impacts will be minimal
Engineering/Road Design	Preferred	Less Preferred	Intersection 1 can tie into existing Main Street West seamlessly and does not require a left turn lane at the connection to old Main Street. Intersection 2 will require the widening of old Main Street West to accommodate a new left turn lane to Livingston Avenue.
Socio-economic Environment	Less Preferred	Preferred	Intersection 2 is preferred under the socio- economic category due to its minimal impact to existing entrances along Main Street.
Archaeological & Built Heritage Resources	Eq	ual	Archaeological & built heritage resources are considered essentially equal.
Cost	Eq	ual	Costs are considered to be essentially equal although with the requirement to widen Main Street, Intersection 2 may be marginally more expensive.

Table 7-4: Alternative West-end Alignment/intersection Options Evaluation Summary

8.0 Preferred Design Concept

8.1 Introduction to the Preferred Design Concept

This section of the ESR outlines the specifics of the preferred design concept. The details of the preferred design concept are summarized into the following general categories:

- Road traffic lanes and active transportation facilities;
- Electrical and illumination;
- Property;
- Utilities; and
- Construction staging and traffic management.

A separate section dealing with overall corridor drainage/stormwater management is provided (Section 8.4).

Design criteria were developed consistent with the Transportation Association of Canada's Geometric Design Guide for Canadian Roads, 2017 (TAC) and their stated design philosophy:

Design is a process in which sound engineering judgement and experience play significant roles. Designers choose the features of the road and dimensions of the primary design elements. Although they may use judgement, technical references, and calculations to assist in selecting the appropriate primary design elements, selecting elements in isolation from each other is not design. The final design is the sum of all the decisions made during the design process.

The Niagara Region Complete Streets Design Guidelines (June 2017) were used as the starting point in determining the appropriate road standards to consider for Livingston Avenue. These Guidelines identify six street typologies for Regional roads:

- Main Street;
- Urban General (Narrow);
- Urban General (Wide);
- Transitioning;
- Hamlet; and
- Rural.

As indicated previously, the Livingston Avenue Extension, through the Irish Grove Woodlot westerly to Main Street West/Oakes Road is a new road through rural lands and was considered to be classified as a rural / hamlet typology. The primary function of such roads is to move people and goods, however, these roads should also include pedestrian facilities, recreational cycling facilities (for example, a paved shoulder or multi-use path) and may also accommodate transit. There is minimal private property frontage along this road and transit accommodation (e.g. bus stops) was not considered a requirement in the short term; if required in the future, some property taking may be required. As per the guidelines, the edges

of rural roads should include drainage swales, and minimum depth swales are recommended through the Irish Grove Woodlot. Based on public input at PIC and the on-line survey (alternative design concepts), there was a desire for a design that transitioned from the original rural setting, to a design that includes the sidewalks, curbs, local storm sewer and shallow swales (ditches).

8.2 Road Elements, Traffic Lanes and Active Transportation Facilities

Figure 8-1 illustrates the recommended roadway elements for Livingston Avenue. These include a basic 3.5 m lane with 1.8 m bike lane in each direction and a 1.8m, north-side sidewalk. This is consistent with the recommended treatment for Livingston Avenue to the east as determined through the Casablanca Boulevard and GO Station Access Environmental Assessment Environmental Study Report. A design speed of 60 km/h is recommended (with a posted speed of 50 km/h) similar to Livingston Avenue to the east of Casablanca Boulevard, heading east into Downtown Grimsby. The existing posted speed along Main Street West, west of Oakes Road North is 70 km/h. A speed transition zone will be required to reduce the speed in the west section of the new road. The length and treatment of this transition will be determined in the design phase. The available, Region-owned right-of-way width is 30.5 m (100 feet). A local storm sewer is proposed to serve as a storm water outlet for pavement drainage and to outlet the shallow swales on each side of the road. Final swale sizing will be completed as part of the future detail design phase. Road granular will be drained via sub-drains also out-letting to the proposed storm sewer.



Figure 8-1: Recommended Livingston Avenue Cross-Section

Refer to **Figures 8-2, 8-3, 8-4 and 8-5** for the proposed layout of the recommended facilities. The total length of new road is approximately 1,250 m from just east of the Irish Grove Woodlot to the Oakes Road/Main Street West intersection.

At the east end it is assumed that the initial stage of the extension of Livingston Avenue will have been previously constructed as part of the implementation of the West Niagara Transit Terminal facilities (refer to **Figure 8-2**). The proposed work will therefore involve removing the temporary cul-de-sac that would have been constructed during the initial work. It is assumed

that the entrance to the West Niagara Transit Terminal will be located toward the east side of the Region's property and that the development of eastbound left-turn lane into the terminal will be achievable completely east of the Irish Grove Woodlot. This will be confirmed during the design phase. There may be the need to extend the development of this left-turn lane into the woodlot but this should be avoided if at all possible in order to limit the impact footprint.

At Hunter Road, a basic intersection configuration is recommended with Hunter Road traffic operating under stop-sign control. Livingston Avenue will be the through road (refer to **Figure 8-3**). Additional property acquisition will likely be required at this location to achieve adequate sight-lines in the north-east, north-west and south-west quadrants of the intersection; to be confirmed and finalized during the future detail design phase.



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NUE EXTENSION		0.5m RND 1.2m BLVD 1.8m SW	
		1.8m 3.5m → 3.5m	
PROPOSED CONCRETE CULVERT		0.7m BLVD	MATCH



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NO.



At the west end, Livingston Avenue will be extended to Oakes Road to tie into existing Main Street West (Regional Road 81) and Main Street will be closed and re-routed to tie into new Livingston Avenue approximately 200 m east of Oakes Road. Main Street will be stop-controlled at the Livingston intersection. Left-turn lanes will not be required on either Livingston Avenue or Main Street (**Figure 8-5**).

8.2.1 Electrical and Illumination

Full illumination will be provided along this section of Livingston Avenue. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design. Lighting design will require recognition of the following:

- Appropriate road and pedestrian lighting requirements and levels;
- Minimizing light spill over to existing residences along the new roadway, and
- Minimizing light spill over into the Irish Grove Woodlot.

8.2.2 Landscaping/Treescaping

The approach to landscaping and treescaping along the new corridor will be required to consider the preservation of existing trees and other vegetation within the right-of way but outside of the Project road design footprint (travel lanes, pedestrian facilities, cycling facilities), as follows:

- Within the Irish Grove Woodlot: Trees that must be removed from the Project footprint will be compensated for as described in **Section 9.4.4**. Every attempt will be made to preserve mature, healthy trees and vegetation within the right-of-way as part of detailed design and construction. New plantings will also be considered where possible, in addition to the design of bioswales to support greenscaping of the corridor; and
- West of the Irish Grove Woodlot: Existing trees that must be removed from the Project footprint will be compensated for as described in Section 9.4.4. Additional landscape items should be considered in sections of the new corridor where appropriate such as new plantings and pedestrian amenities (e.g. benches).

The removal of any woodlot would decrease the carbon sequestration of the Project, increasing the net greenhouse gas emissions. The annual CO2e sequestration for a woodlot is estimated to be about eight tonnes/year per hectare using methodologies provided in the Tree Canada Afforestation and Reforestation Protocol³. As the area of the Irish Grove Woodlot within the Region-owned RoW, to be removed is quite small (less than 1.1 ha), the annual carbon

³ Tree Canada (2015). Tree Canada Afforestation and Reforestation Protocol. Version 2.0 April 2015.

sequestration of the on-site woodlot represents a very small proportion of the Project's annual emissions.

8.2.3 Property

All proposed, new facilities along Livingston Avenue can be constructed within existing property limits (Refer to **Figures 8-2, 8-3, 8-4 and 8-5**). Access to existing properties will be affected at the west end, east of Oakes Road where five properties have driveways onto Main Street West that that will need to be re-established off of new Livingston Avenue and or the new Mains Street West tie-in roadway. In addition two existing driveways north of new Livingston Avenue at Hunter Road may have to be adjusted (one on the west side and one on the east side).

8.2.4 Utilities

The Livingston Avenue Extension will occupy an existing, undeveloped Regionally-owned right-ofway (right-of-way) with minimal utility conflicts. The elevation of manhole covers on the existing sanitary sewer in the right-of-way from Casablanca Boulevard to Hunter Road will need to be adjusted to reflect the new road grade through the woodlot. An existing water main exists in the right-of-way from Hunter Road westerly. Other existing local utilities may need minor re-work at intersections at Hunter, Main Street West and Oakes Road. A new power supply will be required along the new road to supply power for street lighting, or solar-powered lighting fixtures as determined during Detailed Design.

8.2.5 Construction Staging and Traffic Management

Construction staging of the works will be fairly straight forward as most of the new work is located in open fields, or wooded areas with no traffic management issues. Short-term, periodic detours/closures will likely be required on Hunter Road, Main Street West and Oakes Road.

8.3 Drainage and Stormwater Management

This section outlines the existing and proposed hydrology for the Study Area of the proposed Livingston Avenue extension, hydraulics for the proposed culverts under the extension and a preliminary evaluation of the ditch size requirements along Livingston Avenue. The proposed location for the road extension is located within the Greenbelt, through agricultural land east of Oakes Road North and west of Emily Street.

8.3.1 Climate Change

An important aspect of climate change is developing an understanding of the current risks posed to municipal infrastructure and operations. Increased frequency of intense precipitation events can stress stormwater management systems beyond their capacity which can lead to localized flooding and disruptions to traffic circulation.

Climate change projections completed by the MNRF/MECP in 2015 are shown in **Table 8-1**. Specifically for sub-basin Lake Ontario, the mean annual precipitation is expected to increase by a range of 74 mm to 102 mm, with more drastic changes in precipitation patterns occurring more frequently in the winter months. Projected total annual, sum]=mer, and winter precipitation and mean annual, summer, and winter temperatures are shown in the figure for three 30-year time periods, namely: 2011–2040 (the 2020s), 2041–2070 (the 2050s), and 2071–2100 (the 2080s).

