REPORT

Schedule "C" Municipal Class Environmental Assessment for The Dufferin County Road 109/2nd Line Amaranth Realignment

Environmental Study Report (ESR)

Submitted to:

Dufferin County

Submitted by:

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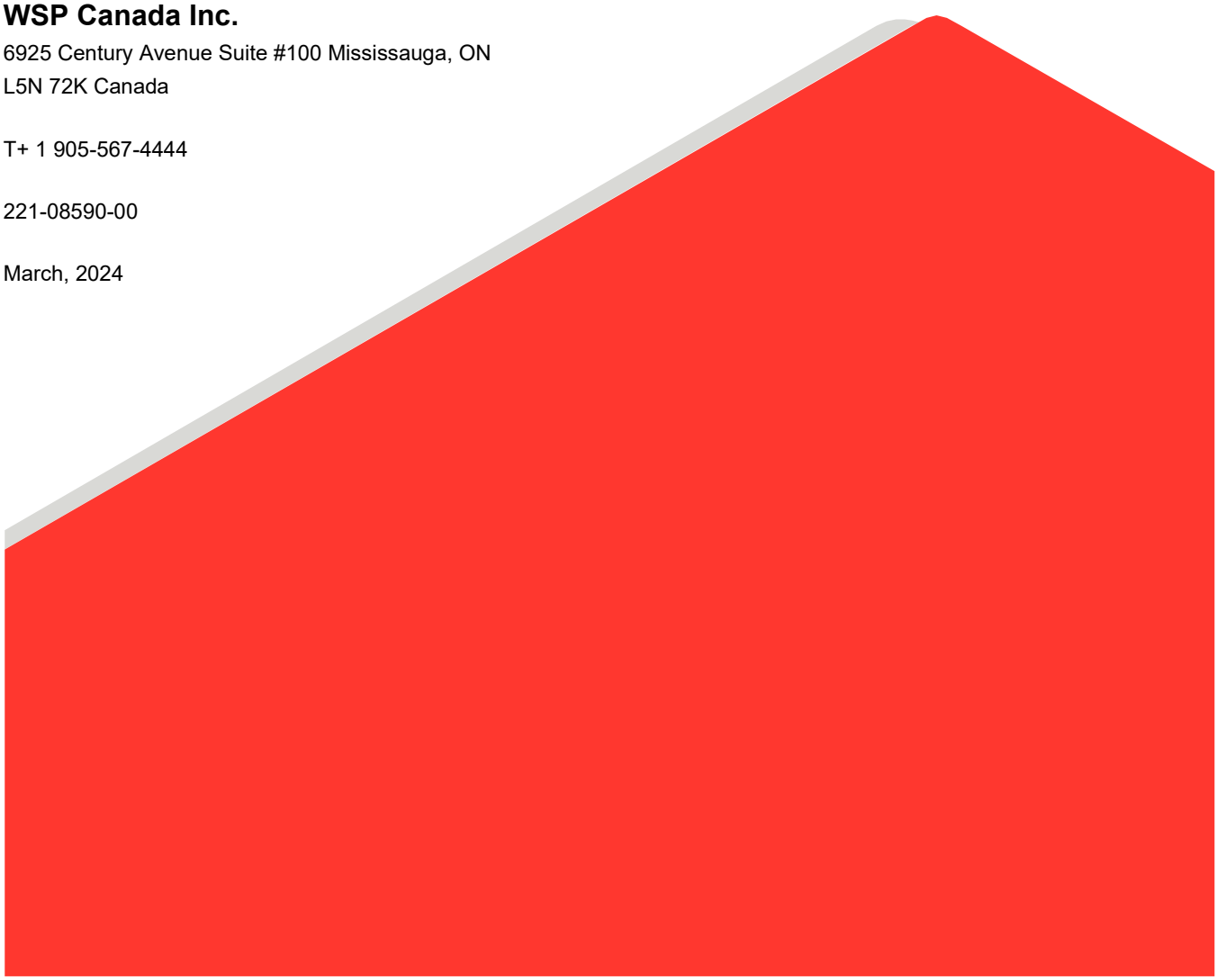


Executive Summary

Introduction

Dufferin County retained WSP Canada Inc. to undertake the Schedule 'C' Municipal Class Environmental Assessment (MCEA) Study to consider potential solutions to realign Dufferin County Road 109 and 2nd Line Amaranth. 2nd Line Amaranth is proposed to be realigned as the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. This realignment could precipitate a domino effect of impacting other intersections, namely Dufferin County Road 3 and Dufferin County Road 23, which is less than 100m south of the Dufferin County Road 109 and Dufferin County Road 3 intersection. The project will look to better understand the broader traffic impacts of the realignment and to confirm the best solution(s) for the study area.

Municipal Class EA Planning Schedule

The Dufferin County Road 109 / 2nd Line Class EA has been identified as a Schedule 'C' project under the MCEA process. An Environmental Study Report (i.e. this report) is required for Schedule 'C' projects to document the decision-making process.

Problem and Opportunity Statement

There is a proposed development located near Dufferin County Road 109 and 2nd Line Amaranth. As part of the development, 2nd Line Amaranth is proposed to be realigned as the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. This realignment could precipitate a domino effect on traffic impacting other intersections in the surrounding area. Given this, the Environmental Assessment study will evaluate alternatives that will:

- Enhance safety of all users and all modes in the surrounding area.
- Accommodate existing and future traffic demands.

Alternative Solutions

The following alternative solutions were originally identified to address the problems and opportunities identified in the Problem and Opportunity Statement:

- 'Do Nothing' (Carried Forward for comparison)
- Improve and Expand Transit Service (Transportation Demand Management) (Set Aside)
- Improve and Expand roadways within the study area (Set Aside)
- Construct a new roadway (Set Aside)
- Construct realignment alternatives within the study area (Carried Forward): This includes constructing realignment alternatives of current roads/ intersections within the study area and would address the forecasted traffic congestion by directing the traffic flow appropriately to ease congestion and addresses safety concerns within the current study area. As such, this alternative solution was carried forward as the preferred alternative salutation for further technical development and evaluation.

Design Alternatives

As the need for the project was established and a Preferred Alternative Solution was selected, this phase involved the development and evaluation of design alternatives for the study area. Phase 3 for this Class EA study involved the following activities:

- Development and Screening of the Long List of Alternatives;
- Development of the Short List of Alternatives;
- Identification of evaluation criteria and weighting for evaluation of alternatives;
- Evaluation of Short List of Alternatives;
- Consider feedback received at Public Information Centre #2; and
- Selection of the Technically Preferred Alternative.

In evaluating the short list of design alternatives presented in **Section 6.2**, several key factors and design elements were considered. The evaluation criteria and their weightings are listed below:

- Natural Environment (High);
- Socio-Economic (High);
- Cultural Environment (Medium);
- Transportation/Technical (High); and
- Costs (High).

The results of the evaluation determined that Option 1b is the preferred option because of its minimal and minor impacts to the natural environment, minor impacts to socio-economic environment, and has no impacts to the cultural environment. From a traffic perspective, this option supports increases in traffic safety especially in light of projected future traffic volumes, ease of pedestrian crossings, and the potential for integration of cycling facilities in the future. The option has similar costs to Option 2c.

Option 1b includes the realignment of 2nd Line Amaranth to the east to intersect with Dufferin County Road 109 opposite the existing alignment of Dufferin County Road 3. Dufferin County Road 23 will also be realigned to intersect with Dufferin County Road 3 approximately 135m west of its original alignment, in order to increase spacing between the two intersections.

Recommended Plan

The Recommended Plan (**Figure E1-1)** includes the following modifications to the following existing roads:

- 2nd Line Amaranth will be realigned to form the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. The intersection will be converted from stop-controlled to a four-way signalized intersection.
- The existing Dufferin County Road 109 will be widened to four lanes (two in each direction) with right- and left-turn lanes eastbound and westbound.
- The existing Dufferin County Road 3 will be realigned to remove the channelized northbound right turn lane and to improve the intersection geometry;
- Dufferin County Road 23 will be realigned further south of the existing Dufferin County Road 23 to ensure the intersection of Dufferin County Road 3 and Dufferin County Road 23 does not conflict with the

proposed four-legged intersection. In addition, realignment of Dufferin County Road 23 provides adequate left turn storage and taper for vehicles turning left from Dufferin County Road 3 onto Dufferin County Road 23

- As a result of realigning Dufferin County Road 23 to the south, the existing Paula Court will be extended further south to maintain a T-intersection with Dufferin County Road 23.

There is no sidewalk or Active Transportation facilities (MUP) planned within the current EA study area including Dufferin County Road 109, Dufferin County Road 3, Dufferin County Road 23, re-aligned 2nd Line Amaranth and Paula Court extension. Transit does not presently operate in the study area. Transit stops could be designed and implemented in the future, should transit service be offered.

The intersection of Dufferin County Road 109 and re-aligned 2nd Line Amaranth / Dufferin County Road 3 will be a four legged signalized intersection that is AODA compliant. All other T-intersections within the EA Study Area will be stop-controlled. The intersection of Dufferin County Road 109 and re-aligned 2nd Line Amaranth / Dufferin County Road 3 will have full illumination. All other T-intersections within EA Study Area will be partially illuminated.

The general conclusion established from this Environmental Study Report is that the construction of the Dufferin County 109 Road Realignment can be undertaken with minimal disruption to, and impact on the natural, socio-economic, and cultural environment. The project impacts can be mitigated through the measures prescribed in this Environmental Study Report, along with special considerations during Detail Desing. The mitigation measures will be carried forward to the contract documents, and further mitigated through standard design measures, and Best Management Practices.

Consultation

Recognizing that public, technical agency, and Indigenous consultation is a critical aspect of the MCEA process, a detailed consultation and engagement program was implemented to gather input at key stages throughout the Project.

A range of stakeholders with identified and contacts to address key issues and provide an opportunity to gather areas of concern regarding the Project. Various methods were undertaking to achieve the objectives of the consultation program, including:

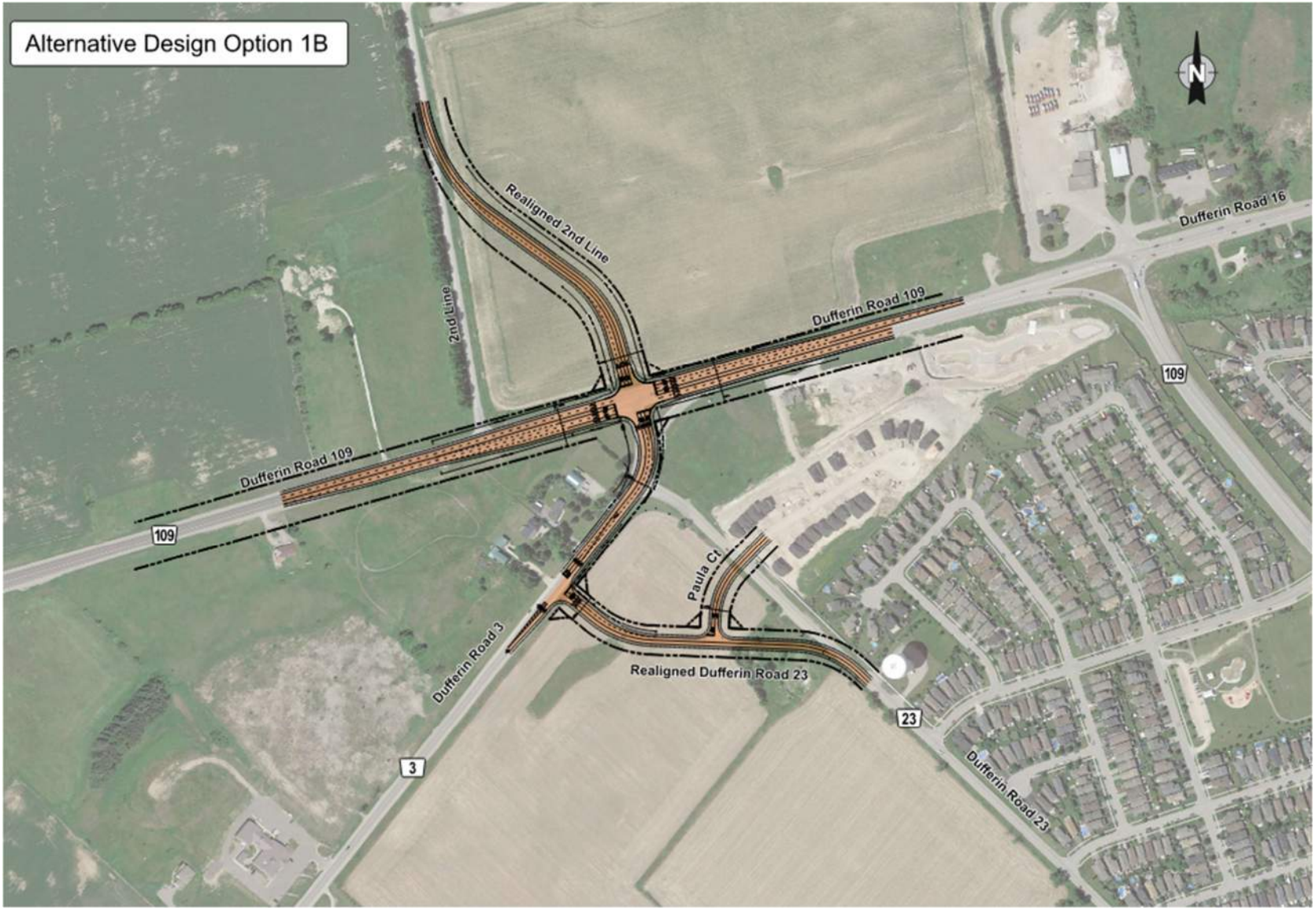
- Notices of Study Commencement, Public Information Centres 1 and 2, as well as Study of Completion;
- Two Public Information Centres during Phase 2 and 3 of the Study;
- Distribution of notices to the Public, agencies, stakeholders, and Indigenous Communities via mail, website, email and postings in the newspaper.

Construction Staging and Cost

Dufferin County Road 109 can be constructed in either two or three stages. The recommended staging is outlined in further detail in **Section 6.12** detailing the steps of the two or three stage options. The proposed road works for the three sections of the road network (Dufferin County Road 109, Dufferin County Road 3 and Dufferin County Road 23) are on green fields and can be constructed independently with staging and similar construction works being done simultaneously for Dufferin County Road 109, Dufferin County Road 3 and Dufferin County Road 23.

The preliminary cost estimate for the proposed improvement is estimated to be approximately $8.3M (includes Dufferin County Road 109 at $4.4M, 2nd Line Amaranth at $1.5M, Dufferin County Road 3 at $900K, Paula Court at $400K and Dufferin County Road 23 at $1.1M); including allocated for minor works, utility items, drainage works, contingency and engineering.

Figure E-1: Recommended Plan



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1.0 INTRODUCTION

1.1 Study Purpose

Dufferin County has completed the Schedule 'C' Municipal Class Environmental Assessment (MCEA) Study to investigate potential solutions to realign Dufferin County Road 109 and 2nd Line Amaranth. 2nd Line Amaranth is proposed to be realigned as the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. , namely Dufferin County Road 3 and Dufferin County Road 23, which is less than 100m south of the Dufferin County Road 109 and Dufferin County Road 3 intersection. The project looked to better understand the broader traffic impacts of the realignment and to confirm the best solution(s) for the study area.

This Environmental Study Report (ESR) documents the Schedule 'C' planning process used for the:

1) Identification of the problems and opportunities (Municipal Class EA Phase 1);

2) Consideration and evaluation of alternative solutions and the selection of the preferred alternative solution (Municipal Class EA Phase 2); and,

3) Consideration and evaluation of design alternatives and the selection of the preliminary preferred design alternative (Municipal Class EA Phase 3).

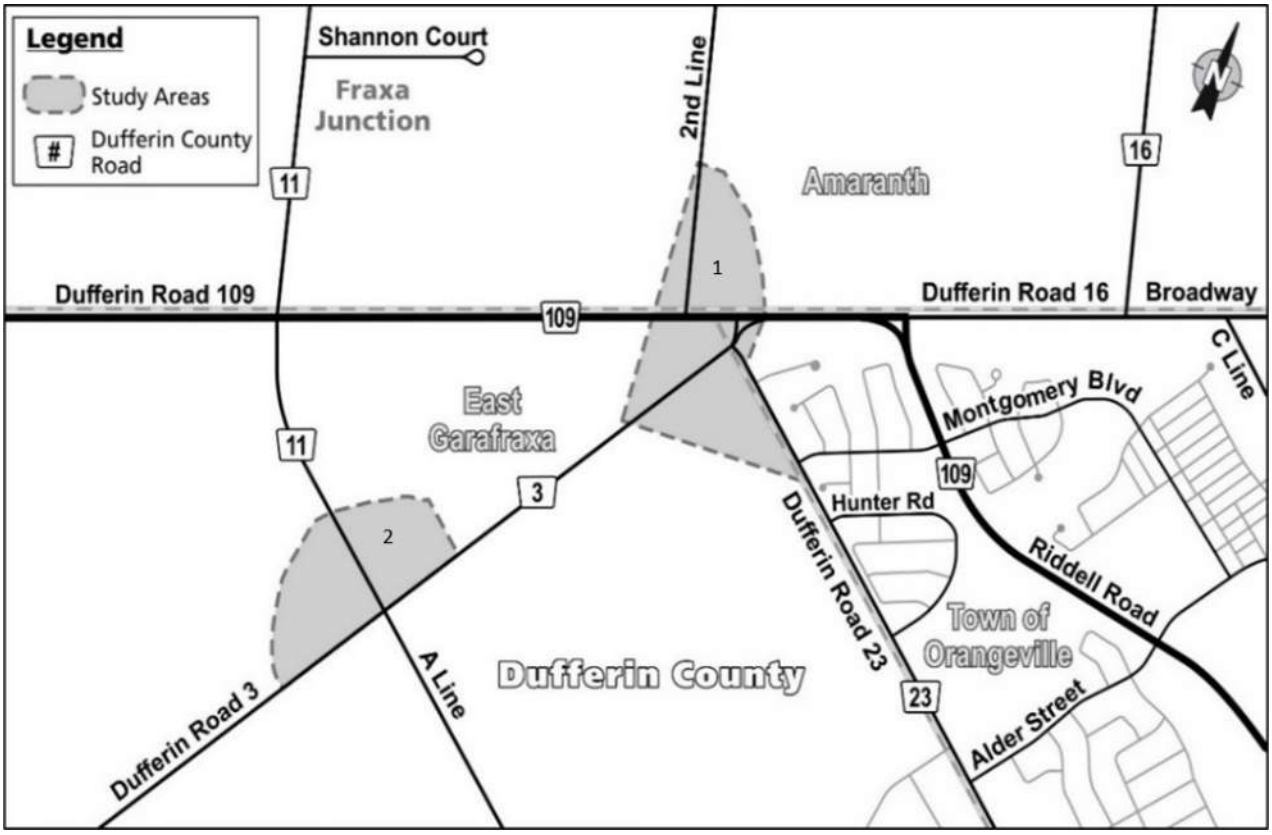
This ESR also documents the consultation work and technical studies that were completed as part of this EA Study to satisfy Municipal Class EA Phase 4.

1.2 Study Area

The study area is located within the Township of Amaranth and the Township of East Garafraxa and is adjacent to Town of Orangeville. It includes lands surrounding the Dufferin County Road 109, 2nd Line Amaranth and Dufferin County Road 3 intersection, Dufferin County Road 23 and Dufferin County Road 3 intersection, and Dufferin County Road 11 and Dufferin County Road 3 intersection (**Figure 1-1**). The study area is currently a mixture of agricultural land and residential and industrial buildings with an area of approximately 26.3 hectares (65.1 acres).

A map of the study area is provided in **Figure 1-1.** The study area was segmented into two study areas (1 and 2). Depending on the results of the traffic analysis there was potential for alternatives proposed in both of the study areas or just the study area 1 that included 2nd Line Amaranth.

Figure 1-1:Study Area



1.3 MCEA Schedule 'C' Process and Requirements

Municipal infrastructure projects are subject to the Ontario Environmental Assessment Act (EA Act). The Municipal Class EA (October 2000, as amended in 2007, 2011, 2015 and 2023) is an approved self-assessment process under the EA Act that applies to municipal infrastructure projects including roads, water and wastewater.

The Municipal Class EA outlines a planning process to consider the environmental and technical advantages and disadvantages of alternatives in order to determine a preferred solution for addressing problems and opportunities. The project commenced prior to the amendments to the Ontario EA Act that resulted in the updated MCEA Schedule and requirements. During the course of the project the MCEA requirements were restructured to allow exemptions for Schedule A and A+. The types of projects and activities are intended to be categorized based on the magnitude of their anticipated environmental impact. In specific cases, however, a project may have a greater environmental impact than indicated by the Schedule. The classification of the various undertakings in the approved class of undertakings outlined in the MCEA 2023 are:

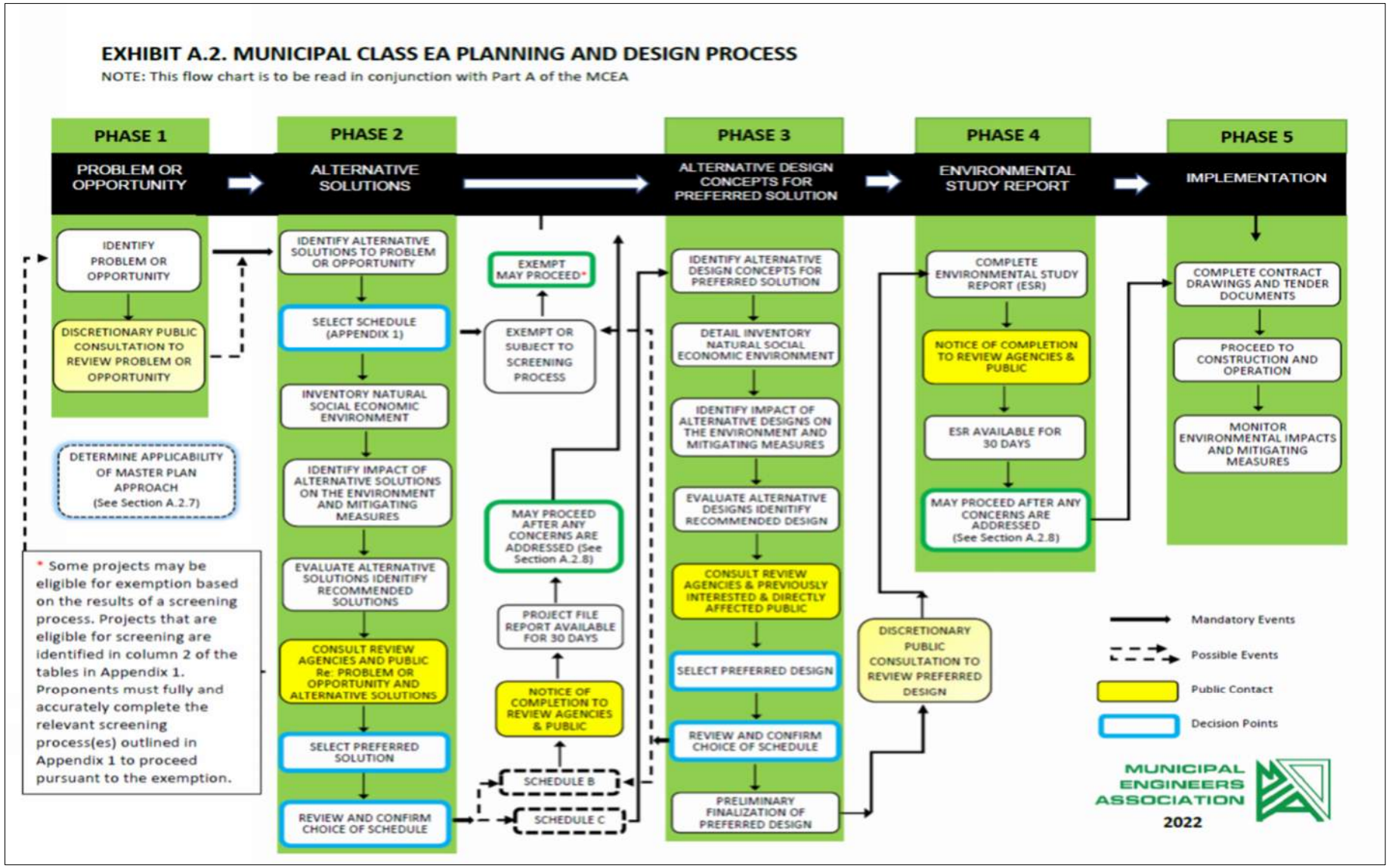
- Exempt From Environmental Assessment Act (EAA) requirements.
- Eligible for exemption based on the results of the screening process(es) in MCEA Appendix 1.
    - Exemption eligible examples: Various maintenance, operation, rehabilitation, and other small projects that are limited in scale and have minimal adverse environmental effects are exempt from the EAA. Previously these projects were classified as Schedule A or A+ but are now classified as exempt.
- Proceed through Schedule B or C despite being eligible for screening.

- Schedule B projects, the proponent may, at its discretion, decide to carry out the process for a Schedule C project.
    - Schedule B: Includes projects that have the potential for adverse environmental effects. This includes improvements and minor expansions of existing facilities. These projects are approved subject to a screening process which includes consulting with stakeholders who may be directly affected and relevant review agencies.
- Schedule C projects, the proponent may decide to carry out an individual EA. Proponents of exempt projects may decide to carry out an EA- like process outside of the EAA regime.
    - Schedule C: Includes the construction of new facilities and major expansions to existing facilities. These undertakings have the potential for significant environmental effects.

The Dufferin County Road 109 / 2nd Line Amaranth Class EA has been identified as a Schedule ‘C’ project under the MCEA (**Figure 1-2**). Environmental Study Report (i.e. this report) is required for Schedule ‘C’ projects to document the decision-making process.

As illustrated in **Figure 1-2** the Municipal Class EA document outlines the planning and design process. Schedule C projects are required to follow Phases 1 through 4 of this process**.**

Figure 1-2:Municipal Class EA Process



1.4 Environmental Study Report

This Environmental Study Report (ESR) documents the process followed to develop the Preferred Plan and the environmentally significant aspects of the planning, design, and construction of the proposed works. The ESR describes: the problem being addressed; the existing social, natural cultural environmental considerations, planning, and design alternatives that were considered; a description of the recommended alternative and its environmental effects and proposed mitigation measures; and commitments to further work, consultation / engagement, and monitoring associated with the implementation of the project.

As required by the MCEA, this ESR is being made available to stakeholders, regulatory agencies, Indigenous Communities, and the public for a minimum of 30 calendar-day review period. A Notice of Completion was placed in local newspapers and on Dufferin County's project website, and letters were mailed / emailed to notify government agencies, Indigenous Communities, and members of the public on the study mailing list. During the review period, parties with outstanding issues are encouraged to bring their project concerns to the attention of Dufferin County for resolution. This ESR has been placed on the public record on the project website (https://www.dufferincounty.ca/MCEA) and at the following in-person viewing locations:

Viewing Location:	W&M Edelbrock Centre 30 Centre Street, Orangeville ON L9W 2X1

1.4.1 Section 16 Order

The Class EA process includes an appeal provision. The Minister of the Environment, Conservation and Parks has the authority and discretion to make an Order under Section 16 of the *Environmental Assessment Act*.

A Section 16 Order may require that the proponent of a project going through a Class Environmental Assessment (Class EA) process, such as the MCEA:

1) Submit an application for approval of the project before they proceed. This is generally referred to as an Individual Environmental Assessment (individual EA).

2) Meet further conditions in addition to the conditions in the Class EA. This could include conditions for: further study, monitoring and/or consultation.

The minister can also refer a matter in relation to a Section 16(6) Order request to mediation.

Before making an Order, the minister must consider the factors set out in Section 16(5) of the Environmental Assessment Act. If a Section 16 Order request is made, the project proponent cannot proceed with the project until the minister makes a decision on the request. If the minister makes a Section 16 Order, the proponent may only proceed with the project if they follow the conditions in the Order.

Note, Section 16 Order requests were previously known as Part II Order requests.

Reasons for Requesting an Order

A concerned party may ask the minister to make a Section 16(6) Order if:

- they have outstanding concerns that a project going through a Class EA process may have a potential adverse impact on constitutionally protected Aboriginal and treaty rights;
- they believe that an Order may prevent, mitigate or remedy this impact.

A Section 16(6) Order request cannot be made to simply delay or stop the planning and implementation of a project that is going through a Class EA process. Prior to making a Section 16(6) Order request, the concerned party should first try to resolve any concerns directly with the project proponent, in this case, Dufferin County.

Timing for an Order Request

During the 30-day public comment period, anyone can review the documentation, submit any comments or concerns to the proponent, and request a Section 16(6) Order.

To request a Section 16 Order for a project, on the grounds that an Order may prevent, mitigate or remedy potential adverse impacts on constitutionally protected, Aboriginal and treaty rights, a concerned party must make the request before the public comment period is complete.

How to make a request

To submit a Section 16(6) Order request, the following information must be provided:

- name, address and email address;
- project name;
- proponent name;
- what kind of Order is being requested i.e., a request for additional conditions or a request for an individual environmental assessment;
- details about the concerns about potential adverse impacts on constitutionally protected Aboriginal or treaty rights and how the proposed Order may prevent, mitigate or remedy the identified adverse impacts;
- whether the concerned party belongs to, represents or has spoken with an Indigenous community whose constitutionally protected Aboriginal or treaty rights may be adversely impacted by the proposed project;
- whether the concerned party has raised their concerns with the proponent, the proponent's response (if any) and why the concerns could not be resolved with the proponent; and
- any other information to support the request.

Section 16 Order requests are made to the Minister of Environment, Conservation and Parks and the Director of Environmental Assessment Branch:

Minister Ministry of the Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto ON M7A 2J3 Minister.mecp@ontario.ca	Director Environmental Assessment Branch Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto ON M4V 1P5 enviropermissions@ontario.ca

There is no appeal of the minister's decision with respect to a Section 16 Order. If the request for a Section 16(6) Order is denied by the minister, the proponent can proceed with the project. If the minister makes an Order, the proponent may only proceed with the project if they follow the conditions in the Order.

The above discussion is intended as an overview of the process only. For more information and specific instruction, please visit:

https://www.ontario.ca/page/class-environmental-assessments-section-16-order

2.0 PLANNING CONTEXT

This chapter reviews the planning and policy framework applicable to the Dufferin County 109 / 2nd Line Amaranth Realignment Class EA Study. The planning and policy framework guides infrastructure planning, land use planning, and strategic investment decisions to support Provincial, County and Local objectives in growth and transportation.

The identification of the study area problems and opportunities considered this policy framework, to ensure that the final recommendations are consistent with Provincial, Regional and Local policies and objectives.

2.1 Provincial Planning Context

2.1.1 Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS), 2020 provides overall policy directions on matters of provincial interest related to land use and development in Ontario. The PPS was prepared under the authority of the Planning Act but may be considered in the planning and policy context of infrastructure planning completed under the Ontario Environmental Assessment Act (OEAA).

The PPS provides policy direction for the use and management of land, as well as infrastructure while protecting the environment and resources and to ensure opportunities for employment and residential development. The sections of the PPS applicable to the planning of transportation infrastructure are as follows:

Part IV: Vision for Ontario's Land Use Planning System – The development of land should be optimized to promote efficient use of land, resources and public investment in infrastructure and public service facilities. These land use patterns promote mixed uses including residential, employment, recreation, parks and open space. The supporting transportation infrastructure is to provide choices and promote increased use of active transportation as well as transit before other modes of travel. This is in support of building livable and healthy communities.

Part V: Policies – Specifically, Section 1.6.7 Transportation Systems and Section 1.6.8 Transportation and Infrastructure Corridors outlines the policies for infrastructure and public service facilities under transportation systems and policies for transportation and infrastructure corridors. The policies state that:

- "Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs."
- "As part of a multimodal transportation system, connectivity within and amongst the transportation systems and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries." and
- "A land use pattern, density and mix of uses should be promoted that minimize the length and number of vehicle trips and support current and future use of transit and active transportation." and
- "When planning for corridors and rights-of-way for significant transportation, electricity transmission, and infrastructure facilities, consideration will be given to the significant resources in Section 2: Wise Use and Management of Resources."

Planning for the Dufferin County 109 / 2nd Line Amaranth realignment is consistent with the policy directions as prescribed by the PPS by promoting safe transportation as part of a wider connected transportation network.

2.1.2 A Place to Grow - Growth Plan for the Greater Golden Horseshoe (2020)

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (“Growth Plan”), 2019, was prepared and approved under the Places to Grow Act (2005) as a legal framework to implement the Province’s vision for managing growth within the Greater Golden Horseshoe (GGH). Dufferin County is located within the GGH.

The GGH is a dynamic and diverse area, and one of the fastest growing regions in North America. By 2041, this area is forecast to grow to 13.5 million people and 6.3 million jobs. The magnitude and pace of this growth necessitates a plan for building healthy and balanced communities and maintaining and improving our quality of life while adapting to the demographic shift underway.

To better co-ordinate planning for growth across the region, this Plan provides population and employment forecasts for all upper- and single-tier municipalities in the GGH. This Plan is about accommodating forecasted growth in complete communities by providing guidance on transportation, infrastructure planning, land-use planning, urban form, housing, natural heritage and resource protection. Complete communities support quality of life and human health by encouraging the use of active transportation and providing high quality public open space, adequate parkland, opportunities for recreation, and access to local and healthy food.

The Dufferin County Road 109 and 2nd Line Amaranth EA Study area is located within a Primary Settlement Area. Policy 3.2.2 (2) and (3) of the Growth Plan provides direction on General Transportation Planning. The following excerpted policies are applicable to this Class EA Study:

(2) The transportation system within the GGH will be planned and managed to:

provide connectivity among transportation modes for moving people and, for moving goods;

offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation;

be sustainable and reduce greenhouse gas emissions by encouraging the most financially and environmentally appropriate mode for trip-making and supporting the use of zero- and low-emission vehicles;

offer multimodal access to jobs, housing, schools, cultural, and recreational opportunities, and goods and services; and

provide for the safety of system users.

(3) *In the design, refurbishment, or reconstruction of the existing and planned street network, a complete streets approach will be adopted that ensures the needs and safety of all road users are considered and appropriately accommodated.*

Policy 3.2.3 of the Growth Plan provides direction on Moving People. The following excerpted policies are applicable to this Class EA Study:

(4) *Municipalities will ensure that active transportation networks are comprehensive and integrated into transportation planning to provide:*

a) safe, comfortable travel for pedestrians, bicyclists, and other users of active transportation; and

continuous linkages between strategic growth areas, adjacent neighbourhoods, major trip generators, and transit stations, including dedicated lane space for bicyclists on the major street network, or other safe and convenient alternatives.

Planning for the realignment of Dufferin County Road 109 and 2nd Line Amaranth is consistent with the policy direction of the Growth Plan by contributing to the development and provision of connectivity among transportation modes for moving people and for moving goods. As well it will enhance continuous linkages between strategic growth areas, adjacent neighbourhoods, major trip generators, and transit stations by providing an alternative branch to the existing intersection.

2.1.3 Greenbelt Plan

The *Greenbelt Plan* strives to:

- protect against loss and fragmentation of agricultural lands;
- provide permanent protection to natural heritage and water resource systems; and
- provide for a range of economic and social activities associated with rural communities.

