

Project File Report

Gordon Street between Edinburgh Road and Lowes Road,
Class Environmental Assessment, Schedule 'B' and Preliminary Design

July 2020

Document Control Page

CLIENT:	City of Guelph
PROJECT NAME:	Gordon Street between Edinburgh Road and Lowes Road, Class Environmental Assessment, Schedule 'B' and Preliminary Design
REPORT TITLE:	Gordon Street between Edinburgh Road and Lowes Road, Class Environmental Assessment, Schedule 'B' and Preliminary Design
IBI REFERENCE:	117734
VERSION:	4.0
DIGITAL MASTER:	[File Location]
ORIGINATOR:	Patrick Garel
REVIEWER:	John Bayley
AUTHORIZATION:	John Bayley
CIRCULATION LIST:	City of Guelph
HISTORY:	Version 1.0 – May 15, 2020
	Version 2.0 – July 7, 2020 (missing requested field work from NRSI)
	Version 3.0 – July 10, 2020 (minor revisions, missing requested field work from NRSI)
	Version 4.0 – July 14, 2020 (minor revisions, missing requested field work from NRSI)
	Version 5.0 – July 17, 2020 (final draft)

This document has been prepared in accordance with the City of Guelph Accessible Document Guidelines. Should you require further assistance accessing this document, please contact:

Gwen Zhang, P. Eng.
Project Manager
City of Guelph
1 Carden Street
Guelph, ON N1H 3A1
519-822-1260 Ext. 2638
Gwen.Zhang@guelph.ca

Table of Contents

Executive Summary	1
1 Introduction	5
1.1 Study Purpose	5
1.2 Study Area.....	5
1.3 Study Objectives.....	7
1.4 Related Studies	7
1.4.1 City of Guelph Official Plan (2018 Consolidation).....	7
1.4.2 City of Guelph Strategic Plan	8
1.4.3 Guelph-Wellington Transportation Study (2005)	8
1.4.4 Guelph Transit Growth Strategy (2010).....	8
1.4.5 Cycling Master Plan – Bicycle Friendly Guelph (2012)	9
1.4.6 Gordon Street Wellington Road 46 Class Environmental Assessment (2000)	9
1.4.7 Urban Design Concept Plans for the Gordon Street Intensification Corridor	9
1.5 Municipal Class Environmental Assessment Process.....	9
1.6 Project Team.....	12
2 Problem and Opportunity	14
3 Consultation	15
3.1 Notice of Study Commencement	15
3.2 Public Information Centre #1.....	15
3.2.1 Notice of Public Information Centre #1.....	16
3.2.2 Venue, Format and Attendance	16
3.2.3 Comments from the Public.....	17
3.3 Public Information Centre #2.....	21
3.3.1 Notice of Public Information Centre #2.....	21
3.3.2 Venue, Format and Attendance	22

Table of Contents (continued)

3.3.3	Comments from the Public.....	22
3.4	Agency and Utility Consultation.....	26
3.5	Stakeholder Consultation	28
3.6	Indigenous Communities Consultation.....	29
3.7	Guelph City Council Approval.....	30
3.8	Notice of Study Completion	30
4	Existing Conditions.....	31
4.1	Land Use	31
4.2	Natural Environment	33
4.2.1	Aquatic.....	33
4.2.2	Terrestrial	33
4.2.3	Significant Wildlife Habitat.....	39
4.2.4	Ecological Linkage and Deer Crossings	39
4.2.5	Species at Risk Habitat	39
4.2.6	Significant Species Habitat	40
4.3	Utilities.....	40
4.4	Noise	40
4.5	Geology and Physiography	41
4.5.1	Hydrology	41
4.6	Cultural Heritage.....	41
4.6.1	Archeology	41
4.6.2	Built Heritage	41
4.7	Drinking Water Source Protection.....	41
5	Transportation	42
5.1	Existing Transportation Conditions.....	42
5.1.1	Existing Road Network.....	42
5.1.2	Existing Traffic Operations.....	43

Table of Contents (continued)

5.2	Future Transportation Conditions.....	43
5.3	Road Safety Assessment	45
5.4	Bus operations at Gordon Street and Arkell Road.....	47
5.5	Recommended Operational Improvements.....	47
6	Alternative Solutions.....	48
6.1	Preliminary Alternatives	48
6.2	Preliminary Evaluation	51
6.3	Refinement of Alternatives	51
6.4	Detailed Evaluation	52
	6.4.1 Alternatives for Detailed Evaluation	52
	6.4.2 Detailed Evaluation Criteria	52
	6.4.3 Detailed Evaluation of Alternatives.....	55
6.5	Preliminary Preferred Alternative.....	62
6.6	Preferred Alternative	62
6.7	Additional Recommended Improvements.....	62
7	Environmental Impacts, Mitigation and Commitments.....	64
7.1	Natural Environment	64
	7.1.1 Aquatic	64
	7.1.2 Terrestrial	64
	7.1.3 Ecological Linkage and Deer Crossings	66
	7.1.4 Species at Risk Habitat	67
	7.1.5 Sediment and Erosion	68
	7.1.6 Water Quantity and Quality Control	69
8	Conclusions.....	70
8.1	Estimated Project Costs	71

Table of Contents (continued)

Appendix A – Consultation Materials

Appendix B – Environmental Impact Study and Tree Inventory and Preservation Plan

Appendix C – Traffic Operations and Safety Analysis Report

Appendix D – Detailed Evaluation of Alternative Design Solutions

Appendix E – Estimated Capital Costs

Appendix F – Preliminary Design Drawings

Executive Summary

The City of Guelph has undertaken a Municipal Class Environmental Assessment (Class EA) Schedule 'B' and preliminary design work, for improvements on Gordon Street, between Edinburgh Road and Lowes Road, in the City of Guelph.

There is an opportunity to address delays and improve safety for all road users by adding a continuous two-way left-turn, and enhancing walking and cycling facilities and transit operations

Traffic volumes on Gordon Street have increased over the years and will continue to increase with ongoing redevelopment and intensification. There are peak hour left-turn movements that interfere with and block through traffic due to absence of turning lanes at numerous driveways and insufficient storage lengths at the intersections of Edinburgh Road, and Arkell Road.

The delays and left-turn capacity problems caused by the current traffic condition can be addressed by providing a continuous two-way left-turn lane between Edinburgh Road and Lowes Road with improvements to dedicated left-turn lanes at the intersections. This two-way left-turn lane can also facilitate outbound traffic from private driveways by providing two-stage left-turn operation, and provide extra space for emergency vehicles. This improvement to mobility will also support transit operations along Gordon Street, and presents an opportunity to make localized operational improvements while enhancing the existing walking and cycling experience.

Alternative design solutions were developed and evaluated with public input

In addition to the "Do Nothing" alternative, six possible design alternatives were prepared and evaluated in detail. The "Do Nothing" alternative was presented as Option 1 at Public Information Centre #1, and subsequently screened out, as it does not address delays, improve safety, nor enhance walking and cycling facilities and transit operations.

At Public Information Centre #2, Option 1 was replaced with an alternative design solution to widen the road to accommodate a two-way left-turn lane. As such the following design alternatives were carried forward for detailed evaluation:

- **Option 1** – Widen equally about existing centreline with a 4m two-way left-turn lane
- **Option 2** – Widen equally about existing centreline with a 5m two-way left-turn lane
- **Option 3** – Widen equally about existing centreline with a 4m two-way left-turn lane and 3m multi-use-paths
- **Option 4** – Widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths
- **Option 5** – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m separated bike lanes
- **Option 6** – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m off-road cycle tracks

The six alternatives were evaluated against criteria that examine the potential impacts of each on the surrounding environment, including:

- **Traffic Capacity, Operations and Safety:** Traffic Level-of-Service, Safety, Access Management, Transit, Cycling, Pedestrians, and Emergency Services
- **Natural Environment:** Aquatic Species and Habitat, Terrestrial Species and Habitat, Floodplain, Wetlands, Trees and Landscaping, Wildlife, Contamination, and Drainage
- **Social-Cultural Environment:** Cultural Heritage and Archaeology, Culture and Recreation, Businesses, Construction, Streetscaping, Air and Noise, and Private Property
- **Economic Environment:** Utility Relocation Above Ground, Utility Relocation Underground, Capital Costs, Operation and Maintenance Costs
- **Public Opinion:** Public Preference

Public Input Was Collected through Two Public Information Centres, and Communications with Various Agencies and Stakeholders

Public consultation on the existing conditions and numerous potential changes were a key component of this study, used to shape and refine the analysis and findings.

The Notice of Commencement, and Notices of Public Information Centres were published in the Guelph Mercury and posted on the City's website. Notices were also mailed to over 800 property owners within and around the Study Area, and delivered to identified agency, stakeholder group, and Indigenous community representatives. In addition, mobile signs were set up on Gordon Street at the both ends of the study area prior to Public Information Centres.

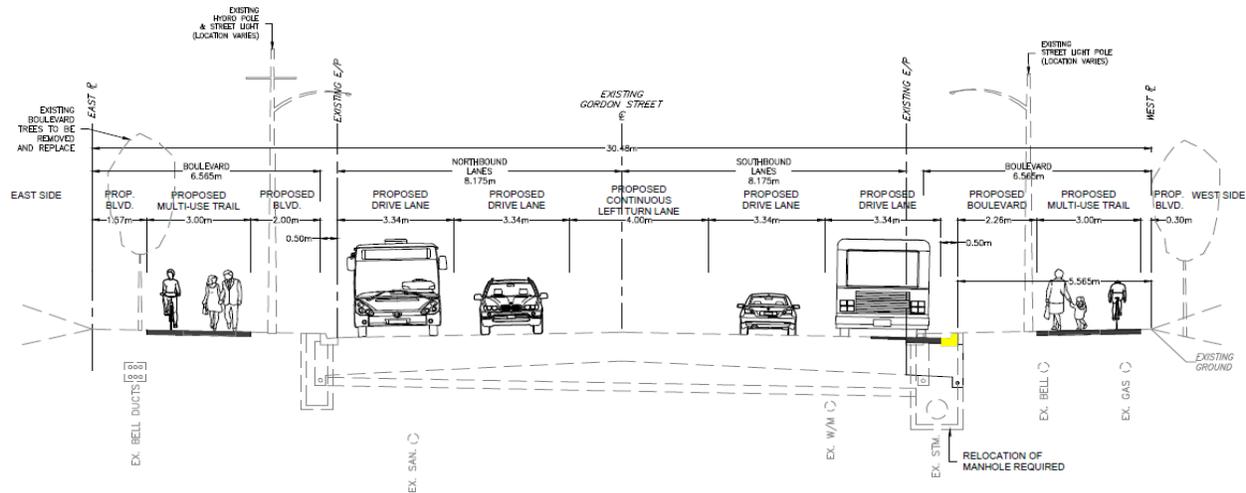
Public Information Centre #1 was held on October 1, 2019 at the Salvation Army Guelph Citadel & Nursery School, located at 1320 Gordon Street. This drop-in style open house presented information on the study purpose, study area limits, the Class EA process being followed (Schedule B), the problems and opportunities, preliminary alternative solutions, and how the alternative solutions will be evaluated. The PIC also provided contact information for the City and consultant Study leads, the Study's website address, and information on how to actively participate. Questionnaire surveys and location-based comments were collected during and following this event.

A total of 52 individuals were in attendance, of which 48 signed in. A total of 48 comments were collected at the event and afterwards via email. Based on the input from comments received through the questionnaire survey, it is understood that the community considered vehicles turning into properties and stopping through traffic as a top concern. This was followed by the concern over through traffic being delayed by turning vehicles at intersections. Of the alternative solutions that were presented (including the "Do Nothing" alternative), **Option 4 was the most preferred** by respondents. It is also important to note that **no respondents selected "Do Nothing" as their preferred alternative**, as it did not address the concerns identified.

Public Information Centre #2 was held on February 20, 2020 at the same venue, the Salvation Army Guelph Citadel & Nursery School. This drop-in open house offered information on the study purpose, study area limits, the Class EA process being followed, design alternatives considered including additional design options premised on public input from PIC#1, public feedback received to date, design alternative evaluation, potential environmental impacts and mitigation measures were presented to provide transparency in how the preferred solution was determined. The PIC also provided contact information for the City and consultant Study leads, the Study's website address, and information on how to actively participate. Questionnaire surveys and location-based comments were collected during and following this event, focused on the preliminary preferred design alternative, Option 4.

A total of 49 individuals were in attendance, of which 45 signed in. A total of 44 comments were collected at the event and afterwards via email. Of the respondents that expressed a preference, approximately 70% support the preferred design alternative Option 4. The remaining respondents expressed a preference for moving pedestrians further away from traffic, keeping pedestrians and cyclists separate, and widening equally on each side of the road.

Design Alternative Option 4 (widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths) is the Preferred Alternative



Option 4 was selected through the evaluation process because it:

- Separates cyclists from vehicular traffic, enhancing safety and comfort;
- Moves cyclists behind bus stops, avoiding conflicts with buses and passengers;
- Has limited social environment impacts;
- Has the second least amount of private property impacts;
- Requires the least number of utility relocations;
- Has the lowest capital cost; and,
- Was the most preferred by the public at both Public Information Centres.

The estimated cost of Option 4 is \$760 per metre (to be updated during detailed design).

Other potential improvements were identified during the course of the study through public consultation

These potential improvements have been examined for the preferred alternative, as additional refinements. The following provides a summary of additional recommended improvements with notes describing further work during detailed design or additional study that is required:

- Include centre medians near intersections for traffic signal infrastructure and to minimize turning conflicts.
- Reduce speed limit on Gordon Street to 50 km/h within the Study Area and consider similar reductions beyond the Study Area and/or signage indicating the change.
- Include a northbound right turn lane at Arkell Road combined with a northbound queue pass-by lane for buses at Arkell Road, creating a possible transit priority function during peak periods.
- Improve the Heritage Drive intersection geometry with the following modifications:
 - Heritage Drive – replace the existing median island with new pavement markings that sets the eastbound left-turn lane stop bar further back from the intersection, providing an improved turning radius for northbound to westbound left turns
 - Southside Plaza north driveway – realign the driveway to match improvements on Heritage Drive and line up the through lanes.
- Improved intersection design for pedestrian and cyclist crossings to make protected intersections.
- Consider a pedestrian crossover near Vaughan Road, or as a minimum, the provision of underground conduits and footings for future pedestrian crossover signal poles.
- Consider placement warning signage on each side of the deer crossing locations to warn drivers and reduce potential deer mortality.
- Consider the use of oil/grit separators where suitable along the corridor.
- Consider Low Impact Development (LID) enhancements where space and conditions allow.
- Consider measures to reduce runoff through the selection of surface materials, and consideration of stormwater flow controls/storage where suitable along the corridor.
- Consider streetscaping enhancements within the designated road allowance, such as plantings, decorative paving materials, decorative streetlights, etc.
- Complete additional traffic signal timing optimization to improve intersection operations.
- Consider effective ways to separate cyclists and pedestrians such as providing a 0.5m buffer, using different pavement materials for cycle paths and sidewalks, and designing wider cycle paths where possible.

Subsequent to this study, the City will proceed with detailed design and implementation of the preferred design through a future detailed design undertaking for the project.

1 Introduction

The City of Guelph and their consulting team from IBI Group with support from Natural Resource Solutions Inc. have undertaken a Municipal Class Environmental Assessment (Class EA) following the Schedule 'B' process and associated preliminary design work, for improvements to the Gordon Street corridor, between Edinburgh Road and Lowes Road, in the City of Guelph.

The study investigates intersection turning lane capacity and access to street fronting properties in a growing urban environment. The study considers the addition of a continuous two-way left-turn lane, increase intersection left-turn capacity, and improvements to walking and cycling facilities and transit operations.

This document summarizes the findings of the Class EA process, including existing and projected future traffic conditions, existing environmental conditions, alternative solutions, an evaluation process, the preferred solution, potential impacts and mitigations, and input from consultation with the public and stakeholders.

1.1 Study Purpose

The purpose of the study is to investigate the need for safety and operational improvements and traffic management for Gordon Street between Edinburgh Road and Lowes Road, and recommend a preferred alternative solution to address identified problems.

1.2 Study Area

The Study Area includes Gordon Street and immediately adjacent lands, between Edinburgh Road and Lowes Road, in the City of Guelph, as shown in **Exhibit 1-1**. Gordon Street is an important arterial road running in a north-south direction with a posted speed of 50 km/hour north of Hands Drive and 60 km/hour south of Hands Drive to Clair Road. The posted speed increases to 70 km/hour south of Clair Road. Gordon Street carries approximately 27,000 vehicles per day north of Arkell Road and 23,000 vehicles per day south of Arkell Road (as of 2016 traffic counts) and has a right-of-way of 30 metres.

As discussed in Section 1.4.6, Gordon Street was previously widened from two to four lanes between Harts Lane to Clair Road, completed as an urban cross-section with bike



Gordon Street at Arkell Road (Existing Conditions)

lanes, sidewalks and upgraded underground services. Intensification is also ongoing along this corridor, with a number of redevelopments proposed.

Exhibit 1-1: Map of the Study



1.3 Study Objectives

The study seeks to achieve the following objectives:

- Improve transportation needs for all users, including drivers, pedestrians, cyclists and transit users;
- Minimize undesirable impacts to the surrounding properties, natural environment, heritage and scenic landscape, socio-economic activity and existing infrastructure;
- Support the transformation of Gordon Street to a "Complete Street";
- Improve traffic management needs for access and intersection turning provisions;
- Consider adjacent land uses and community growth to develop effective and sustainable recommendations for improvement; and
- Engage with the public and stakeholders to receive input on potential impacts to ensure appropriate criteria are used to select the preferred alternative solution.

1.4 Related Studies

The following municipal studies and environmental assessment were consulted throughout the study process.

1.4.1 City of Guelph Official Plan (2018 Consolidation)

The strategic goal for transportation in the Official Plan (2018) is to "develop a safe, efficient, convenient and sustainable transportation system that provides for all modes of travel including cycling and walking to support sustainable land use patterns." Gordon Street is considered a Major Gateway into the City of Guelph and a Primary Street as it "provides access to and through Downtown for pedestrians, transit, bicycles and auto vehicles." The improvements proposed on Gordon Street, from Edinburgh Road to Lowes Road, are supportive of achieving this strategic goal by providing safe and efficient travel for all users.

To bring the City's Official Plan into conformity with Ontario's "Growth Plan for the Greater Golden Horseshoe," Amendment No. 39 to the Official Plan was adopted by City Council in 2009. Amendment No. 39 identifies Gordon Street south of Stone Road as one of the intensification corridors. Since then, a number of redevelopment and intensification projects have taken place abutting Gordon Street with a concentration between Edinburgh Road and Lowes Road. Gordon Street will continue to be under growth pressure with a number of properties currently in various stages of preparation for redevelopment and intensification.

Official Plan Amendment No. 48 ensures that the remaining sections of the Official Plan are in conformity with provincial legislation and plans and is consistent with the Provincial Policy Statement. Amendment No. 48 (Phase 3 of the Official Plan update) was approved with modifications by the Ministry of Municipal Affairs and Housing on December 11, 2013. Amendment No. 48 is considered in the development of the preferred alternative.

1.4.2 City of Guelph Strategic Plan

The vision of the City's Strategic Plan for 2019 to 2023 is an inclusive, connected, prosperous city where we look after each other and our environment. The Plan includes five strategic priorities that aim to improve sustainability:

- Powering our future: Contribute to a sustainable, creative and smart local economy that is connected to regional and global markets and supports shared prosperity for everyone;
- Sustaining our future: Care for the local environment, respond to climate change and prepare Guelph for a net-zero-carbon future;
- Navigating our future: Foster easy, accessible movement through trails, paths, roads and corridors to tie the community together and connect Guelph's economy with other regions;
- Working together for our future: Run an effective, fiscally responsible and trusted local government with engaged, skilled and collaborative employees; and,
- Building our future: Make strategic investments that nurture social well-being, provide landmark beauty and offer a safe place where everyone belongs.

The proposed improvements to Gordon Street contribute to meeting the "navigating our future" priority by:

- Improving connections to workplaces in Guelph;
- Investing in and promoting active transportation; and,
- Improving the safety, efficiency and connectivity of the whole transportation system.

1.4.3 Guelph-Wellington Transportation Study (2005)

The Guelph-Wellington Transportation Master Plan is included in the Guelph-Wellington Transportation Study and provides detailed recommendations for Transportation Demand Management (TDM) measures and non-motorized modes, public transit, roadway improvements, and highway improvements. The Master Plan promotes coordinating transportation infrastructure with land use planning to support urban systems, increased density, mixed land use developments, and implementing neighborhood design measures.

The City of Guelph is in the process of updating its Transportation Master Plan, which will define how the transportation system will support growth in Guelph. The updated plan will include policies and guidelines that promote the balance of mobility, environment and efficiency and provide safety and access for all users. The proposed improvements to Gordon Street prioritize safety and improve transportation access for all users.

1.4.4 Guelph Transit Growth Strategy (2010)

The vision for transit in the City is that "transit is the preferred transportation choice over the single occupant vehicle for residents, employees and visitors to Guelph." This strategy identifies Gordon Street as a major transit spine, where improved mobility is vital to transit operation. The introduction of a continuous two-way left-turn lane on

Gordon Street, between Edinburgh Road and Lowes Road, will reduce traffic delays and collisions, and will directly improve transit mobility along this stretch of road.