Projected precipitation patterns also indicate an annual increase in the Ontario basin. Summers are projected to be drier basin-wide, with winter precipitation likely to change more dramatically than summer precipitation.

		Change from	-	2011-2040	6-	1	2041-2070	(3	2071-2100	2
		1971–2000 baseline	RCP 2.6	RCP 4.5	RCP 8.5	RCP 2.6	RCP 4.5	RCP 8.5	RCP 2.6	RCP 4.5	RCP 8.5
	8	Temperature (°C)	2.3 (0.1)	2.3 (0.1)	2.4 (0.1)	3.1 (0.1)	3.8 (0.1)	4.6 (0.2)	3 (0.1)	4.6 (0.1)	7.6 (0.2)
	lal		1.8 to 2.6	1.8 to 2.6	1.9 to 2.7	2.6 to 3.4	3.3 to 4.1	4 to 4.9	2.4 to 3.3	4.1 to 4.9	6.9 to 8
	Ann	Precipitation (mm)	55.1 (18.4)	22.9 (17.7)	36.3 (17.5)	62.5 (19.8)	61 (19.8)	72.6 (19.9)	74.3 (18.6)	66.7 (18.9)	102 (20.8)
_			16 to 121	-16 to 96	-2 to 105	23 to 142	20 to 141	33 to 154	35 to 143	26 to 144	62 to 186
Bas	Summer	Temperature (°C)	1.9 (0.2)	2 (0.2)	2.1 (0.2)	2.6 (0.2)	3.2 (0.2)	4.4 (0.2)	2.6 (0.2)	4.1 (0.2)	7.6 (0.2)
2			1.4 to 2.3	1.5 to 2.4	1.6 to 2.5	2.1 to 3	2.8 to 3.7	3.9 to 4.9	2.1 to 3.1	3.7 to 4.6	6.9 to 8.1
B		Precipitation (mm)	-0.1 (5.2)	-7.5 (4)	-3.3 (4)	-3 (4.5)	-4.8 (4.4)	-9.5 (4.3)	5.2 (5)	2.7 (3.9)	-10.6 (6)
e k	••		-11 to 17	-16 to 6	-12 to 10	-13 to 12	-14 to 10	-18 to 5	-5 to 21	RCP 4.5 RCP 8. 4.6 (0.1) 7.6 (0.2 4.1 to 4.9 6.9 to 4 66.7 (18.9) 102 (20. 26 to 144 62 to 18 4.1 (0.2) 7.6 (0.2 3.7 to 4.6 6.9 to 8 2.7 (3.9) -10.6 (6 -6 to 18 -23 to 5 5.4 (0.2) 8.1 (0.2 38.5 (8.9) 72 (10.3 17 to 65 50 to 10	-23 to 7
<u>⊐</u> [Temperature (°C)	2.7 (0.1)	2.4 (0.2)	2.8 (0.2)	3.5 (0.2)	4.5 (0.2)	5.2 (0.2)	3.5 (0.2)	5.4 (0.2)	8.1 (0.2)
	ter		2.2 to 3	1.9 to 2.8	2.3 to 3.2	3 to 3.9	4 to 4.9	4.6 to 5.6	2.9 to 3.9	2071-2100 RCP 4.5 RCP 8 4.6 (0.1) 7.6 (0. 4.1 to 4.9 6.9 to 66.7 (18.9) 102 (20 26 to 144 62 to 1 4.1 (0.2) 7.6 (0. 3.7 to 4.6 6.9 to 8 2.7 (3.9) -10.6 (-6 to 18 -23 to 5.4 (0.2) 8.1 (0. 4.8 to 5.7 7.3 to 8 38.5 (8.9) 72 (10 17 to 65 50 to 1	7.3 to 8.6
	Win	Precipitation (mm)	22.2 (7.7)	25 (7.8)	20.9 (6.9)	35.5 (9)	26.4 (8.1)	44.3 (9.1)	33.7 (7.9)	38.5 (8.9)	72 (10.9)
			1 to 46	3 to 48	2 to 40	12 to 62	5 to 49	22 to 71	13 to 57	17 to 65	50 to 105

Table 8-1: Climate Changes Predictions⁶

Table 5. Changes in temperature and precipitation for the five Great Lakes Sub-Basins from 1971–2000 baseline values under three representative concentration pathways (RCP 2.6, 4.5, and 8.5) and for three time periods (2011–2040, 2041–2070, and 2071–2100). For each entry, the first row is the mean (SD) and the second is the range across the watershed (minimum to maximum).

8.3.2 Drainage/Stormwater Criteria

General stormwater management design criteria, related to Livingston Avenue, has been based on a review of available background documents including the Niagara Peninsula Conservation Authority (NPCA)'s Stormwater Management (SWM) Guidelines Report (2010), the Ministry of

/MECP, Climate Change Projections for Ontario. Climate Change Research Report CCRR-44, 2015

Transportation (MTO)'s Drainage Management Manual (DMM) (1997), the MTO's Highway Drainage Design Standards (HDDS) (2008), and site specific design constraints.

The general stormwater management design adopted for this Project includes consideration of the following criteria:

- Culvert design flows were initially based on the MTO's HDDS, references SD-1 and WC-1:
- For a non-watercourse crossing: SD-1 Design flow return period for major system is 1:100-year (urban/rural arterial);
- For a watercourse crossing: WC-1 Design flow return period for structure with a span less than 6.0 m is 1:50-year (urban arterial);
- The alteration of hydrologic characteristics, resulting from the increase in road surface imperviousness of the Livingston Avenue corridor should have no-net-impact on the rate of stormwater runoff discharged to any given receiving water system. This includes changes in flow regime for design flows up to and including a Climate Change storm event;
- Based on guidelines in the MTO's DMM, alterations of the hydrologic characteristics within the impacted road corridor should not result in a reduction in the level of service of existing MTO drainage infrastructure, specifically the freeboard and clearance of the QEW culverts that facilitate drainage;
- The proposed improvements should not increase the risk of flooding within any one of the receiving water ecosystems, particularly the Vine Road intermittent drainage channel which has been previously identified as having limited capacity to convey 'Major' storm events; and
- Culverts should be sized to convey the design flows under non-pressurized conditions.

As part of the preliminary design process, several overall drainage and stormwater management strategies have been developed to address the change in hydrologic characteristics that will result from the Livingston Avenue extension. The key drivers behind the development of the stormwater management strategy include:

- The need to effectively collect and convey stormwater runoff from the roadway corridor and direct runoff to a stormwater outlet with sufficient capacity for post-development design flows;
- The need to control post-development runoff rates to a level that does not worsen flow rates of the identified, unnamed, watercourse that outlets to Lake Ontario; and
- The need to control post-development runoff rates to a level that does not result in a reduction in the level of service of existing MTO drainage infrastructure downstream of Livingston Avenue.
8.3.3 Drainage/Stormwater Methodology

Assessment of hydrologic conditions of existing and proposed catchment areas was undertaken using the Rational Method equation. The Rational Method flow equation is:

$$Q = 0.0028 \times CIA$$

Where:

Q = flow rate (m^3/s)

C = weighted runoff coefficient

A = drainage area (ha)

I = intensity of rainfall (mm/hr)

Runoff coefficients from the NPCA SWM Guidelines were used to calculate the weighted runoff coefficients for the catchment areas. The runoff coefficients for the land use of the catchment areas are presented in **Table 8-2**.

Surface Type	Runoff Coefficient
Paved Areas	0.95
Commercial	0.90
Low Density Residential	0.50
Park / Open Space	0.20

Table 8-2: Runoff Coefficient

The Airport and Bransby-Williams formulas were used to calculate the time of concentration for the catchment areas. According to the MTO DMM, the Airport formula is used when the runoff coefficient for the catchment area is less than 0.40; and the Bransby-Williams formula is to be used when the runoff coefficient for the catchment area is greater than 0.40. When the time of concentration was calculated as less than 10 minutes, an assumed time of concentration for those catchments was 10 minutes. Appendix D includes the detailed calculations.

8.3.3.1 Existing Conditions

The catchment areas consist primarily of agricultural, forest, and residential land uses. To compare pre-development and post-development conditions, existing catchments were used to reflect the proposed road configuration. See Appendix D for an illustration of the existing catchment delineations in the Study Area. Culvert inverts located upstream were determined based on the survey data provided by the Region.

The stormwater runoff for the identified catchment areas flow south to north and, ultimately outlet to Lake Ontario. There are two existing drainage features including an unnamed watercourse located in the agricultural land between Emily Street and Hunter Road, which appears to form at the base of the escarpment, traversing under the QEW and outlets to Lake Ontario; and the Vine Road rear-yard intermittent drainage channel that flows through private properties east of Casablanca Boulevard and outlets to Lake Ontario. The flow to this latter channel was addressed as part of the Casablanca Boulevard EA and is not part of the Project (the catchment area for this channel is completely east of the Irish Grove Woodlot, outside of the Focused Study Area). Its characteristics are presented here for context purposes only.

Existing Hydrology

An assessment of hydrologic conditions was completed in accordance with accepted methods outlined in the MTO DMM (1997) and the NPCA Stormwater Management Guidelines Report (2010). A weighted runoff coefficient was calculated for each of the catchment areas based on the land use within them. As previously outlined, stormwater runoff peak flows were calculated based on the Rational Method and NPCA recommended land use coefficients and IDF parameter values. The existing catchment area characteristics are shown in **Table 8-3**, and peak flows are summarized in **Table 8-4**. The detailed calculations are included in **Appendix D**.