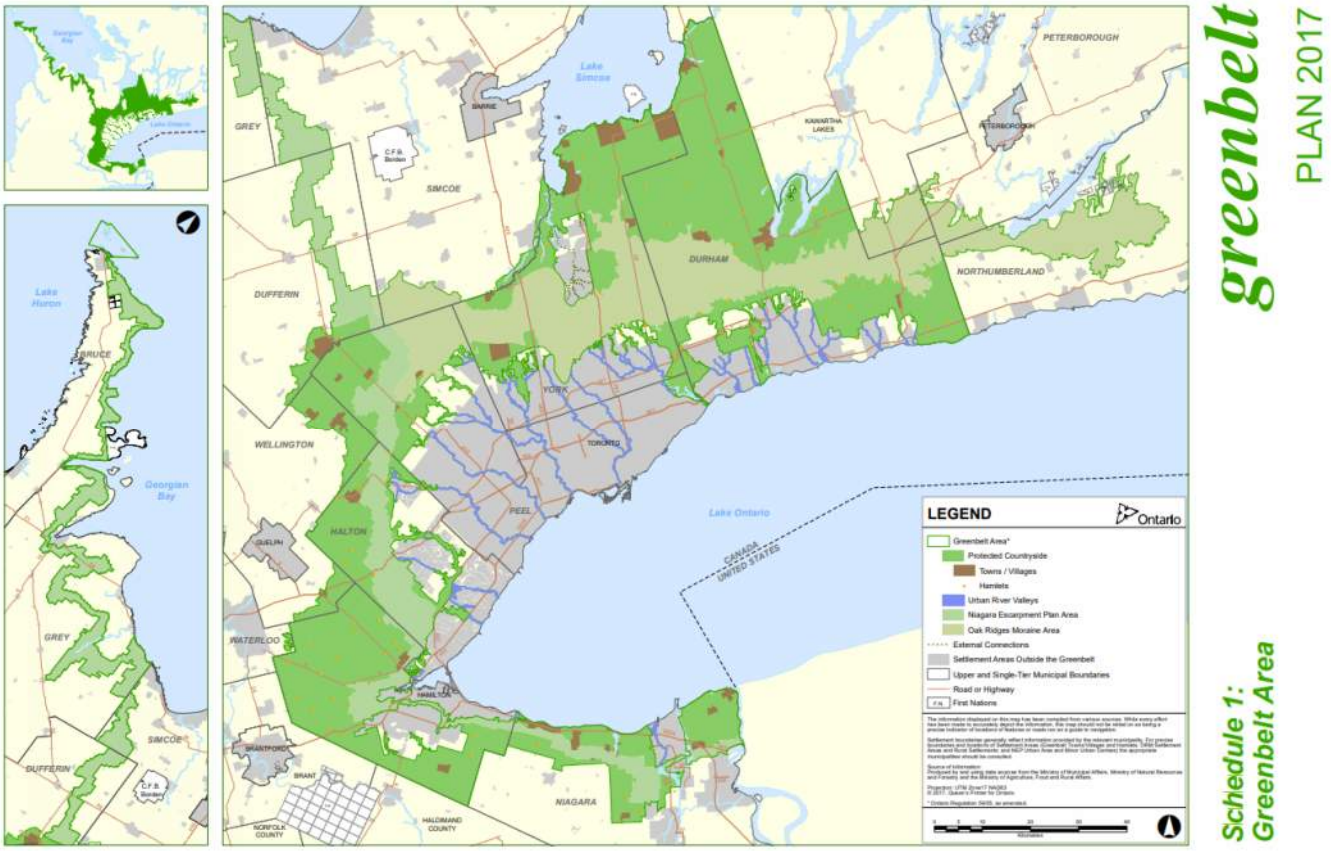
The objectives of the Infrastructure and Natural Resources policies of the Greenbelt Plan are to promote infrastructure that is consistent with the goal of the *Greenbelt Plan* and *Growth Plan*, while pursuing to minimize the impact on the environment. The Greenbelt Plan acknowledges that infrastructure is essential to Ontarians' economic well-being, human health, and quality of life. It allows existing, expanded or new infrastructure in the Greenbelt, provided that the infrastructure serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban centres and between these centres and Ontario's borders.

Similar to the PPS and *Growth Plan*, *Greenbelt Plan* policies influence transportation primarily through municipal planning policy as the *Greenbelt Act* requires that Official Plans conform to the policies of the Plan. The *Greenbelt Plan* also sets out policies for how transportation infrastructure may be planned, designed and constructed. As per Schedule 1 of the Greenbelt Plan (also shown in **Figure 2-1**), the extent of the Study Area falls within the Protected Countryside of the Greenbelt Plan area. No portion of the Study Area is located within the Greenbelt Plan Natural Heritage System. An analysis of the Greenbelt Plan Area will include protection measures to minimize the environmental impacts to the habitats, resources systems, agricultural lands, and socio-economic factors.

Original or modified existing infrastructure approved under the EA process is permitted within the Protected Countryside, although the infrastructure is required to avoid Key Natural Heritage and Key Hydrologic Features unless a compelling need is established and there is no reasonable alternative. Where development does intrude or result in loss of Key Natural Heritage and/or Key Hydrologic Features, the impacts and disturbance must be minimized.

The project team considered the land-use in the area and confirmed there will be minimal to no impacts in the key natural features of the Greenbelt Areas.

Figure 2-1: Schedule 1 - Greenbelt Area (Greenbelt Plan, 2017)



2.2 Regional Planning Context

2.2.1 Dufferin County Official Plan (2017)

The Dufferin County Official Plan ("County Official Plan"), 2017, provides a policy direction on high-priority matters in the County. The County Official Plan guides County growth management and decisions for land sharing high-level land use planning guidance for the eight local municipalities of Dufferin County. The Dufferin County Official Plan provides a policy basis for administering the local approval authorities for local municipal official plans. The Plan directs the County Council and local municipal Councils in understanding their responsibilities, and guides certainty for citizens and businesses in the County regarding land use planning matters.

The County Official Plan assists in growth management in a County expected to experience continued strong growth in population and urban development over the next twenty years in accordance with the Growth Plan. The Purpose of the Office Plan is to:

- Establish an upper-tier planning framework for land within Dufferin County.
- Guide a 20-year planning timeline and framework on growth management for the County to accommodate the anticipated population and employment forecasts over the planning horizon to 2036.
- Advocate for civilized growth and development in the County through the thoughtful, efficient and cost effective allocation of land uses and infrastructure deployment.
- Build policies to encourage economic development in the County, including those for employment, agriculture, tourism and recreation based uses and natural resources.
- Guide private investment through policies on land use and development that promise efficient approvals of development and administrative methods consistent with the County's goals and objectives.
- Provide policies to enhance the health, safety, quality of life and welfare for current and future residents.
- Implement provincial policies, statements and guidelines that impact the County.
- Define the measures and means of implementing, monitoring, reviewing and updating the policies and schedules of this Plan.

The Dufferin County Road 109/2nd Line Amaranth intersection is located within one of the County's designated Community and Urban Settlement Areas and adjacent to the Greenbelt Plan Area and Provincially Significant Wetlands (**Figure 2-2).** The project is also within the Protected Countryside within the Greenbelt Plan Area (**Section 2.3**).

The County's Official Plan focuses on promoting growth within the settlement areas, to increase efficiency to existing infrastructure, developing complete communities, and protecting the natural environment and agricultural areas. The improvements to the Study Area are aligned with the direction of the Plan.

An excerpt from Dufferin County's Plan outlines that the County's growth management objectives include:

a) Foster the creation of complete, healthy, and vibrant communities and enhance the quality of life for all residents by directing the majority of growth and development to the settlement areas to conserve and protect natural heritage features and areas and agricultural areas.

Provide a settlement structure for directing and managing growth and development in the County over a 20-year planning horizon.

Promote a settlement structure which directs the majority of urban development on full municipal services to the County's three urban settlement areas which include the: Town of Orangeville, Town of Shelburne and Town of

Grand Valley urban area, and to a lesser extent to the community settlement areas, which are able to accommodate additional growth.

Promote development patterns in settlement areas that efficiently use land, resources, infrastructure, and public service facilities, through compact urban forms, a mix of land uses and appropriate densities.

Encourage opportunities for redevelopment, revitalization and intensification in appropriate locations and of a scale and character of development that is compatible with the community.

Encourage economic development opportunities through the protection of employment areas and providing an appropriate range and mix of uses to meet long-term needs and attract businesses to the County.

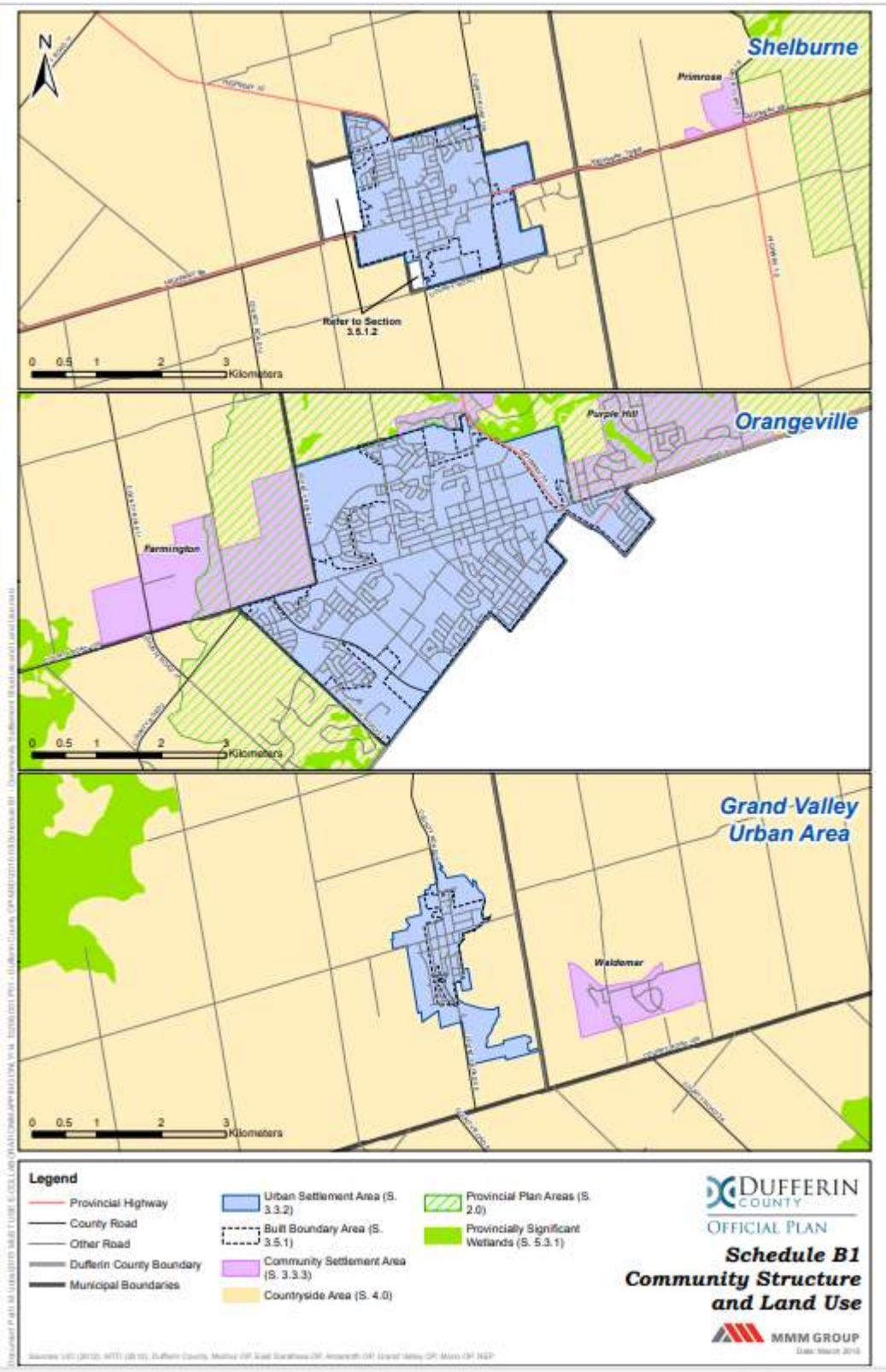
Encourage the provisions of a broad range of housing types and affordability to meet the needs of the existing and future residents of the County.

The County's growth management goals include:

- Promote a settlement structure that guides most of the urban development of municipal services to the County's primary urban settlement areas: Town of Orangeville, Town of Shelburne and Town of Grand Valley urban area, and to a less at community settlement areas, since they can accommodate additional growth.
- Promote development patterns in settlement areas that efficiently use land, resources, infrastructure, and public service facilities, through compact urban forms, a mix of land uses and appropriate densities.

Dufferin County is currently home to 66,000 people, with growth projections expected to reach 95,000 by 2051 according to the Ontario Growth Plan released by the Province. In an effort to meet the population growth predictions, Dufferin County is developing the Municipal Comprehensive Review (MCR) which is a schedule of studies to influence the Dufferin County Official Plan. It provides structure and guidelines for the growth of the County over 30 years. Dufferin County is currently conducting the MCR update and Official Plan amendments at the time of writing this report. WSP is the consultant working with the County on the MCR.

Figure 2-2: Dufferin County Provincial Plan Areas (Schedule B1, Dufferin County Official Plan)



2.2.2 Dufferin County Transportation Master Plan (October 2023)

The Transportation Master Plan (TMP) was developed in 2023. The recommendations under the roads improvement strategy were a catalyst for the improvements in this project.

The Dufferin County Transportation Master Plan (TMP) presents multi-modal transportation investments to accommodate the forecasted growth of population and employment for the County to the year 2051. The TMP was prepared following the Municipal Class Environmental Assessment (MCEA) process for master plans, addressing Phase 1 (problem/opportunity statement), and Phase 2 (assessment of alternatives), and included multiple opportunities for input in the Municipal Comprehensive Review and TMP processes.

The Vision for the TMP, which addresses Phase 1 of the MCEA process is:

“A vibrant and integrated community that supports users of all ages and abilities through active transportation facilities, transit routes and roads. The multi-modal transportation network should provide mobility and connectivity in an accessible, equitable, environmentally, and financially sustainable manner. Viable transportation options should be provided to foster healthier, more sustainable choices for its residents and visitors.”

Dufferin County currently has a transportation network which provides an efficient system for the movement of goods and people. A transportation system should be efficient and effective to encourage and support economic development in the County and accommodate future growth. Therefore, in developing the roadway improvements, a comprehensive approach was adopted to meet the following transportation system-related objectives from the County’s Official Plan:

- Promote the establishment of a comprehensive and efficient transportation system to move people and goods to support economic development objectives of the County.
- Support and encourage active transportation to contribute to the development of healthy, safe, and complete communities and minimize auto-dependence.
- Optimize the use of existing infrastructure and public facilities prior to considering the development of new infrastructure.

To identify capacity deficiencies across various corridors, a screenline analysis of the corridors across the County was also conducted by estimating future traffic volumes and assessing the available capacities along the roadway corridors. According to the Growth Plan for the Greater Golden Horseshoe 2020 report and the Land Needs Analysis Report prepared as part of the County’s Municipal Comprehensive Review, about 90% of the future employment and population growth in the County is concentrated within the delineated built-up areas of Grand Valley, Orangeville, and Shelburne. This growth is expected to occur through intensification and expansions of the settlement areas. Thus, the road needs in the growth areas were identified by conducting an area focussed screenline analysis that evaluated the capacities of road corridors bordering these areas.

Most importantly to the EA, the TMP identified road widening of County Road 109 from two lanes to four lanes through the study area. This improvement is needed to accommodate growth in traffic due to population and employment growth in the County.

2.3 Municipal Planning Context

2.3.1 Town of Orangeville Official Plan (2020)

The current Official Plan was implemented by the Town Council in 1985 and since has undergone various amendments to the Plan with the most recent issued in December 2020. The values of Orangeville are reflected in the Plan demonstrating the desire to maintain the Town's quality of life despite the growth pressures. The purposes of the plan are outlined as:

- Assist Council, the public and agencies with development planning in the town with policies and actions permitted by the Municipality.
- Assess the financial status of the Town during developments that consider residential and commercial-industrial assessment to maintain.
- Provide information regarding future development patterns of the Municipality to increase transparency.
- Ensure compliance with the Town's Plan for developments undertaken by private developers.
- Provide direction to foster a sustainable community development for the Town.

The objectives of the Plan are to:

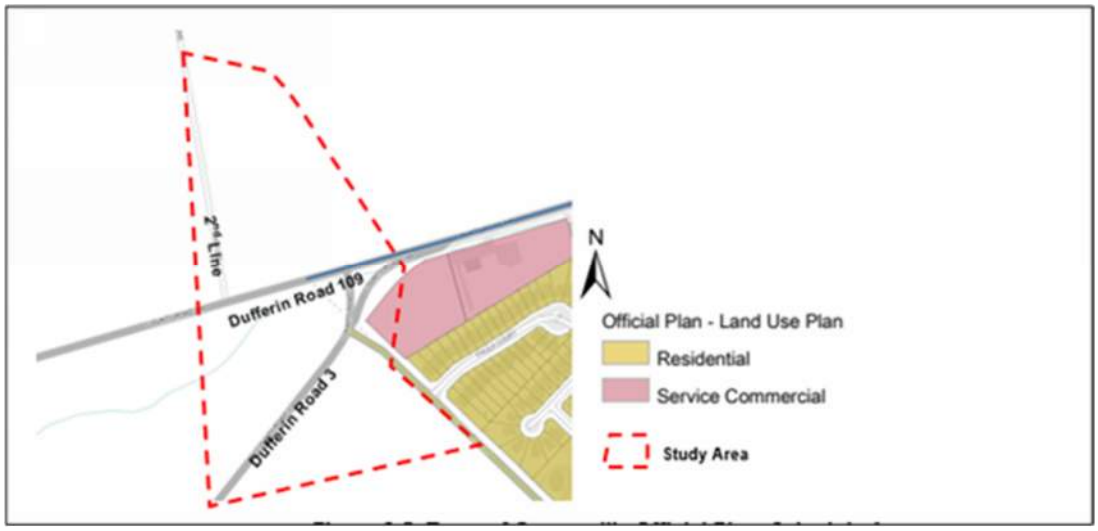
- Recognize and maintain a high Quality of Life in the Town
- Provide adequate housing
- Support economic growth via development on available lands, and expansion of existing infrastructure, and support commercial development.
- Growth management to promote and facilitate a method of land use and infrastructure planning between jurisdictions in the Orangeville area, and delineating urban and agricultural land uses on rural lands in surrounding municipalities.
- Promote open space recreation on Town lands.
- Natural environment, water, resources and natural hazards
- Industrial facilities, transportation and services
- Heritage resources, community improvement, downtown, community form and identity, and community culture, and live/work balance
- Prioritize public safety, and accessibility.
- Sustainable development for a growing future and energy conservation

The portion of Study Area 1 located within the Town of Orangeville is designated as Service Commercial Area as per Schedule A of the Town of Orangeville Official Plan (2020) (**Figure 2-3**).

Service Commercial Areas are located along major transportation routes within the town to provide commercial uses that provide a specialized product or service. The areas cater businesses to the public traveling on the key transportation routes and the physical requirements to build the development, in terms of shape and size, are

such that it cannot be accommodated in other commercial uses such as Central Business District, General Commercial, or Neighbourhood Commercial.

Figure 2-3: Town of Orangeville Official Plan, Schedule A



Source: WSP Socio-Economic Report, 2025

The Town of Orangeville is directly adjacent (east) of the project study area that is facing significant population growth over the next 15 years. The Town will work to maintain and improve the community's socio-economic growth through economic development and planning programs. This will include Town Council making efforts to collaborated tightly with adjacent municipalities, federal and provincial agencies, and the private sector for undertakings that co-ordinate for mutually attractive industrial municipalities.

Although the project study area is adjacent to the Town of Orangeville the project study area is an important intersection and project roads likely will experience increased vehicular traffic on account of the development adjacent to Orangeville.

As of the writing of this ESR, the Town of Orangeville is currently reviewing their Official Plan to determine if any new or updated provincial policy and legislation are either:

- Still consistently reflected by current Town OP policy, with no update needed;
- Somewhat reflected by current OP policy, but modification, including additional
- and/or revised policy direction would be beneficial; or
- Not captured, or conflicted by current OP policy, with new or amended policies needed for consistency.

2.3.2 Township of Amaranth Official Plan (2018, excluding Amendment 4)

The Township of Amaranth's Official Plan was approved by Council in 2005. It has since undergone iterations to accommodate the evolving landscape of Planning with the most recent update in 2018. The purpose of the Official Plan is:

- To support in establishing future policies and actions in development aspects.
- Support members of the public and private agencies related to development and future needs.
- Publicly share information concerning future development patterns

- Ensure compliance with the Town's Plan for developments undertaken by private developers.
- To support economic growth via development with highest positive impact on the Township.
- Assure land use planning contributes to protection, maintenance, and enhancement of water and related resources, and aquatic ecosystems from the perspective of a combined watershed management.

Section 4.1 on Environmental Management outlines the below:

General Development Criteria

The Environmental Criteria in this section shall apply to all development in the Township. The uses permitted by this Plan may only be allowed provided that:

a) The long-term capacity of the site can support the use without a negative impact on environmental features, functions and attributes such as, water quantity and quality, natural vegetation, soil, wildlife, population, visual character and cultural heritage features;

b) The cumulative impact of development will not have detrimental effects on the environment including air quality, water quality and quantity, vegetation, soil, wildlife, and the natural landscape;

c) The site is not considered hazardous to life or property due to unstable soil conditions or possible flooding;

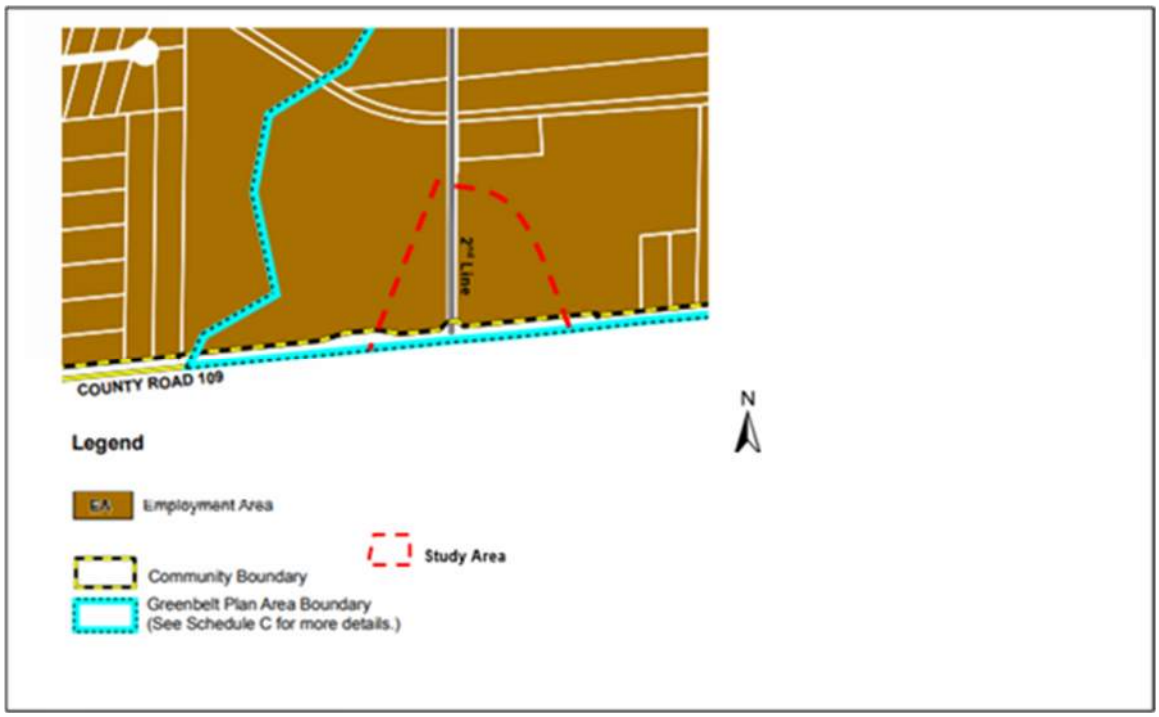
d) Development meets applicable Federal, Provincial, County and municipal requirements including health and servicing requirements; and,

e) Development shall be consistent with the Provincial Policy Statement issued under Section 3 of the Planning Act.

The portion of Study Area 1 located within the Township of Amaranth is situated in proximity to the Farmington settlement area and is designated as Employment Area as per Schedule A-3 of the Township of Amaranth's Official Plan (2004) **(4.**)

The objective of the Employment Area is to provide employment opportunities for economic growth. The areas focus on large-scale commercial, industrial and institutional uses in such a way that they complement the land use in the adjacent areas.

Figure 2-4: Township of Amaranth Official Plan, Schedule A-3



Source: WSP Socio-Economic Report, 2025

Township of Amaranth population growth is anticipated to increase by 4,680 residents by 2031. The Township of Amaranth is generally supportive of this development as it supports the need for improved transportation services that will improve access to the rising population and increased employment projections.

2.3.3 Township of East Garafraxa Plan (2005)

The official Plan for the Township of East Garafraxa was established in 2005 and last amended in 2021. The intent of the plan is to:

- Provide the groundwork for discussions made by the Township's Counsil, members of the public and government agencies regarding future land use.
- Provide the public and property owners with a feeling of certainty there will be guidance on future development on their lands and those surrounding them.
- Transparency in the development process and decrease misunderstanding and uncertainty when proposed developments arise.
- Protect the physical and natural resources in the Township to permit sustained satisfaction from the environment.
- Manage alterations to land use that influence positive impacts on the Township.

Mission and Principles:

- Cost effective development and land use methods activating growth of the economy.
- Preserve high quality of life, environmental quality and top-notch agricultural areas. Protect and improve natural features. Maintain, protect, and improve agricultural areas.

- Growth management policies in the plan will guide financial well being and economic opportunities (present and future) for the township.

Dufferin County Road 109 forms the north boundary limit for the Township of East Garafraxa and therefore much of the general project study area is situated within the north-east section of the municipality. The following Township of East Garafaxa (2004) land use designations are located within Study area 1 and Study Area 2 as illustrated in **Figure 2-5** and **Figure 2-6**:

- Agricultural Areas
- Employment Areas
- High Potential Aggregate Resources
- Areas More Vulnerable to Contamination

The following provides an overview of the land use designations within the study area.

Agriculture

The section of Study Area 1 south of Dufferin County Road 3 and the western portion of Study Area 2 are designated as Agricultural areas as per Schedule A of the Township of East Garafaxa Official Plan (**Figure 2-5**). The objective of Agriculture areas is to promote all forms of agriculture and safeguard farmlands from adverse impacts of the changing market conditions.

Employment Area

The section of Study Area 1 north of Dufferin County Road 3 and the east portion of Study Area 2 are designated as Employment areas as per Schedule A of the Township of East Garafaxa Official Plan (**Figure 2-5**). The Employment Areas are aimed for developing large scale industrial, commercial, and institutional development.

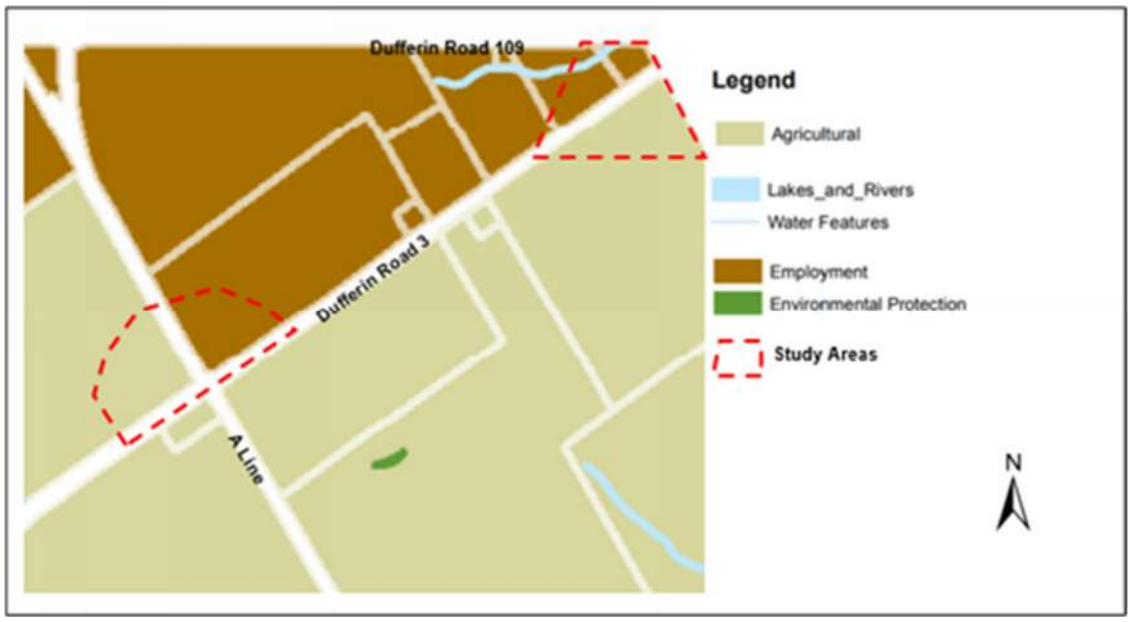
High Potential Aggregate Resources

The southwest section of Study Area 1 is designated as High Potential Aggregate Resources as per Schedule B of the Township of East Garafaxa Official Plan (**Figure 2-6**). As per the Official Plan, new development proposed in or adjacent to high potential aggregate deposits shall not preclude or hinder the establishment of new operations or access to the resources.

Areas More Vulnerable to Contamination

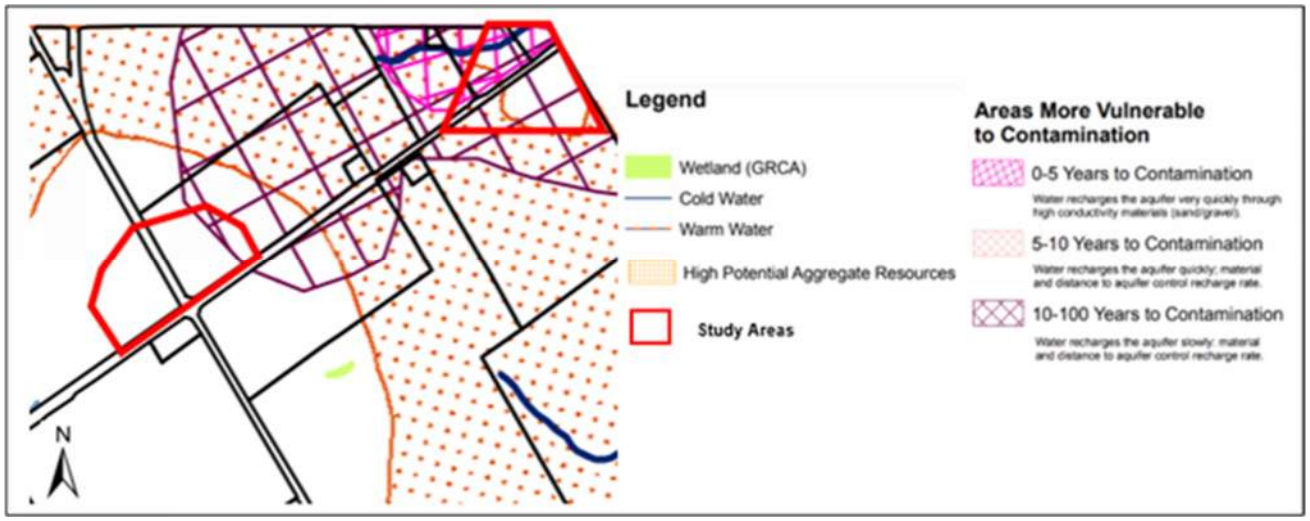
The northern section of Study Area 1 and the east limits of Study Area 2 are located within Areas More Vulnerable to Contamination as per Schedule B of the Township of East Garafaxa Official Plan (**Figure 2-6**). All applications for major development proposals such as subdivisions or commercial, industrial or institutional shall be accompanied by a Water Resource Management (WRM) Report within these areas.

Figure 2-5: Township of East Garafaxa Official Plan, Schedule A



Source: WSP Socio-Economic Report, 2025

Figure 2-6: Township of East Garafaxa Official Plan, Schedule B



Source: WSP Socio-Economic Report, 2025

The Township is in support of assessing existing roads and intersections with the purpose of undertaking improvements such alignments improvements, access, and traffic flow (section 6.5 Official Plan). This correlates directly to the need for the Dufferin County Road 109 and 2nd Line Amaranth realignment.

3.0 EXISTING CONDITIONS

As **Chapter 2.0** provided an outline of the existing policies associated and influencing the EA Study, **Chapter 3.0** provides a description of the existing environmental conditions of the Study Area to inform the identification of the problems and opportunities. As described further in Section 6.1 Short List of Alternatives, at the beginning of the study there were concerns the realignment of 2nd Line Amaranth could precipitate a domino effect that might impact Study Area 1, as shown in **Figure 1-1** (i.e. Dufferin County Road 3 and Dufferin County Road 11 intersection). After PIC #1, further traffic analysis was completed (**refer to Section 3.7)** that concluded for Study Area 1 a realignment of Dufferin County Road 3 and Dufferin County Road 11 would not be required. Based on this, the Design Alternatives developed did not include any design changes to this intersection and the below existing conditions information does not include information on Study Area 1.

3.1 Socio-Economic Environment

A Socio-Economic Review Memo (**Appendix A**) was prepared in support of the Dufferin County Road 109 / 2nd Line Amaranth Realignment EA Study and informed the below **Sections 3.1.1, 3.1.2 and 3.1.3**.

3.1.1 Community Profiles

The following provides a brief overview of each community located within the study area.

Town of Orangeville

The Town of Orangeville is located at the southern edge of Dufferin County, closest to the Greater Toronto Area. It is the centre of Dufferin County's residential, commercial, and social activities and is identified as a thriving small town that aims to improve quality of life, provide jobs, housing, community facilities and business opportunities as identified in the Town's Official Plan (OP).

According to the 2021 Census (Stats Can 2021), the current population is 30,167. There has been a 4.4% population increase from 2016 to 2021.

Township of Amaranth

The Township of Amaranth is located west of the Town of Orangeville and north of the Township of East Garafraxa within Dufferin County within Dufferin County and covers an area of approximate 265 km^2. The Township includes diverse landscape features, rivers, and wetlands and is characterised with a hamlet and an agricultural community.

According to the 2021 Census (Stats Can 2021), the current population is 4,327. There has been a 6.1% population increase from 2016 to 2021.

The Township of East Garafraxa

The Township of East Garafraxa is a rural township located west of the Town of Orangeville and south of the Township of Amaranth in Dufferin County and covers an area of approximately 166 km^2. The Township aims to respect natural heritage, sense of community and the land while enhancing opportunities for growth.

