City of St. Catharines

Moffatt Street Secondary Access Municipal Class Environmental Assessment Study Environmental Study Report

December 2021

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City of St. Catharines

Environmental Study Report

Moffatt Street Secondary Access

Municipal Class Environmental Assessment (EA) Study

City Project Number P19-066-1

Prepared by: _____

Kate Barclay, EIT

Verified by: _____

David Hiett, P.Eng.

Verified by: _____

Stephen Keen, P.Eng.

Executive Summary

The City of St. Catharines has completed a Municipal Class Environmental Assessment (Class EA) to explore viable options for a secondary access to Moffatt Street. The study was carried out as a Schedule C project in accordance with the Municipal Class EA document (October 2000, amended in 2007, 2011, and 2015), as approved under the Ontario Environmental Assessment Act.

Moffatt Street is a local roadway situated in an isolated pocket of residential homes on the west side of the Old Weiland Canal. The Moffatt Street neighbourhood is bounded by Highway 406 to the west and north, the Old Weiland Canal to the east, and a Canadian National (CN) Railway to the south. Currently, vehicles access the neighbourhood via Disher Street. There is an emergency access across the CN Railway at the south end of Moffatt Street; however, this access is not always maintained. A section of the Merritt Trail is in the study area and has several access points. The study area is shown in **Figure 1**.

Existing Conditions

Existing conditions of the study area were collected and reviewed, through the following and further detailed in **Chapter 2**:

- Various background studies and reports;
- Investigations undertaken as part of this Class EA study (e.g., Cultural Heritage Resource Assessment, Stage 1 Archaeological Assessment, Natural Heritage Assessment, Phase I Environmental Site Assessment, site visits, etc.);
- Consultation with the City Project Team, relevant City Staff, Agencies and Key Stakeholders; and
- Consultation with members of the public, (including two virtual Public Information Centres).

Problem and Opportunity Statement

Moffatt Street is approximately one kilometer long and provides access to over 200 homes. The street is effectively a cul-de-sac and accessible via Disher Street. In emergency situations where Disher Street is closed, the Moffatt Street neighbourhood is landlocked and a suitable second access for vehicles is not available. Based on Institute of Transportation Engineers (ITE) guidelines, Moffatt Street significantly exceeds the threshold for a second access in terms of the number of dwellings and length of cul-de-sac. There is ongoing infill and redevelopment in the area surrounding Moffatt Street,

and as the density of the residential area increases, the need for a second access becomes more critical.

There is an opportunity to improve access for residents / emergency vehicles and eliminate the safety concerns associated with the Moffatt Street neighbourhood being isolated in situations where Disher Street is closed.

Evaluation of Alternative Solutions

The following Alternative Solutions were considered to address the problems and opportunities:

1) Do Nothing: Maintain existing road network within the study area, i.e. residents and emergency services continue to use Disher Street to access Moffatt Street
2) Provide a Secondary Access to Moffatt Street: construct a new connecting link to provide another access to serve the Moffatt Street neighbourhood
3) Transit Demand Management (TDM): improvements to existing or new transit routes to improve public mobility
4) Improvements to Existing Infrastructure: widening or upgrading the existing road network

The Alternative Solutions were assessed in their ability to reasonably address the problems and opportunities. ‘Do Nothing’, ‘TDM’, and ‘Improvements to Existing Infrastructure’ were screened out because they do not address the need to improve access for residents / emergency vehicles or eliminate safety concerns associated with the isolation of the Moffatt Street neighbourhood in situations where Disher Street is closed. ‘Provide a Secondary Access to Moffatt Street’ was carried forward for further consideration because it addresses the need for a secondary access to Moffatt Street.

Due to barriers such as Highway 406 and the CN Railway, the most viable connection to Moffatt Street is between Moffatt Street and Oakdale Avenue, crossing over the Old Welland Canal. Several locations for a new connection were considered and assessed. The selection process was conducted in two phases: high-level screening focusing on general road location; low-level screening focusing on road alignment. Based on the selection process results, a secondary access to Moffatt Street between Marshall Lane and Abbot Street (Alternative 1C) was identified as the preferred solution. The long list of alternative solutions is further detailed in **Chapter 3**.

Evaluation of Alternative Structural Design Concepts for the Preferred Solution

To provide a secondary access to Moffatt Street between Marshall Lane and Abbot Street a new crossing of the Old Welland Canal is required. Five structural design concepts were considered, including three structural culvert and two bridge options. The bridge options were not carried forward because they have extensive foundation requirements and require the road profile (height of the road) to be raised to accommodate the structure. The profile raise would result in additional footprint impacts and cost.

The remaining structural culvert options were evaluated based on the following criteria: bridge aesthetics, durability, ease to build (constructability), construction duration, environmental impact during construction, and construction cost. Based on the evaluation and feedback received from the public and other stakeholders, Option A – Single Cell Precast Arch Culvert, was identified as the preferred design concept. The evaluation is further detailed in **Chapter 4**.

Consultation

An extensive stakeholder consultation and engagement program was undertaken to assist the planning and decision-making process. Throughout the study, the public, external agencies, and Indigenous Communities were engaged to provide input. Key milestones of the consultation program included:

- Notice of Study Commencement published in the local newspaper on September 25, 2020, and mailed to area property owners, agencies, and other stakeholders;
- Virtual Public Information Centre #1 held from February 8 to March 8, 2021;
- Virtual Public Information Centre #2 held from May 20 to June 18, 2021;
- Presentations to St. Catharines Heritage Advisory Committee and Transportation Advisory Committee;
- Meetings with CN Rail, Niagara Peninsula Conservation Authority, property owners, etc.; and
- Mississaugas of the Credit First Nation review of Stage 1 Archaeological Assessment.

A dedicated website was established through the City of St. Catharines website at the beginning of the project. Study notices and Public Information Centre materials (e.g., Notices, display material, Q&As) were made available on the website as the study

progressed. The consultation undertaken as part of this study is further detailed in **Chapter 5.**

Study website: https://www.stcatharines.ca/en/governin/moffatt-street-secondary-access-environmental-assessment.asp

Description of the Recommended Plan

The Recommended Plan includes the provision of secondary access to Moffatt Street, by constructing a new local road connection between the existing intersections of Moffatt Street / Marshall Lane and Oakdale Avenue / Abbot Street. The new road will include a single-cell pre-cast structural arch culvert across the Old Welland Canal. The proposed cross-section is based on the City's typical 20 m right-of-way urban cross-section with sidewalks and bike lanes (Drawing No.: 110-5028).

The new road will cross a former industrial property which may require soil remediation. As part of this study, a Phase I Environmental Site Assessment (ESA) was completed, and a Phase II ESA was obtained through secondary sources. Contaminants at the site have been identified, and mitigation measures have been recommended for the subsequent design and construction phases.

High-level traffic analysis was undertaken to determine the type of traffic control warranted at the new intersections of Moffatt Street / Marshall Lane and Oakdale Avenue / Abbot Street. Based on the analysis, four-way stop control is not warranted at either intersection. Considering the traffic volumes, the approaches of Moffatt Street from the north and south are recommended to be stop-controlled at the future Moffatt Street / Marshall Lane intersection. At the future Oakdale Avenue / Abbot Street intersection, the approaches from the new crossing and Abbot Street are recommended to be stop-controlled. The traffic control at the new intersections will be confirmed in later design phases, upon completion of the Detailed Design and after further consultation with the City.

Other elements of the project include illumination improvements, utility relocation, landscaping, and cultural heritage commemoration opportunities. The cultural heritage commemoration strategy will be confirmed in Detailed Design and after further consultation with the City and the St. Catharines Heritage Advisory Committee.

Further details of the proposed undertaking, including the proposed plan, cross-section, a 3D illustration of the Recommended Plan are included in **Chapter 6**.

Environmental Impacts and Proposed Mitigations

Through the Class EA process, the Recommended Plan has incorporated methods to avoid or minimize impacts to social, cultural, and natural environments. Where impacts cannot be entirely avoided, mitigation measures and commitments further work during Detailed Design and construction have been developed. **Chapter 7** provides a summary of these impacts and mitigations, and the sections thereafter provide the detail under each related discipline

Property Requirements

Based on the Recommended Plan, one privately-owned property will be directly impacted (65 Oakdale Avenue). The impacted property is a former industrial property and is currently vacant land. At the time of writing the Environmental Study Report, there are no approved development or site plans for the land. Further details are included in **Section 6.10**.

Notice of Completion

The Environmental Study Report (ESR) for this study is available for a 45-calender day public review during which comments/concerns can be submitted, and the review period was announced with the publishing of the Notice of Study Completion. As detailed in the notice, interested persons may provide written comments to the project team by **January 24, 2022**. Further details on providing comments/concerns or requests for further study are included in **Section 1.2.2**.

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1 Introduction and Background

1.1 Introduction and Study Area

The City of St. Catharines has completed a Municipal Class Environmental Assessment (EA) Study to explore viable options for a secondary access for Moffatt Street. The study was carried out as a 'Schedule C 'project in accordance with the Municipal Class EA document (2000, as amended in 2007, 2011 and 2015) approved under the Ontario Environmental Assessment Act.

Moffatt Street is a local roadway located in an isolated pocket of residential homes, generally bounded by Highway 401 to the west and north, the Old Welland Canal to the east, and the Canadian National (CN) Railway to the south, within the City of St. Catharines. Currently, the neighborhood is accessed only via Disher Street West. The study area is shown in **Figure 1.**

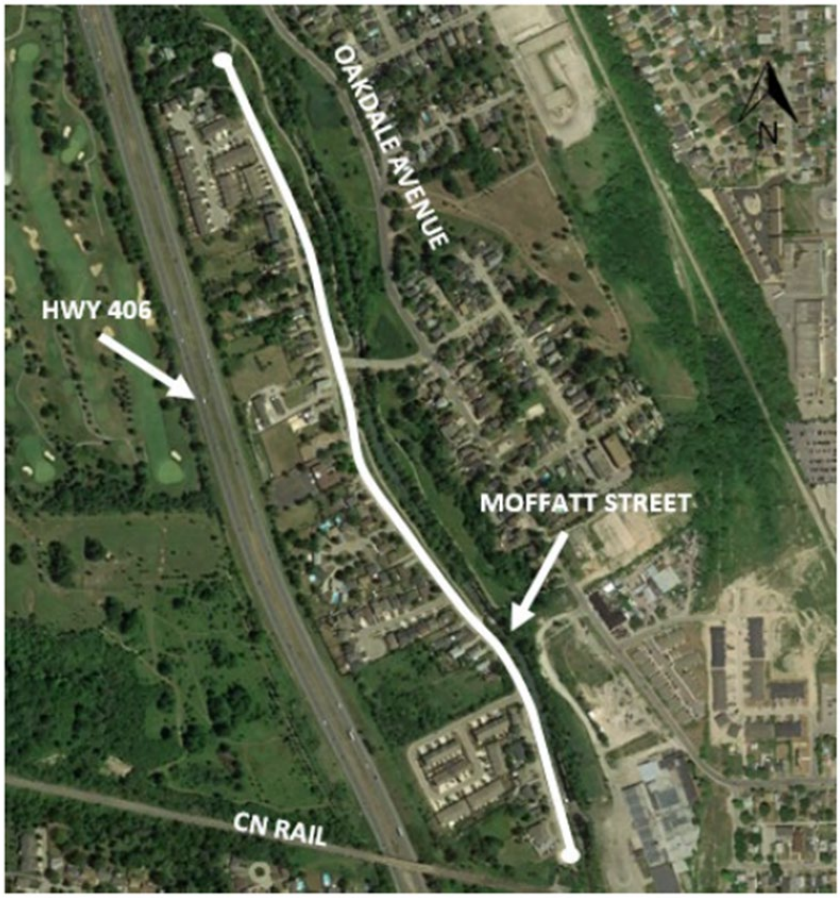


Figure 1: Key Plan

1.2 Municipal Class Environmental Assessment Process

This study follows the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment process for a Schedule C project (October 2000, as amended in 2007, 2011, and 2015). The Municipal Class Environmental Assessment is an approved planning and design process under the Ontario Environmental Assessment Act. As illustrated in **Figure 2**, the planning and design process is comprised of five phases. Schedule C projects are required to follow Phase 1, 2, 3, and 4 of this process.

Phase 1 Identify Problem or Opportunity;

Phase 2 Identify and Evaluate Alternative Solutions to the Problem or Opportunity;

Phase 3 Identify and Evaluate Alternative Design Concepts for the Preferred Solution;

Phase 4 Complete and File Environmental Study Report (ESR) for public review; and

Phase 5 Future implementation of the project (Detailed Design, Construction, Operation, and Environmental Monitoring).

Transportation improvements are classified into one of the following schedules:

Schedule A Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process.

Schedule A+ Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process. However, the public is to be advised prior to implementing the project.

Schedule B Projects may have some adverse environmental impacts. The proponent must undertake a screening process, involving contact with directly affected public and technical/regulatory review agencies to ensure that they are aware of the project and that their concerns are addressed. A Project File is prepared for public review.

Schedule C Projects may have significant environmental impacts. The proponent must follow the full planning, design, and documentation process of the MEA Municipal Class EA document. An Environmental Study Report is prepared for public review.

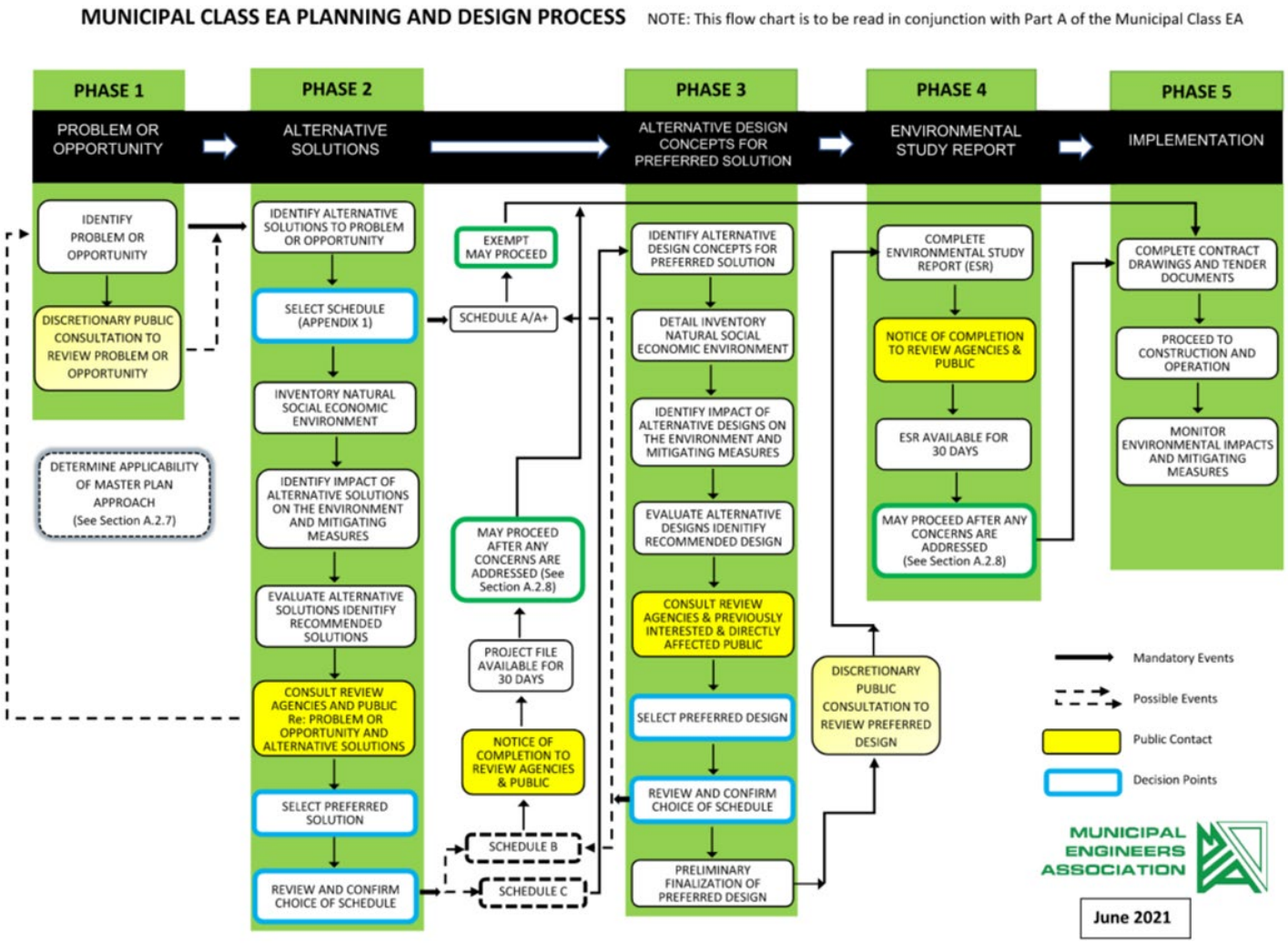


Figure 2: Municipal Class Environmental Assessment Planning and Design Process

1.2.1 Environmental Study Report

Phases 1, 2, 3 and 4 of the Schedule C process are documented in an Environmental Study Report (i.e. this report), which includes:

- Study background information;
- Description of the existing environment (socio-economic environment, cultural environment, and natural environment);
- Study area problems and opportunities;
- Alternative solutions to the undertaking;
- Evaluation of alternative solutions and identification of the preferred alternative solution;
- Alternative design concepts for the preferred solution;
- Evaluation of alternative design concepts and identification of the preferred alternative design concept;
- Anticipated impacts and proposed mitigation measures;
- Public and agency consultation; and
- Supporting technical documents.

The Environmental Study Report for this study is available for a 45-calender day public review period commencing on **December 9, 2021,** and ending on **January 24, 2022.** A Notice of Study Completion was published to announce the public review period (further detailed in **Section 1.2.2)**.

This Environmental Study Report has been placed on the public record during the COVID-19 pandemic. At this time, exceptional measures are being employed by various levels of government to curb the pandemic. Due to these measures, the Environmental Study Report is not being provided in 'hard copy' for public viewing at centralized locations. Interested members of the public may view the document on the City's website. Should a member of the public request a hard copy of the Environmental Study Report, the City will assess how this might be prepared and delivered in a manner that is consistent with current public health agency and government direction regarding public protection.

1.2.2 Notice of Completion

The Environmental Study Report (ESR) for this study is available for a 45-calender day public review during which comments/concerns can be submitted. The review period was announced with the publication of the Notice of Study Completion. As detailed in

the notice, interested persons may provide written comments to the project team by **January 24, 2022.** All comments and concerns should be sent directly to **Imtiaz Ahmad** at the City of St. Catharines.

Imtiaz Ahmad, P.Eng.
Project Manager
City of St. Catharines
Tel.: (905) 688-5601 ext. 1668
Email: iahmad@stcatharines.ca

The Municipal 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:

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

Timing for an Order Request

During the 45-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;
- 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

1.3 Study Approach

1.3.1 Project Team

The core project team is comprised of staff from the City of St. Catharines and CIMA+ Canada Inc., and their sub-consultants. Lead members of the project team are listed in **Table 1**.

Table 1: Core Project Team

Name	Role
City of St. Catharines	
Imtiaz Ahmad	Project Manager
CIMA+ Canada Inc.	
Stephen Keen	Project Manager & Class EA Process
David Hiett	Preliminary Design & EA Process
Lisa Cullen	Urban Design
Akram Khan	Structures
Pinchin Ltd.	
Rocky Yao	Natural Environment
David Mignone	Environmental Assessment
Weidong Li	Noise Analysis
Archaeological Services Inc.	
Lisa Merritt	Archaeology
Lindsay Graves	Cultural Heritage
Civicplan	
Paul Shaker	Enhanced Consultation

2 Study Area Needs and Existing Conditions

2.1 Study Area Needs

Moffatt Street is a local road within the City of St. Catharines that services an isolated enclave of residential homes. The area is bounded by Highway 406 to the west and north, the Old Welland Canal to the east, and the Canadian National Railway to the south. The street is oriented north-south and is approximately one kilometer in length with cul-de-sacs at either end. The roadway generally accommodates one lane of traffic in each direction; however, there are no painted lines on the street, and the speed limit is not posted.