Catchment ID	Catchment Area (ha)	Weighted Runoff Coefficient	Catchment Length (m)	Catchment Slope (%)	Time of Concentration (min)
1	18.5	0.23	676	1.33	27
2	0.6	0.20	20	1.25	10
3	8.5	0.31	354	0.85	17
4	202.8	0.21	2570	4.71	63
5	1.3	0.20	150	2.67	10*
6	17.2	0.20	322	0.31	17
7	8.1	0.34	403	0.99	19
8	0.8	0.20	20	1.25	10*
9	9.7	0.20	323	0.93	15
10	5.1	0.33	180	2.22	10*
11	1.6	0.20	20	1.25	10*
12	18.9	0.29	335	0.90	15

Table 8-3: Existing Catchment Area Characteristics

Catchment	Peak Flow Rate (m ³ /s)						
ID	2 Year	5 Year	10 Year	25 Year	50 Year	100 year	
1	0.46	0.60	0.71	0.83	0.91	1.00	
2	0.02	0.03	0.03	0.04	0.04	0.05	
3	0.38	0.49	0.58	0.68	0.74	0.81	
4	2.56	3.33	4.00	4.69	5.17	5.66	
5	0.05	0.06	0.07	0.09	0.09	0.10	
6	0.48	0.63	0.73	0.86	0.94	1.03	
7	0.37	0.48	0.57	0.66	0.72	0.79	
8	0.03	0.04	0.05	0.06	0.06	0.07	
9	0.30	0.38	0.45	0.53	0.57	0.63	
10	0.32	0.41	0.48	0.56	0.61	0.67	
11	0.06	0.08	0.09	0.11	0.12	0.13	
12	0.84	1.09	1.28	1.50	1.63	1.79	

Table 8-4: Existing Peak Stormwater Flow

* Time of concentration is calculated to be less than 10 minutes, an assumed time of concentration for the catchment areas was set at 10 minutes.

8.3.3.2 Future Conditions

The proposed Livingston Avenue extension will be constructed with curbs and gutters, a pedestrian path and cycling lanes. The curb and gutter system is proposed to capture stormwater runoff from the road right-of-way and transfer it to storm sewers. The storm sewers will convey the stormwater to a drainage point along the road that maintains the existing drainage pattern to the best extent possible. The flow in the storm sewers will have a controlled release rate matching predevelopment peak flows.

Storm sewer outfall locations include the unnamed watercourse, a proposed crossing culvert east of the proposed extension (not part of this Project), two crossing culverts under Hunter Road, and the existing storm sewer system at the intersection of Oakes Road North and Main Street West. In order to maintain existing drainage patterns, stormwater runoff from the southern external catchment areas must continue to flow under the roadway extension, therefore culverts will be sized to convey these flows, and allow for the extension to cross the unnamed water course. Additionally, the two culverts proposed for the west and east sides of Hunter Road are to convey stormwater flows through the existing ditches along Hunter Road.

Proposed Hydrology

To maintain existing drainage patterns, four culverts are proposed along the length of the Livingston Avenue Extension. Culvert 1 to direct flow to the Vine Road rear-yard intermittent drainage channel, Culvert 2 to ensure flow of the unnamed watercourse is not obstructed, Culvert 3 to convey the ditch drainage along Hunter Road; and Culvert 4 under Hunter Road, to convey stormwater from the catchment area to the west of Hunter Road and south of Livingston Avenue. **Table 8-5** provides a summary of the proposed hydrologic characteristics, and **Table 8-6** identifies the proposed peak flows for the drainage system.

Catchment ID	Catchment Area (ha)	Weighted Runoff Coefficient	Catchment Length (m)	Catchment Slope (%)	Time of Concentration (min)
1A	18.5	0.23	676	1.33	27
2A	0.6	0.95	190	0.53	10*
ЗA	8.5	0.31	354	0.85	17
4A	202.8	0.21	2570	4.71	63
5A	1.3	0.95	355	0.85	10*
6A	17.2	0.20	322	0.31	17
7A	8.1	0.34	403	0.99	19
8A	0.8	0.95	250	1.20	10*
9A	9.7	0.20	323	0.93	15
10A	5.1	0.33	180	2.22	10*
11A	1.6	0.95	563	0.53	14
12A	18.9	0.24	335	0.90	15

Table 8-5: Proposed Hydrologic Characteristics

* Time of concentration is calculated to be less than 10 minutes, an assumed time of concentration for these catchments was set at 10 minutes.

	Peak Flow Rate (m³/s)					
Catchment ID	2 Year	5 Year	10 Year	25 Year	50 Year	100 year
1A	0.46	0.60	0.71	0.83	0.91	1.00
2A	0.11	0.14	0.16	0.19	0.20	0.22
ЗA	0.38	0.49	0.58	0.68	0.74	0.81
4A	2.56	3.33	4.00	4.69	5.17	5.66
5A	0.23	0.30	0.35	0.41	0.45	0.49
6A	0.48	0.63	0.73	0.86	0.94	1.03
7A	0.37	0.48	0.657	0.66	0.72	0.79
8A	0.15	0.19	0.22	0.26	0.28	0.31
9A	0.30	0.38	0.45	0.53	0.57	0.63
10A	0.32	0.41	0.48	0.56	0.61	0.67
11A	0.24	0.31	0.36	0.43	0.46	0.51
12A	0.84	1.09	1.28	1.50	1.63	1.79

 Table 8-6: Proposed Peak Flow Summary

The hydraulic performance of the culverts was assessed using CulvertMaster®. The hydraulic modelling software was used to evaluate how the proposed culverts performed. The same assumptions and considerations were used in the determination of the future hydraulic conditions. The downstream inverts were calculated assuming the culverts' slopes will be 0.3%. The culverts' lengths are assumed to be 25 m (the proposed width of Livingston Avenue's right of way is 30.5 m). Detailed modelling output is included in **Appendix D**. Further analysis of the culverts is required in detailed design to ensure that all hydraulic criteria are met based on the finalized road elevations and climate change considerations.

Roadside conveyance along existing Livingston Avenue west of Casablanca Boulevard is currently provided by ditches on both north and south sides; as indicated in the Casablanca Boulevard and GO Station Access EA, these ditches will be replaced by a storm sewer as part of improvements to the existing section of Livingston Avenue. There will be a drainage swale along the north side of the proposed Livingston Avenue Extension which will be graded to convey stormwater flow from a small segment of the proposed Livingston Avenue right of way that cannot be captured by the storm sewer system on the road. Ditch design calculations are presented in **Appendix D**.

9.0 Anticipated Impacts, Proposed Mitigation and Benefits

9.1 Introduction

The proposed Livingston Avenue Extension Project has the potential to result in impacts to the environment, including the natural and social environment. Further, considerable public concern has been raised by some residents regarding the proposed road improvements including:

- Ecological disturbance to the Irish Grove Woodlot area;
- Noise, vibration, and overall activity disturbance to residents in the area;
- Safety for pedestrians and cyclists, as well as for families with children;
- Safety for students and staff at the Smith Public School;
- Stormwater management where ponding typically arises; and
- Removal of mature trees from the area, including within and outside of the Irish Grove Woodlot.

Attempts have been made to address these issues and reduce the potential for effects to the natural and social environment through the design of the road facility and the incorporation of mitigation measures. This section of the ESR describes potential impacts of the preferred road design and the Region's commitment to mitigation. Potential impacts and mitigation are described in **Section 9.2**, and the anticipated Project benefits in **Section 9.3**.

It is expected that the recommended mitigation measures would be further refined during Project Detailed Design. A number of considerations/concerns heard through the public feedback collected in PIC#1, PIC#2, and PIC#3 that were considered in the completion of the EA and development of the Preferred Design concept and which will need to be further addressed through Detailed Design are outlined in **Table 9-1**.

Concern	Recommended Mitigation	Detailed Design Considerations
Need for mitigation of natural environment impacts, including tree removal, habitat impacts, segmentation of the Irish Grove Woodlot, and watercourse crossing.	Alternative alignments through the woodlot were considered, assessed and evaluated. Ultimately the use of the existing right-of-way was considered as the preferred alignment as rationalized in Section 6.4. Mitigation of impacts to wildlife habitat, terrestrial vegetation and aquatic habitat are recommended. See Table 9-2 for details.	Development of dust, noise, and light pollution management plans for construction period. Refresh Tree Inventory and Species-at- Risk (SAR) studies to confirm impacts and design appropriate mitigation.
Need for traffic calming and control of speeding through the woodlot, to be investigated through the refinement of the roadway design.	A posted speed limit of 50km/hr is recommended, and traffic calming in the way of landscaping and pedestrian amenities included in the Preferred Design Concept (see Section 8.2.2).	Design of streetscaping elements along the roadway extension.
Impacts to the rural character of the area.	Landscaping buffers and consideration of roadway design with bioswales to suit the rural character of the area.	Design of streetscaping elements along the roadway extension.
Need for noise mitigation and property security concerns due to the road extension and traversing the Irish Grove Woodlot, which is privately owned.	Noise mitigation required to reduce noise levels at identified receptor locations as outlined in Table 9-2. Noise monitoring post-development of the road extension is recommended to confirm effectiveness of the implemented mitigation measures.	Design of noise mitigation for impacted properties in consultation with property owners and the Town of Grimsby.
Concerned with lighting of the roadway, particularly in sensitive areas such as through the Irish Grove Woodlot and adjacent to residences. Need to reduce light pollution.	Lighting to be directed to the roadway and designed to reduce spillage into adjacent areas.	Design of lighting standards to reduce ecological impact to the Irish Grove woodlot as well as light pollution to adjacent residences.
Utility pole placement to be kept as far from residences as possible.	Design of roadway elements to fit within the right-of-way.	Consideration of placement of utility poles to limit potential impacts to adjacent residences.

Table 9-1: Key Concerns Identified through Public Consultation

The description of effects, mitigation and residual net effects is based on a similar set of environmental and technical considerations used to evaluate the alternatives including:

- Transportation;
- Socio-economic;
- Natural Environment;
- Cultural;
- Archaeological; and
- Engineering.

9.2 Description of Project Effects and Mitigation Measures

The following section provides a description of the potential effects and mitigation of the Project.

These have been assessed on two levels:

- Temporary Project construction effects; and
- Long-term operation and maintenance effects once the Project has been implemented.