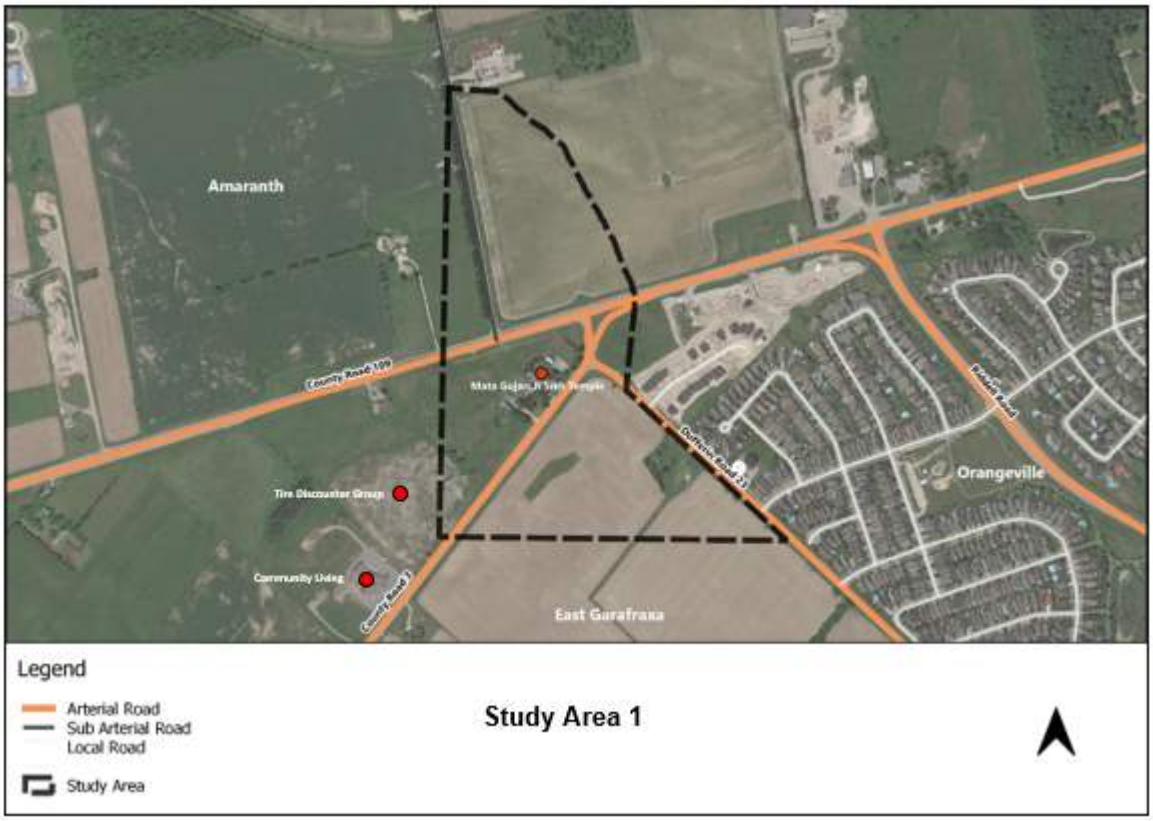
According to the 2021 Census (Stats Can 2021), the current population is 2,794. There has been an 8.3% population increase from 2016 to 2021.

3.1.2 Existing Land Use

The existing land uses within the study area are comprised of agricultural lands with rural residential properties. The study area is generally located within the intersection of Dufferin County Road 109 and the 2nd Line Amaranth, within the Township of Amaranth, Town of Orangeville and Township of East Garafraxa, as illustrated in **Figure 3-1** .The north portion of the study area is located with proximity to the Community Settlement of Farmington in the Township of Amaranth. The majority of Study Area 1 is located within the Province of Ontario's Greenbelt designated area and consists of agricultural uses. A Sikh Temple and two rural houses are located along Dufferin County Road 3 within the southwest quadrant of the Dufferin County Road 3 and Dufferin County Road 109 intersection, with commercial properties located further west on Dufferin County Road 3 adjacent to the study area. There is a newly constructed subdivision located directly adjacent to the study area in the southeast quadrant of the Dufferin County Road 23, Dufferin County Road 3 and Dufferin County Road 109 intersection in the Town of Orangeville.

There is also a potential cultural heritage property located in the southwest quadrant of the Dufferin County Road 3 and Dufferin County Road 109 intersection, further discussed in the Section 3.3.

Figure 3-1: Study Area



3.1.3 Future Land Use

The following provides a summary of the current active development applications within and / or adjacent to study area.

780 Broadway : The proposed development includes a mixed-use development comprising of four three-storey townhouse blocks containing a total of 54 dwelling units, as well as a single-storey commercial building containing approximately 920.55 square metres of commercial floor space. The development is located 75 m from the study area.

Proposed Development : There are two proposed developments within the larger parcel of land north of 109 and straddling 2nd. One is a tire distribution centre, and the other is a heavy equipment auction site.

3.1.4 Agriculture

An Agriculture Impact Assessment (AIA) was carried out in support of the Class EA Study and is included in **Appendix B**. For this study, the proposed realignment was referred to as the Primary Study Area (PSA). The PSA lands include portions of Dufferin County Road 109, 2nd Line Amaranth, Dufferin County Road 3, and Dufferin County Road 23. For the purpose of this AIA, agricultural operations and activities were evaluated in a larger area, described as the zone of impact extending for 500 m (0.5 km) beyond the boundary of the PSA. This larger area, called the Secondary Study Area (SSA), comprises 500 m (0.5km) area outside the PSA to allow for characterization of the agricultural community and the assessment of impacts adjacent to and in the immediate vicinity of the PSA.

Geographical Limits

The PSA and the SSA were located within the Dundalk Till Plain physiographic region. The Dundalk Till Plain was characterized as an area of undulating till plain. In the main part of the till plain, the flutings run southeastward. Swamps, bogs, and poorly drained areas occur in the depressional areas of the flutings.

The PSA was considered as gently undulating, with the overall topography sloping to the south, southeast. The topography of the SSA is also considered as gently undulating, with the higher elevations occurring in the west and sloping to the east. The slopes within the SSA slope down from the west to the south and the southeast.

The PSA and SSA are located between the 2700 and 2900 Crop Heat Units isolines (CHU-M1) available for corn production in Ontario.

The PSA and SSA are located in the OMAFRA Climate Zone D and have an average Frost-Free period of 130-165 days, an Average Date of Last Spring Frost of May 11, and an Average Date of First Fall Frost of October 1.

The PSA comprised approximately 68.5 percent Canada Land Inventory (CLI) capability of Class 1 – 3, with approximately 4.0 percent as Class 1, 41.1 percent as Class 2, and 23.4 percent as Class 3. Approximately 14.5 percent of the PSA was identified as Class 5 lands, with the remaining 17.0 percent identified as not rated.

The SSA comprised approximately 68.5 percent Canada Land Inventory (CLI) capability of Class 1 – 3, with approximately 9.7 percent as Class 1, 33.9 percent as Class 2, and 24.9 percent as Class 3. Approximately 13.9 percent of the SSA was identified as Class 5 lands, with the remaining 17.6 percent of the lands not rated.

Agricultural Land Use

The PSA existing land use was comprised of approximately 26.6 percent as built up/disturbed areas, 51.9 percent as common field crop (soybean, corn), 6.8 percent as forage/pasture areas, 9.5 percent as open field, 4.7 percent as scrublands, and 0.5 percent as woodland areas.

The SSA existing lands use comprised approximately 33.7 percent as built up/disturbed areas, 54.2 percent as common field crop (soybean, corn), 2.6 percent as forage/pasture lands, 4.5 percent as open field, 0.5 percent as railway, 2.0 percent as scrublands, and 2.5 percent as woodland areas.

The relatively high amount of land in non-agricultural land use is typical of areas in proximity to urban spaces and an existing road network. This amount of non-agricultural land use is expected for a study where the purpose of the project is realigning an existing road network. The closest transportation network (major roadway) is Dufferin County Road 109 (within the PSA and the SSA) and Dufferin County Roads 3 and 23.

Agricultural and non agricultural land uses are illustrated in **Figure 3-2.**

Agricultural Investment

A total of 2 agricultural buildings were identified within the SSA. No agricultural buildings were observed in the PSA. One building was a machine shed/garage, while the other building was a pole barn. Both buildings appear to be used for storage. No livestock was noted at the pole barn.

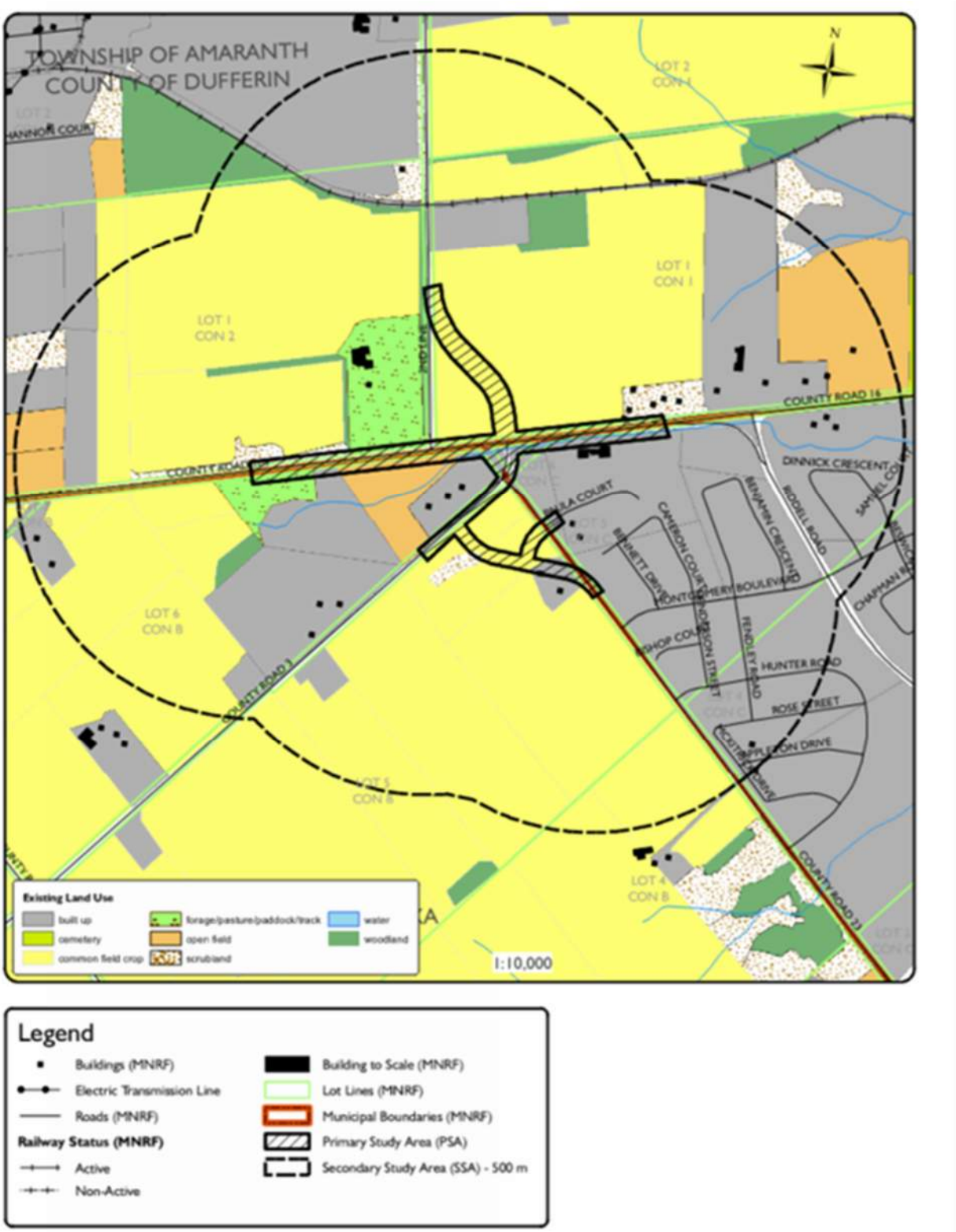
A review of the online Agricultural System Portal (OMAFRA) indicated that there were no nurseries, specialty farms (crop or livestock), frozen food manufacturing, refrigerated warehousing/storage, livestock assets or abattoirs in the PSA or the SSA.

Land Fragmentation and Severance

Land fragmentation represents a major impact to the long-term viability of agriculture in the SSA and is typical of areas under pressure from non-agricultural land uses.

The PSA included portions of the urban area of the Town of Orangeville. Additional smaller parcels were noted along Dufferin County Road 3. The review of fragmentation in the SSA revealed similar conditions with a portion of the SSA comprising small parcels within the Town of Orangeville. The parcel count for the PSA and the SSA indicates the presence of numerous small parcels, and fewer larger parcels. This type of fragmentation pattern is common in areas near urban boundaries and within the Greater Toronto Area (GTA) and Greater Golden Horseshoe (GGH) areas.

Figure 3-2 : Existing Agricultural Land Uses



3.2 Cultural Heritage Resources

3.2.1 Built Cultural Heritage

A Cultural Heritage Resource Assessment is used to describe cultural heritage landscapes (CHL) and built heritage resources (BHR). A cultural landscape is perceived as a collection of individual built heritage features and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage features are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

A Cultural Heritage Report was carried out in support of the Class EA Study and is included in **Appendix C**

A field visit was conducted on September 23, 2022, by a Cultural Heritage Specialist, to record the existing conditions of the Project Study Area. The field review was preceded by a review of available historical and current aerial photographs and maps. These photographs and maps were reviewed for any potential BHRs and CHLs that may be extant in the Study Area. The existing conditions of the Study Area are described in detail in the Cultural Heritage Report.

A desktop study and a field visit were completed to identify known and potential BHRs and CHLs older than 40 years of age located within or adjacent to the Study Area. A review was conducted to determine previously identified heritage resources documented within or adjacent to the Study Area, including listed (registered non-designated) and designated properties, heritage conservation districts and known CHLs. Six CHLs was identified in the Study Area.

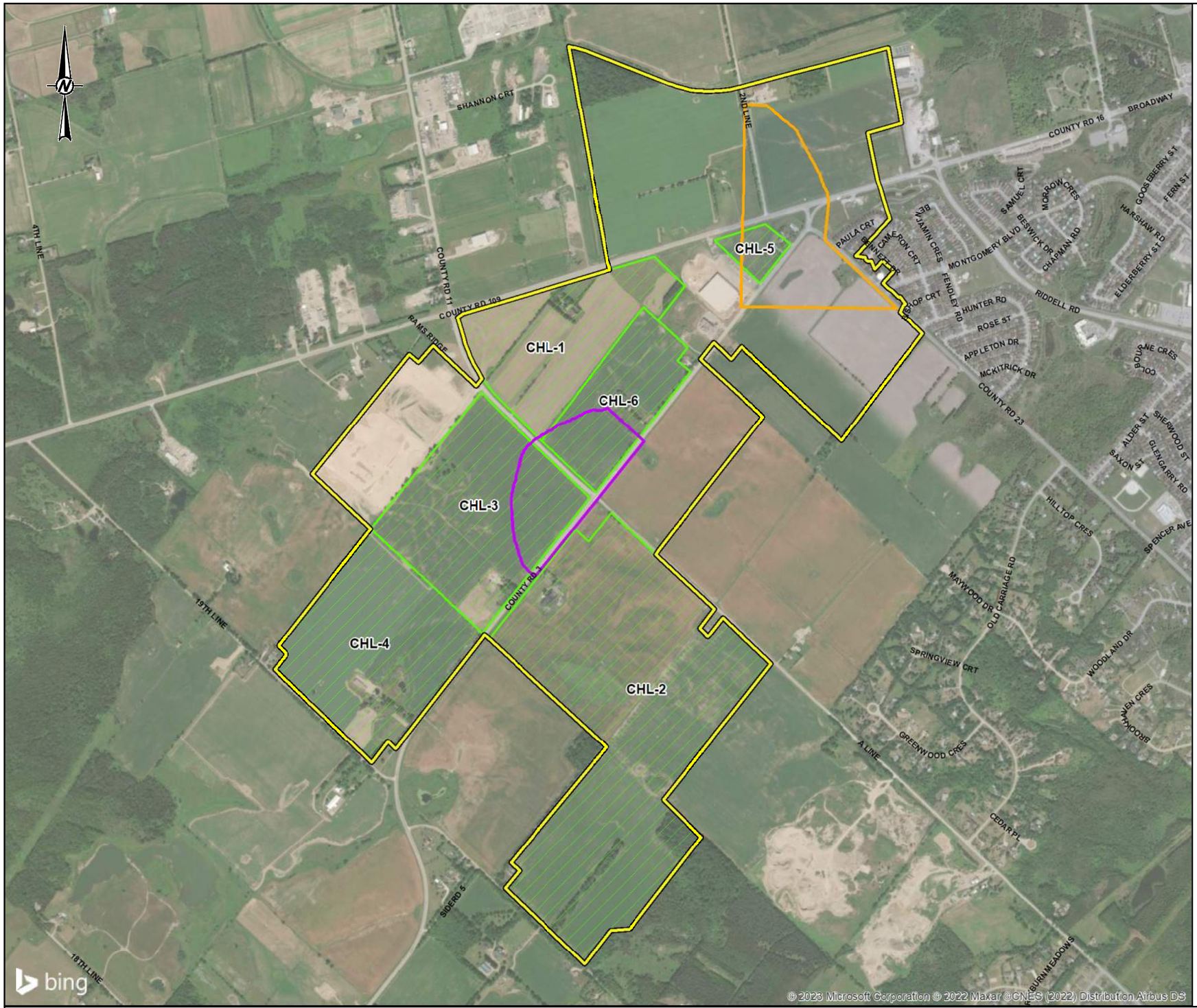
During the field review, the Study Area was examined for potential heritage resources by employing a high-level and cursory evaluation based on an understanding of the criteria identified in the MCM's Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes. As a result of this review, six CHLs and have been identified within the study area. See Section **Table 3-1** for a description of the heritage resources and refer to **Figure 3-3** for an illustration of the cultural heritage features (i.e., BHRs and CHLs) location within the study area.

Table 3-1: Description of Heritage Resources

CHL #	Type of Property	Location	Heritage Recognition	Description of Known or Potential CHVI
CHL-1	Farmstead	205328 Dufferin County Road 109	Identified during field review	The property includes a two-and-a-half storey brick house with a projecting front bay and a combination of segmentally arched and round-headed windows. The property is lined with mature trees, making it difficult to discern the configuration of the house, however, based on aerial photographs, it has a hipped roof and a one-story rear addition. Three ancillary buildings are also visible on aerial photographs.
CHL-2	Farmstead	065252 Dufferin County Road 3	Identified during field review	The property is accessed by a straight driveway, lined with mature trees. A one-and-a-half storey house and a complex of barns and silos are set back from Dufferin County Road 3 approximately 90 metres. The house is clad in vertical siding

CHL #	Type of Property	Location	Heritage Recognition	Description of Known or Potential CHVI
				and features a side-gable roof with a large front-facing addition.
CHL-3	Farmstead	065243 Dufferin County Road 3	Identified during field review	The residence on the property is a vernacular structure with Gothic Revival influence. The one-and-a-half storey house has an L-shaped plan, is clad in dichromatic brickwork. The building has decorative elements including buff brick quoins, arched-headed windows with brick eyebrow moldings and a bay window with a bellcast roof. A one-storey addition is present on the west façade. The property is accessed by a long, tree-lined driveway which provides access to two ancillary buildings which are set back approximately 80 metres from Dufferin County Road 3.
CHL-4	Farmstead	065175 Dufferin County Road 3	Identified during field review	The house on the property is set back approximately 160 metres from Dufferin County Road 3, and is accessed by a long, tree-lined driveway. Although difficult to confirm due to the mature tree cover, the house appears to be a one-and-a-half storey Ontario Cottage with Gothic influences, it is clad in red brick, has buff brick quoins and a buff brick stringcourse. The façade facing Dufferin County Road 3 is symmetrical and centrally placed entrance and a porch covered with a bellcast roof. There is a centrally placed gable in the roof peak. The photograph provided here is taken from 19th Line and is of the west elevation of the house. A large barn and an outbuilding are also present on the property, which is surrounded by active agricultural fields.
CHL-5	Farmstead	065407 Dufferin County Road 3	Identified during field review	The property contains one barn and one driveshed, they are both clad in vertical barnboard and end gable roofs. The barn appears to be partially sited on a high rubble stone foundation. A modern, one-story house of brick construction is located east of the barns. The house and barns are surrounded by active fallow agricultural fields.
CHL-6	Farmstead	065321 Dufferin County Road 3	Identified during field review	Tree-lined driveway leading to a barn with a gable roof. A one-and-a-half storey red brick house is set back approximately 110 metres from Dufferin County Road 3. The house appears to be of modern construction and has an

CHL #	Type of Property	Location	Heritage Recognition	Description of Known or Potential CHVI
				asymmetrical façade with an enclosed porch and a hipped roof.



LEGEND

- CULTURAL HERITAGE STUDY AREA
- STUDY AREA 1
- STUDY AREA 2
- CULTURAL HERITAGE LANDSCAPE

0 150 300 600

METRES

Dufferin County Road 109/2nd Line Realignment
Schedule "C" Municipal Class Environmental Assessment
Environmental Study Report

Cultural Heritage Resources

Exhibit
3-3

3.2.2 Archaeological Resources

A Stage 1 Archaeology Assessment was carried out in 2022 in support of the Class EA Study and is included in **Appendix D**. This Stage 1 archaeological assessment determined that the majority of both study areas retain archaeological potential and requires Stage 2 archaeological assessment to determine the presence/absence of archaeological resources. The results are shown in **Figure 3-4.** Areas visually confirmed to have been previously disturbed where archaeological integrity has been compromised include roadways and their associated right-of way disturbance (i.e. grading, berms, ditching), building footprints, and areas with subsurface utilities. Areas of steep slope greater than 20° are considered to have low archaeological potential. Areas with no or low archaeological potential do not require further archaeological assessment.

Figure 3-4 : Results of Stage 1 Archaeological Assessment

3.3 Natural Environment

An Environment Impact Study Report is provided in **Appendix E** and was prepared to identify the potential impacts on natural environment features and functions associated with the preferred alternative and to provide recommended mitigation measures to avoid or mitigate these potential impacts. The Natural Environment existing conditions is shown in **Figure 3-5.**

3.3.1 Surface Water Features

The Study Area is located entirely within the Credit River watershed. There is one drainage feature located within the Study Area that flows into Mill Creek, outside of the Study Area. This drainage feature runs parallel to Dufferin County Road 109 on the south side of the road. Based upon aerial photo review, this drainage feature appears to be a portion of a stormwater management system, and no water was observed during the site visit. Mill Creek is present approximately 500 m south and east of the Study Area.

3.3.2 Designated Natural Areas

Features identified as designated natural areas under municipal, provincial, or federal policy are described below. These features are illustrated on **Figure 3-5.**

Through agency consultation and the desktop and background data review the following features were identified as absent from the Study Area, and are not discussed further in this report: ANSIs, Significant Valleylands, Environmentally Sensitive Areas (ESAs), Provincial Parks, Provincially Significant Wetlands (PSWs), unevaluated wetlands, woodlands, Significant Woodlands, and natural heritage features identified under all three local official plans with jurisdiction in the Study Area, including Environmental Protection area, and Natural Core areas and Linkages. One mapped feature, Protected Countryside within the Greenbelt Plan Area, falls within the Study Area, as discussed below.

Greenbelt Plan Area

New or expanded infrastructure approved under the EA process is permitted within the Protected Countryside, however the infrastructure must avoid Key Natural Heritage Features (KNHFs) and Key Hydrologic Features (KHF) unless a need is established and there is no reasonable alternative. Where development does intrude or result in loss of KNHFs or KHFs, the impacts and disturbance must be minimized. KNHFs of the Greenbelt Plan include habitat of endangered or threatened species, fish habitat, wetlands, life science ANSI, significant valleylands, significant woodlands, SWH, and rare plant communities (e.g., sand barrens, savannahs, tallgrass prairies and alvars). KHF include permanent or intermittent streams, lakes, seepage areas and springs, and wetlands. Outside of the Greenbelt NHS, KNHF are defined by, and subject to, the policies of the PPS (MMAH 2017).

The entire Study Area is within the Protected Countryside of the Greenbelt Plan area. No portion of the Study Area is located within the Greenbelt Plan NHS.

LEGEND

- INTERMITTENT / SEASONAL DRAINAGE
- WATERCOURSE
- PREFERREDALIGNMENT OPTION 1B: SITE
- RIGHT-OF-WAY
- PREFERREDALIGNMENT OPTION 1B: STUDYAREA
- POTENTIAL BOBOLINK (THR)AND EASTERN MEADOWLARK (THR) HABITAT
- ELC COMMUNITY

CRV: RESIDENTIAL

CUM1: MINERAL CULTURAL MEADOW

CUM1-1: DRY - MOIST OLD FIELD MEADOW

HR: HEDGEROW

OAGM1:ANNUAL ROW CROPS

0 100 200 400

1:5,000 METRES

Dufferin County Road 109/2nd Line Realignment
Schedule “C” Municipal Class Environmental Assessment
Environmental Study Report

Natural Environment
Existing Conditions

Exhibit
3-5

3.3.3 Flora and Vegetation Communities

The Study Area is dominated by active agriculture, fallow fields, regional and municipal roads and associated roadsides, cultural meadows and manicured residential areas with mown grass and planted landscape trees. Natural vegetation communities are present only outside of the 120m Study Area.

A total of 52 vascular plants were identified during the survey on October 11, 2022. Of the 52 identified species, 22 (42%) are native and 30 (58%) are non-native plant species. All the observed species are listed as G5 – G4 (secure to apparently secure nationally) and S5 – S4 (secure to apparently secure provincially). None of the observed species are listed as SAR under the ESA or SARA. One species, Purple-veined Willowherb, is considered regionally rare by CVC (Kaiser 2001). All vascular plants recorded are listed in the Environmental Impact Study Report **Appendix E.**

Five vegetation units were delineated within the Study Area. All of these communities are common in Ontario (Bakowsky 1996 / NHIC). Each community is described briefly below:

- **Annual Row Crops (OAGM1):** The majority of the Study Area was active agriculture, more specifically Annual Row Crops. At the time of the single fall site visit, the fields had been harvested, and crop type was not evident. This cultural ecosite provides minimal habitat for native plants and wildlife.
- **Mineral Cultural Meadow (CUM1):** This vegetation unit consisted primarily of roadside vegetation typical of ROW areas. Ground layer species included early successional species such as Wild Carrot (*Daucus carota*), Grass-leaved Goldenrod, Common Ragweed, and more. Woody vegetation was rare within this community. Given that this unit includes ROW ditches, it also contained low lying areas with some wetland-associated species. This unit was regularly subjected to anthropogenic disturbances, including ROW maintenance and indirect impacts such as salt-spray, and therefore contained a high proportion of invasive and disturbance-tolerant species.
- **Dry-Moist Old Field Meadow (CUM1-1):** This vegetation unit consisted of larger / wider fields, one of which is located in the western portion of Study Area north and south Dufferin County Road 109, and one of which is located southwest of Dufferin County Road 23. These units appear to be former farm residential properties with some evidence of demolished or derelict buildings. The ground layer of this meadow was dominated by grasses, specifically Common Timothy, Smooth Brome, and Reed Canarygrass, with a sparse mixture of forbs similar to those listed above, including frequent Common Milkweed. Although this unit was larger and less disturbed in its interior, many of the anthropogenic influences listed above were also present along its edge.
- **Residential (CRV):** This area consisted of single-family residential dwellings, with associated horticultural vegetation including mowed turfgrass.
- **Hedgerow (HR):** The hedgerow located along the west side of 2nd Line Amaranth directly north of Dufferin County Road 109 was composed of a narrow row of large, mature Sugar Maples.

3.3.4 Wildlife

As described above, the Study Area is primarily agricultural with little nature vegetation cover providing wildlife habitat. Habitat features present in the Study Area and broader landscape include agricultural fields, fallow fields, roadsides, residential areas, semi-natural features (e.g., cultural meadows, planted trees, and hedgerows). Habitats within the Study Area show varying levels of anthropogenic disturbance. The suite of wildlife species

observed during the October 11, 2022 site visit was expected and typical of open field habitats. All of the wildlife species identified during the fall site visit are secure and common, widespread and abundant in Ontario and globally (S4 or S5; G4 or G5). The full details of species observed are provided in the Environmental Impact Study Report and its appendices.

A total of nine bird species were observed, three of which are considered Species of Interest (CVC 2010): Ruby-crowned Kinglet, Golden-crowned Kinglet , and Dark-eyed Junco. Additionally, two species are considered Species of Urban Interest; American Kestrel, and Sharp-shinned Hawk. One species is considered “area sensitive” according to SWH criteria schedules (MNRF 2015): Sharp-shinned Hawk. Given the timing of the field survey (i.e., October) all bird individuals were observed during migration and therefore observations are not an indication of suitable breeding habitat.

No mammals were recorded in the Study Area during the field survey. However, the general area likely supports a range of mammals often found in similar habitats, including Raccoon, Eastern Chipmunk, Eastern Cottontail, Grey Squirrel, Red Squirrel, Groundhog, Striped Skunk and Red Fox, as well as a number of small mammals that often go undetected (e.g., shrews, voles, mice, bats).

No amphibian or reptile species were recorded in the Study Area during the single fall site visit. The Study Area may provide habitat for common species such as American Toad and Garter Snake, however no specialized habitat types were identified, including breeding or overwintering habitats.

3.3.5 Significant Wildlife Habitat

Wildlife habitat is defined as areas where plants, animals, and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual life cycle; and areas which are important to migratory or non-migratory species (MMAH, 2020). Wildlife habitat is referred to as significant if it is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (MMAH, 2020).

No Significant Wildlife Habitat (SWH) was identified within the Study Area during the field survey and no SWH is mapped by the province within the Study Area.

3.3.6 Species at Risk

For the purposes of this report, the term SAR refers to those species listed as Endangered, Threatened and Special Concern, listed on the Species at Risk in Ontario (SARO) List (Ontario Regulation 230/08) and protected under the ESA (2007).

The following nine SAR have ‘moderate’ to ‘high’ potential to be present or to use habitat in the Study Area based on habitat suitability:

- Barn Swallow (Special Concern),
- Bank Swallow (Threatened),
- Red-headed Woodpecker (Endangered),
- Chimney Swift (Threatened) Grasshopper Sparrow (Special Concern),
- Bobolink (Threatened),
- Eastern Meadowlark (Threatened),

- Monarch (Special Concern),
- and Butternut (Endangered).

These species are each discussed in detail in the Environmental Impact Study Report in **Appendix E.**

3.4 Tree Inventory and Assessment

A Tree Impacts Memo and Tree Management Plan was completed as part of the Dufferin County Rd 109 / 2nd line Amaranth Realignment EA Study and is included in **Appendix F**.

Vegetation consists of primarily mature trees within public ROWs and private lands, and some newly planted boulevard trees.

Treed Vegetation

Trees are a mixture of planted and naturally occurring within the Study Area. Young trees planted within the boulevard of Paula Court, as well as some private trees have been maintained, while most trees have been left to mature within road ROWs or as hedgerows. Species consist of mostly native maples, with some non-native varieties. Tree sizes and age are a range from very young and newly planted, large mature trees with clear signs of decline. Vegetation composition and size is detailed below by location:

Road Right-of-Way: A total of 135 trees were inventoried within the road ROWs. 20 trees were individuals, while the remained 115 were within groupings. Trees were found to be either newly planted or established, or large mature Sugar Maple (Acer saccharum) trees. Tree sizes range from 1 to 105cm DBH. Trees are primarily deciduous with some White Cedar (Thuja occidentalis) and a mixture of native and non-native species (see Tree Impacts Memo for further information):

- Frequent: Sugar Maple (Acer saccharum), Honey-locust (Gleditsia triacanthos), Northern Red Oak (Quercus rubra);
- Occasional: Chokecherry (Prunus virginiana), Honeysuckle sp. (Lonicera sp.), Eastern White Cedar (Thuja occidentalis), Red Maple (Acer rubrum);
- Rare: European Buckthorn (Rhamnus cathartica), Japanese Tree Lilac (Syringa reticulata), Norway Maple (Acer platanoides), Silver Maple (Acer saccharinum), Ginkgo (Ginkgo biloba), Little-leaf Linden (Tilia cordata), Northern Catalpa (Catalpa speciosa), Ash sp. (Fraxinus sp.), Mountain-ash sp. (Sorbus sp.), Cherry sp. (Prunus sp.).

Private: A total of 109 trees were inventoried on adjacent properties to the ROW. 15 trees were inventoried as individual trees and the remaining 94 trees were within groupings. Tree sizes range from 10 to 100cm DBH and were generally semi-mature to mature in age. Trees were a mixture of deciduous and coniferous of primarily native species (see Tree Impacts Memo for further information).

- Frequent: White Spruce (Picea glauca), Eastern Cottonwood (Populus deltoides), Silver Maple (Acer saccharinum), Sugar Maple (Acer saccharum);
- Occasional: Manitoba Maple (Acer negundo), Norway Maple (Acer platanoids);
- Rare: Trembling Aspen (Populus tremuloides), Crabapple sp. (Malus sp.), Eastern Red Cedar (Juniperus virginiana), European Beech (Fagus sylvatica), Mountain-ash sp. (Sorbus sp.).

Condition

Overall, tree health ranges between good and poor; the majority observed to be in good to fair condition overall. Signs of decline and defects were observed in many mature trees.

Signs and symptoms of decline and defects included:

- Broken or dead leaders;
- Broken or dead limbs;
- Epicormic growth;
- Trunk wounds / cavities;
- Unbalanced crown;
- Black knot;
- Cracks in bark;
- 30 to 70% dieback or deadwood;
- Dead or dying.

3.5 Transportation

In order to assess the needs of the transportation system, the first step is to establish the condition of the existing transportation network in the study area. The following subsections provide a profile of the existing transportation network within the study area.

3.5.1 Existing Road Network

The following section describes the existing conditions of the roadways within the EA project limits. **Figure 3-6.** shows the general location of this project.

Figure 3-6: Study Area

3.5.1.1 Dufferin County Road 109

Dufferin County Road 109 is an arterial road that runs east-west within the Environmental Assessment (EA) project limits. The posted speed on County Road 109 is 80km/hr. The existing cross section from west of 2nd Line Amaranth to east of Dufferin County Road 11 intersection consists of two eastbound lanes that merge to one east bound lane 870m east of Dufferin County Rd 11 and two westbound lanes. The existing cross-section changes east of 2nd Line Amaranth to introduce a dedicated east bound right-turn lane to southbound right-turn slip lane onto Dufferin County Road 3 and a center two-way left-turn lane east of Dufferin County Rd 3. In current conditions, the intersections of 2nd Line Amaranth and Dufferin County Road 3 are both stop-controlled.

3.5.1.2 2nd Line Amaranth

2nd Line Amaranth is a rural two-lane local road with a posted speed of 50km/hr. 2nd Line Amaranth runs north-south and terminates at the southern limit of Dufferin County Road 109 with stop-controlled T-intersection.

3.5.1.3 Dufferin County Road 3

Dufferin County Road 3 is a rural collector road that runs southwest and northeast within EA study limits. The existing cross section consists of one lane in each direction with a posted speed of 80km/hr. Dufferin County Road 3 terminates at the southern limit of Dufferin County Road 109 with stop-controlled T-intersection and free-flow northbound to eastbound right turn slip lane.

3.5.1.4 Dufferin County Road 23 (B Line)

Dufferin County Road 23 is a rural collector road that runs southeast and northwest within EA study limits. The existing cross section consists of one lane in each direction with posted speed of 60km/hr. The posted speed in the vicinity of the intersection with Paula Court and Dufferin County Road 3 intersection is 50km/hr and south of Paula Court is 60km/hr. Dufferin Country Road 23 terminates at Dufferin County Road 3 with a stop-controlled T-intersection.

