

Transportation Feasibility Study of Metrolinx's Guelph Subdivision Existing Level Rail Crossing Locations Study Report - FINAL

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Prepared For: City of Guelph

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Executive Summary

Project Overview

Metrolinx is expanding service along the Kitchener GO rail line through Guelph, which includes two-way all-day GO service. Increasing the frequency and speed of GO trains may require changes at several level rail crossings (LRCs) in Guelph to meet safety regulations and current design standards in accordance with Transport Canada's *Railway Safety Act*. While there are no current plans to close or change any existing level rail crossings, the City is proactively undertaking this transportation feasibility study to protect the safety and connectivity at the crossings should there be any future changes.

Therefore, the City of Guelph has retained Parsons to complete a transportation feasibility study to understand what crossing options are feasible. Options include grade separation (overpass or underpass), active transportation-only crossings, road closures, or maintaining the existing level rail crossings (do nothing). The feasibility study focuses primarily on transportation impacts such as traffic performance, operations, safety and connectivity, but also considers City plans and policies, constructability, property and cost impacts at a high level. As the focus of this study was on transportation feasibility, other impacts, such as the natural, cultural and socio-economic environments, were not considered as part of this study.

The transportation feasibility study was divided in Study Areas A and B due to location of the level rail crossings and their proximity and impacts to each other. Study Area A includes the level rail crossings at Alma Street, Edinburgh Road, Yorkshire Street, and Glasgow Street as well as the active transportation-only crossings at Margaret Greene Park and Dublin Street. Study Area B includes the level rail crossing at Watson Road and includes the active transportation-only crossing at Cityview Drive.

Public and Stakeholder Engagement

Consultation with members of the public and relevant stakeholders was conducted as part of the study. The key public engagement milestones included:

- the Notice of Study and Online Survey in November 2022 to announce the commencement of the study and to understand public perception and use of the level rail crossings;
- the online Public Open House on June 1, 2022, that was held to present the findings on this transportation feasibility study; and,
- two information sessions on June 20 and 22, 2022 to provide additional information, particularly on the potential Edinburgh Road grade separation.

Specific stakeholders were also contacted based on their interest and relevance to this study, which included Metrolinx, Guelph Coalition for Active Transportation, and local school boards.

Transportation Analysis and Level Rail Crossing Alternatives

The study team conducted an existing traffic conditions analysis for Study Areas A and B to set the baseline context for the transportation system and to identify the existing traffic operational concerns. Conceptual design drawings of various options at each level rail crossing and each new active transportation-only crossing were also prepared to get a high-level understanding of footprint and grading impacts as well as to determine what was feasible, particularly for underpasses and overpasses. The existing traffic conditions analysis and the conceptual designs informed the preparation and evaluation of alternatives and scenarios for the level rail crossings.

For Study Area A, as there were four crossings that were directly related to each other, seven scenarios were prepared that captured various combinations of crossing options. The seven scenarios are:

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Scenario	Alma Street	Edinburgh Road	Yorkshire Street	Glasgow Street
A1	Do Nothing	Do Nothing	Do Nothing	Do Nothing
A2	Overpass	Underpass	Underpass	Underpass
A3	Closed	Do Nothing	Closed	Closed
A4	Closed	Underpass	Closed	Closed
A5	Closed	Do Nothing	Do Nothing	Closed
A6	Closed	Underpass	Do Nothing	Closed
A7	Do Nothing	Underpass	Do Nothing	Do Nothing

The future traffic (2041) analysis and grade separation warrant analysis were completed for all seven scenarios. Those findings were used to evaluate the seven scenarios against the following criteria: local traffic circulation, connectivity, traffic operations, City planning and operations guidelines, constructability, property impacts, and costs.

Based on the evaluation, A7 is the preferred scenario and ranks 1st compared to the other scenarios. A7 includes grade separation of Edinburgh Road with an underpass structure; the grade separation would require the completion of an Environmental Assessment to determine optimal solution/design at this location. At the other level rail crossings in Study Area A, it is recommended that the existing conditions be maintained (i.e., “Do Nothing”). Traffic operations and safety should continue to be monitored at the LRCs should there be changes at the intersection that may warrant improvements or change. If closure to vehicles is warranted at these LRCs, active transportation-only crossings should be considered.

For Study Area B, which covers only the Watson Road level rail crossing, the alternatives considered include Do Nothing, Closure, or Grade Separation. Based on the assessment of the three alternatives, the “Do Nothing” option is the preferred scenario. It is recommended that traffic operations and safety should continue to be monitored at the Watson Road LRC should there be changes at the intersection that may warrant improvements or change.

New Active Transportation-Only Crossings

The scope of this transportation feasibility study also includes reviewing three potential active transportation-only crossings. These three locations at Cityview Drive, Margaret Greene Park and Dublin Street were identified as key desirable connections in the City of Guelph. There are no formal crossings at these locations at this time, though there are signs that people cross the rail corridor despite not having any formal crossing infrastructure.

The three options for an active transportation-only (AT-only) crossing include:

- a level rail crossing with enhanced safety measures,
- an overpass and
- an underpass/tunnel.

Based on a review of the three AT-only crossings locations, including existing grades, the following is recommended:

AT-Only Crossing Location	Preliminary Preferred Crossing Option
Cityview Drive	Underpass (Tunnel) or Overpass (Bridge)
Margaret Greene Park	Underpass (Tunnel)
Dublin Street	Level Rail Crossing ¹

¹ Metrolinx is not supportive of this crossing option

Next Steps

This is a feasibility study to determine what options are feasible at each of the level rail crossing locations and potential AT-only crossings. Further analysis, including additional design work and more site-specific review, is required to determine impacts and confirm feasibility.

Further environmental assessment (EA) studies through the Municipal Class EA process are required to evaluate the alternatives for the crossings and consider other criteria that were not considered under this feasibility study (such as natural heritage, cultural, socio-economic, etc.).

1 Introduction

Parsons has been retained by the City of Guelph (the 'City') to undertake a transportation feasibility study to explore the transportation impacts on five level rail crossings and three potential active transportation (AT) crossings along the Metrolinx corridor. A level rail crossing refers to the intersection of a road and a railway line at the same elevation. At a level rail crossing, the road and railway are at conflict with one another in that only one can be crossed safely at a given time.

This study aims to review and evaluate different level rail crossing options based on transportation policies and traffic operations at each crossing as well as determine a preferred option if there were potential impacts and changes required at the crossing. To achieve that, an existing conditions and future traffic study was undertaken for the areas around the level rail crossings that looked at travel patterns, traffic demand and operations of the current network and future crossing scenarios. The study also looks at conceptual crossing options and the next steps for implementing the preferred scenario, if warranted.

