



City of Guelph

Feasibility Study Report

Gordon Street Cycling Improvements

April 2023

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Acronyms, Abbreviations, Definitions

AAA – All Ages and Abilities

EA – Environmental Assessment

EAA – Environmental Assessment Act

EIS – Environmental Impact Study

ESA – Endangered Species Act

GCAT – The Guelph Coalition for Active Transportation

GRSPP – Grand River Source Protection Plan

km/h – Kilometres per Hour

LID – Low Impact Development

m – Metres

MCEA – Municipal Class Environmental Assessment

MECP – Ministry of the Environment, Conservation and Parks

MUP – Multi-use pathway

OHA – Ontario Heritage Act

QTN – Quality Transit Network

ROW – Right-of-Way

SAR – Species at Risk

SUE – Subsurface Utility Engineering

TMP – Transportation Master Plan

VRU – Vulnerable Road User

WHPA – Wellhead Protection Area

Executive Summary

The City of Guelph (City) retained Dillon Consulting Limited (Dillon), in partnership with Mobycon, to determine the feasibility and preferred approach to implement All Ages and Abilities (AAA) cycling facilities on Gordon Street between Clair Road and Lowes Road, and between Edinburgh Road and Waterloo Avenue. This report documents the study process, findings, the recommended conceptual design, and next steps.

This study builds on the recommendations of the 2022 Guelph Transportation Master Plan (TMP) Update, which identifies the Gordon Street study corridor as a component of the City's "Cycling Spine Network." The Cycling Spine Network will consist of AAA cycling facilities that will provide access to major destinations throughout the network and support the City's mode share target of 10 percent of all daily trips in Guelph to be made by bike.

Design options for cycling facilities were developed and assessed to determine the feasibility and preferred approach to implement AAA facilities along the corridor. Potential impacts to the natural, socio-economic, cultural, and engineered environments were considered as part of the assessment.

Based on the evaluation results, the preferred design option for Gordon Street is cycle tracks from Clair Road to Waterloo Avenue. In the 2020 Gordon Street Improvements Environmental Assessment, multi-use pathways are recommended between Edinburgh Road and Lowes Road. The project will consider the findings of this study during the detailed design stage.

The proposed works are exempt from the Ontario *Environmental Assessment Act* (EAA). Despite being exempt from the EAA, this Feasibility Study approximately followed the Municipal Class Environmental Assessment process for transparency. Accordingly, the study included consultation with agencies, Indigenous communities, stakeholders, and the public throughout.

It is recommended that improvements to the Gordon Street study corridor be staged in five phases as listed below. Timelines are dependent on funding and ability to coordinate with other capital infrastructure projects along the corridor.

1. Stone Road to College Avenue;
2. College Avenue to Royal City Park;
3. Royal City Park to Waterloo Avenue;
4. Edinburgh Road to Stone Road; and
5. Clair Road to Lowes Road.

Based on the conceptual design, the estimated capital cost to construct the project is \$25.9 million, not including property acquisition or contemplation of full road reconstruction.

Overall, minimal environmental impacts are anticipated based on the conceptual design. Potential for minor property impacts has been identified at five locations:

- South of Wellington Street (both sides);
- At the transit stop across from Albert Street;
- South of Landsdown Road (east side);
- At the transit stop north of the Pergola Commons entrance (near Tim Hortons); and
- At proposed protected intersections (Clair Road, the Pergola Commons entrance north of Clair Road, Edinburgh Road, Kortright Road, Harvard Road, Stone Road, South Ring Road, College Avenue, and Waterloo Avenue).

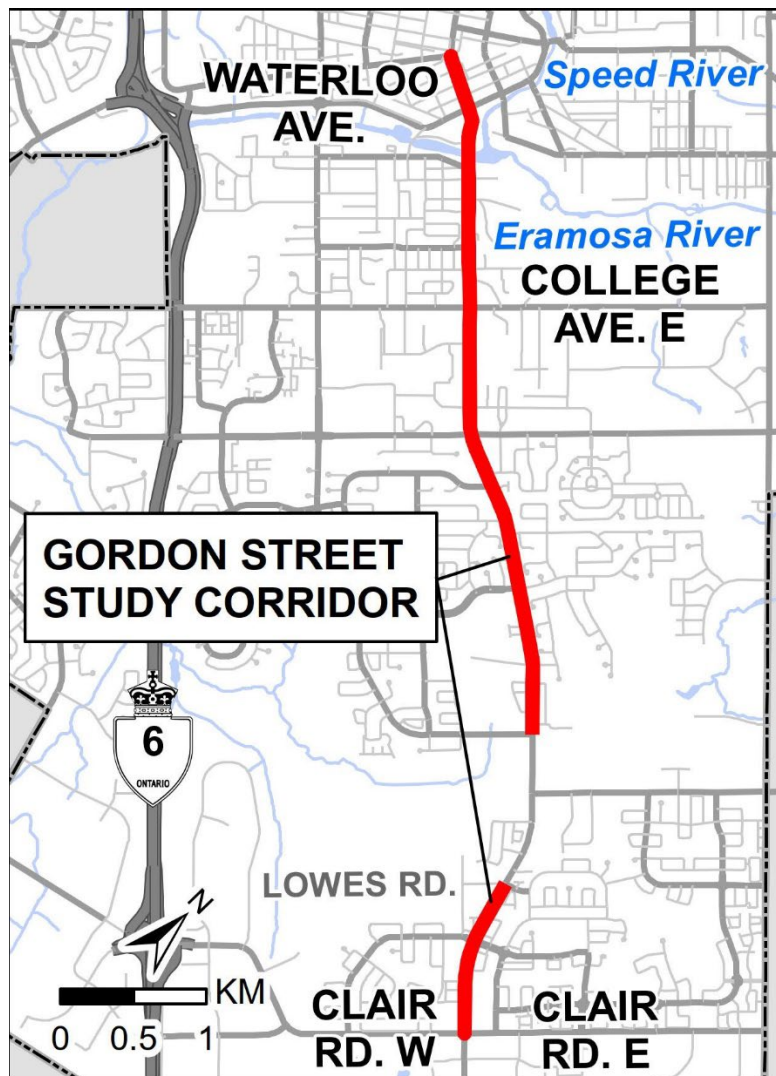
Consultation with impacted property owners should be completed during detailed design when the area of impact has been accurately determined. Other potential impacts and mitigation, as well as commitments for future studies, consultation, and anticipated approvals, are outlined in this report.

1.0

Introduction

The City of Guelph (City) retained Dillon Consulting Limited (Dillon), in partnership with Mobycon, to determine the feasibility and preferred approach to implement All Ages and Abilities (AAA) cycling facilities on Gordon Street. The study limits extend from Clair Road to Lowes Road, and from Edinburgh Road to Waterloo Avenue, as illustrated in **Figure 1**. Design of active transportation facilities between Lowes Road and Edinburgh Road was considered separately as a component of the [Gordon Street Improvements EA](#), filed in 2020.

Figure 1: Project Location



This project originates from a funding proposal to the Investing in Canada Infrastructure Program (ICIP). The original proposal put forward by the City and approved was to meet the ICIP objectives of facilitating public transit. Gordon Street is an important north-south corridor for public transit, and has been identified as part of the Quality Transit Network (QTN) in the Guelph Transportation Master Plan (TMP, 2022). Five intersecting roads have also been identified as part of the QTN: Waterloo Avenue, College Avenue, Stone Road, Edinburgh Road, and Clair Road. Cycling improvements on Gordon Street will support first/last mile connections to the many destinations along the corridor as well as intersecting public transit routes.

Gordon Street is a key transportation link within Guelph. It is part of the only continuous arterial corridor that crosses through the City's downtown, the University of Guelph, key commercial nodes, and both the most southerly and northerly limits of the City's urban boundary. The portion of Gordon Street between College Avenue to north of Royal City Park falls within the City's only heritage conservation district. Beyond the City boundaries, the roadway transitions to Highway 6, with connections to Highway 401 and Highway 403 (Hamilton) to the south and continuing to Tobermory in the north.

The Gordon Street study corridor connects a key growth area in the south end of Guelph to the downtown. The southern limit of the study corridor is Clair Road, which is identified in the City of Guelph Official Plan as a Community Mixed-Use Node. The Official Plan also identifies the portion of Gordon Street from Clair Road to Stone Road as an Intensification Corridor. North of Stone Road, the study corridor extends through the University of Guelph, another key destination. Toward downtown, the corridor connects to existing trails at the Speed River. The northern limit of the study corridor is Waterloo Avenue, which connects to existing downtown cycling facilities.

At present, cyclists are accommodated on Gordon Street with painted bike lanes that run the entire length between the south and north study limits. Given vehicular operating speeds, traffic volumes, and the number of heavy trucks and transit vehicles that operate within the corridor, these painted bike lanes are not considered appropriate for all ages and abilities of cyclists.

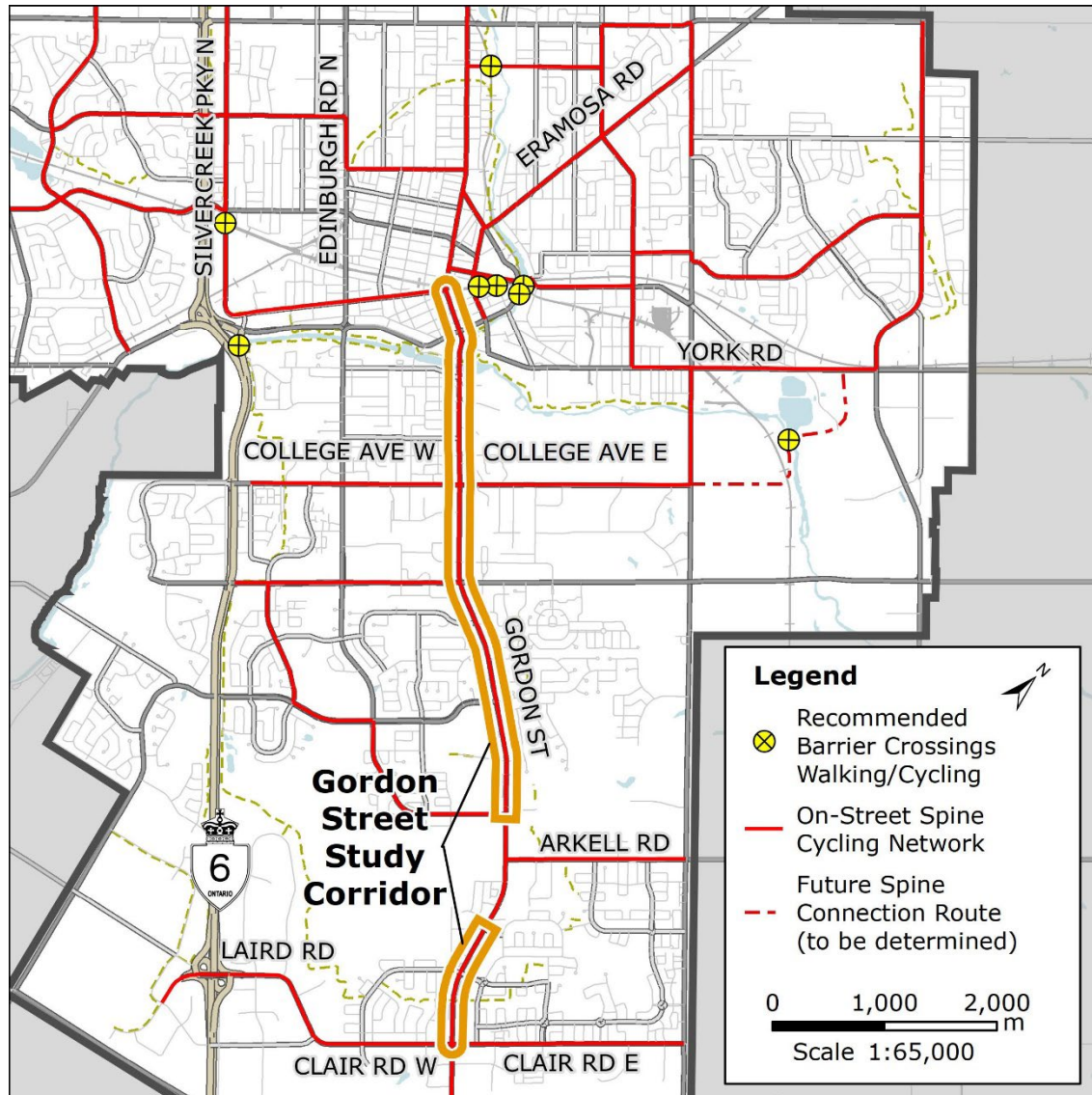
This report documents the study process used to determine whether implementation of AAA cycle facilities along Gordon Street is feasible. The study approximately followed the Municipal Class Environmental Assessment (MCEA, 2023) process, though was not subject to it. The study process included:

- An examination of the existing transportation, natural environment, socio-economic, and cultural heritage conditions;
- Development and evaluation of alternative design options;
- Consultation on a recommended design; and
- Identification of anticipated impacts, mitigation measures, and next steps.

1.1 Study Purpose and Objectives

Through completion of the 2022 Guelph TMP Update, the Gordon Street study corridor has been identified as a component of the City's priority "Cycling Spine Network" (**Figure 2**). The Cycling Spine Network consists of AAA cycling facilities that will provide access to major destinations throughout the network and support the City's mode share target of 10 percent of all daily trips in Guelph to be made by bike.

Figure 2: Cycling Spine Network and Study Corridor (adapted from Guelph TMP)



Key objectives of this study include:

- Create the foundations of a coherent, well-connected AAA cycling network;
- Determine the feasibility of providing physically separated space for all ages and abilities of cyclists on Gordon Street in a fiscally responsible way;
- Balance the needs of pedestrians, cyclists, transit users, goods movement, and drivers;
- Address the TMP goal to increase the percentage of individuals cycling throughout Guelph, with a focus on the inner suburbs and the University of Guelph area;

- Implement the Official Plan policies calling for an accessible transportation system that meets the needs of all members of the community, including safe and comfortable cycling facilities; and
- Avoid or mitigate impacts to the natural, social-economic, cultural, and built environments where possible.

1.2 Exemption from the Environmental Assessment Process

Based on the nature of the proposed works, this project is exempt from the Ontario *Environmental Assessment Act* (EAA). Under the MCEA (2023), this project is considered “reconstruction where the reconstructed road will be for the same purpose, use, and vehicular capacity, and will be at the same location as the existing road.” This type of project is exempt from the EAA in accordance with activity 21 in Appendix 1, Table A (Municipal Road Projects) of the MCEA.