Moffatt Street is connected to the greater transportation network within the City of St. Catharines via Disher Street. Disher Street intersects Moffatt Street approximately mid-way down the street between the north and south terminus. The intersection is a T-intersection with stop-control on Disher Street. Several other local road intersections along Moffatt Street connect to dead-end streets and crescents with no alternate access. There is also gated secondary access from Mountain Street for emergency vehicles only, which otherwise functions as a trail system. The emergency access/trail is not always maintained.

A section of the Merritt Trail is in the study area and has several access points. The trail follows the Old Welland Canal, connecting downtown St. Catharines to the neighbourhoods near Oakdale Avenue and Moffatt Street. There are currently no pedestrian or cycling facilities on Moffatt Street or Oakdale Avenue. An extension of the Merritt Trail and bike lanes on Oakdale Avenue are proposed as part of the City's Transportation Master Plan (2021).

This Class EA has been undertaken to contemplate and plan for permanent secondary access to Moffatt Street. The City has identified the need for a secondary access from a community safety perspective as well as improving multi-modal connectivity in the area. As part of the study, a literature review was undertaken to review industry standards and guidelines related to the provision of more than one access to a subdivision, as the City of St. Catharines currently does not have a specific standard.

A second access to a subdivision provides a potential alternate evacuation route for residents and emergency vehicle access, should the only existing access be blocked for reasons such as vehicle collision, construction resulting in limited or full closure of the road, natural disasters, etc. As noted above, Moffatt Street has a secondary access point for emergency access and active transportation; however, the access is not always maintained and therefore not always accessible.

Policies containing information regarding secondary or emergency access regarding cul-de-sacs from municipalities within Canada were reviewed. Some jurisdictions base these policies on the maximum length of the cul-de-sac, while others use the maximum number of homes on the street. To compare the findings, the maximum number of dwellings and the cul-de-sac length were determined using the Institute of Transportation Engineers (ITE) assumption of a typical lot size of approximately 14 m. The maximum number of dwellings and the maximum length of a cul-de-sac for each jurisdiction reviewed is shown in **Figure 3.** Moffatt Street is approximately one kilometer in length with over 200 dwellings.

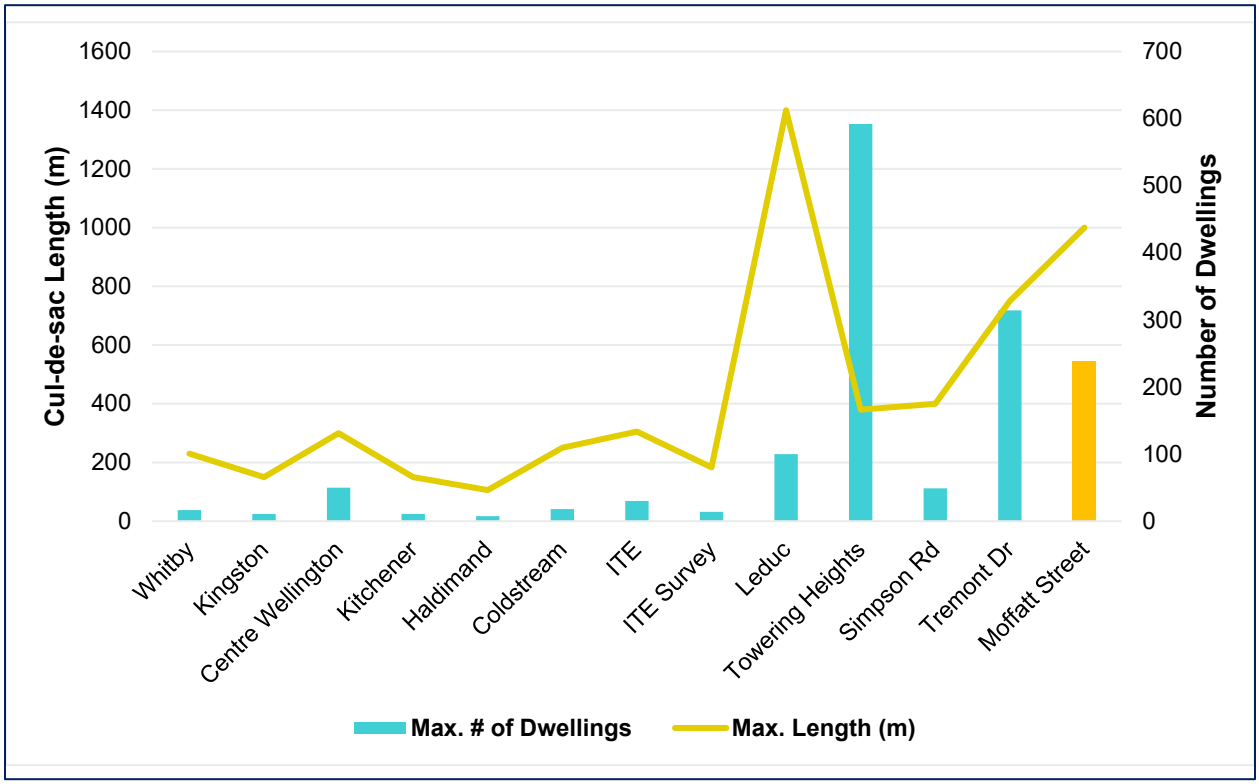


Figure 3: Summary of Policy Review

The yellow line depicts the maximum recommended length of a cul-de-sac with only one access. The blue bars illustrate the maximum recommended number of dwellings for a cul-de-sac with only one access (identified from each jurisdiction's guidelines). As shown in the figure, Moffatt Street is significantly longer than most recommended maximum cul-de-sac lengths, with more dwellings than recommended by the guidelines in many municipalities. The average maximum length of a cul-de-sac with a single access in the jurisdictions reviewed is 342 m, and the maximum number of dwellings with a single access point is 29. Moffatt Street is almost three times as long as the

average maximum cul-de-sac length and has more than nine times the average maximum number of dwellings.

Therefore, the literature review suggests there is a strong rationale for providing a secondary access to the subdivision. The complete literature review is provided in **Appendix A.**

2.2 Planning Context

The provincial and municipal planning and policy context was also considered in assessing the existing infrastructure needs of the study area. The provincial and municipal policy framework guides infrastructure, land use planning, and strategic investment decisions to support City growth and transportation objectives. The identification of study area problems and opportunities and the assessment of the study's need and justification were carried out with due consideration of the planning framework to ensure that the Recommended Plan is consistent with the policies and objectives of the various levels of government.

Provincial Planning Context

The Places to Grow Act, 2005 provides the legal framework necessary to implement the Province's vision for managing growth within the Greater Golden Horseshoe (GGH). The Act enables the government to plan for population growth, economic expansion and the protection of the environment, agricultural lands and other resources in a coordinated and strategic manner. The Growth Plan for the Greater Golden Horseshoe was prepared under the Places to Grow Act. Originally prepared in 2006, the Growth Plan was updated in 2020 to reflect growth planning to 2051, guiding decisions on transportation, infrastructure planning, land-use planning, urban form, housing, natural heritage, and resource protection.

Section 3.2 of the Growth Plan provides the infrastructure policies to support sustainable growth. While the Growth Plan should be considered in its entirety, the policies that are particularly relevant to the Moffatt Street Class EA are excerpted below:

Growth Plan Section 3.2.1 Integrated Planning

- Planning for new or expanded infrastructure will occur in an integrated manner and will be supported by infrastructure master plans, asset management plans, community energy plans, watershed planning, environmental assessments, and other relevant studies where appropriate.

Growth Plan Section 3.2.2 Transportation - General

- Transportation system planning, land use planning, and transportation investment will be coordinated to implement this Plan.
- 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; and
    - offer multimodal access to jobs, housing, schools, cultural and recreational opportunities, and goods and services.
- 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.

Growth Plan Section 4.2.10 Climate Change

- Upper- and single-tier municipalities will develop policies in their official plans to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, aligned with the Ontario Climate Change Strategy, 2015 and the Climate Change Action Plan, 2016 that will include:
    - supporting the achievement of complete communities as well as the minimum intensification and density targets in this Plan;
    - reducing dependence on the automobile and supporting existing and planned transit and active transportation;
    - assessing infrastructure risks and vulnerabilities and identifying actions and investments to address these challenges; and
    - undertaking stormwater management planning in a manner that assesses the impacts of extreme weather events and incorporates appropriate green infrastructure and low impact development.

Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS) is issued under the Planning Act and supports the Growth Plan in providing policy direction for the use and management of land and infrastructure while protecting the environment and resources. Sections of the PPS that are applicable to the planning of transportation infrastructure include:

- Part IV Vision for Ontario's Land Use Planning System – land development should be optimized to promote efficient use of land, resources and public investment in infrastructure and public service facilities. The supporting transportation infrastructure is to provide choices and promote increased use of active transportation as well as transit before other modes of travel.
- Part V Policies – transportation systems should be safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs. A multimodal transportation system is to provide connectivity within and amongst the transportation systems.

City of St. Catharines Official Plan (2012)

The City's Official Plan (OP) outlines the long-term vision for the City's physical form, community character, and design. It provides guidance and direction for the development and growth of the City to the year 2031 and reflects a planning approach consistent with Growth Plan, Provincial Policy Statement and the Region of Niagara plans and policies.

OP policies prioritize accommodating growth by (excerpted from Policy 2.3.3):

- creating efficiency and usability of vacant and occupied lands
- more compact built form and density of development
- the reuse, rehabilitation, regeneration, intensification and enhancement of the built environment
- service, infrastructure, energy, transportation, sustainable, accessible, efficient and supportive development

City of St. Catharines Transportation Master Plan (2021)

The City's Transportation Master Plan (TMP) provides clear direction on future transportation investments to 2041 through a renewed focus on complete streets that enable people to travel by any mode they wish and a renewed emphasis on linking land use and transportation planning to create context-sensitive solutions.

Planning Context Summary

The planning context illustrates the rationale for context-sensitive and integrated land use and multi-modal transportation planning. In the case of the Moffatt Street area, the existing residential enclave is experiencing small-scale infill and redevelopment, despite having only one access to the area. A secondary access will provide more security in terms of emergency response, more direct transportation routing to a portion of the community, additional sustainable active transportation options. The planning principles and approaches being applied within the Class EA framework are all consistent with provincial and municipal plans and policies.

2.3 Existing Conditions

2.3.1 Land Use

Moffatt Street is located within the urban area in the City of St. Catharines. Land use in the surrounding area is primarily Low Density Residential with some parkland & open space along the Old Welland Canal. An extract from the City's Official Plan Land Use Schedule E9 is included in **Figure 4**.

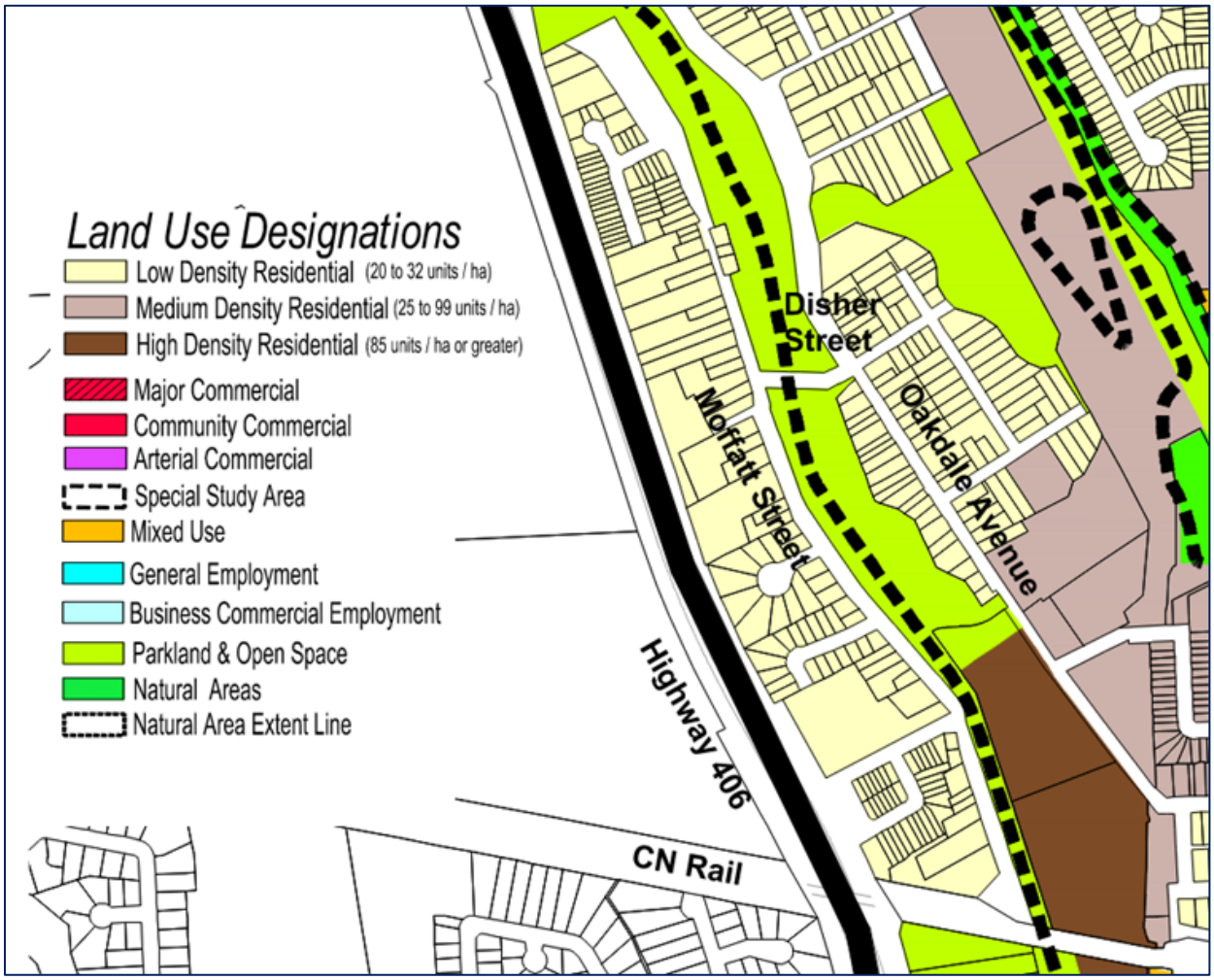


Figure 4: Study Area Land Use Designations (Source: City Official Plan)

There is ongoing development on Corbin Street, west of Moffatt Street, and north of Marshall Lane. The lands are zoned and planned to allow for residential uses. The latest development includes a private road development with 17 townhouse units and a private road development with townhouse units (St. Catharines City Council Corporate Report, PBS-138-2020). The property located at 65 Oakdale Avenue on the east side of

the study area is currently vacant and may be developed in the future. At the time of filing this Environmental Study Report, no approved site plans are in place for the land.

2.3.2 Cultural Heritage Resources

2.3.2.1 Built Cultural Heritage

A Cultural Heritage Resource Assessment (CHRA) was conducted as part of the study. The assessment was undertaken by Archaeological Services Inc. (ASI). The purpose of the CHRA is to describe the existing conditions of the study area, present an inventory of above-ground built heritage resources and cultural heritage landscapes, assess potential impacts of the proposed undertaking, and propose appropriate mitigation measures and recommendations to minimize and/or avoid negative impacts on identified cultural heritage resources.

Key findings are summarized as follows:

- A total of 12 cultural heritage resources were identified in the study area.
    - Seven known cultural heritage resources were identified through a desktop review:
        - One cultural heritage resource is designated under Part IV of the *Ontario Heritage Act*;
        - One resource is identified by Niagara Region as an *"Historic Site"*;
        - One resource is both recognized as a National Historic Event and is identified as a Cultural Heritage Landscape in Niagara Region's Official Plan (year); and
        - Four resources are recommended for listing on the St. Catharines Register of Cultural Heritage Properties.
    - Five additional properties were identified following a field review of the short-listed alternative solutions.
    - Identified cultural heritage resources are historically, architecturally, and contextually associated with a combined residential land use and waterway transportation history dating back to the early nineteenth century on the lands of Merriton surrounding the Welland Canal in the City of St. Catharines.

The potential impacts of the proposed undertaking and mitigation measures are discussed in **Section 7.2.1** of this report.

The complete Cultural Heritage Resource Assessment is included in **Appendix B.**

2.3.2.2 Archaeology

A Stage 1 Archaeological Assessment was conducted as part of the study. The assessment was carried out by Archaeological Services Inc. (ASI) in accordance with the *Ontario Heritage Act* (1990, as amended in 2018) and the 2011 *Standards and Guidelines for Consultant Archaeologists*, administered by the Ministry of Heritage, Sport, Tourism, and Culture Industries. The purpose of the Stage 1 Archaeological Assessment is to:

- Provide information concerning the geography, history, and current land conditions of the study area;
- Determine the presence of known archaeological sites within the study area;
- Present strategies to mitigate project impacts to such sites;
- Evaluate in detail the archaeological potential of the study area; and
- Recommend appropriate strategies for future archaeological assessment if some or all of the study area is found to have archaeological potential.

The Stage 1 background study determined that four previously registered archaeological sites are located within one kilometer of the study area. One registered archaeological site, the Euro Canadian historical Moffatt Street site (AgGt-240), is located within the study area. The site represents an early 19th-century homestead owned by Oliver Phelps, chief builder of the first Welland Canal. As such, the site exhibits cultural heritage value or interest (CHVI). Parts of the study area exhibit near-surface and deeply buried archaeological potential for features associated with the first and second Welland Canals; these areas also retain CHVI.

The Stage 1 property inspection determined that part of the study area has been previously disturbed by construction and demolition of building and landscaping; these areas can be considered free of archaeological concern. Other parts of the study area have archaeological potential due to their proximity to the first and second Welland Canal and their associated features. If impacted, these lands will require Stage 2 archaeological assessment prior to any construction activities. The Euro Canadian historic Moffatt Street site (AgGT-240) requires Stage 4 mitigation of impacts. In 2018, the site was subject to a Stage 3 assessment conducted by ASI.

The complete Stage 1 Archaeological Assessment is included in **Appendix C**.

2.3.3 Natural Environment

A Natural Heritage Assessment (NHA) was completed by Pinchin Ltd. and is found in **Appendix D**. The NHA included background review and field studies to characterize

existing natural heritage features and functions in the study area. Background information was augmented by field review that encompassed the following key aspects:

Vegetation Assessment - within the Study Area were assessed and described using the provincial Ecological Land Classification system. The Ecological Land Classification for Southern Ontario: First Approximation and its Application (Lee et al., 1998) was referenced to classify the habitats to ecosite. Ecosites classified within the Study Area were then applied to Ecological Land Classification (ELC polygons mapped using aerial imagery. The vegetation communities were sampled for their structure, species composition and habitat characteristics. This information was supplemented by floristic surveys at the time of each visit.

Species at Risk - The likelihood of occurrence for Species at Risk was assessed qualitatively based on the ability of the habitat to meet one or more life requisites for each Species at Risk identified during the desktop assessment. If habitat suitable for Species at Risk was identified, additional survey effort was applied in that area. If incidental Species at Risk were observed, they were recorded throughout the field assessment within and adjacent to the Site.

Incidental Wildlife Observations - Wildlife was surveyed as part of general wildlife surveys during the Site visit. These surveys involved general coverage recording all species observations and signs, including tracks / trails, scat, burrows, dens, browse, and vocalizations. The wildlife surveys occurred during the coincident surveys for vegetation communities and vascular plants. Significant wildlife habitat was assessed according to the MNRF Natural Heritage Reference Manual (MNRF 2010) and the MNRF Significant Wildlife Habitat Technical Guide (MNRF 2000).

Key findings are summarized as follows:

- Study area is situated within Ecodistrict 7E-3 (Mixedwood Plains)
- Eight vegetation communities are present;
- Significant Wildlife Habitat is likely not present;
- No Regionally or Municipally designated Significant Wetlands, Hazard lands, Valleylands, Areas of Natural and Scientific Interest (Life or Earth Science ANSI) present;
- Study area is within the Niagara Natural Environment Screening Layer in the Niagara Region Official Plan (2020);
- Screening for potential Species at Risk habitat has identified some potential within some vegetation communities/habitats;

- Old Welland Canal is the only drainage and aquatic feature present and is regulated by the Niagara Peninsula Conservation Authority.

In terms of ecological function and significance of the features present:

- The study area consists of eight ecosites with an abundance of invasive and early successional species that are common throughout southern Ontario.
- The canal provides little in terms of fish habitat and contains a number of barriers against any fish migration due to the presence of locks. This canal largely functions as a stormwater pond.
- There are no designated natural features present.