1.1 Study Purpose

Metrolinx is expanding service along the Kitchener GO rail line through Guelph, which includes two-way all-day GO service. Increasing the frequency and speed of GO trains may require changes at several level rail crossings in Guelph to meet safety regulations and current design standards in accordance with Transport Canada's *Railway Safety Act*. While there are no current plans to close or change any existing level rail crossings, the City is proactively undertaking this transportation feasibility study to protect the safety and connectivity at the crossings should there be any future changes. Changes could include:

- Metrolinx service expansion (more frequent or faster trains);
- Transport Canada safety and design standards updates; and
- Growing and changing travel patterns in the City.

The City of Guelph retained Parsons to complete a transportation feasibility study to provide a high-level and conceptual understanding of what options at the crossings are feasible. This study includes an analysis of existing Metrolinx level rail crossings and the transportation impacts of various scenarios on the crossings. Also included in the study is an assessment of three potential active transportation-only crossings. This study involves collecting and analyzing the movements of people by different modes of travel and testing possible changes to that network (for example, the impact of closing a road at the rail line or maintaining access). This study will evaluate the feasibility of various crossing options based on impacts to the whole transportation system. The feasibility study focuses primarily on transportation impacts such as traffic performance, operations, safety and connectivity, but also considers City plans and policies, constructability, property and cost impacts at a high level. As the focus of this study was on transportation feasibility, other impacts, such as the natural, cultural and socio-economic environments, were not considered.

1.2 Rail Crossing Options

This transportation feasibility study will consider several options for the level rail crossings:

- Level rail crossing, or an at-grade crossing, which means maintaining existing conditions
- Overpass, where the road passes over the railway tracks
- Underpass, where the road passes under the railway tracks
- Close the road, such that no vehicles can cross the railway tracks

All the options above would also accommodate active transportation at the crossing. For the active transportation-only crossings, the options that can be implemented include:

- A level rail crossing, or an at-grade crossing

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- AT-bridge, where active transportation users cross above the railway tracks
- AT-tunnel, where active transportation users cross under the railway tracks

1.3 Study Area

The transportation feasibility study was divided in study areas A and B due to location of the level rail crossings and their proximity and impacts to each other. The active transportation-only crossings are shown on the study area maps, however, were considered separately for the analysis.

1.3.1 STUDY AREA A

Study Area A includes the Metrolinx level rail crossings at Alma Street, Edinburgh Road, Yorkshire Street, and Glasgow Street as shown in Figure 1. The active transportation-only crossings at Margaret Greene Park and Dublin Street are also found in Study Area A. This study does not include a review or analysis of the Canadian National (CN) Railway / Guelph Junction Railway (GJR) rail-crossings to the north; the focus of the study is on the crossings along the Metrolinx rail corridor.

Study Area A is located in the City's 'Old City' and 'Guelph Junction' communities, comprised primarily of low-density residential neighbourhoods in a dense grid pattern.

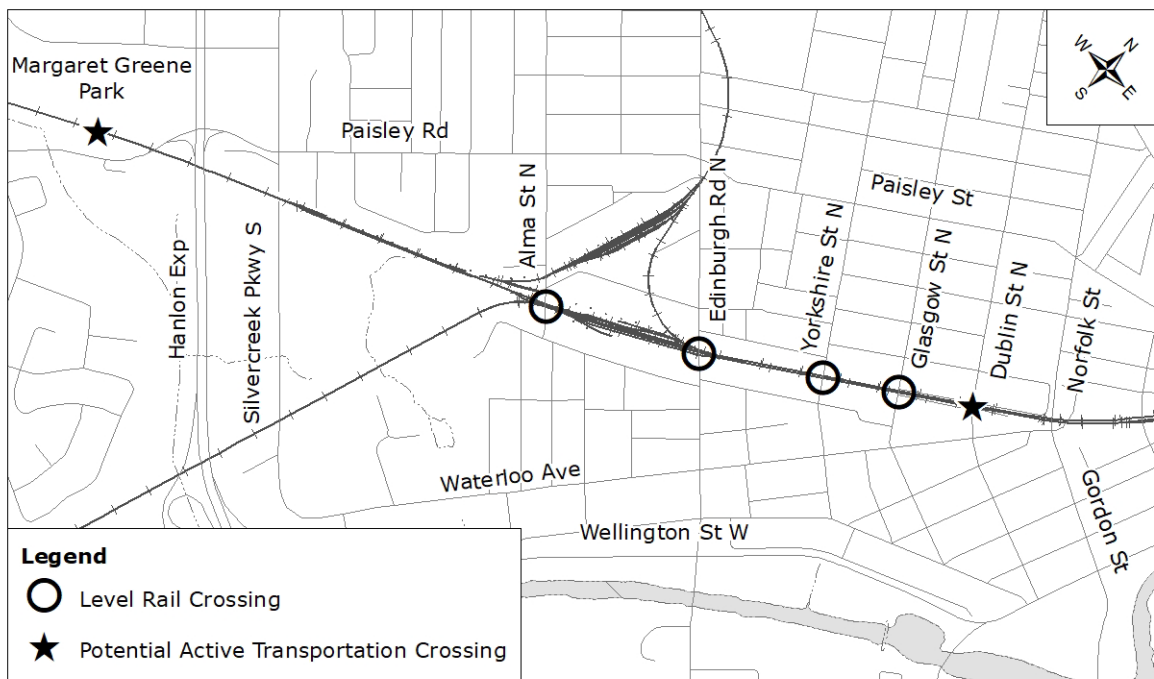


FIGURE 1: STUDY AREA A

1.3.2 STUDY AREA B

Study Area B includes the Metrolinx level rail crossing at Watson Road as shown in Figure 2. The active transportation-only crossing at Cityview Drive is also found in Study Area B.