At the outset of this study, it was unclear what the MCEA requirements would be, if anything. As such, the City of Guelph opted to approximately follow the MCEA planning and design process for traceability and transparency purposes. The City issued project notices and collected feedback from stakeholders and the public throughout the study.

Going forward, the City will be responsible for addressing concerns raised with respect to the project, as appropriate. The City will also be responsible for obtaining the required permits, approvals and authorizations for this project as it moves towards construction.

2.0 Consultation and Engagement

This section provides an overview of consultation and engagement completed throughout the study.

Further information on activities, comments, responses, and how feedback influenced the designs are provided in the Engagement Summary Report (**Appendix A**).

Consultation and engagement for this project was bundled with coincident projects on Eramosa Road and College Avenue through the Guelph Protected Cycling Network Study. The Engagement Summary Report documents the results for all three study corridors, including overarching feedback and comments specific to each corridor.

A detailed summary of comments received throughout the study regarding Gordon Street specifically, and how they were addressed by the project team, is provided in **Appendix B**.

2.1 Early Engagement Activities

2.1.1 Walking Workshop

A walking workshop was held with staff from key departments at the City and the consulting team to become familiar with the existing conditions of the study corridor. The workshop was held on September 27, 2021. During the workshop, staff and consultants walked key sections of the corridor and discussed challenges, opportunities, and ideas. Comments and responses regarding how they were addressed, where applicable, are outlined in **Appendix B**.

2.1.2 Key Informant Interviews

Key informant interviews were held early in the study to establish open lines of communication, answer questions, get initial feedback, and discuss the community engagement process. Interviews were held with the following key stakeholder groups:

- The Guelph Coalition for Active Transportation (GCAT; December 15, 2021);
- The University of Guelph (December 15, 2021);
- The Guelph Cycling Club (January 17, 2022); and
- The City of Guelph Accessibility Advisory Committee (February 15, 2022).

The stakeholder groups provided input regarding the study and communication methods, and offered to support with advertising engagement opportunities as well as encouraging participation. The stakeholders' primary comments can be summarized as follows:

- GCAT recommended that protected infrastructure be considered for intersections along Gordon Street, that special attention be paid to the College Avenue intersection, and that provision of a consistent facility type be considered for the entire corridor.
- The University of Guelph raised concerns about the impacts of potential widening of Gordon Street between Stone Road and College Avenue and the design of transit stops in relation to cycle infrastructure. The University also raised concerns about the potential disruptions caused by construction.
- The Accessibility Advisory Committee expressed safety concerns regarding the combination of different transportation modes including pedestrians with disabilities on multi-use pathways.

Concerns raised by the stakeholders were considered by the project team during the assessment of design options as documented in **Section 4.0**.

2.2 Routine Engagement

Notifications for this study were completed in consultation with City staff and in accordance with the typical approach for communications on MCEA studies in Guelph. While the recommended solution for Gordon Street is exempted from the EAA, the MCEA process was approximately followed for consistency and transparency.

2.2.1 Contact List

The study contact list was compiled through a screening of impacted stakeholders in consultation with City staff. The contact list is included in the Engagement Summary Report (**Appendix A**) and includes the following groups:

- Elected officials;
- Provincial ministries;
- City staff;
- Indigenous communities;

- Local agencies and institutions;
- Community and advocacy groups;
- Employment/business organizations;
- Accessibility advocates;
- Senior and youth groups;
- Immigration organizations; and
- Equity seeking groups.

Notifications were sent to the contact list to provide information and advertise opportunities to get involved as the study progressed. Notifications were also sent to individuals who signed up for the mailing list on the project webpage.

2.2.2 Social Media

The City used its social media pages on Facebook and Twitter to promote the study and notify followers about upcoming meetings and engagement opportunities throughout the study.

2.2.3 Project Webpage

A dedicated webpage for the overall Protected Cycling Network Study (including Eramosa Road, Gordon Street, and College Avenue) was hosted on the City's website (<https://guelph.ca/cyclingnetwork>). This project page contains information and communications including timelines, background documents and resources, study process and funding, and details on engagement activities. The website was updated throughout the study.

A dedicated page on the City's community engagement platform, 'Have Your Say', was also created for the study (<https://www.haveyoursay.guelph.ca/cycling-network-study>). This page served as the main hub for engagement and a one-stop location for information and communications about the study.

2.3 Notice of Commencement

A Notice of Commencement was developed to introduce the study objectives and provide an initial opportunity for engagement. The Notice included a link to the project website where recipients could find more information about the study and participate in the 'Map the Routes' survey described in **Section 2.3.1**.

The Notice of Commencement was first published in the local newspapers and posted on the project webpage during the week of December 2, 2021. The Notice was distributed to the study contact list during the week of December 2, 2021, and was re-sent to contacts not originally included in the study contact list on April 19, 2022 along with the project update newsletter (**Section 2.4**). A copy of the Notice of Commencement is included in the Engagement Summary Report (**Appendix A**).

2.3.1 Map the Routes Survey

An online survey was used early in the study to gather feedback from the community on existing challenges and opportunities for the Gordon Street corridor. The survey included an interactive map where participants could use pins to identify key destinations, safety concerns, accessibility issues, important connections, design ideas, and other comments or concerns.

The map survey was available from November 30, 2021 to January 10, 2022. A total of 206 comments regarding the Gordon Street corridor were placed on the map. Of the 206 comments, 88 were related to safety concerns, 10 were related to accessibility concerns, and 62 provided design recommendations. The remaining 46 comments responded to routing related questions. Concerns were raised regarding:

- Safety associated with the McDonald’s Entrance (17 comments);
- Right and left hook conflicts;
- Uncertainty regarding how to complete left turns at major intersections;
- Cycling near high-volume, fast-moving vehicles; and
- The need for improved all-season maintenance of the cycle facilities.

Comments and responses regarding how they were addressed, where applicable, are outlined in **Appendix B**.

2.4 Project Update Newsletter

A Project Update Newsletter was circulated in April 2022 to provide an update on input received through the Notice of Commencement and Map the Routes survey. The newsletter also summarized how the input was being used to inform the development of alternative design options. The newsletter was distributed to the study contact list and posted on the project webpage.

2.5 Stakeholder Follow-up Meetings

Following the development and evaluation of design options, follow-up meetings were held with the stakeholders that were interviewed at the beginning of the study (**Section 2.1.2**):

- The City of Guelph Accessibility Advisory Committee (July 5, 2022);
- The University of Guelph (July 21, 2022);
- GCAT (week of July 18, 2022); and
- The Guelph Cycling Club (week of July 18, 2022).

The purpose of the follow-up meetings was to share the conceptual designs and collect feedback prior to the Public Open House. The following comments were received regarding the preferred conceptual design for Gordon Street:

- Education needs to be a key component of AAA facility implementation as many people do not know how to use protected intersections; and
- University of Guelph needs to be engaged during detailed design, particularly regarding property and streetscaping.

2.6 Public Open House

A Public Open House was held on July 27, 2022 to gather feedback on study progress to date and the preferred conceptual design for Gordon Street. The preferred design for Gordon Street includes cycle track on both sides of the roadway between Clair Road and Waterloo Avenue. To advertise the event, a Notice of Consultation was circulated to the study contact list and published in local newspapers as well as the project website.

Approximately 45 people attended the in-person event. To provide additional opportunities for review and comment, materials were also posted online for two weeks prior to and following the in-person event for a total of one month.

Participants expressed concerns about sections with minimal separation between the back of curb or sidewalk and the cycle track, as well as how cyclists are intended to navigate through intersections that will not be designed as protected intersections.

Comments and responses regarding how they were addressed, where applicable, are outlined in **Appendix B**. Comments and concerns regarding the preferred conceptual design should be reviewed during the future detailed design stage.

2.7 Engagement with Indigenous Communities

The City communicated with the following Indigenous communities via email and telephone throughout the project:

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

Communications with Indigenous communities included sending notifications via email for engagement opportunities, offering to meet and discuss the study, and sending the Stage 1 Archaeological Assessment Report for review and comment. No concerns were raised by Indigenous communities regarding the study or the Archaeological Assessment Report. Mississaugas of the Credit First Nation and Six Nations of the Grand River expressed interest in being involved in the recommended Stage 2 Archaeological Assessment.

2.8 Notice of Correction

Towards the completion of the study, it was determined that the project is exempt from the MCEA process, as noted in **Section 1.2**. A Notice of Correction was first issued on December 1, 2022 to inform residents and community members of this change (**Appendix C**). The Notice was posted on the project 'Have Your Say' webpage and in local newspapers in December 2022, and was circulated to the study contact list in March 2023.

3.0 Existing Conditions

The following sections provide details related to the existing conditions within and adjacent to the Gordon Street study corridor.

3.1 Engineered Environment

3.1.1 Transportation

3.1.1.1 General Overview

Gordon Street is a north-south urban arterial roadway with a four-lane cross-section south of South Ring Road and north of Royal City Park to Waterloo Avenue. Between South Ring Road and the northern limit of Royal City Park, the roadway has a two-lane cross-section. The posted speed is 60 km/h to the south of Hands Drive and 50 km/h to the north. Auxiliary lanes are currently provided at most arterial and collector intersections along the corridor. Raised medians divide north and southbound traffic lanes between Clair Road and Clairfields Drive. South of Stone Road, Gordon Street is also part of the Permissive Truck Route.

The corridor generally has a curvilinear horizontal alignment and a gentle rolling vertical alignment. The grade on approach from both sides of the Speed River, between Dean Avenue and Waterloo Avenue, is approximately 6 percent. Due to the study area's naturally rolling topography, there are also several segments of Gordon Street that include retaining walls, as identified in **Section 3.1.3**.

The right-of-way (ROW) varies over the length of the study area. Between Clair Road and Lowes Road, the ROW ranges between 30 m and 34 m wide, with a further localized widening across from Roehampton Crescent to accommodate a short parallel roadway with local access (known as a window street). Between Edinburgh Road and Harvard Road the ROW generally ranges between 30 m and 32 m. North of Harvard Road to Reynolds Walk, the ROW widens to nearly 37 m through the Stone Road intersection before narrowing to approximately 25 m between Reynolds Walk and College Avenue. North of College Avenue, the ROW narrows to 20 m and then narrows further to 17 m from University Avenue to Forbes Avenue. The ROW continues at 20 m from north of

James Street to north of Royal City Park, where it then widens to a consistent 30 m within the downtown core.

There are numerous private accesses directly onto Gordon Street between Edinburgh Road and Harts Lane, around Oak Street and between College Avenue and Dean Avenue. There are also several higher volume commercial entrances within the downtown core, adjacent to Kortright Road, and at the southern end of the study limits. The presence of numerous driveways, particularly high-volume commercial driveways, is a safety concern for cyclists.

With exception of select locations in the downtown core (Guelph Farmer's Market and Earth to Table Bread Bar), there is no on-street parking permitted along the corridor.

3.1.1.2 Active Transportation Facilities and Network

Gordon Street features sidewalks and on-road cycle lanes on both sides throughout the study limits. Sidewalks are generally separated from the edge of the roadway by a grassed boulevard, with the exception of segments between University Avenue and Royal City Park where the ROW narrows.

Cycling facilities intersecting with Gordon Street currently exist on Clair Road, Arkell Road, Stone Road, South Ring Road, McGilvray Street, College Avenue, and Waterloo Avenue. Trails intersect Gordon Street south of the Speed River (Royal Recreation Trail), north of MacDonald Street, and at Johnson Green, Alumni Walk, Reynolds Walk, and the Gosling Gardens Trail.

3.1.1.3 Planned Future Transportation Conditions

The Guelph TMP (2022) sets out goals for the future share of trips by the various transportation modes throughout the City and in particular areas. This is described further in **Section 3.3.2**.

Based on 2016 Transportation Tomorrow Survey (TTS) data, 3 percent of individuals in Guelph travel by bicycle. The TMP aims to increase the percentage of trips taken via bicycle to 10 percent city-wide, 3 percent in the outer suburbs, 5 percent in the inner suburbs, and 15 percent around the University of Guelph and downtown. These targets emphasize the importance of cycling improvements throughout the city, and particularly along cycling spines.

Future transportation network changes in and near the study area have been identified in the City's 2022 TMP, the 2012 Cycling Master Plan and the 2021 Guelph Transit Future Ready Action Plan. The Guelph TMP (2022) identifies Gordon Street as part of the Cycling Spine Network. Four intersecting roads are also identified as part of the Cycling Spine Network: Clair Road, Edinburgh Road, Stone Road West, and College Avenue.

As outlined in the City's Cycling Master Plan (2012), cycling upgrades to the following routes intersecting Gordon Street are planned:

- Wilson Street (painted bike lanes);
- Dean Avenue (signed bike route);
- Stone Road East (painted bike lanes);
- Harvard Road (signed bike route);
- Kortright Road West (painted bike lanes);
- Kortright Road East (signed bike route); and
- Edinburgh Road (painted bike lanes).

The locations of these intersecting routes are illustrated in Schedule 1 of the Cycling Master Plan, which is included in **Appendix D**.

The recommended cycling facility types for connecting routes may need to be revisited due to evolving best practices. It is imperative that intersection upgrades and proper transitions at those decision points be examined during future design stages of this study to support safe and intuitive movements for cyclists traveling between Gordon Street and the connecting cycling routes.

As noted in **Section 1.0**, design of active transportation facilities between Lowes Road and Edinburgh Road was considered separately as a component of the Gordon Street Improvements EA. That study recommended the addition of a centre two-way-left-turn lane and multi-use pathways on either side, along with a dedicated right-turn lane and transit queue-jump lane at Arkell Road.

Quality Transit Network

The Guelph TMP recommends a "Quality Transit Network" (QTN), which identifies corridors for operational improvements as well as transit priority measures. The QTN includes the full length of Gordon Street from the south urban boundary into the downtown core. Five roads that intersect Gordon Street are also designated as part of

the QTN: Clair Road, Arkell Road (outside study area), Edinburgh Road, Stone Road, College Avenue, and Waterloo Avenue.

The TMP recommends a staged approach to implementing the QTN, where first service frequency is increased and performance for all routes is optimized. In cases where buses continue to experience significant delays following this first stage, transit priority measures such as signal timing adjustment or queue jump lanes at intersections are to be implemented. The third stage involves road widening/lane conversion to create dedicated transit lanes, where warranted.