1.4.5 Cycling Master Plan – Bicycle Friendly Guelph (2012)

The Cycling Master Plan supports the City's commitment to "encouraging sustainable transportation options including cycling as a means of reducing traffic congestion and related emissions." The improvements proposed for Gordon Street will increase safety for cyclists by physically separating the cycling facilities from vehicular traffic. These cycling improvements align with the first recommendation of the Cycling Master Plan, providing a safe and continuous network of cycling infrastructure.

1.4.6 Gordon Street Wellington Road 46 Class Environmental Assessment (2000)

The Gordon Street Wellington Road 46 Class EA was completed in 2000 to improve conditions for pedestrians, cyclists and bus riders and provide additional capacity for increasing traffic volumes. In 2003, following the Environmental Assessment, Gordon Street from Harts Lane to Clair Road was widened from two lanes to four lanes in an effort to accommodate the anticipated increase in traffic flows. The road widening was completed as an urban cross-section with bike lanes, sidewalks and upgraded underground services.

1.4.7 Urban Design Concept Plans for the Gordon Street Intensification Corridor

The purpose of this design document is to "illustrate a cohesive vision for future planning and intensification for Gordon Street", between Stone Road and Clairfields Drive, that aligns with the Official Plan and other City policies. The vision of the Gordon Street is to "become a vibrant pedestrian friendly street framed by mid-rise buildings, continuous rows of healthy trees, and active at-grade uses that engage the street and the sidewalk. Future development will carefully protect, maintain, restore and enhance the Natural Heritage System and sensitivity transition to the adjacent low-rise neighborhoods."

Seven demonstration sites have been identified along Gordon Street, four of which are included in the Study Area. Detailed directions including, context, site, buildings, cars, people, trees, and adjacent uses are provided for each demonstration site. The improvements along Gordon Street will support future development and intensification as identified in this document.

1.5 Municipal Class Environmental Assessment Process

This study was conducted as a Municipal Class EA Schedule 'B' project in accordance with the planning and design process outlined in the Municipal Engineers Association *Municipal Class Environmental Assessment* (as amended to 2015). The approved process is a five-phase planning process, mandated by the Ontario Environmental Assessment Act. The Class EA process defines four schedules of applicable projects based on scale and potential for adverse environmental impact, identifying which of the five phases are required. The four schedules are outlined in Exhibit 1-2.

There are five phases of the Class EA:

- Phase 1: Problem or Opportunity
- Phase 2: Alternative Solutions
- Phase 3: Alternative Design Concepts for Preferred Solution
- Phase 4: Environmental Study Report
- Phase 5: Implementation

Each of the five defined phases have specific steps and requirements, as shown in **Exhibit 1-3**. This study was conducted as a Schedule B, requiring the completion of Phases 1, 2 and 5 only, which is reflected in **Exhibit 1-3**. The Class EA process includes the requirement for consultation with the public and external agencies. This approach offers those who may be affected by or have an interest in the proposed project the opportunity to participate in the study.

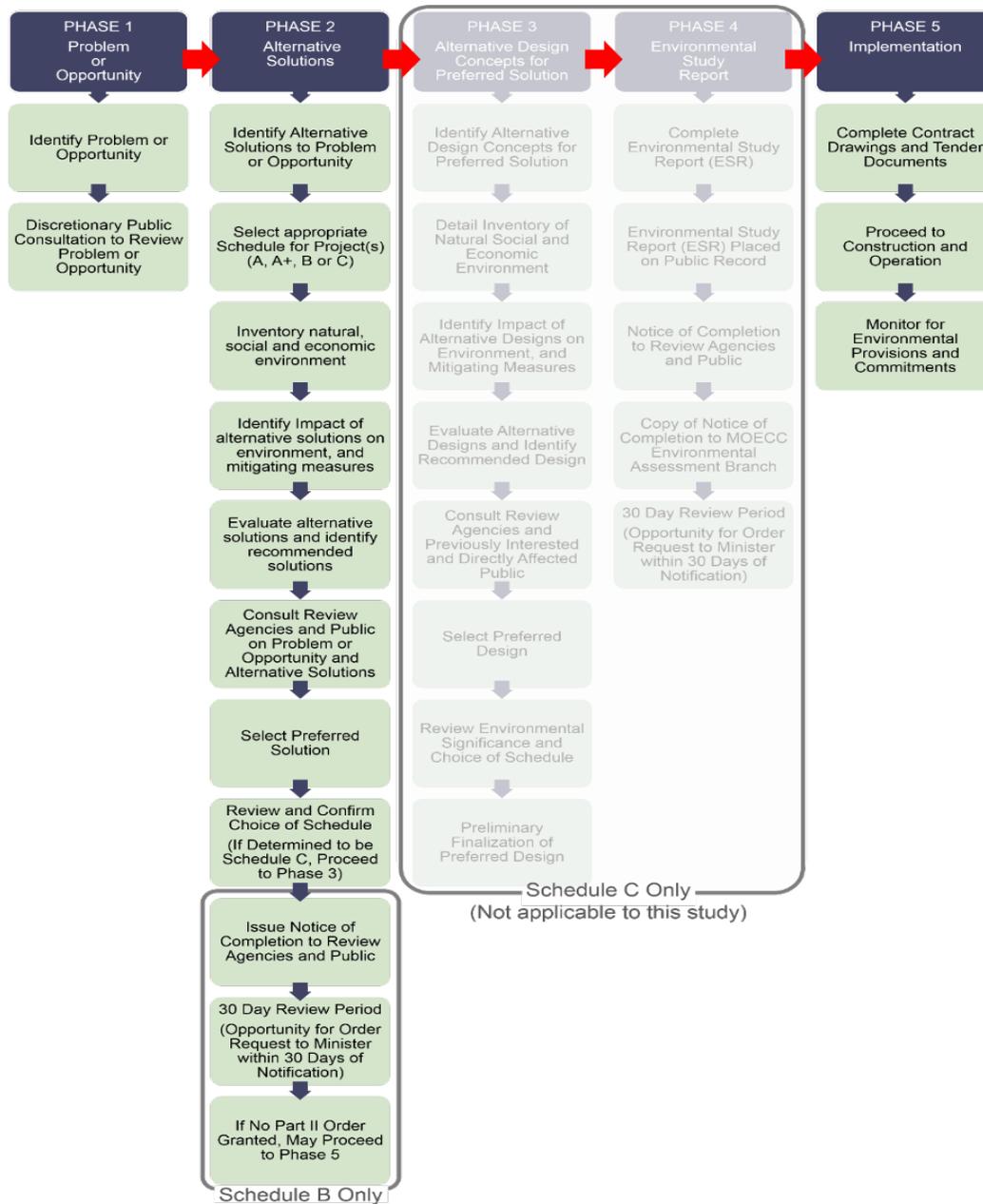
In addition to consultation, the Class EA process includes an evaluation of alternative solutions and alternative design concepts, an assessment of potential impacts associated with the proposed improvements and the development of measures to mitigate identified impacts. The Class EA will identify, assess and recommend strategies to:

- Address future transportation infrastructure deficiencies;
- Manage future transportation demand;
- Optimize local intersection capacity and operations; and
- Enhance road capacity while taking into consideration surrounding land uses and active transportation infrastructure.

Exhibit 1-2: Municipal Class EA Project Schedules and Applicable Phases

		Phases				
		1	2	3	4	5
Schedule A	<ul style="list-style-type: none"> Minimal and predictable adverse environmental impacts – easily mitigated (i.e. emergency operational and maintenance activities) Pre-approved to proceed to Phase 5 	✓				✓
Schedule A+	<ul style="list-style-type: none"> Similar to Schedule A, but required to notify public prior to Phase 5 No ability for public to request Part II order – comments directed to municipal council 	✓				✓
Schedule B	<ul style="list-style-type: none"> Some potential for adverse environmental impacts (i.e. improvements or minor expansions to existing facilities) Must include evaluation of alternative solutions and public consultation 	✓	✓			✓
Schedule C	<ul style="list-style-type: none"> Potential for significant environmental impacts (i.e. construction of new facilities and major expansion of existing facilities) Must include evaluation of alternative solutions, evaluation of alternative designs for the preferred solution, and public consultation 	✓	✓	✓	✓	✓

Exhibit 1-3: Steps involved for each Phase of Municipal Class EA Process



1.6 Project Team

In 2018, the City of Guelph retained IBI Group to complete a Municipal Class EA for improvements to Gordon Street between Edinburgh Road and Lowes Road.

The study has been directed by a team of staff at the City of Guelph, led by the City’s project manager, Gwen Zhang. As the lead consultant, IBI Group has led this study with support from specialty sub-consultant Natural Resource Solutions Inc. The consultant team has been led by IBI Group’s project manager, John Bayley. **Exhibit 1-4** presents the Study Team.

Exhibit 1-4: Gordon Street EA Study Team

City of Guelph



City Project Manager

Gwen Zhang, P.Eng.

Transportation Planning Manager

Jennifer Juste, M.Pl.

Transportation Engineering Manager

Steve Anderson, C.E.T.

**Supervisor Infrastructure
Engineering**

Arun Hindupur, P.Eng.

Project Engineer

David Di Pietro, P.Eng.

**Manager Policy Planning and Urban
Design**

Melissa Aldunate

Environmental Planner

Leah Lefler

Landscape Planner

Rory Templeton

**Transit/Supervisor Scheduling
Service Planning**

Andrea Mikkila

**Route Performance Scheduling
Specialist**

Darron Glasgow

**Community Engagement Program
Specialist**

Kate Bishop

Communications Officers

Katherine Galley

Patricia Halajski

IBI Group



Consultant Project Manager

John Bayley, P.Eng.

Traffic Engineering Lead

Scott Johnston, P.Eng.

**Environmental Assessment Process
Lead**

Patrick Garel, P.Eng.

Senior Road Designer

Dan Roethel, CET, LEL

Active Transportation Specialist

Zibby Petch, M.PL., P.Eng., RSP

Natural Resource Solutions Inc.



Terrestrial and Wetland Biologist

Ryan Archer, M.Sc.

2 Problem and Opportunity

Traffic volumes on Gordon Street have increased over the years and will continue to increase with ongoing redevelopment and intensification. The traffic generated by developments in other parts of the City also contributes to the increase in traffic volumes. As a four-lane cross-section, sufficient through traffic capacity exists to accommodate the anticipated redevelopment and intensification. However, there are peak hour left-turn movements that interfere with and block through traffic due to the absence of turning lanes at numerous driveways and the insufficient storage lengths at intersections of Edinburgh Road and Arkell Road.

The delays and left-turn capacity problems caused by this traffic condition may be addressed by providing a continuous two-way left-turn lane between Edinburgh Road and Lowes Road, and consequently improving the overall mobility on Gordon Street. This intended improvement to mobility will also support transit operations along Gordon Street, a major transit spine.

There is also an opportunity to undertake localized operational improvements and enhance the existing walking and cycling facilities.



Curbside transit stop at Gordon Street

3 Consultation

Public consultation on the existing conditions and potential changes were a key component of this study. Two Public Information Centres (PICs), and two questionnaire surveys were held over the course of the study, offering opportunities for the public to review information, ask questions, and provide comments. This section summarizes the findings of the consultation program, which were used to shape the evaluation of alternatives, and select the preferred solution.

All consultation materials discussed in the following section are included in **Appendix A**, including Consultation Summary Reports completed after each PIC.

3.1 Notice of Study Commencement

The Notice of Commencement was delivered to over 800 property owners, published in the Guelph Mercury on May 9 and 16, 2019, and posted on the City's website (www.guelph.ca) on May 9, 2019.

The notice invited the public to participate in the study and provided information on the:

- Study and its purpose;
- Study area and streets to be examined;
- Project being subject to the requirements of the Class EA Schedule B;
- Stages of the study, noting future PICs and where notices would be published;
- Contact information for the City and consultant project leads;
- Study's website address; and
- How to participate actively in the study through the planned PICs and/or requesting to be added to the project mailing list.

3.2 Public Information Centre #1

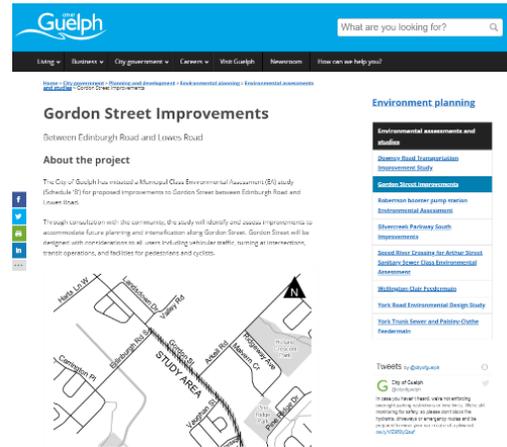
PIC #1 was held to introduce and present information on the study, including the purpose, study area limits, the Class EA process being followed (Schedule B), existing challenges and constraints, potential solutions (including Option 1 as "Do Nothing") with preliminary unit costs and how the alternative solutions will be evaluated.

3.2.1 Notice of Public Information Centre #1

The Notice of PIC #1 was published in the Guelph Mercury on September 19 and 26, 2019 and posted on the City's website (www.guelph.ca/gordonea) on August 28, 2019. Notices were also mailed to over 800 residents within and around the Study Area, and emailed to identified agency, stakeholder group, and Indigenous community representatives.

The notice invited all interested parties to participate in the study and provided information on the:

- Study and its purpose;
- Date, time and venue for the PIC;
- Project being subject to the requirements of the Municipal Class EA, Schedule B;
- Contact information for the City and consultant project leads;
- Study's website address; and,
- How to actively participate in the study through the PIC and/or by requesting to be added to the project mailing list.



Study Website

In addition to this, mobile signs were set up on Gordon Street at the both ends of the study area from September 26, 2019 to October 3, 2019.

3.2.2 Venue, Format and Attendance

The first PIC was held on October 1, 2019 at the Salvation Army Guelph Citadel & Nursery School, located on Gordon Street, within the Study Area.

The PIC was a drop-in open house format where members of the project team and City staff were present to speak with individuals and small groups about the study and to address any questions and concerns. A total of 52 individuals were in attendance (of which 48 signed in).

Information on the study was presented on display boards, placed in a walk-through format around the room. A large aerial map of the study area was also placed on a table in the centre of the room, where attendees could review potential improvements in detail, and leave location-based comments.

The PIC #1 Survey was provided to attendees to collect information on where respondents reside, the frequency of their travel along the corridor, the mode of travel used, the purpose of their travel, their primary concerns about the existing corridor, and the proposed option(s) that would improve their feeling of safety.



Participants at PIC #1

3.2.3 Comments from the Public

A total of 48 comments were submitted for PIC #1, including 36 at the PIC and 12 received by email after the PIC. Of these comments, 46 included completed surveys. A total of 14 location-based comments, placed on the large plan of the Study Area, were also collected at PIC #1.

Respondents to the PIC #1 survey were predominately citizens of Guelph, who most often drive along the corridor for a mix of reasons, including work, recreation, shopping, church, doctor's appointments, and school, as summarized in **Exhibit 3-1**. Nearly one-third of the respondents also often use transit, cycle and/or walk. Respondents were primarily concerned with challenges related to turning vehicles, including challenges turning onto adjacent properties and onto Gordon Street, and through traffic being delayed by long queues of turning vehicles or stopped transit vehicles, as summarized in **Exhibit 3-2**.

Respondents also submitted other concerns, which included:

- Speeding;
- Drivers changing lanes unexpectedly to move around stopping buses;
- Sightlines (bus stops at Valley Road, Arkell Road and Lowes Road obstructing driver's views, and skewed intersections at Heritage Drive and Lowes Road);
- Increased development leading to higher traffic volumes, mid-block access and turning movements;
- Noise and vibration from vehicles;
- Overcrowding and concentration of bus route on Gordon Street;
- Duration of construction and impact on local businesses; and,
- Need for intersection control and/or pedestrian crossing at Vaughan Street.

The sixth and final survey question asked respondents to identify the presented alternative solution(s) they most preferred. Of the five proposed options presented, **the most popular was Option 4** (widen on west side with a 4m two-way left-turn lane, and separated 3m multi-use-paths in each direction), selected in 27% of the responses. The results of the PIC #1 Survey are summarized in **Exhibit 3-3**.

It is important to note that **12% of respondents offered other possible solutions**, ranging from constructing new and/or extending existing roadways, reducing development along the corridor, adding bus bays along the corridor (without any other changes), and reducing/modifying traffic patterns/controls. About 9% of responses indicated no preference.

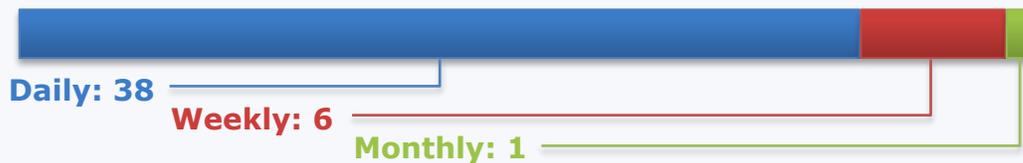
Additionally, 11 of the respondents offered additional suggestions to augment their preferred alternative. While some of the suggestions will or have been considered for this study, others were beyond its scope, and have been identified for the City to consider under future study.

Exhibit 3-1: Summary of PIC 1 Survey Respondent Profile

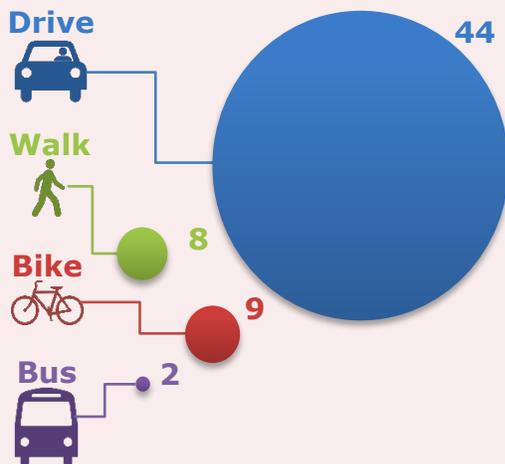
Q1. Where do you live?



Q2. How often do you travel on this section of Gordon Street?



Q3. What is the travel mode you often use on this section of Gordon Street?



Note: Some respondents use more than one mode

Q4. What is the general purpose of your travel on this section of Gordon Street?

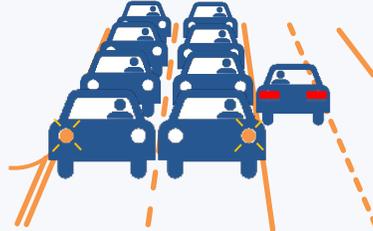


Note: Some respondents have more than one purpose of travel

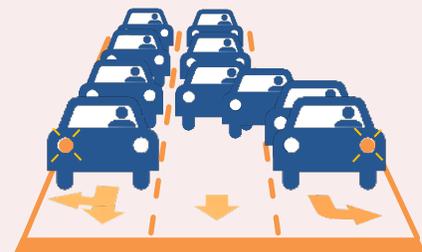
Exhibit 3-2: Summary of PIC 1 Survey Top Respondent Concerns

74%
 identified vehicles turning into properties, stopping through traffic as a top concern

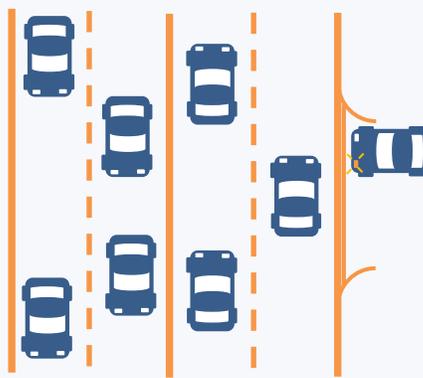
Most identified concern



70%
 identified through traffic being delayed by turning vehicles at intersection as a top concern



46%
 identified inadequate gaps for exiting vehicles to turn onto Gordon Street as a top concern



39%
 identified conflict between cyclists and auto drivers as a top concern



24%
 identified busy intersections for pedestrians to cross as a top concern



13%
 identified other issues as a top concern, including speeding, through traffic stops and lane changes due to stopped buses, left turns for cyclists, and bus shelter locations causing poor sightlines or high pedestrian traffic



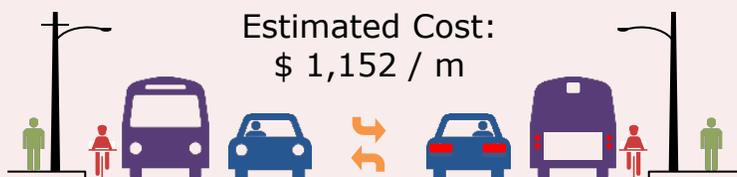
Exhibit 3-3: Summary of PIC #1 Survey Respondent Preferred Alternatives

0%
of
Responses
in Favour of
Option 1



Two Lanes each Direction with Separated Sidewalks on each side (Existing Conditions)

14%
of
Responses
in Favour of
Option 2



Widen equally about existing centreline with two lanes in each direction, a 5m two-way left-turn lane, on-street bike lanes in each direction, and separated sidewalks on each side

21%
of
Responses
in Favour of
Option 3



Widen Equally about Existing Centreline with Two Lanes in each Direction, a 4m Two-way left-turn lane, and Separated 3m multi-use -Paths in each Direction

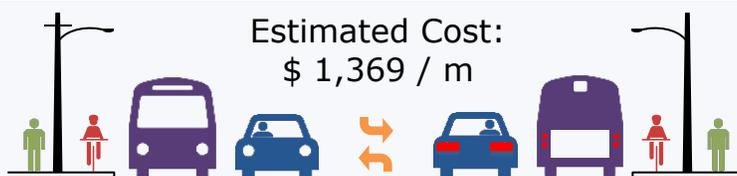
27%
of
Responses
in Favour of
Option 4



Widen on West Side with Two Lanes in each Direction, a 4m two-way left-turn lane, and Separated 3m multi-use - Paths in each Direction

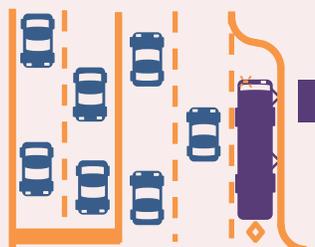
Most Preferred Alternative

17%
of
Responses
in Favour of
Option 5



Widen equally about existing centreline with two lanes in each direction, a 4m two-way left-turn lane, separated 1.8m bike lanes in each direction, and separated sidewalks on each side

12%
of Responses
in Favour of
**Other
Solutions**



Suggestions included new and extended roadways, reducing development, adding bus bays only, and reducing/modifying traffic patterns/controls

9%
of Responses Indicated
No Preference

3.3 Public Information Centre #2

PIC #2 was held to present the preferred solution for the Study. Information on the study purpose, study area limits, the Class EA process being followed, design alternatives considered including additional design options (Option 1 as widening equally about existing centreline with a 4m two-way left-turn lane, and Option 6), public feedback received to date, how the design alternatives were evaluated, potential environmental impacts, and mitigation measures were presented to provide transparency in how the preferred solution was determined.