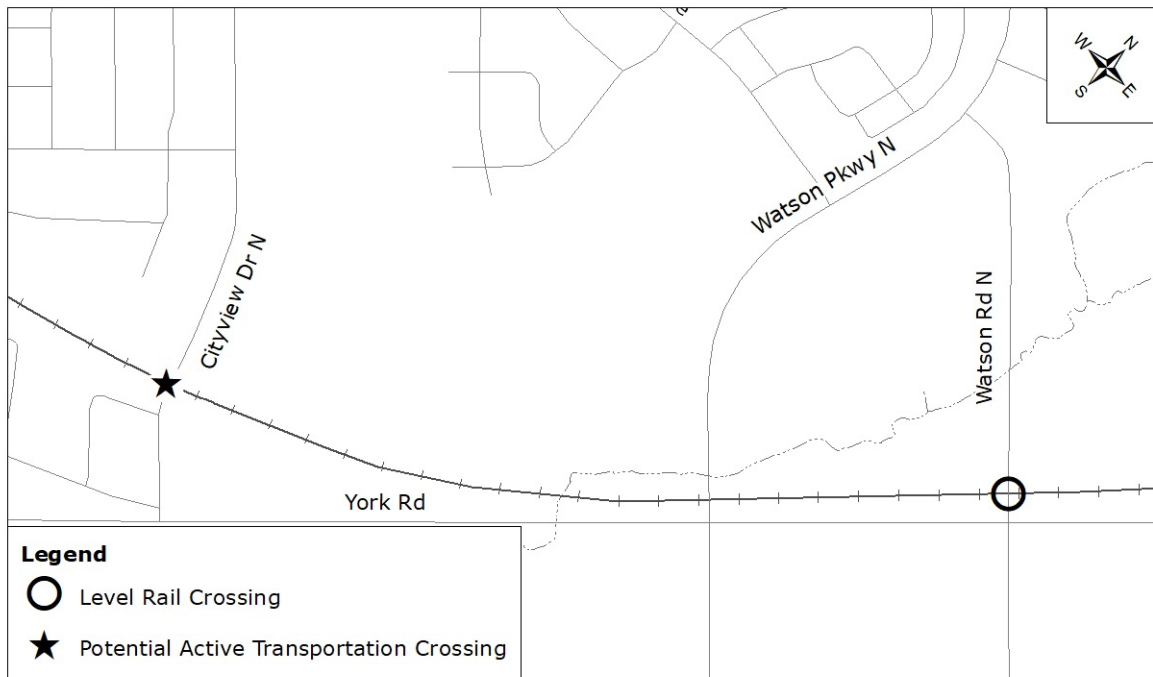


FIGURE 2: STUDY AREA B

2 Public and Stakeholder Engagement

As these level rail crossings are key access and connection points in their respective Guelph neighbourhoods, public engagement and feedback are critical to understanding what is important to the public and to get the public's perspectives on the crossings. This section summarizes the engagement efforts and activities undertaken as part of this transportation feasibility study. For more details, consult the Engagement summaries in Appendix A.

2.1 Notice of Study Commencement and Survey

At the start of the study, a Notice of Study was published both physically and digitally to inform the public that the study had started, to provide information on the study, and to request feedback from the public. The Notice was posted in the local paper, distributed to the communities around each LRC, posted on signs at each LRC, online on the City's website and the City's engagement platform (Have Your Say), and on City's social media platforms. The purpose of this initial engagement activity was to understand the public's perception of the LRCs being reviewed as part of the study, how the public used and valued these crossings, and their main concerns about the crossings and the impacts on their neighbourhoods.

The Notice also included an invitation for interested members of the public to participate in an online survey. The survey was available from October 28 to December 10, 2021. The survey asked questions relating to the type of road user, preferred modes of transportation, most important neighbourhood traffic considerations, general feedback on the study, and specific feedback about each of the LRCs. The survey received 1,780 responses. Feedback was also received through questions and comments on the Have Your Say page, emails, and phone calls to the study team. Many questions and comments were asked through these different channels and the study team provided responses either directly to respondents or through the Have Your Say study page.

The key themes identified from the feedback received through the Notice of Study and survey include:

- Crossings should remain open, specifically Edinburgh Road should stay open to vehicular traffic.

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- Some responses were open to crossings being closed to vehicular traffic but remaining open for active transportation modes.
- Desire to maintain connectivity between neighbourhoods as people cross the rail corridor as part of daily commutes to and from destinations. Respondents valued the walkability of their neighbourhoods and wanted to see that be preserved. With the grade separation options for Edinburgh Road, there was also a desire to maintain connectivity across Edinburgh Road.
- Traffic is an existing problem in the vicinity of the crossings and closures would create increased congestion and local traffic.
- There are several schools in the vicinity of the crossings and many students cross the rail corridor as part of their walk to/from school or their bus route. Local school boards were contacted for input as a part of this study.
- Respondents brought up locations not originally in the scope of the project: Dublin Street, Cityview drive and Margaret Greene Park. This feedback resulted in the project scope being expanded to study the feasibility for AT-only crossings at these locations.
- Respondents expressed disappointment with the closure of the Dublin Street crossing; some wanted it to be reopened either to vehicular traffic or active transportation only. The City confirmed there are no plans to reopen Dublin Street for vehicular traffic, though a LRC for active transportation is considered as part of this study.

Following the Notice of Study and the survey, the study team moved forward with the traffic analysis and scenario development of the various LRCs.

2.2 Public Open House

Once the transportation analysis was completed and preliminary recommendations were developed, a Public Open House (POH) was held to present the results to the public and to receive public feedback. The POH was held virtually on June 1, 2022 from 6:00pm to 8:00pm on Webex and a Notice of Open House was also distributed to notify the public about the POH and how to attend. The two-hour POH timeslot included a 30-minute presentation through the display materials, which covered an overview of the study, the purpose of the transportation feasibility study, the traffic analysis and evaluation of scenarios at the LRCs and AT-only crossings, and next steps for the study. The remainder of the POH was used as a question and answer (Q&A) session where attendees could post questions in the chat function and a panel of study representatives were present to answer questions. The virtual POH was attended by 68 people. The POH presentation slides are included in **Appendix A**.

Following the POH, all POH materials including questions and comments from the Have Your Say page, the POH display boards, the POH presentation recording, and a community engagement survey were made available online.

Two additional follow-up information sessions were also held on Webex on June 20, 2022 (6:30pm – 7:30pm) and June 22, 2022 (2:30pm – 3:30pm) to help clarify details on the study, with a focus on the Edinburgh Road LRC recommendation.

The key trends identified from the feedback received through the virtual POH are:

- Most concerns and questions related to the underpass recommended at Edinburgh Road. Many concerns were related to the property impacts associated with the potential underpass and the potential detour shown on the conceptual drawings. As a result of this feedback, two additional public follow-up sessions were conducted in June 2022 to provide more details and answer questions on the Edinburgh Road LRC. Property impacts are not determined as part of this study. A future Environmental Assessment would be required to determine optimal solutions/designs and resulting property impacts.
- There were also questions and concerns about the impacts to local roads that would be closed, connectivity, construction impacts, and concerns with the shunting trains at the Paisley Road crossing.
- Ongoing concerns about various topics including: downtown traffic and congestion, Dublin Street crossing, noise from trains, Silvercreek Parkway, and future Metrolinx initiatives.

- Questions on the next steps and future plans, including future studies, costs, and timing of studies and construction.