3.5.1.5 Paula Court

Paula Court is a two-lane local urban road section with a posted speed of 40km/hr. Paula Courts services a local development and is connected to Dufferin County Road 23 through stop-controlled T-intersection.

3.5.2 Transit

Transit does not presently operate in the study area.

3.5.3 Active Transportation

There are no existing cycling facilities or provisions for cyclists within the study area.

3.6 Traffic

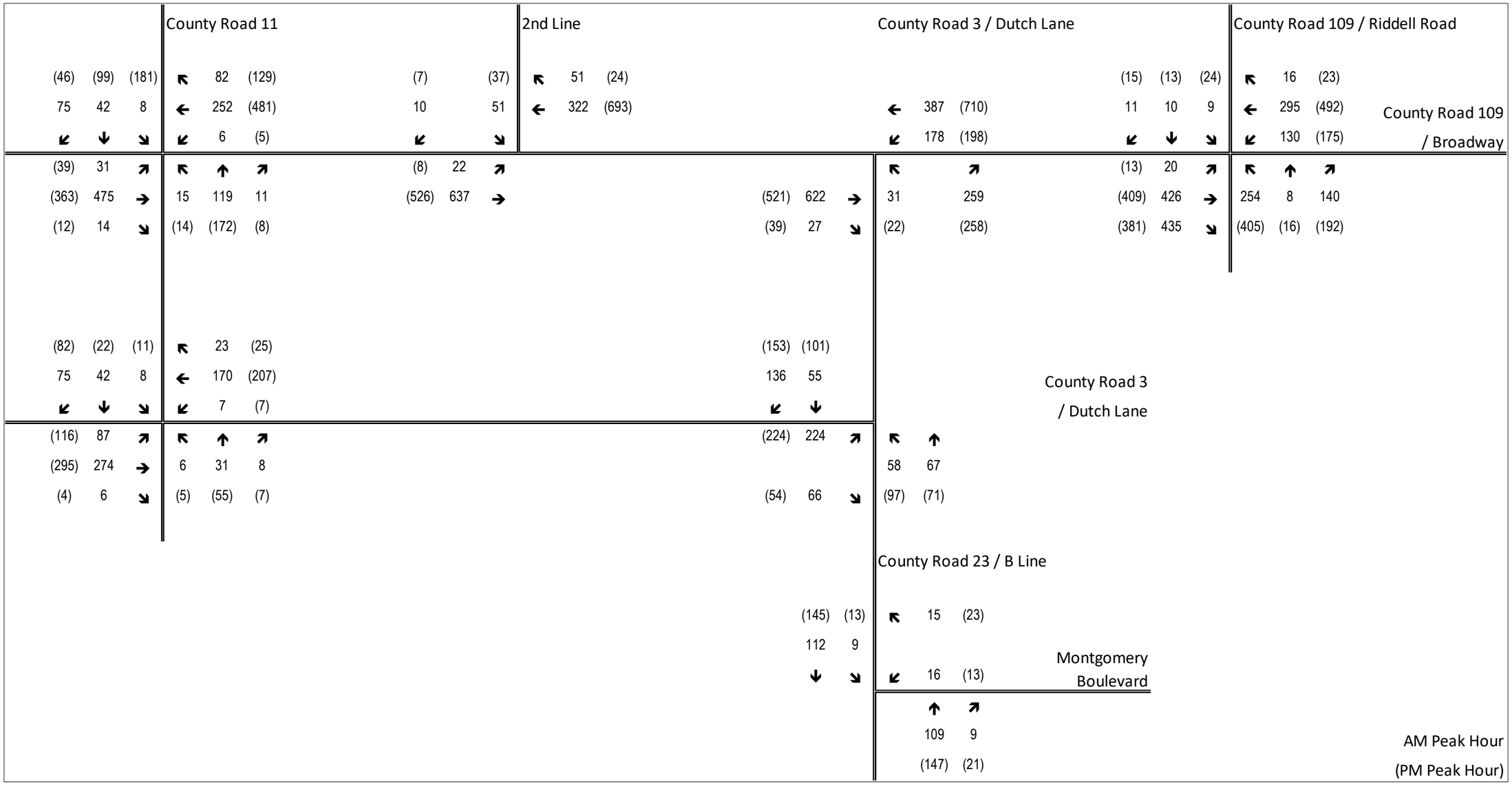
3.6.1 Existing Conditions

As part of this EA Study, a traffic analysis report was carried out for the existing (2022) conditions and is available in **Appendix G.**

Turning movement counts, including vehicles, pedestrian and bicycle volumes were collected by Ontario Traffic Inc. for the study area intersections. The traffic data were collected on Thursday, September 22, 2022, for a twelve-hour period that included the morning and evening peak period conditions. Weekday AM and PM peak

hour volumes were taken from the counts collected as a basis for traffic operations analysis. The existing AM and PM peak hour volumes used in the analysis are summarized in **Figure 3-7.**

Figure 3-7: Existing Traffic Volumes



Based on the analysis for the existing traffic operations, each intersection operates at an overall (Level of Service) LOS C or better. All individual movements at the intersections operate at a LOS E or better Intersection movements experiencing higher delays and queuing include the following:

- Dufferin County Road 109 and Riddell Road – under existing conditions, the V/C ratio of the northbound left turn is 0.83 during the AM peak hour and 0.98 during the PM peak hour, respectively approaching and exceeding the MTO critical V/C threshold. The PM peak hour queues extend to 120m, slightly longer than the available storage of 110m.
- The eastbound through movement into Orangeville on Dufferin County Road 109 approaching Riddell Road in the weekday AM peak hour is a heavy movement. This shows the commuter stream to work and school entering Orangeville in the mornings during the week. While there is adequate storage length to accommodate the queue under existing conditions, queue impacts are expected to grow with future traffic growth.
- Dufferin County Road 109 and 2nd Line Amaranth – under existing conditions, the southbound approach will operate at a LOS D during both the AM and PM peak hours. With low volumes on this approach the queues will remain short (typically one car), but delays will be higher as a result if having to wait for gaps in traffic to turn onto Dufferin County Road 109.
- Dufferin County Road 109 and Dufferin County Road 3 – under existing conditions, the northbound left turn will operate with delays corresponding to LOS E during the AM and PM peak hours. With low volumes making this movement the delays and V/C ratios will remain low, but delays will be higher as a result if having to wait for gaps in traffic to turn onto Dufferin County Road 109.

3.6.2 Future Conditions

Analysis of future traffic operations has been undertaken to reflect two future horizon scenarios:

- 2027, corresponding to five years after existing conditions and the anticipated implementation of the proposed road modifications and associated development to the north;
- 2041, corresponding to the County's Transportation Master Plan medium-term planning horizon.

Traffic volumes for the selected horizon years have been projected using a growth rate of 1.5% per year, based on projected population growth for Orangeville in the Dufferin County Official Plan (2017). Current AADT data for Dufferin County Roads 109 and 3 from Dufferin County were also reviewed, but it is noted that limited historical data was available for the segment of Dufferin County Road 109 between Dufferin County Road 11 and Riddell Road. 10-year growth rates since 2012 on Dufferin County Road 109 outside of this segment range between 0.8% east of Riddell Road and 2.7% west of Dufferin County Road 11; it is noted that the higher growth west of Dufferin County Road 11 is influenced by a high post-COVID increase in traffic volumes that was not observed in traffic volumes on the other segments approaching Orangeville. Historical data on Dufferin County Road 3 indicates a 10-year annual growth of 1.0%.

Based on a review of the historical traffic growth, the 1.5% based on projected population increase in Orangeville was maintained for the projection of future traffic volumes, as this provides a conservative estimate of volumes on Dufferin County Roads 3 and 109 closer to Orangeville in the event that the post-COVID recovery in traffic volumes observed further to the west results in a sustained increase to the 2041 horizon.

2027 and 2041 traffic volumes were calculated from the baseline 2022 traffic counts using the 1.5% growth rate defined above. The proposed development to the north off of 2nd Line Amaranth was not considered as part of future background traffic as is it is contingent on the proposed road modifications; this development will be considered as part of future total traffic in the analysis of the road modification alternatives.

The Rasha Soami Society has completed construction a large worship facility on Dufferin County Road 11 between Dufferin County Roads 3 and 109 in 2021. A Traffic Impact Study (TIS) for this proposed development prepared by C.C Tatham & Associates Limited prepared in September 2016 was provided as part of the background information for this study. The TIS report indicates that weekly events held on Sundays will attract up to 3,000 people, with annual events that will draw even larger crowds. While the traffic analysis in the TIS indicates notable traffic impacts during Sunday peak periods before and after these events, there were no weekday impacts anticipated and given the isolated nature of the incidents and number of alternative routes to and from the site available, no additional road improvements were proposed. It is assumed that all weekday traffic generated by the site is included in the traffic counts collected in September 2022; Sunday impacts have not been reviewed as part of this study.

There were no additional developments identified in the study area to be considered as part of future background analysis, and thus the projected future background volumes are based on annual traffic growth only.

The projected 2027 and 2041 traffic volumes are summarized in **Figure 3-8 and 3-9**, respectively.

Figure 3-8: 2027 Future Background Traffic Volumes

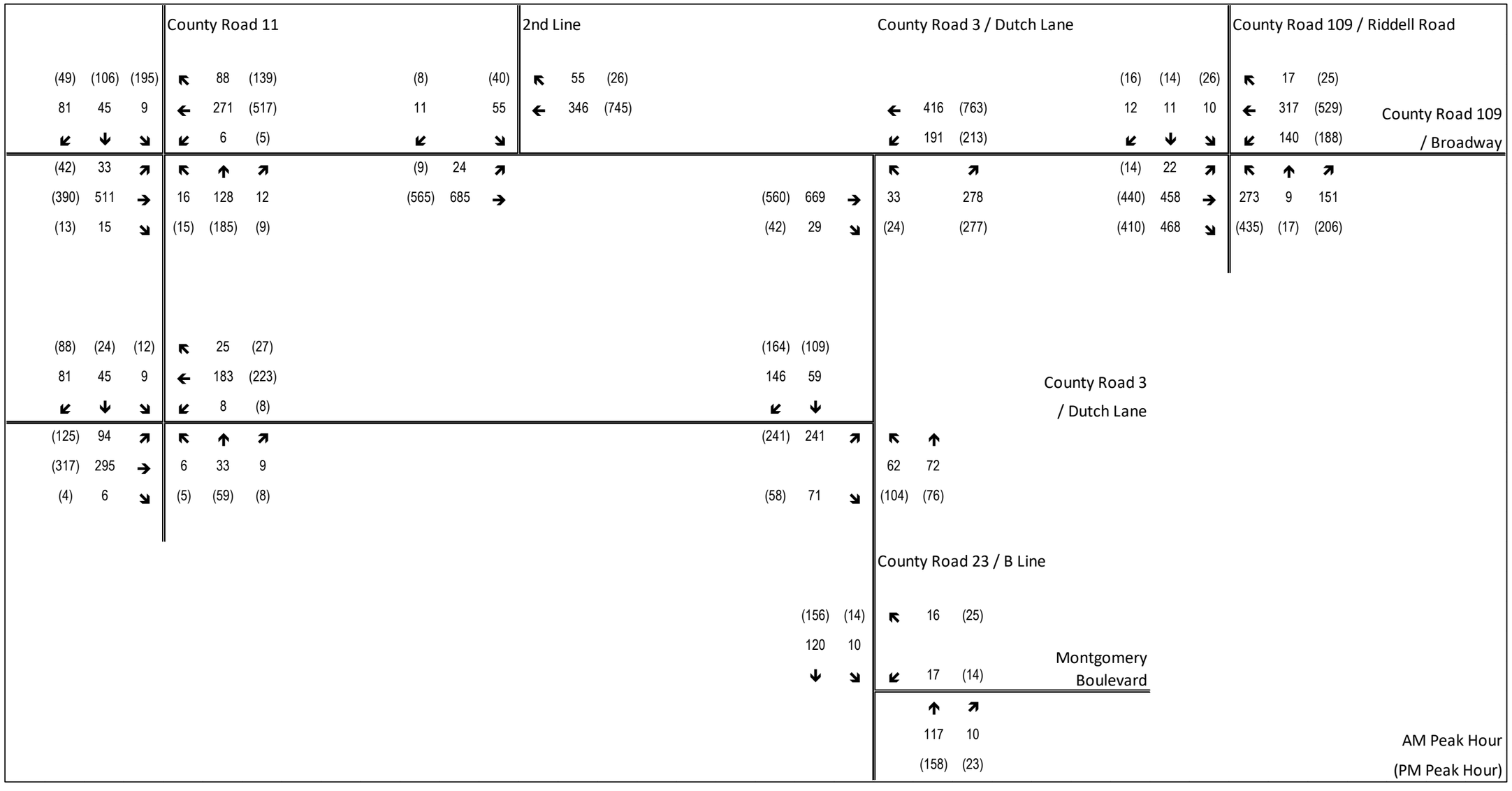
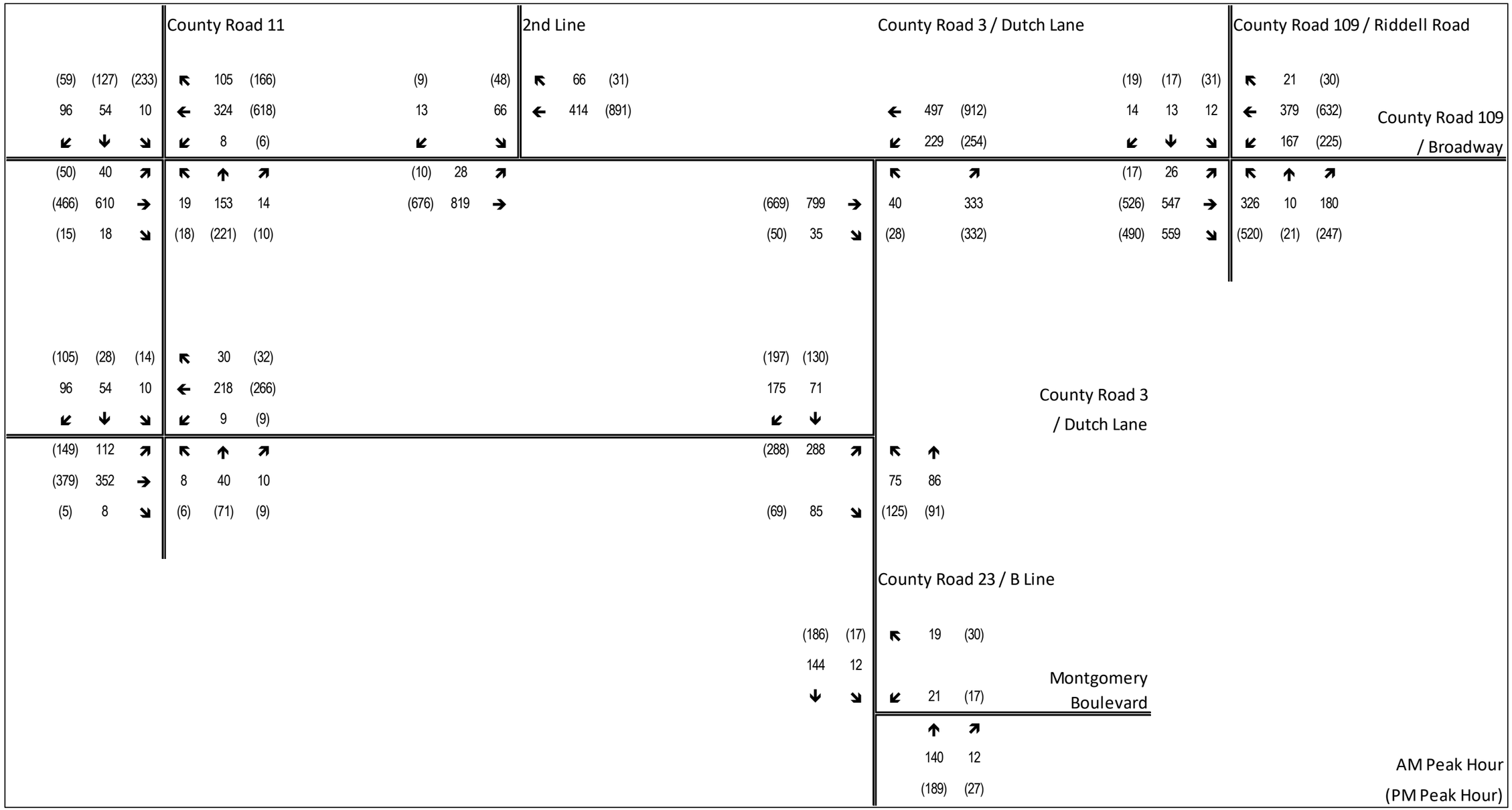


Figure 3-9: 2041 Future Background Traffic Volumes



Analysis of future background traffic volumes has been undertaken using Synchro-11 to provide analysis results for the 2027 and 2041 horizon years.

Based on the analysis by the 2041 planning horizon, all of the intersections in the study area are expected to operate at an overall LOS of D or better. However, with the future growth in traffic there will be a number of individual traffic movements that will meet or exceed the MTO critical V/C threshold of 0.85, or will result in delays that result in a LOS F. These movements include the following:

- Dufferin County Road 109 and Dufferin County Road 11 – by 2041, the southbound left/through movement will operate at a LOS E during the AM peak with a V/C ratio of 0.95; the PM V/C ratio will also be a critical at 0.91. AM and PM peak hour queues will extend to approximately 120m; these will extend beyond the adjacent 55m right turn lane and driveways of GT Auto.
- Dufferin County Road 109 and 2nd Line Amaranth – the southbound approach to this intersection from 2nd Line Amaranth will reach a LOS E by 2027 and LOS F by 2041 during the PM peak hour, primarily as a result of the delays from additional through traffic along County Road 109 conflicting with this movement. Options for additional traffic control to mitigate this operation will be assessed in the analysis of road network alternatives in the following section.
- Dufferin County Road 109 and Dufferin County Road 3 – the northbound left turn at this intersection will reach F during the AM and PM peak hours by 2027. Similar to the southbound movement at 2nd Line Amaranth, this increase will primarily be a result of the growth in through traffic along County Road 109 and fewer gaps to make the unsignalized movement from the side approach. Options for additional traffic control to mitigate this operation will be assessed in the analysis of road network alternatives in the following section.
- Dufferin County Road 109 and Riddell Road – the northbound left turn, currently near capacity in existing conditions, is expected to exceed capacity during the PM peak hour by 2027 and during both the AM and PM peak hours by 2041. With the eastbound and westbound movements approaching congestion as well, there will be limited opportunities to fix this through signal timing modifications.
- Dufferin County Road 3 and Dufferin County Road 11 and A Line – the stop-controlled northbound and southbound approaches will operate at a LOS D by 2027 and LOS E by 2041 during both the AM and PM peak hours. While queues will be short, vehicles at these movements will experience extensive delays as they wait for gaps in the traffic along Dufferin County Road 3.

3.7 Drainage and Stormwater Management

A Drainage and Stormwater Management Report was completed as part of the Dufferin County Rd 109 / 2nd Line Amaranth Realignment EA Study and is included in **Appendix H**.

There are four crossing culverts and 10 entrance culverts within the study area that convey external drainage areas as well as roadway runoff.

Under existing conditions, runoff from 2nd Line Amaranth, Dufferin County Road 3, and most of Dufferin County Road 23 is conveyed through ditches and culverts. Within the study limits, Dufferin County Road 3 and 23 drains north through the ditches towards Dufferin County Road 109. The runoff is then collected by ditch inlets at the Dufferin County Road 109 and Dufferin County Road 3 intersection. These ditch inlets are connected to the existing storm sewer.

The runoff from 2nd Line Amaranth is either conveyed south through ditching towards Dufferin County Road 109 or sheet flows into the field east of 2nd Line Amaranth.

Runoff from Dufferin County Road 109 is draining east towards the Dufferin County Road 109 and Dufferin County Road 16 intersection. On the west side of the study limits drainage is captured and conveyed through ditches and culverts until it reaches one of the two ditch inlets connected to the existing storm sewer. One of the ditch inlets is located on the south side of the road at the Dufferin County Road 3 intersection and the other is located on the north side of Dufferin County Road 109 approximately 438 m from 2nd Line Amaranth. Any runoff east of the Dufferin County Road 3 intersection will be captured by catch basins and be conveyed through the storm sewer.

The majority of the external catchments south of Dufferin County Road 109 are draining north, except for catchments 160 and 170 which are draining south. Most of the catchments north of Dufferin County Road 109 and west of 2nd Line Amaranth are draining towards the east except for catchment 111 which is draining south.

The sewers outlet to a stream located south of Dufferin County Road 16 and east of the Dufferin County Rd. 16 and Dufferin County Road 109 intersection. There are four crossing culverts and 10 entrance culverts within the study area.

Hydrologic modelling is used to simulate the hydrologic response of the drainage area during the design storms.

A hydrologic model was developed for the 2-year to 100-year design storms in the study area to determine peak flow runoff rates that would occur during flood events. The hydraulic modelling assessed for the following, and further details on the parameters and results of the study can be found in the Drainage Report, in **Appendix H**:

- Design Storm
- Rainfall IDF Parameters
- Storm Distribution

3.8 Hydrogeology

A Hydrogeological Assessment was prepared in support of this EA Study and can be reviewed in **Appendix I**. The objective of the desktop hydrogeological assessment study was to provide relevant background information regarding the groundwater conditions of the Study Area.

A summary of the groundwater conditions includes:

- The surficial geology consists of till with clay, sand, gravel, and silt layers. The areas of clay are expected to behave as aquitards, whereas areas of sand are expected to behave as aquifers. The sandy areas could present zones of increased recharge and/or permeability.
- Bedrock is not hydrogeologically significant with respect to the Dufferin County Road 109 and 2nd Line Amaranth realignment project.
- Project is within wellhead protection areas for the Orangeville Municipal Wells. There are no sensitive surface water features or wetland features within either Study Area boundary.
- Located within an issue contributing area where sodium and chloride from road salt are the unwanted substances of concern.

- Located in a Significant Groundwater Recharge Area (SGRA), or an area where precipitation recharges the groundwater source or aquifer.
- Located within a Highly Vulnerable Aquifer (HVA), or an area with an underground water supply that can easily be contaminated because overlaying soil layers are thin or permeable.
- Groundwater levels are expected to be approximately 10-25 mbgs surface.
- The MECP WWR database indicated that there are forty-two well records in the study area. All identified well records are shown on **Figure 3-10.** A review of the well records indicates that twenty-seven wells are considered water supply wells, four wells are reported as abandoned or not used, nine wells are classified as test and observation wells, and two wells are reported as unknown. Only twenty-eight of the wells are bedrock wells screened in either the limestone or dolostone bedrock units. Static water levels for the bedrock wells range from approximately 5-36 mbgs, with an average of 19.5 mbgs. Five wells are considered overburden wells based on the reported lithology. A single overburden well has a reported static water level of 7.9 mbgs. Additional wells appear to be overburden wells; however, the lithology surrounding the well screens cannot be confirmed due missing lithology details within the WWRs.

N

7266443
1702237
2ND LINE
1705245
SHANNON COURT
1702408
1705892
1700003
1705871
7045637
BROADWAY
1700004
COUNTY ROAD 16
1700002
7266444
7331767
1700001
1702065
7266640
1706380
1706375
1700124
CK CRESCENT
MORROW CRESCENT
Mill Creek
1704823
1704864
BESWICK DRIVE
CHAPMAN ROAD
1700118
7390185
1703285
7288649
1704642
7170407
1701356
7200867
COUNTY ROAD 109
7288650
1704690
1704691
1705658
MONTGOMERY BOULEVARD
7288651
1705800
BISHOP COURT
FENDLEY ROAD
HUNTER ROAD
RIDDELL ROAD
1700117
COUNTY ROAD 3
7142831
1700122
ROSE STREET
1700930
APPLETON DRIVE
7041707
MCKITRICK DRIVE
1703536
1704889
7234100
COUNTY ROAD 23
COUNTY ROAD 21
ALDER STREET
bing

LEGEND:

- STUDY AREA 1
- 500 m STUDY AREA BUFFER
- MECP WATER WELL

0 50 100 200 300
Metres

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MECP Water Well Locations

Exhibit
3-10

3.9 Contamination

A Contamination Overview Study (COS) was prepared in support of this EA Study and can be reviewed in **Appendix K**. The objective of the COS is to identify actual and potential sources of environmental liabilities associated with the current and historical operations of the properties present within the Study Area and within 300 m of the Site.

The scope of work undertaken for this COS included the following tasks:

- Review of available historical environmental reports related to the Study Area, where available, including existing environmental reports (if any, to be provided by the client);
- Review of available historical aerial photographs available from the National Air Photo Library for the Study Area; Aerial photographs were used to assist in the determination of the first developed use in the Study Area, identify structures and buildings, and provide information with respect to land use over time;
- Review of topographic, physiographic, and geological maps for the Study Area. These sources were reviewed to obtain information regarding the stratigraphy of the underlying soil and to assist in identifying areas of potential environmental concern, such as above ground storage tanks (ASTs), pipelines and cemeteries and the potential for the migration of subsurface contaminants;
- Review of information available from the Technical Standards and Safety Authority (TSSA) for selected properties in the Study Area;
- Review of database information from EcoLog Environmental Risk Information Services (ERIS) Ltd. The comprehensive database provides information with respect to above and underground storage tanks, waste disposal sites, polychlorinated biphenyl storage, compliance, convictions and spills, incidents recorded in the National Pollutant Release Inventory, the Inventory of Coal Gasification Plants, notices and instruments including RSCs, and landfill information;
- Review of the water well records available through the Ontario Ministry of the Environment, Conservation and Parks (MECP);
- Review of available historical fire insurance plans (FIPs), if any available, to confirm the development history of the Study Area. This information was used to assess the historical occupants in the Study Area, the historical presence of underground storage tanks, and general development;
- Conduct a windshield site reconnaissance and visually inspect the Site and Study Area to assess current conditions to evaluate the potential for impacts to soil and ground water. Photographs were taken to support pertinent observations;
- Identify Areas of Potential Environmental Concern (APECs) associated contaminants of potential concern (COPCs), and potentially impacted media (soil, groundwater and/or sediment) based on visual observations and background information. A qualitative ranking of potential contamination associated with the identified APECs within the Study Area will be provided; and
- Document findings within a COS Report and provide recommendations and comment on the need for additional investigations such as Phase 1 Environmental Site Assessments.

WSP performed a field assessment comprised of a windshield-level survey of the Site and Study Area for the COS on October 24, 2022. The purpose of the inspection was to document land uses and business operations that may represent a potential source of site contamination within the Site and Study Area (e.g., gas stations, automobile repair facilities, and industrial operations). WSP requested Permission-To-Enter (PTE) to property owners with properties within the Site. At the time of the site reconnaissance, WSP received two PTEs for properties within the Site 1 and were able to conduct a comprehensive exterior inspection of the two properties, if applicable. The remaining Site observations were made from publicly accessible lands. Any inferences regarding the presence or absence of Site contamination are strictly based on visual observations made from the roadside in the publicly accessible areas.

The results of the inspection show that land uses in the Study Area consists of a mixture of agricultural, residential, community, institutional, commercial, light industrial land uses, vacant lands and roadways.

No actual sources of contamination were identified during the Site reconnaissance.

Based on the findings of this report, APECs have been identified within the Study Area. The APECs correspond to locations where potentially contaminating activities (PCAs) were identified at the Site or within the Study area that have the potential to impact soil and/or groundwater quality within the Site, according to Ontario Regulation 154/04, as amended. APECs with high, moderate, and low potential for contamination are summarized in the sections below. The APECs are shown in the tables below. PCAs leading to APECs of high and moderate potential for contamination for the Site are shown on **Table 3-2** and **Table 3-3**.

Table 3-2*:* APECs with High Potential for Contamination

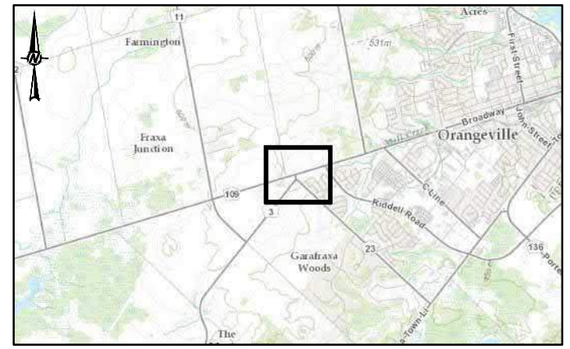
APEC	Location of APEC on Site 2	Potentially Contaminating ActiVity	Location of PCA	APEC Descrition
1	Dufferin County Road 109, Dufferin County Road 23, Dufferin County Road 3, 2nd Line Amaranth	#30 - Importation of Fill Material of Unknown Quality (30-A)	On-Site and Off-Site	Fill material of unknown quality was likely imported to the Site 2 during historical construction activities and used as a base beneath paved areas on Site 2 and within the Study Area 2.
2	Dufferin County Road 109, Dufferin County Road 23, Dufferin County Road 3, 2nd Line Amaranth	N/A - Application of De-icing agents under conditions of snow and ice (NA-A)	On-Site and Off-Site	The application of de-icing agents under snow and ice conditions for road maintenance is likely conducted on roadways, road shoulders, and roadside drainage areas within the Site 2 and Study Area 2.
3	65418 Dufferin County Road 3 at the southwestern corner of the intersection of Dufferin County Road 109 and Dufferin County Road 3	PCA # 28 – Gasoline and Associated Products Storage in Fixed Tanks (28-A)	On-Site	Above ground fuel storage tank was observed at the northeastern edge of the property. Due to the distance of the AST from publicly accessible locations, WSP was unable to assess the condition of the tank or surrounding vegetation.
4	Part of 511286 Dufferin County Road 23 at the	#30 – Importation of Fill Material of	On-Site	Fill material of unknown quality may be present at and surrounding the

APEC	Location of APEC on Site 2	Potentially Contaminating ActiVity	Location of PCA	APEC Descrition
	southeastern portion of the Site	Unknown Quality (30-B)		historic locations of the buildings at the property.

Table 3-3 : APECs with Moderate Potential for Contamination

APEC	Location of APEC on Site 2	Potentially Contaminating ActiVity	Location of PCA	APEC Descrition
5	Western-central portion of the Site, on the south side of Dufferin County Road 109, east of 2nd Line Amaranth	#55 – Transformer Manufacturing, Processing and Use	On-Site	A pole mounted transformer is located on Site 2. No evidence of odours or staining was observed at the base of the transformer. The likelihood for soil and groundwater contamination from the pole mounted transformer at the Site is moderate.
6	The intersection of Dufferin County Road 3 and Dufferin County Road 109	NA-2 - Spills	On-Site	A coolant spill of 10 litres was identified at Dufferin County Road 3 and Dufferin County Road 109, East Garafraxa, due to a dump truck accident on January 9, 2019. Environmental impact was not identified.

KEY MAP



SCALE 1:100,000

LEGEND:

- SITE 2 BOUNDARY
- BUILDING FOOTPRINT
- APEC 1
- APEC 2
- APEC 3
- APEC 4
- APEC 5
- APEC 6
- (#) PCAs CONTRIBUTING TO APEC
- (#) PCAs CONTRIBUTING TO APEC
- TANK CONTRIBUTING TO APEC

APEC	PCA	COPC	Significance of APEC
1	30-A	Metals and Inorganics, PHCs, BTEX	High
2	NA-A	EC, SAR	High
3	28-A	PHCs, BTEX	High
4	30-B	Metals and Inorganics, PHCs, BTEX	High
5	55	PCBs, Metals	Moderate
6	NA-B	Ethylene Glycol	Moderate

0 35 70 140
METRES

Dufferin County Road 109/2nd Line Realignment
Schedule "C" Municipal Class Environmental Assessment
Environmental Study Report

Areas of Potential Environmental Concern

Exhibit **3-11**

3.10 Air Quality

As part of the EA, an Air Quality Impact Assessment (AQIA) is required to document the existing air quality and evaluate the impact of traffic related air pollution (TRAP) concentrations in the Study Area, this report can be found in **Appendix L**. The AQIA is based on information available at the time of the assessment and any future modification would be subject to assessment during the future design stages.

Based on the assessment of existing conditions, the existing air quality in the Study Area is considered good as the air quality criteria are met for the indicator contaminants. Existing sources of air emissions in the Study Area include industrial activities, roadways, long-range transboundary air pollution, and small regional sources. Based on existing ambient monitoring data, air quality in the Study Area is considered good as the air quality criteria are met for the indicator contaminants selected for this assessment.

Twenty (20) industrial facilities were identified within 1 km of the Study Area. Expected emissions are accounted for in the ambient air quality of the Study Area. Two (2) sensitive receptors as well as residential dwellings and areas of residential development have been identified within 300 m of the Study Area. From a Greenhouse Gas (GHG) perspective the Dufferin County Community GHG Inventory Report for 2016, which is the latest GHG inventory report available for the County, reported 215,499 tonnes CO2eq (carbon dioxide equivalent) from the transportation sector. This accounts for approximately 0.1% of the 2016 Ontario total GHG inventory.

3.11 Noise

A Noise Assessment Report was conducted as part of the Project to document the noise impact of the proposed realignment of County Road 109/2nd Line Amaranth.

The objective of the study is to predict the relative change in noise impacts from Future “Build” resulting from operational improvements (i.e., road realignment) and from Future “No-Build” from road traffic at locations adjacent to the Noise Sensitive Areas (NSAs) within the Study Area.

The noise impact from a transportation corridor depends on several source parameters (i.e., traffic volume, speed, road surface, etc.) and the location of the noise receptors.

A NSA is defined as a noise sensitive land use with an Outdoor Living Area (OLA) associated with it. NSAs include:

- Private homes such as single-family residences;
- Townhouses;
- Multiple unit buildings, such as apartments, with OLAs for use by all occupants; and,
- Hospitals and nursing homes where there are OLAs for patients/residents.

NSAs within the Study Area were identified based on a review of land uses and aerial imagery. A total of nine receptors were identified as representative of all NSAs within the Study Area. These receptors represent the OLAs. The receptor locations are shown in the Noise Assessment report in **Appendix M.**

4.0 PROBLEMS AND OPPORTUNITIES

The problem and opportunity statement addresses Phase 1 of the EA process and clearly defines why the project is being undertaken. There is a proposed development located near Dufferin County Road 109 and 2nd Line Amaranth. As part of the development and mentioned in Section 1 of the ESR, 2nd Line Amaranth is proposed to be realigned as the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. This realignment could precipitate a domino effect on traffic impacting other intersections in the surrounding area. T
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- Enhance safety of all users and modes of transportation in the surrounding area.
- Accommodate existing and future traffic demands.

5.0 IDENTIFICATION OF ALTERNATIVE SOLUTIONS

As part of Phase 2 of the MCEA process, reasonable and feasible solutions to the problem and opportunities (outlined in **Section 4** of the ESR) are identified and evaluated based on their ability to resolve the issues, and their impacts to the socio-economic, natural, cultural, and technical environments.

5.1 Description and Evaluation of Alternative Solutions

The following alternative solutions were originally identified to address the problems and opportunities identified in **Section 4:**

- 'Do Nothing'
- Improve and Expand Transit Service (Transportation Demand Management)
- Improve and Expand roadways within the study area
- Construct a new roadway
- Construct realignment alternatives within the study area

A description and evaluation of each alternative solution is outlined in the below sections and summarized in **Table 5-1**.