3.3.1 Notice of Public Information Centre #2

The Notice of PIC #2 was published in the Guelph Mercury on February 6 and 13, 2020 and posted on the City's website (www.guelph.ca) on January 30, 2020. Notices were also mailed to over 800 residents within and around the Study Area, and emailed to identified agency, stakeholder group, and Indigenous community representatives.

The notice invited all interested parties to participate in the study and provided information on the:

- Study and its purpose;
- Date, time and venue for the PIC;
- Project being subject to the requirements of the Municipal Class EA, Schedule B;
- Contact information for the City and consultant project leads;
- Study's website address; and,
- How to actively participate in the study through the PIC and/or by requesting to be added to the project mailing list.

In addition to this, mobile signs were set up on Gordon Street at the both ends of the study area from February 12, 2020 to February 21, 2020.



Mobile Sign on Gordon Street Advertising PIC #2

3.3.2 Venue, Format and Attendance

PIC #2 was held on February 20, 2020 at the same venue as PIC #1, at the Salvation Army Guelph Citadel & Nursery School.

Similar to PIC #1, PIC #2 was a drop-in open house format where members of the project team and City staff were available to speak with individuals and small groups about the study, and to address any questions and concerns. A total of 49 individuals were in attendance (of which 45 signed in), which was similar to the attendance at PIC #1.

Display boards were setup around the room, providing details on the Study. A large aerial map of the study area was also laid along a table in the centre of the room, where attendees could review the preferred solution in detail, and leave location-based comments.



Participants at PIC #2

The PIC #2 Survey was provided to attendees. The PIC #2 Survey included the same respondent profile and top concern questions from PIC #1 to serve as a comparison, as well as a question about whether the proposed solution addresses the top concerns identified in the PIC #1 Survey. The PIC #2 Survey also included the solicitation of comments on the study findings and overall support for the Preferred Option 4, and if there were any additional considerations that should be addressed prior to detailed design for the proposed improvements.

3.3.3 Comments from the Public

A total of 44 PIC #2 Surveys were submitted, including 30 at the PIC and 12 afterwards by email or mail. These submissions also included comments, in addition to survey

responses. A total of 2 location-based comments, placed on the large plan of the Study Area, were also collected at PIC #2.

The profile of PIC #2 Survey respondents generally corresponds with those of the PIC #1 Survey. **Exhibit 3-4** provides a comparative summary of PIC #1 and #2 Survey respondent profiles.

Respondents generally deemed the top concerns to be addressed by the preferred alternative (between 64% and 85% of respondents for each), as summarized in **Exhibit 3-5**. Reducing delays caused for or by turning vehicles scored the highest, while reducing gaps for exiting vehicles to turn onto Gordon Street scored the lowest.

Of the respondents that expressed a preference, approximately 70% support the preferred design alternative (Option 4). The remaining respondents expressed a preference for moving pedestrians further away from traffic, keeping pedestrians and cyclists separate, and widening equally on each side of the road.

Additional suggestions and recommendations from the responses to be considered during detailed design include:

- Providing a mid-block pedestrian crossing near Vaughan Street
- Limiting closure of lanes for construction
- Restricting future traffic entering and exiting new developments / restricting left turns or direct access to Gordon Street
- Restricting movements at intersections
- Potential conflicts between pedestrians and cyclists on multi-use path
- Improvements to roadway grading to enhance overland drainage
- Improvements to signal coordination
- Improvements beyond study area to be made before major redevelopment
- Greater network improvements for consideration in Transportation Master Plan
- Including bus bays for all stops

The two location-based comments included the following suggestions for consideration during detailed design:

- Improve visibility for motorists turning onto and off Gordon Street to reduce potential collisions (overall Study Area)
- Provide pedestrian activated crosswalk near Vaughan Street

Exhibit 3-4: Summary of PIC #1 and #2 Survey Respondent Profiles

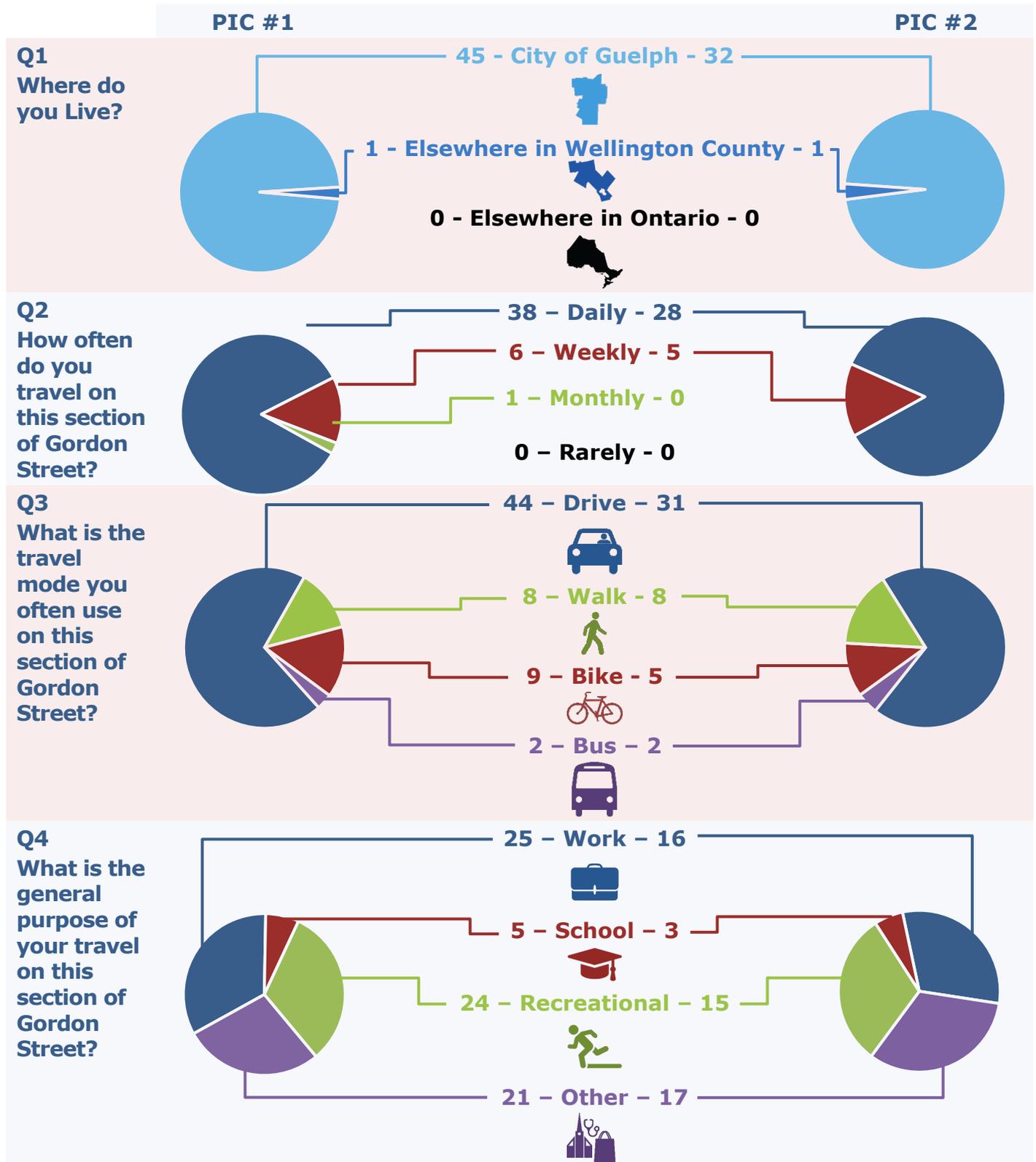
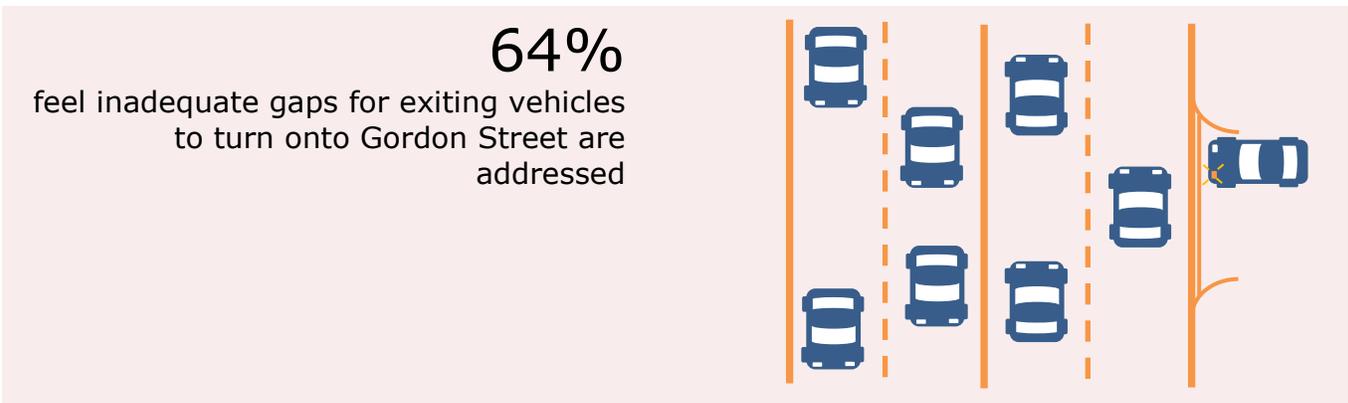
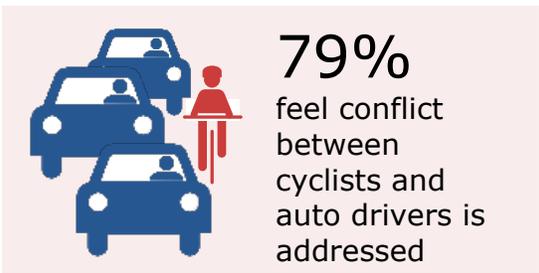
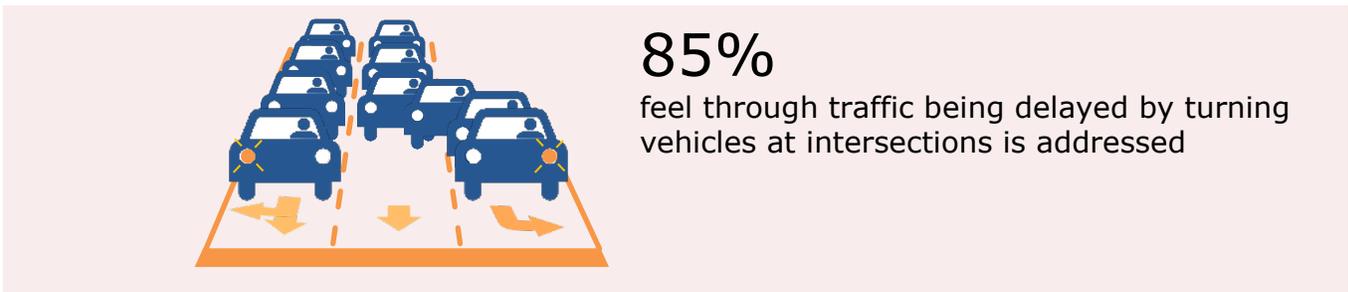
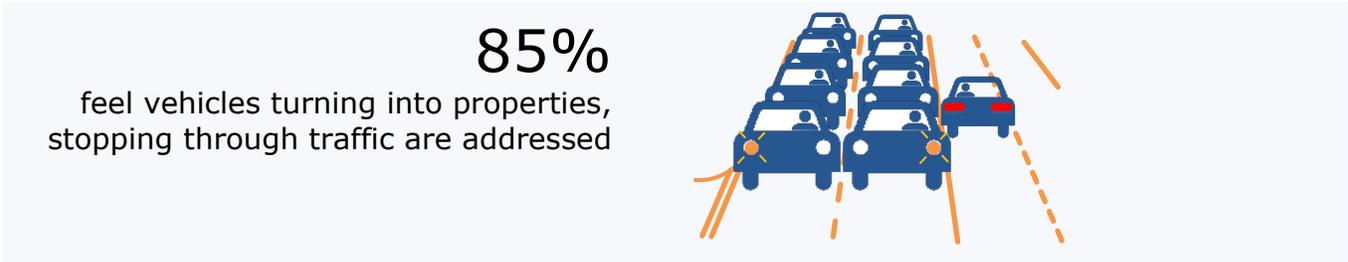


Exhibit 3-5: Respondent Opinions on Preferred Alternative (Option 4) Addressing Top Concerns



3.4 Agency and Utility Consultation

Various agencies and utilities were contacted and provided all formal notices, as part of the consultation program for this Study, including:

- **Federal Agencies:**
 - Department of Fisheries and Oceans
- **Provincial Agencies:**
 - Ministry of the Environment, Conservation and Parks
 - Municipal Class EA (West Central Region), EA notification
 - Ministry of Indigenous Affairs
 - Ministry of Natural Resources and Forestry
 - Ministry of Heritage, Sport, Tourism and Culture Industries
 - Infrastructure Ontario
- **City of Guelph departments:**
 - City of Guelph Planning and Building Services
 - City of Guelph Engineering and Transportation Services
 - City of Guelph Transit
 - City of Guelph Communications and Community Engagement
 - Guelph City Council
 - Guelph Police Service
 - Guelph Fire Department
 - Guelph Transit
- **School Boards:**
 - Upper Grand District School Board
 - Wellington Catholic District School Board
- **Conservation Authority**
 - Grand River Conservation Authority
- **Utilities:**
 - Hydro One Networks
 - Alectra Utilities (formerly Guelph Hydro)
 - Enbridge Gas (formerly Union Gas)
 - Rogers
 - Bell Canada
 - COGECO Cable Solutions
 - Imperial Oil SPPL

Copies of the correspondence with agencies and utilities are found in **Appendix A** and a summary of the responses are provided in **Exhibit 3-6**.

Exhibit 3-6: Summary of Agency and Utility Comments

Respondent	Summary of Comments	Responses
School Boards		
Upper Grand District School Board	<p>Want to be kept informed of project and will be participating in review.</p> <p>Interested in improved pedestrian infrastructure and signalized intersections to allow students to travel to and from school.</p>	Included on mailing list for all Study notices.
Conservation Authority		
Grand River Conservation Authority (GRCA)	Want to be kept informed of project and will be participating in review.	Included on mailing list for all Study notices.
Provincial Agencies		
Ministry of the Environment, Conservation and Parks	EA Coordinator assigned to review project. Confirmation of receipt of Notice of Study Commencement provided, including confirmation of Indigenous Communities to be included in the consultation program.	Included on mailing list for all Study notices.
Ministry of Heritage, Sport, Tourism and Culture Industries	Confirmation of receipt of Notice of Study Commencement provided. At 1453 Gordon Street, if the excavation won't go deeper than the previous construction then there is no need for a cultural heritage assessment.	City will conduct a cultural heritage assessment surrounding 1453 Gordon Street during the detail design prior to construction.
City of Guelph Planning Services	Staff from Planning Services expressed their wish to implement enhanced off-street pedestrian and cyclist facilities due to the planned intensification and associated increase in pedestrian traffic.	This will be addressed through the detailed design with options such as a buffer within the multi-use path to separate pedestrians and cyclists and wider bike lanes where feasible.

3.5 Stakeholder Consultation

Local stakeholder groups were identified at the start of the Study, in coordination with the City of Guelph and maintained over the course of the Study. The stakeholders were provided all formal notices, including invitations to the PICs. Identified stakeholders include:

- Guelph Coalition for Active Transportation
- Rickson Ridge Neighborhood Group
- Guelph Chamber of Commerce
- Speed River Cycling Club

Copies of the correspondence with stakeholders are found in **Appendix A** and a summary of the responses are provided in **Exhibit 3-7**.

Exhibit 3-7: Summary of Stakeholder Comments

Respondent	Summary of Comments	Responses
Stakeholders		
Guelph Coalition for Active Transportation	<ul style="list-style-type: none"> • Prefer Options 4, and 6 • Separated and protected cycling and walking facilities preferred • Reduced speed limits and narrowed vehicle travel lanes • Use refuge islands • Improve/increase signage and education • Increase buffers from vehicles • Bi-directional bike path for Option 4 • Option 6 lacks any buffer from vehicle lanes, and bike-friendly curbs reduce protection. Also, winter maintenance will likely leave snow from road on bike lane • Protected intersection designs 	<ul style="list-style-type: none"> • Option 4 is the preferred design alternative • The study has considered separated cycling and pedestrian facilities and will further consider during detailed design development. • Limited space for separated pedestrians and cyclists due to existing infrastructure, snow storage, tree impacts, and cost of relocating hydro poles being prohibitive • Bi-directional bike path will be considered during detailed design development.
Rickson Ridge Neighborhood Group	<ul style="list-style-type: none"> • None to date 	
Guelph Chamber of Commerce	<ul style="list-style-type: none"> • None to date 	
Speed River Cycling Club	<ul style="list-style-type: none"> • None to date 	

3.6 Indigenous Communities Consultation

First Nations were identified at the start of the Study, in coordination with the Ministry of the Environment, Conservation and Parks, and Ministry of Indigenous Affairs, and maintained over the course of the Study. The identified First Nations include:

- Six Nations of the Grand River Territory
- Haudenosaunee Confederacy Chiefs Council
- Mississaugas of the New Credit First Nation

The First Nations were provided all formal notices, including invitations to meet directly and to attend the PICs. Copies of the correspondence with the First Nations are found in **Appendix A** and a summary of the responses are provided in **Exhibit 3-8**.

Exhibit 3-8: Summary of First Nation Comments

Respondent	Summary of Comments	Responses
Mississaugas of the Credit First Nation	MCFN has a low level of concern about the project. MCFN should be notified if there are any changes to the project as they may impact MCFN's interests. MCFN requests a copy of all associated environmental and/or archaeological reports. If additional environmental and/or archaeological assessment fieldwork is scheduled, MCFN is to be notified so that they may participate. MCFN employs Field Liaison Representatives who must be on location whenever any fieldwork for environmental and/or archaeological assessments is undertaken.	City to notify MCFN of any future environmental and/or archaeological assessment fieldwork.
Six Nations of the Grand River Territory	None to date	
Haudenosaunee Confederacy Chiefs Council	None to date	

3.7 Guelph City Council Approval

The recommendations of this study have been presented to Guelph City Council on August 24, 2020. and approved by the council on _____.

3.8 Notice of Study Completion

The Notice of Study Completion was published in the Guelph Mercury on _____ and posted on the City's website (www.guelph.ca) at approximately the same date.

The notice initiated a 30-day review period and invited the public to review and submit comments on the Project File Report. Digital copies of the Project File Report were made available on the City's website. Physical copies were also made available at _____. The Notice of Completion also provided information on the:

- Study and its purpose;
- Study area and streets examined;
- Project being subject to the requirements of the Class EA Schedule B;
- The City's intention to proceed with the preferred alternative, subject to comments received and necessary approvals;
- Contact information for the City and consultant project leads;
- Study's website address;
- Location of copies of the Environmental Project Report;
- 30-day comment period; and,
- Ability and how to submit a request to the Minister of the Environment, Parks and Conservation to require a higher level of assessment under an individual Environmental Assessment process (referred to as a Part II Order).