2.3 Stakeholder Consultation

In addition to the public engagement activities carried out for this study, the study team also consulted specific stakeholders for the study. The study team engaged with:

- Metrolinx to discuss their existing plans for expansion and their future plans for the corridor.
- Local school boards to identify key schools and school routes.
- Guelph Coalition for Active Transportation (GCAT) regarding active transportation connectivity and facilities.

3 Background Review and Data Gathering

To contextualize and inform the transportation analysis, a review of the existing policies and studies for the City of Guelph was completed and presented in the Background Review and Data Gathering memorandum (included in **Appendix B**). A summary of the policies and planning documents is presented in this section.

3.1 Transport Canada Guidelines

Rail regulations in Canada are set by Transport Canada and the Canadian Transportation Authority. The federal regulations apply to railways that operate in more than one province, cross a federal border, or are within the jurisdiction of the parliament. Railways can be licensed by the provinces separately, under applicable provincial railway safety legislation. Any operation or use of railways, either by provinces or municipalities, must adhere to the regulations and standards set by Transport Canada. The level rail crossings for which this study is dedicated, is operated by Canadian National, Canadian Pacific, and by Metrolinx, by way of the Province of Ontario, therefore federal rail regulations apply.

Transport Canada has developed two (2) main documents regarding level rail crossings, in accordance with the *Railway Safety Act* (RSA) and the *Grade Crossing Regulations* (GCR):

- The Grade Crossing Standards (GCS, 2019) are enforceable standards for meeting the safety standards of the RSA and are incorporated in the GCR by reference. The GCS document provides standards for existing and new grade crossings which encompasses items like crossing surface widths, warning systems, roadway approaches geometry and sightline requirements. For existing crossings, the railway companies and road authorities must ensure that the GCS is complied with by November 28, 2021, however, due to Covid-19 impacts, a 1-3 years extension has been granted.
- The Grade Separation Assessment Guidelines is meant to inform companies and road authorities when considering grade separation or elimination of road/rail conflicts. The document provides criteria and thresholds to consider for grade separation, including traffic and safety related criteria including traffic volumes, posted speeds, vehicle queuing, delay, level of service of the crossing road, average train volumes, maximum speed, and cross product for the railway. The document also provides additional factors to be considered such as collision history, number of lanes/tracks, road surface, noise, social impacts and feasibility and constructability. The guidelines recommend conducting a feasibility study to establish the grade separation need through a combination of the criteria.

These standards and guidelines are used for the analysis of grade separation warrants, providing various criteria to determine whether an existing level rail crossing should be grade separated for future conditions.

3.2 Provincial Plans

The 2041 Regional Transportation Plan (RTP) for the Greater Toronto and Hamilton Area (GTHA) was adopted by Metrolinx in 2018. The RTP builds on The Big Move (2008), taking municipal transportation master plans (TMPs) and official plans (OPs) and integrating them into a region wide coherent plan. One of the primary focuses of The Big Move implementation was the GO Regional Express Rail (RER) project, which envisioned the backbone of an integrated regional rapid transit network connecting subways, light rail transit and bus rapid transit across the GTHA. The GO RER program would enable service improvements to all seven GO train corridors with five corridors delivering service every 15 minutes or better in both directions. Infrastructure expansion includes new tracks, bridges, signals, and a new fleet.

In the RTP, the Kitchener GO line is planned for 15 minutes or better service in both directions from Union Station to Mount Pleasant Station. The segment from Mount Pleasant GO Station to Kitchener GO Station is slated to have two-way all-day service; however, the train frequency is not mentioned in the RTP.

3.3 Local Plans

3.3.1 GUELPH FUTURE READY – CITY'S STRATEGIC PLAN

The City of Guelph's Strategic Plan for 2019 to 2023 was developed to build and achieve its vision outlined in the Community Plan. Priorities outlined in the plan are intended to improve economic and environmental sustainability, develop a safe and connected transportation network, and investing in the community well-being. Under the "Navigating our Future" pillar, the plan supports local transportation improvements and integration with regional transit and rail service while improving transportation connectivity and safety within the City's limits.

3.3.2 CITY OF GUELPH OFFICIAL PLAN

The City of Guelph's Official Plan (OP) guides future community development outlining the vision, principles, goals, objectives, and policies to promote long term community sustainability, social well-being, economic activity, cultural conservation and enhancement, environmental integrity, and energy sustainability. One of the key guiding principles to shape the future of the City is having a safe community conveniently connected for pedestrians, cyclists, public transit users and motorists. This includes offering a balance of transportation choices and connectivity between the different modes with emphasis on promoting transit, cycling, and walking. From a planning perspective, the expansion or improvement of existing transportation infrastructure should consider opportunities to move people by rail. Priority should also be given to expanding existing transit services to residential and other land uses that are transit supportive.

The City's downtown adjacent to Study Area A is connected through multiple streets across Norfolk Street. The OP identifies Downtown as the Urban Growth Centre as well as a major transit station area functioning as a central transit hub providing connections within and outside the City.

3.3.3 CITY OF GUELPH TRANSPORTATION MASTER PLAN

The City of Guelph approved the 2022 Transportation Master Plan (TMP) in January. The TMP is a long-range strategic plan that directs how Guelph's future transportation system will be built and operated and establishes policies and programs to guide the delivery of transportation infrastructure and services. The recommendations of the TMP makes transit and active transportation a priority and provides more flexibility and resiliency to adapt to emerging technologies as well as changing trends in travel. It recommends city-wide network improvements for all modes of transportation and sets new mode share targets to support the Race to Net Zero Carbon by 2050 and mitigate traffic congestion as the city grows.

The TMP identifies the Metrolinx rail corridor as a barrier to travel in several locations and recommends exploring opportunities to study grade separation opportunities where they make sense.

The TMP has also factored in the interregional travel and encourages coordination with both Provincial and Regional authorities to improve Hanlon Expressway and interregional transit including GO rail and bus services. The 2005 Guelph

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Wellington Transportation Study had recommended a grade separation for the Edinburgh Road and CN Rail crossing beyond 2010, however, the grade separation has not been constructed yet.

3.3.4 CITY OF GUELPH ACTIVE TRANSPORTATION PLANS

Four key plans, combined, shape the active transportation network plan of the City. The TMP, Active Transportation Network Study (2017) and Cycling Master Plan focus on pedestrian and cycling infrastructure in the road right-of-way. The Guelph Trail Master Plan (GTMP), recently completed in May 2021, focuses on trails located outside of road right-of-ways.