Nonetheless, the Study Area is designated on the Niagara Natural Environment Screening Layer from the Niagara Regional Official Plan (Niagara Region, 2020). Development, redevelopment site alteration, and the use of lands within this area may be subject to policies outlined in Provincial or Regional documents. Lands within this area may also be subject to polies outlined by the NPCA.

2.3.3.1 Landform, Geology, and Physiography

The study area is situated within a residential landscape consisting of urban subdivisions with some light industrial and commercial uses. A portion of the Merritt Trail and old second Welland Canal are located within the study area.

The bedrock underlying the study area consists of Upper Ordovician red and grey shale, with thin limestone dolostone and siltstone interlayers of the Queenston Formation in the north, Lower Silurian Cilton-Cataract Group shales and mudstones in the central portion of the study area, and Lockport Formation dolostone with some shale in the south. The quaternary geology is Halton Till composed predominantly of silt to silty clay. The surficial geology is a mix of clay to silt-textured till derived from glaciolacustrine deposits of shale or the anthropogenic deposits associated with the canal.

The study area is situated within Ecodistrict 7E-3 (Mixedwood Plains), which forms part of the Niagara Fruit Belt. The soils in the study area have not been classified by Agriculture Canada and the Ministry of Agriculture and Food; however, soil samples taken during the field assessment indicated primary loam and sandy loam soils are present.

2.3.3.2 Vegetation

Vascular Plants

A total of 97 plant species were identified on the study area from the vegetation surveys. Of these 97 species, 61 are non-native species, many of which are typical in

old-fields and disturbed habitats. These species are generally widespread and abundant within the area. 33 of the 36 native species found within the Study Area are considered “secure, common and widespread” in Ontario and the remaining three are considered “apparently secure, uncommon but not rare” in Ontario.

Vegetation Communities

Eight vegetation communities were identified in the study area, including: Dry-Fresh Graminoid Meadows; Dry-Fresh Exotic Deciduous Forest; maintained parkland; Dry-Fresh Manitoba Maple Deciduous Forest; Cattail Graminoid Mineral Meadow Marsh; Sandbar Willow Mineral Deciduous Thicket Swamp; Common Reed Graminoid Mineral Meadow Marsh; and Canal/Open Sewer. The largest communities are the canal, and the wooded area and parkland parallel to the canal. The remainder of the study area consists of a mix of small wetlands and meadows, as well as a small forest. There are several invasive species within these communities, likely due to the urban nature of the study area and walking path along and across the canal.

2.3.3.3 Species at Risk

The Ontario Endangered Species Act 2007 (ESA) provides protection from harm, harassment, or captures to species listed as extirpated, endangered, or threatened on the Species at Risk Ontario List. Additional protection is provided to the habitat of endangered or threatened species on the Species at Risk Ontario List. Species habitat includes anywhere the species depend on for reproduction, rearing, hibernation, migration, or feeding; or prescribed habitat as defined in Ontario Regulation 242/08 of the General Regulation.

A total of 22 Species at Risk (SAR) were identified as having potential occurrence within the study area, based on a review of NHIC records and other available data. The potential for each of the 22 species was then evaluated against the habitats and habitat potential of the vegetation communities and natural features within the study area, the date of last observation etc. Out of this screening, 15 species were determined to have potentially suitable habitats in the study area. None of these species were observed during the field assessment. The screening is provided in **Appendix D**.

2.3.3.4 Incidental Wildlife

The following incidental wildlife were directly observed during vegetation surveys conducted in September 2020:

- Common Eastern Bumblebee *(Bombus impatiens);*
- Blue Jay *(Cyanocitta cristata);*
- Eastern Chipmunk *(Tamius striatus);*

- Grey Squirrel *(Sciurus caolinensis)*; and
- Mourning Dove *(Zenaida macroura)*

Additionally, there was evidence of White-tailed Deer *(Odocoileus virginianus)*, with laydown areas observed in the meadow and prints around the study area.

2.3.3.5 Aquatic and Drainage Feature

The former Welland Canal has been identified as the only aquatic and drainage feature in the study area. The Niagara Peninsula Conservation Authority regulates the watercourse and its boundaries. The canal was historically designed as an open sewer for stormwater drainage from surrounding residential, industrial, and commercial practices and to accommodate vessels for navigation and transportation purposes. The watercourse is not identified as fish habitat.

The canal is approximately 20 m wide with a rocky substrate and flows north at a slow to medium rate. Little to no vegetation was observed in the canal or on its banks. Some algae were found within open portions of the canal, and some common species were found within small bays and slow-moving sections. The only aquatic wildlife observed were Four Common Carp *(Cyprinus carpio).* The canal is connected to upstream drainage and downstream rivers and acts as an aquatic feature with contributing functions such as nutrient transport to downstream fish habitats.

2.3.4 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was conducted to determine the likelihood that one or more contaminants have affected any land or water on, in or under the study area. The Phase I ESA was completed by Pinchin Ltd, in general accordance with the *Phase I Environmental Site Assessment, CSA Standard Z768-01* (2001, as reaffirmed in 2016). A site reconnaissance was conducted in November 2020.

The Phase I ESA identified the following potential issues of environmental concern in the study area:

- The Old Welland Canal formerly traversed the majority of the central and east portions of the study area and was infilled in years subsequent to 1921. Historical on-site buildings were visible adjacent to the locks and were potentially infilled upon demolition. The source and quality of the fill materials used is unknown. There is record of a historical landfill location, which operated during the early 1970s at Oakdale Avenue and Disher Street;

- A coal-fired paper mill was present north of the north of the site. The southern portion of the facility extended onto the north portion of the study area and operated from at least 1921 to sometime between 1934 and 1948;
- Railway lines traverse the south portion of the study area in a southeast-northwest direction and have been present since at least 1921;
- Bulk storage and stockpiling of salt and/or salt/sand mixtures in the southeast portion of the study area;
- A landfill was historically located in the area of present-day Clifford's Creek Park and operated during the 1970s;
- Historical industrial operations (i.e. steel forge, waste disposal site and scrap metal recycling facility) and associated structures (e.g. transformers, USTs, lagoons, etc.), as well as previously identified soil and groundwater impacts at the property located a present-day 55 and 65 Oakdale Avenue. This property is situated adjacent to the east and hydraulically upgradient of the site related to the inferred groundwater flow and direction; and
- Historical industrial paper mill operations and associated structures (e.g. lagoons) at the property located at present-day 343 Glendale Avenue. This property is situated adjacent to the south and hydraulically upgradient of the site, relative to the inferred groundwater flow direction.

The complete Phase I ESA is provided in **Appendix E.**

2.3.5 Municipal Services and Utilities

The following municipal services and utilities are in the study area:

- Watermain
- Sanitary Sewer (Regional)
- Storm Sewer
- Illumination
- Underground Gas Line
- Overhead Hydro (Alectra)
- Underground Bell
- Underground Cable
- Underground TV
- Hydro Pole with Street Lighting

The improvements proposed as part of this study may conflict with the utility infrastructure in the study area. Potential utility conflicts are identified as part of this study in **Section 6.7** and will be subject to further review in Detailed Design.

2.4 Problem and Opportunity

Based on a review of the existing traffic conditions and safety issues, the following problems were identified:

- The only access to Moffatt Street is via Disher Street, and a background review of related transportation guidelines would suggest a secondary access is required for a subdivision of this size and cul-de-sac of this length.
- Ongoing residential development through infill and localized redevelopment on Moffatt Street, increasing the reliance on the existing single access and increasing the severity of any closures.
- In emergencies where Disher Street is closed (i.e., due to an accident), or if Disher Street is temporarily closed for construction, Moffatt Street is landlocked. Residents would not be able to access the wider network and similarly, emergency vehicles would not be able to access the neighbourhood in an emergency event.

2.4.1 Problem and Opportunity Statement:

Moffatt Street is approximately one kilometer long and provides access to over 200 homes. Effectively, Moffatt Street is a cul-de-sac and the only access to the Moffatt Street neighbourhood is via Disher Street. In emergency situations where Disher Street is closed, the Moffatt Street neighbourhood is landlocked and a suitable second access for vehicles is not available. Based on Institute of Transportation Engineers (ITE) guidelines, Moffatt Street significantly exceeds the threshold for a second access in terms of the number of dwellings and cul-de-sac length. There is ongoing infill and redevelopment in the area surrounding Moffatt Street, and as the density of the residential area increases, the need for a second access becomes more critical.

There is an opportunity to improve access for residents / emergency vehicles and eliminate the safety concerns associated with the Moffatt Street neighbourhood being isolated in situations where Disher Street is closed.

3 Alternative Solutions

Phase 1 of the Municipal Class EA process involves the identification of transportation problems and opportunities to be addressed by the study and is detailed in **Section 2.4**. The following section details Phase 2 of the Municipal Class EA process, which involves the identification of alternative solutions to address the problems and opportunities by considering the existing environment and evaluating a range of possible alternative solutions to establish the preferred solution.

3.1 Description of Alternative Solutions

The following Alternative Solutions were considered:

1) Do Nothing: Maintain existing road network within the study area, i.e., residents and emergency services continue to only use Disher Street to access Moffatt Street
2) Provide a Secondary Access to Moffatt Street: construct a new connecting link to provide another access to serve the Moffatt Street neighbourhood
3) Transit Demand Management (TDM): improvements to existing or new transit routes to improve public mobility
4) Improvements to Existing Infrastructure: widening or upgrading the existing road network

3.2 Screening of Alternative Solutions

The Do Nothing solution does not resolve the key problem of limited access, as identified in Phase 1, and as a result, it was screened out. Similarly, the Transit Demand Management (TDM) and Improvements to Existing Infrastructure solutions were also screened out as they would not provide additional access. The remaining solution was to provide a secondary access.

Due to the environmental barriers of Highway 406 and the CN Railway, as described in **Chapter 2**, the most viable new connection to Moffatt Street is over the Old Welland Canal to connect with Oakdale Avenue. However, as Moffatt Street has a total length of just over one kilometer, many locations could be considered. Therefore, the selection process was conducted in two phases: a high-level screening focusing on areas, and a low-level screening, focusing on alignment.

3.2.1 High-Level Screening of Alternative Solutions

A high-level screening of the study area was conducted to identify viable areas for a new access to Moffatt Street. The following factors were considered in selecting an area for a potential new access:

- Offset from Disher Street – if a second access it too close to Disher Street both could be closed at the same time (e.g. in the event of a major collision queues could block both accesses)
- Potential impact to private properties
- Location of new road - ability to tie into existing intersections is favoured, connecting a new road directly in the vicinity of driveways on Moffatt Street and Oakdale Street would be inadvisable from a traffic operation and headlight glare impact perspective

The potential new access areas are shown in **Figure 5.** Their screening is presented in **Table 2**. As noted, the 'Do Nothing' alternative solution does not meet the study's objectives and is therefore not carried forward for further screening.

Table 2: Screening of Potential New Access Locations

Proximity to Disher Street	Less than 100 m (Red)	More than 100 m (Orange & Blue)	More than 200 m (Yellow & Purple)
Assessment	• Located less than 100 m from Disher Street • An emergency that would result in the closure of Disher Street may result in the closure of a new route within 100 m of Disher Street and therefore negate the utility of the second access	• Located more than 100 m from Disher Street • Potential traffic operations impacts (i.e. headlights shining directly into homes and access issues) due to proximity of homes and driveways to access	• Located at least 200 m from Disher Street • Opportunity to tie into existing intersections with Moffatt Street and/or Oakdale Avenue • Most desirable from a traffic operations perspective
Recommendation	**Screen Out**	**Screen Out**	**Carry forward for further review**

Based on the screening of potential areas for a new access, areas located at least 200 m from Disher Street were the most viable for a second access and were carried forward for further consideration. Potential impacts will be investigated further when road alignments are developed.

Figure 5: Potential New Access Locations

3.2.2 Development of Alternative Solutions

Based on the areas identified by the high-level screening, a long list of viable crossing locations were developed within the yellow and purple areas (i.e., more than 200 m from Disher Street), as shown in **Figure 5**.

Eight viable crossing locations were identified:

- Alternative 1A – New Road from Rossie Place to Smythe Street
- Alternative 1B – New Road from Corbin Street to Oakdale Avenue
- Alternative 1C – New Road from Marshall Lane to Abbot Street
- Alternative 2A – North-East Extension of Moffatt Street to Lincoln Avenue
- Alternative 2B – North-East Extension of Moffatt Street to Oakdale Avenue (North of Lincoln Avenue)
- Alternative 3A – Southerly Extension of Moffatt Street to Chestnut Street (via existing Merritt Trail)
- Alternative 3B – Southerly Extension of Moffatt Street to Chestnut Street (via a new alignment)
- Alternative 4 – New Road from Glory Hill Road to Oakdale Avenue.

The long list of crossing locations are shown in **Figure 6**.

Figure 6: Long List of Crossing Locations (Alternative Solutions)

3.2.3 Low-Level Screening of Alternative Solutions

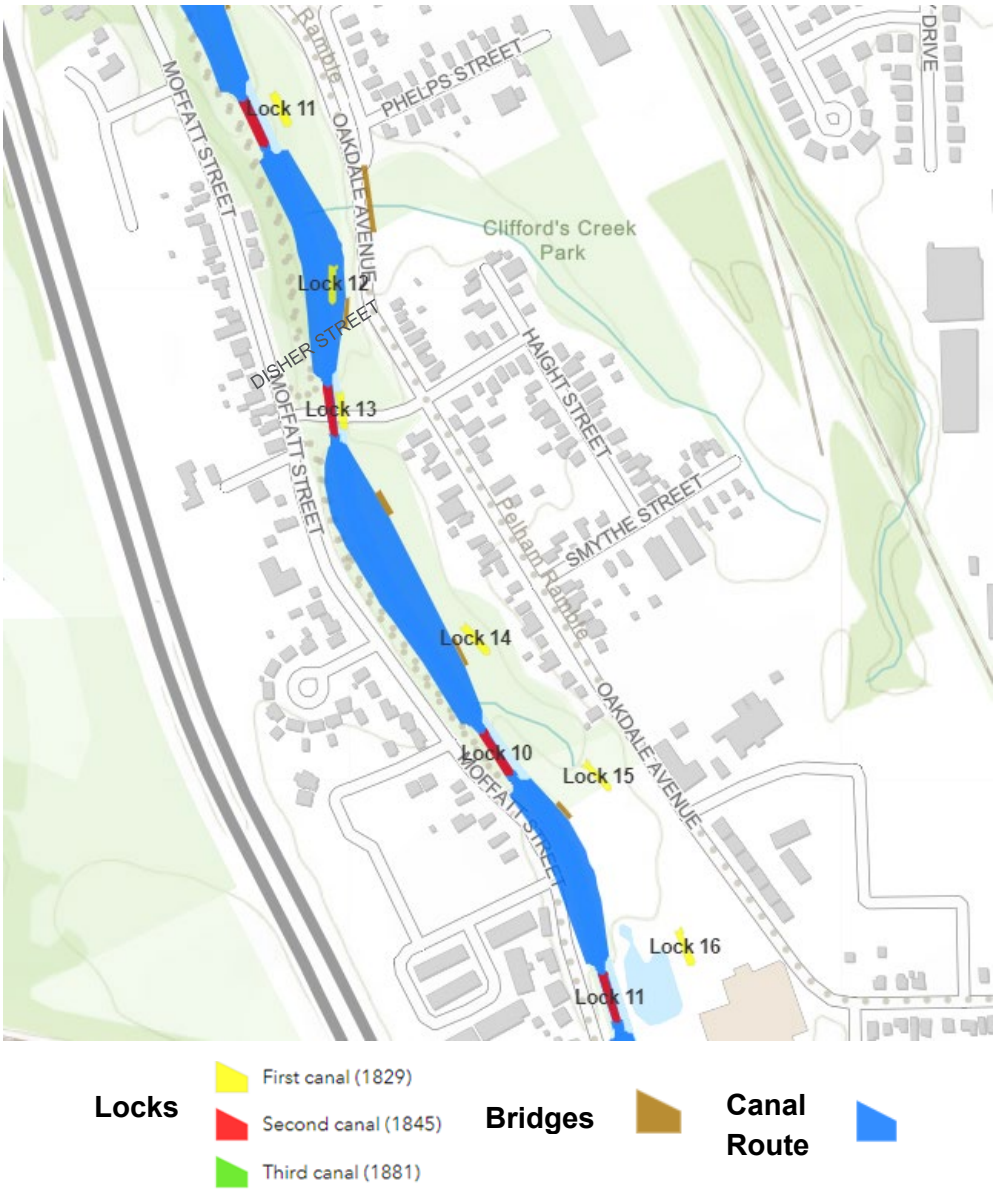
A long list of crossing locations was screened to review the alternatives with respect to severe impacts or engineering constraints. Criteria were developed to guide the screening process, so that technical and environmental (socio-economic and cultural/heritage) conditions were factors when identifying the short-list of alternative solutions. The short-list of alternatives was taken forward for evaluation to identify a preferred.

The screening focused on the following key attributes:

- Impacts to the Old Welland Canal Locks
- Impacts to the Socio-Economic Environment
- Traffic Operations and Safety
- Cost

3.2.3.1 Impacts to the Old Welland Canal Locks

The Old Welland Canal is a key heritage resource within the study area. City records suggest that initial construction of the canal and locks began in 1842. Mapping of the canal in the vicinity of Disher Street is illustrated in **Figure 7.** During a site visit in November 2020, it was noted that while there is some weathering on the surface, the lock walls appear to be in relatively good structural condition. It is unclear how they are supported as there are no apparent tiebacks and no drainage to alleviate pressure from behind the wall. It was concluded that is any new construction in the vicinity of the canal locks would not only result in heritage impacts but could also result in constructability issues due to a risk of destabilizing the structural integrity of the locks.



(Source: Historic Welland Canals Mapping Project)

Figure 7: Welland Canal Mapping

The canal between the locks appeared to now act as a simple natural drainage channel. There is a pedestrian crossing of the canal located approximately 350 m south of Disher Street.

A Cultural Heritage Resource Assessment (CHRA) was conducted to identify the heritage features in the study area. The CHRA identified the existing locks as a Historic Welland Canal Site. Additional details regarding the heritage value of the locks are available in the CHRA. Based on the recommendations of the CHRA as well as the

history of the canal, it was determined that the existing locks should be avoided to minimize potential structural and heritage impacts.

Therefore, the following alternatives are screened out:

- Alternative 1B – New Road from Corbin Street to Oakdale Avenue
- Alternative 2B – North-East Extension of Moffatt Street to Oakdale Avenue (North of Lincoln Avenue)

3.2.3.1.1 Impacts to the Socio-Economic Environment (Cultural Heritage)

Several cultural heritage resources have been identified in the study area, including the Old Welland Canal and 129 Oakdale Avenue (north side of Alternative 1A). The residence located at 129 Oakdale Avenue has potential to retain physical or design and contextual value as an early twentieth-century residence along the waterway. Alternative 1A would have significant impacts to this property.

Therefore, the following alternative is screened out:

- Alternative 1A – New Road from Rossie Place to Smythe Street

3.2.3.1.2 Traffic Operations / Geometry

In Alternatives 2A, 2B, 3A, and 3B, Moffatt Street is extended as a local roadway. The geometry of the extensions corresponds with a design speed of 30 km/h. Per City standards, the design speed for a new local road connection is 50 km/h. Therefore, a design speed of 30 km/h was considered unacceptable for a continuation of Moffatt Street in terms of operations and geometry.

Therefore, the following alternatives are screened out:

- Alternative 2A – North-East Extension of Moffatt Street to Lincoln Avenue
- Alternative 2B – North-East Extension of Moffatt Street to Oakdale Avenue (North of Lincoln Avenue)
- Alternative 3A – Southerly Extension of Moffatt Street to Chestnut Street (via existing Merritt Trail)
- Alternative 3B – Southerly Extension of Moffatt Street to Chestnut Street (via a new alignment)

3.2.3.1.3 Cost

Alternatives 3A and 3B were screened out due to potential issues associated with the CN Rail crossing. A meeting with CN Rail was held to discuss the requirements for a new road crossing at this location. The meeting is summarized in **Section 5.4** and its

minutes are included in **Appendix F**. There is an existing switch directly adjacent to the crossing and a relocation of this switch would be required at a very high cost (approximately $5.0M). Additionally, a new at-grade crossing would have to comply with the Transport Canada requirements, including but not limited to:

- Sightline requirements (i.e., crossing at 90 degrees)
- Warning system requirements (e.g., an active warning system with a gate, flashing lights, and bells)
- Requirements for crossing surface, flangeway width and depth, gradients, horizontal and vertical alignment of the road approaches, and the angle of crossing.
- A public grade crossing with a railway design speed greater than 25 km/h must not be within 30 m of an intersecting road or entranceway.