Sections 9.2.1 to **9.2.5** provided a description of potential effects of new Livingston Avenue Extension from just east of the Irish Grove Woodlot westwards to Main Street West at Oakes Road North as previously described in **Section 8**. A summary of the Project effects, recommended mitigation measures, and resulting residual effects is provided in **Table 9-2**.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring ⁵	Net Effect
TRANSPORTATION			
Potential for impact on traffic operations during construction.	Project construction could lead to traffic delays at the intersections with existing corridors along the extension, namely Hunter Road and Main Street West/Oakes Road, particularly for the construction of new travel lanes, intersection improvements including turning lanes.	As part of Detailed Design, prepare a construction phasing plan/detour plan as required to minimize delays to through movement of traffic.	Some temporary delays to traffic movement through the corridor.
Potential for conflicts with driveways and other entrances.	A number of driveways along Main Street West, east of the proposed intersection with Livingston Avenue (Intersection Alternative 1) will need driveway access to be provided to the newly constructed elements of Livingston Avenue.	Property owners to be informed of any temporary entrance restrictions in advance. Restrictions to entrances to be minimized as much as possible. Alternative parking to be provided along Main Street West in the event that entrances are blocked during construction, until new access points are constructed.	Some short term entrance restrictions may occur during construction.
Potential to accommodate school buses and waiting students.	Potential for some delay to school bus travel along Main Street West/Oakes Road North and along Hunter Road. Potential for disturbance/safety issues to students waiting for school buses during construction.	Project contractor to be made aware of school bus activity and location of school bus stops prior to construction. Use of heavy equipment in vicinity of school bus stop locations to be minimized during student pick-up and drop-off periods. Project contractor to inform school boards/transportation provider of construction phasing and activities in advance.	Some temporary disturbance to students during construction.
Potential for impact on response times/access for Emergency Vehicles during construction.	Project construction could lead to delays in response times of emergency access vehicles using Main Street West Oakes Road and Hunter Road.	Consult with emergency service providers to seek their input during Detailed Design and development of a construction phasing plan. Keep emergency response providers aware of construction phasing and any roadway lane closures.	Minimal delay to emergency response times.
	ATIONS		
Impact to existing and planned servicing and utilities (e.g. sanitary sewer) within the corridor.	There is the potential need for the relocation of below/above ground utilities (power, communications, TV, municipal) at intersections and sanitary sewer manhole surface elevation adjustments within the Livingston Avenue right-of-way (east of Hunter Road), as previously described in Section 8.2.4 .	Need for relocations to be confirmed during detailed design. Consultation with utilities companies and the Town of Grimsby to be undertaken as part of Detailed Design to confirm utility relocations.	Some short-term service interruption possible during construction. Long-term effects to utilities or service levels are not expected.
Increase in stormwater run- off (water quantity).	The additional roadway lanes and cycle facilities will result in an increase in the impervious area in the corridor. This will result in a greater volume of runoff.	The drainage and stormwater management system will need to accommodate the additional amount of run-off as a result of the additional roadway lanes.	With implementation of recommended drainage and stormwater management infrastructure described in Section 8.3, no flooding issues are anticipated.
CULTURAL ENVIRONMEN	r		
Potential for impacts to registered archaeological sites and undisturbed lands.	As a result of the new road, cycle lanes, and sidewalk, there could be some impact to undisturbed lands with archaeological potential.	Conduct Stage 2 Archaeological Assessment along the planned extension of Livingstor Avenue. Pending results of Stage 2 work, additional archaeological investigations may be warranted.	No net adverse effects anticipated through following of provincial archaeological assessment protocol.

⁵ Mitigation to be refined during Detailed Design phase.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring ⁵	Net Effect
Potential to impact known built heritage resources (i.e. listed/designated under Part IV or Part V of the Ontario Heritage Act and/or identified as culturally significant).	There are five cultural heritage features along the Livingston Avenue Extension that could potentially be impacted: three single-dwelling residences just east of the intersection of Oakes Road and the Livingston Avenue Extension, along Main Street West (BHR1, BHR2, and BHR3 on Figure 4-8), one laneway (CHL1) and one orchard (CHL2). Impacts to BHR1, BHR2, BHR3 and CHL2 are considered to be minor, as the roadway will be extended along the southern edge of these properties, within Region owned lands. Impacts to the laneway (CHL1) will be in the form of driveway re-construction (shortening) in order to establish access to the new road, which would change the visual continuity along the laneway.	Buffering with landscaping will be considered at required locations to mitigate visual impacts of the intersection with the Livingston Avenue extension. The impacts to CHL1 will be mitigated through discussion with the Town of Grimsby and the property owner, to maintain the key heritage attributes (sightlines, rural character) and limit impacts of an added intersection with Livingston Avenue.	Limited adverse effects to cultural heritage resources.
Potential for community character impacts/ change in views	Impacts to views of the Irish Grove Woodlot resulting from potential noise mitigation structures, and changes to the rural, agricultural character of the area from the introduction of a new road corridor.	Landscaping buffers to manage visual impacts and mesh with the rural character of the area.	Despite the introduction of mitigation measures with the new road facility, some change to the character of the areas that the roadway passes through will result. It is anticipated that the overall effect will be moderate as a result of the proposed mitigation.
SOCIO-ECONOMIC ENVIRO	NMENT		·
Requirement for property and/or easement acquisition(s) and impacts to buildings.	Buildings are generally well set back from the edge of roadway/Right-of-Way. For the most part the Project will not require the acquisition of private property. Some private property takings may arise from the need for noise attenuation structures, where noise impacts have been identified and at the Hunter Road intersection where some additional small land acquisitions may be required to provide adequate sight lines.	Affected property owners will be consulted on the need for and design of noise attenuation structures and the Hunter Rd. intersection, to reduce property impacts. Compensation will be required to affected property owners.	With provision of compensation to property owners for required property, no adverse net effects are anticipated.
Air emission/quality effects to residents and business during construction.	Temporary air emission effects to residents and businesses from construction equipment operation and soil disturbance. As the new road corridor is anticipated to attract existing traffic from existing east-west corridors, there are anticipated to be limited new air emissions from traffic along the Livingston Avenue corridor. At a regional scale, with less road congestion, air quality should be improved.	 Develop and implement a dust control plan. Apply water and dust suppressants during construction to protect air quality due to dust. Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce emissions from the construction activities. Air quality related complaints received by the public (e.g. dust) will be monitored by the proponent and/or the Project constructor. Follow up action will be taken where appropriate. 	Some short-term air quality nuisance effects (e.g. dust) may occur for some receptors during construction. With monitoring and follow-up/mitigation to any received complaints, the effects should be minimized.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring ⁵	Net Effect
Noise disturbance effects to residents and business during construction.	There is potential for temporary noise effects to residents located adjacent to/near the proposed roadway extension including those near the future intersections at Hunter Road and at Oakes Road/Main Street West. Attendees of the sports field connected to the Smith Public School may also experience some disruption from construction equipment operation.	 Develop and implement noise control plan. Contractor operational constraints related to construction noise will be incorporated into the contract documents. Construction activities throughout the Project will conform to current Municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce noise from the construction activities. Noise related complaints received by the public will be monitored by the proponent and/or the Project constructor. Follow-up action will be taken where appropriate. 	Some short-term noise effects may occur for some receptors during construction. With mitigation and the monitoring and follow-up to any received complaints, the effects should be minimized.
Change in noise levels during operations	This is a new road in a rural area passing relatively close to a number of residences, in addition to the Christ Our Saviour Lutheran Church and the sports fields connected to the Smith Public School. During the construction period there will be temporary noise impacts from the operation of machinery and equipment.	The design and implementation of mitigation measures for the PORs listed will be addressed during the detailed design stage for the Livingston Avenue Extension. This will help ensure that the mitigation measures will be designed to reflect the most up-to- date and accurate information regarding this Project.	No significant net noise impacts are predicted to result from the Project, once mitigation measures are instituted.
	Once the road is constructed and operational, there will be increased noise levels to these residents and users of these amenities. The noise modelling undertaken for the operations period (see Section 9.4.2 and Appendix I), indicates that the change in noise levels as a result of this undertaking is greater than 5 dBA for three Point-of-Receptions (i.e., POR1, POR2, and POR11) which are located just east of Hunter Road. These PORs are also representative on noise level increases for about 10 residences along Geddes St. that back onto the woodlot. There are also three PORs adjacent to the Oakes Road and Main Street West intersection (POR8, POR9, and POR10) with predicted sound levels greater than 65 dBA. Note that the projected noise level change to the Smith Public School for 2031 and 2041 are less than 5 dB and that the total traffic noise level is less than 65 dBA. As such, traffic noise mitigation measures is not warranted for the school.	Noise mitigation measures will be determined in consultation with affected property owners.	
Disruption in access to residential property and local businesses.	Very low potential for temporary access restrictions to property during construction. Re-work of existing entrances will be required at the west end of the new corridor. This will be to establish access to the new road instead of the portion of Main Street West that is being bypassed.	Contractor to minimize access restrictions as much as possible. Landowners to be notified of any access restrictions in advance.	Minimal to no restrictions to/from property access are expected.
Impacts on farm operations/Removal of agricultural land.	The Livingston Avenue Right-of-Way is owned by the Region, and is intended for a transportation corridor. Agricultural land will not be removed for the extension of Livingston Avenue. Lands adjacent to the Livingston Avenue Extension (north and south) are also currently not actively being farmed. During construction there is potential for minor disruption effects to the movement of farm machinery due to possible delays to existing roadway users.	Minimize road closures/detours during construction. As the impacted lands are owned by the Region and is intended for a transportation corridor, no agriculture specific mitigation is warranted.	No specific mitigation warranted.
NATURAL HERITAGE FEAT	URES		1