Within Study Area A, there are several streets which currently contain bike lanes or paved shoulder cycling facilities including Waterloo Avenue, Norfolk Street, and a section of Paisley Street between Edinburgh Road and Glasgow Street. The existing signed bicycle route on Yorkshire Street connects the Old City neighbourhood to the city-wide bike network through bike lanes on Waterloo Avenue and Paisley Street. A local bike route on Alma Street provides the north-south connectivity between Paisley Road and Waterloo Avenue. A dedicated buffered bike lane facility also exists along Watson Parkway within Study Area B.

No cycling facilities are proposed along Edinburgh Road. There are multiple roadways where active transportation network improvements are proposed. A multi-use trail is proposed along Silvercreek Parkway, which is also proposed to be part of the Spine Cycling Network. A trail is planned along Watson Road turning west along the north bank of Clythe Creek and connecting to bike lanes on Watson Parkway and subsequently the desired route along York Road. A signed bike route is also proposed along Cityview Drive along with a CN rail crossing connecting south to the desired route along York Road.

3.3.5 GUELPH TRANSIT GROWTH STRATEGY

The Guelph Transit Growth Strategy and Plan and Mobility Services Review, completed in 2010, provided a detailed analysis and forecast for the operation of Guelph Transit and Mobility Services. The strategy recognized the need for integration between GO Rail and Guelph Transit. The study noted a strong travel demand between Guelph and Kitchener, greater than the demand between Guelph and Toronto.

The study also recommended Gordon/Norfolk/Woolwich Bus Rapid Transit which is included in the TMP Quality Transit Network.

4 Existing Traffic Conditions

An Existing Conditions Technical Memorandum was completed that documents the existing conditions of the transportation system, including technical traffic findings. The Existing Conditions Memo included an inventory of the existing transportation infrastructure, Highway Capacity Analysis software analysis of the transportation system that analyzed operations at the level rail crossings and intersections, and a site visit to observe and confirm assumptions. A summary is provided in this section, however, refer to **Appendix C** for the full report.

4.1 Study Area A

4.1.1 EXISTING TRAFFIC CONDITIONS

A traffic study area was developed to encompass the area that should be analyzed as part of the transportation study. The study area is bounded by Paisley Road to the north, Wellington Street to the south, Norfolk Street to the east, and Silvercreek Parkway to the west (see Figure 3).

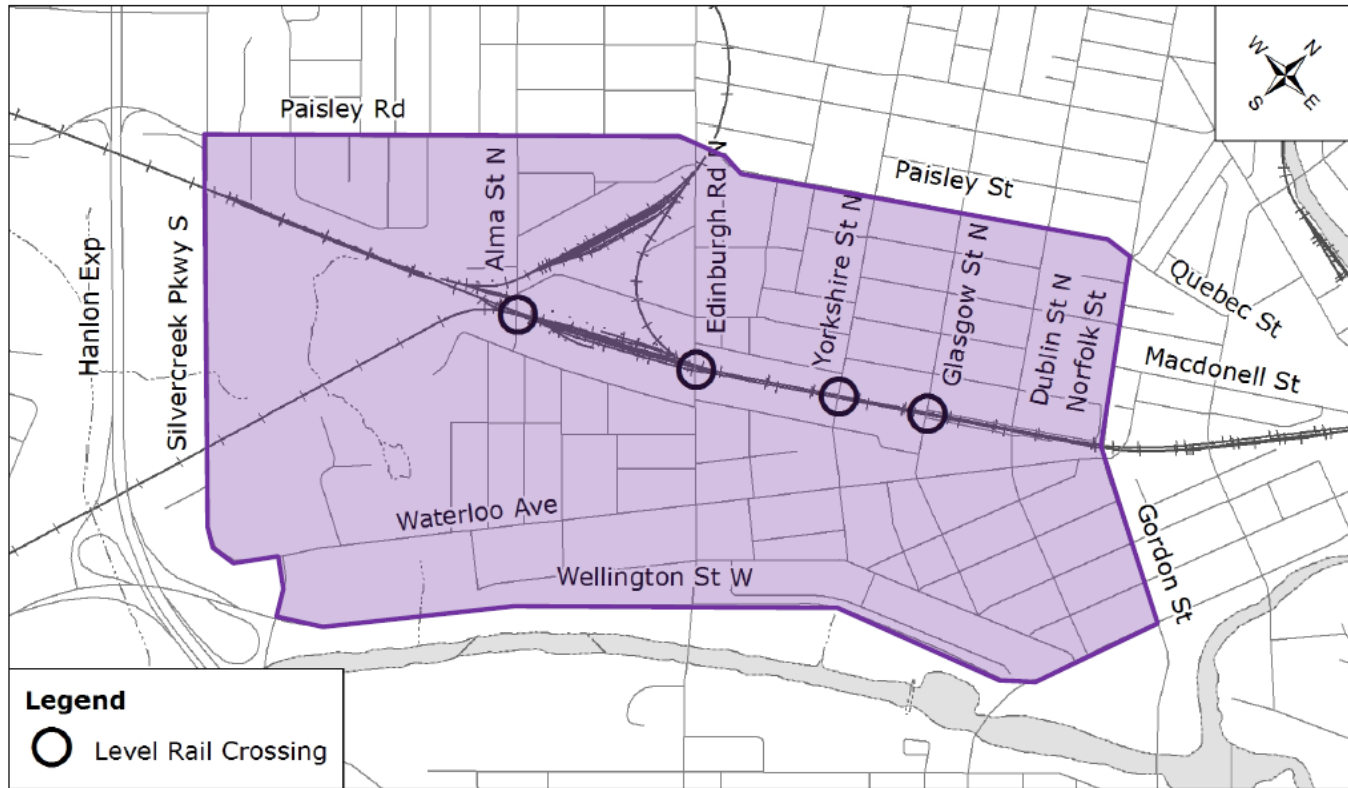


FIGURE 3: TRAFFIC ANALYSIS AREA FOR STUDY AREA A

The four level rail crossings include Alma Street, Edinburgh Road, Yorkshire Street, and Glasgow Street and are described below:

Alma Street

Alma Street is a two-lane north-south local road providing access to primarily residential and commercial land uses. Alma Street has two rail crossings approximately 70m apart between Inkerman Street and Lucan Street. The south crossing is the main CNR and Metrolinx corridor protected with automatic gates and flashing lights. The north crossing serves freight and shunting operations and has no gate. The posted speed limit is 50 km/h.

Edinburgh Road

Edinburgh Road is a two-lane north-south arterial road providing access primarily to residential land uses. It has a posted speed limit of 50 km/h with left-turning lanes at signalized intersections. Within the study area, there are two level rail crossings along Edinburgh Road; the first located south of Paisley Road supporting freight rail and related shunting operations, and the second located further south between Foster Avenue and Preston Street, supporting CNR, Metrolinx and VIA rail operations.