Grade separation of the CN Rail tracks (i.e., having the road/rail pass over or under each other) would result in significant construction complexity and cost. As the existing road grade is below the rail corridor, the conditions would lean to the road passing under the rail. This, however, requires large structure work and closure and/or diversion of the rail line. To facilitate a raise up and pass over the rail line, the grading of the new road would extend to long distances on either side of the rail, resulting in environmental and property impacts.

Due to the above impacts associated with Alternative 3A and 3B, and as there are other viable options, these options were screened out.

3.2.4 Summary of Low-Level Screening

A summary of the screening of Alternatives 1A through 4 is presented in **Table 3**. Alternative 1C and 4 were carried forward to the short-list for further evaluation. A map highlighting the alternative locations and key constraints in the study area is shown in **Figure 8** through **Figure 10.**

Table 3: Summary of Secondary Screening

Alternatives that were carried forward to the short list are indicated with “yes” and screen-out alternatives are indicated with “no” in the last row of the table.

Factor	1A	1B	1C	2A	2B	3A	3B	4
Lock Impacts	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Socio-Economic	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Traffic Operations	Yes	Yes	Yes	No	No	No	No	Yes
Cost	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Results	***No***	***No***	***Yes***	***No***	***No***	***No***	***No***	***Yes***

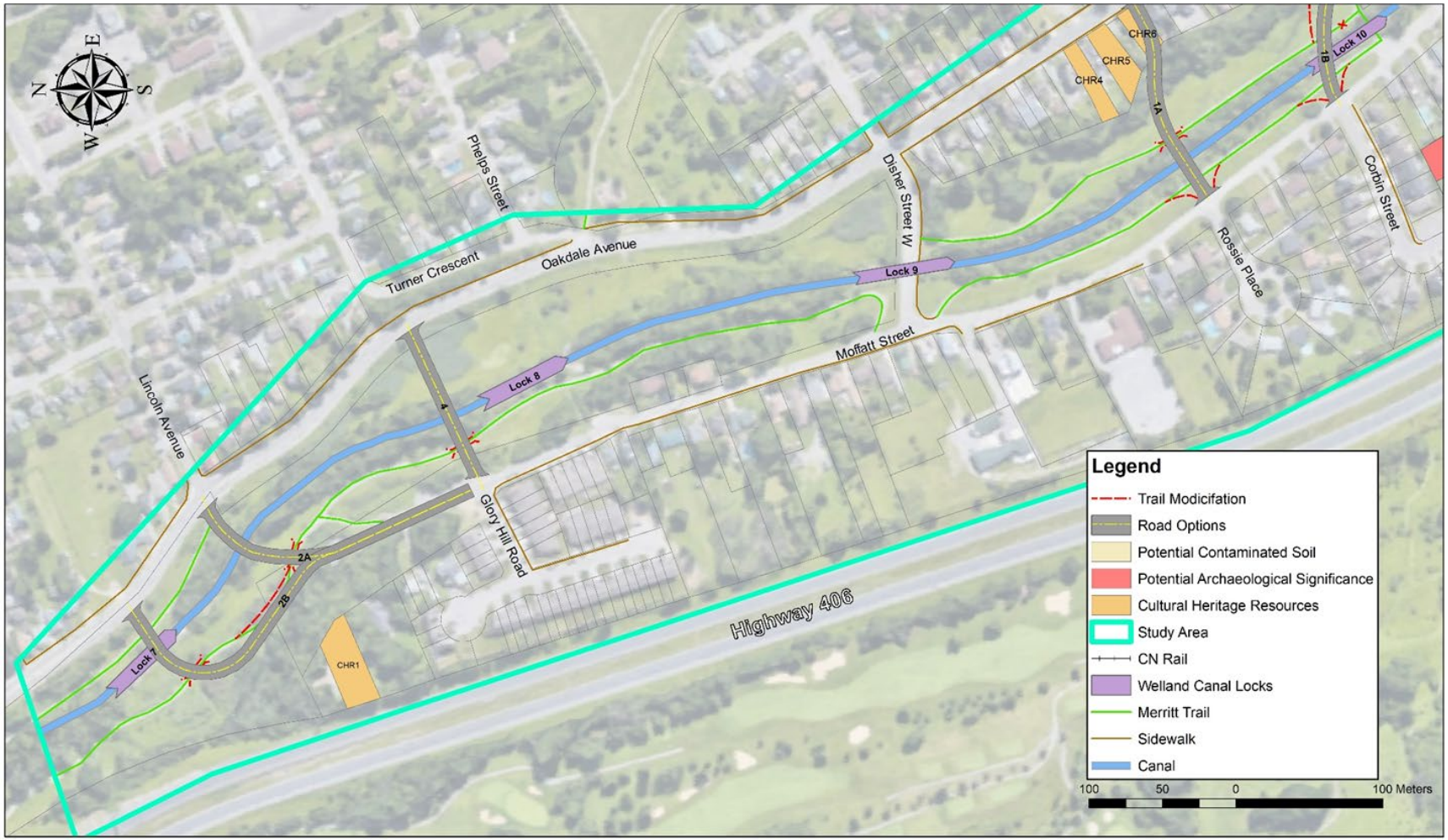


Figure 8: Alternative Locations and Key Constraints (1/3)

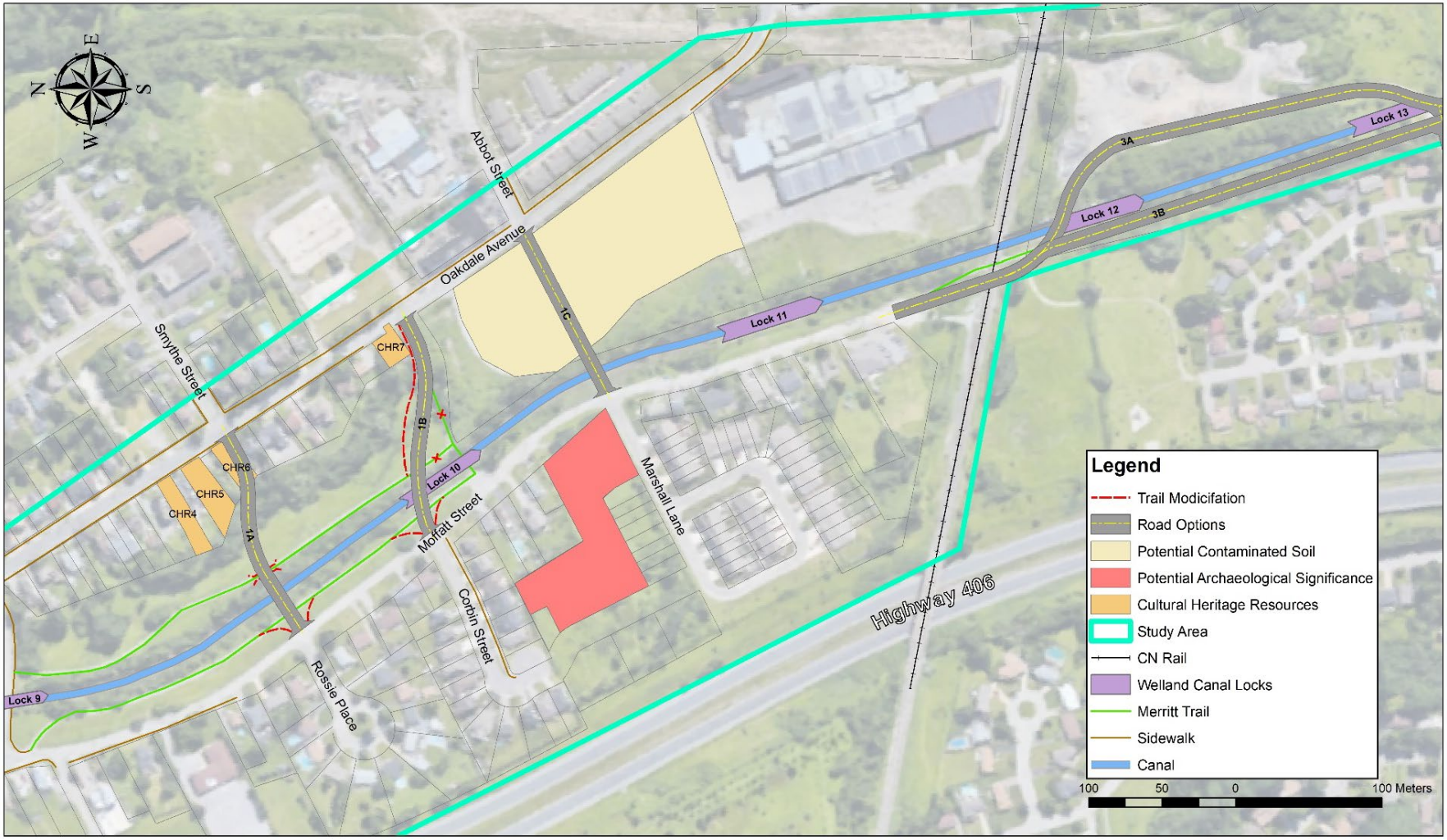


Figure 9: Alternative Locations and Key Constraints (2/3)

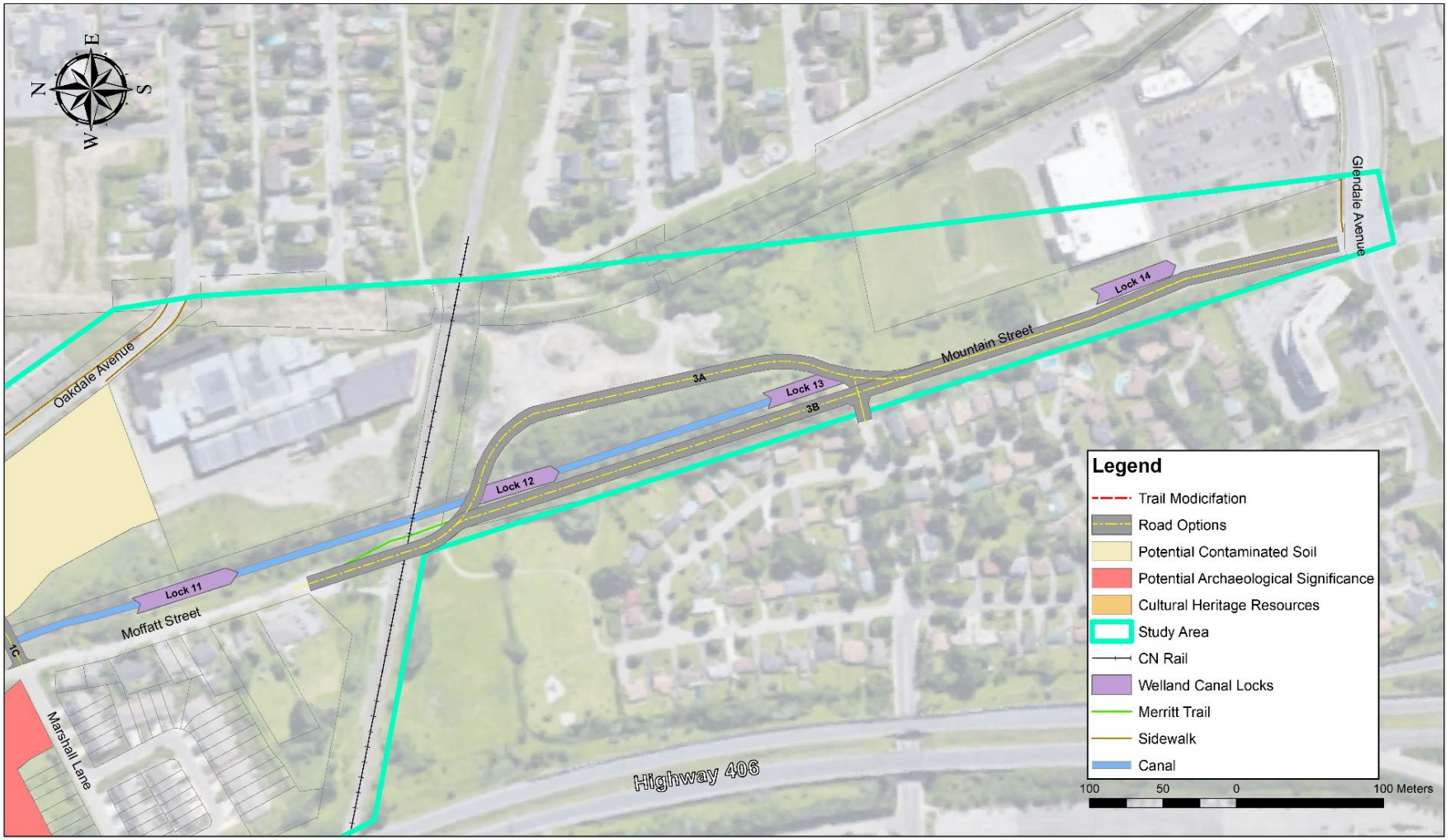


Figure 10: Alternative Locations and Key Constraints (3/3)

3.3 Assessment and Evaluation of Alternative Solutions

The short-listed alternative solutions were assessed using a range of criteria developed to guide the assessment process so that transportation planning, technical and environmental (socio-economic, community, and cultural heritage) conditions are factored into the final recommendation. The assessment of the short-listed alternative solutions is presented in **Table 4.**

Table 4: Assessment of Short-Listed Alternative Solutions

Legend

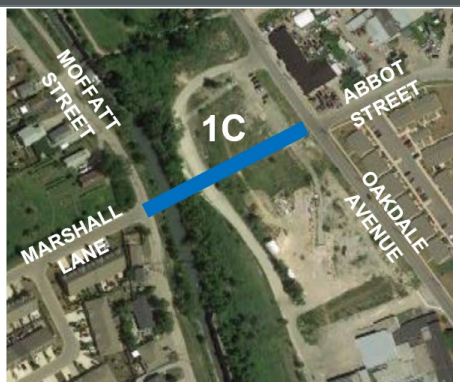
Very Low Impact (Most Positive)

Fairly Low Impact

Medium/Ambivalent Impact

Fairly High Impact

Very High Impact (Least Positive)

Technical Criteria	Alternative 1C – New Crossing from Marshall Lane to Abbot Street	Alternative 4 – New Crossing from Glory Hill Road to Oakdale Avenue
Schematic		
Traffic Operations and Safety	• Ties into existing intersections at Marshall Lane and Abbot Street. • Vehicle speeds are not expected to be an issue due to short length of road. • No sightline restrictions.	• Ties into existing intersection with Glory Hill Road. • Ties into Oakdale Avenue (mid-block) at point of with minor curvature.

Technical Criteria	Alternative 1C – New Crossing from Marshall Lane to Abbot Street	Alternative 4 – New Crossing from Glory Hill Road to Oakdale Avenue
		• Vehicle speeds are not expected to be an issue due to short length of road. • Potential sightline restrictions at Oakdale Avenue due to guiderails and curves.
		
Pedestrian and Cyclist Safety	• No crossings of the Merritt Trail. Pedestrians and cyclists using the Merritt Trail remain separated from vehicles. • A sidewalk is provided along new road which connects to existing sidewalk on east side of Oakdale Avenue. No bicycle lane connections.	• Trail underpass is provided for west side trail. Pedestrians and cyclists are not required to cross any roads. • A sidewalk is provided along new road which connects to existing sidewalk on west side of Moffatt Street and east side of Oakdale Avenue. No bicycle lane connections.
		
Offset from Disher Street Access • Larger offset is preferred	490m	320m
		
Natural Environment and Contamination: Footprint impacts Impacts to areas of contamination potential	• Minimal impacts to natural environment anticipated. • Roadway north of crossing traverses a former industrial property, northeast of the canal, which has potential for contamination. A Phase II Environmental Site Assessment identified	• Larger footprint than Alternative 1C, due to the height of fill required, results in an increased impact to natural environment. • Crossing also located in a larger area of natural resource, compared to Alterative 1C.

Technical Criteria	Alternative 1C – New Crossing from Marshall Lane to Abbot Street	Alternative 4 – New Crossing from Glory Hill Road to Oakdale Avenue
	contaminants located >2m below surface, and thus unlikely to be impacted by the proposed works.	
		
Cultural Heritage and Archeology: • Impacts to Cultural Heritage Resources (CHRs) and Cultural Heritage Landscapes (CHLs) (including canal locks) • Impacts to areas of Archeological Potential identified by Stage 1 Assessment	• One direct impact to a CHR (Welland Canal) and potential indirect impacts to two CHRs. • Located away from nearest lock (Lock 11) thus no direct or indirect impacts are anticipated. • Stage 2 Archaeological Assessment will be required for both alternatives. • May require additional Archaeological investigation beyond Stage 2 due to proximity to a registered archaeological site.	• Two direct impacts to CHRs (Welland Canal and Merritt Trail) and potential indirect impacts to two CHRs. • Located close to a lock (Lock 8), increasing potential for adverse interaction during construction. • Stage 2 Archaeological Assessment will be required for canal crossing.
		
Property Impacts	• No impact to residential properties. • Requires property from industrial property, northeast of canal	• No impact to residential properties. • No impact to surrounding industrial/commercial properties
		

Technical Criteria	Alternative 1C – New Crossing from Marshall Lane to Abbot Street	Alternative 4 – New Crossing from Glory Hill Road to Oakdale Avenue
Cost	• $3.2M • Site contamination cleanup (cost unknown) • Requires the purchase of private property (included in cost). • Requires 136m of new road and a bridge length of 30m.	• $4.3M • Does not require private property. • Requires 125m of new road and a bridge length of 25m.
		
Constructability	• Potential site contamination issues. • Possible issues with abutments.	• High fills required increases constructability difficulty. • Close location to canal lock increases constructability risk (vibration impacts)
		
Overall Recommendation		

Alternative 1C is preferred as it has an overall lesser impact.

While Alternative 1C results in more private property impacts, Alternative 4 has a less desirable geometry, larger footprint and natural environmental impacts, larger constructability requirement, larger cost, and larger cultural heritage impacts.

3.4 Preferred Solution

Based on the results of the assessment and evaluation analysis and evaluation presented in **Table 4**, **Alternative 1C: New Crossing from Marshall Lane to Abbot Street**, is preferred as while it results in more private property impacts, Alternative 4 has a less desirable geometry, larger footprint, and natural environmental impacts, larger constructability requirement, larger cost, and more significant cultural heritage impacts.

4 Alternative Structural Design Concepts

The following section details Phase 3 of the Municipal Class EA process. This phase involves examining alternative design methods to implement the preferred solution based on the existing environment, public and agency input, anticipated environmental effects, and methods to minimize negative effects and maximize positive effects.

As noted in **Chapter 3**, Alternative 1C can be constructed using a relatively short tangent of approximately 130 m, resulting in little need for refinement of the roadway alignment, and was identified as the preferred solution. Alternative design concepts have been developed for this study focused on the crossing of the Old Welland Canal (i.e. Alternative 1C).

4.1 Description of Alternative Structural Design Concepts

The preferred solution, Alternative 1C: requires a crossing over the Old Welland Canal. Five alternatives structural design concepts (options) were considered for the crossing, as shown in **Table 5**.

Table 5: Alternative Structural Design Concepts

Option	Culvert Type	Representation of Culvert Type
Option A	Single Cell Precast Arch Culvert	
Option B	Rigid Frame Culvert	

Option	Culvert Type	Representation of Culvert Type
Option C	Twin Side-by-Side Box Culvert	
Option D	Single-Span Steel Plate / Box Girder Bridge	
Option E	Single-Span, Pre-Stressed Concrete Girder Bridge	

4.2 Screening of Alternative Structural Design Concepts

Upon initial review of the options, Option D and E (the bridge options) were not carried forward due to their extensive foundation requirements and the raise in road height required to accommodate the structures (the raise in height would result in additional footprint impacts and costs). Options A, B, and C (the structural culvert options) were carried forward further evaluation

4.3 Evaluation of Alternative Structural Design Concepts

The remaining structural culvert design concepts (i.e., Options A, B and C) were evaluated using the following criteria:

- Bridge Aesthetics;
- Durability;
- Difficulty of Construction;

- Construction Duration;
- Environmental Impacts; and
- Construction Cost.

A summary of the alternative design concepts evaluation is presented in **Table 6**.