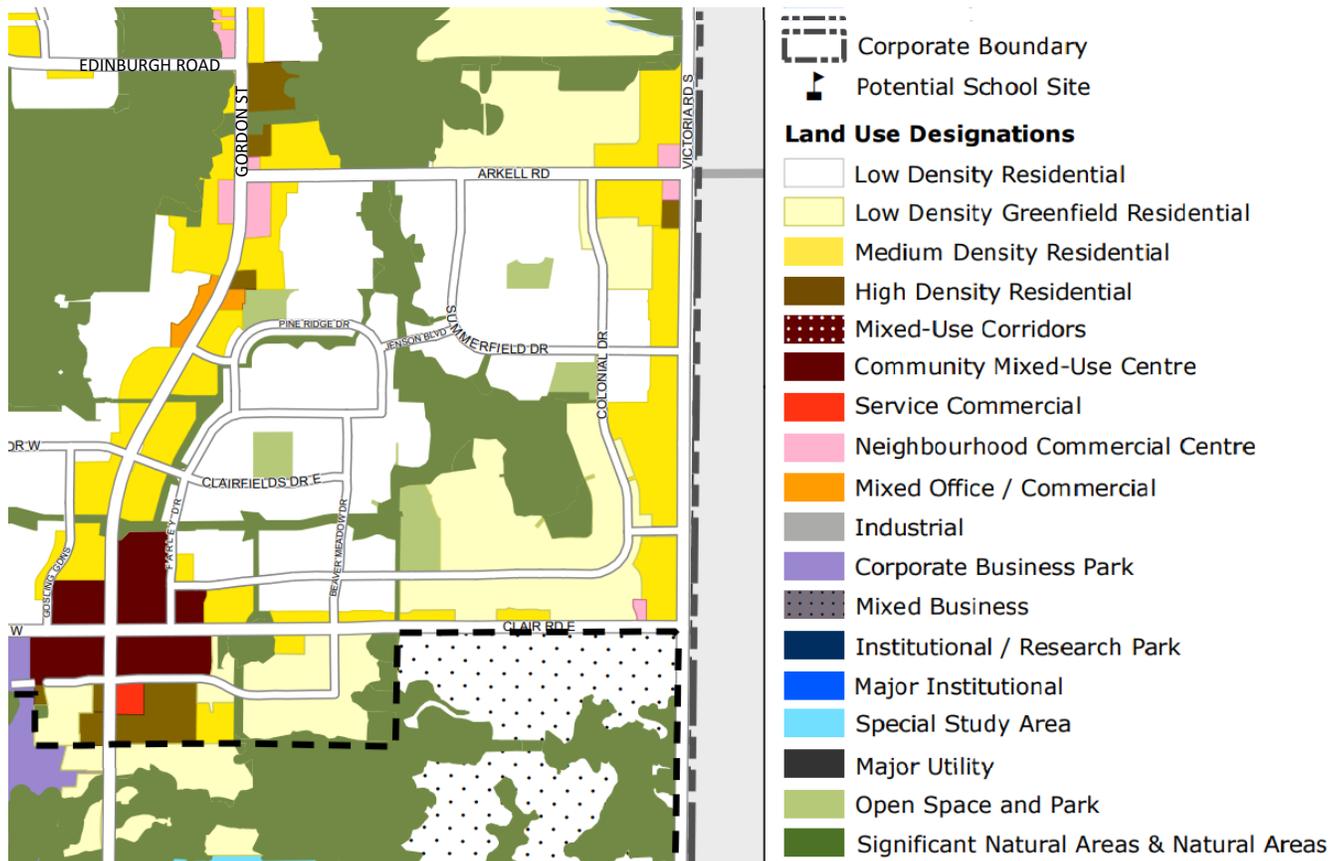
The EA Act provides an appeal mechanism that allows any person or party that feels their concerns have not been and will not be addressed through the Class EA to submit a request to the Minister of the Environment, Conservation and Parks to change the project status and require the proponent complete an individual EA (referred to as a Part II Order). Requests must be received by the Minister within the 30-day review period initiated by the Notice of Completion. Requests must be submitted in writing and include reasons for the request. The Minister will then review the request and make a decision on whether to issue a Part II Order.

4 Existing Conditions

4.1 Land Use

The land use within the study area, per the City of Guelph Official Plan (2018), is primarily medium density residential, followed by neighbourhood commercial centre, high-density residential, and mixed office/commercial. To the west and east of Gordon Street there are significant natural areas and natural areas. The land uses are shown in **Exhibit 4-1**.

Exhibit 4-1: City of Guelph Official Plan Land Use Map

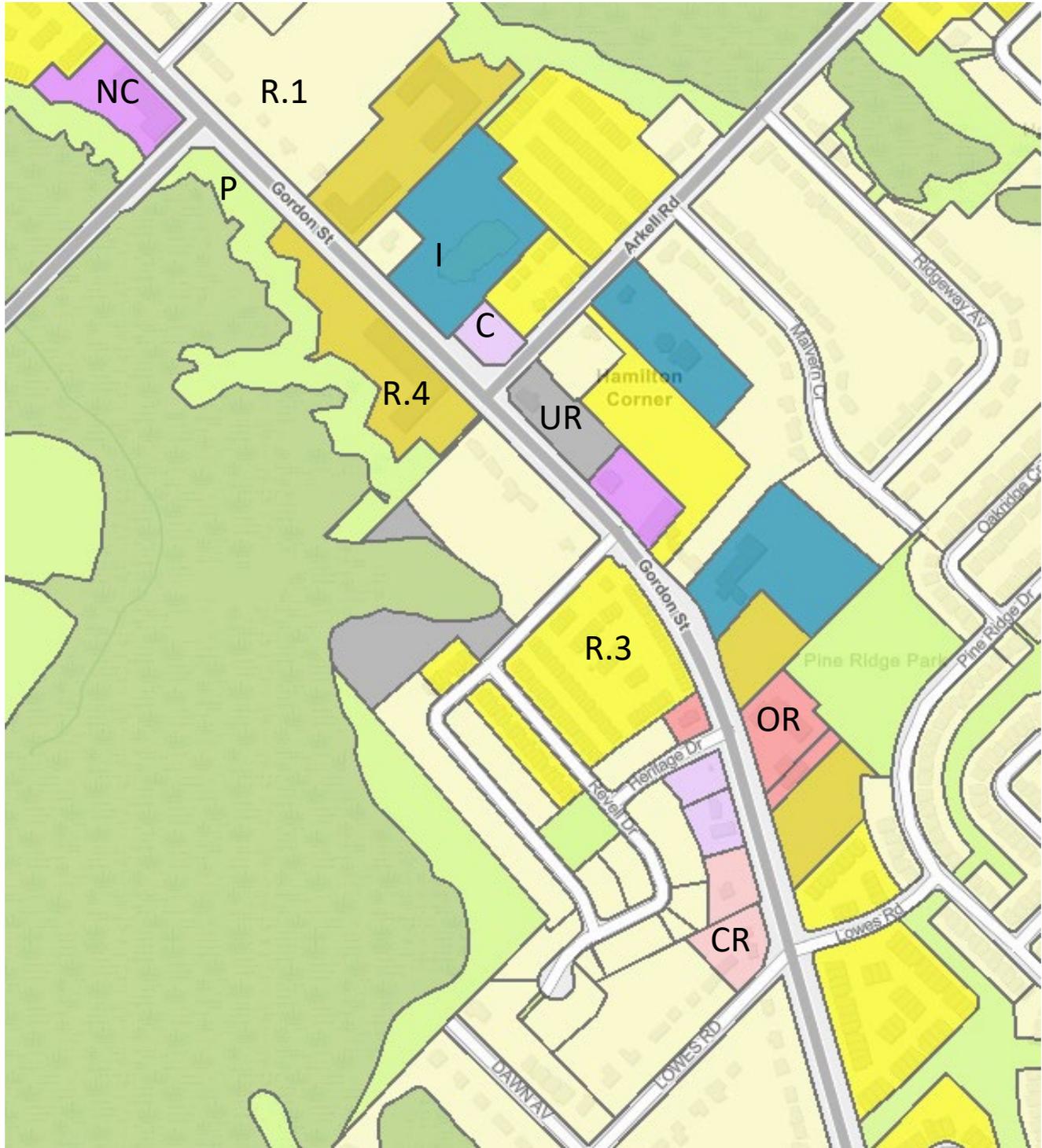


The Official Plan defines medium density residential as multiple unit residential buildings with a permitted height of two to six storeys. High density residential permits multiple residential buildings generally in the form of apartments from three to ten storeys tall. The medium density residential land use requires net density between 35 and 100 units per hectare, while the high-density residential land use requires net density between 100 and 150 units per hectare.

The current zoning of the study area, per the City of Guelph Zoning Bylaw (1995) – 14864, includes a mix of single detached residential (R.1), townhouse (R.3), apartment (R.4), convenience commercial (C), neighbourhood shopping centre (NC), office

residential (OR), commercial residential (CR), institutional (I), park (P), and urban reserve (UR). A map of the zoning of the study area is shown in **Exhibit 4-2**.

Exhibit 4-2: Zoning Bylaw, Schedule A - Map of Study Area



4.2 Natural Environment

IBI Group retained Natural Resource Solutions Inc. (NRSI) to complete an Environmental Impact Study (EIS) to inform the Schedule B Class EA for Gordon Street. The full study is included in **Appendix B**. The EIS characterized adjacent vegetation communities, completed a preliminary Tree Inventory and Preservation Plan (TIPP), a screening report for Species at Risk (SAR), provided recommendations regarding wildlife crossings, and informed the preliminary design.

Maps of the natural environment constraints are presented in **Exhibit 4-3** through **Exhibit 4-7**, and discussed in the following sections.

4.2.1 Aquatic

There are no watercourses or other defined drainage channels within the study area.

4.2.2 Terrestrial

Vegetation and Vascular Flora

The Hanlon Creek Swamp Provincially Significant Wetland (PSW), located to the west of Gordon Street between Edinburgh Road and opposite Arkell Road, is the only dominant natural feature within the Study Area. Ecological Land Classification (ELC) communities identified in the study area, include: Cattail mineral shallow marsh, non-native mineral thicket swamp, cultural meadow, Scots Pine cultural plantation, and residential plantings (primarily maintained lawns). A full description of the environmental characteristics of the ELC communities is provided in the EIS in **Appendix B**.

NRSI identified 77 plant species present in the study area through vegetation and tree inventories. Several of the identified species were found within the right-of-way or on adjacent developed lands. The area to the west of Gordon Street and south of Edinburgh Road, including Hanlon Creek Swamp PSW, hosts the majority of the natural vegetative growth in the area. The species identified along the ROW are urban-tolerant, whereas the species associated with the wetland have a lower tolerance for urban disturbances and site alteration.

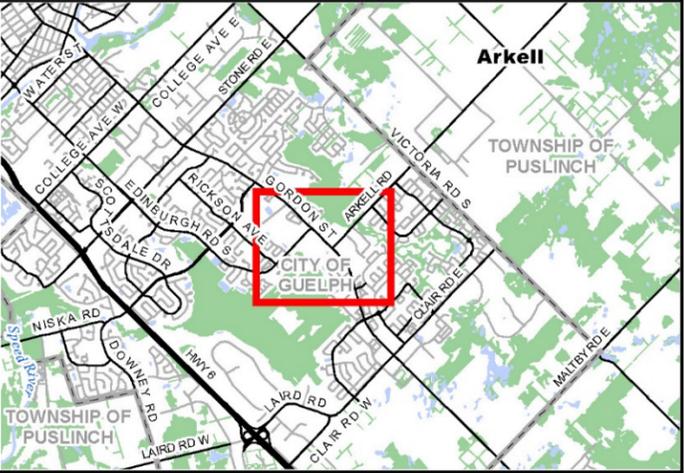
Tree Inventory

Within the study area, 191 trees were inventoried and comprise of 26 species. The inventory and assessment identified that 68 of the trees are native species and the remaining 123 trees are non-native species. The full Tree Inventory and Protection Plan (TIPP) is provided in **Appendix B**.



Exhibit 4-3: Natural Environment Constraints (Overview of Study Area)

Gordon Street, Guelph EA Study Area



- Legend**
- Study Area
 - Permanent Watercourse
 - Regulation Limit (GRCA)
 - City of Guelph Natural Heritage System (boundaries approximate)**
 - Deer Crossing
 - Restoration Area
 - Significant Natural Area
 - Provincially Significant Wetland (PSW)
 - Ecological Linkage

NATURAL RESOURCE SOLUTIONS INC.
 Aquatic, Terrestrial and Wetland Biologists

Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright Queen's Printer Ontario. Imagery: ESRI (2017).

Project: 2252 Date: July 7, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:6,000
-------------------------------------	------------------------------------------------



Exhibit 4-4: Natural Environment Constraints (Detailed Map 1 of 4)

Gordon Street, Guelph EA Natural Environment Constraints and Preliminary Design



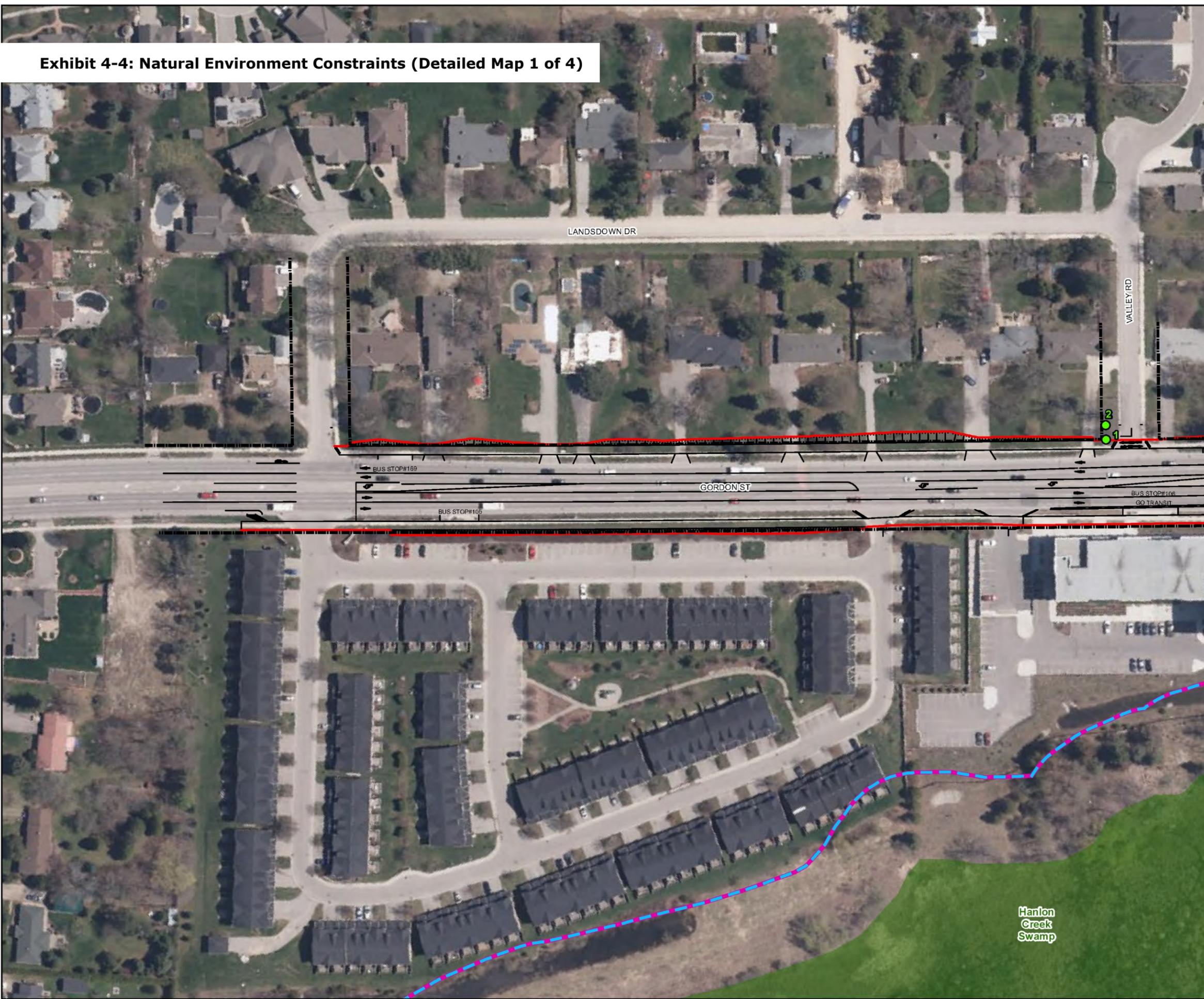
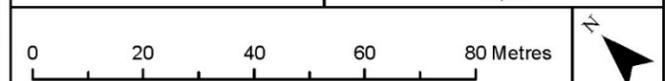
Legend

- Right of Way (ROW)
- Limit of Construction
- Preliminary Design
- Potential Bat SAR Habitat Tree
- Significant Natural Area Boundary
- Surveyed Wetland Boundary
- PSW Buffer (30m)
- Provincially Significant Wetland (PSW)
- Deer Winter Congregation SWH
- Significant Woodland
- Significant Woodland Buffer (10m)
- Deer Crossing
- Ecological Linkage
- Locally Significant Species
- Sweet Gale (*Myrica gale*)



Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright: Queen's Printer Ontario. Imagery: First Base Solutions Inc. (2019).

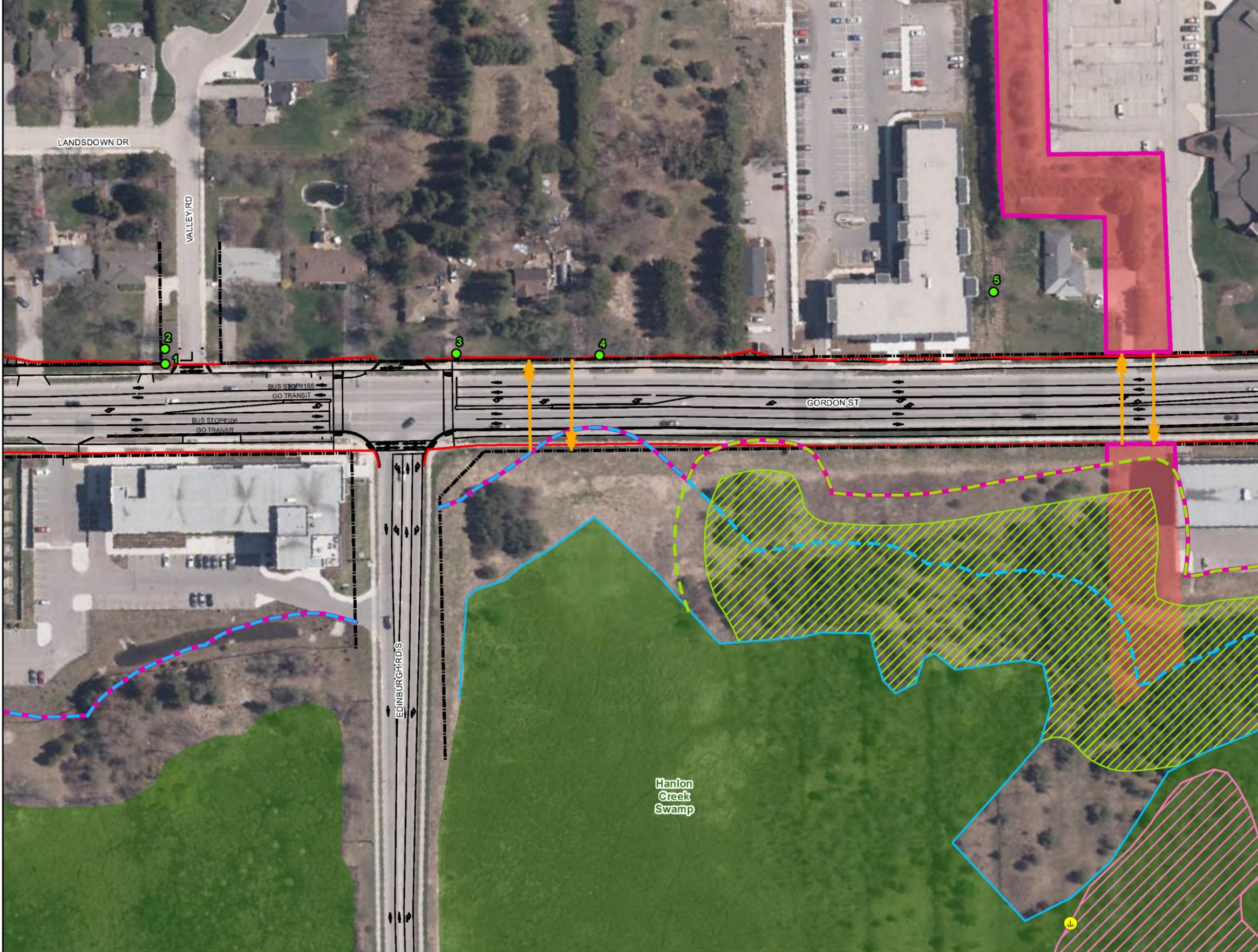
Project: 2252 Date: July 8, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:1,300
-------------------------------------	------------------------------------------------



Hanlon
Creek
Swamp

Exhibit 4-5: Natural Environment Constraints (Detailed Map 2 of 4)

Gordon Street, Guelph EA Natural Environment Constraints and Preliminary Design



Legend

- Right of Way (ROW)
- Limit of Construction
- Preliminary Design
- Potential Bat SAR Habitat Tree
- Significant Natural Area Boundary
- Surveyed Wetland Boundary
- PSW Buffer (30m)
- Provincially Significant Wetland (PSW)
- Deer Winter Congregation SWH
- Significant Woodland
- Significant Woodland Buffer (10m)
- Deer Crossing
- Ecological Linkage

Locally Significant Species

- Sweet Gale (*Myrica gale*)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

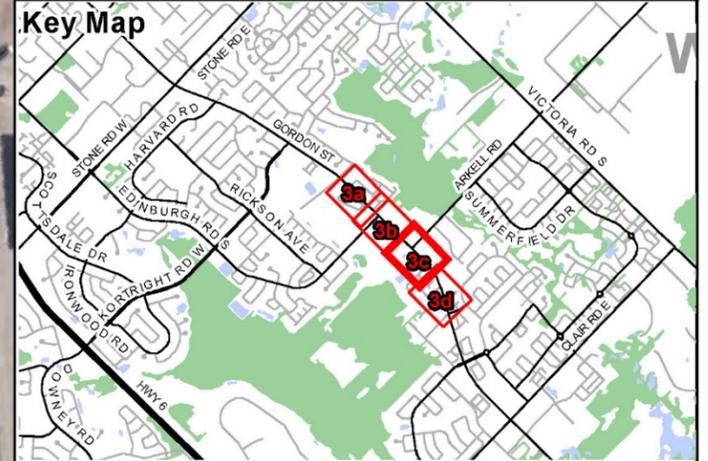
Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright: Queen's Printer Ontario. Imagery: First Base Solutions Inc. (2019).