Yorkshire Street

Yorkshire Street is a two-lane collector road running north-south through the study area and serves primarily residential land use. On-street parking is restricted on the east side except on Sundays. In the absence of a posted speed limit, it is assumed that Yorkshire Street operates at 50 km/h. Approximately 200m north of Waterloo Avenue, Yorkshire Street has a level rail crossing across CNR and Metrolinx tracks with automatic gates and flashing lights.

Glasgow Street

Glasgow Street is a two-lane local road providing access to residential properties. On-street parking is restricted except for 2:00 AM to 6:00 AM on the east side, however a significant number of parked cars were observed during the site visit. Approximately 150 meters north of Waterloo Avenue, Glasgow Street has a level rail crossing CNR and Metrolinx tracks

with automatic gates and flashing lights. In the absence of a posted speed limit, it is assumed that Glasgow Street operates at 50 km/h.

Based on the traffic analysis of existing conditions, some traffic concerns were noted at the Edinburgh Road level rail crossing (LRC). Based on observations of train shunting operations, queues on Edinburgh Road extend relatively far upstream of the crossing for long periods of time. At the Edinburgh Road level rail crossing, all five (5) collisions over the five-year period for which collisions were measured (2016 – 2021) were rear-end impacts, which are anticipated to be a result of large queues during busy traffic periods resulting in queues following too closely. Based on traffic data collected at the level rail crossings, the Edinburgh Road LRC was found to serve significantly more traffic during the peak hours than the other three crossings in Study Area A.

Under existing conditions, all the signalized intersections in Study Area A operate acceptably with adequate residual capacity. The exception includes the Wellington Street / Gordon Street intersection, which has queues in the southbound left movement and during both the AM and PM peak hours. At this intersection, the southbound left movement and westbound through shared with right turn movement are experiencing queues/approach capacity. The Edinburgh Road / Paisley Street intersection is also approaching capacity in the shared northbound and southbound through-right movements.

All of the unsignalized intersections are shown to operate well under existing conditions, however, at the two-way stop-controlled intersection of Norfolk Street and Cork Street, the eastbound and westbound movements experience relatively high delay.

Based on the operational analysis of the LRCs, it was found that the crossing at Edinburgh Road experiences relatively long queues during both the AM and PM peak hours. The remainder of the level crossings were found to operate with acceptable delay and queues. These findings were corroborated during the site visit.

Other notable findings include finding that traffic from the Dublin Street LRC closure was diverted to Glasgow and Yorkshire Streets. Additionally, pedestrian and bicycle volumes were typically found to be higher during the weekends and in the PM periods.

4.2 Study Area B

4.2.1 EXISTING TRAFFIC CONDITIONS

A traffic study area was developed to encompass the area that should be analyzed as part of the transportation study. The study area is bounded by Watson Parkway to the north and to the west, York Road to the south, and Watson Road to the east (see Figure 4).

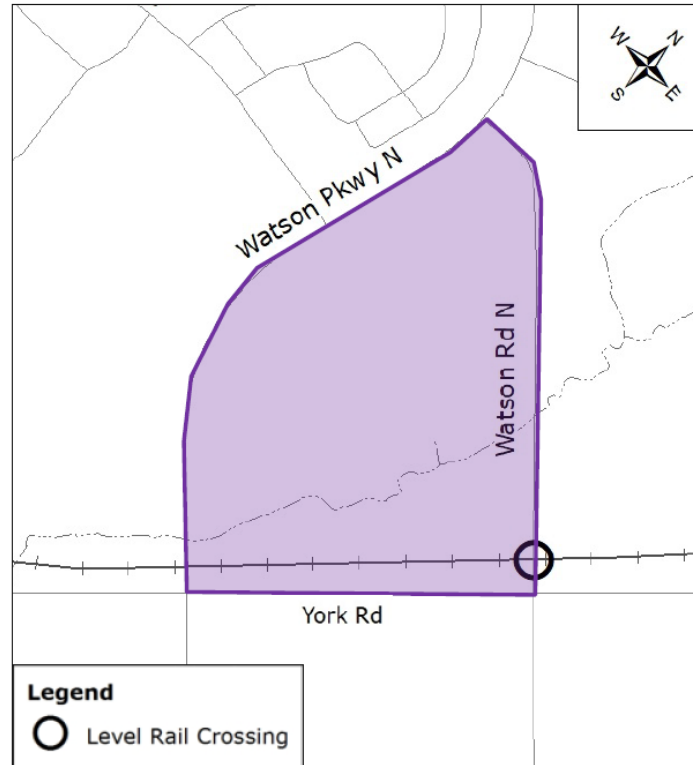


FIGURE 4: TRAFFIC ANALYSIS AREA FOR STUDY AREA B

The one LRC in Study Area B is Watson Road which is described below:

Watson Road

Watson Road is a north-south collector road with one traffic lane in each direction. Watson Road serves primarily residential land uses, with a posted speed limit of 60 km/h. Watson Road has a level rail crossing immediately north of York Road. No sidewalks or bicycle lanes are available on Watson Road.

This crossing does not experience any train shunting and there was no collision history data available at this crossing. Based on available AADT data, the level crossing facilitates 1,752 vehicles each day. Similarly, based on Metrolinx's GO Train schedule, a total of 22 trains operates each weekday at this rail crossing. Based on pedestrian and bicycle counts at the Watson Road north of York Road LRC, both pedestrian and bicycle demand is minimal, however, there are more bicycles than pedestrians.

Under existing conditions, both of the signalized intersections operate acceptably with adequate residual capacity. Only the southbound queue at Watson Road and York Road exceeds the available 20 meters of space between the intersection and the LRC. Both of the unsignalized intersections in the study area operate acceptably. Based on the operational analyses conducted at the LRC, the northbound queue during the PM peak hour is longer than the 20 meters of available space between the crossing and the Watson Road and York Road intersection. However, the intersection and the rail crossing are equipped with a train pre-emption.

5 Grade Separation and AT-only Crossings Conceptual Designs

Before evaluating the potential options at each of the LRCs and potential AT-only crossings, a review of the feasibility of constructing overpasses and underpasses was undertaken for each crossing to get a high-level understanding of the potential footprint impacts and costs.

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Inherent with constructing a grade separation (overpass, or underpass) in an urban environment, access to adjacent properties and roadways to the crossing will be disrupted or cut off as a result of changes to the roadway profile. Significant property impacts and utility relocation are also important considerations.