Table 6: Evaluation of Alternative Structural Design Concepts

Options →	A	B	C
Criteria ↓	Single Cell Precast Arch Culvert	Rigid Frame Culvert	Twin side-by-side Box culvert
Bridge Aesthetics	Highest aesthetic quality due to curvature of arch	Medium aesthetic quality	Lowest aesthetic quality
Durability	High durability	High durability	Highest durability
Ease to Build (Constructability)	High complexity due foundation compared to Option C	Similar complexity to Option A. Requires cofferdam protection during assembly	Least Complex with no foundation; however, it requires temporary flow diversion during construction
Construction Duration	Longest duration	Similar duration to Option A	Shortest duration
Environment Impacts During Construction (i.e., silt etc.)	Less impact than Option C	Similar impacts to Option A	Greatest impact
Construction Cost*	$1.3M	$1.6M	$1.8M
Overall Evaluation	**Preferred**	**Not Preferred**	**Not Preferred**

*The overall cost of Alternative 1C is estimated to be $3.2M. This estimate includes the cost of the structural culvert and roadway construction.

4.4 Preferred Structural Design Concept

As detailed in **Table 6**, **Option A: Single Cell Precast Arch Culvert** was identified as the preferred design concept because it has the highest aesthetic quality, is highly

durable, minimizes environmental impacts, and is the least costly to construct compared with the other options.

Based on the selection of road alignment / access location Alternative 1C as the preferred solution and Option A as the single cell precast arch culvert as the preferred structural design option, the full “Recommended Plan” is described in Chapter 6 of this ESR.

5 Consultation

5.1 Key Points of Contact

External agencies, utilities, emergency service providers, residents, business owners, and Indigenous communities were contacted directly at key milestones during the Municipal Class EA Study to provide input to the study and feedback on the decision-making process. The key points of contact are listed in **Table 7**.

At the outset of the study, a direct mailing list of residents and businesses within a defined catchment area associated with the study area, relevant agencies, and utilities. The mailing list was updated throughout the study based on feedback received throughout the study.

Members of the public were made aware of the study through a notification in the local newspapers (St. Catharines Standard and Niagara This Week) and were invited to contact the project team to join the project mailing list. Members of the general public requesting to be on the mailing list received direct notification of subsequent study milestones.

A dedicated project webpage was established through the City of St. Catharines' website at the outset of the study. Project updates were uploaded to the website as the study progressed.

Project website: www.stcatharines.ca/moffatt-ea

Table 7: Key Points of Contact

Date	Notification	Purpose
Notice of Study Commencement **September 25, 2020**	• Notice sent to property owners / mailing list - September 29, 2020 • Newspaper - September 25, 2020 • External Agencies and Stakeholders - September 29, 2020 • Indigenous Communities - September 30, 2020 • Streamlined EA Project Information Form sent to MECP - September 29, 2020	To introduce and invite participation in the study and to request preliminary comments.

Date	Notification	Purpose
Public Information Centre #1 **February 8 to March 8, 2021**	• Notice sent to property owners / mailing list - February 4, 2021 • Newspaper – February 8 / 11, 2021 • External Agencies and Stakeholders – February 4, 2021 • Indigenous Communities - February 4, 2021 • Social Media Channels (Facebook/Twitter) – February 8 – March 8, 2021	To notify and invite interested parties to view and participate in the first virtual Public Information Centre held between February 8 and March 8, 2021.
Public Information Centre #2 **May 20 to June 18, 2021**	• Notice sent to property owners / mailing list – May 14, 2021 • External Agencies and Stakeholders – May 20, 2021 • Indigenous Communities - May 20, 2021 • Social Media Channels (Facebook/Twitter) – May 20 – June 18, 2021	To notify and invite interested parties to view and participate in the second virtual Public Information Centre held between May 20 and June 18, 2021.
Notice of Study Completion **December 9, 2021**	• Notice sent to property owners / mailing list – December 6, 2021 • Newspaper – December 9 / 16, 2021 • External Agencies and Stakeholders – December 9, 2021 • Indigenous Communities – December 9, 2021 • Streamlined EA Project Information Form sent to MECP – December 9, 2021	To announce completion of the Class EA Study and notify interested parties of the 45-calendar day review period for the Environmental Study Report.

5.2 Public Information Centre #1

The first of two virtual Public Information Centres (vPIC) was held between February 8 and March 8, 2021. A link to the vPIC materials was posted on the City's website: www.stcatharines.ca/moffatt-ea.

The purpose of the first vPIC was to provide stakeholders and interested members of the public an opportunity to view study information, including project background, key issues, the Municipal Class EA process, assessment and evaluation of alternative solutions, and the selection of a preliminary preferred solution. The PIC included a video presentation establishing the project context and limitations and an interactive map explaining the alternatives considered for the study.

The virtual PIC (vPIC) had 307 visitors, and of those visitors, 36 participated in the PIC using the interactive tools (e.g., embedded comment form, interactive map, etc.). Participants were asked to share comments on the preferred alternative solution for a secondary access, as well as to provide general comments. Not all participants provided comments, but of the 25 who did, many were supportive of the preferred alternative solution. Other comments included a mixture of not supportive of the preferred alternative solution, supportive of another alternative solution, generally complementary of the study process or had questions regarding the financial cost or necessity of the project. A summary of the written comments received and how the feedback was considered in this study is included in Appendix F. Based on our review of respondent postal codes we confirmed that outreach efforts successfully solicited feedback from potentially interested residents.

5.3 Public Information Centre #2

The second of two virtual Public Information Centres (vPIC) was held between May 20 and June 18, 2021. A link to the vPIC materials was posted on the City's website: www.stcatharines.ca/moffatt-ea.

The purpose of the vPIC was to provide stakeholders and interested members of the public with an opportunity to review the preliminary preferred design plan and next steps of the study and provide comments. The vPIC included a video presentation that led participants through a series of "virtual boards" displaying alternative design concepts for the crossing over the Welland Canal, the preliminary recommended plan, and next steps.

The vPIC had a total of 106 visitors, and of those visitors, 17 participated in the vPIC using the interactive tools. Participants were asked to share comments on the

preliminary recommended plan for a secondary access and express any general comments or concerns related to the project. Not all participants provided comments, but most of those who did comment supported the preliminary recommended plan. Other comments were related to traffic control at the intersection of Marshall Lane and Moffatt Street and the project's overall cost. A summary of the written comments received and how the feedback was considered in this study is included in **Appendix F.**

5.4 External Agency and Stakeholder Consultation

A list of relevant technical agencies was assembled at the beginning of the study. External 'agencies' (including regulator/review agencies, utilities and emergency service providers) were first notified of the study via email informing them of the commencement of the study and soliciting their comments.

The St. Catharines Fire Service attended the study start-up meeting on August 14, 2020, to provide support for the project need and justification as it relates to emergency access.

The following agencies, utilities, and other stakeholders were consulted throughout the study, including notification of the vPICs:

- Provincial Agencies
    - Ministry of the Environment, Conservation and Parks
    - Ministry of Natural Resources and Forestry
    - Ministry of Heritage, Sport, Tourism and Culture Industries
    - Ministry of Transportation
    - Niagara Peninsula Conservation Authority
    - St. Lawrence Seaway Management Corporation
- Municipal Agencies
    - St. Catharines Heritage Advisory Committee
    - St. Catharines Heritage Permit Advisory Committee
    - City of St. Catharines Transportation Committee
    - City of St. Catharines Accessibility Committee
- Emergency Services
    - Niagara Regional Police Services
    - Niagara Emergency Medical Services
- Utility Services

    - Canadian National (CN) Rail
    - Enbridge Gas Distribution
    - Hydro One Networks Inc.
    - Rogers Cable
- Interested Stakeholders
    - Canadian National (CN) Rail
    - Potentially Impacted Property Owners

A summary of external agency comments is provided in **Table 8**. Throughout the study, the Project Team met with various agencies to provide information and updates on the study and seek input on specific project components. Notes of all meetings are on file with the City. The meetings are summarized in **Table 9.**

Relevant correspondence is included in **Appendix F.**

Table 8: Summary of Key External Agency Correspondence

Agency	Comments Received	Course of Action
Provincial Agency		
Ministry of Environment, Conservation and Parks	• Provided expectations of study process for Schedule 'C' MEA Class EA	• Schedule 'C' MEA Class EA process followed for the study
Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDNRF)	• Confirmed MNDNRF has not completed a screening of natural heritage of other resources values for the project at this time • Provided guidance for identification and assessment of natural features and resources	• Natural Heritage Assessment completed to identify and assess natural features and resources within the study area.
Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)	• Recommended that a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment and archaeological assessment be	• Cultural Heritage Resource Assessment (CHRA) completed to identify existing conditions and assess preliminary impacts within the study area

Agency	Comments Received	Course of Action
	undertaken as part of the study • Provided comments on Draft Cultural Heritage Resource Assessment.	• Stage 1 Archaeological Assessment filed with MHSTCI, February 10 2021
Niagara Peninsula Conservation Authority (NPCA)	• Project Team met with the NPCA twice throughout the study. • Confirmed NPCA will not require generation of the 100-year floodplain for a second access to Moffatt Street across the Old Welland Canal. • Confirmed NPCA does not have requirements for the hydraulic capacity of the proposed crossing.	• No further action required.
St. Lawrence Seaway Management Corporation (SLSMC)	• Confirmed study area does not fall within SLSMC jurisdiction and the proposed work will not impact their operations	• No action required.
Municipal Agencies		
St. Catharines Heritage Advisory Committee	• Consultant Project Manager presented to the Committee on February 11, 2021	• Final design and commemoration strategy to be provided to SCHAC at a future date, for review and comment (to be completed in Detailed Design)
St. Catharines Transportation Advisory Committee	• Committee reviewed Public Information Centre #1 presentation at meeting on February 10, 2021.	• No action required.

Agency	Comments Received	Course of Action
	• Consultant Project Manager presented to the Committee on April 29, 2021.	
Interested Stakeholders		
Canadian National (CN) Rail	• Project Team met with CN Rail on November 19, 2020. • CN noted that alternatives that cross the CN Rail corridor are not preferred from their perspective.	• Information obtained during meeting considered in evaluation of alternatives
Owners of 65 Oakdale Avenue	• Owner provided information about status of property. • Project Team provided overview of options that may impact property.	• Potential property impacts to be confirmed in subsequent phase

Table 9: Key External Agency and Stakeholder Meetings

Agency	Meeting Date	Meeting Summary
Provincial Agencies		
Niagara Peninsula Conservation Authority	November 9, 2020	• The Project Team met NPCA on November 9, 2020. • The purpose of the meeting was to determine NPCA's interest in the study. • NCPA expressed no concerns from a floodplain perspective; however, stated they will have interest in the hydraulic flows. • Following the meeting, NPCA confirmed they do not have a hydraulic model for the canal and thus, no current requirements for the hydraulic capacity of the proposed crossing.
	December 16, 2020	• The Project Team met NPCA on December 16, 2020 on site to review the study area and discuss initial alternatives. It was deemed that there would be no significant impacts that could not be mitigated.
Municipal Agencies		
St. Catharines Heritage Advisory Committee (SCHAC)	February 11, 2021	• The Consultant Project Manager presented to the St. Catharines Heritage Advisory Committee on Thursday, February 11, 2021. • The purpose of the presentation was to introduce the study, review the preliminary preferred alternative solution and findings of the Heritage Impact Assessment, discuss questions and concerns, and review next steps.

Agency	Meeting Date	Meeting Summary
		• During the meeting, a question was raised concerning how archaeological considerations will be addressed. A Stage 1 archaeological impact study was carried out as part of this project and recommendations within the study addressed the need for future actions to safeguard and properly document archaeological resources. A Stage 2 archaeological assessment will be required in the future. • A question was asked about whether there would be traffic signals associated with the crossing. The need for signalization will be considered in the future • SCHAC supports the recommendation of Alternative 1C being the preferred alternative, and would have minimal impact on heritage resources • SCHAC supports the requirement for a commemoration plan in the future, and details of the final design / commemoration strategy be forwarded to the SCHAC for future review and comment.
St. Catharines Transportation Advisory Committee	April 29, 2021	• The Consultant Project Manager presented to the St. Catharines Transportation Advisory Committee on April 29, 2021. • The purpose of the presentation was to review the preferred solution, evaluation of design options, preliminary recommended plan, and next steps.

Agency	Meeting Date	Meeting Summary
Interested Stakeholders		
Canadian National (CN) Rail	November 19, 2020	• The Project Team met with CN Rail on November 19, 2020. • The purpose of the meeting was to introduce the study and review alternatives that cross the CN Rail corridor. • CN Rail provided information about corridor and potential impacts to their infrastructure based on the alternatives presented. • Alternatives that cross the CN Rail corridor are not desirable from CN's perspective.

5.5 Indigenous Community Engagement

In correspondence dated September 30, 2020, the Ministry of the Environment, Conservation and Parks (MECP) identified the following communities to be engaged for this project:

- Mississauga's of the Credit First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council

A summary of correspondence with Indigenous communities is provided in **Table 10**. A copy of the written correspondence is included in the consultation record in **Appendix F**.

Table 10: Summary of Indigenous Community Engagement

Indigenous Community	Key Correspondence	Course of Action
Mississaugas of the Credit First Nation (MCFN)	• MCFN provided a letter (dated September 14, 2020) to Project Team noting their interest in the study area	• The draft Stage 1 Archaeological Assessment was provided to MCFN for

Indigenous Community	Key Correspondence	Course of Action
	and participating and monitoring during archaeological fieldwork • MCNF provided comments on draft Stage 1 Archaeological Assessment via email on December 14, 2020. Aside from the action items further described to the right, MCFN confirmed they have no further concern about the report or the recommendations.	review via email on November 30, 2020. • At time of review, MCFN have no desire to participate in the Stage 4 assessment recommended at the Euro-Canadian historical Moffatt Street site (AgGT-240). If pre-contact artifacts are found at the site, MCFN should be notified as soon as possible to reassess their level of involvement. • MCFN Field Liaison Representative to participate in any Stage 2 archaeological field work
Six Nations of the Grand River	• Study notices provided to Chief via email: ○ Notice of Study Commencement – September 30, 2020 ○ Notice of PIC 1 – February 4, 2021 ○ Notice of PIC 2 – May 20, 2021	• No comments were received in response to the project notices emailed to the Chief
Haudenosaunee Confederacy Chiefs Council	• Study notices provided to community via mail c/o Haudenosaunee Development Institute ○ Notice of Study Commencement – September 29, 2020 ○ Notice of PIC 1 – February 4, 2021	• No comments were received in response to the project notices mailed to the Haudenosaunee Development Institute.

Indigenous Community	Key Correspondence	Course of Action
	○ Notice of PIC 2 – May 14, 2021	

The City commits to continuing outreach and engagement will all Indigenous Communities that may have interest in the study area during Detailed Design. The City acknowledges MCFN's request for field liaison representation during the Stage 2 field work and will work with their archaeological consultant to facilitate outreach and engagement at that time. All future correspondence will be documented and submitted with any subsequent applications to the MECP.

6 Description of the Recommended Plan

The Recommended Plan includes the provision of a secondary access to Moffatt Street, by constructing a new local road connection between the existing intersections of Moffatt Street / Marshall Lane and Oakdale Avenue / Abbot Street. The new road will include a single-cell pre-cast structural arch culvert spanning the Old Welland Canal. The following sections outline the features of the proposed undertaking.

6.1 Roadway Design

The secondary access to Moffatt Street will be classified as a local road. The function of a local road is to enable the movement of low volumes of traffic to collector roads. The geometric design standards used to develop the alignment and cross-section for the proposed secondary access to Moffatt Street are summarized in **Table 11.** Geometric design standards are based on the classification of the road and the design speed.

Table 11: Roadway Design Criteria

	Design Standards [a]	Proposed Standards
Road Classification	Local Road	Local Road
Design Speed (km/h)	50	50
Minimum Grade (%)	0.30	1.23
Maximum Grade (%)	8.00	2.42
Vertical Curvature Min. K. value of Sag Curve Min. K. value of Crest Curve	 12 8	 15 100
Pavement Width (m)	8.5 [b]	10.0
Bike Lane Widths (m)	1.5	1.5
Sidewalk Widths (m)	1.5	1.5
R.O.W Width (m)	18 / 20 [b]	20
Posted Speed (km/h)	50	50

Notes:

a) Design standards sourced from City of St. Catharines Engineering Standards Manual – Roadway Design Criteria & City Standard Drawing 110-5028

b) At the discretion of the City Engineer

The preliminary design details (alignment and typical cross-sections) for the proposed roadway are detailed in **Figure 11** and **Figure 12**. Following input from the City and to best accommodate adjacent active transportation networks (see **Section 6.2**), the proposed cross-section will accommodate bike lanes.

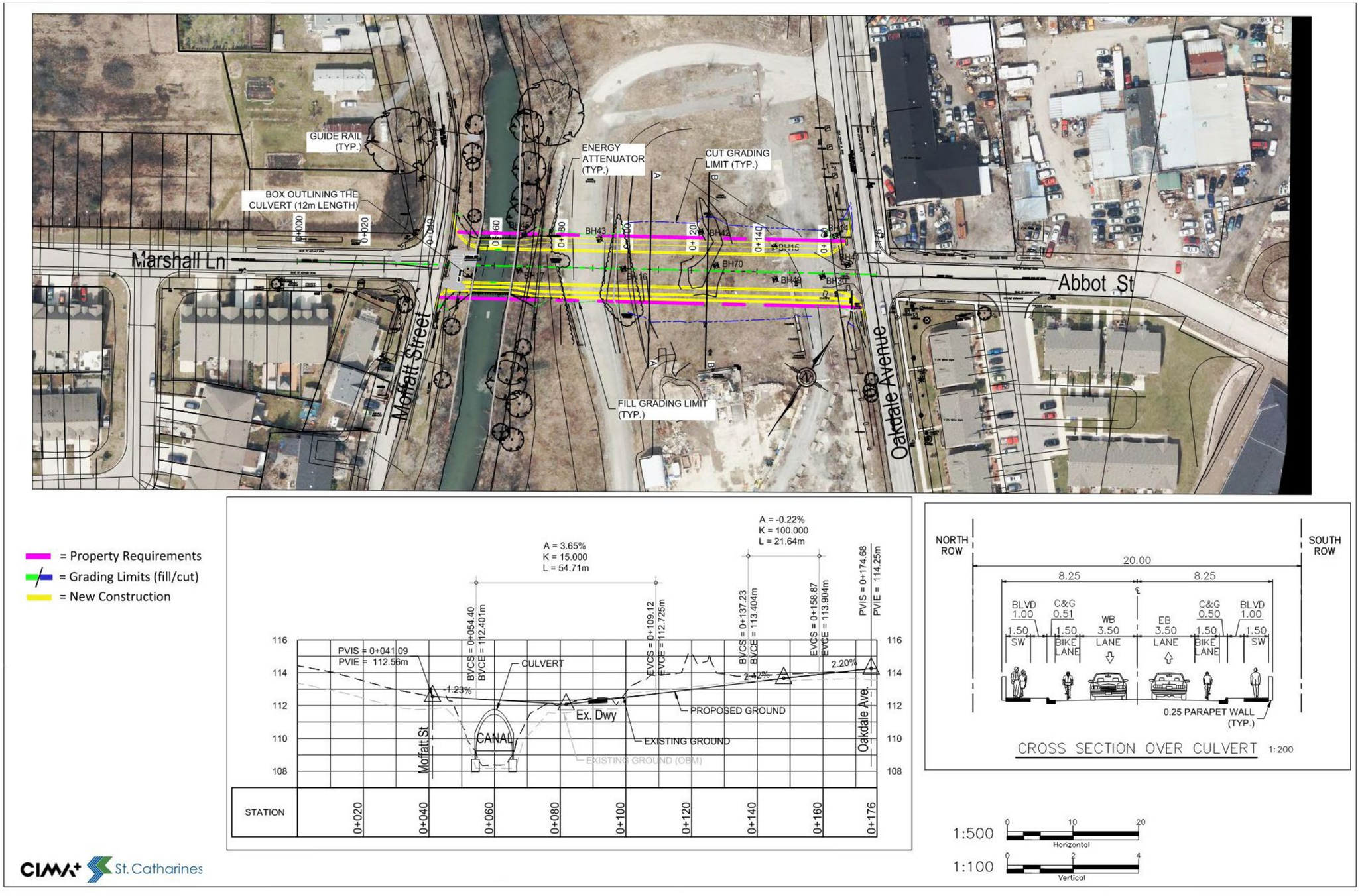


Figure 11: Recommended Plan and Profile

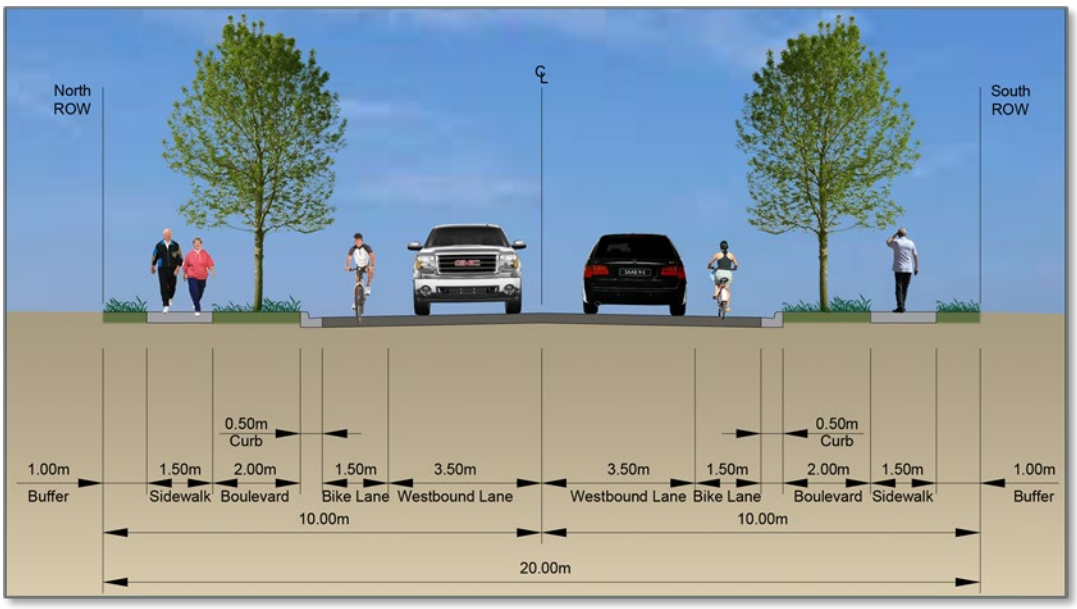


Figure 12: Proposed Road Cross-Section

The proposed cross-section is based on the City's typical 20 m right-of-way (ROW) urban cross-section with sidewalks and bike lanes (Drawing No.:110-5028).