Potential impacts to terrestrial vegetation, wildlife and wildlife habitat.	There are significant natural heritage features along the Livingston Avenue extension corridor. Approximately 1.1 ha of habitat would be removed (about 7% of the total woodlot) by the road footprint and an additional 1.9 ha (16% of the total woodlot) would be isolated from the remaining woodlot to the north. Additional impacts may include vegetation removal within the firsh Grove woodlot to accommodate required noise mitigation measures that are to be determined during Detailed Design. The Livingston Avenue Extension is located within the existing right-of-way owned by the Region which includes a buried sewer line; the right-of-way has grown over with vegetation including many trees. A total of 364 trees with ≥ 10 cm DBH (Diameter Breast Height) were inventoried by an ISA certified Arborist within the proposed Livingston Avenue Project footprint in the Irish Grove Woodlot. Of the 364 trees inventoried 131 were ash trees, of which 61% (80 trees) were assessed as dead or in poor condition as a result of being affected by the Emerald Ash Borer. Two SCC (Eastern Wood-pewee and Red-headed Woodpecker) were observed during the 2018 field investigation in association with the Irish Grove woodlot. A SCC habitat assessment was completed for the Study Area, and based on the field investigation results, it was determined that the Study Area has the potential to provide habitat for the following SCC: • Red-headed Woodpecker (Special Concern); • Eastern Wood-pewee (Special Concern); • Land bird Migratory Stopover Area; • B	 Limit the area of construction operations and the Prot the Irish Grove Woodlot to reduce impacts to hab habitats and potential movement corridors to the exter Establish Tree Protection Zones (TPZs) during Detai the TPZs on the contract drawings adjacent to propo Study Area to protect vegetation to be retain fences/barriers demarcate TPZs and protect existing from equipment damage. Schedule tree/vegetation clearing outside species ac Bird active season: April 1 – August 15; and Bat active season: April 1 – October 30. Develop a tree compensation/re-planting plan durin compensate for tree removals. Develop and implement an edge management plan. Disturbed areas should be re-vegetated as soon as p Implement best management practices to mitigate th impacts (e.g. staging of equipment and stockpiling areas). Sediment and erosion control measures (i.e. silt fenci prior to construction to avoid impacts (e.g. sediment natural features and minimize potential for encroareas. It is recommended that a Contractor Information documenting the various wildlife species with encountered during construction activities, as well as in the event wildlife is encountered during constructior to be determined with input from landowners, the T and NPCA. Complete a hazard assessment for the ash trees in RoW, as there is the potential for the deal/dying damage/injury or death to construction crew member Conduct wildlife sweeps prior to the commencemen determine if wildlife are present at the site and enprocesses (e.g. nesting, etc.); Following the wildlife sweeps prior to the commencement determine if wildlife are present at the site and enprocesses (e.g. nesting, etc.); Following the wildlife sweeps prior to the commencement determine if wildlife are present at the site and enprocesses (e.g. nesting, etc.); Following the wildlife sweep or install, monitor, and muffling and maintenance of machinery a

Project footprint through abitat. Avoid sensitive extent possible; etailed Design and show posed work areas in the ained. Tree protection ing trees along cut lines	With the implementation of the mitigation measures and re-planting of replacement trees and/or habitat, net impact will be minimal. Loss of mature trees will be minimized. Net impact will involve a loss of some mature trees, with a net increase in total trees through compensation.
active seasons:	
rring Detailed Design to	
n. s possible. the potential for indirect ing away from wooded	
ncing) should be in place ent loading) on adjacent croachment into natural	
on Manual be prepared n the potential to be as the steps to be taken ction. ion. Areas to be planted e Town, the Region and	
s in and adjacent to the ing ash trees to cause pers and/or equipment. nent of work activities to engaged in critical life	
ould be isolated to deter	
nd maintain appropriate pment, to mitigate noise	
odlot to be focused along on into the Woodlot.	

Potential Impact	Description of Potential Impact	Mitigation/Monitoring⁵	Net Effect
Potential impact to fisheries and fish habitat.	The watercourse that runs through the Irish Grove Woodlot and continues south to Main Street West was assessed as potential fish habitat, and is sensitive to disturbance. Potential impacts include the construction of a culvert/crossing.	 The design of the watercourse crossing to be undertaken as part of future Detailed Design work should consider sensitive ecological design principles and limit fish habitat impacts. Mitigation that would be implemented is expected to include, but is not limited to: Avoid sensitive timing windows; Maintain flows downstream of the construction area; If possible, maintain fish passage; Implementation of appropriate ESC measures; Where pumps are used, implement fish screens at intakes to prevent impingement and entrainment of fish; Prevent entry of deleterious substances into the watercourse; and Minimize the limits of disturbance where possible. 	With the implementation of appropriate mitigation measures to be identified during Detailed Design, net negative effects to fish and fish habitat is anticipated to be minimal. DFO approval is expected to be required for this crossing and will be confirmed in advance of Detailed Design.
Potential to impact to Species at Risk (SAR).	 Three SAR (Barn Swallow, Eastern Meadowlark and Bank Swallow) were observed during the 2018 field investigation; none of the 2018 SAR observations were made in association with woodlands. A SAR habitat assessment was completed for the Study Area, and based on the field investigation results, it was determined that the Study Area has the potential to provide habitat for the following SAR: Little Brown Myotis (Endangered); Norther Myotis (Endangered); Tri-colored Bat (Endangered); Barn Swallow (Threatened); Eastern Meadowlark (Threatened); and Bobolink (Threatened). 	 Design the illumination through the Irish Grove Woodlot to limit light spillage into adjacent lands. Future follow-up work is recommended in the form of additional field sampling/observation for SAR to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage. If necessary, develop species specific mitigation plans. Review species specific seasonal timing windows to avoid sensitive periods for species. It is recommended that construction personnel receive SAR training prior to the commencement of construction activities and that a Contractor Information Manual be prepared documenting the various SAR with the potential to be encountered during construction activities, as well as the steps to be taken in the event SAR is encountered during construction. 	With implementation of the mitigation measures, impacts to SAR are anticipated to be minimal.
	 None of the aforementioned species have regulated habitat under Ontario Regulation 242/08.Potential impacts to the SAR as a result of the Project include: Habitat displacement; Potential encroachment of SAR habitat; Reduced habitat effectiveness; Sensory disturbances; and Potential to kill harm or harass the species during construction and post-construction 	 Conduct wildlife sweeps prior to the commencement of work activities to determine if SAR (or other wildlife) are present at the site and engaged in critical life processes (e.g. nesting, etc.). Potential impacts to SAR and their habitat should be identified as early as possible. Depending on the extent of work proposed and the potential impact(s), targeted species surveys may be required to confirm presence (or lack thereof) in support of potential permitting and/or approvals under the ESA 2007. Consultation with MECP is recommended in advance of Detail Design to determine the need for targeted surveys and permitting/approvals under the ESA. In the event the Project has the potential to impact Barn Swallow, Eastern Meadowlark and/or Bobolink habitat, the Project is eligible for registration under Ontario Regulation 242/08 of the ESA. So long as the Project is registered, and the conditions in the regulation are followed, the Project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA. 	

Potential Impact	Description of Potential Impact	Mitigation/Monitoring ⁵	Net Effect
Potential for alteration to surface water quality	The Project area includes a permanent watercourse that runs through the Irish Grove Woodlot in a north-south direction and empties into Lake Ontario to the north of the Project area. During construction there is the potential for alterations to surface water quality due to sedimentation and the introduction of deleterious substances to watercourses. Sources may include fuel leaks from construction equipment, entry of sediment or stockpiled materials into the watercourses. With the installed stormwater management controls, surface water resources are not expected to be impacted during the operations period.	 Develop and implement an effective erosion and sediment control plan During construction som (ESCP) to prevent migration of loose soils and accumulated sediment. Include measures for managing water flow onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the watercourse. Handling of fuel, excess materials and debris will be properly managed onsite and removed as per standard construction practices necessary to protect watercourses. Develop a spills response plan. All materials used or generated (e.g. organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses. Erosion and sediment control measures are inspected and maintained on a regular basis during drainage works. Any damages to erosion and control measures are to be repaired immediately. Removal of non-biodegradable erosion and sediment control materials once site has been stabilized. During operations, monitor effectiveness of the SWM facility and bioswales. Monitoring program to be determined during Detailed Design. 	
Potential for impact to groundwater resources.	During construction, uncontrolled runoff could potentially result in contamination of groundwater through infiltration of potential contaminants, and/or infiltration of contaminated surface water. Local water resource/supply impacts are not anticipated as residents are serviced by Town piped water. No groundwater impacts during the operations period are expected from the roadway.	Implement best management practices (BMPs) as noted above in regards to potential impacts on surface water quality. If groundwater dewatering is required during construction, then dewatering should be conducted in accordance with applicable procedures including determination of the need for a Permit to Take Water (PTTW) from MECP. Give regard to and implement measures required to meet source water protection policies – to be defined during Detailed Design.	During construction there is some potential for effects to groundwater resources in the local area (primarily in the vicinity of lands requiring dewatering). With the implementation mitigation, adverse effects are anticipated to be temporary and minimal.

9.2.1 Transportation Effects

The Project has the potential to impact the transportation system during the construction period including possible traffic delays at the future intersections with Hunter Road and Oakes Road North. During construction, efforts will be made to minimize these delays as much as possible including signage and advising local residents of temporary road closures, detours, and/or delays. There are no adverse effects of the Project on the Transportation system during the operations period, as the Project is to improve east-west road network capacity, and the net effects will be positive, as described in **Section 9.3**.

9.2.2 Socio-Economic Effects

A description of baseline or existing socio-economic conditions is provided in **Section 4.4**. These conditions were considered in the assessment of potential Project effects as described in the following sub-sections.

9.2.2.1 Land Use/Direct Property Impacts

Land use along the Livingston Avenue extension corridor is residential and agricultural, with one institutional use at the intersection with Oakes Road North (the Smith Public School). As these lands are within the Protected Countryside designation of the Greenbelt Plan, no significant future development is expected in the local area or on adjacent land parcels – the exception being the development of the GO Transit Rail Station and Regional Transit Facility just east of the Focused Study Area. As such, existing land use along the new road corridor is not expected to change as a result of the Project.