To understand the impacts and resulting closures of either an overpass or an underpass, highly conceptual designs were prepared. The preferred type of grade separation at each LRC was selected based primarily on constructability and on whether it minimized property and access impacts. This feasibility exercise is used to compare the relative impacts of an overpass, underpass, and a level rail crossing in order to evaluate the alternatives. This exercise does not imply any real or potential property impacts.

Conceptual designs and footprints of the grade separation options were developed at each LRC in Study Area A. For Study Area A, pedestrian bridges were also developed at each LRC should the crossing be closed, and an AT-only crossing be implemented. Conceptual designs of an underpass and overpass for all three AT-only crossings were also developed. A conceptual design was not prepared for the Watson Road LRC in Study Area B as grade separation would not be feasible due to the impacts to the York Road/Watson Road intersection. A memorandum outlining concepts and sizing of the grade separation and pedestrian bridges, including impacts to the adjacent properties and Class D cost estimates is provided in **Appendix D**.

The recommended grade separation options for the purposes of evaluating alternatives are summarized below:

1. Alma Street – Overpass for all traffic modes
2. Edinburgh Road – Underpass for all traffic modes
3. Yorkshire Street – Underpass for all traffic modes
4. Glasgow Street – Underpass for all traffic modes

6 Future Traffic Conditions

A Future Conditions Technical Memorandum was completed that documents the forecasted future traffic volumes and operations to 2041 based on projected population and employment growth, planned developments, modal shifts, and future infrastructure improvements. The Future Conditions Memo analyzes the traffic impacts of various scenarios at the LRCs and how the transportation system performs. A summary is provided in this section, however, refer to **Appendix E** for the full report.

6.1 Study Area A

6.1.1 ALTERNATIVE SCENARIOS

As there are four LRCs to be considered in Study Area A with a large number of possible combinations of options at each crossing, more consideration was given to certain scenarios (i.e., a set of options at each LRC in Study Area A) that were more feasible and therefore, can be carried forward for further traffic analysis. This process helped screen out options that were less desirable or not feasible. The preferred grade separation type (overpass or underpass) determined from Section 5 was used in developing and evaluation the scenarios.

Scenario A1 was developed to represent a “baseline” scenario where “Do Nothing” (i.e., maintain LRC) was the option at each LRC. Scenario A2 was developed to represent a grade separation scenario where either an overpass or underpass was selected at each LRC (whichever had a smaller footprint/property impact).

For the remaining scenarios (A3-A7), grade separation was not considered at Alma Street, Yorkshire Street or Glasgow Street due to significant property impacts as well as closure of local crossing roads due to the grade separation. Therefore, only the “Do Nothing” and “Road Closure” options were considered for these three LRCs.

Based on the existing traffic conditions at Edinburgh Road, the road cannot be closed as it would have significant impacts on traffic volumes and the transportation network that cannot be accommodated elsewhere, therefore the

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“Road Closure” option for Edinburgh Road was not considered in any of the scenarios carried forward. During development of the grade separation conceptual designs (see Section 5), it was determined that the overpass option is not a feasible option to carry forward at Edinburgh Road. As such, only the “Do Nothing” and “Underpass” options were considered at the Edinburgh Road LRC.

Seven scenarios were shortlisted for analysis and can be found in **Table 1**. These scenarios represent a range of alternatives that either represent a baseline (A1 and A2) or more feasible alternatives that try to address traffic conditions while balancing property impacts and construction costs (A3 to A7). These scenarios have been carried forward into the future (2041) traffic analysis phase of the study to determine the traffic impacts and operations of implementing the grade separations/closures as indicated in the scenarios.

TABLE 1: SHORTLIST LRC ANALYSIS SCENARIOS

Scenario	Alma Street	Edinburgh Road	Yorkshire Street	Glasgow Street
A1	Do Nothing	Do Nothing	Do Nothing	Do Nothing
A2	Overpass	Underpass	Underpass	Underpass
A3	Closed	Do Nothing	Closed	Closed
A4	Closed	Underpass	Closed	Closed
A5	Closed	Do Nothing	Do Nothing	Closed
A6	Closed	Underpass	Do Nothing	Closed
A7	Do Nothing	Underpass	Do Nothing	Do Nothing

6.1.2 FUTURE TRAFFIC ANALYSIS

Study Area A includes four existing LRCs (Alma Street, Edinburgh Road, Yorkshire Street, and Glasgow Street), however Silvercreek Parkway, which is currently closed at the rail crossing, was included as part of the analysis. The seven (7) scenarios from Table 1 were evaluated. Scenario A1 – ‘Future Do Nothing’, evaluated traffic operational performance of the intersections with all rail crossings maintained at grade. Operations in the study area resulted in several intersections operating at or above capacity, specifically along Edinburgh Road (i.e., at Paisley Street, Waterloo Avenue, and Wellington Street). The poor performance at Wellington Street and Gordon Street during existing conditions is significantly exacerbated in future conditions. Finally, due to high delays for the eastbound and westbound stop-controlled movements at Norfolk Street and Cork Street, a traffic signal warrant for future conditions was completed. While the warrant analysis does not justify the need for traffic signalization, the operational analysis completed suggests that the large delays and queues can be mitigated if signals are implemented.

Among the analysis scenarios, operations are most critical under scenario A3, given that Edinburgh Road is maintained as a level crossing, and supports additional traffic from the closures of the Alma, Yorkshire, and Glasgow Street rail crossings. Under scenarios A5 and A6, Alma and Glasgow Street’s roads are closed at the rail crossing, resulting in poorer overall performance than Scenarios A1 and A2. Yorkshire Street’s level crossing is left open which reduces some demand from Edinburgh Road, performing marginally better in comparison to scenarios A3 and A4. Scenario A7, with all rail crossings open and Edinburgh rail crossing transformed into an underpass would result in marginally worse operational performance comparing with A6 scenario. **Table 2** below summarizes the operational performance at the signalized intersections for each of the scenarios, and their respective overall ranking.