Table 5-1: Alternative Solutions Evaluation Table

Alternative Solutions Evaluation		
Do Nothing	While the 'Do Nothing' alternative would not involve capital costs and would not impact the environment or private property, it also does not address the problem statement concerns of forecasted traffic congestion and safety concerns within the study limits.	Carried forward (for comparison)
Improve and Expand Transit Service (Transportation Demand Management)	Enhancing transportation demand management measures may reduce vehicle demand in the study area to a certain degree. Expanding transit service would not necessarily increase transit ridership to a point of decreasing vehicle traffic demand enough to not require any further improvements to the roadways.	Set Aside
Improve and Expand roadways within the study area	Widening roadways within the study area addresses the forecast vehicle capacity constraints to a certain degree but does not address improvements of the flow of traffic and safety concerns.	Set Aside

Alternative Solutions Evaluation		
Construct a new roadway	Constructing a brand new roadway that presently does not exist in the study area would not be ideal due to the property impacts and constraints of the other roadways in the study area.	Set Aside
Construct realignment alternatives within the study area	Constructing realignment alternatives of current roads within the study area would address the forecasted traffic congestion by directing the traffic flow appropriately to ease congestion and addresses safety concerns in the current study area.	Carried Forward

5.1.1 Do Nothing

“Do Nothing” is considered the status quo, maintaining the existing intersection alignment as is, in which the intersection alignment would be limited to the implementation of approved municipal, regional, and provincial initiatives. To maintain the status quo at the intersections studied would result in generally acceptable conditions. Stop-controlled movements at 2nd Line Amaranth and at Dufferin County Road 3 do experience delay. While the Do Nothing alternative would not involve capital costs and would not impact the environment or private property, it also does not address the problem statement concerns of forecasted traffic congestion and safety concerns within the study limits. The ‘Do Nothing’ alternative was carried forward and considered as a baseline in the evaluation of the alternative solutions for the Project.

5.1.2 Improve and Expand Transit Service (Transportation Demand Management)

This alternative includes enhancing transportation demand management measures that may reduce vehicle demand within the study area to a certain degree. Expanding transit service would not necessarily increase transit ridership to a point of decreasing vehicle traffic demand enough to not require any further improvements to the roadways. Generally, the County would likely require additional improvements in the future and/or continue with routine service maintenance to the intersection within the Study Area. As such, this alternative solution was set aside.

5.1.3 Improve and Expand Roadways

This alternative includes the widening of roadways within the study area which addresses the forecast vehicle capacity constraints to a certain degree although it does not address improvements of the flow of traffic and safety concerns. A primary problem of the project is the current safety concerns (for motorists, pedestrians and active transportation users), as well as the forecast of traffic congestion in the Study Area. As such, this alternative solution was set aside.

5.1.4 Construct a New Roadway

This alternative includes the construction of a roadway that is entirely new and not existing in the study area. It would not be ideal due to the property impacts, constraints imposed on adjacent roadways, as well as increased environmental impacts in the Study Area. As such, this alternative solution was set aside.

5.1.5 Construct Realignment Alternatives to Intersection

This alternative includes constructing realignment alternatives of current roads/ intersections within the study area would address the forecasted traffic congestion by directing the traffic flow appropriately to ease congestion and addresses safety concerns within the current study area. As such, this alternative solution was carried forward for further technical development and evaluation.

5.2 Preferred Alternative Solution

In conclusion, based on the review of the alternative solutions, "**Constructing realignment alternatives within the study area**" is the preferred alternative solution as it addresses the forecasted traffic congestion and improves safety.

6.0 DESIGN ALTERNATIVES

Phase 3 of the Municipal Class EA process involves the assessment and evaluation of design alternatives. Having established the need for the project (**Section 4**) and selected a Preferred Alternative Solution (**Section 5**) this next phase involved the development and evaluation of design alternatives for the study area.

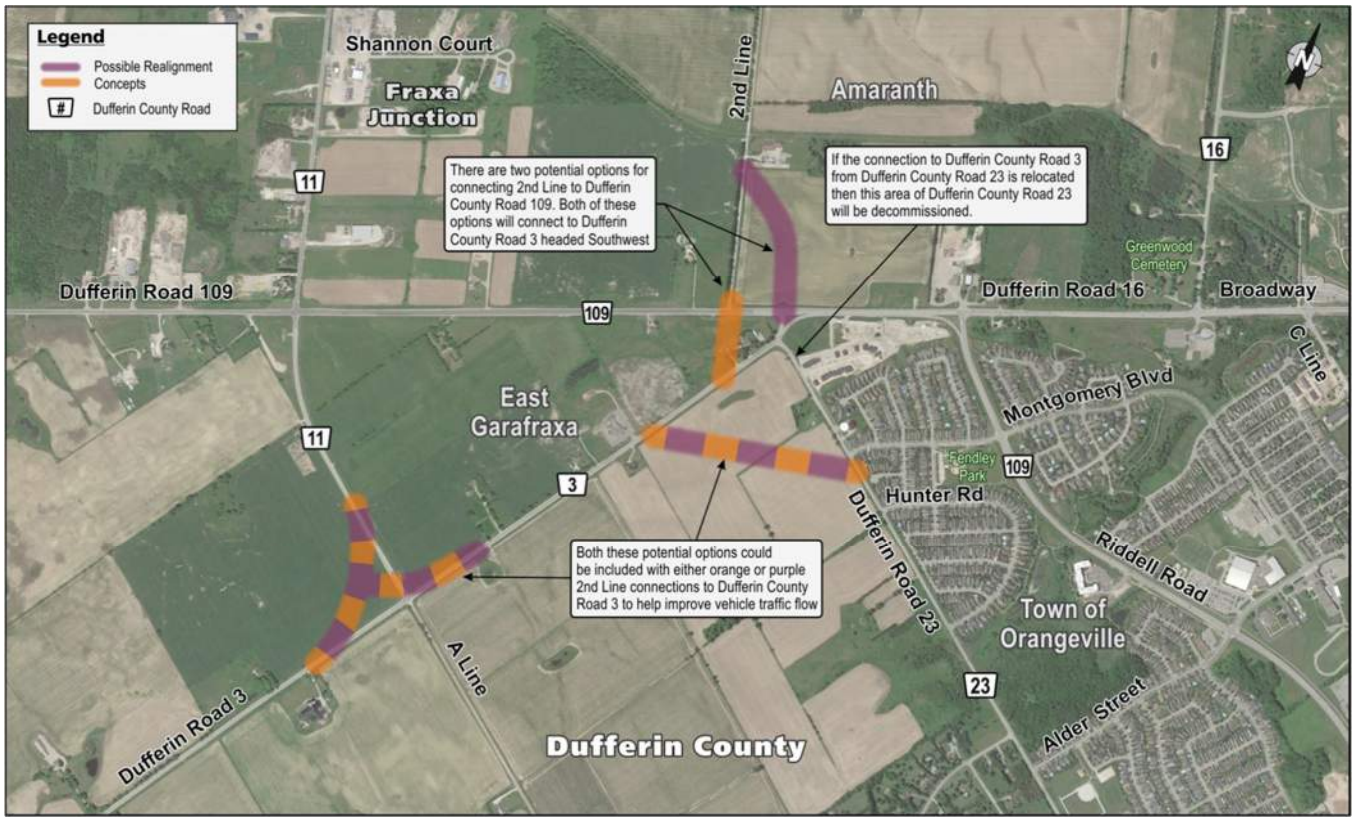
Phase 3 for this Class EA study involved the following activities:

- Development and Screening of the Long List of Alternatives;
- Development of the Short List of Alternatives;
- Identification of evaluation criteria and weighting for evaluation of alternatives;
- Evaluation of Short List of Alternatives;
- Consider feedback received at Public Information Centre #2; and
- Selection of the Technically Preferred Alternative.

6.1 Development and Screening of the Long List of Alternatives

Public Information Centre (PIC) #1 in December 2022 presented possible design concepts that were being considered as shown on **Figure 6-1**. It was noted potential combinations of these options would be carried forward to develop the alternative designs for evaluation.

Figure 6-1: Realignment Concepts from PIC #1



At the beginning of the study there were concerns the realignment of 2nd Line Amaranth could precipitate a domino effect that might impact Study Area 1, as shown in **Figure 1-1** (i.e. Dufferin County Road 3 and Dufferin County Road 11 intersection). After PIC #1 further traffic analysis was completed (**refer to Section 3)** that

concluded for Study Area 1 a realignment of Dufferin County Road 3 and Dufferin County Road 11 would not be required. Based on this, the Design Alternatives developed did not include any design changes to this intersection.

The Project Team then developed a long list of possible alternatives based on feedback from PIC #1 and the forecasted traffic.

The following alternatives, Option 1a (**Figure 6-2**), 2a (**Figure 6-3**), 2b (**Figure 6-4**) and 3a (**Figure 6-5),** from the long list of alternatives were not carried forward for evaluation for the below mentioned reasons.

Figure 6-2: Option 1a

Option 1a creates Dufferin County Road 23 as the main through road. It was not carried forward because it creates a dead end at Dufferin County Road 3. This is not ideal for several reasons including the impacts for the properties on this road, including the East Garafraxa Township Office.

Figure 6-3: Option 2a

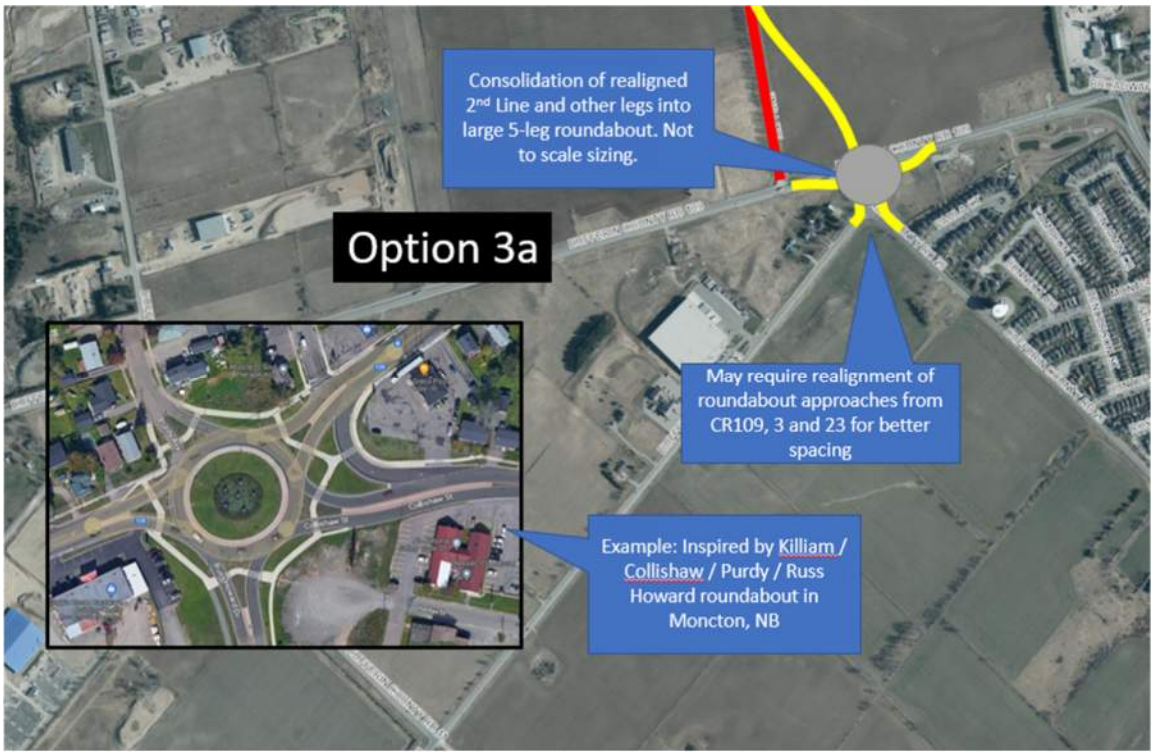
Option 2a was not carried forward as it also creates Dufferin County Road 23 as the main through road which is not preferred.

Figure 6-4: Option 2b

Option 2b was not carried forward due to geometry concerns with the Dufferin County Road 23 connection to Dufferin County Road 3. Additionally, there is not enough storage space on Dufferin County Road 3 to support forecasted traffic volumes and would cause queueing that would block Dufferin County Road 23.

It can be noted that Option 2c (**Figure 6-7**) is a more ideal version of extending 2nd Line Amaranth south to Dufferin County Road 3 and was carried forward for evaluation.

Figure 6-5: Option 3a

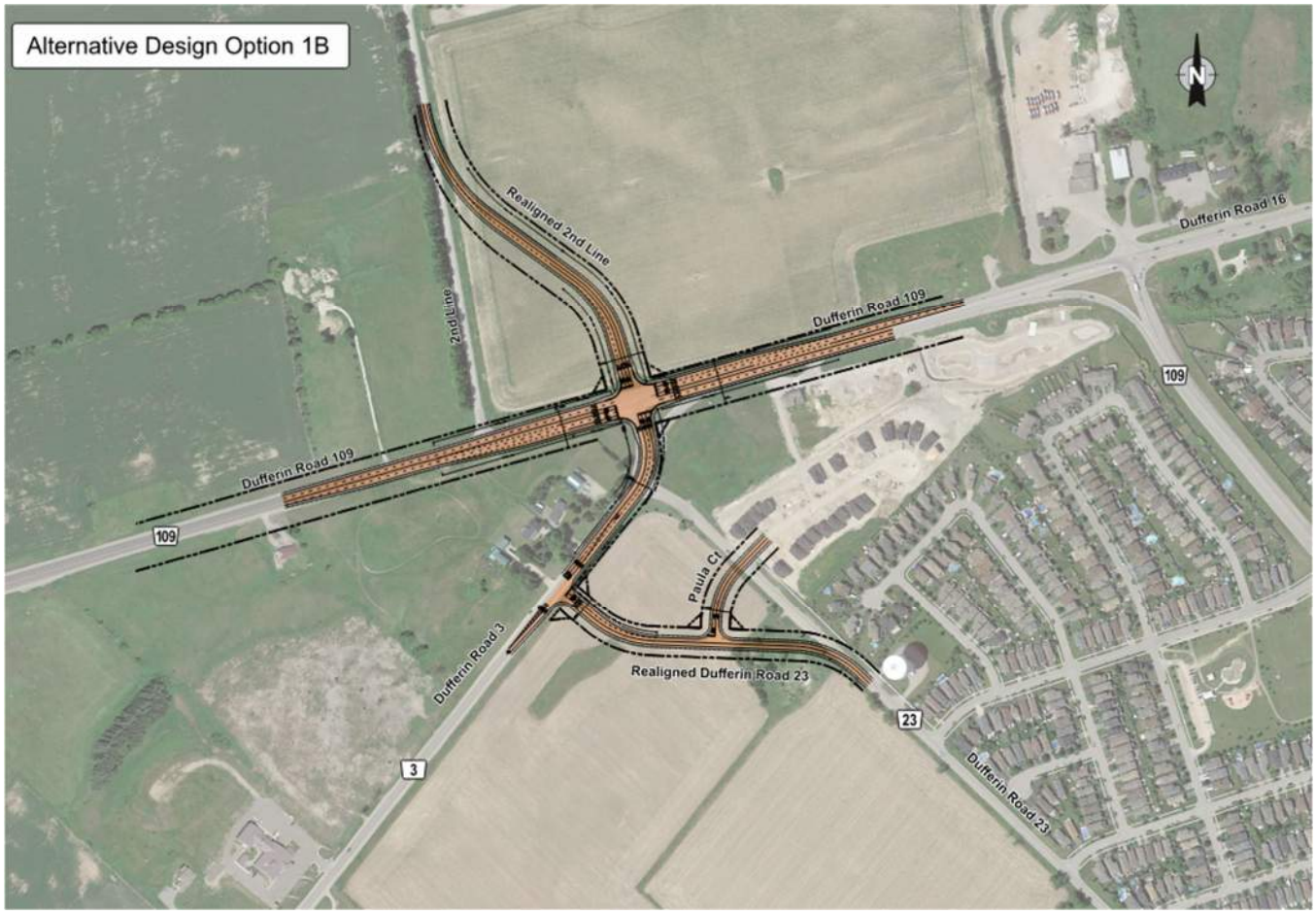


Option 3a is a 5-leg roundabout. This alternative was not carried forward as this large roundabout would have a significant impact to property and the surrounding area. There would also be a high flow of uncontrolled traffic into adjacent controlled intersections. In addition to this, traffic analysis revealed that due to existing and projected traffic distribution amongst each of the 5 legs, a roundabout would not function adequately. Ultimately this scenario would operate in a similar manner to stop-controlled for the minor legs due to restrictive volumes on the major, higher volume legs (the east-west vehicle traffic on Dufferin County Road 109). Excessive delays would be expected for vehicular traffic on the north and south approaches as they wait for a gap to enter the roundabout. For a roundabout to function properly, traffic volumes on each leg should be reasonably balanced.

6.2 Short List of Alternatives

Figures 6-6 to 6-8 depicts the short list of alternatives that were carried forward for evaluation. Option 0 is the Do Nothing option that is carried forward as a comparison against the design alternatives.

Figure 6-6: Option 1b: 2nd Line Amaranth Realignment (Dufferin County Road 23 Diverted to Dufferin County Road 3)



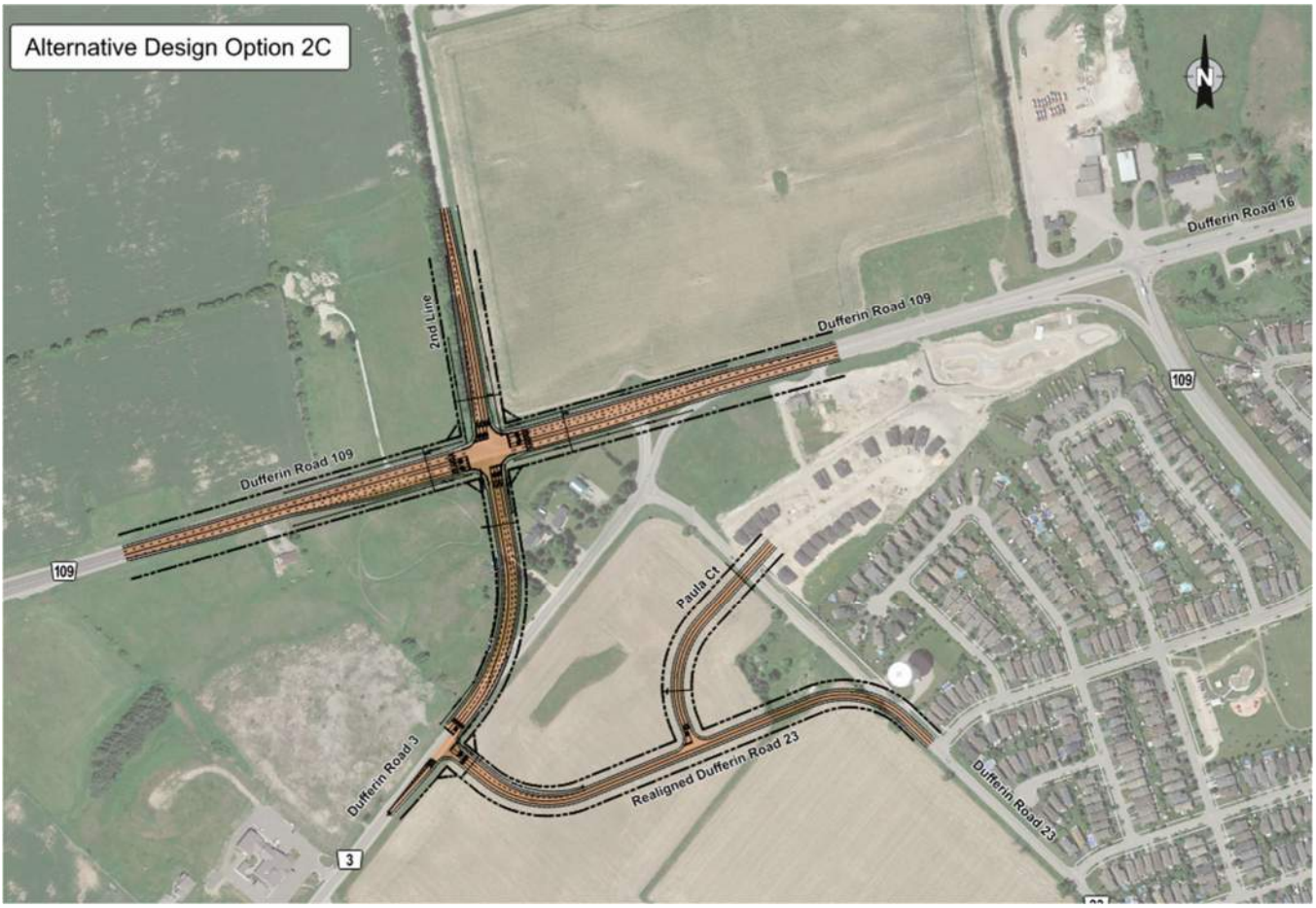
Option 1b (**Figure 6-6**) includes the realignment of 2nd Line Amaranth to the east to intersect with Dufferin County Road 109 opposite the existing alignment of Dufferin County Road 3. Dufferin County Road 23 will also be realigned to intersect with Dufferin County Road 3 approximately 135m west of its original alignment, in order to increase spacing between the two intersections. The consolidation of 2nd Line Amaranth / Dufferin County Road 3 / Dufferin County Road 109 into a new signalized intersection will include the following elements:

- The removal of the existing northbound right turn channel on Dufferin County Road 3 and reconfiguration of the northbound approach with separate left, through and right turn lanes.
- Widening of Dufferin County Road 109 in both directions approaching the consolidated intersection to provide two through lanes as well as left and right turn lanes in each direction at the consolidated intersection.
- Widening of the realigned 2nd Line Amaranth to provide separate left, through and right turn lanes at the consolidated intersection.

Road network modifications will also include the following:

- Widening of the realigned Dufferin County Road 23 to provide separate left and right turn lanes at the intersection with Dufferin County Road 3.
- Widening of Dufferin County Road 3 to provide a southbound left turn lane to Dufferin County Road 23.
- The extension of Paula Court to intersect with the realigned Dufferin County Road 23 at a new unsignalized intersection.

Figure 6-7: Option 2c: Dufferin County Road 23 Realignment (Dufferin County Road 3 Continuous)



Option 2c (**Figure 6-7**) includes the realignment of Dufferin County Road 3 to intersect with Dufferin County Road 109 opposite the existing alignment of 2nd Line Amaranth. Similar to Option 1b, this alternative will also include the realignment of Dufferin County Road 23 to meet Dufferin County Road 3 at a new intersection approximately 320m south of Dufferin County Road 109, and the extension of Paula Court to meet the realigned Dufferin County Road 23. All relocated intersections in Option 2c including the consolidated intersection of 2nd Line Amaranth / Dufferin County Road 3 / County Road 109 are proposed with identical lane configurations as were presented in Option 1b.

Figure 6-8: Option 3b: Roundabout (4 legs)

Option 3b (**Figure 6-8**) is based on a similar road configuration as Option 1b with the realignment of 2nd Line Amaranth to meet Dufferin County Road 109 opposite Dufferin County Road 3, but with the consolidated intersection of 2nd Line Amaranth / Dufferin County Road 3 / Dufferin County Road 109 configured as a roundabout instead of a signalized intersection.

Preliminary analysis indicated that a single lane roundabout will not be sufficient to accommodate the projected future traffic volumes, as such the Option 3 road network includes the following elements:

- A two-lane roundabout at the intersection of 2nd Line Amaranth / Dufferin County Road 3 / Dufferin County Road 109 to accommodate anticipated traffic volumes.
- Two-lane approaches on Dufferin County Road 109 configured as a shared left-through and through-right lane approaching the roundabout.
- Single lane approaches on the northbound approach from Dufferin County Road 3 and southbound approach from 2nd Line Amaranth, with additional auxiliary lanes added approaching the roundabout for the northbound right and southbound left turns. This configuration will also remove the existing northbound channelized right turn lane from Dufferin County Road 3.

- Identical lane configurations at the relocated Dufferin County Road 3 / Dufferin County Road 23 and Dufferin County Road 23 / Paula Court intersections as were proposed in Option 1b.

6.3 Evaluation Criteria

In evaluating the short list of design alternatives presented in Section 6.2, several key factors and design elements were considered. The evaluation criteria and their weightings are outlined in **Table 6-1.**

Table 6-1: Evaluation Criteria and Weightings

Factor/Indicator	Weighting	Rationale
Natural Environment Impacts to wildlife, terrestrial resources, water resources, contamination, Species at Risk	Medium	Natural environment features are not prominent in the study area.
Socio-Economic Environment Impacts to private properties and accesses, future land uses and operations, noise and air quality	High	Socio-economic is located in a built environment and it is desirable to minimize property requirements and potential impacts on residences, agricultural operations / lands and properties
Cultural Environment Impacts to potential built and cultural heritage resources/landscapes, potential archaeological resources	Medium	Given the study area is actively used for farming, commercial or other active purposes, the archaeological potential is considered low. There are potential heritage resources in the area.
Transportation/Technical Impacts to predicated future traffic, resilience to extreme events and emergency responses, goods and service movements, active transportation, road user safety and traffic operations	High	Transportation has a high importance because the overall purpose of the project is to accommodate existing and future traffic demands.
Costs Construction and property acquisition costs	High	Construction costs are required while minimizing property acquisition costs where possible.

6.4 Summary of Short List of Alternatives

Table 5-3 summarizes the evaluation that took place on the short list of alternatives. The detailed evaluation table can be found in **Appendix J.**

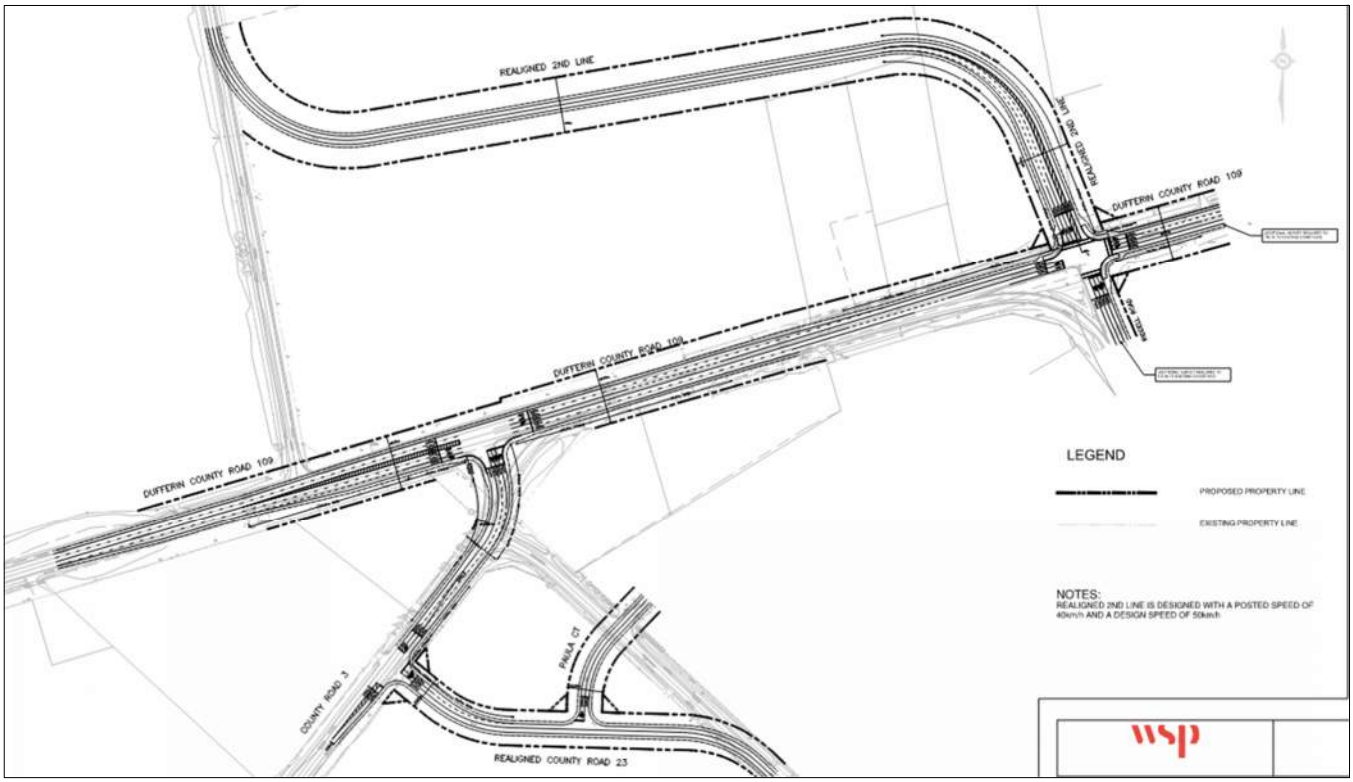
Table 6-2: Summary of Evaluation of Short List of Alternatives

Factor	Option 0: Do Nothing	Option 1b: 2nd Line Amaranth Realignment (CR23 Diverted to CR 3)	Option 2c: CR 23 Realignment (CR3 Continuous)	Option 3b: Roundabout (2nd Line, CR 3, 23, and 109)
Natural Environment				
Evaluation				
Summary	Option 0 is the preferred alternative because there are no impacts to the natural environment. Option 1b and 3b are next preferred option with minimal and minor impacts to vegetation and wildlife. Option 2c has potentially suitable nesting habitat for two Threatened Species at Risk (Bobolink and Eastern Meadowlark) which makes this the least preferred option. All alternatives have similar impacts to contaminated properties and groundwater.			
Socio-Economic Environment				
Evaluation				
Summary	Option 0 is the preferred alternative because there are no impacts to property and future land uses as well as minimal potential noise and air quality impacts. Option 1b is next preferred because it has the least impacts to property, future land uses, and has reduced potential noise impacts. Option 2c and Option 3b are least preferred because of their impacts to property, future land uses, potential noise impacts and potential impacts to air quality.			
Cultural Environment				
Evaluation				
Summary	Option 0 is the preferred option with no impacts on built heritage resources, cultural heritage landscapes and potential archeological resources. Option 1b is the next preferred option given there is no direct impacts on the built heritage resources or cultural heritage landscapes. Options 1b, 2c and 3b require a Stage 1-2 archeological assessment. Option 2c results in the demolition of a potential cultural heritage resource and is the least preferred option.			
Transportation/Technical				
Evaluation				
Summary	Option 1b and Option 2c are tied as the preferred option based on the transportation evaluation given the acceptable level of service for all impacted movements for the roads in each direction. Option 0 does not solve the current concerns with traffic and safety and increases potential delays and surges in traffic. Option 3b does not accommodate future traffic volumes well, would need special design elements to account for heavy truck volumes, and is difficult for cyclists to navigate.			
Costs				
Evaluation				
Summary	Option 0 is preferred with no design to implement but does not solve the overall goal of the study. Option 1b and 2c are the next preferred option with similar costs. Option 3b has the highest cost.			
Overall Evaluation				
Evaluation	**SET ASIDE**	**PREFERRED**	**SET ASIDE**	**SET ASIDE**
Summary	Although having the least direct impacts and the lowest cost, the “Do Nothing” alternative does not achieve the overall goal of the study (to enhance safety through the realignment of the intersection).	Option 1b is the preferred option because of its minimal and minor impacts to the natural environment, minor impacts to socio-economic environment, and has no impacts to the cultural environment. From a traffic perspective, this option supports increases in traffic safety especially in light of projected future traffic volumes, ease of pedestrian crossings, and the potential for integration of cycling facilities in the future. The option has similar costs to Option 2c.	From a transportation and technical perspective Option 1b and 2c are tied but Option 2c has more negative impacts in all the other categories assessed. Option 2c has potential impacts to two threatened Species at Risk, has socio-economic environment impacts and has negative impacts to the cultural environment. Option 2c is similar in cost to Option 1b but has a larger amount of additional property required.	From a transportation and technical perspective, Option 3b does not accommodate future traffic volumes without future design changes. Option 3b is least preferred from a socio-economic perspective because of its impacts to property, future land uses, potential noise impacts and potential impacts to air quality. Option 3b has the highest costs.

6.5 Feedback at PIC #2

The alternative figures and evaluation table outlined in **Section 6** were presented to stakeholders and the public for comment and review at Public Information Centre (PIC) #2. The Project Team received feedback from a property owner at the PIC to consider another alternative that was not previously evaluated. This option was to realign 2nd Line Amaranth through the farm field to connect to Dufferin County Road 109 / Dufferin County Road 16 / Riddell Road, as shown in **Figure 6-9.** The realignment of Dufferin County Road 23 to Dufferin County Road 3 and Paula Court extension would still apply to this alternative.

Figure 6-9: PIC #2 Additional Alternative Considered



The Project Team looked at this alternative at a high level since field work did not occur in this north/eastern portion of the farm field in this area. It was determined that since it is a longer alignment than the Preferred Option 1b it would likely have more environmental impacts, including on drainage and trees, and more construction costs. Geometrically it could also be challenging as it will require sharp curves on both ends and will have issues with sufficient length for a right-angle approach. Initial traffic analysis was done to review the option at a high level from a traffic perspective and it was concluded there is no traffic preference over Option 1b or this new option. There are also more property impacts than Option 1b. Due to the above reasons the alternative was not evaluated further and was screened out.

6.6 Preferred Alternative

Based on the evaluation outlined in **Table 6-2** and stakeholder and public feedback, the Preferred Alternative was selected as Option 1b (**Figure 6-6**). **Section 7** will describe in further detail the Preferred Alternative as the Recommended Plan for this project.