9.2.2.2 Noise and Air Quality

Based on the preliminary design, the Project is expected to be largely located within the Regionally-owned right-of-way. The exception to this is at the intersection of Hunter Road where some land acquisition may be required to provide required sightlines and road turning radii. In addition, required noise mitigation measures for the residential properties east and west of Hunter Road may require additional property portions. There will be no removal of residences required. The residual impacts following the implementation of the required noise mitigation measures, are to be determined at the time of Detailed Design.

During the construction phase of the Project, noise and air quality effects (e.g. from dust and engine emissions) to local residents may occur as a result of machinery operation and/or other construction activities. Effects will be temporary in nature and will be variable, depending on the activity and its location. To minimize air and noise construction emissions, standard mitigation measures are to be implemented, including limiting evening/night time work as described in **Table 9-2**.

Predictive noise modelling work was undertaken for the future condition for 11 representative sensitive receptor locations along the Livingston Avenue extension right-of-way (see **Table 9-3**). These receptors include ten residences and one institutional receptors, the Christ Our Saviour Lutheran Church at 448 Main Street West.

Figure 9-1 identifies the locations of the receptors where the noise modelling was conducted. It should be noted that the sports field associated with the Smith Public School which is located at the intersection of Oakes Road North and Main Street West was not included as a receptor based on the classification in the Ministry of Transportation Environmental Guide for Noise (the Guide), Appendix A. However, one residential receptor (POR8) was modelled, which is directly adjacent to the sports field.



Figure 9-1: Locations of Noise Modelling Receptors

POR ID	POR Description
POR1	Single storey residential dwelling on East side of Hunter Road, North of Main Street West
POR2	Two storey residential dwelling on East side of Hunter Road, North of Main Street West
POR3	Church on North Side of Main Street West, West of Casablanca Boulevard
POR4	Two storey residential dwelling on Main Street West, West of Casablanca Boulevard
POR5	Single storey residential dwelling on North side of Main Street West, West of Casablanca Boulevard
POR6	Single storey residential dwelling on South side of Main Street West, West of Casablanca Boulevard
POR7	Two storey residential dwelling on South side of Main Street West, West of Casablanca Boulevard
POR8	Two storey residential dwelling on Northeast corner of Main Street West and Oakes Road intersection
POR9	Single storey residential dwelling on Northwest corner of Main Street West and Oakes Road intersection
POR10	Single storey residential dwelling on Southwest corner of Main Street West and Oakes Road intersection
POR11	Single storey residential dwelling on Hunter Road, North of Main Street West

Table 9-3: Description of Noise Modelling Receptor Sites

As shown in the modelling results (**Table 9-4**), the change in noise levels above the ambient, as a result of the Project is greater than the threshold 5 dBA for the 2031 and 2041 horizon years at three representative receptors: POR1, POR2, and POR11. These sites are all to the east of the future intersection of Livingston Avenue and Hunter Road. It is noted that POR2 is a representative receptor for all the residences that are located along Geddes St. and which will back onto the proposed roadway extension. There are about 10 residences that are expected to experience a similar level of noise impact as modelled for POR2. Noise mitigation measures will be required for all of these residences.

In addition, for three receptors, (POR8, POR9, and POR10) and the future intersection of Livingston Avenue and Oakes Road North, while the projected increase is less than 5 dBA, the project total noise level will exceed the 65 dBA criterion for the 2031 and 2041 horizon years.

The Smith Public School is located approximately 220m north from the proposed new Livingston Avenue alignment. Assessment of traffic noise impact associated with the

proposed Livingston extension indicate that the change in noise level at the school for 2031 and 2041 are less than 5 dB and that the traffic noise level is less than 65 dBA. As such, assessment of traffic noise mitigation measures is not warranted for the school.

If predicted noise levels with the Project exceeds the 65 dBA criterion, the Guide requires investigation of noise control measures. The Guide also requires that mitigation measures, where introduced, should achieve a minimum of 5 dBA attenuation for the first row of residences/receptors.

	Year 2021	Year 2021		Year 2031	Year 2031	
POR ID	Ambient Noise Levels "NO BUILD" Leq (16 hr) dB∆	Future Noise Levels "BUILD" Leq (16 hr)	Change due to Undertaking dBA	Ambient Noise Levels "NO BUILD" Leq (16 hr) dBA	Future Noise Levels "BUILD" Leq (16 hr)	Change due to Undertaking dBA
POR1	49.37	60 7	11.33	49.85	60.93	11.08
POR2	49.82	56.78	6.96	50.3	57.01	6.71
POR3	64.03	64.42	0.39	64.62	64.63	0.01
POR4	59.46	59.92	0.46	60.05	60.13	0.08
POR5	63.76	64.18	0.42	64.35	64.39	0.04
POR6	64.03	64.44	0.41	64.62	64.65	0.03
POR7	61.89	62.32	0.43	62.48	62.53	0.05
POR8	66.95	68.58	1.63	67.62	68.75	1.13
POR9	66.95	68.54	1.59	67.62	68.75	1.13
POR10	65.34	67.14	1.8	66.06	67.35	1.29
POR11	39.38	58.38	19	39.86	58.6	18.74

Table 9-4: Summary Table of Future Noise Levels with and without Proposed Undertaking

Noise mitigation measures in the area of the impacted residences, should be developed in consultation with the affected property owners and in keeping with the Guide. These measures may include structural elements, such as noise barrier fencing and/or berms where feasible and which can be designed to be in character with the surrounding environment including within the Irish Grove Woodlot.

9.2.2.3 Property Access/Entrances

Access to residential and business properties will be maintained as much as possible during construction. However, there could be short-term restrictions to property access. These effects are expected to be very temporary. Landowners would be notified in advance of any periods when access restrictions are in place. In particular, access disruption to retail business operations and greenhouse operations will be minimized as much as possible. If driveway access is not possible for a short period of time, then alternate parking will be provided (e.g. along the roadway).

9.2.2.4 Agricultural Land

Work proposed for the extension of Livingston Avenue will have minimal effect on agricultural land or farm operations. No agricultural land will be removed for the extension of Livingston Avenue along the Regional Road Right-of-Way. The Greenbelt Plan permits the development of infrastructure within the Protected Countryside, provided the impacts have been considered and mitigation measures designed. During construction, it is possible that the movement of farm equipment could be temporarily impacted as a result of temporary road/access closures. Every effort will be made during construction to limit the period of temporary road/access closures closures and to notify those affected beforehand.

9.2.3 Cultural Environment

9.2.3.1 Built and Cultural Heritage Resources

As described previously in **Section 4.7.1** and per the Cultural Heritage Assessment report in **Appendix G**, there are a number of Built Heritage Resources (BHRs) and Cultural Heritage Landscapes (CHLs) adjacent to Livingston Avenue RoW, extending to Oakes Road North. These are summarized in **Table 9-5**.

Feature ID	Address/Location	Resource Type	Heritage Recognition
BHR1	482 Main Street West	Residence	Listed in the Town of Grimsby's Municipal Heritage Register Previously identified by AMEC (2014)
BHR2	500 Main Street West	Residence	Previously identified by AMEC (2014)
BHR3	470 Main Street West	Residence	Listed in the Town of Grimsby's Municipal Heritage Register
CHL1	482 Main Street West	Laneway	Previously identified by AMEC (2014)
CHL2	500 Main Street West	Orchard	Previously identified by AMEC (2014)

Table 9-5: Built and Cultural Heritage Resources adjacent to the Livingston Avenue Right-of-Way

The impacts to all assets identified in **Table 9-5** except for CHL1, the laneway, is anticipated to be minimal, as the Livingston Avenue extension will not infringe on the properties and will pass adjacent to the property boundary. For CHL1, the roadway extension will shorten the existing laneway to provide access off the new road instead of Main Street West, with potential impacts to key heritage attributes (rural character, continuous sightline along the laneway to the residence at the north end). Mitigation measures recommended include identification of design elements to maintain the rural character at the intersection with the laneway.

9.2.3.2 Archaeological Resources

As previously reported in **Section 4.7.2**, a Stage 1 Background Study conducted by ASI is included in **Appendix H**. The report recommendations and results indicate that there will be a need for a Stage 2 Archaeological Assessment to confirm the absence/presences of archaeological features along the Livingston Avenue extension.

The Regional Municipality of Niagara commits to conducting the Stage 2 Archaeological Assessment within areas of archaeological potential prior to construction. The Stage 2 fieldwork will be scheduled prior to construction activities. Consultation with Indigenous communities will need to be undertaken as part of the Stage 2 Archaeological Assessment as well. Depending on the results of the Stage 2 work, additional studies may be required (e.g. Stage 3 work).

9.2.4 Natural Environment

9.2.4.1 Fisheries and Aquatic Habitat

There is one unnamed permanent watercourse in the Study Area that flows through the Irish Grove Woodlot. This permanent watercourse is located in association with the Irish Grove Woodlot and appears to have been straightened. The bankfull dimensions of the channel were measured to be approximately 3.0 m wide and 1.5 m deep. The presence of watercress suggests the watercourse receives groundwater inputs. In stream cover for fish and herptiles was sparse and visible signs of erosion were evident along both banks. The watercourse was assessed as having the potential to provide fish habitat.

Although stormwater flow results from the Project are not anticipated to change, the construction phase of the Project has the potential to impact fish and aquatic habitat if not mitigated. Refer to **Table 9-2** for recommended mitigation measures.

9.2.4.2 Terrestrial Resources

As stated in Section 4.6.2, there are a number of natural heritage features located within the Study Area. The Niagara Section Escarpment Life Science Area of Natural and Scientific Interest (ANSI) located immediately south of the Focused Study Area (MNRF, 2018) is not impacted by the proposed extension of Livingston Avenue. Although three SAR birds were observed in 2018, there are no SAR or SCC among the botanical species inventoried. The Livingston Avenue Extension is associated with the Irish Grove Woodlot (referred to as woodland D in Appendix F). The Irish Grove Woodlot meets the Significant Woodland criteria as outlined in the Region's Official Plan.