Implementation of the QTN along Gordon Street includes consideration for converting the curb lanes south of Stone Road to bus-only lanes for peak hours or all day transit use. Between Stone Road and College Avenue, potential road widening from two lanes to four lanes is recommended to provide a bus-only lane in each direction. North of College Avenue to the Speed River is a designated cultural heritage district where widening is not feasible; as a result, only operational improvements (i.e. changes to signal timing) would be implemented in this section.

The 2021 Guelph Transit Future Ready Action Plan identified service improvements (frequency) and route improvements for the Route 16, 59, and 99 which use Gordon Street within the study area. The 99 Mainline is planned for 5-minute frequency Monday to Friday, and 15-minute frequency south of Downtown Saturday and Sunday.

This study assessed the feasibility of, and preferred approach for, implementing AAA cycling facilities within the existing Gordon Street study corridor. Further studies would be required to consider the needs of transit, if and when transit operations indicate a need for transit priority.

3.1.1.4

Collision History – Vulnerable Road User Safety

Available vulnerable road user (VRU) safety data was reviewed to identify specific areas of concern within the Gordon Street study area. Given the length and diverse contexts of the study corridor, it was broken into three segments for review. The outcomes of the review and associated recommendations are summarized in the following sections.

Clair Road to Edinburgh Road

In the 5-year period of the data (2016-2020) there were 7 collisions involving cyclists and 5 collisions involving pedestrians, resulting in non-fatal injuries and property damage. All cyclist collisions were the result of right and left hook conflicts, with the majority taking place at the Gordon Street / Clair Road intersection. All pedestrian collisions were the result of vehicles failing to yield right-of-way.

Implementing compact, protected intersection designs and considering reduced posted speeds of 40 km/h are anticipated to reduce the risks and severity associated with recorded pedestrian and cyclist collisions through this segment of Gordon Street.

Edinburgh Road to College Avenue

During the 5 years of available data (2016-2020) a total of 11 collisions involving cyclists and 7 collisions involving pedestrians were recorded between Edinburgh Road and College Avenue. All resulted in non-fatal injuries. All cyclist collisions were the result of right and left hook conflicts, with three related to cyclists suspected of riding on sidewalks in the opposite direction to traffic.

Pedestrian related collisions can be summarized as follows:

- Vehicles failed to yield right-of-way to crossing pedestrians (2), one at an intersection, the other at a private driveway;
- Pedestrians “crossing without right-of-way” at mid-block or unsignalized intersection, an indication of pedestrian crossing demands (3); and
- Pedestrians “crossing without right-of-way” at signalized intersection (2).

Implementing compact, protected intersection designs and considering reduced posted speeds of 40 km/h are anticipated to reduce the risks and severity associated with recorded pedestrian and cyclist collisions through this segment of Gordon Street.

Additional improvements could include implementation of truck aprons at Gordon Street and Stone Road and review of pedestrian accessibility at transit stops located away from controlled intersections.

College Avenue to Waterloo Avenue

In the 5-year period of available data (2016-2020) there were 23 collisions involving cyclists and 11 collisions involving pedestrians between College Avenue and Waterloo

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Improvements
April 2023



Avenue. All collisions resulted in non-fatal injuries and/or property damage. All cyclist collisions were due to right-hook and left hook conflicts between cyclists going ahead and turning vehicles at the intersections or driveway/commercial access locations. Collisions involving pedestrians were primarily related to vehicles failing to yield right-of-way (10), while one was the result of a pedestrian crossing without right-of-way. The majority of the collisions involving either cyclists (17) or pedestrians (9) took place in the downtown section.

To alleviate the risk and severity of these collisions, dedicated cycling facilities separate from motorized traffic and compact protected intersection designs are recommended. Considering reduced posted speeds of 40 km/h is also recommended through this segment of Gordon Street. Additional safety improvements should consider:

- At Wellington Street, tighten up the curb radii at all four corners and/or add truck aprons to slow down turning vehicles;
- At Waterloo Avenue / Norfolk Street, consider implementing truck aprons in the southwest corner to slow down turning vehicles; and
- At the McDonald's drive-through access, the driveway access taper should only be wide enough to accommodate a passenger vehicle turning at a slow speed. An alternative solution can be sought as part of the access management plan for Gordon Street in downtown. This also applies to numerous other commercial properties with direct access to Gordon Street.

3.1.2 Water Resources

3.1.2.1 Drainage and Stormwater Management

Drainage and stormwater management conditions are documented in the Existing Drainage Conditions and Low Impact Development (LID) Opportunities Memo (Dillon, March 2023; **Appendix E**).

The Gordon Street corridor is an urban cross-section fronted primarily by residential and commercial properties. This road follows the local topography, which is relatively flat or gently rolling with exception of the segment bordering the Speed River which includes slopes that average 6 percent. Within the study limits there are a number of boulevards, parks, and private spaces that have been identified as potential locations suitable for LID implementation. Specific locations for consideration have been identified in the memo

provided in **Appendix E**. Challenges for the installation of LID measures along Gordon Street include: retaining walls, mature trees located within Royal City Park and many grassed boulevards, and buildings located near the edge of the road.

3.1.2.2 Source Water Protection

The Grand River Source Protection Plan (GRSPP; February, 2022) was reviewed to identify source protection policies that apply to the Gordon Street study corridor. The applicable Schedules from the GRSPP are included in **Appendix F**.

The study corridor falls within Wellhead Protection Areas (WHPA) B (north of South Ring Road) and C (south of South Ring Road), as illustrated in Schedules E and F of the GRSPP. A WHPA is defined in Volume I Appendix A as “an area that is related to a wellhead and within which it is desirable to monitor drinking water threats.” WHPA-A is within the closest proximity to the wellhead, whereas WHPA-B and WHPA-C are less closely related to the wellhead.

The GRSPP assigns Vulnerability Scores, which categorize the relative vulnerability of a particular area to contamination. Areas with higher scores are considered more vulnerable, with 10 being the highest score. The segment of Gordon Street between South Ring Road and Forbes Avenue is primarily identified as having a Vulnerability Score of 8. North of Forbes Avenue to Waterloo Avenue, Gordon Street is wholly within an area with a Vulnerability Score of 10. Areas with Vulnerability Scores of 8 and above are particularly vulnerable to certain drinking water threats, including: road salt, snow storage and fuel. Specific construction, operations, and maintenance procedures should be developed to limit exposure to any of these threats as a result of any new or reconstructed infrastructure.

3.1.3 Structures

The Gordon Street study area includes a two-lane concrete bridge over the Speed River. The bridge is identified as a potential heritage resource in the Cultural Heritage Report prepared as part of this study (**Appendix K**, LHC Heritage Planning & Archaeology Inc., 2023).

There are also several segments of stone and concrete retaining walls at the following locations within the study area:

- Monticello Crescent to Stone Road (approximately 290 m);
- Along the front of the University of Guelph Science Complex;
- University Avenue to just north of Simpson Way; and
- Along select business frontages within the downtown core.

Given the potential heritage value associated with the Speed River bridge and the significant cost associated with replacement of the existing retaining walls, modification of these features was avoided during the design process.

3.1.4

Utilities

Existing utility infrastructure within the study areas was reviewed at a high-level as part of this study, with the review documented in the Utilities Existing Conditions Memo (**Appendix G**; Dillon, February 2022). The following utilities were identified within the study area:

- Alectra Utilities (hydro);
- Bell (telecommunications);
- Enbridge (gas); and
- City underground water, storm, and sanitary services.

Overhead hydro pole lines are present along both sides of the ROW throughout the study area. Between Clair Road and Stone Road, a substantial overhead pole line runs along the west side of the roadway, with utility poles primarily between the sidewalk and back of the curb. There are no overhead hydro lines within the Gordon Street ROW from north of Stone Road to north of College Avenue. Between College Avenue and the Speed River, overhead hydro poles are located in close proximity to the roadway, often immediately behind the back of the curb. There are no evident overhead hydro poles on Gordon Street between the Speed River and the north study limit.

From Waterloo Avenue to south of Wellington Street, Bell conduit runs under the road centerline and west boulevard. South of Wellington, the majority of Bell infrastructure is located within both the east and west boulevards. Cross street services, private subdivision services, and pedestal laterals cross Gordon Street at various locations. Data

provided by the utility indicates that all Bell plant within the study area is subsurface cable and conduit. No aerial lines were identified.

Enbridge infrastructure of various sizes is located along sections of both the east and west boulevards north of College Avenue. Between College Avenue and Hands Drive, a distribution line exists under the east boulevard. From south of Harvard Road to Clair Road, a distribution is located under the west boulevard, in close proximity the edge of the ROW. There were no high-pressure Enbridge pipelines located within the Gordon Street study limits.

Overall, the watermain, storm and sanitary gravity sewers remain within the outside drive lanes and boulevard within the Gordon Street study area (with the exception of private drain lateral connections and cross street services). At the bridge crossing of the Speed River, the stormwater system outlets into the river on the south-east side of the bridge. No sanitary sewer is within the Gordon Street ROW (except for intersecting sewers from side streets) between Terrance Lane and Kortright Road West, with the exception of between Oak Street and Hands Drive. South of Lowes Road, the sanitary sewer extends into the western middle lane to north of Clairfields Drive West.

3.2 Natural Environment

The Gordon Street study corridor is highly urbanized, with exception of the crossing of the Speed River, at Cutten Fields (between James Street and Forbes Avenue), along Johnston Green and various street trees and other vegetation along the corridor.

Gordon Street crosses through the Natural Heritage System associated with the Speed River north of Albert Street, within Royal City Park. At this crossing, the Speed River comprises a number of Natural Heritage System features, including: Cool Water Fish Habitat (Official Plan Schedule 4B) and Significant Wildlife Habitat (SWH) for Waterfowl Overwintering Areas (OP Schedule 4E). The Speed River and surrounding riparian areas are identified as Significant Valleylands – Undeveloped Portions of the Regulatory Floodplain (OP Schedule 4D).

Existing natural environment conditions are documented in the Environmental Impact Study (EIS; **Appendix H**; Dillon, December 2022); key findings are summarized in the following sections.

3.2.1 Aquatic Ecosystems

The Speed River is one of the major rivers in the Grand River watershed (GRCA, 2014). It supports a diverse community of fish and aquatic species. Gordon Street crosses the Speed River within the historic Guelph downtown core, where its shoreline has been altered to include concrete retaining walls to prevent shoreline erosion. The infrastructure of the Gordon Street bridge has also been established directly in portions of the river.

The Fisheries and Oceans Canada online Aquatic Species at Risk (SAR) mapping tool and the Natural Heritage Information Centre online records tool were reviewed for the portions of the Speed River that overlap the Gordon Street study area. The review did not identify any SAR fish or mussels or any Critical Habitat for aquatic SAR as listed under SARA or the provincial *Endangered Species Act* (ESA). Occurrence records were identified for Snapping Turtle (*Chelydra serpentina*) and Northern Map Turtle (*Graptemys geographica*), both of which are listed as Special Concern under both SARA and the ESA. As Special Concern species, neither the species nor their habitat are subject to the legal protections of the ESA or SARA.

3.2.2 Terrestrial Ecosystems

There are no defined terrestrial ecosystems located beyond the limits of the Speed River Natural Heritage System within the limits of the Gordon Street study area. Cutten Fields and Johnson Green, located between College Avenue and the Speed River, are manicured open spaces with mature trees.

3.3 Socio-Economic Environment

A Socio-Economic and Land Use Existing Conditions Memo (**Appendix I**; Dillon, October 2022) was prepared as part of this study. The memo documents existing and future socio-economic and land use characteristics, provincial and municipal planning policy, and future development within a one-kilometre study area surrounding the study corridor.

3.3.1

Relevant Planning Policies

The study area is subject to the following relevant provincial and municipal planning policies. Applicability of these policies to the current project are highlighted in the Socio-Economic and Land Use Existing Conditions Memo.

- Provincial Policy Statement (Ministry of Municipal Affairs and Housing);
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (Province of Ontario);
- City of Guelph Official Plan; and
- City of Guelph TMP.

3.3.1

Community Demographics

According to 2016 Statistics Canada Census Profiles, Guelph Census Subdivision had a population of 131,794 which is 8.3 percent higher compared to the 2011 population. The median age in Guelph is 38.3. A total of 35,060 households are owned, while 17,030 are rented (Statistics Canada, 2017).

In 2016, a total of 60,400 households held a postsecondary certificate, diploma, or degree. Approximately 66 percent of the population was employed; 4 percent were unemployed, and 30 percent were not in the labour force. The median total income (before taxes) of households during the same period was \$37,540. This was below the Canadian average income of single earner households over the same period, reinforcing the importance of providing equitable transportation in the city.

3.3.2

Commuting Patterns

As a component of the 2022 Guelph TMP Update, work was completed to identify current and potential future mode share throughout the city using Census, TTS, and Streetlight™ data. Current city-wide mode choice base on the 2016 Census data, as well as the target mode choice for portions of Gordon Street are presented in **Table 1**.

Table 1: City of Guelph Mode Choice Based on 2016 Census Data Compared to Target Mode Shares for Gordon Street

Mode Choice	Percentage of Individuals Currently Using the Mode	Target Mode Share Percentage:			
		Clair Road to Stone Road	Stone Road to College Avenue	College Avenue to Speed River	Speed River to Waterloo Avenue
Walking	5.9	10	20	20	25
Cycling	1.6	3	5	15	15
Public Transit	7.1	12	15	25	20
Automobile	84.5	75	60	40	40

3.3.3 Existing Land Use and Future Development

The land use designations along Gordon Street include:

- Medium Density Residential;
- Mixed Office Commercial;
- Commercial Mixed Use Centre;
- Neighborhood Commercial;
- Institutional/Research Park;
- Major Institutional (University of Guelph);
- Secondary Plans (Downtown);
- Open Space/Parks; and
- Significant Natural Areas and Natural Areas.

The approved Secondary Plan for the Downtown applies to the segment of Gordon Street north of the Speed River. Streetscape and lighting guidelines from the Secondary Plan will need to be applied to this section. The designs being recommended through this study meet the active transportation design guidelines from the Secondary Plan.

The University of Guelph and the Ontario Veterinary College are both located along Gordon Street between Stone Road and College Avenue. The University and Ontario

Veterinary College should continue to be consulted as the project advances through detailed design.

From the Speed River southerly towards College Avenue, Gordon Street passes through the Brooklyn and College Hill Heritage Conservation District (HCD). Proposed changes, including those within the road ROW, should adhere to the 2014 Council-approved Brooklyn and College Hill HCD Plan and Guidelines.