Through consultation with the City's Transportation Advisory Committee, a potential refinement to the cross-section was identified, including reducing lanes to 3.3 m to increase bike lane width and/or provide buffered bike lanes. The proposed design provides flexibility to accommodate this configuration. The final bike lane design will be confirmed in Detailed Design and in conjunction with the completion of the future bike lane design along Oakdale Avenue.

A specific constraint to the proposed secondary access road alignment is the risk of site contamination. As covered previously in this report, the Recommended Plan crosses a vacant industrial property with the potential for soil remediation requirements (i.e., treatment and/or removal of contaminated soils). As part of this study, an ESA Phase I report was completed (detailed in **Section 2.3.4**), and a previously completed ESA Phase II report (2017) undertaken by A&A Environmental Consultants Inc. was obtained through background research and consultation.

The scope of the Phase II ESA undertaken included a sub-surface investigation of the soil and groundwater quality. A total of 10 boreholes and four (4) groundwater monitoring wells were installed within the vicinity of the secondary access. Soil and groundwater samples were analyzed for identified contaminants of concern, including metals, petroleum hydrocarbons (PHC), and polycyclic aromatic hydrocarbons (PAH)

and compared to the applicable Site Condition Standard as defined by Ontario Regulation (O.Reg) 153/04.

Analytical results are summarised as follows:

- Metals impacts identified in soils from six (6) boreholes at depths ranging between 2.5 and 14.6 metres below ground surface (mbgs);
- PHC (F2-F4) impacts identified in soils from one (1) borehole between 2.5 and 4.5 mbgs;
- PAH impacts identified in soils from one (1) borehole between 5 and 7 mbgs; and,
- PHC (F2 and F3) identified in groundwater from one groundwater monitoring well (depth unknown).

Based on the sub-surface conditions reported by A&A (2017) the impacts in soil are located at a depth greater than 2.5 m below ground level. The proposed profile, as shown in **Figure 11**, aims to limit excavation to be above this level; however, the following considerations would need to be put in place prior to and during construction. The final roadway profile will be refined in Detailed Design.

- A Risk Assessment (RA) is recommended for the property prior to construction in order to meet the requirements of filing a Record of Site Condition (RSC) under O.Reg 153/04. Soil and groundwater quality in the vicinity of the works should be compared to any Property Specific Standards (PSS) developed as part of the RA.
- A Remedial Action Plan (RAP) and associated Risk Management Plan (RMP) should be put in place for the excavation of shallow soils (less than 2.5 mbgs) to address any potential impacts and to protect human health (worker exposure) and ecological receptors; and
- All waste removed as a result of the works should be handled in accordance with O.Reg 406/19.

6.2 Active Transportation

The proposed typical cross-section for the secondary access has been designed to accommodate bike lanes and sidewalks along both sides of the roadway. The cross-section accommodates sidewalks of 1.5 m width and bike lanes of 1.5 m width on both sides of the road, between Oakdale Avenue and Moffatt Street.

Active transportation (AT) was a key consideration as part of this project. This Class EA study was completed during the City's Transportation Master Plan update, wherein the

existing and future AT networks were reviewed. As part of the City's Transportation Master Plan (2021), bike lanes are proposed on Oakdale Avenue, and the City have plans for a future extension of the Merritt Trail. Through consultation with the City, influences of the city-wide AT networks on Recommended Plan were considered. Two potential AT configurations were identified and illustrated in **Figure 13**. Consideration of AT needs and the assessment of the alternatives is detailed in **Appendix G**.

The assessment identified Alternative 1 (Bike Lanes) as preferred. The options are very similar regarding design standards, cost, and connections to future respective multi-use / bike networks.

The key difference is implementation as Alternative 2 is only truly effective with the future, wider multi-use network (construction timing of which is to be confirmed). Alternative 1 is not as dependent, as it can be used by existing cycle tours, and if desired, a wide roadway can be used initially, and the bike lanes painted later with the wider bike network improvements along Oakdale Avenue. Also, Alternative 1 can provide a measure of flexibility as it could not preclude a widening of its northern sidewalk to a multi-use trail if the City should so desire it in the future. It would be more costly/impactful to reconstruct curbs and widen the roadway pavement for bike lanes if the City initially implemented Alternative 2.

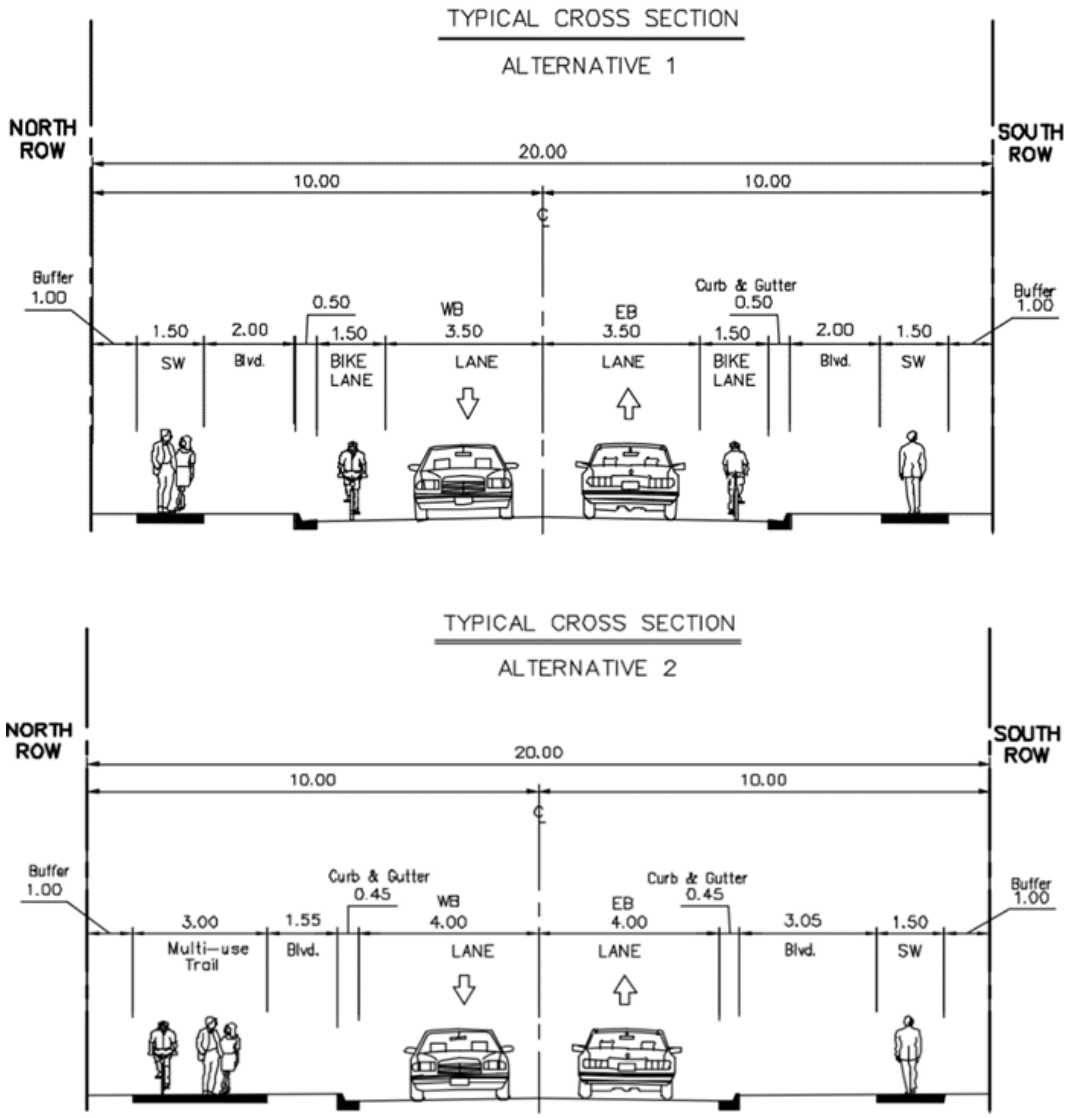


Figure 13: Potential Active Transportation Configurations

6.3 Traffic Control

High-level traffic analysis was undertaken to determine the type of traffic control warranted at the new Oakdale Avenue / Abbot Street and Marshall Lane / Moffatt Street intersections. As this project's primary need and justification is access and not the traffic capacity or intersection operations, a detailed analysis (i.e., microsimulation) was not completed as part of this study.

Traffic volumes and turning movements were estimated using existing counts at the Disher Street and Oakdale Avenue intersection. Future developments at Corbin Street and 65 Oakdale Avenue were considered and potential changes in travel behaviour

resulting from the secondary access. The methodology and analysis undertaken is further detailed in **Appendix H**. The high-level analysis identified that both the Oakdale Avenue / Abbot Street and Marshall Lane / Moffatt Street intersections do not warrant four-way stop control due to the low volume of traffic expected. Further, the warrants are anticipated to remain unchanged when adjacent development proposals (e.g., the planned Corbin Street development) are constructed. At the future intersection at Moffatt Street / Marshall Lane, traffic analysis indicates that the major movement at the intersection will be east-west, thus the approaches of Moffatt Street from the north and south are recommended to be stop-controlled. At the future Oakdale Road / Abbot Street intersection, Oakdale Road will remain the major roadway, and the approaches from the new cross and Abbot Street are recommended to be stop-controlled. Existing and potential future traffic control is shown in **Figure 14.**

It is acknowledged that the structural culvert is located close to the Moffatt Street / Marshall Lane intersection and while obstructions to sight-triangles are not anticipated, the final design of the culvert parapet wall will consider potential lookouts and/or streetscaping present as possible sight obstructions. The need for pedestrian crosswalks could also be likely in the future, given the promotion of active transportation by the proposed bike lanes and due to the City's future extension of the Merritt Trail westerly. Therefore, while not warranted from a traffic perspective, the use of the four-way stop control at this intersection could have merit and will be confirmed in Detailed Design.

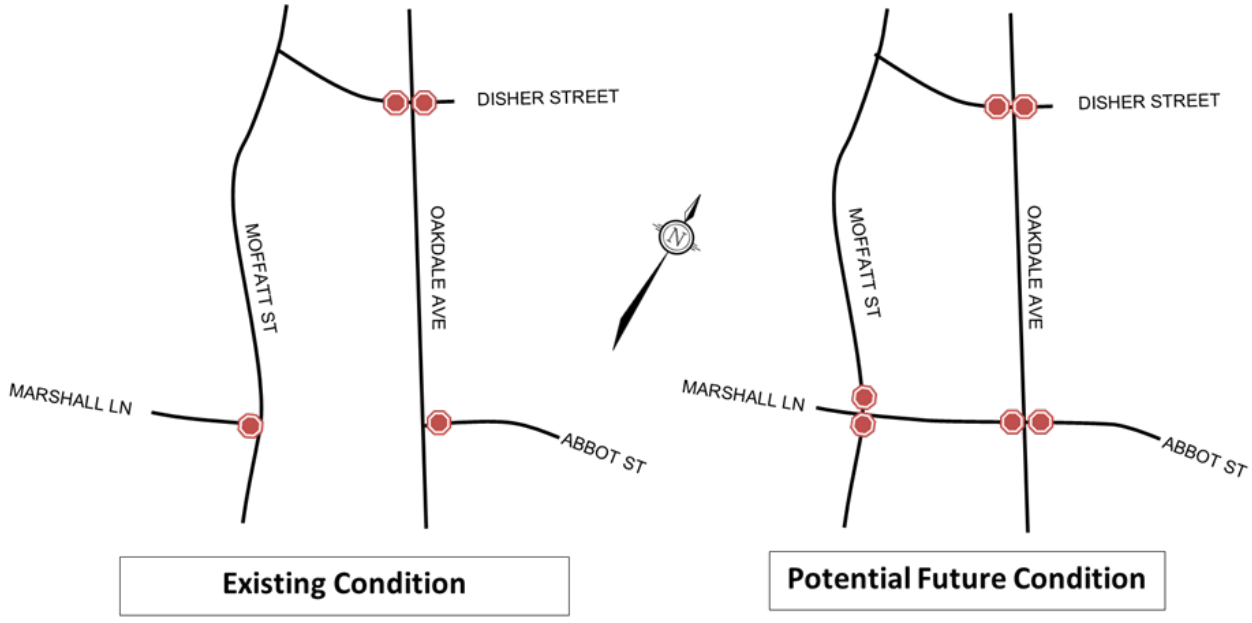


Figure 14: Existing and Potential Future Traffic Control

6.4 Structural Engineering

As described in **Chapter 4,** the single cell precast arch culvert was identified as the preferred structural culvert type. As the structural design parameters (i.e., span / width / rise) fell within the typical range of this precast culvert, a specific design is not required, and the culvert can be obtained through the purchase of a provider's typical inventory.

6.5 Drainage and Stormwater Management

6.5.1 Hydraulic Assessment

The crossing of Old Welland Canal posed a unique challenge when assessing the hydraulic requirements for the proposed culvert since the canal does not function like a typical watercourse, due to the locks. The structural culvert is required to accommodate the hydraulic needs of the canal to ensure that there will not be any detrimental impacts (i.e., increase) to the water level in the canal. While the canal is disused, it still acts as a receiving area for the drainage of the surrounding areas. Through consultation with Niagara Peninsula Conservation Authority (NPCA), it was found that there is no existing hydraulic model. Therefore, for the purposes of this preliminary design and environmental assessment study, a high-level hydraulic review was conducted to estimate anticipated fluctuations in water levels and confirm the feasibility of the alternative design concepts. The review is detailed in **Appendix I**.

Based on assumed flow rates to recreate the existing average water level and the most conservative structural design (the box culvert), the analysis determined that the new culvert would result in minimal increases (<0.03 m) in water surface elevation. As the box culvert design concept is the limiting the structural design options considered, it was determined, at a high-level, that the new crossing will not change the hydraulic function of the canal (i.e., will not create a bottleneck that could result in a flooding event). Preliminary analysis and results will be confirmed during Detailed Design.

The new secondary access road is only ~ 130 m; therefore, a detailed Stormwater Management analysis was not required for the purpose of this Class EA. It is proposed that the short segment of roadway will drain to the Old Welland Canal with design details to be developed in the future design phase. In terms of quantity control, the new roadway will have a nominal increase to the existing impervious area already draining into the canal and is likely to have no impact. The roadway will have an urban cross-section with curbs and gutters. Water will likely be conveyed via outlet to the Old Welland Canal. The stormwater drainage design will be detailed in the future design

phase. An oil/grit separator or sediment trap would enhance water quality and should be considered in Detailed Design.

6.6 Construction Staging

Construction of the new secondary access to Moffatt Street will be staged with minimal traffic impacts. In general, traffic will continue accessing Moffatt Street using the existing access via Disher Street during the construction of the Recommended Plan.

The construction staging strategy is comprised of two main steps:

1) Construct the new roadway between Moffatt Street and Oakdale Avenue offline (i.e., no impact to existing road network)
2) Tie-in the new roadway to the existing intersections at Moffatt Street and Marshall Lane and Oakdale Avenue and Abbot Street (tie-in work may result in short term traffic disruption at the intersections).

Short-term disruptions and partial lane closures may be required at some intersections on Moffatt Street and Oakdale Avenue to implement the proposed improvements. It is recommended that any traffic disruptions occur during off-peak times, to the extent possible and that access remain available to emergency vehicles.

6.7 Municipal Services and Utilities

The following municipal services and utilities are located within the study area: A Utility Conflict Plan that shows the existing municipal services and utilities and potential conflicts has been developed.

The several municipal services that may require protection or relocation to accommodate the secondary access. **Table 12** provides a summary of the anticipated conflict locations and potential impacts, subject to further review in Detailed Design. Other utilities such as gas lines, Bell, and cable are unlikely to be impacted as they are located further from the access road connections and are assumed to be in an area that will not be reconstructed to full depth. On-going consultation with utility companies and municipal services in the area will be required during Detailed Design, to keep them informed about the proposed work and confirm impacts.

Table 12: Potential Utility Conflict Locations and Impacts

Municipal Service / Utility Company	Conflict Location	Potential Impacts
Municipal	West tie-in of the new access road at the Marshall Lane and Moffatt Street Intersection	• Storm Sewers (525 mm and 900 mm) • Storm Manhole (1) • Sanitary Sewer (675 mm) • Sanitary Manhole (1)
Municipal	East tie-in of the new access road at Oakdale Avenue and Abbot Street	• Storm Sewer (300 mm) • Catch Basin (1) • Sanitary Sewer (200 mm) • Sanitary Manhole (1) • Watermain (150 mm and 250 mm)
Hydro	Oakdale Avenue south of the proposed crossing	• Hydro Support Pole requires relocation. This pole may be relocated without moving adjacent poles. To be confirmed in Detailed Design.

6.8 Illumination

The new local roadway connection of the secondary access will be fully illuminated. The proposed layout consists of four new pole-mounted light fixtures along the new roadway: three along the northside of the new road and one new fixture at the North-West corner of Oakdale Avenue / Abbot Street intersection. Included in the illumination design are the existing streetlights adjacent to each intersection. The intersection of Oakdale Avenue / Abbot Street, in its existing condition, does not achieve the minimum illumination level as recommended by the RP-8-18 lighting manual. By installing the new pole-mounted fixture on the northwest corner, illuminance levels would fall within acceptable levels. If desired by the City, an additional marginal gain in illuminance could be achieved by replacing the existing light fixture at the South-East corner of the intersection with a typical but higher wattage version.

The intersection of Moffatt Street / Marshall Lane currently does not achieve the recommended minimum illuminance as recommended by the RP-8-18 lighting manual. Given the land constraints at this intersection due to the steep banks of the adjacent canal, no additional poles are recommended on the eastern side. It is recommended that two existing fixtures be replaced at this intersection with higher wattage fixtures.