Project: 2252 Date: July 8, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:1,300
-------------------------------------	------------------------------------------------

0 20 40 60 80 Metres

Exhibit 4-6: Natural Environment Constraints (Detailed Map 3 of 4)

Gordon Street, Guelph EA Natural Environment Constraints and Preliminary Design



Legend

- Right of Way (ROW)
- Limit of Construction
- Preliminary Design
- Potential Bat SAR Habitat Tree
- Significant Natural Area Boundary
- Surveyed Wetland Boundary
- PSW Buffer (30m)
- Provincially Significant Wetland (PSW)
- Deer Winter Congregation SWH
- Significant Woodland
- Significant Woodland Buffer (10m)
- Deer Crossing
- Ecological Linkage
- Locally Significant Species**
- Sweet Gale (*Myrica gale*)



Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright: Queen's Printer Ontario. Imagery: First Base Solutions Inc. (2019).

Project: 2252 Date: July 8, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:1,300
-------------------------------------	------------------------------------------------

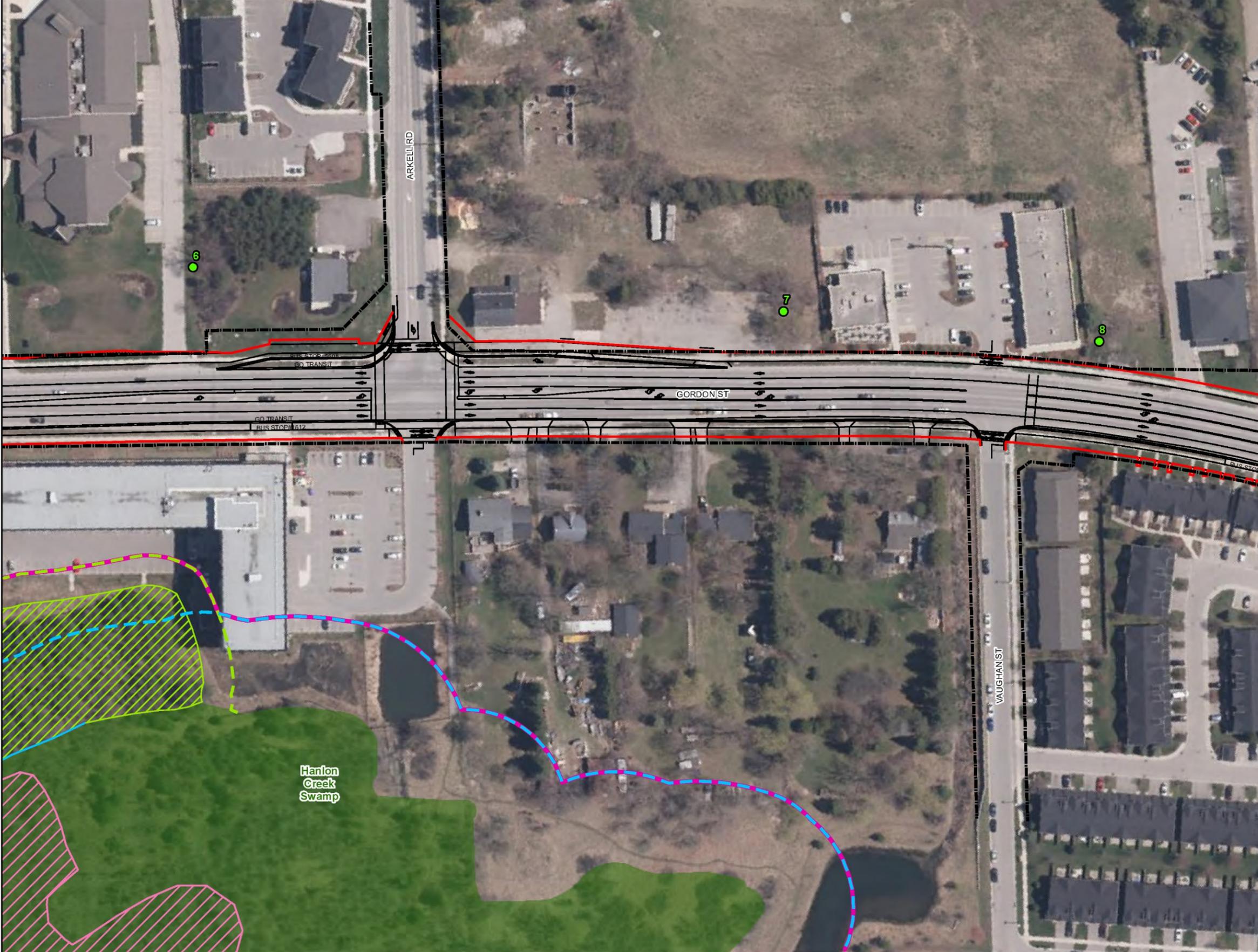
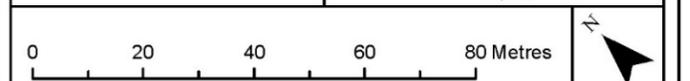


Exhibit 4-7: Natural Environment Constraints (Detailed Map 4 of 4)

Gordon Street, Guelph EA Natural Environment Constraints and Preliminary Design



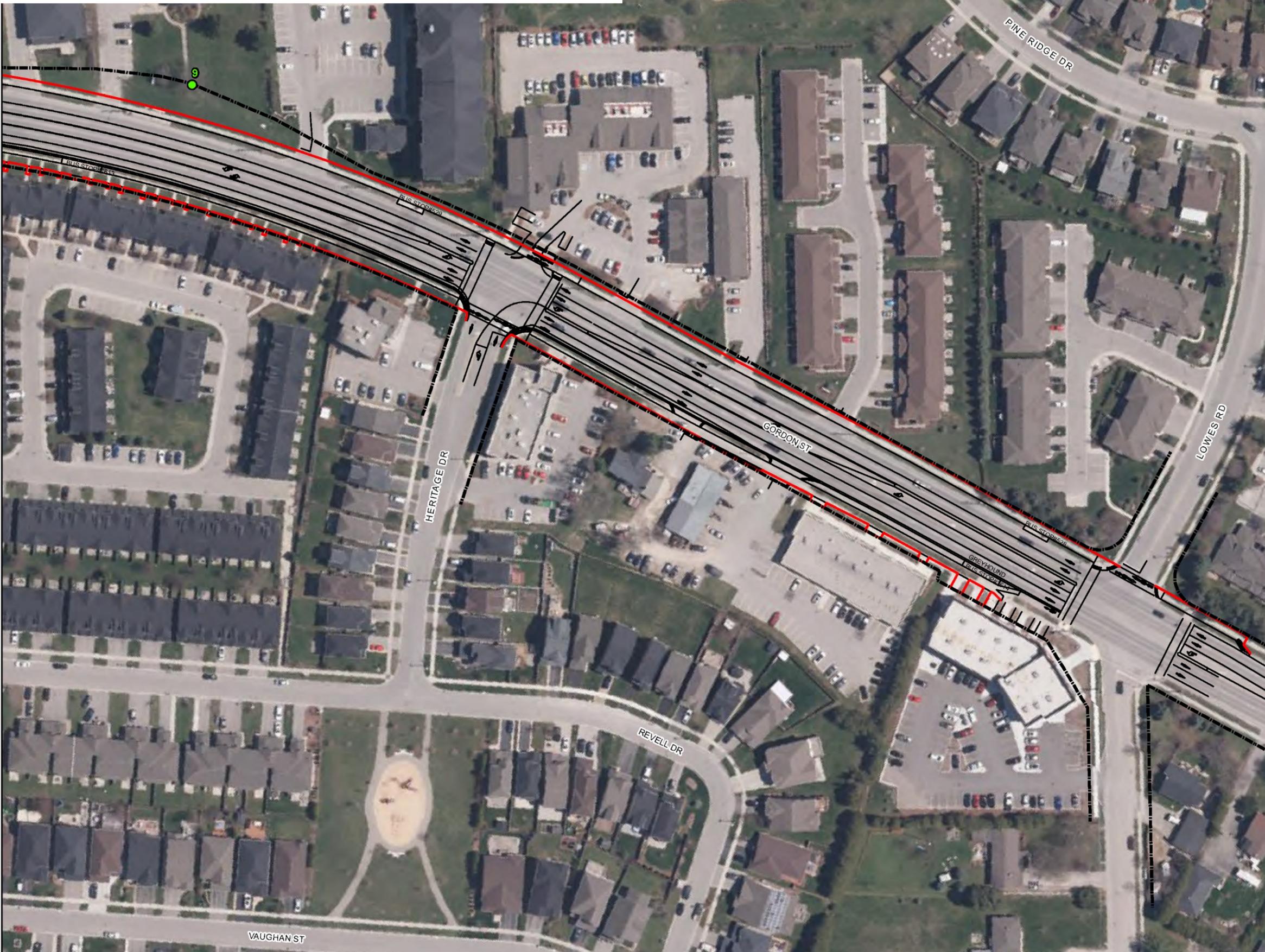
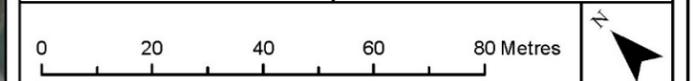
Legend

- Right of Way (ROW)
- Limit of Construction
- Preliminary Design
- Potential Bat SAR Habitat Tree
- Significant Natural Area Boundary
- Surveyed Wetland Boundary
- PSW Buffer (30m)
- Provincially Significant Wetland (PSW)
- Deer Winter Congregation SWH
- Significant Woodland
- Significant Woodland Buffer (10m)
- ➔ Deer Crossing
- Ecological Linkage
- Locally Significant Species**
- Sweet Gale (*Myrica gale*)



Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright: Queen's Printer Ontario. Imagery: First Base Solutions Inc. (2019).

Project: 2252 Date: July 8, 2020	NAD83 - UTM Zone 17 Size: 11x17" 1:1,300
-------------------------------------	------------------------------------------------



Wildlife

To establish the existing wildlife conditions of the study area, historical recordings and documents were reviewed and site investigations were conducted. In total, 114 bird species, 17 reptile and amphibian species, 31 mammal species, and 56 butterfly and 69 odonate species have been recorded in the vicinity of the study area. The EIS includes site characterization results for bird species and a complete list of all herpetofauna and mammal species known from the study area.

4.2.3 Significant Wildlife Habitat

The study area is in an urbanized landscape within south Guelph with low, medium, and high-density residential developments and some commercial properties. In addition, Hanlon Creek Swamp PSW and associated Locally Significant Wetland (LSW) are located directly west of Gordon Street and south of Edinburgh Road. A Significant Wildlife Habitat (SWH), designated by the City of Guelph, is also located within these wetlands as a result of deer overwintering habitat. The OP defines these features as Significant Natural Areas.

The SWH, mapped by the City of Guelph and Ontario Ministry of Natural Resources and Forestry (MNRF), is setback from the Gordon Street right-of-way with the closest point approximately 110m away.

4.2.4 Ecological Linkage and Deer Crossings

The City of Guelph has also identified a 20m wide Ecological Linkage in the study area, crossing Gordon Street north of Arkell Road and linking Torrance Creek Swamp PSW on the east to Hanlon Creek Swamp PSW on the west. This linkage is a corridor for wildlife movement, particularly for the White-tailed Deer during the overwintering and summer foraging habitats. A second deer road crossing is identified in the study area, located just south of the Gordon Street and Edinburgh Road intersection.

4.2.5 Species at Risk Habitat

Suitable habitat for Species at Risk (SAR) is limited in the Study Area to the following:

Bats

Nine cavity trees were identified within the study area which may provide suitable roosting habitat. Following a conservative approach, these trees would be considered potential roosting habitat for SAR bats. Impacts to these trees (e.g., removal or pruning) without proper consideration for avoidance or mitigation measures, in consultation with the MECP, may therefore constitute contravention of the ESA. As assumed habitat for SAR, impacts to these trees is also prohibited under City OP policies except where permitted or authorized by the MECP pursuant to the ESA.

Barn Swallow and Bank Swallow

While the majority of the Study Area, including open wetland and meadow habitats, and urban developed lands, provides suitable foraging habitat for Barn Swallow and Bank Swallow, these species are not specifically documented within the Study Area. As such,

potential habitat impacts associated with the proposed undertaking are not expected to have negative impact on foraging habitat availability for these species.

4.2.6 Significant Species Habitat

One individual of a locally significant vegetation species, Sweet Gale, was documented within the study area. This species is located within an existing significant natural feature (Hanlon Creek Swamp PSW) and is well removed from the Gordon Street right-of-way (approximately 140m). As such, this species would not be impacted by the planned undertaking and does not represent a project constraint.

4.3 Utilities

The utilities and services within the study area, as summarized in **Exhibit 4-8**, must be considered in any changes to infrastructure.

Exhibit 4-8: Utility and Service Providers in Guelph

Utility/Service	Provider/Authority	Description
Water	City of Guelph	Underground distribution of municipal water
Sewage	City of Guelph	Underground collection of storm and sanitary sewage
Electricity	Hydro One Networks	Distribution grid made up of overhead and underground lines
	Alectra Utilities (formerly Guelph Hydro)	Overhead and underground lines including street lighting
Natural Gas	Enbridge Gas (formerly Union Gas)	Underground distribution of natural gas
Telecommunications	Rogers	Telephone, cable and internet services
	Bell Canada	Telephone, cable and internet services
	COGECO Cable Solutions	Cable and internet services
Traffic Signals	City of Guelph	Traffic signals, actuators and power supply

4.4 Noise

Within the Study Area, background noise is primarily generated by vehicular traffic along Gordon Street and connecting roads. Noise levels are typical of an arterial road in Guelph. Sensitive receptors are primarily made up of residences adjacent to the corridor.

4.5 Geology and Physiography

The study area is located within the physiographic region known as the Guelph Drumlin Field (Chapman and Putnam 1984). These drumlins are primarily comprised of loamy and calcareous till deposits, referred to as Wentworth Till. Local soils generally comprise stony tills and deep gravel terraces typical of drumlins and meltwater spillways. Surficial soils within the study area vicinity have generally been described as within the "Guelph Series", comprising well drained soils with a predominantly loamy texture (North-South Environmental 2011).

4.5.1 Hydrology

The study area falls within the eastern extent of the Hanlon Creek subwatershed, with the topographical break for the adjacent Torrance Creek subwatershed located nearby to the east of the study area. The terrain is relatively gently sloping toward the west. No watercourses or other defined surface drainage channels exist within the study area.

4.6 Cultural Heritage

4.6.1 Archeology

Given the existing road, sidewalks and utilities within the right-of-way, there is limited potential for archaeological sites in the Study Area.

4.6.2 Built Heritage

The City of Guelph has a Municipal Register of Cultural Heritage Properties that serves as the official list of culturally or historically important properties. Within the project study area, there is one designated cultural heritage property at 1453 Gordon Street, designated by By-law (2006)-18201. Also, within the study area is 1428 Gordon Street, a non-designated property with potential cultural heritage value or interest. The next closest designated property is located north of the study area at 13 Evergreen Drive, east of Gordon Street and south of Stone Road East.

The designated property at 1453 Gordon Street is a 1 ½ storey Victorian Ontario farmhouse built circa 1890. The property is on the northwest corner of Gordon Street and Heritage Drive. The original building is one of the remaining examples of a farmhouse related to the settlement of the area and the Brock Road School House. The farmhouse has had an extension on the back of the house and is currently used for office space.

The Brock Road School House at 1428 Gordon Street is the only non-designated property with potential cultural heritage value or interest. The building is currently occupied by the Upper Grand District School Board for Continuing Education.

The City will conduct a cultural heritage assessment during the detail design prior to construction.

4.7 Drinking Water Source Protection

Based on a review of Permits to Take Water from the Ontario database, there are no known drinking water sources within the Study Area.

5 Transportation

Traffic Operations and Safety Analysis were completed in support of this Study and is included in **Appendix C**. This section summarizes the finding of this report.

5.1 Existing Transportation Conditions

5.1.1 Existing Road Network

For the purpose of traffic analysis, the study area is bounded by Landsdown Drive to the north and Lowes Road to the south. The following provides a summary and review of the study area road network.

Gordon Street is a north-south arterial roadway. It has a typical four-lane urban cross-section with on-road bike lanes. The posted speed limit within the study area is 60 km/h. Pedestrian sidewalk facilities are provided on both sides. Gordon Street south of Stone Road is identified as an intensification corridor as per Amendment 39 of the City's Official Plan.

Landsdown Drive is an east-west local roadway with a two-lane cross section. With no signage present, a posted speed limit of 50 km/h is assumed. The four-way intersection with Gordon Street is unsignalized. The west leg of the intersection is a private driveway connection to residential townhouses.

Valley Road is an east-west local roadway with a two-lane cross section. With no signage present, a posted speed limit of 50 km/h is assumed. The three-way intersection with Gordon Street is unsignalized.

Edinburgh Road South is primarily a north-south arterial roadway, that turns east as it approaches its southern terminus at Gordon Street. It has a typical two-lane cross section and a posted speed limit of 50 km/h. The three-way intersection with Gordon Street is signalized.

Arkell Road is an east-west arterial roadway. It has a typical two-lane urban cross-section with bike lanes (on both sides) and a posted speed limit of 50 km/h. The west-leg of the intersection is a driveway to a residential apartment building. The four-way intersection with Gordon Street is signalized.

Vaughan Street is an east-west local roadway and has a typical two-lane urban cross-section. It has a posted speed limit of 50 km/h. The east leg of Vaughan Street is a private driveway connection to commercial developments. The four-way intersection with Gordon Street is unsignalized.

Heritage Drive is an east-west roadway with a typical two-lane cross section. With no signage present, a posted speed limit of 50 km/h is assumed. The east leg of Heritage Drive is a private driveway connecting to a small commercial plaza. The four-way intersection with Gordon Street is signalized, with Heritage Drive and the private driveway out of alignment.

Lowes Road is an east-west roadway with a typical two-lane cross section. With no signage present, a posted speed limit of 50 km/h is assumed. The four-way intersection

with Gordon Street is signalized, with the west leg of Lowes Road approaching the intersection on a skewed angle.

5.1.2 Existing Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the year of 2019, representing existing conditions.

During the a.m. peak hour:

- Minor delays are observed in at Gordon Street and Arkell Road intersection in the westbound direction.
- All unsignalized intersections are operating with no critical movements.
- Bike counts provided by the City from May 24, 2019 to May 30, 2019 indicate up to 17 bikes per hour in both directions on Gordon Street between Edinburgh Road and Arkell Road.

During the p.m. peak hour:

- Gordon Street and Landsdown Drive is operating with delays from side streets. However, intermittent challenges and delays exist for eastbound traffic turning left from a private driveway due to high traffic volumes on Gordon Street providing limited gaps for entering traffic.
- Gordon Street and Edinburgh Road is operating with delays in the eastbound and southbound through directions. The queue for the northbound left is extending beyond the available lane storage, causing delays for northbound through traffic.
- Gordon Street and Arkell Road is operating with delays, with southbound left traffic extending beyond the available lane storage, causing delays for southbound through traffic.
- Bike counts provided by the City from May 24, 2019 to May 30, 2019 indicate up to 24 bikes per hour in both directions on Gordon Street between Edinburgh Road and Arkell Road.

Generally, p.m. peak hour is more critical than a.m. peak hour traffic. During the p.m. peak, the northbound left movement at Edinburgh Road queues exceed available storage due to high southbound through volumes and high northbound left turn volumes. At Arkell Road, the southbound left movement is experiencing queuing with inadequate storage.

5.2 Future Transportation Conditions

To determine future needs for improvements and lane requirements, traffic forecasts were developed for the review of 2031 conditions. An annual growth rate of 1.5% was applied to existing traffic volumes and combined with expected traffic to be generated by 11 known future developments along the corridor. The 1.5% annual growth rate used is in line with the City's population growth over this period.

For the development planned on the east side of Gordon opposite to Edinburgh Road, the access road is being proposed as the 4th leg of the intersection of Gordon Street and

Edinburgh Road. As part of the City's Urban Design Concept, Valley Road will be closed at Gordon Street for auto traffic in future.