The segment of Gordon Street located between Stone Road and immediately north of the Gordon Street / Clair Road Mixed Use Node is an 'Intensification Corridor' that has experienced growth in multi-unit residential apartments, townhouses, and ground-floor commercial uses in the past decade. Of particular relevance to the current study, the Gordon Street Intensification Corridor guiding principles include the following statements:

- Promote greening of Gordon Street through the design and location of buildings, by establishing a consistent landscaped street frontage and retaining healthy regulated trees when possible; and
- Create pedestrian connections that facilitate an ease of mobility and expand the City's active transportation network.

3.3.4 Other Environmental Assessments Completed Adjacent to the Study Area

The following EAs have been completed for areas within 100 m of the Gordon Street study area. Recommendations from these studies should be reviewed before proceeding to detailed design for this project:

- Gordon Street Improvements MCEA, 2021 – applicable to the section of Gordon Street between Lowes Road and Edinburgh Road; and
- Southwest Guelph Water Supply MCEA, Ongoing – will determine whether new infrastructure is required in the vicinity of Gordon Street.

3.4 Cultural Environment

3.4.1 Archaeological Resources

A Stage 1 Archaeological Assessment (**Appendix J**; LHC, 2022) was completed as part of this study to assess the archaeological potential of the Gordon Street study corridor. The

study area included lands within ten metres of the road ROW. The study found that the following significant portions of the study area exhibit archaeological potential and therefore require Stage 2 archaeological assessment prior to any ground disturbing activities:

- Areas fronting Royal City Park, Marianne’s Park and the Guelph Lawn Bowling Club;
- Areas fronting Cutten Fields Golf Course and the northwest and southeast quadrants of the Gordon Street / Dormie Lane intersection;
- Simpson Way to MacDonald Street;
- Lands fronting the University of Guelph and Ontario Veterinary College southerly towards Stone Road; and
- Along the Gosling Gardens Trail.

The Stage 1 Archaeological Assessment Report should be reviewed to confirm limits of the areas identified above as well as other smaller segments that have demonstrated archaeological potential.

The Stage 1 Archaeological Assessment Report was entered into the Ontario Public Register of Archaeological Reports on May 11, 2022.

3.4.2

Built Heritage and Cultural Heritage Resources

A Cultural Heritage Report (**Appendix K**; LHC, 2023) was completed as part of this study to identify built heritage resources and cultural heritage landscapes within the study area. Preliminary impact assessment was also completed as part of the Cultural Heritage Report; the results of that assessment are summarized in **Section 5.4**. The study area included lands within 40 metres of the Gordon Street ROW.

The report identified a number of built heritage resources and cultural heritage landscapes along Gordon Street, including the following, which are primarily located between Stone Road and Waterloo Avenue:

- Approximately 20 properties identified through the Couling Inventory;
- Approximately 40 properties with Part V Designation under the *Ontario Heritage Act* (within the Brooklyn and College Hill HCD);
- 13 properties Listed under Part IV of the Ontario Heritage Act;
- 3 properties Designated under Part IV of the Ontario Heritage Act; and
- University of Guelph Cultural Heritage Landscape.

4.0 Alternative Design Options

4.1 Key Elements of AAA Cycle Facility Design

All Ages and Abilities cycle facilities should be designed to meet the recommendations outlined in **Table 2**.

Table 2: Recommended Elements of AAA Cycle Facility Designs.

Design Element	Recommended Condition
Comfortable Cycle Facility Width and Separation from Vehicular Traffic	<ul style="list-style-type: none"> • Facility widths should be designed in accordance with the recommendations of Ontario Traffic Manual Book 18. • Cycling facilities should be physically separated from motor vehicles. The extent of horizontal and vertical separation required is dependent on adjacent motor vehicle speeds and volumes.
Cycling Access to Key Destinations	<ul style="list-style-type: none"> • Safe, accessible cycling facilities should be provided between key destinations along both sides of the corridor. • Crossing locations should be clearly delineated, with cyclist priority provided over vehicular traffic.
Steep Sections Should be Limited or Avoided	<ul style="list-style-type: none"> • Road elevation change should generally be less than 5 percent to allow for sustained cycling speeds and reduced weaving. • Steeper segments should be limited to: <ul style="list-style-type: none"> ○ Less than 500 m in length, for grades 5 percent to 7 percent; ○ Less than 150 m in length (about a block), for grades between 7 percent and 8 percent; and ○ Less than 30 m in length, for grades above 8 percent.

Design Element	Recommended Condition
Enhanced Rider Safety	<ul style="list-style-type: none"> • Risks associated with conflicts with motor vehicles should be reduced through: <ul style="list-style-type: none"> ○ Minimizing the operating speed differential between vehicles and cyclists, particularly at intersections and entrances; ○ Reducing the number of contraflow conflicts with turning vehicles; and ○ Implementing mitigation measures to limit the number of right hook conflicts (i.e. through restricting right on red). • Risks associated with cyclist-transit vehicle conflicts should be reduced through physical separation of operating spaces. • Risks associated with conflicts with pedestrians should be reduced through: <ul style="list-style-type: none"> ○ Separation of cyclists and pedestrians, particularly where high volumes of either are anticipated; ○ Minimizing the operating speed differential between cyclists and pedestrians on shared facilities; and ○ Avoiding sudden path narrowing. • Facility should be designed and maintained to be clear of obstructions, including: <ul style="list-style-type: none"> ○ Surface debris (i.e. leaves); ○ Surface inlet catch basins and gutters; and ○ Snow/ice to enable all season operation of the facility.
Cohesion	Consistent design throughout the corridor.

4.2 Development of Alternative Designs

Four design options for AAA cycling facilities were developed and assessed to determine their feasibility for implementation on Gordon Street.

- Option 1: Protected Bike Lanes;
- Option 2.1: Multi-Use Pathway, One Side;
- Option 2.2: Multi-Use Pathways, Both Sides; and
- Option 3: Cycle Tracks.

As noted in **Section 3.1.1.3**, the segment of Gordon Street between Lowes Road and Edinburgh Road is subject to the Gordon Street Improvements EA, which recommended implementation of multi-use pathways. Accordingly, the evaluation of design options is focused on Clair Road to Lowes Road, and from Edinburgh Road to Waterloo Avenue. However, as consistency is an important facet of AAA cycle facility design, all alternative design options considered application of only one of the following options for the entire segment between Clair Road and Waterloo Avenue.

Additional details pertaining to each of the design options is provided in the following sections.

4.2.1

Option 1: Protected Bike Lanes

Protected bike lanes are one-way, on the same level as the roadway, with physical separation between people riding bikes and motor vehicle traffic. Physical separation may include the use of painted buffers, curbs, bollards, and planter boxes.

As illustrated in **Figure 3** and **Figure 4**, and in **Appendix L**, design Option 1 for Gordon Street generally includes the following elements, which are intended to be implemented between the existing curbs:

- 1.5 to 2.0 m wide bike lanes on either side of the roadway. Narrower lanes were implemented in the downtown where vehicle lanes were at or near the established design minimum. Wider lanes were applied on sections with steep grades and sections where existing painted medians could be narrowed or eliminated.
- 0.3 to 1.3 m wide physical separation between cyclists and vehicles depending on the remaining available space. Breaks in the barrier would be provided at driveways and could be made mountable to maintain delineation between the cycle facility and adjacent vehicle lane.
- 3.3 to 3.5 m wide vehicular through lanes and 3.0 to 3.3 m wide turn lanes.

Figure 3: Design Option 1 Example between Clair Road and South Ring Road

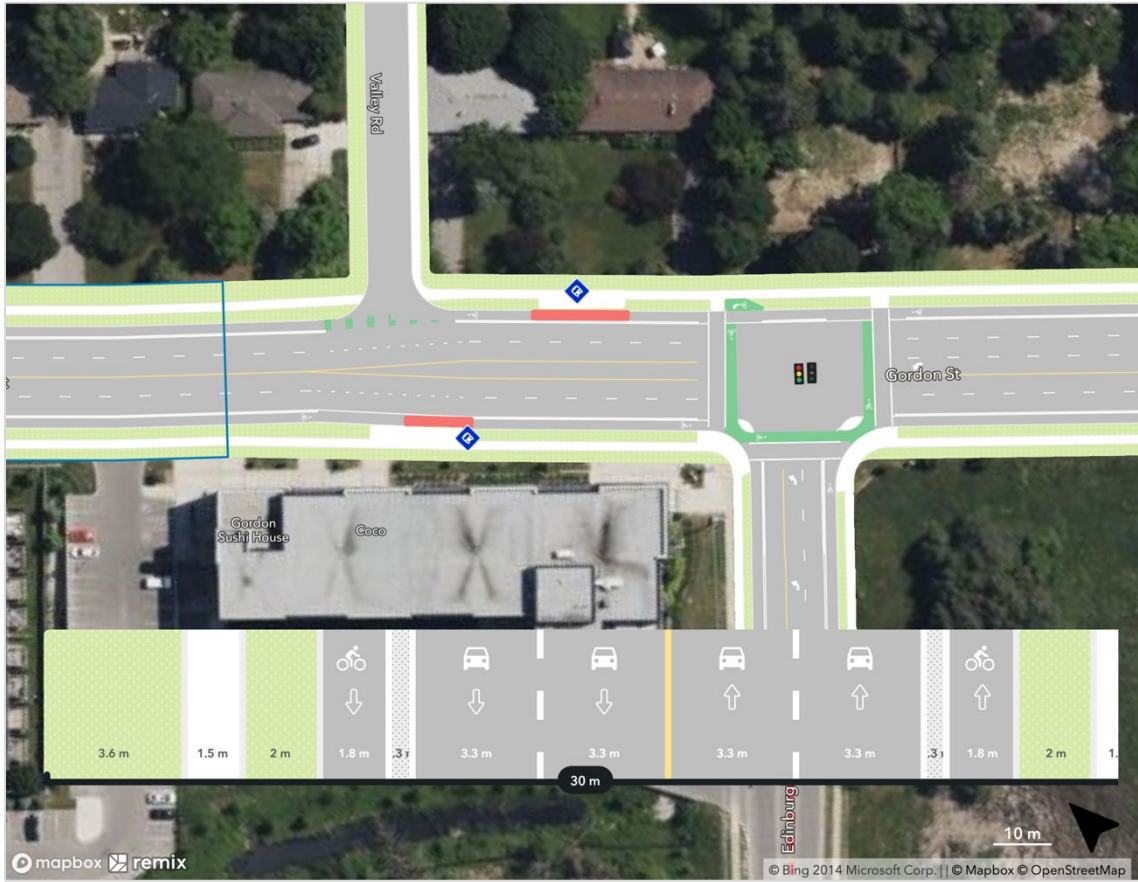
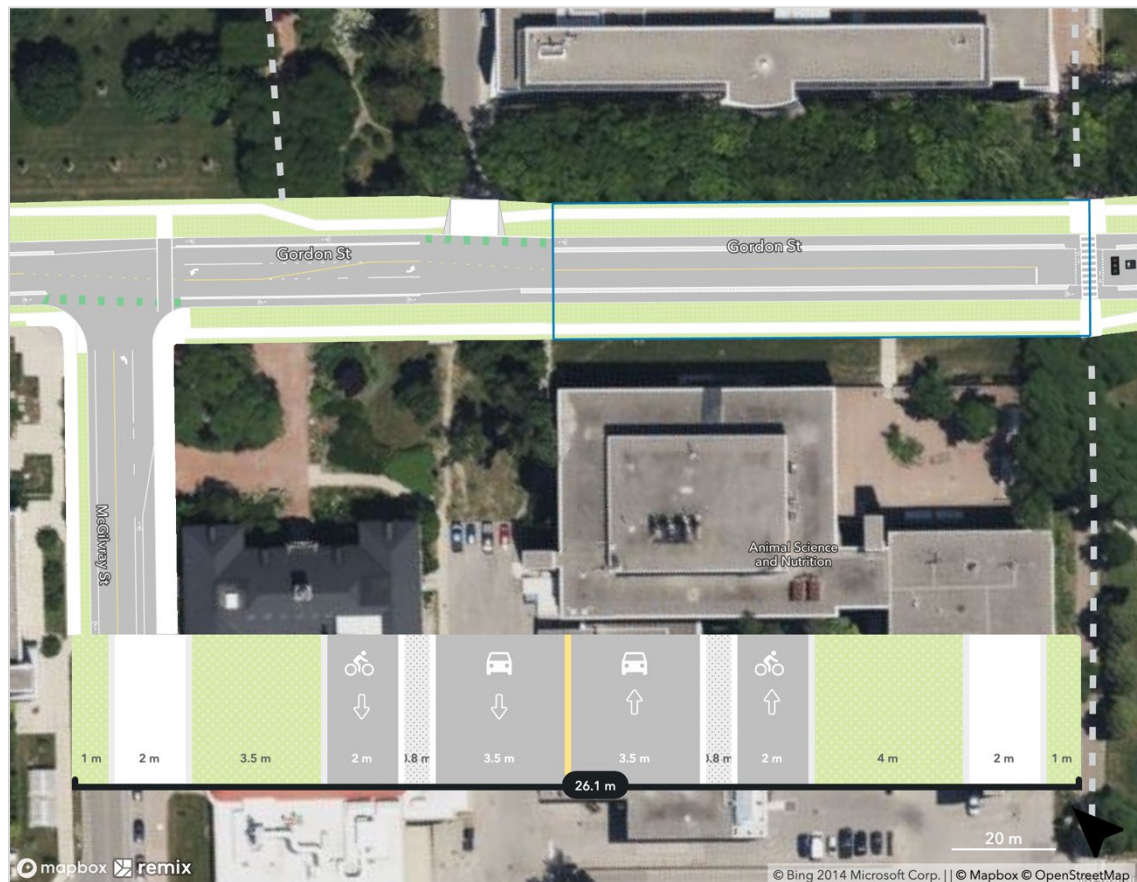


Figure 4: Design Option 1 Example between South Ring Road and the Speed River Bridge



Implementation of Option 1 would allow sidewalks and boulevards to remain as-is. Protected intersections would be implemented at key junctions using pre-cast islands at the corners to create vertical protection from turning vehicles.

4.2.2 Option 2: Multi-Use Pathways

Multi-use pathways (MUPs) are a two-way combined pedestrian and cycling facility, physically separated from motor vehicle traffic. They are most often located similarly to a sidewalk, but are wider to accommodate both pedestrians and cyclists.

Two options were developed that include MUPs. Option 2.1 involves implementation of a single MUP on the east side, while Option 2.2 involves implementation of MUPs on both sides of Gordon Street. Space for the MUPs would be obtained through removal

and reallocation of space from one or more of the existing sidewalks and vehicular lanes.