The proposed light fixtures models were selected to match the existing lights and pole locations adjacent future trail connections and active transportation facilities were selected to ensure users are sufficiently illuminated. The poles will be spaced 30 m apart from each other and will be the same height to maintain uniformity. The four new poles are to be 30 feet in height, to match the existing poles on Moffatt Street. The pole material (i.e. wood, concrete, metal) will be determined in coordination with Alectra and the City of St. Catharines.

The proposed illumination is further detailed in the Illumination technical memo, included in **Appendix K**. The proposed illumination layout is included in **Figure 15**, where blue and green circles represent the proposed lighting distribution.

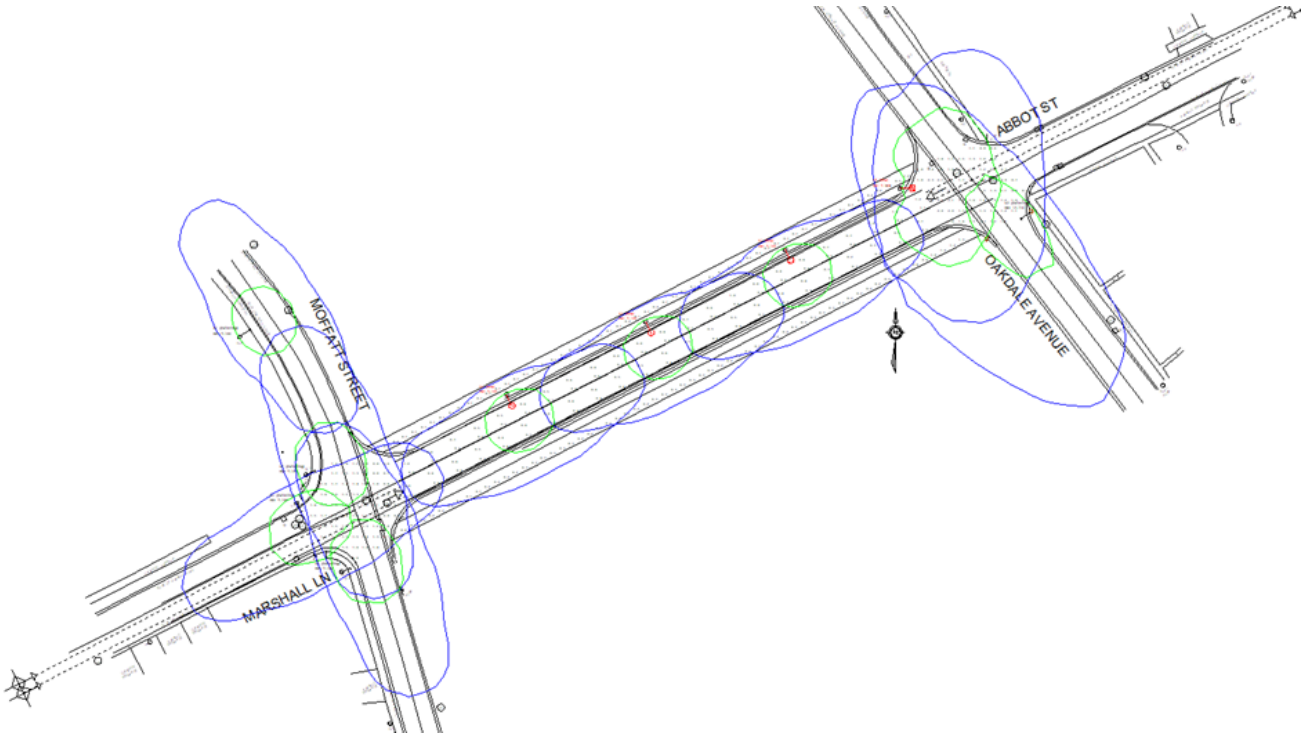


Figure 15: Proposed Illumination Layout

6.9 Landscaping / Heritage Commemoration

The new roadway presents landscaping opportunities within the new right-of-way (ROW) and the culvert presents the opportunity for a look-out over the Old Welland Canal, which is a key cultural heritage feature within the area. As part of this study, the project team consulted with the St. Catharines Heritage Advisory Committee (SCHAC) and a recommendation of a commemoration plan was supported by the committee. The commemoration plan will be confirmed with the completion of the final design, undertaken in the subsequent Detailed Design phase. The details of the

commemoration plan and final design are to be forwarded to the SCHAC for review and comment. In this regard, the structural culvert parapet walls also provide opportunities for commemorations such as plaques or dedications. **Figure 16** is a 3D rendering of the Recommended Plan that was shown at PIC 2 and illustrates the future secondary access road and crossing of the Old Welland Canal.

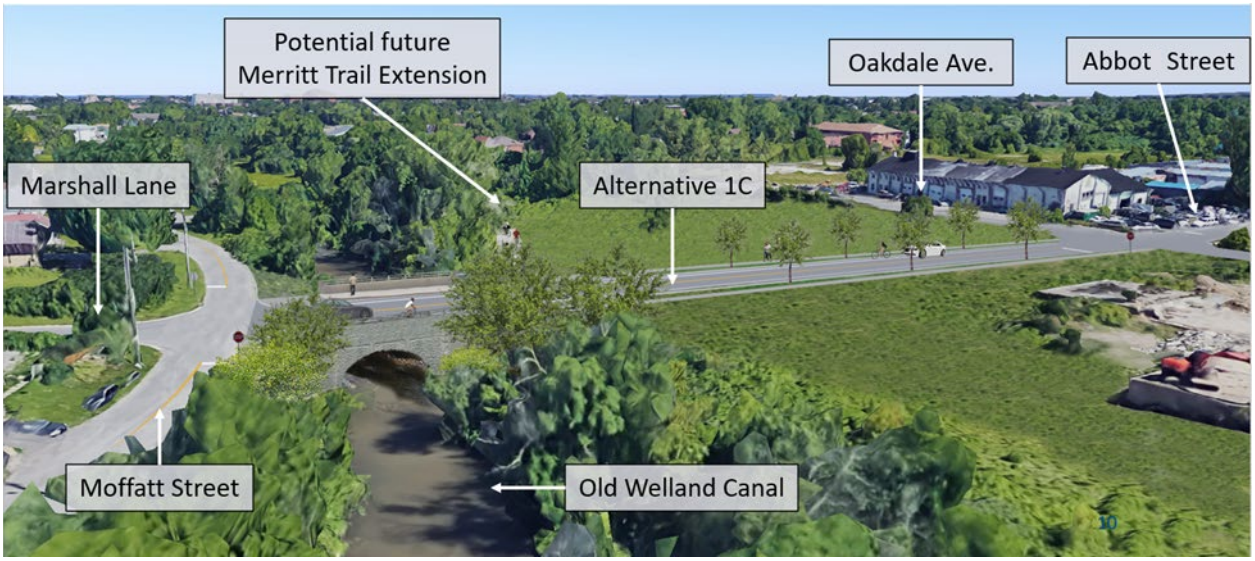


Figure 16: Recommended Plan Illustration

6.10 Property Requirements

One private property will be directly impacted by the proposed undertaking. Property acquisitions will be negotiated individually between the City of St. Catharines and the property owner.

6.11 Implementation

At this time, the timing of implementation has not been confirmed. It is anticipated that the proposed improvements will be constructed within a 10-year time frame, subject to Council approval and funding.

7 Potential Environmental Impacts, Proposed Mitigation, and Commitments to Further Work

The Recommended Plan has incorporated specific measures to mitigate potential negative impacts, where possible. Where impacts cannot be entirely avoided, mitigation recommendations for review and commitments for further work during detailed design and/or construction have been developed.

7.1 Socio-Economic Environment

7.1.1 Land Use

The Recommended Plan is considered compatible with the existing and future land use in the study area and the City's Official Plan. The secondary access enhances multi-modal access and safety to a residential enclave subject to minor infill and redevelopment.

Engaging the surrounding communities during the Class EA study greatly contributed to the development of a meaningful and relevant design plan and resulted in a high level of local support for the project.

7.1.2 Properties and Access

The Recommended Plan will impact one private property - the road will bisect the vacant parcel that is designated as High Density Residential in the City's Official Plan. Parcel size of the remaining lands on either side of the secondary access should be large enough to support future development.

Final property requirements will be confirmed during Detailed Design. The City of St. Catharines will continue to consult with the affected property owner and property acquisition will be in accordance with the City of St. Catharines realty policies and procedures.

Access during construction is anticipated to be provided from the adjacent intersections of Moffatt Street / Marshall Lane and Oakdale Avenue / Abbott Street. Temporary traffic management measures may potentially be required to facilitate construction vehicle access and will be confirmed in Detailed Design. The City will notify all area residents of construction plans, staging and traffic management measures in advance of construction.

7.1.3 Noise

Assessment of Potential Long-Term Noise Impacts

A Noise Assessment was completed in accordance with the MTO Noise Guide, MECP/MTO Joint Protocol and Niagara Region Policies to review the impact of the Recommended Plan on adjacent Noise Sensitive Areas (NSAs). NSAs refer to land uses with outdoor living areas, such as private homes, hospitals, educational facilities, daycare centers, campgrounds, etc. The Joint Protocol states that the objective for outdoor sound levels is the higher of 55 dBA L_{eq} (16 hours) or the existing ambient. Future noise levels were modeled with and without the secondary access to Moffatt Street between Marshall Lane and Abbot Street. Mitigation measures (e.g. noise wall) must be reviewed if future noise levels are expected to exceed 55 dBA or increase more than 5 dB over existing levels at receptors in NSAs.

With the implementation of the Recommended Plan, the predicted noise levels are below 55 dBA and the change in noise level are below 5 dBA at receptors in NSAs. Therefore, the consideration of noise mitigation is not warranted per the MECP/MTO Joint Protocol limits. The complete Noise Assessment is provided in **Appendix J**.

Construction Noise

The potential for construction noise issues will be reviewed further during Detailed Design when the construction methodology and schedule are fully developed. Construction activities will conform to the City of St. Catharines Noise Control By-Laws 95-198 and 2015-60. In the Contract Documents, there shall be an explicit indication that Contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the City for all work done by Contractors.

7.1.4 Climate Change Considerations

The Ministry of the Environment and Climate Change (MOECC) guide titled 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 that ‘climate consideration’ within a project means: 1) that consideration has been given to methods to reduce greenhouse gas emissions; and 2) 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. 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.

Corporate Climate Change Adaption Plan

The City of Catharines Corporate Climate Change Adaptation Plan (2021) evaluates climate impacts, risks, and vulnerabilities the municipal government currently faces, or is expected to experience in the future, due to climate change. Understanding climate related risks and vulnerabilities that impact the City of St. Catharines will allow internal municipal operations, policies, and procedures to best align with the future climate.

By implementing the specific adaption actions outlined in the Plan, St. Catharines will be positioned to mitigate, respond and adapt to the local impacts of climate change, such as the rise of extreme heat, increased precipitation levels, and extreme weather events.

The goals and adaptation actions of the Plan have been factored into the project-specific climate considerations discussed below.

Consideration of Climate Change Factors in the Development of the Recommended Plan

The Recommended Plan involves the construction of approximately 130 m of paved two-lane roadway and cycle lanes that will provide secondary access to an existing residential enclave. Minor property infill and redevelopment within the enclave is occurring in a manner consistent with the City's Official Plan objectives around intensification. However, the area is bound by major infrastructure (Highway 406, CN Rail line), so it is limited in terms of population growth potential - while infill will result in some increase in density overall, it is not significant. In this context, the secondary access will not attract outside traffic – all traffic will remain destination-oriented and therefore the secondary access is not expected to contribute in a significant way to local greenhouse gas emissions. The secondary access does redistribute traffic somewhat, offering an alternative route that will shorten the trip for some residents, resulting in minor/nominal benefits in terms of reducing emissions. The Recommended Plan also improves active transportation options, which encourages more sustainable transportation choices, consistent with City strategic plan and other plans/policies.

As documented in **Chapter 3** of the ESR, several alignment / access options were evaluated. The Recommended Plan (Alternative 1C) was selected as it was one of the shortest and most direct access options (i.e., lower quantities of materials/resources to construct) and resulted in the least impact to natural environmental and cultural heritage resources.

Resiliency Planning Within This Project

Resiliency planning in this project involves these aspects that are also embedded within the City's Climate Adaptation Plan:

1) Infrastructure design will follow the criteria/requirements set out by the City of St. Catharines, Niagara Region and Niagara Peninsula Conservation Authority, as appropriate and applicable. This applies to stormwater management for the new roadway and the sizing of the new culvert at the Old Welland Canal. Post construction, overland flow, and infrastructure flooding will be handled through the design, incorporating measures that mitigate these issues. This ESR commits to further investigation, assessment, and design work to be completed in the future Detailed Design phase.
2) The Detailed Design and Contract Package should include construction mitigation and best practices including Erosion and Sediment Control, measures to manage extreme weather events during construction (e.g. management of construction site drainage, dewatering capabilities etc.).
3) Action to reduce direct or indirect greenhouse gas emissions during construction and maintenance of the project. The City can look for bidders to demonstrate good environmental stewardship practices for the management of construction projects through the following:
    - A documented environmental or environmental, health & safety (EHS) policy statement endorsed by senior management;
    - A documented environmental, EHS, and/or vehicle fleet management system or program;
    - Third-party review of environmental or environmental, health & safety system or program (e.g., ISO 14001 certification, E3 Fleet Rating);
    - A documented program for reducing idling for company vehicles and sub-contractor vehicles; and
    - Documentation that demonstrates that vehicle fleets, including sub-contractor fleets, contain vehicles that are model year 2004 or later that conform to the federal On-Road Vehicles and Engine Emission Regulations (SOR/2003-2).
4) Opportunities to enhance existing conditions should be considered in Detailed Design, e.g., an opportunity to enhance stormwater quality through incorporation of oil/grit separators into the local storm sewer system to improve conditions within the Old Welland Canal.

5) Opportunities to contribute to the implementation of the Urban Forestry Management Plan objectives through a restoration/planting plan will be developed in Detailed Design.

7.1.5 Air Quality During Construction

During construction of the roadway, dust is the primary contaminant of concern. Other contaminants including NOx and VOC's may be emitted from equipment used during construction activities. Due to the temporary nature of construction activities, there are no air quality criteria specific to construction activities. However, the Environment Canada "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" document provides several mitigation measures for reducing emissions during construction activities. Mitigation techniques discussed in the document include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, and limiting exposed areas which may be a source of dust and equipment washing. It is recommended that these best management practices be followed during construction of the roadway to reduce any air quality impacts that may occur. It is noted that MECP recommends that non-chloride dust suppressants be applied. MECP also recommends referring to the following publication in developing dust control measures: Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities. Report prepared for Environment Canada. March 2005.

7.1.6 Contaminated Areas

A Phase I Environmental Site Assessment (ESA) was completed as part of this study. The results of the Phase I ESA and potential sub-surface impacts are summarized in **Section 2.3.4.**

In addition to the Phase I ESA, a Phase II ESA previously (2017) completed for a property in the study area was reviewed to assess the sub-surface soil conditions in the vicinity of the proposed secondary access to Moffatt Street. The Phase II ESA investigated evidence of contamination arising from historical operations and industrial land uses in the area and included a sub-surface investigation of the soil and groundwater quality. A total of 10 boreholes and four groundwater monitoring wells were installed within the vicinity of the proposed secondary access.

Based on the sub-surface conditions reported in Phase II ESA, the impacts in the soil are located at depth greater than 2.5 mbgs and therefore at or below the depth of the potential works; however, the following considerations would need to be put in place prior to and during construction:

- A Risk Assessment (RA) should be completed for the property before development proceeds. Soil and groundwater quality in the vicinity of the work should be compared to any Property Specific Standards developed as part of the RA;
- Should construction of the road proceed, a Remedial Action Plan (RAP) and associated Risk Management Plan (RMP) should be put in place for the excavation of shallow soils (less than 2.5 mbgs) to address any potential impacts and to protect human health (worker exposure) and ecological receptors; and
- All waste generated as a result of the work should be handled in accordance with O.Reg 406/19.

In conclusion, based on the soil and groundwater conditions reported in the Phase II ESA, as well as the proposed property use a roadway and works required for construction, the proposed Moffatt Street access is viable from a contaminant perspective.

7.2 Cultural Heritage

7.2.1 Built Cultural Heritage

Within the study area, there are seven previously identified features of cultural heritage value. An additional five properties were identified to have potential cultural heritage value during a field review, conducted in September 2020.

To protect the potential built heritage resources and cultural heritage landscapes and investigate their potential cultural heritage value and interest, the following mitigation measures are recommended:

- Construction activities and staging should be suitable planned and undertaken to avoid impacts to identified cultural heritage resources;
- During Detailed Design, a Heritage Impact Assessment (HIA) should be carried out for the Welland Canal to help form appropriate mitigation measures in order to minimize the impacts to the resource and help guide the design of a proposed crossing. The HIA should include consultation with the Ministry of Heritage, Sport, Tourism and Culture Industries, the Region of Niagara, and the City of St. Catharines;
- The design and material of the proposed crossing of the Welland Canal should be suitably designed to minimize visual impacts as much as possible. Standard 11 of the *Standards and Guidelines for the Conservation of Historic Places in Canada (2010)* state: a) Conserve the heritage value and character-defining

elements when creating any new additions to an historic place or any related new construction, and b) Make the new work physically and visually compatible with, subordinate to, and distinguishable from the historic place;

- Additionally, the *Standards and Guidelines* recommend the following general design guidelines in relation to new additions in cultural heritage landscapes, particularly in relation to areas with significant visual relationships, ecological features, or built features:
    - Designing a new feature when required by a new use that respects the historic visual relationships in the cultural landscape;
    - Introducing a new element, when required by a new use, that does not have a negative impact on the heritage value and condition of the ecological feature; and
    - Designing a new built feature, when required by a new use, to be compatible with the heritage value of the cultural landscape. For example, erecting a new [structure] using traditional forms and materials, or installing signs and lighting compatible with the cultural landscape.
- To ensure the properties at 49 Moffatt Street (CHR 11) and 82-88 Oakdale Avenue (CHR 12) are not adversely impacted during construction, baseline vibration monitoring should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structures at 49 Moffatt Street (CHR 11) and 82-88 Oakdale Avenue (CHR 12) will be subject to vibrations, a vibration monitoring plan should be prepared and implemented as part of the detailed design phase of the project to lessen vibration impacts related to construction; and
- Should future work require an expansion of the study area, or another new bridge crossing location be considered then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources within the expanded area or within a 50 m buffer of the new option.

Further details are provided in the Cultural Heritage Resource Assessment provided in **Appendix B.**

As part of this study, the project team consulted with the St. Catharines Heritage Advisory Committee (SCHAC) and a recommendation of a commemoration plan was supported by the committee. The commemoration plan will be confirmed with the completion of the final design, undertaken in the subsequent Detailed Design phase.

The details of the commemoration plan and final design are to be forwarded to the SCHAC at a future date for review and comment.

7.2.2 Archaeological Resources

A Stage 1 Archaeological Assessment was conducted in September 2020. The Stage 1 Archaeological Assessment identified that most of the study area is disturbed and that these areas are free from archaeological potential. Some areas may have archaeological potential due to their proximity to the historic Welland Canal. A Stage 2 Archaeological Assessment must be carried out for all areas that have archaeological potential and will be impacted by the proposed project. A Stage 4 assessment is recommended for the previously registered, Euro Canadian historical Moffatt Street site (AgGT-240), if required.

Based on the findings of the Stage 1 Archaeological Assessment, the following recommendations have been made:

- The Euro Canadian historical Moffatt Street site (AgGt-240) is located within the study area and is considered to retain further CHVI. The site was previously subject to Stage 3 assessment by ASI in 2018 and has outstanding Stage 4 recommendations. The site is located to the northwest of Alternative 1C and not anticipated to be impacted by the undertaking, however if Stage 4 Mitigation of Development Impacts through avoidance and in situ protection is not viable then Stage 4 excavation would be required according to S & G Section 4;
- Impacted areas of archaeological potential at the canal require Stage 2 archaeological assessment by test pit survey at five-metre intervals, prior to any construction activities;
- Part of the study area retains both near surface and deeply buried archaeological potential associated with the early Welland Canal engineering works. Once construction impacts are known this area should be subject to Stage 2 property survey, including Stage 2 test pit survey at five metre intervals where viable, along with archaeological construction monitoring by a licensed archaeologist, to document any in situ deeply buried archaeological features, following S & G Section 2.1.7.
- The remainder of the study area does not retain archaeological potential on account of deep and extensive land disturbance or having been previously assessed. These lands do not require further archaeological assessment; and

- Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

Further details are provided in the Stage 1 Archaeological Assessment Report provided in **Appendix C**. The location of the Recommended Plan in relation to locations of archeological potential is illustrated in **Figure 17**

Figure 17: Location of the Recommended Plan relative to areas of archaeological potential

The City commits to outreach effort with the Indigenous Communities during Detailed Design where Stage 2 Archaeological Assessment is required. The MCFN has noted the request of field liaison representation during the Stage 2 field work and the City will work with their archaeological consultant in the outreach and engagement at that time.