During the a.m. peak hour:

- At Edinburgh Road intersection, the queue for the northbound left is extending beyond the available lane storage.
- At Arkell Road, long queues are anticipated for the southbound left turns.
- Unsignalized intersections and midblock driveways / accesses are also expected to see long delays due to the high through movement volumes and limited available gaps. However, it is not uncommon for a side street or driveway to operate with some delays.

During the p.m. peak:

- Overall operations are expected to worsen, particularly at the Edinburgh Road and the Arkell Road intersections.
- The eastbound right-turn and southbound through movements at Edinburgh Road are expected to approach / exceed capacity, with high delay and queueing, including queueing for the northbound left turn.
- At Arkell Road, the southbound left-turn movement exceeds capacity, indicating severe congestion due to long queueing.
- Unsignalized intersections and midblock driveways / accesses are also expected to see long delays due to the high through movement volumes and limited available gaps. However, it is not uncommon for a side street or driveway to operate with some delays.
- With future plans to improve Hanlon Expressway, it is expected that some of the north-south travelling volumes will be diverted from Gordon Street and Edinburgh Road, relieving some of the congestion. It is noted that majority of Edinburgh Road runs in the north-south direction with a short east-west stretch as its terminus at Gordon Street.

In summary, the traffic queuing due to turning movements at the Edinburgh Road and Arkell Road intersections will continue to grow.

Capacity analysis was also conducted to determine whether the two-way left-turn lane is required to extend from Edinburgh Road to Landsdown Drive. It was concluded that this two-way left-turn extension is not required due to the following reasons:

- Between Landsdown Drive to Edinburgh Road on the east side of Gordon Street, the southbound left-turn traffic volumes are currently low. In future conditions, as identified in City's "Gordon Street Intensification Corridor Concept Plan", existing driveways to the single detached houses will be terminated and Valley Road will be closed for auto traffic. The new developments on the opposite side of Edinburgh Road will be accessed through a [15 meters] southbound left-turn lane to reach the new east leg at the intersection at Gordon Street and Edinburgh Road.

- Between Landsdown Drive to Edinburgh Road on the west side of Gordon Street, there are only two private driveways just north of Edinburgh Road. Northbound left-turn lanes can be provided to access these two developments.
- The current northbound left-turn lane at Landsdown Drive is sufficient to store turning movements under existing and future scenarios.

5.3 Road Safety Assessment

A review of the collision history data from January 1, 2014 to December 31, 2018 revealed safety concerns along the Gordon Street corridor and are as follows:

- Conflicts due to frequent driveways;
- Insufficient turning storage;
- High operating speeds;
- Insufficient turning radius at intersections; and
- Insufficient bus stop and intersection spacing.

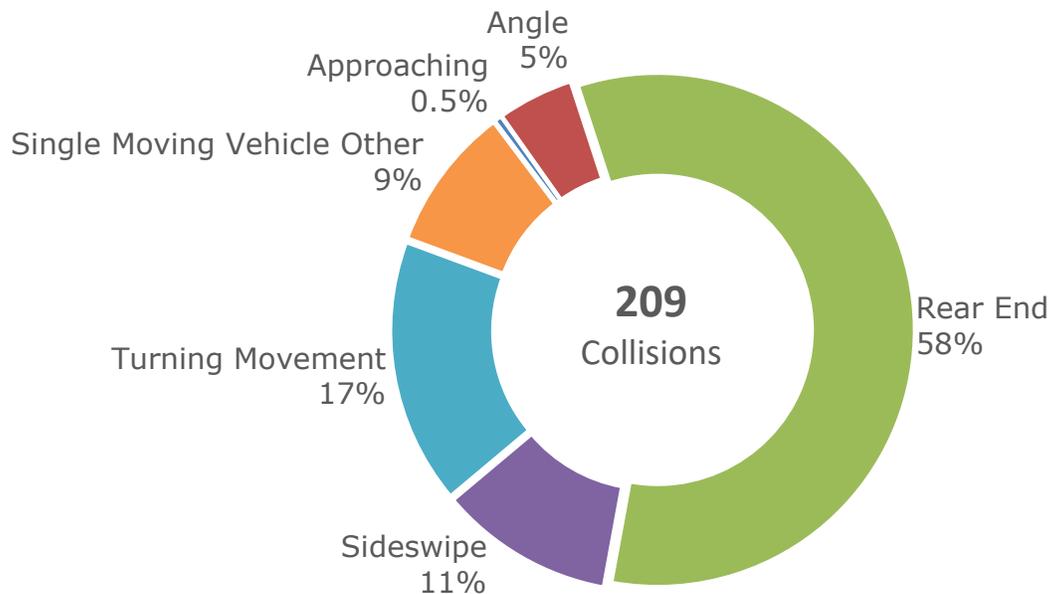
A speed limit assessment was undertaken using Transportation Association of Canada methodology and considering the character of the corridor, to determine if the speed limit should be reduced. The findings indicated that a reduced 50km/h speed limit is supportable for the corridor, and that compliance measures and monitoring may be required.

A total of 209 collisions occurred in the five-year study period, of which 174 were classified as property damage only (least severe), 35 were classified as non-fatal injuries, and none were classified as fatal injuries (most severe).

Exhibit 5-1 presents the distribution of collisions by initial impact type. The most common impact type was rear-end collisions, which is expected for a major arterial road with higher operating speeds and frequent intersections and accesses. Correspondingly, 43% of all rear-end collisions occurred between major intersections (i.e. midblock) because of turns to and from driveways or non-signalized intersections.

The second most common impact type was turning movement collisions. The highest portion of turning movement collisions occurred at the signalized intersection at Arkell Road (31%), at the signalized intersection at Edinburgh Road (20%), and along the segment of Gordon Street between Heritage Drive and Lowes Road (14%).

Exhibit 5-1: Impact Type



Providing for either a two-way left-turn lane or centre median can help reduce the number of collisions, in particular rear-end collisions, and improve overall safety. The results of the safety analysis also indicate, at Heritage Drive and Gordon Street intersection, improvements can be made by removing the median in the west approach to accommodate sufficient swept paths. At the Lowes Road and Gordon Street intersection, lane configuration can be modified in the west approach by pavement marking to ensure sufficient swept paths. The safety assessment also recommends that the bus stop at Gordon Street and Arkell Road intersection be relocated further downstream to minimize queueing conflict, likely reducing rear end collisions.

There are also safety concerns for pedestrians and cyclists at the following intersections:

- Gordon Street and Edinburgh Road: there are safety concerns relating to the location of the crosswalks, which are positioned on two separate driveways which may cause conflict and confusion between pedestrians and egressing vehicles. The stop bar and crosswalk locations were reviewed during the design.
- Gordon Street and Arkell Road: all five of the collisions that resulted in injury involved a left-turn movement from Gordon Street, including one collision causing injury to a pedestrian crossing with right-of-way.
- Gordon Street and Lowes Road: three of the collisions observed at this intersection resulted in injury, including one with a vehicle on Gordon Street turning right and failing to yield to a pedestrian, and one with a cyclist turning right at the same time as a vehicle with the right-of-way. There is also a higher proportion of angle collision (12%) at this intersection, suggesting a lack of obedience to traffic controls.

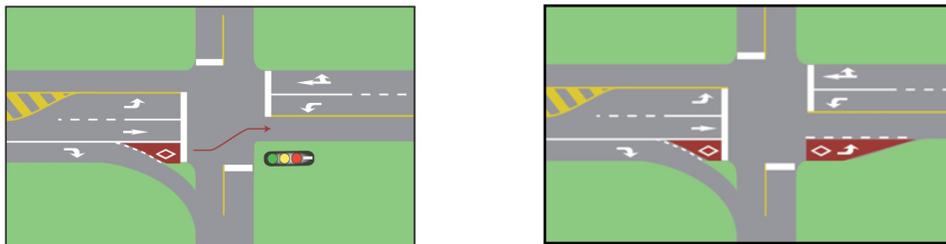
These safety concerns were considered in preparation of the preliminary design, as discussed in Section 6.

5.4 Bus operations at Gordon Street and Arkell Road

Based on discussions with City staff, Guelph Transit and input from the public, a queue jump / by-pass lane and far-side bus bay were considered at the Arkell Road intersection, on the east side of Gordon Street for northbound buses.

Queue jump lanes are typically dedicated bus-only lanes with a transit signal that give early green phasing to buses.¹ This allows transit vehicles to proceed through an intersection ahead of general traffic, thereby improving transit service. Queue by-pass lanes are similar to queue jump lanes, with the exception of having a receiving lane on the far side of the intersection. A queue jump lane plus a far-side bus stop in a dedicated bus bay may improve transit operations if buses can pass through the intersection during the green phase. **Exhibit 5-2** below provides an illustration of both queue jump lane and queue by-pass lane.

Exhibit 5-2: Queue Jump Lane (left image) & Queue By-Pass Lane (right image)



Source: TAC Guidelines for Planning and Implementation of Transit Priority Measures (2012)

A northbound queue jump/ by-pass lane for buses at Arkell Road should be considered, to address the high volume of transit riders (largely from the student residence at 1291 Gordon Street) and available ROW for two bus spaces. Consideration of this improvement would be subject to further consultation and review with the City and Guelph Transit and is dependent on the location of the future bus stop.

5.5 Recommended Operational Improvements

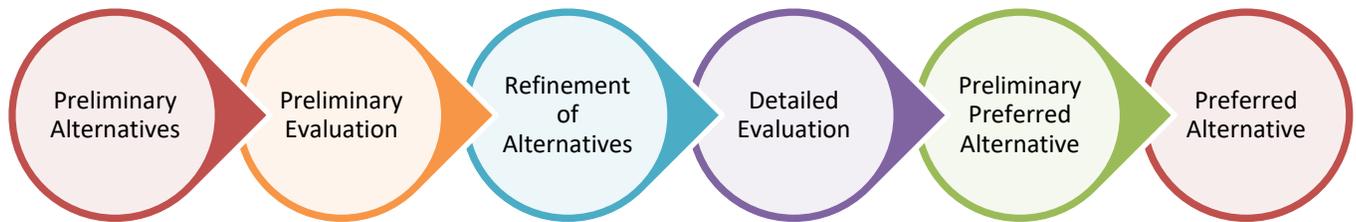
Based on the analysis completed, the Traffic Operations and Safety Analysis Report recommends the following improvements:

- Two-way left-turn lane on Gordon Street from Edinburgh Road to Lowes Road;
- Lengthen cycle length to 120 seconds for Gordon Street at Edinburgh Road and Gordon Street at Arkell Road for a.m. and p.m. peak hours;
- Provision for dedicated northbound right-turn lane at Gordon Street at Arkell Road; and
- Consider queue jump/by-pass lanes at northeast corner of Gordon Street and Arkell Road intersection with space to accommodate two standard buses.

¹ "Guidelines for Planning and Implementation of Transit Priority Measures", Transportation Association of Canada, November 2012.

6 Alternative Solutions

Alternative solutions to address the study purpose and objectives (**Section 6.1**) were developed and varied in scale. These alternatives then went through a six-stage process to arrive at the preferred solution.

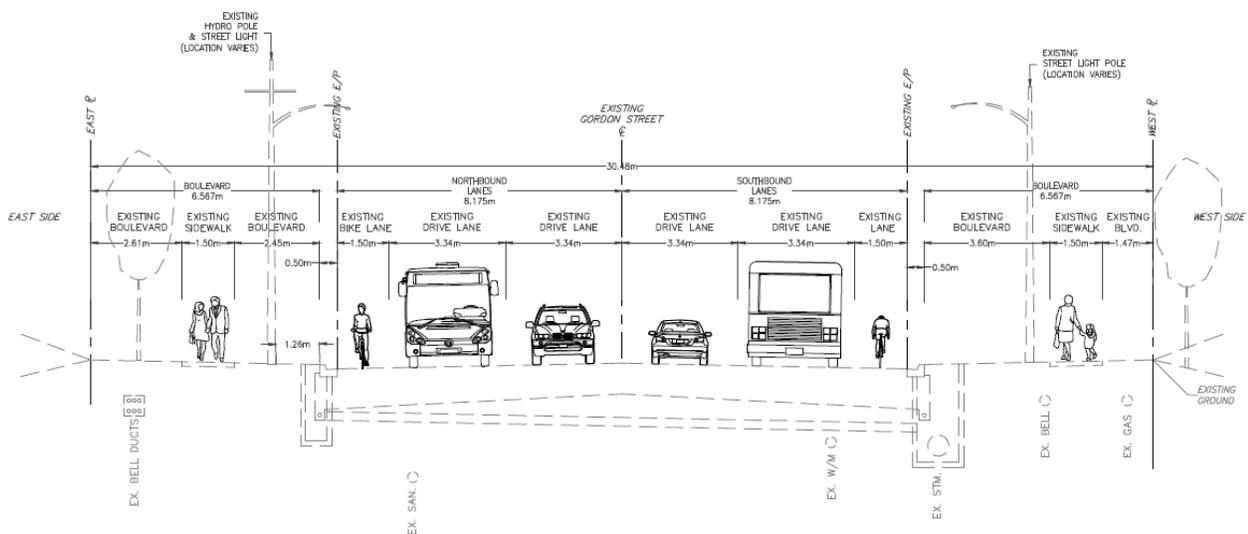


6.1 Preliminary Alternatives

Five preliminary alternative solutions were developed for Gordon Street in cooperation with City staff, and presented to the public at PIC #1 (discussed in **Section 3.2**):

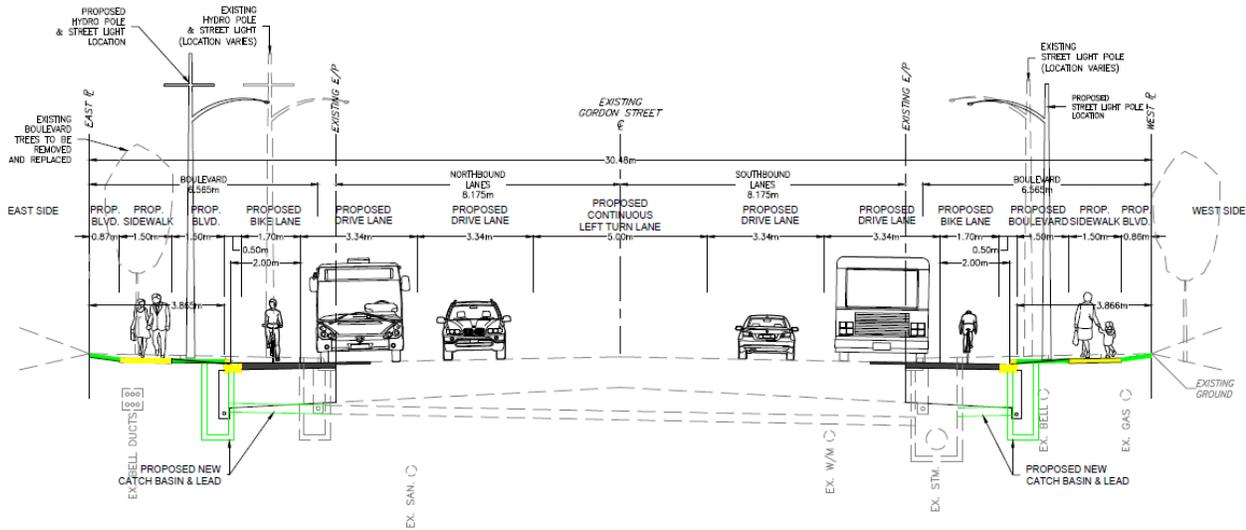
Option 1 - Do Nothing - Maintain Existing Conditions

This alternative solution identifies what would happen if no measures to improve the corridor are implemented. This alternative is considered in order to provide a baseline to which other alternative solutions may be evaluated.



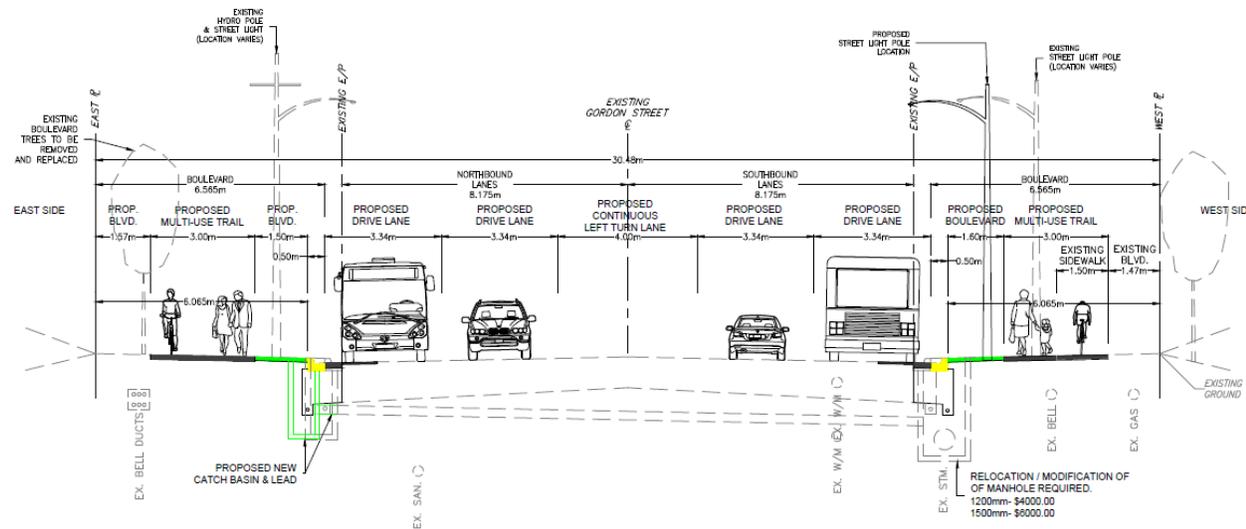
Option 2 – Widen equally about existing centreline with a 5m two-way left-turn lane

This alternative solution involves widening Gordon Street equally about the existing centreline. A 5m continuous two-way left-turn lane is proposed to manage traffic flow and increase safety for users. On-road bike lanes are included in each direction. Sidewalks are proposed in boulevards, measuring 1.5 m, to address walkability. This alternative has a proposed cost of \$1,010/m.



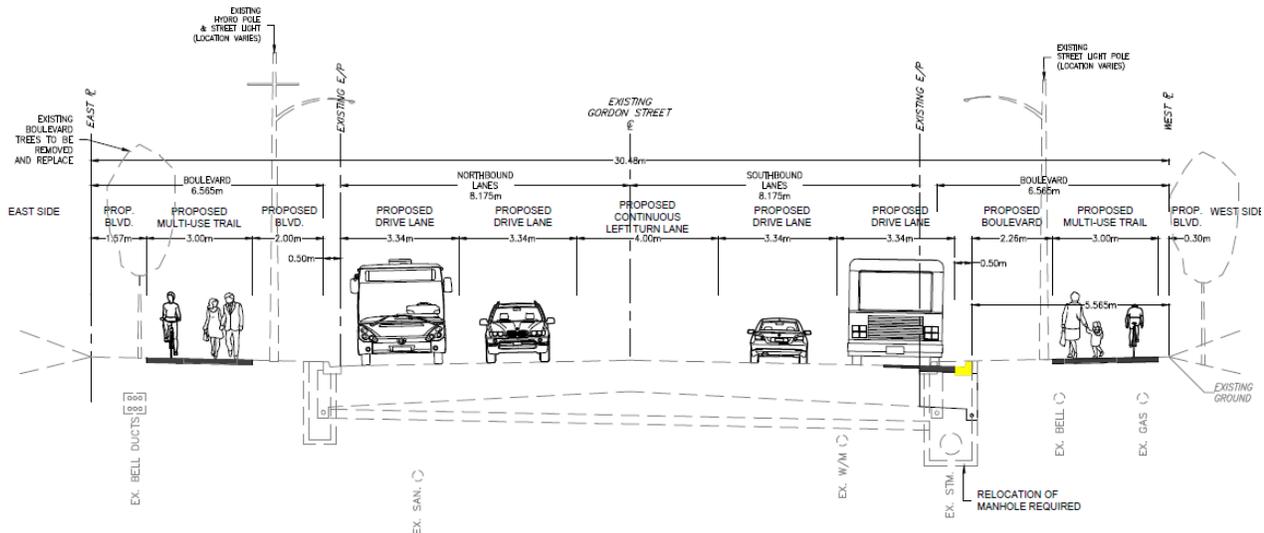
Option 3 – Widen equally about existing centreline with a 4m two-way left-turn lane and 3m multi-use-paths

This alternative also involves widening Gordon Street equally about the existing centreline. The proposed continuous two-way left-turn lane would be 4m wide with no on-road bike lanes included. Instead, a 3m asphalt multi-use-paths in the boulevards in each direction is proposed. This option physically separates cyclists from vehicular traffic. This alternative has a proposed cost of \$955/m.