An area of approximately 6,950 m² would be removed from the Irish Grove Woodlot (about 7% of the total woodlot) by the road footprint, within the Region Road right-of-way, and an additional 16,250 m2 (16% of the total woodlot) would be isolated from the remaining woodlot as the recommended roadway follows the existing right-of-way owned by the Region. Some additional impacts to vegetation and habitat within the woodlot may occur in order to implement noise mitigation measures (e.g. barrier walls and/or berms), which would be determined at the time of Detailed Design.

A tree inventory was completed within the Project footprint by an ISA certified Arborist. Trees were measured by diameter at breast height (DBH), which is the unit used to measure tree

size at breast height (1.34 m). 364 trees of greater than 10 cm DBH were inventoried within the proposed Project footprint. (See Appendix J for drawings showing trees potentially to be removed) Of the trees to be removed:

- 79% (287 trees) have a DBH of 10 to 20 cm;
- 3% (13 trees) have DBH greater than 41 cm;
- 36% (131 trees) of the trees inventoried are ash species; and
- Of the 131 ash trees, 61% (80 trees) were assessed as dead or in poor condition as a result of being affected by the Emerald Ash Borer.

Through best management practices and careful facility design, the number of tree removals has the potential to be reduced. To that end, a hazard assessment is recommended for the ash trees adjacent to and within the right-of-way, as there is the potential for the dead/dying ash trees to cause damage/injury to construction crew members and/or equipment. The decision to remove a tree is to be based on where it is located, and if it has the potential to cause property damage or personal injury. If this threat is real, then the ash trees should be removed.

To the extent possible, the removal of mature trees will be limited. The removal of live/healthy trees will be compensated for at a recommended replacement ratio that will be determined at the time of Detailed Design in consultation with the Town, the Region and the NPCA. Similarly, tree compensation planting areas will be determined with input from landowners, the Town, the Region and NPCA. As the implementation year of 2031 is greater than 10 years away, it is recommended that the terrestrial environment study be refreshed as part of Detailed Design, and the number of trees to be removed be confirmed to inform the tree compensation plan.

Intuitively, the removal of 6,950 m² of area from the Irish Grove Woodlot within the Region's right-of-way to facilitate the road footprint will have the effect of creating two woodland edges (one each, north and south of the road). Newly created woodland edges are known to allow additional sunlight and wind to penetrate into the woodland, which generally results in potential microclimatic changes. These changes can affect species composition, forest structure, premature leaf fall, and animal distribution. Additional potential negative impacts associated with edge effects include: loss or degradation of habitat, introduction and colonization of invasive species, and susceptibility to chemicals (e.g. road salt). As a result, it's important that road ecology concepts be considered during Detail Design as a mechanism to mitigate potential negative impacts on the adjacent natural environment. In addition, an Edge Management Plan should be developed for the Project in consultation with the Town, the Region and NPCA. At a minimum, the Plan should address the following:

- Site Preparation and Clearing;
- Tree Protection Measures;
- Wildlife Exclusionary Measures;
- Road Works and Noise Barriers;
- Construction Monitoring;
- Invasive Species Management; and

• Planting Plan.

9.2.4.3 Wildlife and Species at Risk

As noted in **Section 4.6.5**, the habitat assessment determined that the requirements for the following six (6) SAR and three (3) SCC have the potential to be present in the Focused Study Area:

- Little Brown Myotis (Endangered);
- Norther Myotis (Endangered);
- Tri-colored Bat (Endangered);
- Barn Swallow (Threatened);
- Eastern Meadowlark (Threatened);
- Bobolink (Threatened);
- Red-headed Woodpecker (Special Concern);
- Eastern Wood-pewee (Special Concern)
- Monarch (Special Concern).

Results of the assessment are presented in **Appendix F.** None of the aforementioned species have regulated habitat under *Ontario Regulation 242/08*.

In the event the Project has the potential to impact Barn Swallow, Eastern Meadowlark and/or Bobolink habitat, the Project can be registered under Section 23.5 (Barn Swallow) or Section 23.6 (Bobolink, Eastern Meadowlark) of Ontario Regulation 242/08 of the Endangered Species Act (ESA, 2007), respectively. So long as the Project is registered, and the conditions in the regulation are followed, the Project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA.

It is recommended that MECP be consulted in advance of the Detailed Design stage of the Project to determine targeted survey requirements in support of potential permitting and approvals under the ESA (e.g. potential SAR bat habitat displacement). Future follow-up work is recommended to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage and if necessary, species specific mitigation plans will be developed. In addition, it is anticipated that there would be impacts to wildlife due to noise and light pollution during both the construction and operational phases of the Project. Potential wildlife impacts during construction would need to be mitigated through a range of measures including:

- Conduct wildlife sweeps prior to the commencement of work activities to determine if other wildlife are present at the site and engaged in critical life processes (e.g. nesting, etc.);
- Following the wildlife sweep, the area of activity is to be isolated to wildlife from entering the work space area;
- Minimize the overall disturbance footprint to avoid critical breeding habitats, nesting sites, and movement corridors to the extent possible;

- Require Project contractor to install, monitor, and maintain appropriate muffling and maintenance of machinery and equipment, to mitigate noise impacts to wildlife;
- Develop and implement a dust control plan;
- Design the illumination through the Irish Grove Woodlot to be focused along the road corridor and limit spillage and light pollution into the Woodlot;
- Schedule vegetation clearing outside of the April 1 August 15 window (as described from Migratory Birds Convention Act) to reduce impacts on bird species; and
- Limit the area of construction operations and the Project footprint through the Irish Grove Woodlot to reduce impacts to wildlife.

The potential for collisions with wildlife is a noted stakeholder concern. To minimize impacts, the posting of a 50 km/hr speed limit will help to minimize this effect. Further, as wildlife often use waterway ravine systems as a means to move through an area, the possible benefit of and need for an oversized culvert to facilitate such wildlife movements should be considered during Detailed Design. Further, to minimize wildlife disturbance from the operations period, it is recommended that the roadway illumination plan to be developed during Detailed Design be sensitive to the potential for wildlife lighting impacts.

9.2.4.4 Surface Water/Erosion Control

During construction there is the potential for effects to surface water features, which for purposes of the Focused Study Area includes the permanent watercourse located within the Irish Grove Woodlot, extending south to Main Street West. This watercourse flows into Lake Ontario. During construction there could be increased sedimentation to the watercourse and/or deleterious substances such as from construction equipment fuel spills. Mitigation including Best Management Practices (BMPs) to minimize effects as outlined in **Table 9-2** will be implemented. With these measures in place, effects to surface water resources are expected to be minimal.

The Project design includes a new stormwater management system for the corridor as previously described in **Section 8.3**. The construction of the stormwater system would include the installation of a storm sewer and bioswale system capable of draining the proposed paved surfaces within the right-of-way.

9.2.5 Soil and Groundwater Contamination

There is the potential for soil and groundwater contamination during construction activities (e.g. from fuel spills and/or equipment leaks). **Table 9-2** outlines mitigation to be implemented to minimize the potential for these effects. With this mitigation in place, adverse effects are not anticipated to soil condition during construction. During the operations period, the use of roadway de-icing materials will be as per Region policies. The use of swales will also help to minimize water quality effects.

9.3 **Project Benefits**

The benefits associated with this Project primarily relate to the improvement of east-west movement through West Grimsby, reducing congestion on the South Service Road and facilitating access to the GO Transit Station and Downtown Grimsby. The integration of complete street features including sidewalk and cycling facilities will support greater transportation demand management and integrated mobility opportunities along the corridor.

Emergency detour access and transportation network resiliency will be supported by the extension of the corridor, in instances where an event on the South Service Road or QEW result in significant congestion. The roadway extension will also provide access to properties along the existing right-of-way that currently do not have transportation access.

9.4 Effects Monitoring

Recommended effects monitoring during the construction period includes:

- Monitoring of traffic flow to ensure the minimization of delays;
- Public complaints monitoring and follow-up regarding construction disturbances;
- Monitoring of vegetation removal; and
- Monitoring of the effectiveness of SWM controls to ensure erosion and sedimentation effects are minimized.

9.5 Commitments to Future Work

It is recommended that Additional studies be carried out during or prior to the detailed design phase to finalize the required mitigation measures. These include the development of Edge Management Plans, a Vegetation Compensation Plan, and Stage 2 Archaeological Study. **Table 9-6** details the Region's commitments to further studies/work as this Project advances toward and into the detailed design stage. Commitments for mitigation measures to address potential impacts are discussed in **Section 9.3** and **9.4** of this report. A Qualified Professional is recommended be present to complete the installation and monitoring of the suggested mitigation measure, and the suggested mitigation measures will need to be described in greater detail as the project develops, before work begins, per the feedback received from the MECP (May 14, 2020).