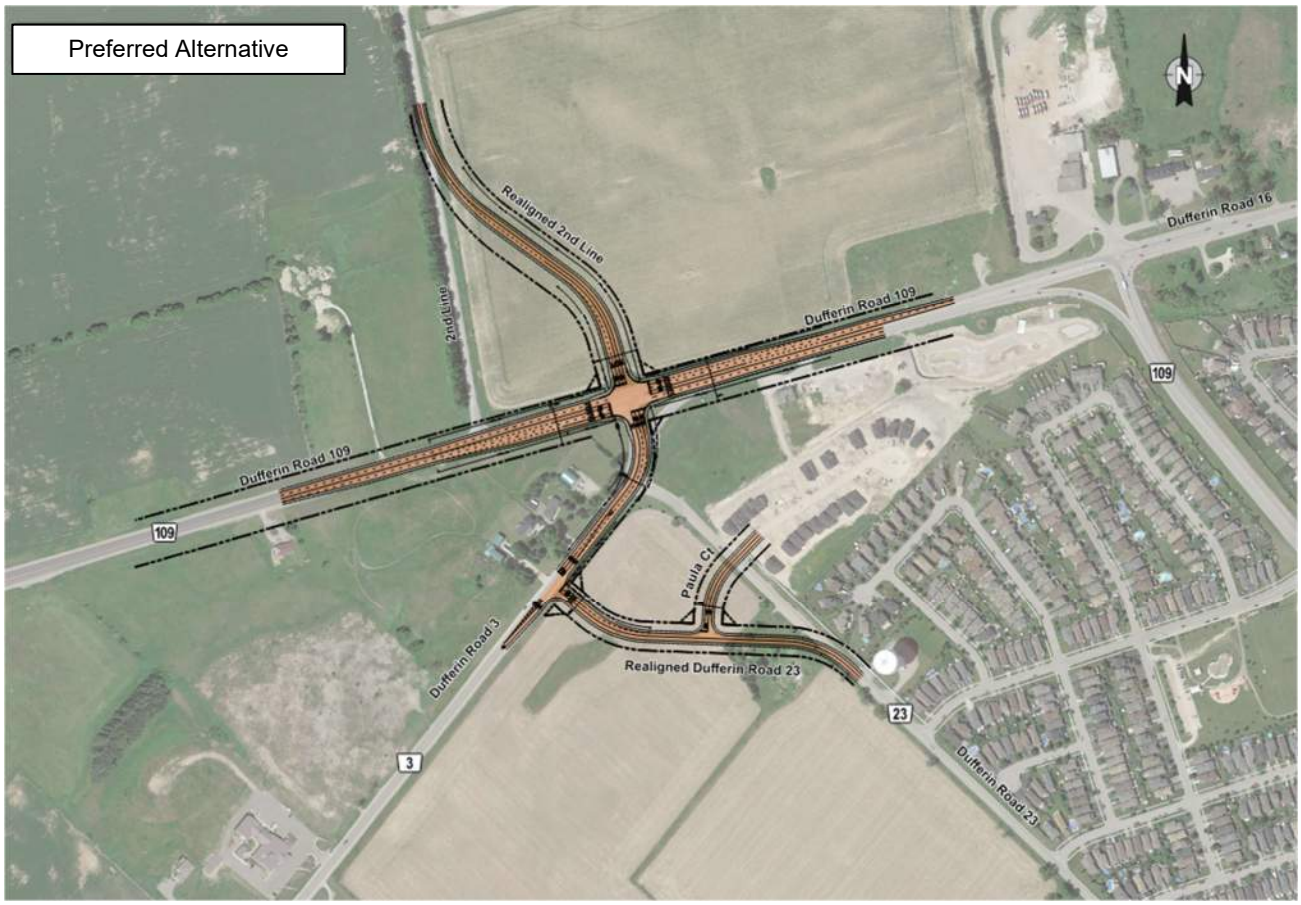
7.0 RECOMMENDED PLAN

The Recommended Plan for the study area is described in this Chapter, shown in **Table 7-1,** and is depicted on the preliminary design plan plates provided in **Appendix N**.

The Recommended Plan includes the following modifications to the following existing roads:

- 2nd Line Amaranth will be realigned to form the fourth leg of the Dufferin County Road 109 and Dufferin County Road 3 intersection. The intersection will be converted from stop-controlled to a four-way signalized intersection.
- The existing Dufferin County Road 109 will be widened to four lanes (two in each direction) with right- and left-turn lanes eastbound and westbound.
- The existing Dufferin County Road 3 will be realigned to remove the channelized northbound right turn lane and to improve the intersection geometry;
- Dufferin County Road 23 will be realigned further south of the existing Dufferin County Road 23 to ensure the intersection of Dufferin County Road 3 and Dufferin County Road 23 does not conflict with the proposed four-legged intersection. In addition, realignment of Dufferin County Road 23 provides adequate left turn storage and taper for vehicles turning left from Dufferin County Road 3 onto Dufferin County Road 23
- As a result of realigning Dufferin County Road 23 to the south, the existing Paula Court will be extended further south to maintain a T-intersection with Dufferin County Road 23.

Figure 7-1 : Preferred Alternative Road Layout



The design plan and profile are subject to further refinement during the future detailed design, at which time, there will be further consultation with relevant technical agencies, utilities, stakeholders, community groups and affected property owners.

This chapter should be viewed in conjunction with Chapter 5 of the ESR which discusses the various design alternatives evaluated and describes the approach to developing the Recommended Plan, and Chapter 8, which includes recommended mitigation measures and commitments to future work.

7.1 Design Criteria

The design criteria used for the road realignments follow the County's standard cross section for arterial, collector, local urban and rural collector roads. The criteria adhere to the Dufferin County Design and Quality Standards. The right-of-way and design speed for each road are noted in **Table 7-1**. The design speed is reflective of the speed near the intersections in the design and is due to the curvature of the design road. These design speeds do not necessarily reflect the midblock design speed away from the intersections, where the design and posted speed may be different, and, if different, typically higher.

Table 7-1: Key Design Criteria

Road	Right of Way	Design Speed
Dufferin County Road 109	47 m	70 km/h
2nd Line Amaranth	47 m	50 km/h
Dufferin County Road 3	30 m	40 km/h
Realigned Dufferin County Road 23	30 m	40 km/h
Paula Court	30 m	40 km/h

7.2 Typical Road Cross-Section

Figure 7-2 – Figure 7-6 illustrates the proposed typical road cross-sections for the roads in the Preferred Plan. Paula Court will be reviewed further in Detail Design for potential updates to an urban cross section (i.e. including sidewalk/pedestrian access to Dufferin County Road 23).

Figure 7-2: Dufferin County Road 109 Typical Cross Section

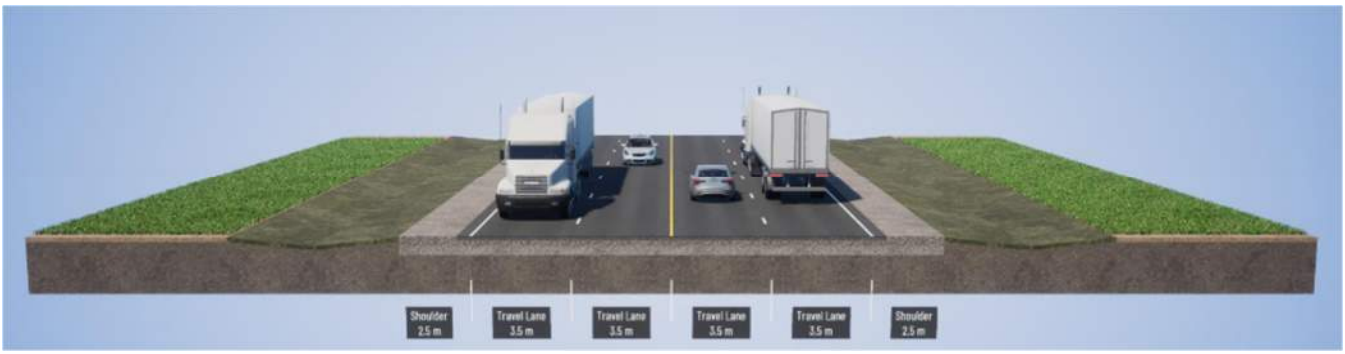


Figure 7-3: Re-aligned 2nd Line Amaranth Typical Cross Section

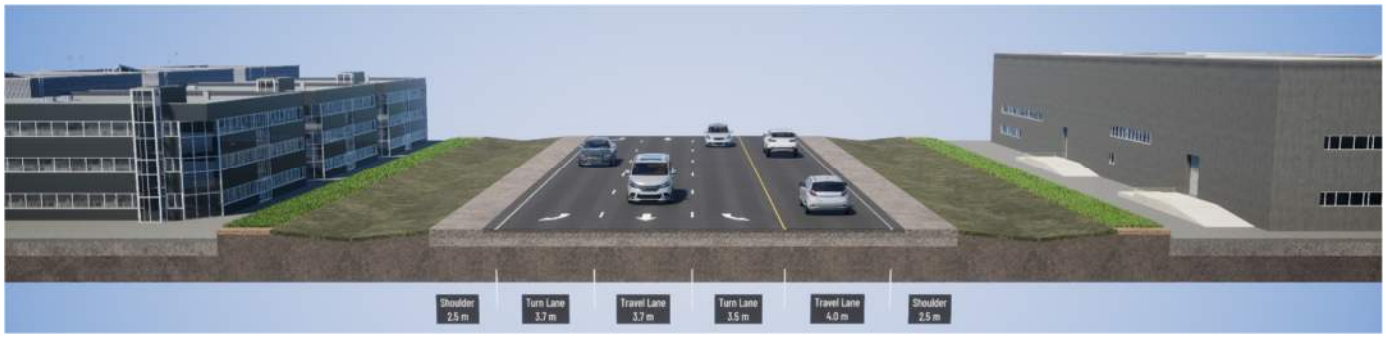


Figure 7-4: Dufferin County Road 3 Typical Cross Section

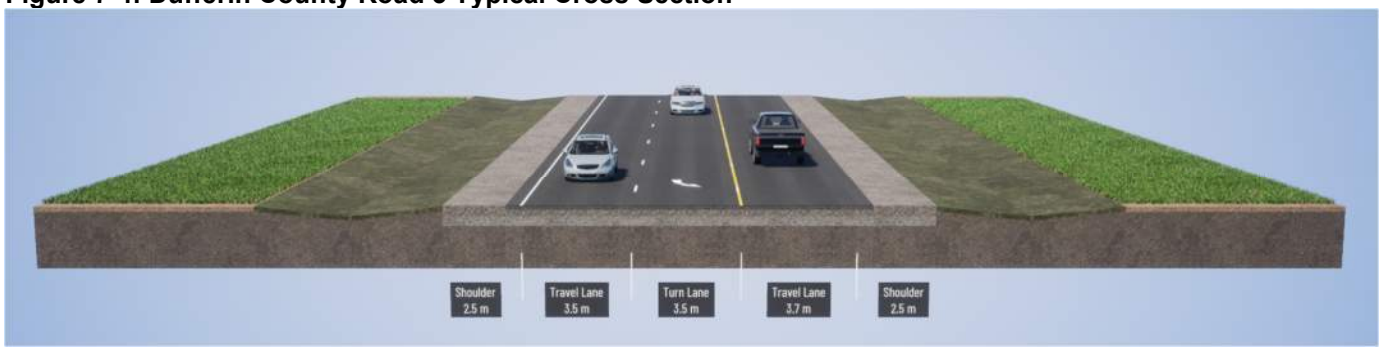


Figure 7-5: Paula Court Typical Cross Section

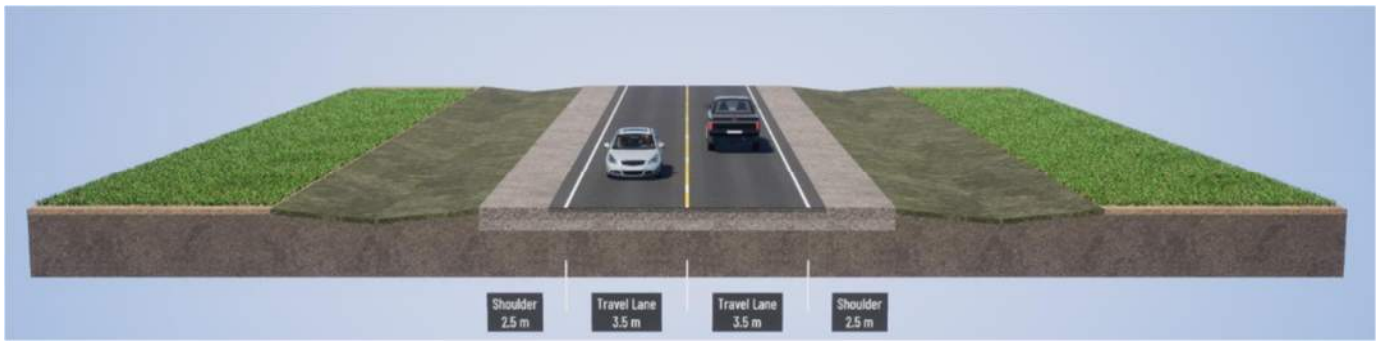
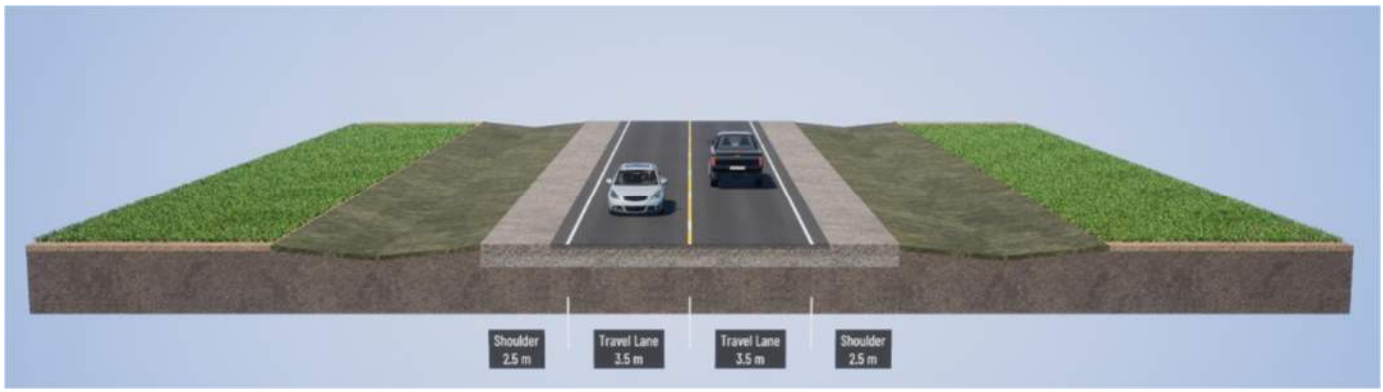


Figure 7-6: Re-aligned Dufferin County Road 23 Typical Cross Section



7.3 Pedestrian and Active Transportation

There is no sidewalk or Active Transportation facilities (MUP) planned within the current EA study area including Dufferin County Road 109, Dufferin County Road 3, Dufferin County Road 23, re-aligned 2nd Line Amaranth and Paula Court extension.

The Dufferin County Road 109 and re-aligned 2nd Line Amaranth / Dufferin County Road 3 intersection will be designed to be AODA compliant, but there will be no pedestrian crossings proposed in the current EA study.

7.4 Geotechnical Investigation

A Geotechnical Investigation Memo was completed for a portion of the EA study area. This memo was prepared for the Temporary Traffic Signal work at Dufferin County Road 109 and existing 2nd Line Amaranth intersection. Detailed geotechnical investigation shall be conducted through detailed design development for the entire road network within the EA study area.

7.5 Traffic

The signal timing for the new consolidated intersection has been developed based on Ontario Traffic Manual Book 12 guidelines and adopted from the existing timings used at the Dufferin County Road 109 / Riddell Road signal. A peak hour cycle length of 120 seconds has been used for this new intersection to permit signal coordination with the adjacent intersections along Dufferin County Road 109. Future traffic analysis also includes the following modifications for mitigation of capacity constraints observed in the future background analysis:

- Reconfiguration of the Dufferin County Road 11 northbound and southbound approaches to the intersection with Dufferin County Road 109. Dufferin County Road 11 would have a dedicated left turn lane and a shared through-right turn lane northbound and southbound**.** The cycle length of this intersection has been extended to 120 seconds during the AM and PM peaks, respectively (90 seconds for the 2027 AM peak) to permit signal coordination with the new intersection at Dufferin County Road 3 / 2nd Line Amaranth to the east.
- Extension of the signal cycle length at the intersection of Dufferin County Road 109 and Riddell Road to 120 seconds, up from the existing 90 seconds, in order to provide additional green time to be balanced between the movements that were operating near or over capacity in the future background analysis. This extension will also permit signal coordination with the new intersection at Dufferin County Road 3 / 2nd Line Amaranth to the west.

By the 2027 total traffic horizon, all of the study area intersections are expected to operate at an overall Level of Service (LOS) of D or better under the projected total traffic volumes with the 2nd Line Amaranth proposed developments in place. Notable intersection impacts include the following:

- Dufferin County Road 109 and Dufferin County Road 11 – the conversion of the approaches to dedicated left turn and shared through / right lanes will provide some mitigation to the congestion along Dufferin County Road 109 despite the additional traffic from the 2nd Amaranth Line developments; the PM peak hour westbound through movements will improve from a V/C ratio of 0.90 to 0.69 with this mitigation. The southbound left turn however will remain near the MTO critical threshold with a V/C ratio of 0.83.

- Dufferin County Road 109 & 2nd Line Amaranth / Dufferin County Road 3 – the new consolidated Dufferin County Road 3 / 2nd AmaranthLine intersection is expected to operate with all movements at an acceptable LOS D or better during the AM and PM peak hours. The longest queue will be for the PM southbound left turn, at approximately 110m.
- Dufferin County Road 109 and Riddell Road – the additional through traffic along Dufferin County Road 109 from the 2nd Line Amaranth developments will result in the eastbound through movement approaching or exceeding capacity by 2027, with AM and PM peak hour V/C ratios of 0.96 and 1.20, respectively. The conflicting westbound left turn will also experience increased congestion as a result, with the PM peak hour V/C ratio increasing to near capacity at 0.92. As observed in the 2027 background analysis, the northbound left turn will also continue to operate near capacity, with AM and PM V/C ratios of 0.96 and 0.92, respectively. Queues along Dufferin County Road 109 approaching this intersection will increase in this scenario, up to 220m eastbound during the PM peak hour.
- Dufferin County Road 3 and Dufferin County Road 23 – this intersection will operate at an acceptable level in its revised configuration, with all movements at a LOS C or better.
- The Dufferin County Road 3 and Dufferin County Road 11 and Dufferin County Road 23 & Montgomery Road will continue to operate similar to the background conditions, with all movements at an acceptable LOS B or better during peak hours.

By 2041, many of the study area intersections will experience increased congestion as a result of the background traffic growth and additional development generated volumes from the 2nd Line Amaranth developments. Specific impacts include the following:

- Dufferin County Road 109 and Dufferin County Road 11 – The continuing growth of through traffic along Dufferin County Road 109 to 2041 will result in congestion on the approaches to this intersection in in the peak directions, but the conversion to left and through/right lanes on the northbound and southbound approaches will allow for improvements to the eastbound and westbound through movements from the future background analysis. In particular, the westbound through movement will improve to a V/C of 0.86, compared with 0.92 as observed for the existing configuration in the future background analysis. By 2041, the southbound left turn will exceed the critical V/C threshold and approach capacity, operating at V/C ratios of 0.90 and 0.92 during the AM and PM peak hours, respectively.
- Dufferin County Road 109 and 2nd Line Amaranth / Dufferin County Road 3 – the consolidated intersection will continue to operate at an acceptable level of service by 2041, with all movements at a LOS D or better during peak hours. The southbound left turn will begin to approach congestion as a result of the anticipated development generated traffic from 2nd Line Amaranth during the PM peak hour; approximately 125m of storage will be required to accommodate the anticipated left turn queues.
- Dufferin County Road 109 and Riddell Road – the background traffic growth to 2041 and additional development generated traffic from 2nd Line Amaranth will result in numerous movements at this intersection approaching or exceeding capacity during 2041 peak hours. The increase in traffic on Dufferin County Road 109 eastbound will reach capacity during the AM and PM peak hours; queues during the AM and PM peak hours will extend to approximately 240m and 280m,

respectively. It is noted that in the case of Option 1b that the consolidated Dufferin County Road 3 / 2nd Line Amaranth intersection will be located approximately 530m to the west; while the queues on Dufferin County Road 109 approaching the intersection with Riddell will not extend this far back, queue impacts for eastbound traffic will begin shortly after passing Dufferin County Road 3. The northbound left turn will also continue to exceed capacity by 2041 similar to the 2041 background analysis, although this will be further exacerbated by the additional development volumes from 2nd Line Amaranth. With both the east-west and northbound directions at or over capacity, there will be limited potential for further mitigation through signal timing modifications. Mitigation of this operation through geometric modifications are examined in **Section 3.6** of this report.

- Dufferin County Road 3 and Dufferin County Road 23 – The reconfigured intersection will continue to operate at an overall LOS A to 2041. It is noted however that with the increase in traffic along Dufferin County Road 3, the PM peak hour delay for the left turn from Dufferin County Road 23 to Dufferin County Road 3 will increase to approximately 37 seconds, corresponding to a LOS E. Queues approaching this movement will remain short however, extending to approximately 23m (3 vehicles).
- Dufferin County Road 3 and Dufferin County Road 11 – Similar to the future background analysis, the northbound and southbound approaches for this intersection will increasingly become congested as the increase in through traffic along Dufferin County Road 3 results in reduced gaps in traffic to turn from the side approaches. The highest impacts will be during the PM peak hour, with the northbound and southbound delays corresponding the LOS F and E, respectively.
- Dufferin County Road 23 and Montgomery Road – This intersection is anticipated to operate well under 2041 total traffic volumes, with all movements at a LOS B or better.

7.6 Transit

Transit does not presently operate in the study area. Transit stops could be designed and implemented in the future, should transit service be offered.

7.7 Drainage and Stormwater Management

Hydraulic performance of existing crossing culverts and one entrance culvert was performed using the CulvertMaster model. The outcome of the analysis is summarized below and further details/culvert locations can be found in **Appendix H.**

- All four existing crossing culverts (C1, C3, C4 and E20) do not meet the hydraulic design criteria.
- Entrance Culvert E13 met all design criteria under existing conditions.
- All other existing entrance culverts in the study area are recommended to be replaced like for like due to no drainage concerns in the area.

Under proposed conditions:

- Three new culverts (C6, C7 and E13A) are recommended to be added into the drainage system due to the proposed design. Culvert E13 is being removed and slightly relocated.
- Culvert C4 and E12 are recommended to be abandoned.

- Proposed culverts were sized based on the available data and they should be further confirmed during the detailed design.

Under proposed conditions, two storage facilities are being proposed for quantity control. Storage facility A requires a volume of 390 m^3 and storage facility B requires a volume of 2228 m^3 to store events up to the 100-year event.

Under proposed conditions, grass swales and OGS units will be utilized for quality control.

7.8 Traffic Signals

The intersection of Dufferin County Road 109 and re-aligned 2nd Line Amaranth / Dufferin County Road 3 will be a four legged signalized intersection that is AODA compliant. All other T-intersections within the EA Study Area will be stop-controlled.

7.9 Illumination

The intersection of Dufferin County Road 109 and re-aligned 2nd Line Amaranth / Dufferin County Road 3 will have full illumination. All other T-intersections within EA Study Area will be partially illuminated.

7.10 Topographic Survey

A topographic survey was completed for Dufferin County Road 109, Dufferin County Road 3, Dufferin County Road 23 and existing 2nd Line Amaranth. Topographic survey within the proposed property lines for re-aligned 2nd Line Amaranth, re-aligned Dufferin County Road 23 and Paula Court extension shall be completed prior to the award of the detailed design work.

7.11 Utilities

SUE Level ‘B’ was completed within the EA study area on Dufferin County Road 109, Dufferin County Road 3, Dufferin County Road 23 and 2nd Line Amaranth within existing ROW. As part of this assignment, SUE investigation was not completed for re-aligned 2nd Line Amaranth, re-aligned Dufferin Couty Road 23 and Paula Court extension. SUE investigation shall be done for these roads as part of the detail design stage.

Within the EA study area, there are underground cables/fiber optics cables with above ground plants for Bell and Rogers. Additionally, there is an above ground Hydro One line that runs on the south side of Dufferin County Road 109 from west of the existing 2nd Line Amaranth to the existing 2nd Line Amaranth intersection. The Hydro One line continues both on the north and south side of the existing 2nd Line Amaranth within the limits of the project.

There are above-ground Hydro lines on the west side of the existing 2nd Line Amaranth, south side of the existing Dufferin County Road 3 and the east side of County Road 23. Utility conflict analysis and SUE Level ‘A’ shall be done as part of the detailed design for any identified utility relocations.

Within the EA study area, there is a gas main that runs along the north side of Dufferin County Road 109 that cuts across the road at Dufferin County Road 3 and across the road to the north side of existing Dufferin County Road 23. There is also a gas main on the west side of Dufferin County Road 3 that cuts across the road at existing County Road 23 and connects to the gas main on the north side of existing Dufferin County Road 23. At the southwest corner of Dufferin County Road 109 and Dufferin County Road 3 there is a gas meter and gas valves.

There is an existing localized storm sewer on the south side of Dufferin County Road 109 that connects the existing ditch inlet catch basins and existing catch basins along the mountable curb from County Road 3 to approximately 350m east of County Road 3. The Storm sewer then outfalls to the existing ditch.

There are no existing wet utilities (sanitary sewer and water main) on the road network within the EA study area.

7.12 Construction Staging

7.12.1 Dufferin County Road 109

It is assumed that property data will be available and all underground / above ground utilities in conflict are relocated before the award of the work.

Dufferin County Road 109 can be constructed in either two or three stages. The recommended staging is outlined below:

Option 1: Two Stages

- **Stage 1**: Keep one lane open in each direction on existing road and widen on both sides to the ultimate condition.
- **Stage 2:** Final finish paving and miscellaneous works.

Option 2: Three Stages

- **Stage 1:** Keep one lane open in each direction and existing right turn lanes open and widen on north side to the ultimate condition.
- **Stage 2:** Keep one lane open in each direction and work on south side to ultimate condition.
- **Stage 3:** Final finish paving and miscellaneous works.

7.12.2 Dufferin County Road 3

Dufferin County Road 3 can be constructed in either two or three stages. The recommended staging is outlined below:

Option 1: Two Stages

- **Stage 1**: Keep one lane open in each direction on existing road and widen on both sides to the ultimate condition.
- **Stage 2**: Final finish paving and miscellaneous works.

Option 2: Three Stages

- **Stage 1:** Keep one lane open in each direction and existing right turn lane open and west / southwest side to the ultimate condition.
- **Stage 2**: Keep one lane open in each direction and work on east / southeast side to ultimate condition.
- **Stage 3**: Final finish paving and miscellaneous works.

Conceptual Staging Sections are included in the **Appendix O.**

7.12.3 Re-Aligned 2nd Line Amaranth, Dufferin County Road 23 and Paula Court

The proposed road works for the three sections of the road network (Dufferin County Road 109, Dufferin County Road 3 and Dufferin County Road 23) are on green fields and can be constructed independently with staging and similar construction works being done simultaneously for Dufferin County Road 109, Dufferin County Road 3 and Dufferin County Road 23.

The construction staging outlined above is conceptual in nature. The Contractor is responsible to develop detailed staging and traffic management plans as per OTM Book 7 during the detailed design phase and shall obtain approval from the County before commencement of the works.

7.13 Access

There will be no impacts to accesses with the recommended plan. There may be temporary access impacts during construction that will be determined during detailed design.

7.14 Property Requirements

There are two permanent private property requirements as a result of the recommended plan for this EA. The properties are in the South West corner of Dufferin County Road 23 and Dufferin County Road 3, as well as the North East area of 2nd Line Amaranth and Dufferin County Road 109. The County will continue to review the property impacts and consult with the property owners.

Some temporary property may be required during construction, which will be reviewed during detailed design.

7.15 Preliminary Cost Estimate

The preliminary cost estimate for the proposed improvement is estimated to be approximately $8.3M (includes Dufferin County Road 109 at $4.4M, 2nd Line Amaranth at $1.5M, Dufferin County Road 3 at $900K, Paula Court at $400K and Dufferin County Road 23 at $1.1M); including allocated for minor works, utility items, drainage works, contingency and engineering. A summary of the cost estimates for each road are provided in **Table 7-2** to **Table 7-6.** The preliminary cost estimate is based on the preliminary design and includes clearing and grubbing, topsoil and sod, stripping top soil, removal and replacement of curb and gutter, sidewalk, traffic signals and signage, and illumination, pavement markings, minor items including additional utility works and a contingency and engineering (detailed design). Land acquisition costs (where necessary) are not included in the estimate.

Table 7-2: Preliminary Cost Estimate for County Road 109

	Item Description	Quantity	Unit	Unit Price	Total
1.	Clearing and Grubbing	19440	m^2	5.00	$97,200.00
2	Stripping Topsoil	1620	m^3	15.00	$24,300.00
3	Grading (Fill assuming 1.0 bank)	6480	m^3	30.00	$194,400.00
4	Hot Mix – HL3	1281	t	150.00	$192,088.58
5	Hot Mix – HL8	3522	t	140.00	$493,027.34
6	19mm Crusher Run Limestone	4928	t	60.00	$295,693.20
7	50mm Crusher Run Limestone	16427	t	50.00	$821,370.00
8	Concrete Curb and Gutter – All Types	136	m	80.00	$10,880.00
9	Subdrain	136	m	40.00	$5,440.00
10	1050 mm Culvert	40	m	900.00	$36,000.00
11	Topsoil and Sod	4480	m^2	18.00	$80,640.00
12	Illumination	0.5	Km	100,000.00	$45,000.00
13	Traffic Signage	1	LS	2,000.00	$2,000.00
14	Traffic Signal (4 legs)	1	LS	300,000.00	$300,000.00
15	Pavement Markings	1	LS	1,000.00	$1,000.00
	Subtotal (Construction)				**$2,699,039.12**
	Minor Items ▪ Utilities (15%) ▪ Minor Works (5%) ▪ Drainage Works (15%)				$909,663.7
	Contingency (10%)				$350,870.28
	Engineering (15%)				$526,305.42
	TOTAL (excluding HST)				**$4,385,878.51**
	Rounded Total (M)				$4.4M

Assumptions:
1. Length of road: 720m
2. Height of bank for grading: 1.0m
3. 40mm HL-3
4. 110mm HL-8
5. 150mm 19mm Crusher Run Limestone
6. 600mm 50mm Crusher Run Limestone
7. Approximate property required: 2500 m2 (47m ROW)
8. Property acquisition cost not included
9. Four legged intersection illumination
10. Signalized Intersection at County Road 109 and 2nd Line Amaranth/Dutch Ln intersection

Table 7-3: Preliminary Cost Estimate for 2nd Line Amaranth

	Item Description	Quantity	Unit	Unit Price	Total
1.	Clearing and Grubbing	17390	m²	5.00	$86,950.00
2	Stripping Topsoil	1541	m^3	15.00	$23,118.75
3	Grading (Fill assuming 1.0 bank)	6165	m^3	30.00	$184,950.00
4	Hot Mix – HL3	427	t	150.00	$64,055.25
5	Hot Mix – HL8	1174	t	140.00	$164,408.48
6	19mm Crusher Run Limestone	1643	t	60.00	$98,604.00
7	50mm Crusher Run Limestone	4109	t	50.00	$205,425.00
8	Topsoil and Sod	2960	m²	18.00	$53,280.00
9	Illumination	0.3	Km	100,000.00	$30,000.00
10	Traffic Signage	1	LS	2,000.00	$2,000.00
11	Pavement Markings	1	LS	1,000.00	$1,000.00
	Subtotal (Construction)				**$913,791.48**
	Minor Items ▪ Utilities (15%) ▪ Minor Works (5%) ▪ Drainage Works (15%)				$319,827.01
	Contingency (10%)				$123,361.85
	Engineering (15%)				$185,042.77
	TOTAL (excluding HST)				**$1,542,023.11**
	Rounded Total (M)				$1.5M

Assumptions:
1. Length of road: 370m
2. Height of bank for grading: 1.0m
3. No Culvert for cross drainage
4. 40mm HL-3
5. 110mm HL-8
6. 150mm 19mm Crusher Run Limestone
7. 450mm 50mm Crusher Run Limestone
8. Approximate property required: 17390 m2 (47m ROW)
9. Property acquisition cost not included
10. Signalized Intersection at County Road 109 and 2nd Line Amaranth/Dutch Ln intersection

Table 7-4: Preliminary Cost Estimate Dufferin County Road 3

	Item Description	Quantity	Unit	Unit Price	Total
1.	Clearing and Grubbing	1740	m^2	5.00	$8,700.00
2	Stripping Topsoil	435	m^3	15.00	$6,525.00
3	Grading (Fill assuming 1.0 bank)	3600	m^3	30.00	$108,000.00
4	Hot Mix – HL3	322	t	150.00	$48,311.55
5	Hot Mix – HL8	886	t	140.00	$123,999.65
6	19mm Crusher Run Limestone	1239	t	60.00	$74,368.80
7	50mm Crusher Run Limestone	3099	t	50.00	$154,935.00
8	Topsoil and Sod	480	m^2	18.00	$8,640.00
9	Illumination	0.1	Km	100,000.00	$10,000.00
10	Traffic Signage	1	LS	2,000.00	$2,000.00
11	Pavement Markings	1	LS	1,000.00	$1,000.00
	Subtotal (Construction)				**$546,480.00**
	Minor Items ▪ Utilities (15%) ▪ Minor Works (5%) ▪ Drainage Works (15%)				$191,268
	Contingency (10%)				$$73,774.80
	Engineering (15%)				$110,662.20
	TOTAL (excluding HST)				**$922,184.99**
	Rounded Total (K)				$900K

Assumptions:
1. Length of road: 290m
2. Height of bank for grading: 1.0m
3. No Culvert for cross drainage
4. 40mm HL-3
5. 110mm HL-8
6. 150mm 19mm Crusher Run Limestone
7. 450mm 50mm Crusher Run Limestone
8. Approximate property required: 170 m2 (30m ROW)
9. Property acquisition cost not included
10. Signalized Intersection at County Road 109 and 2nd Line Amaranth/Dutch Ln intersection
11. Stop Control Intersection at Dutch Ln and County Road 23 Intersection

Table 7-5 Preliminary Cost Estimate Paula Court

	Item Description	Quantity	Unit	Unit Price	Total
1.	Clearing and Grubbing	2100	m^2	5.00	$10,500.00
2	Stripping Topsoil	210	m^3	15.00	$3,150.00
3	Grading (Fill assuming 1.0 bank)	2400	m^3	30.00	$72,000.00
4	Hot Mix – HL3	100	t	150.00	$14,971.95
5	Hot Mix – HL8	274	t	140.00	$38,428.01
6	19mm Crusher Run Limestone	384	t	60.00	$23,047.20
7	50mm Crusher Run Limestone	960	t	50.00	$48,015.00
8	Topsoil and Sod	960	m^2	18.00	$17,280.00
9	Illumination	0.1	Km	100,000.00	$10,000.00
10	Traffic Signage	1	LS	2,000.00	$2,000.00
11	Pavement Markings	1	LS	1,000.00	$1,000.00
	Subtotal (Construction)				**$240,392.16**
	Minor Items ▪ Utilities (15%) ▪ Minor Works (2%) ▪ Drainage Works (15%)				$84,137.25
	Contingency (10%)				$32,452.94
	Engineering (15%)				$48,679.41
	TOTAL (excluding HST)				**$405,661.76**
	Rounded Total (K)				$400K

Assumptions:
1. Length of road: 120m
2. Height of bank for grading: 1.0m
3. No Culvert for cross drainage
4. 40mm HL-3
5. 110mm HL-8
6. 150mm 19mm Crusher Run Limestone
7. 450mm 50mm Crusher Run Limestone
8. Approximate property required: 1975 m2 (30m ROW)
9. Property acquisition cost not included
10. Stop Control Intersection at Paula Court and County Road 23 Intersection

Table 7-6: Preliminary Cost Estimate Dufferin County Road 23

	Item Description	Quantity	Unit	Unit Price	Total
1.	Clearing and Grubbing	10200	m^2	5.00	$51,000.00
2	Stripping Topsoil	1138	m^3	15.00	$17,062.50
3	Grading (Fill assuming 1.0 bank)	4550	m^3	30.00	$136,500.00
4	Hot Mix – HL3	298	t	150.00	$44,761.50
5	Hot Mix – HL8	821	t	140.00	$114,887.85
6	19mm Crusher Run Limestone	1148	t	60.00	$68,904.00
7	50mm Crusher Run Limestone	2871	t	50.00	$143,550.00
8	Topsoil and Sod	2400	m^2	18.00	$43,200.00
9	Illumination	0.4	Km	100,000.00	$40,000.00
10	Traffic Signage	1	LS	2,000.00	$2,000.00
11	Pavement Markings	1	LS	1,000.00	$1,000.00
	Subtotal (Construction)				**$662,865.85**
	Minor Items ▪ Utilities (15%) ▪ Minor Works (2%) ▪ Drainage Works (15%)				$232,003.05
	Contingency (10%)				$89,486.89
	Engineering (15%)				$134,230.33
	TOTAL (excluding HST)				**$1,118,586.12**
	Rounded Total (M)				$1.1M

Assumptions:
1. Length of road: 340m
2. Height of bank for grading: 1.0m
3. No Culvert for cross drainage
4. 40mm HL-3
5. 110mm HL-8
6. 150mm 19mm Crusher Run Limestone
7. 450mm 50mm Crusher Run Limestone
8. Approximate property required: 9440 m2 (30m ROW)
9. Property acquisition cost not included
10. Stop Control Intersection at Paula Court and County Road 23 Intersection, and at Dutch Ln and County Road 23

8.0 CONSULTATION

Public, stakeholder, technical agency, and Indigenous Community input is critical to the success of this project and Dufferin County provided opportunities for such input at key points throughout the Class EA Study process. The intent of the consultation process was to ensure that all stakeholders and Indigenous Communities were given the opportunity to provide input on the transportation needs and existing environment for the study area as well as the evaluation of alternatives and the preferred alternative.