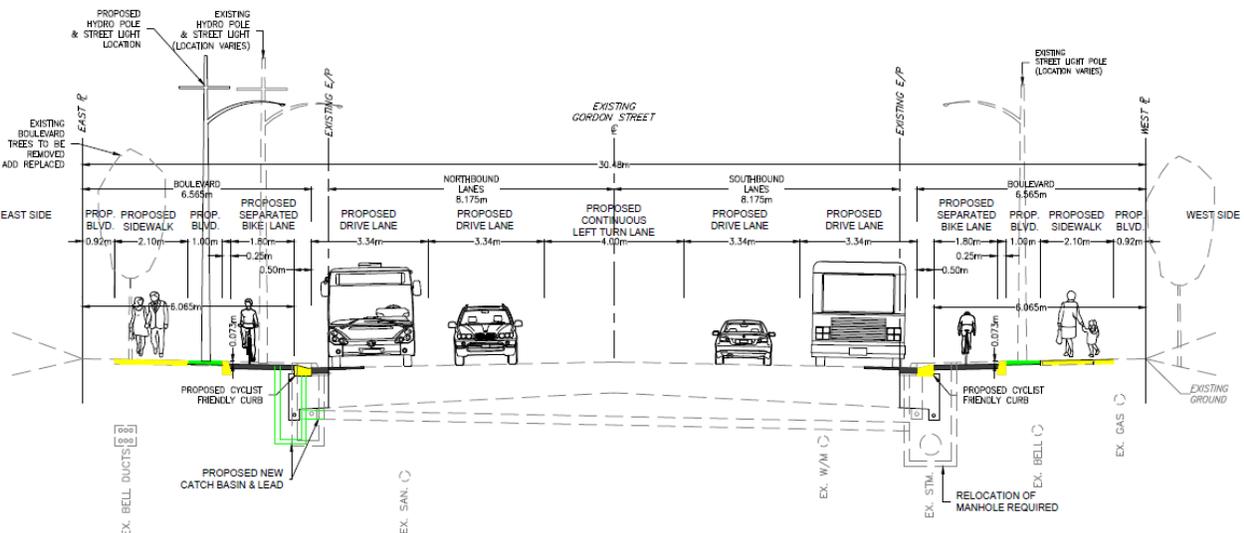
Option 4 – Widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths

Similarly, this alternative widens Gordon Street to introduce a 4m continuous two-way left-turn lane, but only involves widening the road on the west side. Multi-use-paths at 3m wide are proposed in each direction in the boulevards, separating pedestrians and cyclists from vehicular traffic. This alternative has a proposed cost of \$760/m.



Option 5 – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m separated bike lanes

This alternative proposes to widen Gordon Street about the existing centreline, introducing a 4m continuous two-way left-turn lane. The difference with this option is the inclusion of 1.8m separated bike lanes and 2.1m sidewalks within the boulevard. This option physically separates cyclists and pedestrians from each other and from vehicular traffic. This alternative has a proposed cost of \$1,036/m.



6.2 Preliminary Evaluation

A preliminary evaluation was completed following PIC# 1 to eliminate alternatives that would not be feasible. The following alternative was eliminated due to the reasons noted:

Option 1 – Do nothing

The **Do Nothing option was eliminated** from further consideration because:

- It does not address the study objectives or problem / opportunity.
- It does not provide improvements to turning and collision concerns.
- It was not favoured by the public responding to PIC #1.

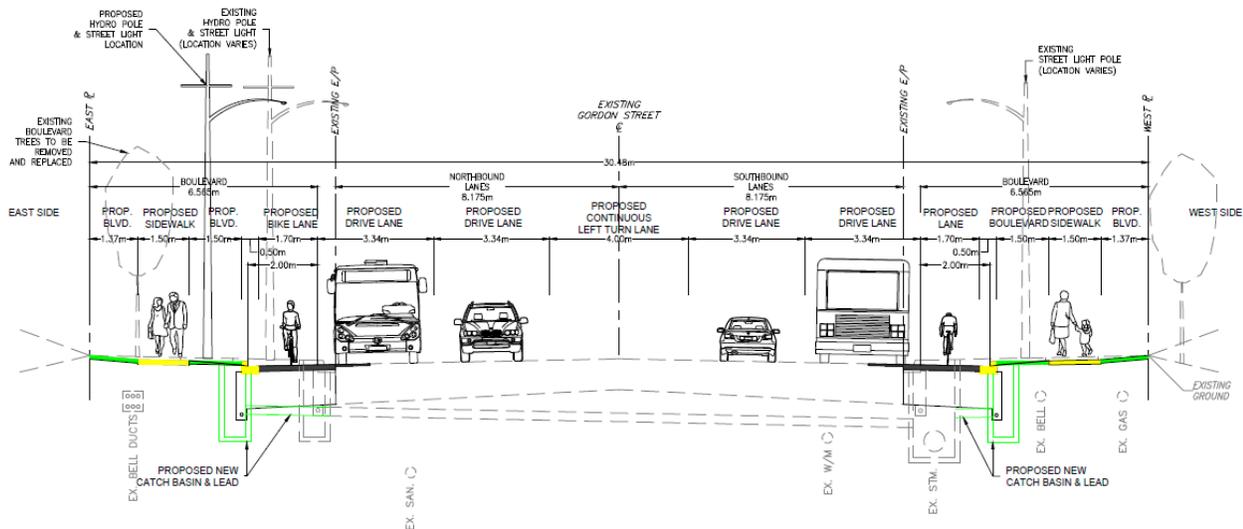
6.3 Refinement of Alternatives

Two additional alternative solutions were developed to account for:

- Input received at PIC #1, and from the City and stakeholders.
- The desire for additional considerations for active transportation.

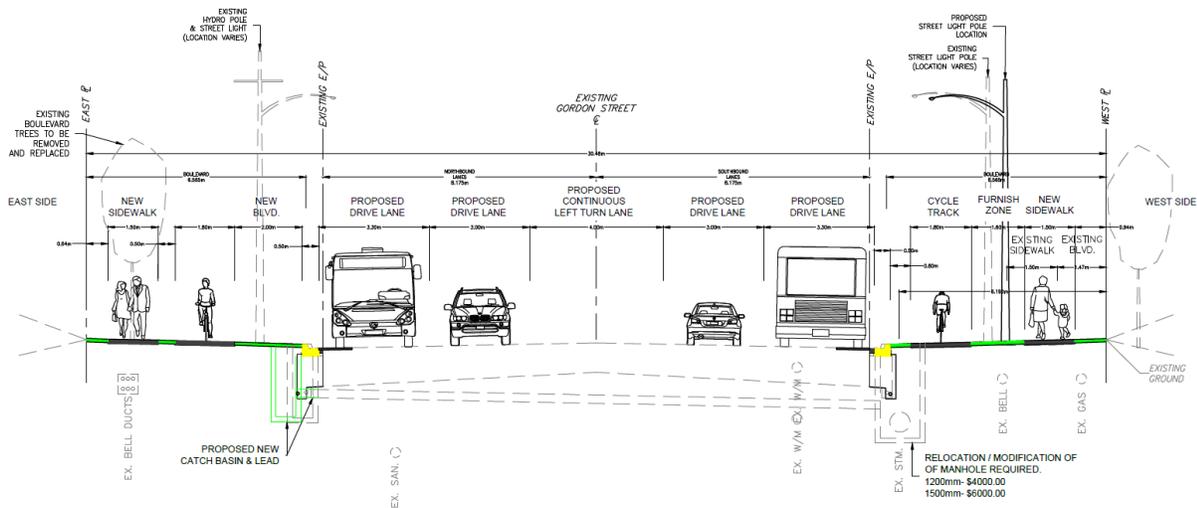
Option 1 – Widen equally about existing centreline with a 4m two-way left-turn lane

This alternative solution involves widening Gordon Street equally about the existing centreline. A 4m continuous two-way left-turn lane is proposed to manage traffic flow and increase safety for users. On-road bike lanes are included in each direction. Sidewalks are proposed in boulevards, measuring 1.5 m, to address walkability. This alternative has a proposed cost of \$925/m. **This option was carried forward in lieu of the "Do Nothing" Option at PIC#2.**



Option 6 – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m off-street cycle tracks

The alternative proposes to widen Gordon Street about the existing centreline, introducing a 4m continuous two-way left-turn lane. The difference with this option is the inclusion of 1.8m off-street cycle tracks and 2.1m sidewalks within the boulevard. This option physically separates cyclists and pedestrians from each other and from vehicular traffic but moves cyclist further away from vehicular traffic than Option 5. This alternative has a proposed cost of \$797/m.



6.4 Detailed Evaluation

6.4.1 Alternatives for Detailed Evaluation

Following the preliminary refinement and evaluation discussed in **Sections 6.3** and **6.2**, respectively, the following alternatives were included in the detailed evaluation:

- **Option 1** – Widen equally about existing centreline with a 4m two-way left-turn lane
- **Option 2** – Widen equally about existing centreline with a 5m two-way left-turn lane
- **Option 3** – Widen equally about existing centreline with a 4m two-way left-turn lane and 3m multi-use-paths
- **Option 4** – Widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths
- **Option 5** – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m separated bike lanes
- **Option 6** – Widen equally about existing centreline with a 4m two-way left-turn lane and 1.8m off-street cycle tracks

6.4.2 Detailed Evaluation Criteria

A set of detailed criteria were developed to evaluate the potential impacts of each alternative on the surrounding environment, including considerations identified at PIC #1

(Section 3.2). Exhibit 6-1 presents a summary of the guide used to define scores for each criterion from zero (least preferred) to four (most preferred).

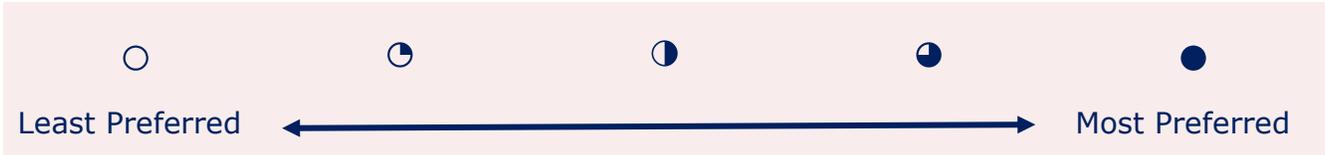


Exhibit 6-1: Detailed Evaluation Criteria

Criteria	Sub-Criteria	Least Preferred	Most Preferred
Traffic Capacity, Operations and Safety 	Traffic Level-of-Service	Increased congestion	Reduced congestion
	Safety	No improvement to safety for users	Improved safety for all users
	Access Management	More difficulty accessing driveways and side roads	Improved access to driveways and side roads
	Transit	Loss of transit service, reduced access to transit stops, potential conflicts with other road users	transit service and access to transit stops maintained or enhanced, reduced conflicts with other road users
	Cycling	No improvement to existing facilities	Separated cycling facilities and pedestrian space
	Pedestrians	Loss of pedestrian space	Separated pedestrian space maintained
	Emergency Services	Increase to emergency response time	Potential reduction in emergency response time
Natural Environment 	Aquatic Species and Habitat	Significant impact to aquatic species or habitat	No impact to aquatic species or habitat
	Terrestrial Species and Habitat	Significant impact to terrestrial species or habitat	No impact to terrestrial species or habitat
	Floodplain	Expansion or construction in floodplain area	Improvements to floodplain storage
	Wetlands	Loss of or impact to wetlands	No loss of, or impact to, wetlands
	Trees and Landscaping	Loss of existing trees and landscaping	Improvements to trees and landscaping
	Wildlife	Significant impact to Species at Risk	Improvements to conditions for Species at Risk
	Contamination	Exposure of contaminated materials	Avoidance of contaminated materials
Socio-Cultural Environment 	Cultural Heritage and Archaeology	Loss or impact to cultural heritage or archaeological sites	No impact to cultural heritage or archaeological sites
	Culture and Recreation	Loss or impact to cultural or recreational facilities	No impact to cultural or recreational facilities
	Businesses	Reduced access to businesses	Improved access to businesses
	Construction	Lengthy construction period with traffic delays and reduced access	Limited construction duration, traffic delays and access restrictions
	Streetscaping	Loss of Streetscaping space and elements (e.g. plantings, decorative paving materials, decorative streetlights)	Improvements to streetscaping elements (e.g. plantings, decorative paving materials, decorative streetlights)
	Air and Noise	Increased air and noise emissions	Reduced air and noise emissions
	Private Property	Avoidance of impacts to, or need for, private property	Need for private property
Economic Environment 	Utility Relocation – Above Ground	Large number of relocations	No relocations
	Utility Relocation – Underground	Large number of relocations	No relocations
	Capital Costs	Higher cost	Lower cost
	Operation and Maintenance Costs	Higher cost	Lower cost
Public Opinion 	Public Preference	Low preference	High preference

6.4.3 Detailed Evaluation of Alternatives

A detailed evaluation of the six alternatives was completed using the criteria identified in Section 6.4.2, and is included in **Appendix D**. The following are the findings of the detailed evaluation.

Different members of the public and groups had varying interests, with potentially different weights for each of the criteria. To provide a fair and balanced evaluation, a neutral weighting method was used.

Traffic Capacity, Operations and Safety

- Traffic Volumes
 - All 6 Options provide efficient and safe movement of current and future traffic volumes.
 - The two-way turning lane and increased storage lengths reduce the overall through lane congestion during the peak periods by reducing the potential for turning lane queues extending into through traffic lanes.
 - Additional signal timing optimization will further improve intersection operations for all options.
- Traffic Circulation
 - All 6 Options offer improved safety.
 - The two-way turning lane allows for more efficient turning to and from adjacent properties, reducing the potential for collisions.
 - Increased storage lengths for turning vehicles will reduce amount of turning vehicles stopping in through traffic lanes, reducing the potential for rear-end collisions.
 - Road surface conditions along the corridor will be improved by all options as a result of new pavement placed during widening/reconstruction.
- Access Management
 - All 6 Options maintain full left and right turn access
 - The two-way turning lane offers improved access for vehicles turning to and from adjacent properties.
- Transit
 - Options 3 and 4 offer the best performance, with transit service maintained and cyclists moved off-street, behind bus stops.
 - Options 1 and 2 maintain transit service, but the roadside is shared with cyclists, leading to potential conflicts with transit vehicles, as well as boarding and alighting transit riders.

- Options 5 is similar to Options 1 and 2, but also potentially limits access to transit stops. Guelph Transit has identified these as their least preferred options, as access to transit stops is a noted concern.
- **Cycling**
 - Options 5 and 6 offer the best performance, with cycling facilities separated from vehicular traffic and pedestrians. Options 3 and 4 follow as next preferred but are shared with pedestrians which is a concern to the cycling community.
 - Options 3 and 4 are less preferred than Options 5 and 6, as they provide cycling facilities that are separated from vehicular traffic only and shared with pedestrians.
 - Options 1 and 2 retain on-road cycling facilities, not separated from vehicular traffic, and are the least preferred as a result.
- **Pedestrians**
 - Options 1, 2, 5 and 6 provide separated sidewalks and offer the best performance for pedestrians.
 - Options 3 and 4 provide shared pathways which accommodate both cycles and pedestrians and satisfy the spatial limitations in the corridor but are less preferred than separation from cyclists.
- **Emergency Services**
 - All 6 Options offer potential for improved response times, with reduced conflicts and use of the two-way turning lane as an emergency bypass.

Natural Environment

- **Aquatic Species and Habitat**
 - There are no existing watercourses, culvert crossings or bridges in the Study Area.
- **Terrestrial Species and Habitat**
 - None of the options are anticipated to impact significant woodland areas or vegetation communities.
 - Vegetation removal will be limited to cultural woodland or cultural thicket communities for all options.
- **Wetlands**
 - A 20m wide Ecological Linkage has been preserved across multiple properties, connecting the Torrance Creek Swamp and Hanlon Creek Swamp PSWs, spans Gordon Street north of Arkell Road. Two City-mapped Deer Crossing locations are identified for Gordon Street: one in line with the Ecological Linkage and one just south of the Edinburgh Road intersection. Although the project is in close proximity to the wetlands

there are no direct or indirect impacts anticipated as a result of any of the options being considered.

- Contamination
 - There are no known contaminated lands affected by any of the options.
- Wildlife
 - Two City-mapped Deer Crossing locations are identified for Gordon Street: one in line with the Ecological Linkage and one just south of the Edinburgh Road intersection.
 - All options include minor pavement widening at the existing deer crossing.
 - All options carry with them the opportunity to add deer crossing advanced warning provisions (advanced signs and seasonal flashing beacons) as an enhancement.
- Floodplain
 - No impacts to the floodplain are anticipated for any of the options.
- Trees and Landscaping
 - Trees along the road side are generally in poor condition due to salt from winter road maintenance.
 - Option #6 was preferred due to the fewest number of estimated tree removals (4).
 - All 6 options require some tree removal, as summarized in **Exhibit 6-2** and the Environmental Impact Statement provides additional elaboration on the treatments to be applied to tree maintenance, re-planting and maintenance during and post construction.

Exhibit 6-2: Expected Number of Trees to be Removed and Replaced

Option	1	2	3	4	5	6
Trees Removed and Replaced	8	16	11	14	21	4

- Drainage
 - All 6 options are similar:
 - No storm water management (SWM) ponds will be included or affected for any of the options.
 - All 6 options will consider the use of oil/grit separators during detailed design.
 - All 6 options will consider measures to reduce runoff during detailed design.

Social Environment

- Cultural Heritage and Archaeology
 - No impacts on matters of heritage interest are anticipated for any of the options.
- Culture and Recreation
 - No impacts to cultural or recreational facilities are anticipated for any of the options aside from possible positive enhancements to the pedestrian and cyclist experience in the study area.
- Businesses
 - All 6 options will have similar temporary access impacts during construction.
- Streetscaping
 - All 6 Options offer an opportunity for streetscaping enhancements within the designated road allowance, which could include plantings, decorative surfaces and paving materials, decorative streetlights, etc.
- Construction
 - All 6 options will have similar impacts, expected to be completed in three stages (between major intersections), each approximately three months in length. Traffic will be maintained by constructing one side at a time (i.e. west side, then east side, or vice versa), while maintaining traffic on existing pavement or newly constructed pavement.
- Air and Noise
 - All 6 Options will reduce traffic delays and related vehicle idling, resulting in reduced local exhaust emissions.
 - All 6 Options include road widening, which over time will result in increased traffic accommodation, and consequently resulting in marginal increases in traffic volumes that may cause a limited increase in noise levels (1 to 2 dB).
- Private Property
 - All 6 Options require private property to accommodate the minor widening, displacing sidewalk, or dedicated cycling facilities thus encroaching on adjacent lands and the dedicated right turn lane storage and taper at the southeast corner of Gordon and Arkell.
 - Options 1 and 4 will require the least amount of private property to be acquired. **Exhibit 6-3** summarizes the property requirements for each option.

Exhibit 6-3: Private Property Requirements

Option	Total Area*	Locations
1	190 m ²	1354, 1417, 1419, 1448 Gordon Street, Southeast corner at Lowes, Solstice Condos.
2	414 m ²	1354, 1388, 1408, 1417, 1419, 1448 Gordon Street, Southeast corner at Lowes, Solstice Condos.
3	254 m ²	1354, 1388, 1417, 1419, 1448 Gordon Street, Southeast corner at Lowes, Solstice Condos.
4	218 m ²	1354, 1417, 1419 Gordon Street, Southeast corner at Lowes.
5	369 m ²	1354, 1388, 1408, 1448 Gordon Street and Southeast corner Lowes, Solstice Condos.
6	445 m ²	1354, 1388, 1408, 1417, 1419, 1448 Gordon Street, Southeast corner at Lowes, Solstice Condos.

*Total areas are approximate.

Costs

- Utility Impacts
 - Options 1 and 4 will require the least number utility relocations. **Exhibit 6-4** summarizes the estimated number of relocations that will be required for each option.

Exhibit 6-4: Estimated Number of Utility Relocations

Utility	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Hydro/ Communication	19 poles	23 poles	14 poles	9 poles	20 poles	12 poles
Traffic Signal	7 poles	11 poles	9 poles	11 poles	9 poles	8 poles
Street Light	11 poles	21 poles	14 poles	22 poles	15 poles	16 poles
Underground	No significant impacts to existing underground utilities anticipated, other than many minor relocations, adjustments to manholes, etc.					

* All values are approximate.

- Initial Capital Costs
 - Option 4 offers the lowest capital roadway construction cost at approximately \$2.1 million. The total construction costs plus engineering and City costs is higher by the same relative proportions for all options. The estimated capital costs are provided in **Appendix E**, and summarized in **Exhibit 6-5**.

Exhibit 6-5: Estimated Capital Costs*



* Property costs were refined further through consultation with the City prior to study completion and resulted in marginally higher costs than those presented at PIC#2. Final cost estimates include a 25% allowance for design engineering, approvals and construction contingencies.

- Operation and Maintenance Costs

- Operation and maintenance costs account for snow removal, pavement repairs and landscaping, and are dependent on the surface area to be maintained, and if facilities are separated/require separate snow plowing operations. **Exhibit 6-6** presents a schematic of the distribution of paved vs landscaped widths for each option.
- Option 1 has smallest increase in total roadway hard surface width and is expected to have the lowest maintenance and operation costs.
- Option 6 has additional costs due to the bike and pedestrian facilities being separated from each other and the roadway.

Exhibit 6-6: Surface Type Distribution



Exhibit 6-7 summarizes the findings of the detailed alternative evaluation, identifying the best performing alternative for each sub-criterion.