As illustrated in **Figure 5** and **Figure 6**, and in **Appendix L**, design Options 2.1 and 2.2 for Gordon Street generally include the following elements, which require relocation of the existing curbs on one or both sides of the roadway in some locations:

- 2.4 to 4.0 m MUP on one (Option 2.1) or both (Option 2.2) sides for the entire length of the corridor. Narrower MUPs were required in the downtown where there was significantly less space behind the existing curb. Wider MUPs were achieved further south, particularly around the University of Guelph, where more space was available.
- 0.3 to 3.5 m horizontal separation from back of curb depending on the available space remaining. An additional 1.8 m painted buffer on the roadway was provided as a result of converting the existing painted bike lanes to buffer space.
- 3.3 to 4.0 m wide vehicular through lanes and 3.0 to 3.5 m turn lanes, consistent with existing conditions.

Figure 5: Design Option 2.2 Example between Clair Road and South Ring Road

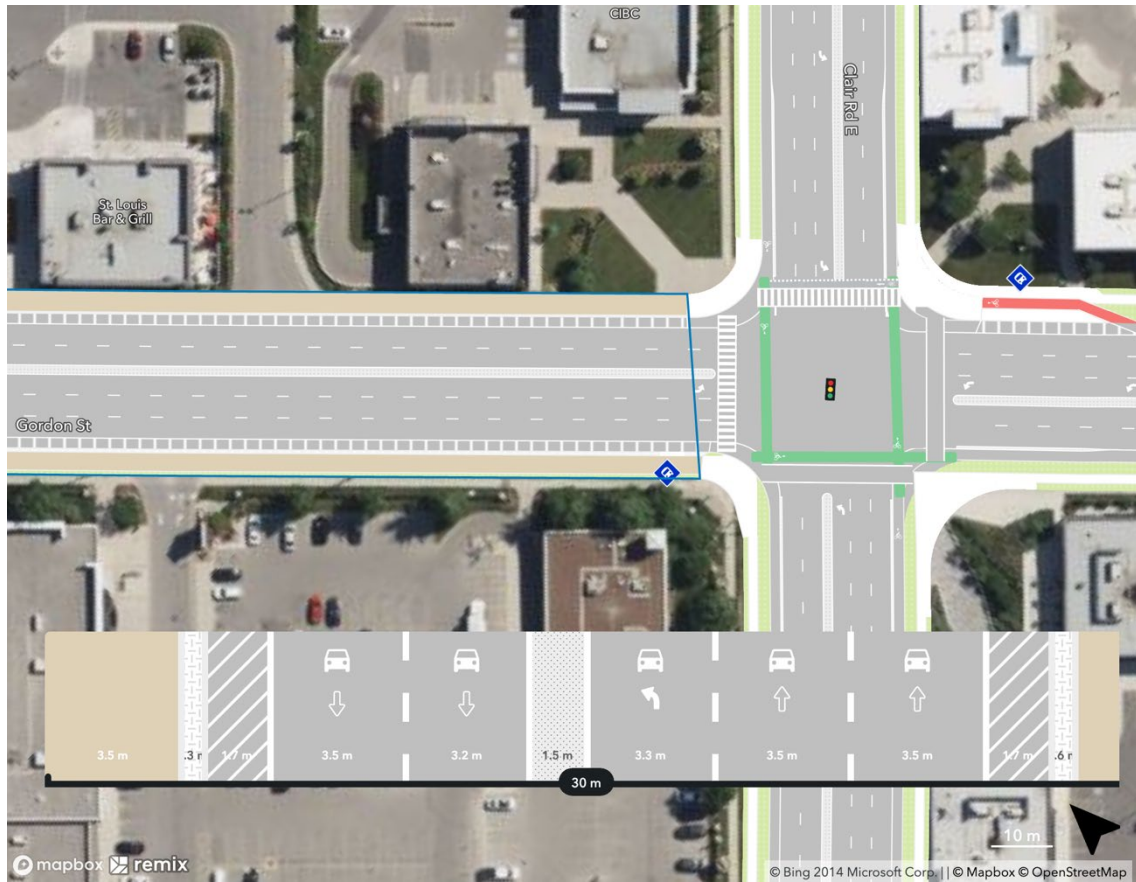
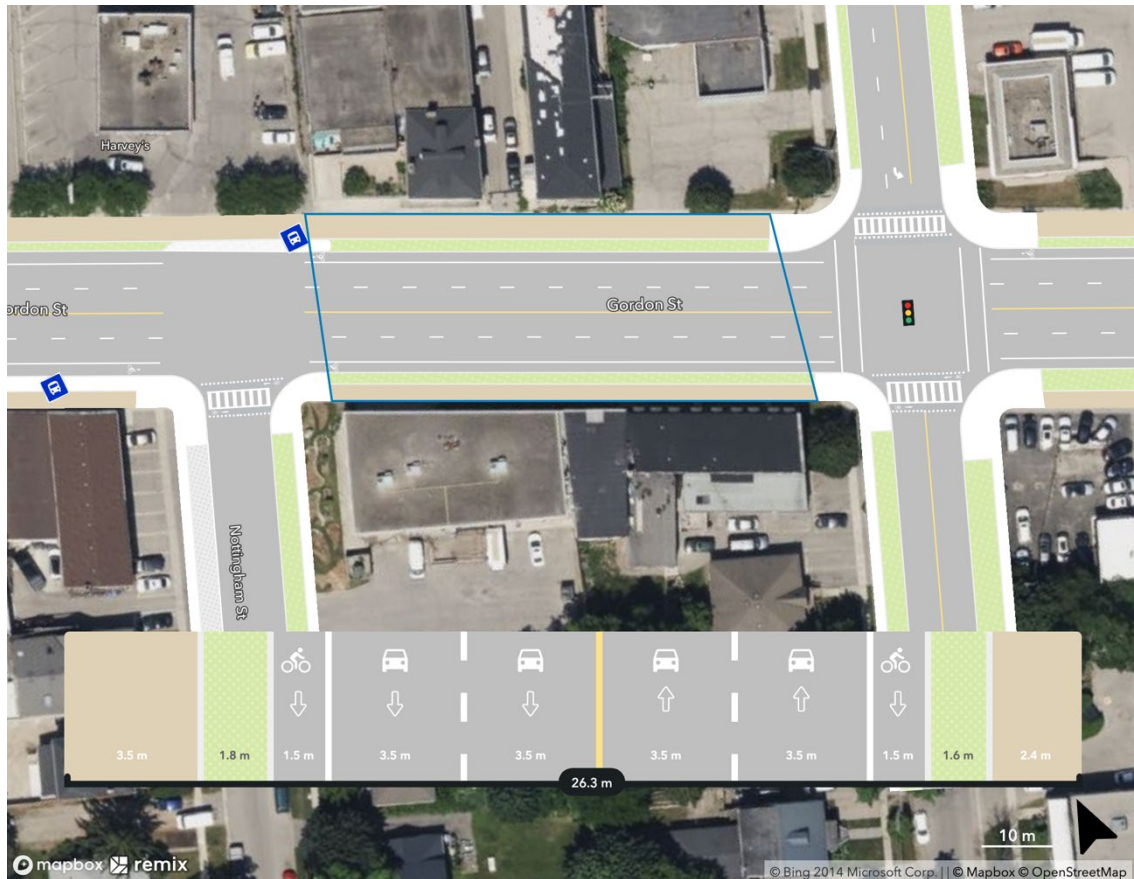


Figure 6: Design Option 2.2 Example between Wellington Street and Waterloo Avenue



From Lowes Road to Landsdowne Drive, the Gordon Street Improvements EA preliminary design was incorporated. This design consisted of a 3 m MUP on either side of the street, 2 vehicle lanes in each direction, and a centre turn lane.

Efforts were made to minimize the need for curb realignment. Several streetscape elements including utility poles, streetlights, trees, and landscaping would need to be removed or relocated to accommodate the MUPs.

Due to the nature of MUPs and the mixing of pedestrians and cyclists, Dutch-style protected intersections are not necessary for the MUP options. All signalized intersections were treated with crosswalks and cross-rides at all approaches, while unsignalized intersections were treated with crosswalks and cross-rides on Gordon Street only.

Attempts were made to provide sufficiently wide (1.5 m) platforms for transit users boarding and alighting vehicles. In many cases this was not possible due to constraints in

achieving sufficient MUP widths. As such, many transit stops would require transit users to wait on the MUP, creating conflicts with cyclists and other pedestrians.

4.2.3

Option 3: Cycle Tracks

Cycle tracks accommodate cyclists only and are located above road grade, often within the boulevard. This provides both horizontal and vertical separation between vehicular and cyclist traffic, as well as horizontal separation from pedestrians. As a result, cycle tracks are considered the 'gold standard' for AAA cycle facility design.

As illustrated in **Figure 7** and **Figure 8**, and in **Appendix L**, design Option 3 for Gordon Street generally includes the following elements, which will require relocation of the existing curbs on both sides of the roadway:

- 1.5 to 2.3 m wide cycle tracks on both sides of the roadway. Narrower facilities were implemented at select constrained intersections to accommodate vehicular turn lanes. Wider facilities were implemented on sections with steep grades and where higher volumes of users could be expected, such as adjacent to the University of Guelph.
- 0.5 to 2.5 m wide physical separation between cyclists and vehicles provided by curb and gutter and either a vegetated or hardened boulevard.
- 1.8 to 3.0 m wide sidewalks.
- 3.3 to 3.5 m wide vehicle through lanes and 3.0 m to 3.3 m wide turn lanes.

Figure 7: Design Option 3 Example between Clair Road East and South Ring Road

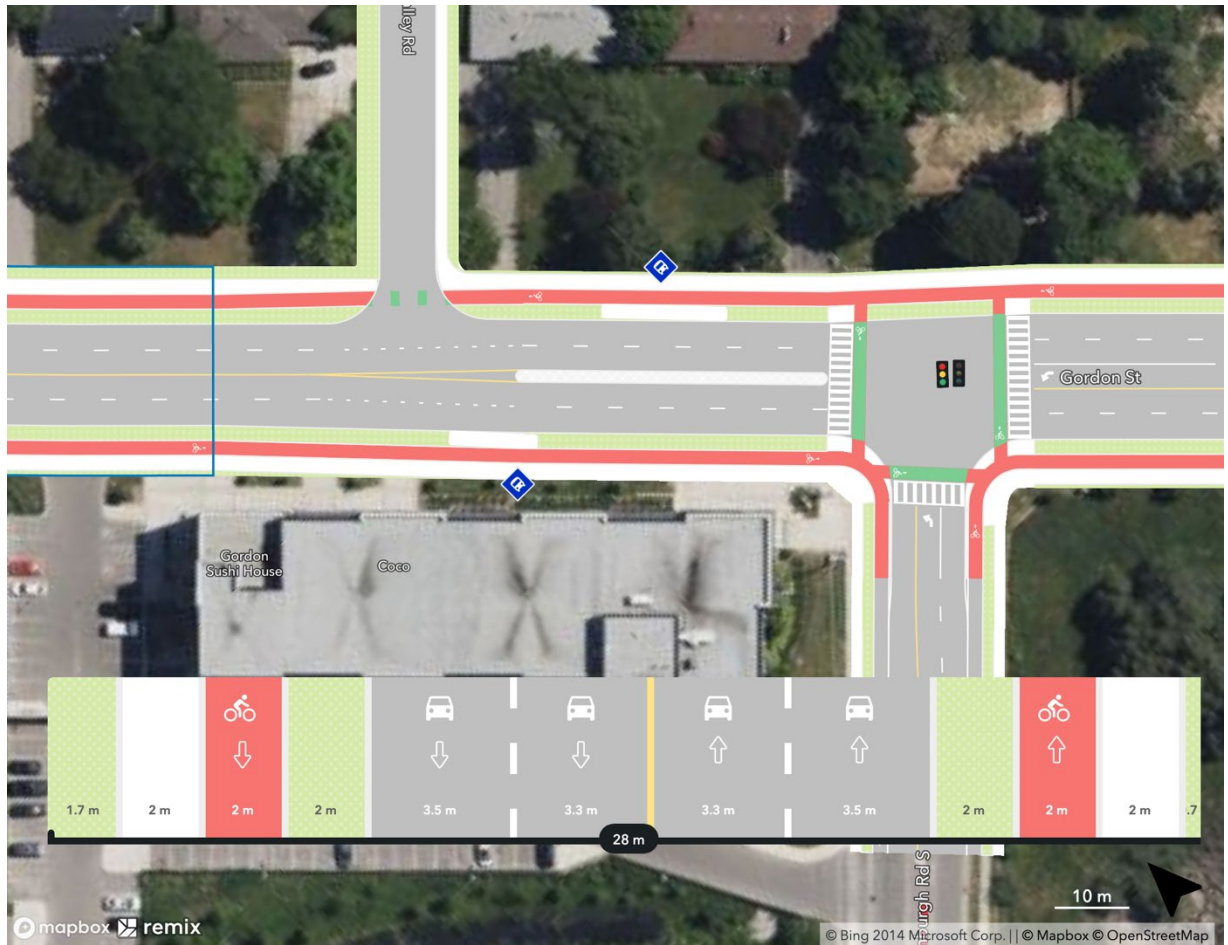
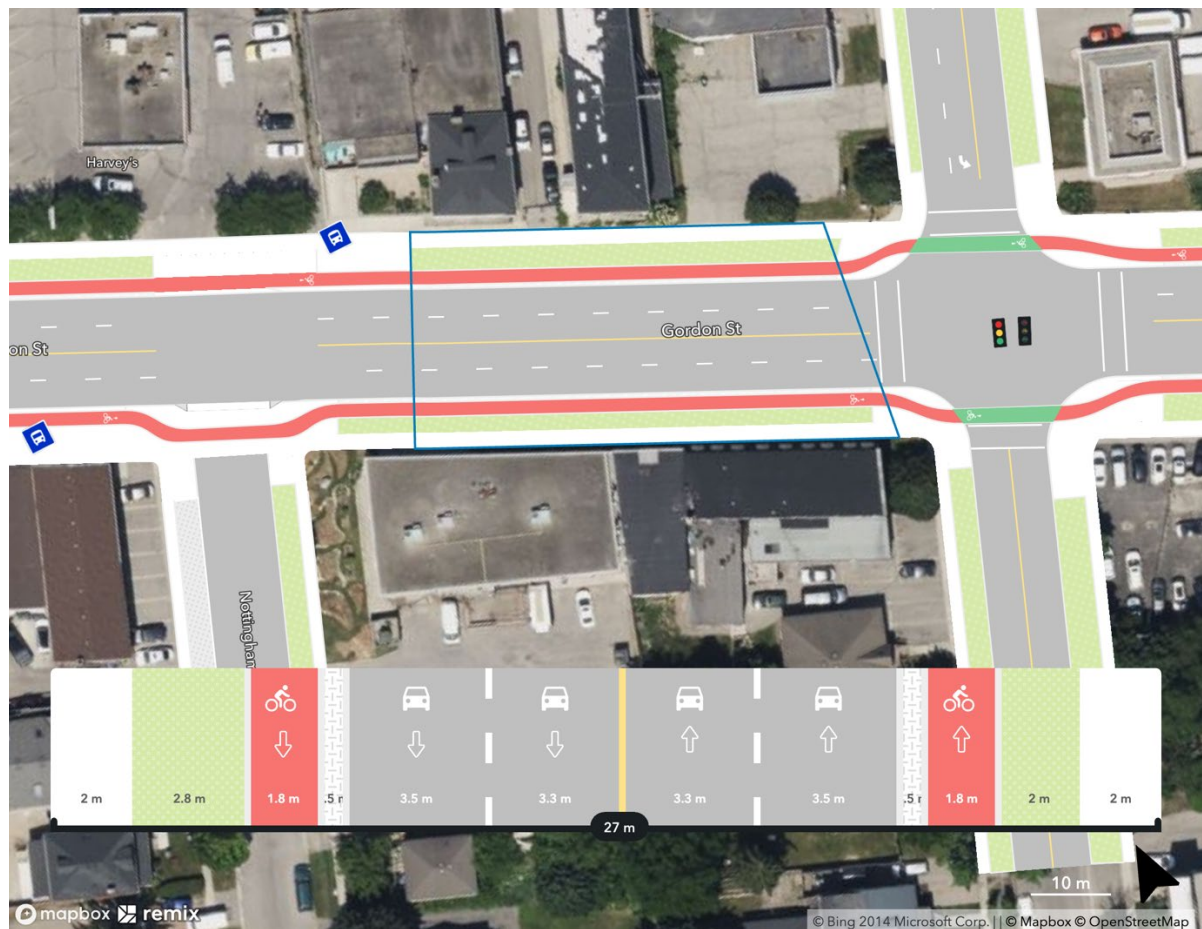