8.1 Study Notifications

The following sections describe the public consultation efforts completed, summary of comments from the public throughout the study and how they were addressed by the Project Team. All public notifications, materials, comments received and responses, excluding personal information, are provided in **Appendix P** in the Notification and Correspondence Record (includes the Public Information Centre Summary Reports).

8.1.1 Notice of Study Commencement

A Notice of Study Commencement for the project was issued to provide notification of the Study's initiation and provide details on how to participate. The project website www.dufferincounty.ca/MCEA went live prior to the Notice of Study Commencement and the Notice was published on the website.

The Notice was also published in the *Orangeville Citizen*, *Orangeville Banner/Erin Advocate, and Shelburne Free Press* newspapers on Thursday October 12, 2022. The Notice was also sent via bulk mail to property owners and business owners within and adjacent the study area on October 6, 2022.

An email with the Notice of Commencement was sent out on October 12, 2022, to the project contact list. The contact list included agencies (municipal, provincial, elected officials, emergency services, potentially impacted property owners, community groups, and conservation authorities).

The project contact list and Notice of Study Commencement can be found in **Appendix P.**

Table 8-1 summarizes the main concerns and interests expressed by the comments received from the agency, stakeholders and general public for the Notice of Study Commencement.

Table 8-1: Summary of Comments Received and Project Team Responses

Agency / Participant	Comment Received	Project Team Response / Action Taken
Agency Comments		
Township of East Garafraxa	On October 31, 2022 a representative from Township of East Garafraxa provided input by sharing a sketch of the alternative route they prefer.	The project team responded with appreciation for their insight provided. It was noted additional information on possible alternative concepts will be presented at the Technical Agencies Committee (TAC) meeting and Public Information Centre (PIC) in December 2022. They were assured their information was included on the project mailing list for future updates.
Town of Orangeville	On October 14, 2022 a representative from Town of Orangeville requested to be added to the mailing list.	The project team thanked them for their email and assured their name was

Agency / Participant	Comment Received	Project Team Response / Action Taken
		included on the project mailing list for future updates.
Ministry of the Environment, Conservation, and Parks	On October 17, 2022 the Ministry shared MECP's Letter of Acknowledgement to the Notice of Commencement. This response included the Indigenous Communities to Project Team are required to consult with for this project.	Letter was reviewed by the project team. No response required.
Grand River Conservation Authority	On November 28, 2022 GRCA revealed that the Natural Heritage and Natural Hazard Features in the area that could be impacted are: unevaluated GRCA wetlands, and regulated watercourses. As the Class EA could propose measures that could impact these regulated features, the GRCA requested to remain involved in the process and be included on the mailing list.	Mailing list updated. No response required.
Ministry of Citizenship and Multiculturalism	On December 2, 2022 the Ministry shared MCM's Letter of Acknowledgment and response to the Notice of Commencement for the project. They shared guidance information as the Environmental Assessment relates to Ontario's cultural Heritage.	Letter was reviewed by the project team. No response required.
Summery of Public Comments		
Public Participants	A number of public participants requested to be added to the project mailing list.	The project team thanked them for their email and assured their name was included on the project mailing list for future updates.
Public Participants	A number of participants asked for further information on the project scope and need for the study.	Information was provided that as part of the upcoming proposed commercial development by OP Trust Amaranth, 2nd Line Amaranth is proposed to be realigned. From a traffic perspective the realignment is warranted to replace the existing intersection between 2nd Line Amaranth and Dufferin County Road 3 along Dufferin County Road 109. Although analysis will be conducted to understand wider traffic impacts and confirm that the realignment is the best solution for not just the proposed development, but also the land uses on the south side of the intersection and the

Agency / Participant	Comment Received	Project Team Response / Action Taken
		traffic along the County Road 109 corridor.

8.1.2 Notice of Public Information Centre #1

A Notice of Public Information Centre (PIC) #1 for the project was issued to provide notification of the first PIC and provide details on how to participate. The Notice of PIC #1 was published on the project website www.dufferincounty.ca/MCEA.

The Notice was also published in the *Orangeville Citizen*, *Orangeville Banner/Erin Advocate, and Shelburne Free Press* newspapers on Thursday December 1, 2022. The Notice was also sent via bulk mail to property owners and business owners within and adjacent the study area on December 5, 2022.

An email with the Notice of PIC #1 was sent out on December 5, 2022 to the project contact list. The contact list included agencies (municipal, provincial, elected officials, emergency services), potentially impacted property owners, public contacts requested to be added to the contact list, community groups, and conservation authorities.

The project contact list and Notice of PIC #1 can be found in **Appendix P.**

8.1.3 Notice of Public Information Centre #2

A Notice of Public Information Centre (PIC) #2 for the project was issued to provide notification of the second PIC and provide details on how to participate. The Notice of PIC #2 was published on the project website www.dufferincounty.ca/MCEA.

The Notice was also published in the *Orangeville Citizen*, *Orangeville Banner/Erin Advocate and Shelburne Free Press* newspapers on Thursday May 25, 2023. The Notice was also sent via bulk mail to property owners and business owners within and adjacent the study area on May 25, 2023.

An email with the Notice of PIC #2 was sent out on May 25, 2023 to the project contact list. The contact list included agencies (municipal, provincial, elected officials, emergency services), potentially impacted property owners, public contacts requested to be added to the contact list, community groups, and conservation authorities.

The project contact list and Notice of PIC #2 can be found in **Appendix P.**

8.1.4 Notice of Completion

The Notice of Completion was issued on March 21, 2024 to announce the completion of the Class EA study and notify interested parties of the 30-day review period for the Environmental Study Report, which was made available on Dufferin County's project website, as well as hard copies at the W.M. Edelbrock Centre - Dufferin County Administrative Building as noted in **Section 1.4.**

8.2 Public Information Centre

8.2.1 Public Information Centre #1

The purpose of the Public Information Centre (PIC) #1 was to:

- Outline the Dufferin County EA study purpose, study area, and problems and opportunities statement;
- Outline the Municipal Class EA process and study timeline;
- Provide an overview of the project location;
- Provide an overview of Environmental Studies and preliminary alternative concepts;
- Provide to the public and to stakeholders the opportunity to share information; and,
- Collect feedback on the presented materials.

Public Information Centre (PIC) #1 was held in-person and the PIC display materials were uploaded to the project website shortly after the PIC.

Date	Thursday, December 15, 2022
Location :	Atrium of the Dufferin County Courthouse 55 Zina Street, Orangeville, ON L9W 1E5
Time :	3:00PM to 7:00PM

A total of 10 participants signed in as attending PIC#1. Signing in was not required to attend and the total participants was about 20. During the PIC #1 event, attendees participated by viewing the display panel presentation and engaging in discussions with representatives from WSP and Dufferin County. The formal comment period was from **December 15, 2022 - January 15, 2023.**

A summary report for PIC #1, including a copy of the display boards, the presentation, and the summary of comments received, is provided in **Appendix P**.

Table 8-2 summarizes the main concerns and interests expressed by the comments received from agencies, stakeholders and general public during and following PIC #1 and how they were addressed.

Table 8-2: Summary of Comments Received and Project Team Responses

Agency / Participant	Comment Received	Project Team Response / Action Taken
Agency Comments		
Town of Orangeville	On December 6, 2022 an email was received from a representative at the Town of Orangeville following the Technical Advisory Committee (TAC) meeting. Overall they shared a variety of considerations for historic and future transportation and planning considerations in the Town of Orangeville.	The Dufferin County project team responded thanking them for their input. They suggested the items discussed would be better suited for different types of a study and/or review aside from this EA project. It was noted there will be future meeting opportunities for these discussions.
Township of Amaranth	On December 6, 2022 an email was received from a staff member at the Town of Orangeville following the TAC meeting. They shared information on how the road motorists access County	The Dufferin County project team responded thanking them for their input. They suggested the items discussed would be better suited for different types of a study and/or review

Agency / Participant	Comment Received	Project Team Response / Action Taken
	Road 109 and County Road 16. They expressed it appears reasonable to include in the Study how traffic potentially changes the Broadway/County Road 16 intersection in this analysis. It was mentioned that it might be included in broader Transportation Master Plans but they would like to ensure this was not being missed.	aside from this EA project. Many of the items are beyond the problem statement of the ongoing EA project. Some areas noted are in the traffic analysis component of the EA study but are not within the alternatives assessment. The County noted they are available to further discuss.
Township of East Garafraxa	On February 2, 2023 an email was received from a staff member at the Township of East Garafraxa wishing to confirm the community engagement process, and how the residents were notified of the study and invited to provide comments.	The project team responded thanking them for their feedback on the project. They informed them the Notice of PIC #1 was advertised in the local newspapers, sent to the project mailing list, unaddressed mail was sent via Canada Post to addresses within the radius of the project. There will also be a TAC meeting upcoming in the next few weeks.
Summary of Public Comments		
Public Participants	A number of public participants requested to be added to the project mailing list.	The project team thanked them for their email and assured their name was included on the project mailing list for future updates. Next steps on the project were shared.
Public Participants	Interest on roundabouts were discussed at the PIC and after the PIC.	The Project Team acknowledged these considerations.
Public Participants	Many PIC attendees reviewed the preliminary concepts board and provided thoughts on alternative designs.	The Project Team acknowledged these considerations.
Public Participants	A number of concerns with issues in the study area were raised, i.e. too many trucks on Dufferin County Road 11, snow drifts, grades of the current roads.	The Project Team acknowledged these considerations.

8.2.2 Public Information Centre #2

The purpose of the Public Information Centre (PIC) #2 was to:

- Outline and review the Dufferin County EA study purpose, study area, and problems and opportunities statement;
- Outline the existing environmental conditions;
- Review the evaluation criteria and methodology for the alternative designs;
- Present the alternative designs and outline the summary of evaluation of alternative designs;

- Present the Preferred Alternative;
- Provide the public and the stakeholders the opportunity to comment on the preferred alternative and share information; and
- Collect feedback on the presented materials.

Public Information Centre (PIC) #2 was held in-person, as noted below, and the PIC display materials were uploaded to the project website shortly after the PIC.

Date	Tuesday June 6, 2023
Location :	Front foyer of the Alder Street Community Centre 275 Alder St, Orangeville, ON L9W 5H6
Time :	3:00PM to 7:00PM

A total of 17 participants signed in as attending PIC#2. Signing in was not required to attend and the total participants was about 45, as numerous people stopped to via materials while entering or exiting the building. During the PIC #2 event, attendees participated by viewing the display panel presentation and engaging in discussions with representatives from WSP and Dufferin County. The formal comment period was from **June 6, 2023, to July 6, 2023.**

A summary report for PIC #2, including a copy of the display boards, the presentation, and the summary of comments received, is provided in **Appendix P**.

Table 8-3 summarizes the main concerns and interests expressed by the comments received from agencies, stakeholders and general public during and following PIC #2 and how they were addressed.

Table 8-3: Summary of Comments Received and Project Team Responses

Agency / Participant	Comment Received	Project Team Response / Action Taken
Agency		
N/A		
Public Participant		
Public Participant	There was a request that a roundabout be considered since there are many intersecting roads to accommodate a variety of vehicle types. Their recommendations included to keep 2nd Line Amaranth as part of the Dufferin County Road 3 and Dufferin County Road 23 intersections with Dufferin County Road 109 (roundabout be considered), and to leave the intersection of County Road 11 and County Road 3 as is (better signage and improvement and a proper left turn lane on Eastbound County Rd 3).	In response to the inquiry about a roundabout, it was described that the PIC #2 in June 2023 presented a 4-legged roundabout (Option 3b) at Dufferin County Road 109 and Dufferin County Road 3, and ultimately this option was not chosen as the preferred alternative due to the property and access impacts associated with the roundabout and because it does not accommodate future traffic volumes without future design changes. A link to the project website was shared with the PIC #2 boards that include the presented

Agency / Participant	Comment Received	Project Team Response / Action Taken
		evaluation of alternatives and the preferred alternative.
Public Participant	An email was received with comments about species at risk (Bobolinks, Meadowlarks, Monarch Butterflies, and Butternuts). As well as snowdrift problems on County Road 3. They also inquired if there has been a consideration to restoring railways bypassing the GTA.	The Project Team responded on thanking them for their insight provided on the Project. In response to the comment about railways, The Project Team noted they are not being considered for this project.
Public Participants	At the PIC there were general interest and comments related to the EA process, evaluation process, environmental studies being completed and potential impacts and mitigation being considered.	The Project Team acknowledged these considerations.
Public Participants	Many participants at PIC #2 shared their support for the Preferred Alternative presented.	The Project Team acknowledged the support.
Public Participants	There was an alternative option brought up to consider realigning 2nd Line Amaranth to Dufferin County Road 109/Riddell Road.	The Project Team considered this alternative post PIC #2 as described further in Section 6.5 of the ESR.

8.3 Technical Advisory Committee Consultation

The list of technical agencies was assembled based on previous Class Environmental Assessment studies and Ministry of the Environment, Conservation and Parks' (MECP) Government Review Team (GRT) list.

8.3.1 Technical Advisory Committee Meeting #1

The project team met virtually with the Technical Advisory Committee (TAC) members on Tuesday December 6, 2022 prior to PIC #1. The PIC displays were presented to the committee followed by a question-and-answer period. The Meeting Minutes for this TAC meeting #1 are provided in **Appendix P.**

8.3.2 Technical Advisory Committee Meeting #2

The project team met virtually with the Technical Advisory Committee (TAC) members on Thursday May 17, 2023 prior to PIC #2. The PIC displays were presented to the committee followed by a question-and-answer period. The Meeting Minutes for this TAC meeting #2 are provided in **Appendix P.**

8.4 Indigenous Communities Consultation

As part of this EA, Dufferin County undertook interest-based engagement with Indigenous Communities that may be affected by the project. As per the direction of the MECP, Dufferin County consulted with the following Communities who had been identified as potentially affected by the proposed project:

- Mississaugas of the Credit First Nation (MCFN)

- Chippewas of Rama First Nation
- Chippewas of Georgina Island First Nation
- Beausoleil First Nation
- Huron-Wendat (for archaeology potential)

The Indigenous Communities above were sent the Project Notices via email for each consultation milestone of the Class EA Study. The Stage 1 Archaeology Report was also circulated to the above Indigenous Communities prior to sending the report to Ministry of Citizenship and Multiculturalism. **Table 8-4** summarizes the communication with Indigenous Communities during the project. Documentation can be found in **Appendix P.**

Table 8-4: Summary of Communications with Indigenous Communities

Indigenous Community/First Nation	Comment Received	Project Team Response / Action Taken
Mississaugas of the Credit First Nation (MCFN)	On December 13, 2022 the MCFN Department of Consultation and Accommodation (DOCA) submitted the following comments regarding the Project: They wished to emphasize that they are the MCFN, descendants of the Mississaugas of the River Credit, and this project is being proposed for development on the treaty lands of the MCFN, more specifically the Ajetance Treaty, No. 19, established in 1818. Due to this the MCFN DOCA must receive all EA reports, and must be engaged for all Archaeological Assessments. This would include in-field participation with MCFN community members present for any archaeological assessments and a review of all reports prior to submission to the ministry for clearance. They noted this engagement should be at the cost of the proponent.	The Project Team responded thanking the MCFN for their input regarding the project. They noted the Stage 1 Archeology Assessment field work was complete and they are currently preparing a draft report that can be provided for review once complete (Note: this report was later sent to MCFN for review). It was noted in the event Stage 2 field work is required the project team will be in touch to coordinate in field participation with MCFN community members. They reiterated they would be happy to meet with MCFN to discuss the project and better understand Indigenous knowledge the community is open to sharing, and they wish to build a strong relationship with the MCFN community and Dufferin County.
Nation Huronne-Wendat	On January 6, 2023 Nation Huronne-Wendat requested information detailing if archaeology studies or fieldwork will be required as part of the project.	The Project Team responded thanking Nation Huronne-Wendat for their input regarding the project. They noted the Stage 1 Archeology Assessment field work was complete and they are currently preparing a draft report that can be provided for review once complete. It was noted in the event Stage 2 field work is required the project team will be in touch to coordinate in field participation with Nation Huronne-Wendat community

Indigenous Community/First Nation	Comment Received	Project Team Response / Action Taken
		members. They reiterated they would be happy to meet with Nation Huronne-Wendat to discuss the project and better understand Indigenous knowledge the community is open to sharing, and they wish to build a strong relationship with the Nation Huronne-Wendat community and Dufferin County. A link to the project website was shared for further information.

9.0 POTENTIAL ENVIRONMENTAL IMPACTS, MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK

Mitigation of negative effects is applied throughout the MCEA process, including development of alternatives to avoid constraints, and selection of the Technically Preferred Plan by identifying the alternative that has the least overall effects on the environment. Some negative effects cannot be completely avoided; therefore, additional mitigating measures (documented in **Section 9.13**) are identified in order to avoid or minimize effects. These measures will be further developed and finalized in the next phase of design and will be included in the contract documents for implementation during construction. Recommendations and commitments to future work can be found in **Section 9.12.**

9.1 Socio-Economic Environment

9.1.1 Land Use

Based on the background information gathered over the course of the EA study, the land use impacts associated with the proposed preferred alternative have been assessed and are summarized in **Table 9-1**. The identified mitigation measures are documented in **Section 9.13** the ESR.

Table 9-1: Land Use Impact Assessment

Land Use	Potential Impact	Recommended Mitigation Measures
Agriculture	▪ Potential for significant impacts to agricultural uses that abut the recommended plan. ▪ Construction activities have the potential to create traffic delays and interfere with access to residences, farms and farm-related businesses in the study area.	▪ Impacts on agriculture uses shall be minimized. ▪ Incorporate the mitigation recommendations from the Agricultural Impact Assessment that has been undertaken separately as part of this Class EA study. ▪ Continue consultation with property owners during detailed design.
Residential (Rural)	▪ The recommended plan involves property buy outs but not displacement of buildings on those properties and no property access impacts. ▪ Construction may temporarily disturb residences adjacent to the proposed road works through noise, dust, use of equipment and traffic impacts.	▪ Impacts to property shall be minimized. ▪ Advanced notice will be provided to property owners to notify them of construction start and any disruptions to existing accesses, as well as construction contractors and/or County's contact information. Access to all properties will be maintained. ▪ The County will continue consultation with impacted property owners during detail design. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
Commercial and Industrial	▪ Construction may temporarily impact Commercial and Industrial uses adjacent to	▪ Access will be maintained to properties during construction.

Land Use	Potential Impact	Recommended Mitigation Measures
	the proposed road works through noise, dust and use of equipment.	▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
Cultural Heritage and Archaeology	▪ No impact on CHL 1, CHL 2, CHL 3, and CHL 6. ▪ Potential direct impact on CHL 5 (Study Area 1 may result in a direct impact to the potential CHL).	▪ Incorporate the mitigation recommendations from the Stage 1 Archaeological Assessment that has been undertaken separately as part of this Class EA study. ▪ Incorporate the mitigation recommendations from the Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment that has been undertaken separately as part of this Class EA study.
Institutions and Community Facilities	▪ Construction may temporarily impact Institution and Community Facility uses adjacent to the proposed road works through noise, dust and use of equipment.	▪ Access will be maintained to properties during construction. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
Natural Features	▪ Minor impacts to vegetation, wildlife, soil, drainage, and groundwater.	▪ Vegetation clearing and grubbing will be minimized to the extent possible. ▪ Incorporate the mitigation recommendations from the Environmental Impact Study Report that has been undertaken separately as part of this Class EA study.

9.1.2 Agriculture

The proposed development of the PSA will result in the creation of three severed parcels from one parcel (two smaller pieces plus the larger remaining piece of the original parcel west of the proposed road realignment). Two smaller areas will be severed from the original parcel. The two smaller areas comprise 1.24 ha and 0.2 ha. The remainder of the large parcel is located west of the proposed road realignment.

There will be no direct impacts to the agricultural buildings identified in the SSA as a result of the construction of the proposed road realignment.

None of the three created parcels (two severed pieces plus the remaining portion of the original parcel) will be landlocked and each of the three parcels will have at least one side along an existing road.

Given the geographical location of these lands, it is the conclusion of this study that the proposed development of the PSA lands will result in a minimal loss of lands presently used for agricultural

production. The proposed road realignment on the PSA will have limited impact on the surrounding agricultural activities within the SSA.

With respect to the potential impacts:

- Interim or permanent loss of agricultural lands – there will be a permanent loss of the use of some agricultural lands as a result of the proposed road realignment.
- Fragmentation of agricultural lands and operations – there will be fragmentation of agricultural lands due to the creation of severed parcels along Dufferin County Road 23.
- The loss of existing and future farming opportunities – there will be a loss of existing or future farming opportunities on a portion of the one designated agricultural parcel (southwest corner of the intersection of Dufferin County Road 3 and Dufferin County Road 23).
- The loss of infrastructure, services, or assets – there will be no loss of infrastructure, services or assets as a result of the proposed road realignment.
- The loss of investments in structures and land improvements – there will be no loss of investments in structures and land improvements as a result of the proposed road realignment.
- Disruption or loss of functional drainage systems – there will be no loss of investment in drainage systems as a result of the proposed road realignment.
- Disruption or loss of irrigation systems – there will be no loss of investment in irrigation systems.
- Changes to soil drainage – there will be no change in soil drainage in the PSA or the SSA as a result of the proposed road realignment.
- Changes to surface drainage – there should be no change in surface drainage in the SSA as a result of the proposed road realignment.
- Changes to landforms – there will be no change to landforms in the SSA as a result of the proposed road realignment.
- Disruption to surrounding farm operations – there should be limited potential for disruption on surrounding/adjacent farm operations on completion of the construction of the proposed road realignment. There may be limited disruption to agricultural traffic during the construction phase of the proposed road realignment.
- Effects of noise, vibration, dust - there should be limited potential for noise, vibration, and dust on the adjacent properties once the construction phase is completed. There is a potential for noise, vibration, and dust during the initial construction phase.
- Potential interim compatibility concerns – there should be limited potential for compatibility concerns due to the presence of existing and active road network (infrastructure) in the immediate local area.
- Traffic concerns – the proposed road realignment will provide smoother transitions at intersections within the PSA. As a result, on completion of the construction, there should be minimal traffic concerns.

Further information on recommended mitigation measures can be found in **Section 9.13.**.

9.2 Natural Environment

9.2.1 Vegetation

Based on the preferred alignment of the Dufferin County Road 109 and 2nd Line Amaranth intersection, direct impacts to the vegetation communities and flora are anticipated to be minimal as the proposed works will occur within and adjacent to the existing ROW as well as in agricultural lands and cultural meadow and will not directly impact any natural vegetation communities.

Direct impacts to vegetation include removal of cultural meadow vegetation and agricultural vegetation (i.e., crops), both of which are already affected by anthropogenic influences and support vegetation that is common and widespread across the broader landscape. One regionally rare plant species, Purple-veined Willowherb, is present within the Site, and may be impacted by the proposed works. This species is considered common in the province and is likely to regenerate naturally following construction. Specific mitigation measures to protect individuals are not warranted.

Preliminary impacts to woody vegetation have been assessed through a Tree Inventory and Assessment Memo and Tree Management Plans (WSP, 2023). Extensive tree and shrub removals are not currently anticipated, however removal of six Silver Maples (*Acer saccharinum*) located in the southeastern former farm residential property along Dufferin County Road 23 will be required to accommodate the proposed works (WSP, 2023). No removal of woody vegetation associated with natural vegetation communities (forests, wetlands, etc.) is anticipated. Impacts to trees and shrubs will be further assessed at later design stages, and appropriate mitigation will be refined.

Impacts to the Greenbelt are anticipated to be minimal; some agricultural land will be lost, however the preferred alternative avoids all KNHFs and KHFs.

Further information on recommended mitigation measures can be found in **Section 9.13**.

9.2.2 Wildlife

Wildlife habitat impacts are generally similar to those described for vegetation. The cultural meadow and agricultural areas within the Site, support minimal local habitat and associated wildlife use, as these areas are fragmented and disturbed in nature. There will be a minor loss of wildlife habitat associated with the vegetation removals within the cultural meadow communities. These areas provide habitat that generally supports common, disturbance-tolerant wildlife species; there is potential for various wildlife (e.g., birds, snakes, small mammals, etc.) to enter the proposed work areas during construction.

The proposed works are not anticipated to affect the movement of animals, as the barriers created by the preferred alternative will be very similar to those that currently exist as a result of the existing road network.

Although no nests of migratory birds were observed in the vegetation within the Study Area during the single fall site visit, surveys were conducted outside the breeding bird season. There is potential for disturbance-tolerant bird species to nest in vegetation throughout the Site and the Study Area. Most migratory species and their nesting activity are protected by the federal Migratory Birds Convention Act (MBCA 1994). Potential impacts include disturbance to nesting activity or possibly loss of any nests present in the year of construction.

Further information on recommended mitigation measures can be found in **Section 9.13**.

Migratory Birds

Nesting migratory birds are protected under the Migratory Birds Convention Act (MBCA, 1994). No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of bird species protected under the MBCA and / or Regulations under that Act. Updated Migratory Birds Regulations came into force on July 30, 2022. These modernized regulations include, but are not limited to, protections for inactive nests considered to have a high conservation value for migratory birds. The nests of 18 species (listed in Schedule 1 of the regulations), whose nests are reused, are provided year-round nest protection, unless they have been shown to be abandoned. Pileated Woodpecker is the only species with some potential to occur in the Study Area; removal of these nests (i.e., tree removals) requires three years of monitoring to demonstrate the inactivity of a given nest. No removals of large trees in Pileated Woodpecker habitat are currently anticipated as part of the proposed works and this eventuality is unlikely. In order to protect nesting migratory birds, in accordance with the MBCA, the Contractor will ensure that:

- No active nests (nests with eggs or young birds) will be removed or disturbed in accordance with the Migratory Birds Convention Act (MBCA 1994).
- No vegetation clearing (including grubbing and removal of trees, shrubs, and grasses) will occur during the bird nesting season (**April 1 to August 31**).
- Should large trees be required to be removed, an evaluation by a qualified biologist will be completed to exclude the possibility of use by protected migratory species (e.g., Pileated Woodpecker).

Other Wildlife

- Any wildlife incidentally encountered during construction will not be knowingly harmed or harassed and will be allowed to move away on its own.
- In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator and / or Environmental Inspector will be notified.
- All disturbed areas will be restored to pre-construction conditions.

9.2.3 Species at Risk

No SAR were confirmed in the Study Area, however nine SAR have ‘moderate’ to ‘high’ potential to occur. Potential impacts to these species are outlined below:

Barn Swallow (SC), Bank Swallow (THR): Although these two species are likely to forage within the Study Area, no direct impacts to individuals or their nesting habitats are anticipated. Impacts to foraging habitat will be minimal and temporary and suitable nesting habitat (e.g., banks, bridges, barns, buildings) is not present within the Study Area, and therefore is not anticipated to be impacted by the proposed works. Impacts to these species are not anticipated with the implementation of the mitigation measures outlined below.

Red-headed Woodpecker (END): No evidence of nesting habitat was observed during the site visit. However, suitable nesting and foraging habitat is present throughout the Study Area, and particularly in the hedgerow

supporting numerous mature Sugar Maples to the east of 2nd Line Amaranth. Impacts to this species are not anticipated with the implementation of the mitigation measures outlined below.

Chimney Swift (THR): Although likely to forage within the Study Area during the breeding season, no direct impacts to this species are anticipated as impacts to foraging habitat will be minimal and temporary. Impacts to this species are not anticipated with the implementation of the mitigation measures outlined below.

Grasshopper Sparrow (SC), Bobolink, and Eastern Meadowlark (THR): There is potential breeding, nesting and foraging habitat present for all three of these grassland bird species within the cultural meadow communities located north and south of Dufferin County Road 109 west of 2nd Line Amaranth and Dufferin County Road 3, as shown in Figure 2, Appendix A of the Natural Environment Report. A portion of this habitat will be directly impacted by the proposed works, however the area impacted is currently anticipated to be small relative to the available surrounding suitable habitat. Although these species are unlikely to nest or forage on the edge of their grassland habitat, there remains some potential for these species to be impacted directly, or to be disturbed during the breeding season. Mitigation measures to protect these species are outlined below however further assessment of the impacts to these SAR birds should be undertaken at future design stages.

Monarch (SC): Impacts to foraging and breeding habitat for Monarch will be minimal, relative to the surrounding available suitable habitat. Specifically, the larger cultural meadow north of Dufferin County Road 109, which will not be impacted, supported a greater density of Common Milkweed (host plant). Impacts to this species are not anticipated with the implementation of the mitigation measures outlined below.

Butternut (END): Potential habitat for Butternut is present throughout the Study Area, and individuals are known to occur within the immediate vicinity of the Study Area, however no Butternut were observed during the site visit and there is little potential for individuals to be present and undetected within 50 m of the Site. Impacts to this species are therefore not anticipated. Impacts to this species are not anticipated with the implementation of the mitigation Measures outlined below.

Further information on recommended mitigation measures can be found in **Section 9.13**.

Recommendations and commitments to future work related to Natural Environment can be found in **Section 9.14.**

9.3 Tree Inventory and Assessment

Tables 9-2 and 9-3 below outline the impacts that may be required due to the current alignments.

Table 9-2: Tree Impacts Removal

Location	Tree ID	Size (cm)	Total Quantity
Private (DR23- B Line)	T2 to T5, T11, T12	15 to 100	6

Table 9-3: Tree Impacts Injury

By-law	Tree ID	Size (cm)	Total Quantity
Private (DR23- B Line)	T10	100	1

Recommendations and commitments to future work related to Tree Inventory can be found in **Section 9.14.**

9.4 Cultural Environment

9.4.1 Built Cultural Heritage

As noted in **Section 3.2.1**, a Cultural Heritage Report was prepared in support of the Project. This section provides a preliminary assessment of the potential adverse affects that may result from the Project. The conservation of BHRs and CHLs in planning is considered to be a matter of public interest. Changes to transit infrastructure have the potential to adversely affect BHRs and CHLs by displacement and/or disruption during and after construction. These heritage resources may experience displacement (i.e., removal) if they are located within the footprint of the undertaking. There may also be potential for disruption or indirect impacts to BHRs and CHLs by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with their character and/or setting.

Methods of minimizing or avoiding a negative impact on a BHR or CHL include, but are not limited to:

- Alternative development approaches;
- Isolating development and site alteration from significant built and natural features and vistas;
- Design guidelines that harmonize mass, setback, setting and materials;
- Limiting height and density;
- Allowing only compatible infill and additions;
- Reversible alterations;
- Buffer zones, site plan control and other planning mechanisms;
- Recommendations for additional studies, including CHERs, HIAs and Strategic Conservation Plans; and,
- Alterations to project design during construction planning and project controls (i.e., vibration reduction, dust suppression or other measures).

Table 9-4 considers the potential impacts of the recommended plan on known or potential BHRs and CHLs. The Study Area for the Dufferin County Road 109 / 2nd Line Realignment was reviewed to assess impacts to identified heritage resources (**Figure 3-3**).

Table 9-4: Impacts and Preliminary Mitigation Strategies for BHRs and CHLs

RESOURCE	ADDRESS/LOCATION	DISCUSSION OF IMPACT	MITIGATION STRATEGIES
CHL-1	205328 Dufferin County Road 109	**No Impact** Rationale: The preferred alternative will be outside the boundaries of CHL-1, therefore no direct or indirect impacts are anticipated to the property.	**None required.**

RESOURCE	ADDRESS/LOCATION	DISCUSSION OF IMPACT	MITIGATION STRATEGIES
CHL-2	065252 Dufferin County Road 3	**No Impact** Rationale: The preferred alternative will be outside the boundaries of CHL-2, therefore no direct or indirect impacts are anticipated to the property.	**None required.**
CHL-3	065243 Dufferin County Road 3	**No Impact** Rationale: The preferred alternative will be outside the boundaries of CHL-3, therefore no direct or indirect impacts are anticipated to the property.	**None required.**
CHL-4	065175 Dufferin County Road 3	**No Impact** Rationale: The preferred alternative will be outside the boundaries of CHL-4, therefore no direct or indirect impacts are anticipated to the property.	**None required**.
CHL-5	065407 Dufferin County Road 3	**Potential Direct Impact** Rationale: The preferred alternative may result in a direct impact to CHL-5.	A CHER is recommended to be completed prior to selection of the Preferred Alternative to determine if the property possesses CHVI. If the property has CHVI, an HIA should also be completed to evaluate alternatives, assess potential impacts to the resource, and recommend appropriate mitigation measures.
CHL-6	065321 Dufferin County Road 3	**No Impact** Rationale: The preferred alternative will be outside the boundaries of CHL-6, therefore no direct or indirect impacts are anticipated to the property.	**None required**.

Recommendations and commitments to future work related to Natural Environment can be found in **Section 9.12.**

9.4.2 Archaeological Resources

The Stage 1 archaeological assessment was carried out in accordance with the Ministry of Citizenship and Multiculturalism's (MCM) 2011 Standards and Guidelines for Consultant Archaeologists. The resultant archaeological recommendations have been made based on the results of background historic research, an understanding of the geography and natural environment of the study area, and a detailed property inspection. Given the results of the Stage 1 archaeological assessment, it was determined that the majority of the land outside of the roadways and associated right-of-way retain archaeological potential. A Stage 2 archaeological assessment is recommended for all land determined to retain archaeological potential (**Figure 3-4**).

The Stage 2 Archaeological assessment must follow Section 2.1 of the Standards and Guidelines for Consultant Archaeologists (MCM, 2011). The Stage 2 recommendations are as follows:

- Recently ploughed agricultural fields must be subject to pedestrian survey at 5 m intervals as per Section 2.1.1 of the Standards and Guidelines for Consultant Archaeologists (2011). Prior to the pedestrian survey, the field must be ploughed and weathered to allow for ideal conditions for the identification of archaeological resources. After ploughing, soil visibility must be at least 80% in order for pedestrian survey to proceed; and
- Where ploughing is not possible, the property must be subject to a test pit survey at 5 m intervals as per Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists (2011). This recommendation includes areas of scrub overgrowth, woodlot, and manicured lawn. The test pit survey can be increased to 10 m intervals in areas of confirmed disturbance based on professional judgement.