Table 9-6 Commitments to Future Work

ltem	Future Work	Comments	
Edge Management Plans	Irish Grove Woodlot.	To be completed in discussions with Niagara Peninsula Conservation Authority, Town of Grimsby, and Region Staff (see Section 9.2.4.2).	
Vegetation Compensation Plans	Region right-of-way through Irish Grove Woodlot and other locations external to the woodlot along the Livingston Avenue extension corridor.	Appropriate replacement ratio to be confirmed based on updated tree inventory undertaken at the time of Detailed Design. The replacement trees should be located within NPCAs watershed; locations to be confirmed in consultation with the Town, the Region and the NPCA.	
Wildlife Crossings	Culvert crossing for the watercourse running through the Irish Grove Woodlot.	Need for and viability and treatment/configuration options to be assessed to facilitate wildlife passage.	
Noise Monitoring Study	North and South of Livingston Avenue extension segment through the Irish Grove Woodlot Residences in proximity to Hunter Road and Oakes Road North future intersections with Livingston Avenue.	Complete a noise monitoring program at these locations including establishing existing baseline noise conditions and post-construction conditions in order to determine the effectiveness of noise mitigation measures once implemented.	
Light Pollution Study	Region right-of-way through Irish Grove Woodlot. Residential areas adjacent to Hunter Road and Oakes Road North.	Light pollution management will reduce the impacts to the existing character and to adjacent residences, as well as impacts to wildlife within the Irish Grove Woodlot.	
Species at Risk Assessment (SAR)	Irish Grove Woodlot. Additional targeted SAR surveys may be required.	If it is determined that the Project has the potential to impact Barn Swallow, Eastern Meadowlark and/or Bobolink habitat, the Project is eligible for registration under <i>Ontario Regulation 242/08</i> under the ESA. So long as the conditions in the regulation are followed, Sections 9 & 10 of the ESA do not apply. SAR identification training provided to workers	
		should include all previously reported SAR in work area, including Eastern Flowering Dogwood, in the event of incidental sightings.	
		Project authorization for Eastern Meadowlark and Bobolink may be required, given suitable foraging and breeding habitat in the proposed work area.	

ltem	Future Work	Comments
		Fish and Amphibian surveys should be completed to confirm presence/absence of any SAR, as suitable habitat for both fish and amphibians was identified but surveys were not completed; lack of SAR reports during a preliminary screening does not confirm absence of SAR.
		Work on the watercourse/culvert may need to be registered under the Project as well in the event of possible SAR presence.
		Consultation with MECP to take place in advance of Detail Design to determine potential permitting and/or approval requirements under the ESA.
Stage 2 Archaeological Studies	Required throughout the Livingston Avenue Extension corridor.	Recommended in the Stage 1 study. To be undertaken prior to construction.

9.6 Permitting

Following the review of background information and the results of the 2018-2019 field investigations, the watercourse associated with the Irish Grove Woodlot has the potential to provide fish habitat, and therefore mitigation measures related to impacts of the watercourse crossing will need to be designed per Section 35 of the *Fisheries Act* (R.S.C., 1985, c. F-14). As a result, it is anticipated that a DFO Request for Review will be required during Detailed Design.

Given that the watercourse associated with the Irish Grove Woodland is regulated by the NPCA, additional consultation and permitting (i.e. Section 28) may be required under *Ontario Regulation 155/06* in support of the Project.

Based on the current understanding of the potential SAR impacts, it is anticipated that some impacts could be addressed through a streamlined Proponent-driven registration process under *Ontario Regulation 242/08* of the ESA. However, in the event the Project does not meet the requirements for registration under *Ontario Regulation 242/08*, permitting and/or approvals under ESA may be required. Given the timelines associated with permitting and/or approvals under the ESA and the potential impacts on Project schedule, it is recommended that the MECP be consulted in advance of Detail Design to determine potential permitting and/or approval requirements under the ESA in support of the Project.

References

Archaeological Services Inc. (2018). Cultural Heritage Resource Assessment: Built Heritage Resources and Cultural Heritage Landscapes. October 2018.

Archaeological Services Inc. (2018). Stage 1 Archaeological Assessment, Casablanca Boulevard Improvements and Livingston Avenue Extension. October 2018.

Cadman, M. (2005). Atlas of the Breeding Birds of Ontario: second Atlas (2001-2005) Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, MNRF and Ontario Nature. 2005.

Dillon Consulting Limited (2020). Detailed Transportation Assessment-Final Report. March 2020.

Dillon Consulting Limited (2020). Livingston Avenue Extension EA - Natural Heritage Assessment Summary. March 2020.

Dillon Consulting Limited (2020). Livingston Avenue Extension EA - Noise Assessment. March 2020.

Dillon Consulting Limited (2020). Livingston Avenue Extension EA - Socio-Economic Assessment. March 2020.

Dillon Consulting Limited (2020). Technical Memo: Stormwater Management Plan for Proposed Livingston Avenue Extension.

Environment Canada (1999). Cumulative Effects Practitioners Guide, 1999. Available at: https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=43952694-1

Fisheries and Oceans Canada (2018). Measures to Avoid Causing Harm to Fish and Fish Habitat. Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html

GeoPro Consulting Limited (2019). Preliminary Geotechnical Investigation. February 2019.

Government of Canada (2012). Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, March 2018, Version 2.

Government of Ontario (2011). Standards and Guidelines for Consultant Archaeologists. Toronto: Ministry of Tourism, Culture and Sport.

Government of Ontario (2009). Ontario Heritage Act, R.S.O. 1990, c. O.18. Last Amendment: 2009, c. 33, Sched. 11, s. 6. Available at: https://www.ontario.ca/laws/statute/S09033#sched11s6s1 Government of Ontario (2007). Endangered Species Act, 2007, S.O. 2007, c. 6. Available at: https://www.ontario.ca/laws/statute/07e06

Government of Ontario (2006a). Ontario Regulation 9/06, Criteria for Determining Cultural Heritage Value or Interest, Under the Ontario Heritage Act. Available at: https://www.ontario.ca/laws/regulation/060009

Government of Ontario (2006b). InfoSheet #5. In Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005. Ministry of Tourism, Culture, and Sport (formerly Ministry of Tourism and Culture). Toronto: Queen's Printer for Ontario.

Government of Canada (1994). Migratory Birds Convention Act. Available at: https://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Government of Ontario (1990a). Environmental Protection Act, R.S.O. 1990, c. E.19. Available at: https://www.ontario.ca/laws/statute/90e19

Government of Ontario (1990b). Planning Act. Available at: https://www.ontario.ca/laws/statute/90p13

Government of Ontario (1990c). Ontario Water Resources Act, R.S.O. 1990, c. O.40. Available at: https://www.ontario.ca/laws/statute/90o40

Government of Ontario (1990d). Drainage Act, R.S.O. 1990, c. D.17. Available at: https://www.ontario.ca/laws/statute/90d17

Grimsby, Town of (2018). Grimsby GO Transit Station Secondary Plan.

Grimsby, Town of (2012). Town of Grimsby Official Plan.

Hemson Consulting Ltd (2012). Greater Golden Horseshoe Growth Forecasts to 2041, Technical Report.

Indigenous and Northern Affairs Canada (2016). Treaty Texts - Upper Canada Land Surrenders. Available at: https://www.aadncaandc.gc.ca/eng/1370372152585/1370372222012#ucls

Metrolinx (2011). Niagara Rail Service Expansion Environmental Study Report.

Ministry of the Environment, Conservation and Parks/OMAFRA/NPCA (2018). Mapping – Geographic Portal, 2018. Available at: https://www.gisapplication.lrc.gov.on.ca/AIA/Index.html?viewer=AIA.AIA&locale=en-US.%20%20

Ministry of the Environment, Conservation and Parks (2019b). O. Reg. 406/19: On-Site and Excess Soil Management. Filed December 4, 2019 under Environmental Protection Act, R.S.O. 1990, c. E.19

Ministry of the Environment, Conservation and Parks (2017c). Considering Climate Change in the Environmental Assessment Process. Available at:

https://www.ontario.ca/page/considering-climatechange-environmental-assessment-process. Last Update: May 8, 2019.

Ministry of the Environment, Conservation and Parks (2007). Endangered Species Act.

Ministry of the Environment, Conservation and Parks (2014). Preparing, Reviewing and Using Class Environmental Assessments in Ontario, January 2014.

Ministry of the Environment, Conservation and Parks (2014b). Code of Practice: Consultation in Ontario's Environmental Assessment Process.

Ministry of the Environment, Conservation and Parks (2002). Species at Risk Act.

Ministry of the Environment, Conservation and Parks (2003). Stormwater Planning and Design Guidance Manual. Queen's Printer. Toronto, ON.

Ministry of the Environment, Conservation and Parks (1990). Environmental Protection Act, R.S.O. 1990, Chapter E.19, Last amendment 2019, c. 9, Sched. 7.

Ministry of Municipal Affairs and Housing (2019). A Place to Grow: Growth Plan for the Greater Golden Horseshoe.

Ministry of Municipal Affairs and Housing (2020). Provincial Policy Statement, 2020.

Ministry of Natural Resources and Forestry (2017). Best Management Practices for the Protection, Creation and Maintenance of Barn Swallow Habitat in Ontario. Queen's Printer for Ontario, 2017. 37 pp.

Ministry of Natural Resources and Forestry (2015). Climate Change Projections for Ontario: An updated Synthesis for Policymakers and Planners.

Ministry of Natural Resources and Forestry (2013). Species at Risk Branch Best Practices Technical Note: Reptile and Amphibian Exclusion Fencing, Version 1.1.

Ministry of Natural Resources and Forestry (2010). Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition, Toronto: Queen's Printer for Ontario, 248 pp. March 18, 2010.

Ministry of Natural Resources and Forestry (1997). Fish and Wildlife Conservation Act. Last Update in 2019. Available at: https://www.ontario.ca/laws/statute/97f41

Ministry of Transportation Ontario (2013). CycleON – Ontario's Cycling Strategy.

Niagara Peninsula Conservation Authority (2013). Niagara Peninsula Source Protection Plan.

Niagara Region (2005). Model Urban Design Guidelines.

Niagara Region (2017). Niagara Region Transportation Master Plan.

Niagara Region (2014). Regional Official Plan.

Niagara Region (2008). Regional Tree and Forest Conservation By-law No. 30-2008.

Ontario Ministry of Agriculture, Food and Rural Affairs (2017). Greenbelt Plan.

Singer, S. N., Cheng, C. K., and M. G. Scafe (2003). The Hydrogeology of Southern Ontario, 2nd Edition. Ministry of the Environment, Conservation and Parks, Environmental Monitoring and Reporting Branch. Toronto, Ontario.

Statistics Canada (2017a). Census Profile. 2016 Census, Grimsby.

Tree Canada (2015). Tree Canada Afforestation and Reforestation Protocol. Version 2.0. April 2015.