Figure 8: Design Option 3 Example between Wellington Street West and Waterloo Avenue



To minimize impacts to property, trees, utilities, and existing sidewalks, space for the cycle track was created by narrowing vehicular lanes and removing on-street cycle lanes. Narrowing of lane widths and the overall curb-to-curb distances across Gordon Street would have the additional benefits of helping to slow traffic and reduce crossing distances. However, this does result in a higher overall cost to implement cycle tracks.

The cycle track option includes the recommended implementation of protected intersections at key junctions where Gordon Street intersects with existing or planned cycling routes in the Cycling Master Plan (2012).

4.3 Evaluation of Design Options

The design options described in **Section 4.2** were evaluated to compare their alignment with AAA design principles and impacts on the engineered, natural, socio-economic, and cultural environments, as well as anticipated costs.

A summary of the comparative evaluation of design options is provided in **Table 3**. Letter grades were used to compare each option's alignment with the ideal condition. A letter grade of 'A' indicates that the option is most closely aligned with the ideal condition, whereas a letter grade of 'F' indicates unacceptable negative impacts. The detailed evaluation tables are included in **Appendix M**.

Option 3 (cycle tracks) scored the highest in the comparative evaluation, primarily because it is most closely aligned with AAA design requirements and the TMP. Key constraints within the corridor are discussed in **Section 4.4**. Details on the preferred design option are presented in **Section 5.0**.

Table 3: Evaluation Summary

Category	Option 1: Protected Cycling Lanes	Option 2.1: Multi-Use Pathway, One Side	Option 2.2: Multi-Use Pathways, Both Sides	Option 3: Cycle Tracks
AAA Design Requirements (Pre-Screening)	<p style="text-align: center;">Grade: B</p> <ul style="list-style-type: none"> • Option meets the majority of requirements for AAA cycling facility design. • Facility will be physically separated from vehicles and at a consistent level through the study area. • Cycle facility will be located between the transit pad and the bus in all instances. 	<p style="text-align: center;">Grade: D</p> <ul style="list-style-type: none"> • Option meets more than half of the requirements for AAA cycling facility design. Primary issues are associated with cycling access only being provided to one side of the corridor, conflicts with pedestrians, and cyclists and vehicles travelling in opposing directions on the same side of the roadway. • Multi-use pathways are not truly considered to be AAA when the facility runs through busy pedestrian areas (i.e. the University of Guelph). 	<p style="text-align: center;">Grade: C</p> <ul style="list-style-type: none"> • Option meets more than half of the requirements for AAA cycling facility design. Primary issues are associated with conflicts with pedestrians, and cyclists and vehicles travelling in opposing directions on the same side of the roadway. • Multi-use pathways are not truly considered to be AAA when the facility runs through busy pedestrian areas (i.e. the University of Guelph). 	<p style="text-align: center;">Grade: A</p> <ul style="list-style-type: none"> • Option meets the majority of requirements for AAA facility design. • Facility will be physically separated from vehicles through the study area, but will require ramps at intersections. • Cycle facility will generally be located beyond the transit pad, though pedestrians will have to cross the cycle track to access the stop.

Category	Option 1: Protected Cycling Lanes	Option 2.1: Multi-Use Pathway, One Side	Option 2.2: Multi-Use Pathways, Both Sides	Option 3: Cycle Tracks
Engineering (Safety, Operations, and Infrastructure)	<p style="text-align: center;">Grade: D</p> <ul style="list-style-type: none"> Option requires coordination of clearing operations to prevent snow from the roadway blocking the cycle lane. Narrowed vehicular lanes may result in additional delay if emergency vehicles need to navigate between vehicles on either side of the roadway. Block-by-block phasing could be used to limit traffic and property access impacts at any given time during the construction period. Requires modification to existing roadway to install raised concrete barriers. Waste collection vehicles will be separated from curbside waste collection sites by a minimum of 2.2m and at some waste collection sites, collection staff will be required to cross the concrete barrier to pick up cans and boxes. 	<p style="text-align: center;">Grade: C</p> <ul style="list-style-type: none"> Option results in an additional 3.4m of space to be freed up between curbs that can be reallocated to provide additional auxiliary lanes where required, e.g., for transit use. Combined facility on only one side of the corridor results in significantly reduced overall cyclist and pedestrian capacity. Option has anticipated impacts to 67 hydro poles and may require approximately 120 m of underground hydro conversion. No anticipated impacts to road alignment, or waste collection. 	<p style="text-align: center;">Grade: B</p> <ul style="list-style-type: none"> Option frees up an additional 3.4m of space between curbs that can be reallocated to provide additional auxiliary lanes where required, e.g., for transit use. Option has anticipated impacts to 109 hydro poles and may require approximately 620 m of underground hydro conversion. No anticipated impacts to road alignment, or waste collection. 	<p style="text-align: center;">Grade: B</p> <ul style="list-style-type: none"> Longer temporary closure of existing cycling facilities is anticipated during construction. Option has anticipated impacts to 91 hydro poles and may require approximately 100 m of underground hydro conversion. The construction process would involve road narrowing and catch basin relocations. Construction adjacent to University would need to be scheduled for summer months.

Category	Option 1: Protected Cycling Lanes	Option 2.1: Multi-Use Pathway, One Side	Option 2.2: Multi-Use Pathways, Both Sides	Option 3: Cycle Tracks
<p>Natural Environment</p>	<p>Grade: B</p> <ul style="list-style-type: none"> Limited vegetation removals anticipated as the majority of the work is contained within the roadway itself with exception of at protected intersections. Greatest opportunities for landscaping enhancements and Low-Impact Development features due to available space. 	<p>Grade: C</p> <ul style="list-style-type: none"> Less vegetation removals than for Option 2.2 as multi-use pathways are proposed on one side only where space is limited. On the east side of the right-of-way, total width of greenspace is reduced by a minimum of 1.5 metres Generally more opportunities for landscaping enhancements and Low-Impact Development features than Option 2.2. 	<p>Grade: D</p> <ul style="list-style-type: none"> More vegetation removals than for Option 2.1 as multi-use pathways are proposed on both sides throughout the corridor. On both sides of the right-of-way, total width of greenspace is reduced by a minimum of 1.5 metres Minimal opportunities for landscaping enhancements and Low-Impact Development features due to space constraints. 	<p>Grade: C</p> <ul style="list-style-type: none"> Anticipated vegetation removals due to addition of cycle track within existing landscaped boulevard. Lost greenspace is primarily compensated through conversion of the existing cycle lane with boulevard space. Generally more opportunities for landscaping enhancements and Low-Impact Development features than Option 2.
<p>Socio-Economic Environment</p>	<p>Grade: A</p> <ul style="list-style-type: none"> Minor property impacts at protected intersections. 	<p>Grade: D</p> <ul style="list-style-type: none"> Will result in removal of existing soft surfaces, negatively impacting the appeal of the corridor. Minor property impacts anticipated. 	<p>Grade: D</p> <ul style="list-style-type: none"> Will result in removal of existing soft surfaces, negatively impacting the appeal of the corridor. Minor property impacts anticipated. 	<p>Grade: B</p> <ul style="list-style-type: none"> Minor property impacts at select transit stops and protected intersections.

Category	Option 1: Protected Cycling Lanes	Option 2.1: Multi-Use Pathway, One Side	Option 2.2: Multi-Use Pathways, Both Sides	Option 3: Cycle Tracks
Cultural Environment	<p>Grade: A</p> <ul style="list-style-type: none"> No anticipated impact to cultural heritage resources No anticipated impact to areas with archaeological potential. 	<p>Grade: C</p> <ul style="list-style-type: none"> Potential edge impacts to 3 cultural heritage resources. Potential edge impacts to 2,800 square metres of property with archaeological potential. 	<p>Grade: D</p> <ul style="list-style-type: none"> Potential edge impacts to 3 cultural heritage resources. Potential edge impacts to 3,600 square metres of property with archaeological potential. 	<p>Grade: B</p> <ul style="list-style-type: none"> Potential edge impacts to 1 cultural heritage resource. Potential edge impacts to 800 square metres of property with archaeological potential.
Anticipated Cost¹	<p>Grade: C</p> <ul style="list-style-type: none"> Estimated capital infrastructure cost of \$13.4 million. Most significant anticipated increase in fall and winter maintenance costs. Barrier infrastructure will have the potential to damage plows. 	<p>Grade: A</p> <ul style="list-style-type: none"> Estimated capital infrastructure cost of \$12.3 million. Minor anticipated increase in winter maintenance costs. Same total length of active transportation infrastructure. 	<p>Grade: C</p> <ul style="list-style-type: none"> Estimated capital infrastructure cost of \$16.1 million. Minor anticipated increase in winter maintenance costs. Same total length of active transportation infrastructure. 	<p>Grade: D</p> <ul style="list-style-type: none"> Estimated capital infrastructure cost of \$26.2 million. Annual winter maintenance budget for active transportation will double.
Conclusion	<p>Grade: B</p> <p>Option meets AAA requirements and aligns with the TMP.</p> <p>Would require additional winter maintenance considerations and results in increased maintenance costs. Requires modifications to existing roadway to install barriers and modifications to waste collection service operations.</p>	<p>Grade: C</p> <p>Option meets more than half of AAA requirements.</p> <p>Does not align with TMP as it removes cycling facilities along east side and reduces pedestrian capacity on west side. Reduces overall pedestrian capacity.</p>	<p>Grade: C</p> <p>Option meets more than half of AAA requirements.</p> <p>Option anticipated to require significant utility relocations, impact existing shrubbery and mature trees, and reduce overall permeable surface area in the ROW. Reduces overall pedestrian capacity.</p>	<p>Grade: A</p> <p>Option is most closely aligned with AAA design requirements and aligns with the TMP. Provides best separation between cyclists and vehicles which is particularly desirable in corridors with higher traffic volumes and operating speeds. Allows for transit stops to be located immediately behind the curb.</p> <p>Potential impacts to mature trees.</p>

¹ Capital infrastructure cost estimates in this table are high-level functional cost estimates. A more detailed cost estimate was completed for the preferred design option (Section 5.2).

4.4 Key Constraints

There are several constraints along the Gordon Street corridor that informed the development of the design alternatives. At key pinch points, multiple solutions needed to be considered to balance the design of a high-quality cycling facility with impacts on streetscape features, structures, utilities, vehicle travel, transit stops, and City services.

4.4.1 Existing Streetscape

A major constraint in the more urban areas of the corridor is the existing streetscape features and presence of buildings located very close to the edge of the ROW. These constraints are particularly present north of Dormie Lane / Forbes Avenue and downtown from Wellington Street to Waterloo Avenue, as discussed in the following sections.

Efforts were made to retain as many existing streetscape elements as possible, including utility poles, streetlights, and trees. Streetscape features were a notable constraint for Option 3 (cycle track) but it was possible to align sections of cycle track and sidewalks to avoid conflict with existing streetscape elements. This was more challenging for Options 2.1 and 2.2 (MUP) as the width of the MUPs was difficult to fit alongside other street elements. In the downtown section of the study corridor, this constraint significantly impacted the MUP options and prevented the design of facilities of sufficient width.

4.4.1.1 Dormie Lane / Forbes Avenue

Constraints north of Dormie Lane / Forbes Avenue, including mature trees, utility poles, and a relatively narrow ROW, are shown in **Figure 9**. Three design options were considered to address the constraint of a narrow ROW combined with utility poles and mature trees north of Dormie Lane / Forbes Avenue, as described below.

Figure 9: Gordon Street North of Dormie Lane / Forbes Avenue (Source: Google Maps)



One option was to remove the mature trees and relocate or bury utilities to maintain the existing curb-to-curb and vehicle lane widths, shifting the sidewalk further to the edge of the ROW, and constructing a cycle track adjacent to the sidewalk.

A second option was to maintain the existing curb-to-curb and vehicle lane widths and weave the cycle track and sidewalk around the mature trees and utilities. However, this option may have required the acquisition of some land outside the existing ROW.

The third solution, which was ultimately recommended in the preferred Option 3 (cycle track), involves realigning curbs, narrowing the roadway and vehicle lanes, removing the existing painted cycle lane, and removing the painted buffer between the vehicle lanes. These changes allowed for 6.2 m to be reallocated to cycle tracks and boulevards while maintaining the existing back of sidewalk, thus avoiding the need for tree removal or land acquisition. At the intersection, the left turn lane was maintained by narrowing the boulevards to near minimum. While this reduces the separation of cyclists from vehicular traffic, it was deemed to be the most acceptable trade-off given the constraints.