The Stage 1 Archaeology Report has been accepted by MCM and has been entered into the Ontario Public Register of Archaeological Reports.

9.5 Transportation

The proposed improvements for the study area as described in Chapter 6 support the transportation goals and objectives of the County of Dufferin.

The Dufferin County Road 109 / 2nd Line Amaranth Realignment EA Study process confirms the function and configuration of the roadway and the preliminary design. Once the MCEA process is completed, the Study will go into detailed design to further refine the design of the roadway.

9.6 Noise

The results of the Noise Assessment indicated that the Project complies with MTO/MOE Joint Protocol and the analysis showed that the future predicted change in sound levels at all NSAs are less than 5 dB; therefore, noise control is not required and a noise control investigation was not carried out.

Construction-related activities will occur throughout the Study Area; however, a detailed construction schedule or equipment usage details are not available at this time for review. It is recommended to implement a complaint management process and noise mitigation measures on construction equipment/activities. These measures will include, but are not limited to:

- Where possible, major construction activities to be scheduled during daytime hours (i.e. 07:00 to 19:00), avoiding the nighttime period.
- The Contractor to keep the idling of construction equipment to a minimum as necessary, unless there is a safety concern, and to maintain equipment in good working order to reduce noise from construction activities.
- Equipment manufacturer recommended noise mitigation measures (e.g., muffler systems) to be installed on construction equipment and maintained in good condition.
- Where possible, the Contractor is to implement administrative controls such as maintaining setbacks from NSAs, plan activities considering timing constraints, or scheduling of specific construction activities to minimally disturb the NSAs.
- Investigate persistent complaints and implement corrective actions.
- White noise backup alarm implementation for all equipment.
- Generators if used should include sound attenuated enclosures providing all discharge of sound from the unit and related exhausts stacks with no greater than 75 decibels (A-weighted) at a distance of seven metres from the unit.
- The contractor is to ensure clear and frequent communication with the Town and relevant authorities as considered reasonable to work within the spirit of applicable noise by-laws. All reasonable attempts should be made including public notification and mitigation measures to reduce noise.

9.7 Air Quality

The Air Quality Impact Assessment (AQIA) report indicated the following potential impacts from the Project. Further details on the full extend of the impacts can be found in the AQIA Section 6 in **Appendix L**.

- The Project is expected to result in a significant increase in traffic volume within the Study Area.
- Emissions of carbon monoxide, benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, and benzo(a)pyrene are expected to decrease for the future (2041) Project full build and Project no build scenarios when compared to the existing (2023) scenario. Overall, the decrease in emissions of these contaminants in the Project full build scenario indicates that the Project is not expected to adversely impact air quality in the Study Area.

- Emissions of NO_2, TSP, PM_{10}, and $PM_{2.5}$ are expected to increase for the future (2041) Project full build and Project no build scenarios when compared to the existing (2023) scenario as a result of increase future traffic volumes. The highest increase was predicted for the Project full build scenario; however, it is predicted that overall emissions of NO_2 will further decrease with advancements in vehicle technology, fuel efficiency and exhaust control efficiency, and particulate emissions can be mitigated.

The GHG emissions in the Study Area are summarized in **Section 9.8 Climate Change** and outlined in detail in the Air Quality Impact Assessment report.

Further information on recommended mitigation measures can be found in **Section 9.13**.

9.8 Climate Change

The impacts to Climate Change are as follows. Further information can be found in the AQIA in **Appendix L**.

- The GHG emissions in the Study Area were predicted to increase for the Project full build scenario when compared to the Project no build scenario as a result of a significant increase in AADT and VMT in the Study Area; however, the increase in GHG emissions is less than the increase in AADT and VMT.
- The GHG emission data indicates that the Project full build is not expected to have a significant impact on Dufferin County and provincial GHG targets.
- It is expected that overall emission rates beyond 2041 will further decrease with advancements in vehicle technology, fuel efficiency and exhaust control efficiency. Emission rates are also expected to decrease as public transit and alternative transportation uses in the area increases to continue to support the reduction of emissions to meet the regional and provincial GHG targets.

The MECP guide Consideration of Climate Change in Environmental Assessment in Ontario sets out ministry expectations and supports the province's Climate Change Action Plan by outlining climate change considerations for environmental assessment studies.

The guide notes 'climate considerations' within a project means that consideration has been given to methods to reduce greenhouse gas emissions and developing a design that is more resilient to future changes in climate and helps maintain the ecological integrity of the local environment in the face of a changing climate. Specifically, proponents are encouraged to consider mitigation (how the project might mitigate climate change) and adaptation (measures to adapt to climate change or make the project more resilient to the effects of climate change). Considering how a project may contribute to climate change through its greenhouse gas emissions or its effects on the natural landscape is important to the planning process as it allows proponents to consider climate mitigation measures to avoid, minimize, or offset such effects.

To mitigate potential effects during the construction phase of the project, the following best practices, or the most current best practices, will be implemented:

- Develop and implement detailed erosion and sediment control measures to be carried out during all construction phases in order to limit the amount of sediment/laden material entering receiving drainage systems.
- Dust suppression techniques to be employed for the duration of construction activities.

- A traffic staging plan will be developed during detailed design to accommodate local access. Opportunities to reduce idling will be considered further during detailed design.
- Potential effects to consider pertaining to construction include the greenhouse gas (GHG) emissions associated with the construction period, including the physical machinery and equipment, travel distance and time for construction workers to travel to and from the site, and sourcing building materials. The construction vehicle movement and access to the site are to be described in the contract documents to be prepared in detailed design. Idling and hours of work conditions will also be considered within the contract documents.

To mitigate potential impacts during the operational phase of the project, aligning with best practices for infrastructure design, practices such as more frequent monitoring and maintenance and improvement of road design to adapt to climate change impacts and minimize impact to individuals within the Dufferin County Road 109 Realignment EA study area in the future may include (but are not limited to):

- Erosion protection techniques developed during detailed design to limit the extent of erosion in the vicinity of the watercourse crossings along the study corridor.
- As the amount of impervious surfaces are increased, appropriate stormwater capacity should be considered to mitigate additional runoff, climate change and the likelihood of extreme precipitation.

The County of Dufferin's Approach to Considering Climate Change:

Dufferin County released a Dufferin Climate Action Plan in in 2021 to document their actions in addressing climate within the County. They have set a target of net-zero by 2050 with a three-phase emissions reduction timeline. Recognizing the importance of aligning and integrating climate planning with the larger development goals of Dufferin County, the Dufferin Climate Action Plan is guided by the following pillars, encompassing the goals articulated in the Dufferin County Official Plan:

- Community vitality: Dufferin County will foster equitable, complete, healthy, and sustainable communities and enhance the quality of life for all residents.
- Environmental sustainability: Dufferin County will protect, restore, or where possible, enhance natural resources, groundwater resources, natural heritage features, and the environment to foster an enhanced and connected natural heritage system.
- Smart communities: Dufferin County will promote economic development and diversification in established settlement areas, while preserving and protecting agricultural areas and the rural and natural character of the County.

Over the next five years the County has a plan to respond quickly and accurately to the climate change crisis.

The County's five goals are the following:

- Develop a municipally led financing program for home energy retrofits to encourage and make the uptake of deep energy retrofitting and energy efficiency measures more accessible for residents.
- Accelerate the transition to low-GHG transportation by developing an electric vehicle charging network across Dufferin and neighbouring municipalities.

- Empower the community to take climate action by institutionalizing climate action in municipal planning and supporting community awareness, education, and knowledge sharing initiatives.
- Support climate-resiliency initiatives in agricultural and natural systems to enhance food security, support local farmers, and protect natural systems.
- Create green development standards to ensure new development is environmentally, socially, and economically sustainable.

9.9 Drainage and Stormwater Management

As part of the Project a Drainage and Stormwater Management Report was prepared to fulfill the Class EA requirements. The Drainage and SWM Report documented the hydrologic and hydraulic analysis of the existing drainage features, determined acceptable opening sizes for culvert crossings and proposed a feasible preliminary stormwater management strategy for the proposed roadways.

The recommended plan will result in a slight increase in impervious area compared to the existing land use. Increased pavement areas as a result of the preferred alignment are proposed to be addressed by stormwater quality treatment and quantity control measures designed according to the requirements. The drainage recommendations are summarized in **Section 7.7.**

9.10 Contamination

Property Acquisitions for Environmental Due Diligence: For the purpose of the undertaking for the Dufferin County Road 109 / 2nd Line Amaranth Realignment Schedule C Municipal Class Environmental Assessment, if property acquisitions are required within APECs with high or moderate potential for contamination, it is recommended that property specific Phase I ESAs (and if necessary, Phase II ESAs) be completed in such areas in support of the property acquisition.

Excess Soil Management: WSP understands that associated design and construction activities for the Dufferin County Road 109 / 2nd Line Amaranth Realignment Schedule C Municipal Class Environmental Assessment undertaking may generate excess/surplus soil which will require the management of soil both on-site and off-site in compliance with the Ministry of the Environment, Conservation and Parks (MECP) “Excess and On-Site Management Regulation” (O.Reg. 406/19 – On-Site and Excess Soil Management). The Excess Soil Reuse Planning requirements include the generation of some or all of the following documents/components: Assessment of Past Uses, Sampling and Analysis Plan, Soil Characterization Report, Excess Soil Destination Assessment Report, Filing of Notice on Registry, and Soil Tracking. In areas where excess soil may be generated at the Site, soils shall be managed in accordance with O.Reg.406/19.

No additional environmental investigations are recommended for APECs with a low potential for contamination at this time. Further activities may be required depending on future changes.

9.11 Hydrogeology

Excavation activities associated with the realignment project are anticipated to be shallow (i.e., less than 3 mbgs). If the final design for the project requires excavation depths greater than 3 mbgs, then groundwater dewatering will potentially need to be addressed. Additional potential impacts from the road realignment construction activities are discussed in the following sections.

As specified in **Section 3.8,** the well record search indicates that there are water wells present within 500 m of the Study Area. The potential impact from the road realignment construction activities is not expected to be significant based on the anticipated shallow depth of construction in relation to groundwater levels. However, WSP recommends a door-to-door water well survey be completed during detailed design. The purpose of the survey is (1) to confirm the existence of wells and water use at the properties identified in the well record search and (2) to obtain background information with respect to groundwater quality. A questionnaire shall be prepared and filled out with the well owners to obtain well details, including water levels (if possible), water quality issues, previous quantity issues, and additional well-related information. During this process, shallow wells shall be identified that may be impacted as part of the construction activities. A monitoring and mitigation plan shall be prepared.

The source water protection search indicates that the Study Areas is within vulnerable areas. The vulnerable areas include WHPA (WHPA-B for Study Area 1, WHPA-D for Study Area 2), and issue contributing areas (contaminants of concern include sodium and chloride), SGRA, WHPA-Q1, and WHPA-Q2. In addition, Study Area 1 is in an HVA. These factors will need to be taken into consideration when preparing the final design of the road realignment.

Vulnerable areas WHPA-B and WHPA-D indicate how long contaminants from land-based activities will take to travel to a well within the area. The final design of the realignment project will need to take into consideration impacts from working within the WHPA-B and WHPA-D areas. For example, during road construction activities, unintentional spills of fuel or hydraulic fluids from heavy machinery can occur. Spill kits should be present near the construction areas to limit the impact of potential spills.

The issue contributing contaminants in the Study Area are sodium and chloride. The Grand River Source Protection Plan indicates that road salt, the storage of snow, and sewage systems are the threat policy categories that identify chloride and sodium as an issue (Lake Erie Region Source Protection Committee, 2022b). Sewage systems are also associated with nitrate and trichloroethene. As these contaminants are not reported as an ICA contaminant in the Study Areas, it is likely that the chloride and sodium are from road salt and the storage of snow. The CTC Source Protection Plan recognizes that the main source of sodium and chloride in snow is from road salt, and that the application of road salt is a drinking water threat anywhere in an ICA for sodium and chloride (CTC Source Protection Committee, 2022). Both Source Protection Plans require a risk management plan for the handling of and storage of salt on public roads. The risk management plan requires provisions for the reduction of salt usage and the use of certified contractors for salt applications (CTC Source Protection Committee, 2022; Lake Erie Region Source Protection Committee, 2022b).

The Study Area is in a SGRA and in an HVA, the potential for sediment migration from the construction activities should be addressed. It is considered best practice to initiate a pro-active Erosion and Sediment Control (ESC) plan for any groundwater receptors in the Study Areas. ESC best practices should be applied during all phases of the project to prevent sediment-laden runoff from entering any known precipitation recharge area.

The potential impact from the road realignment construction activities is not expected to be significant based on the anticipated shallow depth of construction. Since dewatering is not anticipated due to the shallow construction depths, no mitigation is expected to be required as part of the WHPA-Q1 and WHPA-Q2. However, if the road alignment creates a greater impervious surface area compared to the previous road design, a slight decrease to the area available for groundwater recharge could result and mitigation action items would be necessary to compensate for the reduced recharge area. This will need to be discussed with the local conservation authorities.

A review of available maps indicated that there are no sensitive surface water features or wetland features within either Study Area boundary. There are two tributaries in the Study Area. These surface water features are not expected to be affected from the road realignment construction activities.

Further information on recommended mitigation measures can be found in **Section 9.13**.

9.12 Design and Construction Considerations

9.12.1 Potential Impacts During Construction

Commitments to future works specific to each technical discipline are summarized in **Section 9.13**. in this chapter of the ESR. This section summarizes the commitments to future work associated with general design and construction of the proposed undertakings within the EA study area.

- During the detailed design stage and prior to construction, Dufferin County will be responsible for obtaining the permits, registrations and/or approvals discussed further in Section 9.16.
- It is intended that the works proposed are executed in such a manner, which to the fullest possible extent, minimizes any adverse effects on the natural environment of the study area. The Contractor will be responsible to ensure all their personnel are sufficiently instructed so that the work is carried out in a manner consistent with minimizing environmental impact. The County will assign a qualified environmental inspector whose responsibility will be to ensure compliance with the environmental objectives.

9.12.2 Disposal of Excess Materials

Surplus excavated material shall be removed to locations arranged by the Contractor. Prior to the disposal of any surplus excavated material, the Contractor will provide the Engineer with a sketch of the dumping site(s) showing access thereto. A written statement from the property owner(s) agreeing to allow the disposal of fill on the property must be approved by the Engineer.

MECP's current guidance document "On-Site and Excess Soil Management" (O.Reg. 406/19) will be adhered to for all activities associated with the management of excess soil during construction.

Upon completion of the disposing, levelling, and grading of surplus excavated material on any property, the Contractor shall obtain a written statement from the property owner(s) releasing the Contractor and County from any claims and accepting the condition of the property as satisfactory.

9.12.3 Mud and Dust Control

The Contractor shall take such steps as may be required to prevent dust nuisance resulting from their operations. The Contractor shall be responsible for all dirt and mud that is tracked onto the roadways from vehicles entering or leaving the job site. The Contractor shall, upon request from the CA, immediately proceed with cleanup operations, or in the opinion of the CA, the Contractor has not or cannot sufficiently remove the mud from the road, the CA will proceed with the necessary clean up.

9.12.4 Indigenous Community Engagement

Dufferin County remains committed to engagement of Indigenous Communities and will continue to provide information, obtain feedback, and extend the invitation to meet with Indigenous Communities during detailed design.

9.13 Summary of Mitigation Measures

Table 9-5 below summarizes the mitigation measures to be implemented during detailed design.

Table 9-5: Mitigation Measures to be Implemented During Detailed Design

ID #	Category	ID #	Environmental Concern	Proposed Mitigation Measures and / or Detailed Design Commitments
1.0	Natural Environment	1.1	Vegetation	▪ Clearly delineate vegetation clearing and retention zones on contract documents. ▪ Limit vegetation removals to the extent required for construction, and as delineated on contract drawings. Trees shall not be removed from beyond the grading limits. ▪ Employ appropriate vegetation clearing techniques (e.g., trees to be felled away from retained natural areas and watercourses, trimming of damaged branches and roots). ▪ Implement standard practices such as sediment and erosion controls, spill prevention, etc. during the construction phase of the project. ▪ Conduct equipment maintenance and refueling at the designated and properly contained maintenance areas in the works yard or at commercial garages located well away from watercourses and outside retained vegetation areas. The Contractor will have a Spills Prevention Plan and required materials on site at all times. ▪ Stabilize and re-vegetate exposed surfaces as soon as possible following disturbance, specifically within 15 days near watercourses and within 45 days in graded areas. Re-vegetate with CVC Seed Mix 1 (Upland Mix), to ensure each ecosite is returned to pre-construction condition or better. Seed mix and cover crop details are provided in the CVC Plant Selection Guideline (CVC 2018). ▪ Develop planting plans for the road relocation (to be developed at detail design) that utilize plant species that are native to this region of Ontario. ▪ Implement dust control using water, not chemical suppressants. ▪ Ensure equipment arrives on site in clean condition, operated on dry land and in a manner that minimizes disturbance to watercourses and vegetation. ▪ Follow the Clean Equipment Protocol for Industry, as prepared by the Peterborough Stewardship Council and Ontario Invasive Plant Council (May 2016). ▪ Implement environmental inspection during construction to ensure that all mitigation measures are implemented properly, maintained, and repaired, and remedial measures are initiated in a timely manner where warranted.
		1.2	Wildlife and Species at Risk	MECP should be contacted through the Information Gathering Form process in order to determine if there are any permitting or NOA/registration needs associated with the ESA prior to finalization of the design and construction.
		1.3	Significant Wildlife Habitat	For the protection of wildlife in general, the contractor should ensure that: ▪ Any wildlife incidentally encountered during construction will not be knowingly harmed and will be allowed to move away on its own. In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. ▪ Any equipment parked overnight in the area will also be inspected to ensure no wildlife have climbed into or beneath it. ▪ All disturbed areas will be restored to pre-construction conditions.
		1.4	Nesting Migratory Birds	In order to protect nesting migratory birds, in accordance with the MBCA, the contractor should ensure that: ▪ No active nests (nests with eggs or young birds) will be removed or disturbed in accordance with the Migratory Birds Convention Act (MBCA 1994). ▪ No vegetation clearing (including grubbing and removal of trees, shrubs, and grasses) will occur during the bird nesting season (**April 1 to August 31**). ▪ Should large trees be required to be removed, an evaluation by a qualified biologist will be completed to exclude the possibility of use by protected migratory species (e.g., Pileated Woodpecker).
		1.5	Species at Risk	To protect the species and any other SAR generally, the following mitigation measures will be implemented and specified within the Contract documents: ▪ If a SAR is encountered within or adjacent to the construction site and construction activities are such that continuing construction in that area would result in a contravention of the ESA (2007), all activities that would result in a contravention will stop, and the Contractor will contact the MECP SAR Biologist to discuss next steps. SAR Birds: ▪ Adhere to mitigation measures outlined in **Section 9.2.3** for MBCA compliance to avoid impacts to SAR bird species potentially nesting in the work area or vicinity.
		1.6	Impacts to Trees	As the design progresses further detail will be provided during the Detail Design Study with respect to tree injury and removal. Additional work could include: Arborist Report, which details tree impacts, pruning, tree protection measures and mitigative measures; Site Plan & grading plans; Tree Preservation Plans, which illustrate tree removals, impacts, pruning, protection and mitigative measures; Restoration Plans, which illustrate location of proposed tree planting; and Permit applications.

ID #	Category	ID #	Environmental Concern	Proposed Mitigation Measures and / or Detailed Design Commitments
2.0	Cultural Heritage	2.1	Impacts to potential cultural heritage resources.	▪ Storage and construction staging areas should be appropriately located and/or planned to avoid impacts to any of the identified CHLs. ▪ A CHER should be completed for CHL-5 to establish whether this property possesses CHVI. If the property is found to possess CHVI, an HIA should also be completed to determine appropriate alternatives or mitigation measures early in the project. ▪ Storage and construction staging areas should be appropriately located and/or planned to avoid impacting any of the identified CHLs. ▪ Should future work require expansion of the Dufferin County Road 109 and 2nd Line Amaranth Realignment Study Area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on known or potential BHRs and CHLs.
3.0	Archaeological Resources	3.1	Parts of the study area retain potential for the presence of archaeological resources.	The Stage 1 archaeological assessment determined that the majority the study area has archaeological potential and requires Stage 2 archaeological assessment to determine the presence/absence of archaeological resources. Areas visually confirmed to have been previously disturbed where archaeological integrity has been compromised include roadways and their associated right-of way disturbance (i.e. grading, berms, ditching), building footprints, and areas with subsurface utilities. Areas of steep slope greater than 20° are considered to have low archaeological potential. Areas with no or low archaeological potential do not require further archaeological assessment. The Stage 2 Archaeological assessment must follow Section 2.1 of the Standards and Guidelines for Consultant Archaeologists (MCM, 2011). The Stage 2 recommendations are as follows: ▪ Recently ploughed agricultural fields must be subject to pedestrian survey at 5 m intervals as per Section 2.1.1 of the Standards and Guidelines for Consultant Archaeologists (2011). Prior to pedestrian survey, the field must be ploughed and weathered to allow for ideal conditions for the identification of archaeological resources. After ploughing, soil visibility must be at least 80% in order for pedestrian survey to proceed; and, ▪ Where ploughing is not possible, the property must be subject to test pit survey at 5 m intervals as per Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists (2011). This recommendation includes areas of scrub overgrowth, woodlot, and manicured lawn. Test pit survey can be increased to 10 m intervals in areas of confirmed disturbance based on professional judgement.
4.0	Agriculture	4.1	Impacts to or loss of Agricultural Lands	Specific to this project, mitigation measures would include: ▪ Maintaining field and farm operation access. ▪ Creation of new roadside drainage ditches and maintaining the existing roadside drainage ditch system to allow for continued surface drainage patterns. ▪ Limiting the use of tall streetlights that cast or direct light onto agricultural fields. Certain light systems have a negative effect on agricultural crops (soybean in particular). ▪ Maintaining local road access or traffic detouring during construction to allow access for the movement of oversized agricultural vehicles and equipment. ▪ The use of appropriate signage (as necessary) to direct traffic during construction. ▪ Implementing erosion control measures (silt fencing, mulch, erosion control blankets) during construction. ▪ Applying seed and mulch, or erosion control blankets in areas of soil disturbance to provide adequate and long-term slope protection. ▪ Placing strawbales or other flow checks in ditches down slope from areas of soil disturbance.
5.0	Land Use	5.1	Agriculture	▪ Impacts on agriculture uses shall be minimized. ▪ Incorporate the mitigation recommendations from the Agricultural Impact Assessment that has been undertaken separately as part of this Class EA study. ▪ Continue consultation with property owners during detailed design.
		5.2	Commercial and Industrial	▪ Access will be maintained to properties during construction. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
		5.3	Residential (Rural)	▪ Impacts to property shall be minimized. ▪ Advanced notice will be provided to property owners to notify them of construction start and any disruptions to existing accesses, as well as construction contractors and/or County's contact information. Access to all properties will be maintained. ▪ The County will continue consultation with impacted property owners during detail design. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.

ID #	Category	ID #	Environmental Concern	Proposed Mitigation Measures and / or Detailed Design Commitments
		5.4	Cultural Heritage and Archaeology	▪ Access will be maintained to properties during construction. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
		5.5	Institutions and Community Facilities	▪ Access will be maintained to properties during construction. ▪ Construction will be completed in accordance with the Municipal Noise By-laws and their standard construction measures for noise. ▪ Emissions from construction operations will be managed through best management practices for construction operations and monitoring and mitigation requirements will be considered.
6.0	Noise	6.1	Noise During Construction	A detailed construction schedule and equipment usage are not available at this stage. The construction noise impact is temporary in nature and is unavoidable. It is recommended to implement a complaint management process during construction activities and to implement noise mitigation measures on construction equipment/activities. Where possible, it is recommended to include construction noise control requirements in contract documents, as discussed within this report.
7.0	Air Quality	7.1	Potential adverse impact local air quality during construction.	To mitigate construction activities a Construction Air Quality Management Plan (CAQMP) should be developed to address construction equipment vehicle exhaust, potential traffic disruptions and congestion, fugitive dust, and odour. Potential mitigation measures that may be incorporated in the CAQMP include: ▪ Dust suppression measures (e.g., application of water wherever appropriate, or the use of approved non-chloride chemical dust suppressants, where the application of water is not suitable); ▪ Use of dump trucks with retractable covers for the transport of soils and other friable materials; ▪ Minimize the number of loadings and unloading of soils and other friable materials; ▪ Minimize drop heights, use enclosed chutes, and cover bins for debris associated with deconstruction of affected structures; ▪ Washing of equipment and/use of mud mats where practical at construction site exits to limit the migration of soil and dust off-site; ▪ Stockpiling of soil and other friable materials in locations that are less exposed to wind (e.g., protected from the wind by suitable barriers or wind fences/screens, or covered when long-term storage is required) and away from sensitive receptors to the extent possible; ▪ Reduction of unnecessary traffic and implementation of speed limits; ▪ Permanent stabilization of exposed soil areas with non-erodible material (e.g., stone or vegetation) as soon as practicably possible after construction in the affected area is completed; ▪ Ensuring that all construction vehicles, machinery, and equipment are equipped with current emission controls, which are in a state of good repair; and ▪ Dust-generating activities should be minimized during conditions of high wind.
8.0	Hydrogeology	8.1	Impacts to Groundwater	▪ A ground inspection of the tributaries shall be completed. The tributary bisecting the Study Area was determined to be a historical headwater drainage feature based on visual inspection. The second tributary, located northeast of County Road 109, should be located to confirm the status of the tributary. Results of the tributary ground inspection may impact the final design of the realignment project. The tributary should be evaluated to assess the potential for groundwater input. ▪ Precise groundwater elevations could not be determined for the Study Area based on the reviewed data. WSP recommends that a robust hydrogeological program be implemented during detailed design to assess groundwater elevations and potential dewatering. This would include installation of monitoring wells in cooperation with the geotechnical and environmental field programs. A groundwater monitoring program is recommended to be implemented during detailed design, along with single well hydraulic testing and groundwater quality sampling to be tested against Provincial Water Quality Objectives (PWQO). Sodium and chloride shall be included in all water quality samples taken as part of the field program due to the proximity of the Orangeville water supply wells. ▪ A door-to-door private water well survey shall be completed for all potential water well owners within 500 m of the two Study Areas as part of detailed design. A questionnaire shall be prepared and filled out with the well owners to obtain well details, including water levels, water quality issues, previous quantity issues, etc. Shallow wells shall be identified that may be impacted as part of the work. ▪ WSP recommends implementing an ESC plan for any groundwater receptors in the Study Area. ESC best practices should be applied during the construction, clean-up, and restoration to prevent sediment-laden runoff from entering any known precipitation recharge area.
9.0		9.1	Impacts to Erosion and Sediment Control	**Vegetative**: ▪ All areas not subject to active construction 30 days after area grading should be top soiled and seeded immediately after completion of such grading.

ID #	Category	ID #	Environmental Concern	Proposed Mitigation Measures and / or Detailed Design Commitments
	Drainage and Stormwater Management			▪ Immediately following seed application, a straw erosion control blanket should be installed on any exposed slopes adjacent to sensitive features. **Structural:** ▪ As construction proceeds, diversion swales should be graded where needed along the right-of-way boundaries to intercept drainage from external areas and direct it away from exposed surfaces. ▪ Temporary silt fencing and sedimentation traps should be placed around inlets and outlets from existing culverts in the drainage system. ▪ All culvert work should be conducted “in the dry”. ▪ Temporary silt fencing should be installed around sensitive vegetative features. ▪ Flow check should be provided in roadside ditches. ▪ Additional erosion control works may be required during the course of construction. These may consist of silt fences, swales, and/or diversion berms. The location and need for these works will be established in the field.
		9.2	Hydraulic Commitments	▪ Three new culverts (C6, C7 and E13A) are recommended to be added into the drainage system due to the proposed design. Culvert E13 is being removed and slightly relocated. ▪ Culvert C4 and E12 are recommended to be abandoned. ▪ Proposed culverts were sized based on the available data and they should be further confirmed during the detailed design. ▪ Under proposed conditions, two storage facilities are being proposed for quantity control. Storage facility A requires a volume of 390 m^3 and storage facility B requires a volume of 2228 m^3 to store events up to the 100-year event. ▪ Under proposed conditions, grass swales and OGS units will be utilized for quality control.
10.0	Contamination Overview	10.1	Several potentially contaminating activities were identified, and multiple APECs were identified within the Study Area.	If property acquisitions are required within APECs with high or moderate potential for contamination, it is recommended that property specific Phase I ESAs (and if necessary, Phase II ESAs) be completed in such areas in support of the property acquisition.
11.0	Excess Soils	11.1	Excess Soil Management	The Excess Soil Reuse Planning requirements include the generation of some or all of the following documents/components: Assessment of Past Uses, Sampling and Analysis Plan, Soil Characterization Report, Excess Soil Destination Assessment Report, Filing of Notice on Registry, and Soil Tracking. In areas where excess soil may be generated at the Site, soils shall be managed in accordance with O.Reg.406/19. MECP’s current guidance document “On-Site and Excess Soil Management” (O.Reg. 406/19) will be adhered to for all activities associated with the management of excess soil during construction.

9.14 Detailed Design Commitments

Environmental concerns, anticipated impacts, and proposed mitigation measures as they relate to the project, have been described in Chapter 9. Many of the environmental concerns have been mitigated through the process by which the recommended design was selected, as described in the ESR. This section provides an additional list of standard commitments to be carried forward into Phase 5 of the MCEA process – Implementation Phase. These commitments have been developed through consultation with various agencies throughout the study process. It is recognized that certain decisions require specific agency input. Therefore, a key component of detailed design is refining and detailing the impact assessment and mitigation measures as the design is developed and refined, in consultation with the agency staff.

Commitments during detail design include:

- Conduct targeted Bobolink / Eastern Meadowlark Surveys (i.e., three site visits during the breeding bird season) to further assess habitat potential and to confirm whether SAR grassland birds are utilizing habitats that may be impacted by the proposed works.
- Conduct breeding bird surveys concurrently with two of the Bobolink / Eastern Meadowlark Surveys, in the remainder of the Study Area to determine the presence of additional potential SAR and SWH.
- Further assess fish and fish habitat, specifically to characterize the drainage feature on the Site, assess potential impacts to this feature and develop mitigation measures.
- Conduct a Headwater Drainage Feature assessment using CVC or TRCA methodology, and develop suitable mitigation measures, as required.
- As the design progresses further detail will be provided during the Detail Design Study with respect to tree injury and removal. This information would be provided in accordance with Urban Forestry requirements, for example:
    - Arborist Report, which details tree impacts, pruning, tree protection measures and mitigative measures;
    - Site Plan & grading plans;
    - Tree Preservation Plans, which illustrate tree removals, impacts, pruning, protection and mitigative measures;
    - Restoration Plans, which illustrate location of proposed tree planting;
    - Permit applications.
- A CHER should be completed for CHL-5 to establish whether this property possesses CHVI. If the property is found to possess CHVI, an HIA should also be completed to determine appropriate alternatives or mitigation measures early in the project.
- A Stage 2 archaeological assessment must be completed to determine the presence/absence of archaeological resources.
- A door-to-door private water well survey shall be completed for all potential water well owners within 500 m of the Study Areas as part of detailed design.
- If property acquisitions are required within APECs with high or moderate potential for contamination, it is recommended that property specific Phase I ESAs (and if necessary, Phase II ESAs) be completed in such areas in support of the property acquisition.
- Detailed geotechnical investigation shall be conducted through detailed design development for the entire road network within the EA study area.

- Utility conflict analysis and SUE Level 'A' shall be done as part of the detailed design for any identified utility relocations.
- Paula Court will be reviewed further in Detail Design for potential updates to an urban cross section (i.e. including sidewalk/pedestrian access to Dufferin County Road 23).
- Stormwater management will be reviewed if there are updates to the cross sections during Detail Design.

Topographic survey within the proposed property lines for re-aligned 2nd Line Amaranth, re-aligned Dufferin County Road 23 and Paula Court extension shall be completed to inform the detailed design work. .Specific mitigation measures have been selected and committed to by Dufferin County to address potential impacts as discussed in **Section 9.13.** It is recommended that these commitments, as presented in the ESR, become part of the contract package so that Contractors are aware of the requirements prior to tendering. Monitoring of construction activities must ensure that all environmental standards and commitments for construction are met. Dufferin County will work with other authorities during detailed design and prior to the start of construction to ensure that the proposed works are acceptable and to obtain required permits.

Environmental monitoring will be combined with construction supervision to include periodic site visits and inspections throughout the course of the work.

9.15 Monitoring And Maintenance

A general monitoring program will be developed during detailed design which shall be implemented during construction to measure and monitor any potential project impacts on watercourses, including identifying contingency measures to mitigate or minimize the impact, if any.

During construction, the Contractor and on-site Contract Administrator will ensure that implementation of mitigating measures and key design features are consistent with the contract and external commitments (e.g. permit conditions/requirements and EA commitments). Mitigation measures shall be implemented and maintained by the Contractor who will ensure that the natural, social, and economic environments are not impacted by the construction activities and/or that impacts are minimized.

In addition, the effectiveness of the environmental mitigating measures will be assessed to ensure that:

- Individual mitigation measures are providing the expected control and/or protection; and
- Additional mitigation measures are provided, as required, for any unanticipated environmental issues that may develop during construction.

The Contractor will ensure that the environmental measures outlined in this ESR (Section 9) and further developed during detailed design are carried out. In an event that issues arise, appropriate agencies will be contacted to provide further input. If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation will be changed or modified to reduce those impacts.

The Contractor will also ensure that items such as sedimentation controls and appropriate signage are maintained throughout construction. Appropriate signage shall be implemented to identify detour routes at the time of temporary roadway/sidewalk closures. In addition, closure events and restricted access to local residents and/or businesses shall be planned to accommodate vehicle and pedestrian movement during construction.

9.16 Permits, Approvals and Future Commitments

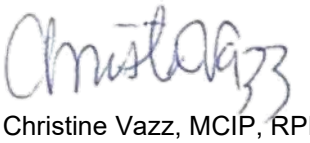
Following the successful completion of the Municipal Class EA process documented in this ESR, all EA requirements will have been met. Other approval requirements will be addressed for the project during detailed design which include:

- *Ontario Heritage Act* requirements for Archaeological Clearance.
- Notifications/permissions for respective utilities with facilities in the area.
- Permitting, Registration or Approvals under the ESA have not been confirmed. Once further field investigations are completed to confirm presence / absence and potential impacts, consultation with MECP will be required at detailed design to confirm requirements for species protected under the ESA.

Signature Page

WSP Canada Inc.

Andrea Dorton
Environmental Planner



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APPENDIX A

Socio-Economic Memo

APPENDIX B

Agricultural Impact Assessment Report

APPENDIX C

Cultural Heritage Report

APPENDIX D

Stage 1 Archaeological Assessment Report

APPENDIX E

Environmental Impact Study Report

APPENDIX F

Tree Impact Memo and Tree Management Plan

APPENDIX G

Traffic Analysis Report

APPENDIX H

Drainage and Stormwater Management Report

APPENDIX I

Hydrogeological Assessment Report

APPENDIX J

Detailed Assessment and Evaluation Tables

APPENDIX K

Contamination Overview Study

APPENDIX L

Air Quality Impact Assessment Report

APPENDIX M

Noise Assessment Report

APPENDIX N

Preliminary Design Plan

APPENDIX O

Construction Staging

APPENDIX P

Consultation and Engagement Summary

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