7.3 Natural Environment

An impact assessment was undertaken to identify potential direct and indirect impacts on the natural environment, as a result of the secondary access to Moffatt Street.

Details about the impact assessment are included in the Natural Heritage Assessment Report in **Appendix D** and are summarized below

Vegetation

Generally, the Recommended Plan results in the least impact to ecological features of all alternatives considered since it crosses a former industrial, now vacant, parcel of land now vegetated with the Mixed Meadow community and the crossing location of the Old Welland Canal is characterized by a narrow strip of trees/shrubs on each bank. The new roadway will result in permanent removal of vegetation within the footprint. Areas immediately adjacent may also be cleared to facilitate construction access, however these areas will be restored following construction.

Old Welland Canal

The proposed arch culvert crossing of the Old Welland Canal is expected to have some permanent in-water footprint however, this will be confirmed during Detailed Design. The impact assessment and agency review requirements for this will be confirmed in Detailed Design and will likely involve review by NPCA and Department of Fisheries and Oceans. Temporary construction access, coffer dams / dewatering for the culvert will also be confirmed in Detailed Design and subject to appropriate review and approvals.

Wildlife

The extent of permanent impacts to wildlife habitat are very limited in magnitude given the nature of vegetation communities present.

A Species at Risk (SAR) Screening was prepared for the entire study area, that encompassed all potential access routing options. In Detailed Design, the SAR Screening should be updated/refined for the proposed road footprint and immediately adjacent areas. The results of the screening should be reviewed with MECP staff to confirm the potential need for targeted SAR surveys and future mitigation/compensation and approval implications. Based on the initial SAR screening, the trees along the Old Welland Canal have some habitat potential and should be further assessed through future review.

It is likely that during the construction period, wildlife including birds and mammals that occasionally meadow and canal bank vegetation for foraging and breeding may be disturbed and are likely to abandon the disturbed edges due to indirect impacts of noise and vibration.

Due to the limited footprint of the new road and culvert crossing and the relatively the short-term and localized nature of construction activities, as well as the relatively low sensitivity of ecological features, the significance of impacts is low.

Construction impacts will be temporary in nature and can be managed through appropriate mitigation. **Table 13** includes several mitigation recommendations and commitments to further work.

7.4 Technical Considerations

The Recommended Plan involves the construction of approximately 130 m of new local roadway, on a tangent between two existing intersections. As such, roadway design, grading and construction are anticipated to not face significant challenges. The following sub-sections focus on specific design elements that will require further review in later design phases and/or during construction.

7.4.1 Road Profile

This design element is linked with the consideration of contaminated soils, as detailed in **Section 7.1.6**. The final profile will be refined in Detailed Design however it is recommended to enable construction to remain above a depth of 2.5 m, shall consider the implications of large cuts, the contamination mitigation measures as detailed above, and the requirement for potential soil remediation.

7.4.2 Illumination

The proposed illumination is detailed in **Section 6.8**. Final illumination plan will be confirmed in Detailed Design.

7.4.3 Utilities

Impacted utilities are further detailed in **Section 6.7**. All utilities and their locations within the study area shall be confirmed in Detailed Design and, if required, a protection plan or utility relocation will be completed. At a minimum, it has been identified that relocation of Hydro Poles (number to be confirmed) will be required as part of the undertaking.

7.4.4 Geotechnical

As described in **Section 6.4**, the recommended structure design at the Old Welland Canal is a single-span, precast arch culvert. Future geotechnical investigations will be required to confirm the culvert footing design. Geotechnical investigations can include an appropriate hydrogeological component to confirm potential future dewatering needs. If required, a PTTW application will be prepared at that time.

7.4.5 Drainage and Stormwater Management

As discussed in **Section 6.5**, further hydraulic investigations will be undertaken in Detailed Design to confirm the size of the proposed culvert. This review will include discussion with NPCA, as the Old Welland Canal is regulated.

The stormwater design will also be developed in Detailed Design. As described in **Section 6.5**, it is expected that water will be conveyed to an outlet at the Old Welland Canal. Opportunities to enhance water quality of stormwater runoff, for example, oil/grit separators, will be considered as part of this design.

7.5 Monitoring

Monitoring requirements will be fulfilled by the City of St. Catharines. Monitoring may encompass the following aspects:

- Monitoring of EA commitments to further work through the future Detailed Design and construction phases to ensure these commitments are fulfilled or addressed;
- Monitoring associated with any conditions of approvals / permits to be obtained;
- Monitoring during construction (by City and/or contractor) to ensure construction mitigation measures are implemented as planned; and
- Monitoring of site restoration aspects including landscape plantings (under warranty).

Other monitoring requirements may be identified in future project phases.

7.6 Summary of Proposed Mitigation and Commitments to Further Work

Table 13 summarizes the identified concerns and the proposed mitigation measures and commitments to future work based on the identified environmental sensitivities and the proposed works.

Table 13: Summary of Mitigation Measures and Commitment to Further Work

Mitigation Measures and Commitment to Further Work
Property and Access
1. Final impacts to private property will be confirmed during detailed design. The City of St. Catharines will continue to consult with affected property owner on an individual basis during detailed design.
2. Property acquisition will occur, in accordance with the City's procedures.
3. It is the City's intent to plan for an efficient construction process to minimize impacts to residents and businesses and this will be one of the primary objectives of the detailed design phase.
4. Permission to enter or temporary construction easements may be required at some locations. These locations will be finalized in detailed design and the City will contact property owners well in advance of construction to seek permission to grade on private lands.
5. The City will work with area property owners in the implementation of the Streetscape Plan and tree management strategies to mitigate impacts associated with removal of trees and landscape features on affected properties.
Community Engagement
6. The City commits to ongoing meaningful engagement of the community through the future detailed design process.
7. Consider preparing a public information package/newsletter during detailed design to provide community members with an opportunity to review the detailed design plan, construction staging and phasing, including the sequence of municipal services and road construction.
Aboriginal Community Engagement
8. The City remains committed to engagement of Aboriginal communities and will continue to provide information, invite feedback and extend the invitation to meet with Aboriginal communities during detailed design.
9. Where Stage 2 Archaeological Assessment is required, the City will coordinate with interested communities in coordinating field monitors, as appropriate. Specifically, Mississaugas of the Credit First Nation have expressed an interested in participating in this work. As best practice, the invitation should also be extended to Six Nations of the

Mitigation Measures and Commitment to Further Work
Grand River and Haudenosaunee Development Institute, despite their lack of response during the EA study. It is understood that First Nations' ability to respond to various notices and invitations for engagement were compromised during Covid-19, with band offices shut down for long periods of time during 2020 and 2021. Therefore, engagement should be carried forward with all three through detailed design.
Traffic Management During Construction
10. A construction staging and traffic management plan will be developed and communicated to area residents well in advance of execution. Communication would typically involve a direct mailout to all residents and information posted on the City's website. 11. Emergency vehicle access will be maintained at all times.
Noise and Vibration
12. Construction noise and vibration issues will be further reviewed during detailed design when construction methodology and schedule is fully developed. 13. All equipment shall be properly maintained to limit noise emissions. As such, all construction equipment will be operated with effective muffling devices that are in good working order. 14. The Contract Documents will contain a reference to appropriate City Noise By-laws. Contractor is expected to adhere to these unless otherwise permitted.
Climate Change
15. Consistent with the City's Climate Change Adaptation Plan, the following aspects of resiliency and adaptation will be considered during detailed design: o Action to reduce direct or indirect greenhouse gas emissions during construction and maintenance of the project. o Opportunities to enhance stormwater quality through incorporation of oil/grit separators into the local storm sewer system to improve conditions within the Old Welland Canal (also noted under Drainage and Stormwater)

Mitigation Measures and Commitment to Further Work
○ Opportunities to contribute to the implementation of the Urban Forestry Management Plan objectives through a restoration/planting plan will be developed in detailed design.
Air Quality
16. During construction, vehicles/machinery and equipment will be in good repair, equipped with emission controls, as applicable, properly maintained and operated within regulatory requirements.
17. Refer to Environment Canada “Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities” for mitigation measures for reducing emissions during construction activities. Mitigation techniques discussed in the document include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, and limiting exposed areas which may be a source of dust and equipment washing. It is recommended that these best management practices be followed during construction of the roadway to reduce any air quality impacts that may occur.
18. It is noted that MECP recommends that non-chloride dust suppressants be applied. MECP also recommends referring to the following publication in developing dust control measures: Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities. Report prepared for Environment Canada, March 2005.
Contamination and Materials Management
19. Based on the Phase I and II Assessments, a Risk Assessment (RA) should be completed for the property before development proceeds. Soil and groundwater quality in the vicinity of the work should be compared to any Property Specific Standards developed as part of the RA.
20. A Remedial Action Plan (RAP) and associated Risk Management Plan (RMP) should be put in place for the excavation of shallow soils (less than 2.5 mbgs) to address any potential impacts and to protect human health (worker exposure) and ecological receptors.
21. All excess soils/waste removed generated as a result of the work will be handled in accordance with O.Reg. 406/19. All excess soils considered waste and any waste encountered on the property will be disposed of in accordance with the Environmental Protection Act (EPA) and O.Reg. 347 as amended.

Mitigation Measures and Commitment to Further Work
Cultural Heritage – Built Cultural Heritage and Archaeology
22. Construction activities and staging should be suitable planned and undertaken to avoid impacts to identified cultural heritage resources. 23. During Detailed design, a Heritage Impact Assessment (HIA) should be carried out for the Welland Canal to help form appropriate mitigation measures in order to minimize the impacts to the resource and help guide the design of a proposed crossing. The HIA should include consultation with the Ministry of Heritage, Sport, Tourism and Culture Industries, the Region of Niagara, and the City of St. Catharines. 24. The design and material of the proposed crossing of the Welland Canal should be suitably designed to minimize visual impacts as much as possible. Standard 11 of the Standards and Guidelines for the Conservation of Historic Places in Canada (2010) state: a) Conserve the heritage value and character-defining elements when creating any new additions to an historic place or any related new construction, and b) Make the new work physically and visually compatible with, subordinate to, and distinguishable from the historic place. 25. Additionally, the Standards and Guidelines recommend the following general design guidelines in relation to new additions in cultural heritage landscapes, particularly in relation to areas with significant visual relationships, ecological features, or built features: o Designing a new feature when required by a new use that respects the historic visual relationships in the cultural landscape; o Introducing a new element, when required by a new use, that does not have a negative impact on the heritage value and condition of the ecological feature; and o Designing a new built feature, when required by a new use, to be compatible with the heritage value of the cultural landscape. 26. To ensure the properties at 49 Moffatt Street (CHR 11) and 82-88 Oakdale Avenue (CHR 12) are not adversely impacted during construction, baseline vibration monitoring should be undertaken during detailed design. Should this advance monitoring assessment conclude that the structures at 49 Moffatt Street (CHR 11) and 82-88 Oakdale Avenue (CHR 12) will be subject to vibrations, a vibration monitoring plan should be prepared and implemented as part of the detailed design phase of the project to lessen vibration impacts related to construction.

Mitigation Measures and Commitment to Further Work
27. Should future work require an expansion of the study area, or another new bridge crossing location be considered then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources within the expanded area or within a 50 m buffer of the new option. 28. During the Class EA, the project team consulted with the St. Catharines Heritage Advisory Committee (SCHAC) and a recommendation of a commemoration plan was supported by the committee. A commemoration plan will be developed with the completion of the final design and the plan will be provided to SCHAC for review and comment. 29. The Euro Canadian historical Moffatt Street site (AgGt-240) is located within the study area and is considered to retain further CHVI. The site was previously subject to Stage 3 assessment by ASI in 2018 and has outstanding Stage 4 recommendations. The site is located to the northwest of Alternative 1C and not anticipated to be impacted by the undertaking, however if Stage 4 Mitigation of Development Impacts through avoidance and in situ protection is not viable then Stage 4 excavation would be required. If pre-contact artifacts are found at the site, MCFN, Six Nations of the Grand River and HDI should be notified as soon as possible to reassess their level of involvement 30. Impacted areas of archaeological potential at the canal require Stage 2 archaeological assessment by test pit survey at five-metre intervals, prior to any construction activities. 31. Part of the study area retains both near surface and deeply buried archaeological potential associated with the early Welland Canal engineering works. Once construction impacts are known this area should be subject to Stage 2 property survey, including Stage 2 test pit survey at five metre intervals where viable, along with archaeological construction monitoring by a licensed archaeologist, to document any in situ deeply buried archaeological features. 32. Refer to Commitment # 8 and 9 related to Indigenous engagement.
Natural Environment
Vegetation 33. The extent of encroachment into the adjacent natural features and, in particular, significant natural features should be limited as much as possible to minimize impacts on the feature/natural vegetation. Special design mitigation measures should be considered during detailed design to minimize encroachment into the significant features. These include for example, steeper slopes retaining walls etc. in areas adjacent to valleylands.

Mitigation Measures and Commitment to Further Work
34. Vegetation protection should be outlined on specification drawings in detailed design. Protection should be implemented to ensure encroachment within the adjacent natural features is restricted to the identified construction footprint. 35. Vegetation that does not require removal for purposes of the construction will be protected through the installation and maintenance of temporary vegetation protection measures (e.g., temporary fencing). Appropriate vegetation clearing techniques will be used (e.g., felling trees away from retained natural areas). Unnecessary traffic, dumping and storage of materials over tree roots will be avoided. 36. The areas of vegetation to be cleared and the adjacent areas to be retained will be clearly delineated, to minimize unnecessary vegetation effects and avoid incidental effects as a result of temporary stockpiling, debris disposal and access. 37. Carry out additional consultation with the appropriate agencies during the subsequent detailed design phase to discuss the above activities. **Wildlife** 38. It is the responsibility of the City to ensure that Species at Risk are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on site. If the proposed activities cannot avoid impacts protected species and their habitats, then the City will need to apply for an authorization under the Endangered Species Act (ESA). 39. In Detailed Design, the SAR Screening that was undertaken during the Class EA study should be updated/refined for the proposed road footprint and immediately adjacent areas. The results of the screening should be reviewed with MECP staff to confirm the potential need for targeted SAR surveys and future mitigation/compensation and approval implications. Based on the initial SAR screening, the trees along the Old Welland Canal have some potential for bat habitat and should be further assessed through future review. 40. 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 birds, of species protected under the Migratory Birds Convention Act, 1994 and/or Regulations under that Act. 41. Ensure that timing constraints are applied to avoid vegetation clearing (including grubbing) during the breeding bird season for tree nesting. Generally, a timing window of April 1 to August 31 be applied. It should be noted that occasionally bird species will precede or exceed the approximate breeding bird season window. Migratory bird

Mitigation Measures and Commitment to Further Work
species that use structures for nesting often commence nesting later and may continue nesting beyond the above period. 42. Wildlife exclusion fencing may be considered to keep wildlife out of the construction zone, particularly in areas adjacent to natural habitat features e.g. fencing to prevent movement of amphibians and reptiles into the construction zone. 43. 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 will stop and the Contract Administrator will be notified. 44. In the event that a SAR or possible SAR is found in the construction area, all construction that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator will then contact the MNRF SAR Biologist for direction, as these animals are protected under the ESA (2007). **Fisheries** 45. Consult with NPCA and DFO during Detailed Design regarding the design of the arch culvert. Review permit/approval requirements.
Streetscape / Landscape Plans and Tree Management
46. A landscape / streetscape plan will be prepared during detailed design that addresses: o Vegetation removals, restoration/revegetation plans related to construction and post-construction activities o Edge management measures for buffering of sensitive ecological habitats o Contribution to potential LID measures identified during detailed design o Streetscape enhancement o Landscape plantings to buffer adjacent residences from new road 47. A Tree Management Plan will be prepared that details specific tree impacts, mitigation and replacement (in conjunction with the landscape plan) detailed tree protection strategies and mitigation. Replacement and compensation strategies will be discussed with NPCA.

Mitigation Measures and Commitment to Further Work
48. Implement all applicable City of St. Catharines tree management standards and mitigation measures (for removals, protection fencing and monitoring), and tree preservation strategies (general practices, pruning practices, and implementation of a tree protection zone).
49. In reference to Commitment # 5, opportunities to contribute to the City's Urban Forest Management Targets should be considered as part of detailed design and the landscape plan.
Erosion and Sediment Control
50. An ESC Plan will be prepared for review by appropriate agencies. MECP has specifically requested review of this document. Stringent erosion and sediment control measures will be implemented during all phases of construction, clean-up and restoration to prevent sediment laden runoff from entering any of the watercourses directly from the construction zone. The erosion and sediment control plan will focus on preventing erosion to avoid or minimize generation of sediment, in accordance with the Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction (2006) or NPCA/City publications.
51. Appropriate sediment and erosion control measures must be maintained during and following construction until all disturbed areas have been stabilized. The contractor will identify a contingency plan for accidental sediment release.
52. In addition to the installation of silt fencing, other measures to reduce or eliminate sediment loading into the adjacent natural features includes temporary siltation ponds, riprap swales and hay-bale check dams can be installed prior to construction activities. Similarly, to mitigate dust deposition, a dust suppressant can be applied to areas of exposed soils to reduce or eliminate dust generation.
53. If any temporary dewatering is required in order to construct any bridge footings, dewatering discharge will not be released directly to the watercourses. Appropriate settling, filtration and energy dissipation measures will be used to detail, filter and release discharge so as to ensure no erosion or sediment release occurs in the watercourses (e.g., temporary settling facility, filter bag, etc., located on level ground at least 30 m from the watercourses.
54. All salvaged or stockpiled materials will be isolated, located a safe distance from the watercourse edges and stabilized to prevent migration of any sediment or other material to the watercourse.

Mitigation Measures and Commitment to Further Work
55. All work areas or other disturbed surfaces draining to the watercourses and/or in the floodplain will be stabilized and re-vegetated with appropriate native, non-invasive species as soon as feasible following construction.
56. The interim erosion and sediment control measures will be left in place, monitored and maintained in proper working order until all disturbed areas draining to the watercourses are fully stabilized, including establishment of vegetative cover.
57. All activity will be controlled so as to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourses. Storage, maintenance or re-fueling or maintenance of equipment will be conducted at least 30 m away from the watercourses. The Contractor will have an appropriate spills management/response plan in place throughout construction, including spill control and absorbent materials, instructions regarding their use and notification procedures.
Road Design and Utilities
58. The road profile will be refined in detailed design. Road profile must consider contamination issues which may influence road elevation / excavation.
59. It is intended that the City will fully integrate storm sewer upgrades into the detailed design and construction.
60. Utility relocations shall be coordinated to minimize service disruptions where possible through liaison and contract requirements.
Stormwater Management
61. As discussed in Section 6.5, further hydraulic investigations will be undertaken in Detailed Design to confirm the size of the proposed culvert. This review will include discussion with NPCA, as the Old Welland Canal is regulated.
62. The stormwater design will be developed in Detailed Design. It is expected that water will be conveyed to an outlet at the Old Welland Canal. Opportunities to enhance water quality of stormwater runoff, for example, oil/grit separators, will be considered as part of this design.

Mitigation Measures and Commitment to Further Work
Geotechnical and Groundwater Investigations
63. Geotechnical investigations will be required to support the detailed design of the culvert. Appropriate hydrogeological aspects will also be investigated. 64. The potential need for dewatering will be investigated during detailed design. A Permit To Take Water application, and supporting documentation, will be prepared as necessary. Resources are provided to guide this process https://www.ontario.ca/page/water-taking-and-transfer-user-guide-clarifications-and-exemptions and https://www.ontario.ca/page/water-taking-user-guide-environmental-activity-and-sector-registry
Construction Monitoring
65. Mitigation measures shall be implemented and maintained through on-site inspections by the City of St. Catharines' staff who will ensure that the natural, social, and economic environments are not impacted by the construction activities and/or that impacts are minimized. The inspection staff will also ensure that items such as sedimentation controls and appropriate signage are maintained throughout construction.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