4.4.1.2

Downtown

In the downtown area from Wellington Street to Waterloo Avenue, old buildings close to the property line and sidewalk, and a consistent row of trees in the boulevard, presented design challenges. These features can be seen on Gordon Street south of Nottingham Street in **Figure 10**.

Figure 10: Gordon Street South of Nottingham Street (Source: Google Maps)



Land acquisition and widening of the ROW was not an option in the downtown area due to the buildings along the property line. As such, one option to maintain the existing curb-to-curb and vehicle lane widths was to remove all trees along the boulevards and relocate streetlights to construct a cycle track in the existing boulevard. This option was not ideal given the number of trees in the boulevards.

A second option was to remove one of the four vehicle lanes and add a centre turn lane, reducing the overall number of lanes to 3. This adjustment would allow for curb realignment and cycle track construction on the roadside of the existing boulevard, with the boulevard trees remaining. Given vehicular traffic volumes on this stretch of Gordon Street, this was also not desirable.

The third option, which was ultimately recommended, involves:

- Curb realignment;
- Removal of the existing painted cycling lanes;
- Slight narrowing of the two inside vehicle lanes; and
- Slight narrowing of the existing boulevards to place the cycle track between the trees and the roadway.

With narrow buffers between the cycle track and roadway, this option reclaims enough space for sufficient cycle track width. However, further study will be needed in detailed design as this option requires precise measurements and alignment.

4.4.2 Slopes and Retaining Walls

The presence of slopes and retaining walls limited the amount of usable space within the ROW in certain areas. An example of these conditions is provided in **Figure 11**, where the roadway slopes downward on the south approach to the Speed River.

Figure 11: Gordon Street North of Dean Avenue (Source: Google Maps)



Due to relatively wide vehicle lanes and a greater acceptance for curb realignment, Option 3 (cycle track) was not significantly impacted by this constraint. Typically, sufficient cycle track widths could be maintained but boulevard widths were required to be relatively narrow, negatively impacting cyclist comfort.

The retaining walls presented a significant challenge for Options 2.1 and 2.2 (MUP) due to existing 1.5 m or 1.8 m sidewalks and narrow boulevards directly adjacent to the retaining wall. This left little room for a MUP and boulevard that met design goals.

4.4.2.1

Key Pinch Points

Slopes and retaining walls presented a major constraint over two segments of Gordon Street: from University Avenue to Dormie Lane / Forbes Avenue and from Monticello Crescent to Stone Road. Fewer design solutions were available at these locations given the cost and difficulty of moving retaining walls or levelling slopes. As such, only two options were considered. With the lack of existing boulevard space at these locations, curb realignment cannot be avoided.

One option was to maintain the existing sidewalk alignment and widths of 1.5 m, and realign the curb to construct a cycle track on the road side of the existing utility poles. From University Avenue to Dormie Lane / Forbes Avenue, this would require the removal of the existing painted cycle lanes and centre painted buffer. From Monticello Crescent to Stone Road, this would require a significant narrowing of vehicle lanes and an absolute minimum cycle track width.

The other alternative, which was ultimately recommended, was to widen the sidewalks to 2 m (maintaining the existing back of sidewalk) and construct wide cycle tracks. From University Avenue to Dormie Lane / Forbes Avenue, extra space could be reclaimed from removing the painted cycle lanes and removing the centre painted buffer. From Monticello Crescent to Stone Road, removing the painted cycle lanes and narrowing the boulevards could achieve this outcome. Utility poles can either be relocated or the utility cables could be buried. This option gives more space to pedestrians, improving comfort when walking beside the retaining walls, and provides wider cycle tracks for improved comfort, particularly when ascending or descending the hill from University Avenue to Dormie Lane / Forbes Avenue.

4.4.3

Operational Constraints

Other general constraints that impacted the design included vehicle lane widths, Guelph Transit services, Emergency Services and the operation of City services. Through lane widths were initially proposed to be reduced to 3.3 m and turn lanes reduced to 3 m for the length of the corridor. However, in response to concerns regarding transit and

Emergency Services access, curb lane widths were increased to 3.5 m and turn lanes were designed to be 3.3 m. The 3.5 m lane width was considered of particular importance for two lane sections of the corridor to provide enough space for vehicles to pull over to let emergency vehicles pass.

Transit stops were another challenge when developing all design alternatives. Due to the characteristics of the different cycling facility types and space constraints, maintaining access to transit stops while minimizing conflicts with cyclists was challenging. This was particularly relevant for Option 1 (protected bike lane) and Options 2.1 and 2.2 (MUP), where conflicts were unavoidable in some locations. For most transit stops, Option 3 (cycle track) proved to be the best alternative to minimize conflicts and maintain transit access for all.

Another design consideration is the future transit improvements associated with the designation of Gordon Street and several intersecting roads as part of the QTN in the TMP (2022). As noted in **Section 3.1.1.3**, this study assessed the feasibility of, and preferred approach for, implementing AAA cycling facilities within the existing Gordon Street study corridor. If and when transit priority measures such as queue jump lanes, lane conversion, or road widening are required in the future, the roadway design for all transportation modes will need to be reviewed.

Preferred Design Option

This study has determined that AAA cycle facilities can be implemented on Gordon Street between Clair Road and Lowes Road, and between Edinburgh Road and Waterloo Avenue. Option 3 (cycle tracks) has been selected as the preferred design option throughout the study corridor.

For the section between Edinburgh Road and Lowes Road, the Gordon Street Improvements EA recommended MUPs. It is recommended the ultimate design for that section be reviewed as part of detailed design in light of the recommendations of this study. For continuity, the conceptual design includes cycle tracks through this section of Gordon Street.

Although one consistent treatment is recommended for the entire corridor, there are a variety of differing contexts along its length that necessitate careful consideration of cycle track application. In general, the southern segment of the Gordon Street corridor, from Clair Road to Stone Road, is a suburban arterial roadway. With the relatively wide ROW, 2 m wide cycle tracks and 2 m wide sidewalks could be accommodated without impacting the number of vehicle lanes. Ample space in this section also allowed for the recommendation of grass boulevard widths ranging from 1.5 m to 3 m, separating the cycle track from the roadway. A typical section for the southern segment of Gordon Street is shown in **Figure 12**.

Figure 12: Gordon Street Looking Southbound from South of Kortright Road



North of Stone Road, the context of Gordon Street changes and the streetscape and land use begins to reflect a more urban form. From Stone Road to College Avenue, wider facilities and medians are recommended to accommodate the increased cyclist and pedestrian activity associated with the University of Guelph, as described in **Section 5.1**. From College Avenue to Waterloo Avenue, there is generally limited available space within the ROW due to retaining walls on the south approach to the Speed River and street trees toward downtown. Cycle track widths along this segment are limited to 1.8 m and boulevard widths separating the cycle track from the roadway are limited to 0.5 m in several areas. A typical section for this segment of Gordon Street is provided in **Figure 13**.

Figure 13: Gordon Street Looking Southbound from Waterloo Avenue



5.1 Major Features of the Conceptual Design

The conceptual design drawings are included in **Appendix N**. Key features of the recommended design include the following:

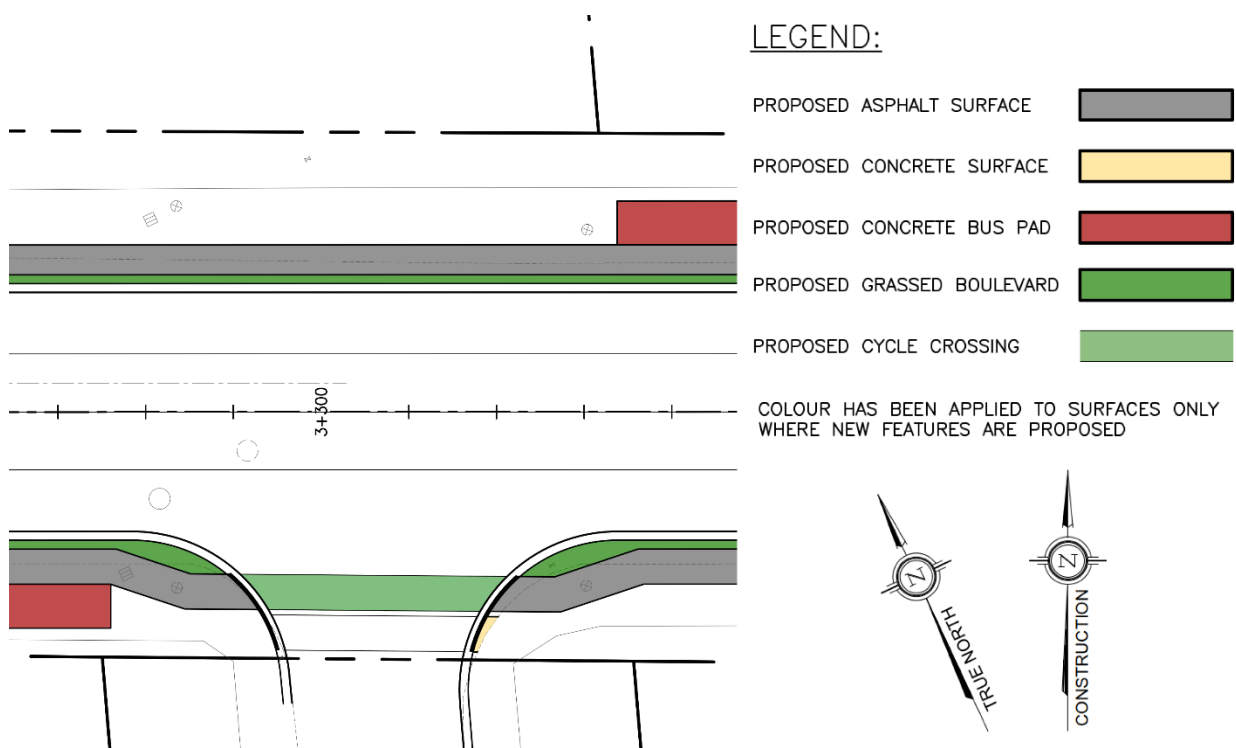
Protected Intersections: A protected intersection is a Dutch-inspired design treatment that provides physically separated spaces for cyclists, pedestrians, and vehicles. The intent is to improve safety and comfort for all users by minimizing potential conflict points. Cyclists will complete left turns through a two-stage process that involves travelling counter-clockwise outside the vehicular lanes and parallel to pedestrians. “Right on red” turn restrictions can be considered to further reduce conflicts.

Protected intersections are proposed at Clair Road, the Pergola Commons entrance north of Clair Road (near Tim Hortons), Edinburgh Road, Kortright Road, Harvard Road, Stone Road, South Ring Road, College Avenue, and Waterloo Avenue. At the Stone Road intersection, the conceptual design assumes removal of the right turn lanes on Gordon Street to minimize property impacts. Design treatments at all intersections are recommended to be reviewed during detailed design. Special attention is required at protected intersections, which should include the following details:

- Sufficient cyclist queueing space (minimum 1.8 m) should be provided so cyclists do not block the bike lane when waiting to cross the street;
- Cross-rides should be set back by a sufficient distance (ideally one car length) to improve driver visibility of cyclists and reduce turn conflicts; and
- Medians should extend beyond the crosswalk and cross-ride to provide pedestrians and cyclists with a protected refuge in case they cannot cross the entire width of the street in one light cycle.

Cycle Track Bend-outs: Where possible within the right-of-way, at intersections where full protection was not recommended, a cycle track bend-out is recommended at the cross street. An example of a bend-out, on the west side of Gordon Street at Nottingham Street, is shown in **Figure 14**. These bend-outs provide additional space between the roadway and crossing cyclists. As a result, drivers have more space to pull off the travelled lanes on Gordon Street as they wait for cyclists to cross. When proceeding across the cycle track, drivers meet cyclists at an angle closer to 90 degrees, improving visibility of cyclists and reducing the risk of right-hook collisions.

Figure 14: Cycle Track Bend-out, West Side of Gordon Street at Nottingham Street



Floating Bus Stops: From Clair Road to Albert Street, floating bus stops are provided with the cycle track passing behind the platform for boarding and alighting transit vehicles. A minimum platform width of 1.5 m is provided to accommodate comfortable navigation by transit users while minimizing conflicts with cyclists.

Due to constrained conditions from Albert Street to Waterloo Avenue, floating bus stops could not be achieved within this segment (with the exception of the northbound bus stop at Surrey Street). As a result, transit users will need to board and alight the bus directly from the cycle track. Pavement markings and signage will be needed on the cycle track to indicate that cyclists must yield to pedestrians when present. These features will need to be incorporated in detailed design.

University of Guelph Design Features: To reflect and accommodate the increased cyclist and pedestrian activity around the University of Guelph, 2.2 m cycle tracks have been recommended from Stone Road to College Avenue. Facilities of this width provide greater cyclist comfort and allow users to ride side-by-side or overtake others. The cycle facility will be accompanied by sidewalks ranging from 2.2 m to 3 m in width.

A 1.6 m to 2.6 m continuous centre median has also been recommended for this segment to provide pedestrian refuge, visually narrow the roadway to reduce vehicle speeds, and improve the aesthetics of the streetscape. This centre median is recommended to be mountable to allow Emergency Services to overtake vehicles in the 3.5 m travel lane.

Improved Trail Connections: On either end of the Gordon Street bridge, a short section of MUP is recommended on both sides of Gordon Street to connect the pathways and parks (Royal Recreation Trail, Marianne's Park, Royal City Park, and the Covered Bridge) on either side of Gordon Street. These MUP connections and cross-rides at Gordon Street and Albert Street, and at the mid-block crossing north of the bridge, will allow cyclists coming from the parks and pathways to continue across Gordon Street without dismounting their bicycles.

Pedestrian and Cyclist Crossings: Existing pedestrian crossovers on the north and south side of the Speed River, and between South Ring Road and McGilvray Street, will be modified to include enhanced pavement markings, signage, and cycle facility connections. A new pedestrian/cyclist crossing is also proposed at the intersection with Hands Drive.

5.2 Estimated Capital Cost

Based on the conceptual design, the estimated capital cost of the improvements to Gordon Street between Clair Road and Lowes Road, and between Edinburgh Road and Waterloo Avenue, is \$25.9 million. This cost estimate does not include property acquisition or contemplation of full road reconstruction. High-level cost estimates are included for upgrading the existing signalized intersections to protected intersections at Clair Road, the Pergola Commons entrance north of Clair Road (near Tim Hortons), Edinburgh Road, Kortright Road, Harvard Road, Stone Road, South Ring Road, College Avenue, and Waterloo Avenue.