Exhibit 6-7: Summary of Detailed Alternative Evaluation

Criteria	Sub-Criteria	Do Nothing*	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
 Traffic Capacity, Operations and Safety	Traffic Level-of-Service (Existing Traffic)	○	●	●	●	●	●	●
	Traffic Level-of-Service (Future Traffic)	○	●	●	●	●	●	●
	Safety	○	●	●	●	●	●	●
	Access Management	○	●	●	●	●	●	●
	Transit	○	○	○	●	●	○	○
	Cycling	○	○	○	●	●	○	○
	Pedestrians	○	●	●	○	○	●	●
	Emergency Services	○	●	●	●	●	●	●
	Traffic Capacity, Operations and Safety Score			26	26	29	29	26
 Natural Environment	Aquatic Species and Habitat	●	○	○	○	○	○	○
	Terrestrial Species and Habitat	●	○	○	○	○	○	○
	Floodplain	●	○	○	○	○	○	○
	Wetlands	●	○	○	○	○	○	○
	Trees and Landscaping	●	●	○	○	○	○	●
	Wildlife	○	○	○	○	○	○	○
	Contamination	●	○	○	○	○	○	○
	Drainage	●	●	●	●	●	●	●
	Natural Environment Score			19	18	18	18	17
 Socio-Cultural Environment	Cultural Heritage and Archaeology	●	○	○	○	○	○	○
	Culture and Recreation	●	○	○	○	○	○	○
	Businesses	○	○	○	○	○	○	○
	Construction	●	○	○	○	○	○	○
	Streetscaping	●	○	○	○	○	○	○
	Air and Noise	○	○	○	○	○	○	○
	Private Property	●	●	○	●	●	○	○
	Socio-Cultural Environment Score			16	13	15	16	11
 Economic Environment	Utility Relocation – Above Ground	●	●	○	○	●	○	○
	Utility Relocation – Underground	●	○	○	○	○	○	○
	Capital Costs	●	○	○	●	●	○	●
	Operation and Maintenance Costs	●	●	●	○	○	○	○
	Economic Environment Score			12	6	9	11	5
OVERALL SCORE		68	73	63	71	74	59	62
 Public Opinion	Public Preference	○	○	○	●	●	○	Not presented

Top Overall Score

Legend

* The Do Nothing alternative was screened out (as discussed in Section 6.2), and has been included here as a baseline reference for the detailed evaluation of the other alternatives.

○ ○ ○ ● ● ● ● ●

Least Preferred ← → Most Preferred

Top Score

6.5 Preliminary Preferred Alternative

Based on the detailed alternative evaluation, discussed in **Section 6.4**, Alternative 4 was identified as the preliminary preferred alternative, as it:

- Separates cyclists from vehicular traffic, enhancing safety and comfort;
- Moves cyclists behind bus stops, avoiding conflicts with buses and boarding or alighting passengers;
- Has limited social environment impacts;
- Has the second least amount of private property impacts;
- Requires the least number of utility relocations;
- Has the lowest capital cost; and,
- Was the most preferred by the public at PIC #1, aligning with the evaluation.

6.6 Preferred Alternative

As discussed in **Section 3.3**, the preliminary preferred alternative (Option 4) was presented to the public at PIC #2, and there was a high level of support (approximately 70%) for this alternative.

Option 4 has also been presented to, and is supported by, City of Guelph staff.

As a result, the **preferred design alternative is Option 4 – Widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths**. The total capital cost of this option is estimated to be \$2.7 million.

6.7 Additional Recommended Improvements

During the course of the study other potential improvements were identified. These improvements have been examined for the preferred alternative, as additional refinements. The following provides a summary of additional recommended improvements with notes describing further work during detailed design or additional study that is required:

- Include centre medians near intersections for traffic signal infrastructure and to minimize turning conflicts.
- Reduce speed limit on Gordon Street to 50 km/h within the Study Area and consider similar reductions beyond the Study Area and/or signage indicating the change.
- Include a northbound right turn lane at Arkell Road combined with a northbound queue jump/by-pass lane for buses at Arkell Road, creating a possible transit priority function during peak periods.
- Improve the Heritage Drive intersection geometry with the following modifications:
 - Heritage Drive – replace the existing median island with new pavement markings that sets the eastbound left-turn lane stop bar further back from the intersection, providing an improved turning radius for northbound to westbound left turns

- Southside Plaza north driveway – realign the driveway to match improvements on Heritage Drive and line up the through lanes.
- Improved intersection design for pedestrian and cyclist crossings to make protected intersections.
- Consider a pedestrian crossover near Vaughan Road, or as a minimum, the provision of underground conduits and footings for future pedestrian crossover signal poles.
- Consider placement warning signage on each side of the deer crossing locations to warn drivers and reduce potential deer mortality.
- Consider the use of oil/grit separators where suitable along the corridor.
- Consider LID enhancements where space and conditions allow.
- Consider measures to reduce runoff through the selection of surface materials, and consideration of stormwater flow controls/storage where suitable along the corridor.
- Consider streetscaping enhancements within the designated road allowance, such as plantings, decorative paving materials, decorative streetlights, etc.
- Complete additional traffic signal timing optimization to improve intersection operations.
- Consider effective ways to separate cyclists and pedestrians such as providing a 0.5m buffer, using different pavement materials for cycle paths and sidewalks, and designing wider cycle paths where possible.

Improvements and enhancements to be revisited during the detailed design stage of the project will closely follow this Class EA study, with the final detailed design presented to the public before construction.

7 Environmental Impacts, Mitigation and Commitments

7.1 Natural Environment

The following sections are based on the findings of the EIS and TIPP, included in **Appendix B**.

7.1.1 Aquatic

There are no watercourses or other defined drainage channels within the study area.

7.1.2 Terrestrial

Vegetation and Vascular Flora

The entirety of the reconstructed infrastructure will be located within the existing right-of-way limits. Therefore, no direct impacts to existing natural features, including the adjacent Significant Woodland and PSW features, will occur.

The planned undertaking will require construction encroachment into the 30m PSW buffer and slightly into the 10m Significant Woodland buffer, which represent components of the Significant Natural Area. Specifically, the construction limit will extend 5.62m into the PSW buffer (comprising an area of 135m²) and will extend 1.78m into the Significant Woodland buffer (comprising an area of 29m²). However, the area of encroachment represents land that already falls within the developed Gordon Street ROW. All areas to be impacted by construction comprise manicured (mown, sodded) ground cover with planted street trees. No federally, provincially or regionally significant vegetation species will be negatively impacted.

The Significant Woodland represented by the Scotch Pine Coniferous Plantation occurs within approximately 8m of the ROW limit in this area and is therefore also susceptible to disturbance if appropriate construction mitigations are not implemented. The PSW is further removed from the ROW and is not expected to be impacted by construction activities.

Efforts should be made to avoid unnecessary or inadvertent damage or destruction of vegetation adjacent to project construction limits. Clearly defined construction limits in the form of tree protection fencing should be established to avoid unnecessary vegetation removal where tree protection measures have been recommended in the TIPP. Tree protection fencing will take the form of paige wire fencing following the specifications outlined in the TIPP. Silt fencing can be combined with tree protection fencing where erosion and sediment control measures are also required. Where tree protection fencing is not required along construction area limits, construction limit fencing in the form of silt fencing, or otherwise brightly coloured snow fencing, should be used to delineate the work area.

Prior to any construction activities (rough grading, vegetation and tree removal), the tree protection fencing should be installed at least 1m beyond the dripline of trees to be retained, where possible, in order to protect the root systems. In areas where paved

surfaces exist, or where construction is proposed within a dripline, but an attempt is made to retain the tree, fencing may need to be adjusted to follow the edges of the paved surface or construction limit, based on specific site conditions. Mitigation measures, such as pruning, have also been recommended for specific notable trees (due to species or size) to limit damage potential to these individuals during construction.

Potential indirect impacts to natural features and wildlife may also arise from noise, vibrations, human presence, dust and artificial lighting associated with construction activities.

During construction activities such as vegetation clearing and grubbing, dust can potentially result in the following:

- Changes in vegetation due to increased heat absorption and decreased transpiration; and,
- Immediate visual impacts.

Impacts due to dust should be mitigated for by moistening areas of bare, dry soil with water as needed during construction activities to reduce the amount of dust produced.

Wildlife impacts resulting from dust, noise, and vibrations are expected to be temporary, minimal and localized during the road construction works. Furthermore, wildlife occupying the affected roadside areas are urban-adapted and resilient to some degree of disturbance. Significant effects on wildlife are not anticipated and it is expected that displaced wildlife species will return to the vicinity of the roadside features following construction. As deer crossing activity typically occurs between dusk and early morning periods, during which construction activity is ceased, no construction impacts on deer crossing activity are anticipated.

Trees

Of 191 trees that were inventoried within the study area, 55 are anticipated to be removed. Of the 55 anticipated to be removed, 17 are recommended for removal as a result of their poor condition and/or because they have a probable potential for structural failure, which may pose a public hazard to adjacent structures or public use of the ROW.

The remaining 38 trees require removal based on the extent of construction activities within the ROW. A total of 31 trees requiring removal are boundary trees straddling the ROW limit. Written permission from the adjacent landowners will be required before boundary trees can be removed. Eight trees that are located on an adjacent private property have been identified for removal because a significant proportion of their root zone will be impacted by the road construction work. Efforts should be made during the Detailed Design stage to retain as many adjacent private and boundary trees as possible, such as through alteration of construction limits to avoid or lessen encroachment into root zones. A total of 16 trees requiring removal are located within the ROW. In addition to City-planted street trees, some of these may be lawn-planted trees inadvertently planted by private landowners within the City ROW. None of the inventoried trees are naturally-established.

Most of the trees to be removed are in fair health with an improbable potential for structural failure. Most are young plantings and have a DBH of <20cm. However, some

of the trees identified for removal are larger, such as a 73.5cm DBH Norway Maple, a 62.2cm DBH Sugar Maple, and a 56.7cm DBH Norway Spruce. As stated above, it is anticipated that some of these large trees located outside or straddling the boundary of the ROW can be preserved through Detailed Design planning of the road improvements.

Recommendations have been provided in the TIPP to protect trees to be retained through the use of tree protection fencing. Recommended measures have also been provided in the TIPP to mitigate construction impacts to adjacent retained trees, and to inspect tree protection fencing and respond to instances of mortality or damage to retained trees.

Based on City guidelines, a total of 54 trees are to be planted in compensation for 18 trees to be removed that are not exempt from the City's compensation requirements. See Section 5.0 of the TIPP for a detailed breakdown and description of tree compensation requirements based on the preliminary design. These compensation plantings are to be established within the Gordon Street ROW to the extent feasible and will in part replace street trees requiring removal to accommodate the undertaking.

Compensation planting details will be provided within a future Landscape Plan to be provided during the Detailed Design stage. See the TIPP (NRSI 2020) for additional details of the tree removal, protection, and mitigation requirements.

The ROW roadside lands to be directly impacted are manicured and do not provide important habitat functions. The planned undertaking will not negatively impact local wildlife species or populations.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs and young, or avoidance of the area by breeding adults. Vegetation clearing should therefore occur outside the bird nesting season of April 1-August 31 so as to limit disturbances to nesting activities of birds and to avoid destruction of active nests.

7.1.3 Ecological Linkage and Deer Crossings

The planned undertaking will require minor widening of the right-of-way infrastructure through the two Deer Crossing locations and the Ecological Linkage. However, lands to be directly impacted are entirely contained within the existing right-of-way.

The proposed improvements include a relatively minor widening, and the location of the deer crossings are not dependent on the existence of vegetation within the right-of-way. As such, the planned construction footprint does not remove linkage habitat and is not expected to affect the likelihood of deer crossings at the two identified crossing locations in the Study Area.

Due to ongoing albeit occasional deer road crossing activity and the continual increase in adjacent land development, population density and traffic volumes, further measures are required to minimize deer-vehicle collisions. It should be noted, however, that no measures can fully eliminate the deer road crossing hazard as long as deer continue to utilize the Ecological Linkage or other crossing points for habitual east-west travel.

7.1.4 Species at Risk Habitat

Of the nine cavity trees inventoried within the Study Area, two are anticipated to require removal based on the preliminary design. It is recommended that these trees be retained as part of the Detailed Design of the road improvements, due to the potential bat roosting habitat function provided by these trees but also because they represent larger trees in fair condition. If it is determined through Detailed Design that these trees will require removal, the MECP must be consulted to confirm appropriate measures to suitably avoid impacts to SAR bats and to determine if any other measures to mitigate the habitat loss will be required.

The following measures are recommended for implementation:

Deer Crossing Signs with Seasonally-Timed Flashing Amber Light

Replacement or retrofitting of the existing deer road crossing signage with signs that incorporate a seasonally-timed flashing amber light. Each deer crossing sign should include a small sign tab that includes the text "increased hazard when flashing", or similar wording. The amber light would flash during the period(s) of peak deer movement. This could be the peak seasonal period (i.e., the rutting season of October-December), or the peak daily movement periods (i.e., 5:00pm-12:00am, 5:00am-8:00am; or 5:00pm-8:00am based on previous documentation of deer movement during overnight hours at Gordon Street (NRSI 2017)), or a combination of these seasonal and daily timing periods. Determination of appropriate period(s) may be confirmed in consultation with the MNRF. It is recommended that an amber light be used with the signs to more effectively attract drivers' attention. The use of standard passive, fixed signs without lights have limited effectiveness due to drivers becoming habituated to the presence of the sign, or drivers altogether not noticing or ignoring the sign (Hedlund et al. 2003). By having the light flash only during specific times, drivers may pay more attention to the sign and associate some significance with the fact that the light is flashing. Incorporation of the additional sign tab allows drivers to understand why the light is flashing. Consequently, the signage may be more effective at capturing drivers' attention, more drivers may take the hazard warning seriously and take responsive actions (i.e., slow down and look for deer at the side of the road).

Two of these signs should be installed: one facing southbound traffic (in place of the existing sign north of Edinburgh Road), and one facing northbound traffic (to be located south of Arkell Road at a specific location to be determined during the Detailed Design stage). These sign locations capture both Deer Crossing locations identified in the City's NHS mapping and are sufficiently set back from the crossings to allow drivers to take precautionary measures before their vehicles reach the crossings.

Reduce Speed Limit

Reducing the speed limit on Gordon Street by 10km/h to a posted limit of 50km/h between an area of approximately north of Edinburgh Road to south of Arkell Road, which encompasses the two known Deer Crossing locations. The reduced speed limit zone can correspond to the area of posted deer crossing hazard signage. A lower speed limit may provide drivers slightly more time to react to deer crossing or at the side of the road, by safely slowing down. A reduced speed limit, in combination with the existing

traffic calming effect of traffic lights at the Gordon Street/Arnell Road intersection to force speed reductions, can be an effective hazard reduction measure. However, the effectiveness of reduced speed limits can only be fully realized through periodic police enforcement.

Maintain Visibility

Ensure any planted roadside vegetation is of a low growth form and/or not densely planted at the Deer Crossing locations, to increase visibility of deer at the side of the road. This may be achieved through appropriately spacing street tree plantings within the ROW. Planted roadside vegetation should not be of a type that would attract deer to the roadside.

Public Communications

A public communications strategy can be considered by the City to educate and inform residents about the existence of Deer Crossing locations both within the Gordon Street study area and elsewhere within the city. This communication would also serve as a caution to residents to drive with care through these areas, especially during the peak deer movement periods.

7.1.5 Sediment and Erosion

During vegetation removal and site grading activities, areas of bare soil will be exposed along roadside areas which have the potential to erode during rainfall events and impact adjacent lands and vegetation. Reduced vegetation cover along the roadsides in combination with the presence of exposed soils during construction activities may also increase the potential for stormwater flow to down-slope areas, such as into the adjacent woodland and wetland features west of Gordon Street, if not appropriately mitigated. Increased stormwater surface flow and erosion processes may cause the deposition of sediments onto down-slope vegetation, ultimately causing vegetation die-back or impaired health.

Soil compaction also has potential to occur as a result of heavy machinery in the area of construction. Soil compaction can greatly reduce the permeability of soils and affect their ability to retain water during rain/snow melt events. This will result in an increase in surface water run-off which will ultimately increase the erosion potential and the amount of sediment being transported into adjacent areas.

An Erosion and Sediment Control (ESC) Plan must be developed prior to any construction activities on-site. The primary principles associated with sedimentation and erosion protection measures are to:

- Minimize the duration of soil exposure;
- Retain existing vegetation, where feasible;
- Encourage re-vegetation;
- Divert runoff away from exposed soils;
- Keep runoff velocities low; and,

- Trap sediment as close to the source as possible.

The ESC Plan should include, but not be limited to, the following measures:

- Placement of silt fencing along any construction limits that are down-gradient of construction zones and may receive sediment-laden runoff;
- Regular inspection, maintenance/repair and where necessary, replacement of damaged silt fencing;
- Operation and storage of all materials and equipment in a manner that prevents any deleterious substance from leaving the construction zone;
- Stripping and strategic placement of topsoil stockpiles, and placement of sediment control fencing around all stockpile areas; and,
- Re-vegetation of completed areas as soon as possible after construction.

7.1.6 Water Quantity and Quality Control

Stormwater drainage within the study area is not expected to change significantly between the pre- and post-development conditions. Stormwater runoff within the impervious surfaces of the ROW will be directed to storm sewers as under the current condition. However, best management practices to maximize runoff infiltration will be explored as part of the Detailed Design phase. This will include consideration of Low Impact Development (LID) measures that are most suitable given the location, capacity and desired function of the system. Factors such as underlying soil types and perviousness, and groundwater table elevations, will need to be explored to confirm the appropriate locations and types of LID systems within the right-of-way.

Nominal amounts of stormwater runoff from pervious grassed surfaces along the right-of-way edge would passively sheet flow into the adjacent natural areas west of Gordon Street and south of Edinburgh Road. The adjacent natural features occur at a lower elevation than the right-of-way. However, under the current condition, it is anticipated that the relatively small amount of runoff from the right-of-way edge would rapidly be taken up and transpired within densely vegetated meadow feature. This condition is not expected to change post-development. Therefore, hydrological inputs from the right-of-way to the adjacent natural features, including the nearby PSW, are considered negligible.

Specific water quality control measures, such as the use of additional oil-grit separators, may be proposed as part of the road improvement design, consistent with the existing condition. Additional water quality treatment potential, relative to the existing condition, may be realized through implementation of LID infiltration measures depending on the type of measure(s) proposed. Specific LID recommendations will be determined during the Detailed Design stage.

The right-of-way does not contribute significant hydrological flow to the adjacent natural features. As such, no water quality effects on the adjacent natural features are anticipated as a result of the planned undertaking.

8 Conclusions

The City of Guelph has conducted this study of Gordon Street, examining the potential to improve operations and safety through the addition of a continuous two-way left-turn lane, and improvements to walking and cycling facilities. Additional consideration is given to related transitional impacts in the stretch of Gordon Street from Edinburgh Road South, northerly to Landsdown Drive. The study was conducted as a Schedule 'B' project in accordance with the Municipal Class Environmental Assessment (Class EA) process (as amended to 2015).

Traffic volumes on Gordon Street have increased over the years and will continue to increase with ongoing redevelopment and intensification. The traffic generated by developments in other parts of the City also contribute to the increase in traffic volumes. As a four-lane cross-section, sufficient through traffic capacity exists to accommodate the anticipated redevelopment and intensification. However, there are peak hour left-turn movements that interfere and block through traffic due to lack of turning lanes at numerous driveways and insufficient storage lengths at intersections of Edinburgh Road, Arkell Road and Lowes Road.

The delays and left-turn capacity problems caused by this traffic condition can be addressed by providing a continuous two-way left-turn lane between Edinburgh Road and Lowes Road, consequently improving the mobility on Gordon Street. There is also an opportunity to make localized operational improvements and enhance the existing walking and cycling facilities.

An evaluation of six design alternatives was completed which accounted for traffic capacity, operations and safety; natural environment; socio-cultural environment; economic environment; and public opinion. The public was consulted over the course of the Class EA process, to allow for input on the evaluation.

As a result of the evaluation and input from public consultation, it was determined that the preferred design alternative is Option 4 – widen road on west side with a 4m two-way left-turn lane and 3m multi-use-paths. Option 4 was selected because it:

- Separates cyclists from vehicular traffic, enhancing safety and comfort;
- Moves cyclists behind bus stops, avoiding conflicts with buses and boarding or alighting passengers;
- Has limited social environment impacts;
- Has the second least amount of private property impacts;
- Requires the least number of utility relocations;
- Has the lowest capital cost; and,
- Was the most preferred by the public at PIC #1, aligning with the evaluation.

The recommendations of this study have been approved by Guelph City Council.

Subsequent to this study, the City will proceed with detailed design and implementation of the proposed project.

8.1 Estimated Project Costs

The overall study capital cost estimate for construction of the work associated with the **Preferred Design Alternative - Option 4** is presented in **Table 8-1**. The cost estimates are based on 2019 construction costs and subject to final agency approvals and related inflationary cost adjustments.

Exhibit 8-1: Estimated Project Costs (2019 basis)

Description	Estimated Cost (Rounded)
Road Construction (Incl. Active Transportation and Storm Sewer (CB, MH and pipe))	\$1,064,000.00
Utility Impacts (pole relocations, etc.)	\$985,000.00
Property Acquisitions (est. based on 2019 City land values)	\$118,000.00
Sub-total	\$2,167,000.00
Engineering & Contingency (25%)	\$541,750.00
Total Estimated Project Construction Cost	\$2,708,750.00

Estimates based on 2019 Construction Costs

Appendix A – Consultation Materials

Appendix B – Environmental Impact Study and Tree Inventory and Preservation Plan

Appendix C – Traffic Operations and Safety Analysis Report

Appendix D – Detailed Evaluation of Alternative Design Solutions

Appendix E – Estimated Capital Costs

Appendix F – Preliminary Design Drawings