The Class C cost estimate for the recommended design is included in **Appendix O**. Additional notes are included within the cost estimate for reference.

5.3 Additional Design Considerations

The following sections outline additional considerations that should be incorporated into the detailed design for the corridor.

5.3.1 Stormwater Management

Opportunities may exist to include LID measures within grassed boulevards when the corridor is reconstructed. Preliminary identification of opportunities/locations for LID measures is included in **Appendix E**. Opportunities to incorporate LID measures within the study corridor should be explored through the ongoing Stormwater Management Master Plan update.

In general, it is anticipated that sufficient, conflict-free space for LID measures will exist in various segments of the study area. As the project is located in a source water protection area, infiltration based LID measures may not be desirable. Filtration LID measures may be more suitable, which pass surface runoff through a filter medium. The treated stormwater is then collected by a perforated underdrain that outlets to a storm sewer, or natural outlet. Any filtration alternative would require impermeable lining to prevent infiltration, or a gate/valve that could prevent runoff from entering the feature during winter months. Enhanced grassed swales, bioretention cells, permeable hardscapes, tree root support systems, subsurface sand filters, and rain gardens are examples of LID filtration features that can treat surface runoff through filtration.

5.3.2 Auxiliary Lane Requirements

With the exception of right turn lane removals at the Stone Road intersection (**Section 5.1**), this study did not consider opportunities to change the number of existing vehicular lanes. Prior to detailed design, it is recommended that traffic analysis be completed to confirm the need for right and left turn lanes at each of the proposed protected intersections. Turn lanes impact both intersection size and safety.

5.3.3 Cycling Supportive Design Features

The following cycling-supportive design features should be incorporated into the detailed design for Gordon Street:

- Bike racks;
- On-street tool kits;
- Pedestrian level lighting;
- Bike signals;
- Street trees; and
- Pavement markings and signs.

5.4 Impacts and Mitigation

The anticipated impacts and recommended mitigation measures for the project, based on the conceptual design, are summarized in **Table 4**. Overall, minimal environmental impacts are anticipated. Mitigation measures outlined in **Table 4** are to be incorporated into the future detailed design and construction phases.

Table 4: Anticipated Impacts and Mitigation Measures

Category	Environmental Feature	Impacts and Mitigation
Natural Environment	Street trees	<p>Construction activities have potential to impact trees in the area of impact. A tree survey and inventory within the proposed municipal right-of-way should be completed during detailed design, including documentation of trees with a diameter at breast height of 10 centimetres or greater.</p> <p>A Landscape Plan is to be prepared following detailed design. The Landscape Plan should incorporate planting of native trees within the boulevard, where possible. Plantings within the Brooklyn and College Hill HCD should adhere to applicable guidelines.</p>

Category	Environmental Feature	Impacts and Mitigation
Natural Environment	Speed River	<p>Minor widening at the approaches to the Gordon Street bridge will involve minor construction in the Speed River riparian areas. Vegetation removal may cause impacts to nesting birds. Vegetation removal and construction activity on the river banks may cause erosion and sedimentation into the Speed River, impacts to water quality, and associated impacts to fish, turtles, their habitat, and to SWH for Waterfowl Overwintering Areas. To mitigate these potential impacts, the following mitigation measures are recommended:</p> <ul style="list-style-type: none"> • Minimize the extent of construction works in vegetated areas to the extent that is practical. • Avoid vegetation removal during the bird nesting period (April 1 – August 31) where feasible. If vegetation removal is required during this period, conduct a search of the vegetated areas for the presence of nesting birds (to be conducted by a qualified biologist), and remove vegetation only after each area has been confirmed to be free of nesting birds. • Develop and implement an Erosion and Sediment Control Plan that would prevent sedimentation into the Speed River. The Erosion and Sediment Control Plan should include the use of silt fencing, silt socks, straw bales, and other suitable erosion prevention measures.

Category	Environmental Feature	Impacts and Mitigation
Natural Environment	Speed River	The operation of construction equipment and road painting have the potential for leaks and spills into the Speed River and impacts to water quality and associated impacts to fish, turtles, their habitat, and to SWH for Waterfowl Overwintering Areas. A Spill and Leak Prevention and Response Plan should be developed and implemented.
	Wildlife	The establishment of buffers from natural heritage features is expected to minimize potential impacts to wildlife, including potential SAR habitat within the study area. Strategies to mitigate impacts to general wildlife prior to and during construction are provided within the EIS included in Appendix H .
	General	An Environmental Monitoring Plan is to be developed and carried out through the duration of construction activities on-site to review that the erosion and sediment control measures operate effectively and to monitor the potential impact, if any, upon the natural environment.

Category	Environmental Feature	Impacts and Mitigation
Water Resources	Drainage and stormwater management	<p>Minimal increase in impervious surface area is anticipated. Throughout the corridor, the road width is being reduced by a nearly equivalent width to the new cycle track infrastructure. This reduction in road width will require existing catch basins to be relocated to the proposed curb and gutter alignment. Some increase in impervious area is anticipated at protected intersections; capacity of the existing storm sewer to capture the increased impervious area will need to be assessed during detailed design.</p> <p>Opportunities to incorporate LID measures within the study corridor should be explored through the ongoing Stormwater Management Master Plan update. Preliminary identification of opportunities and potential locations for LID measures is included in Appendix E.</p>
	Source water	<p>Potential for impacts to source water due to construction activities within sensitive areas throughout the study corridor. A groundwater study should be completed during detailed design to determine potential impacts, mitigation measures, and permitting requirements (if any).</p>
Socio-Economic Environment	Property impacts	<p>Potential property impacts have been identified at several proposed protected intersections. Opportunities to reduce property impacts should be explored during detailed design. Consultation with impacted property owners should be completed during detailed design when the area of impact is confirmed.</p>

Category	Environmental Feature	Impacts and Mitigation
Socio-Economic Environment	Construction-related disruptions	<p>Implementation of the cycling facilities will cause localized disruptions during construction, including lane closures on Gordon Street and at intersections, as well as noise, vibration, and dust. Traffic control measures are required to follow Ontario Traffic Manual – Book 7. Noise control measures including timing restrictions and standard mitigation measures should be developed during detailed design and incorporated into the construction contract in accordance with the local noise by-law. If public complaints are received during construction, they should be addressed as required.</p> <p>Construction adjacent to the University of Guelph should be limited to months when the school is not in session. Construction timeframes should be discussed with, and agreed to, by the University.</p>

Category	Environmental Feature	Impacts and Mitigation
Cultural Environment	Built heritage resources and cultural heritage landscapes	<p>No direct impacts to known or potential cultural heritage resources are anticipated.</p> <p>Potential for vibration impacts and accidental impacts is low; however, the location of all identified built heritage resources and cultural heritage landscapes outlined in Appendix K should be considered in decisions regarding construction laydown. Locations of heritage properties should be clearly marked on all project mapping and workers should be made aware of heritage properties in the vicinity of their workspace.</p> <p>As design and construction of the cycling facilities progresses, design should continue to avoid encroachment onto the heritage properties identified in Appendix K. Should it be determined that there is no other technically feasible location for infrastructure, encroachment should be minimized.</p> <p>Significant changes to design in the vicinity of the heritage properties listed in Appendix K should be reviewed for potential impacts to the cultural heritage value or interest or heritage attributes of identified cultural heritage resources.</p>

Category	Environmental Feature	Impacts and Mitigation
Cultural Environment	Archaeological resources	Potential for impact to archaeological resources within portions of the study area that retain archaeological potential. Within these areas, Stage 2 test pit surveys at 5 m intervals are required in accordance with Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists (Ministry of Heritage, Sport, Tourism and Culture Industries, 2011). Should deeply buried archaeological materials be encountered during construction, all work must cease, and a professionally licenced archaeologist shall be consulted to assess the cultural heritage value and significance of any such archaeological deposits.
Engineering	Utilities	Coordination with affected utilities is required during detailed design when impacts have been confirmed. Based on the conceptual design, significant impacts to above-ground hydro have been identified, including the need to bury select segments.

5.5 Recommended Implementation Plan

This section summarizes the recommended phasing for construction of the project. Further details are presented in the Implementation Phasing Memo (**Appendix P**; Dillon, March 2023). The memo presents the project limits and phasing for the Gordon Street study corridor as part of a larger program of construction including cycling improvements on Gordon Street and Eramosa Road.

Gordon Street is recommended to proceed in five phases of implementation, as shown in **Table 5**. The projects on Gordon Street are recommended to be implemented after the cycling improvements on College Avenue. The strategy does not identify time frames for implementation, which are highly dependent on fiscal viability and ability to coordinate works with other capital projects.

An important consideration in the recommended phasing is to include the intersection reconstructions within each phase as part of ensuring safe continuity of the facilities through these complex intersections, and offering safe transition points to the existing on-street facilities.

Table 5: Recommended Project Phasing for Gordon Street

Phase	Project Limits	Project Description
1	Gordon Street, Stone Road to College Avenue	<ul style="list-style-type: none"> Protected intersections at College Avenue, South Ring Road, and Stone Road; Removal of existing on-street cycle lanes, including relocation of curbs and catchbasins (both sides); Installation of asphalt cycle tracks and replacement of existing sidewalks (both sides); Landscape improvements; and A Schedule B Class EA study may be required to consider QTN transit priority implementation, which could impact timing.

Phase	Project Limits	Project Description
2	Gordon Street, College Avenue to Royal City Park	<ul style="list-style-type: none"> • Removal of existing on-street cycle lanes, including relocation of curbs and catchbasins (both sides); • Installation of asphalt cycle tracks and replacement of existing sidewalks (both sides); and • Landscape improvements.
3	Gordon Street, Royal City Park to Waterloo Avenue	<ul style="list-style-type: none"> • Protected intersection at Waterloo Avenue; • Removal of existing on-street cycle lanes, including relocation of curbs and catchbasins (both sides); • Installation of asphalt cycle tracks and replacement of existing sidewalks (both sides); and • Landscape improvements.
4	Gordon Street, Edinburgh Road to Stone Road	<ul style="list-style-type: none"> • Protected intersections at Edinburgh Road South, Kortright Road, Harvard Road, and Stone Road²; • Removal of existing on-street cycle lanes, including relocation of curbs and catchbasins (both sides); • Installation of asphalt cycle tracks and replacement of existing sidewalks (both sides); and • Landscape improvements.
5	Gordon Street, Clair Road to Lowes Road	<ul style="list-style-type: none"> • Protected intersections at Clair Road and the Pergola Commons entrance north of Clair Road (near Tim Hortons);

² Protected intersection at Gordon Street and Stone Road is accounted for in Phase 1.

Phase	Project Limits	Project Description
		<ul style="list-style-type: none"> • Removal of existing on-street cycle lanes, including relocation of curbs and catchbasins (both sides); • Installation of asphalt cycle tracks and replacement of existing sidewalks (both sides); and • Landscape improvements.

6.0 Recommended Future Work

6.1 Additional Recommended Studies

The following additional studies are recommended prior to implementing cycle tracks on Gordon Street between Clair Road and Waterloo Avenue:

- Complete a detailed topographical survey of the corridor within 5 m of the ROW mid-block and within 10 m of the ROW at protected intersections at a minimum;
- Complete traffic impact studies ahead of detailed design to:
 - Confirm vehicular lane requirements;
 - Assess the need and feasibility of removing dedicated right turn lanes and implementing right on red turn restrictions at protected intersections; and
 - Consider future QTN needs.
- Review public comments regarding the conceptual design and adjust the design where appropriate to address concerns;
- Review design treatments at all intersections during detailed design to identify conflicts with future transit improvements and confirm there is sufficient space for the required protected intersection features;
- Initiate a Schedule B MCEA study for the section from South Ring Road to College Avenue to assess the feasibility and impacts of a transit-only lane expansion, as recommended in the TMP (if required);
- Conduct a Tree Inventory and develop a Tree Protection Plan for lands within the proposed municipal ROW, including documentation of trees with a diameter at breast height of 10 centimetres or greater;
- Conduct a geotechnical and groundwater study ahead of detailed design to determine potential impacts, mitigation measures, and permitting requirements (if any) to minimize source water impacts as well as to inform design of LID measures;
- Explore opportunities to incorporate LID measures within the study corridor through the ongoing Stormwater Management Master Plan update;
- Develop and implement an Environmental Monitoring Plan;
- Complete Heritage Impact Assessments for locations where identified Cultural Heritage Resources may be impacted;

- Stage 2 archaeological assessment is required within portions of the study area that retain archaeological potential, including consultation with First Nations;
- A lighting study should be completed to assess and confirm that existing streetlight light levels are sufficient to meet cyclist and pedestrian needs;
- Updated utility information should be compiled and reviewed as a component of detailed design. A minimum Subsurface Utility Engineering (SUE) investigation with level of Accuracy Level B is recommended.
- Streetscaping plans should be prepared for each stage of the project, with particular attention to the requirements identified through the Brooklyn and College Hill Cultural Heritage Conservation District Guidelines; and
- A public education program should be developed regarding how to navigate protected intersections as a pedestrian, cyclist, and driver.

6.2 Consultation

The following future consultation activities are recommended to be completed as the project proceeds through detailed design:

- Engage with the University of Guelph starting at 30 percent design, particularly on matters related to property impacts, streetscaping, and construction access;
- Consult with impacted property owners regarding required property acquisition when the area of impact is known;
- Engage the Indigenous communities contacted as part of this study prior to conducting further archaeological work to determine their level of interest and involvement; and
- Consult with affected utility companies during detailed design when utility impacts are known.

6.3 Anticipated Permits and Approvals

It is anticipated that the following approvals will need to be obtained prior to construction start:

- A letter from the Ministry of Citizenship and Multiculturalism indicating that the required archaeological assessment report(s) have been entered into the Ontario Public Register of Archaeological Reports is required prior to any ground disturbance;

- The requirement for a permit from the Grand River Conservation Authority should be confirmed during detailed design; and
- The requirement for an Environmental Compliance Approval from the Ministry of the Environment, Conservation and Parks should be confirmed during detailed design.

6.4 Construction Monitoring

Construction monitoring requirements should be developed during the detailed design stage once project specific details are determined and in accordance with any permits, approvals, licenses, or authorizations obtained prior to construction. If, during detailed design or construction, changes are required to identified mitigation measures, they should be implemented through provisions in the construction contract as administered by the contract administrator.