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TABLE 2: TRAFFIC IMPACTS AT SIGNALIZED INTERSECTIONS BASED ON SCENARIO

	Scenario A1				Scenario A2				Scenario A3				Scenario A4				Scenario A5				Scenario A6				Scenario A7			
	AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Paisley St. & Silvercreek Parkway	0.71	C	1.01	D	0.70	C	0.95	D	0.73	C	0.98	D	0.73	C	0.98	D	0.73	C	0.97	D	0.70	C	0.95	D	0.70	C	0.95	D
Waterloo Ave & Wellington St.	0.63	C	0.74	D	0.62	C	0.74	C	0.63	C	0.74	C	0.63	C	0.74	C	0.63	C	0.72	C	0.63	C	0.73	C	0.63	B	0.73	C
Alma St. & Paisley St.	0.65	B	0.83	B	0.63	B	0.77	C	0.50	B	0.66	B	0.59	B	0.60	B	0.49	B	0.61	B	0.46	A	0.56	B	0.56	D	0.58	B
Edinburgh Rd & Paisley St	0.78	C	0.95	D	0.81	D	0.92	D	1.04	E	1.28	F	1.01	E	1.26	F	0.89	D	1.06	E	0.80	D	0.92	D	0.80	D	0.92	D
Edinburgh Rd & Waterloo Ave	0.96	E	1.02	E	0.92	D	1.00	E	1.04	E	1.10	E	1.02	E	1.06	F	0.95	D	0.97	E	0.96	D	0.93	D	0.96	C	0.98	E
Edinburgh Rd & Wellington St	0.84	C	1.21	E	0.88	C	1.22	E	0.88	C	1.18	E	0.89	C	1.18	E	0.88	C	1.22	E	0.89	C	1.22	E	0.89	C	1.22	E
Yorkshire St & Paisley St	0.52	C	0.67	C	0.54	C	0.71	C	0.52	C	0.61	B	0.47	C	0.56	B	0.58	C	0.82	C	0.60	C	0.80	C	0.60	D	0.80	C
Norfolk St & Paisley St	0.66	C	0.70	C	0.66	D	0.70	C	0.66	D	0.71	C	0.67	D	0.71	C	0.67	D	0.71	C	0.67	D	0.73	D	0.67	C	0.73	D
Gordon St/Norfolk St & Waterloo Ave / Wilson St	0.70	C	0.75	C	0.71	C	0.78	C	0.76	C	0.82	C	0.80	C	0.82	C	0.74	C	0.79	C	0.74	C	0.80	C	0.74	E	0.80	C
Wellington St & Gordon St	1.18	E	1.48	F	1.21	E	1.48	F	1.18	E	1.49	F	1.21	E	1.51	F	1.17	E	1.49	F	1.18	E	1.51	F	1.18	C	1.51	F
Operational Ranking	5				4				7				6				3				1				2			

The operational performance of rail crossings was evaluated for those that remain at grade. Overall and individual operations were acceptable for each scenario; however, several queue lengths are expected to exceed the available storage between the crossing and the upstream intersection/driveway. The crossing at Edinburgh Road is projected to have the longest queue lengths during the PM peak hour, especially under scenarios A3 and A5. Operations are significantly worse under the assumed freight train speed of 20km/h than the design speed of 80 km/h.

With regard to overall traffic operation, it is concluded that scenarios that included grade separation at Edinburgh Road and some LRCs open at other locations will generally perform better. Under scenarios where the LRCs are closed, most traffic is expected to divert to the nearest LRC, resulting in poorer operational performance at those locations.

6.1.3 GRADE SEPARATION WARRANT ANALYSIS

A Grade Separation Warrant Analysis was carried out for the LRCs in Study Area A for all scenarios where the LRC was determined to be maintained (i.e., 'Do Nothing' under Table 1). This warrant analysis is used to determine whether any of the crossings meet grade separation warrant criteria based on Transport Canada Grade Separation Assessment Guidelines. Based on the warrant analysis, if even one of the criteria is met, grade separation is considered warranted. Some of the scenarios warranted future grade separation solely based on one criterion. In these cases where only one warrant criteria threshold was met, further review of each LRC was conducted to determine if the criteria could be justified. The full details of the warrant analysis can be found in the Future Conditions Memo.

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For the Edinburgh Road LRC scenarios, grade separation is warranted based on three warrant criteria: 1) the Cross Product/Exposure Index threshold (i.e., the product of the annual average daily traffic at the rail crossing and the average daily train volume), 2) queuing issues resulting from vehicles stopped at crossing gates, and 3) vehicle delay. As several criteria are met and exceed the base threshold, grade separation of Edinburgh Road is warranted. As a result, Edinburgh Road grade separation should be further studied through an Environmental Assessment process to determine all possible options to mitigate the safety concerns and maintain multi-modal traffic across the rail corridor.

At Alma Street, grade separation is warranted under the do-nothing scenario and assuming Silvercreek Parkway remains closed at the Metrolinx crossing. This is based on the Cross Product/Exposure Index threshold and queuing issues that impact adjacent streets.

At Yorkshire Street, grade separation is warranted based on queuing, but only when the average train speed is assumed to be 20 km/h (a more likely occurrence for freight trains at the level crossing).

At Glasgow Street, grade separation is warranted based on queuing that reaches Kent Street both north and south of the LRC and potentially blocks private entrances.

It is to be noted that it is not uncommon having entranceways and streets close to the level rail crossings in the old downtown setting. Alma, Yorkshire, and Glasgow Streets are carrying local traffic. Queues at these crossings are expected to be around 30m (equivalent to four passenger cars) when a train is passing the level rail crossing. Therefore, it is not necessary that grade separation be considered at these locations based on the queuing criteria only. However, it is recommended that safety and operation of these rail crossings be monitored and, if closure to vehicles is warranted, that active transportation-only crossings be considered.

Grade separation at the potential Silvercreek Parkway crossing was also reviewed under the warrant analysis. The findings determined grade separation is warranted as the Transport Canada Grade Separation Guidelines state that “New grade crossings are not permitted where the train speed is more than 25 km/h and there is an entranceway or intersection within 30 m of the nearest rail of the proposed crossing”. Furthermore, Metrolinx policy does not permit new level rail crossings along their corridors and any new rail crossing will need to be grade separated.

6.1.4 EVALUATION OF SCENARIOS






















Scenarios A1 to A7 were evaluated based on the results of the traffic study while also giving high level consideration to other factors such as constructability and costs. The following evaluation criteria were used:

- **Local Traffic Circulation:** considers how the scenario minimizes traffic impacts to surrounding neighbourhoods
- **Connectivity:** considers if a connection is maintained across the railroad
- **Traffic Operations:** considers the findings of the future traffic analysis and if the scenario offers better traffic performance
- **City Planning and Operations Guidelines:** best aligns with the City's Transportation Master Plan and warrant analysis recommendations
- **Constructability:** scenarios that are easier and less complex to construct would rank better
- **Property impacts:** considers the footprint impacts on private property
- **Costs:** lower capital cost to implement would rank better





























The evaluation of the scenarios is meant to be high level to help guide the next steps and is based on conceptual designs only. The seven scenarios were then evaluated against the criteria noted above and can be found in **Table 3**. Circles that are filled in (i.e., a black circle) represent an optimal scoring (most preferred) whereas the circles that are empty represent the lowest scoring (least preferred).

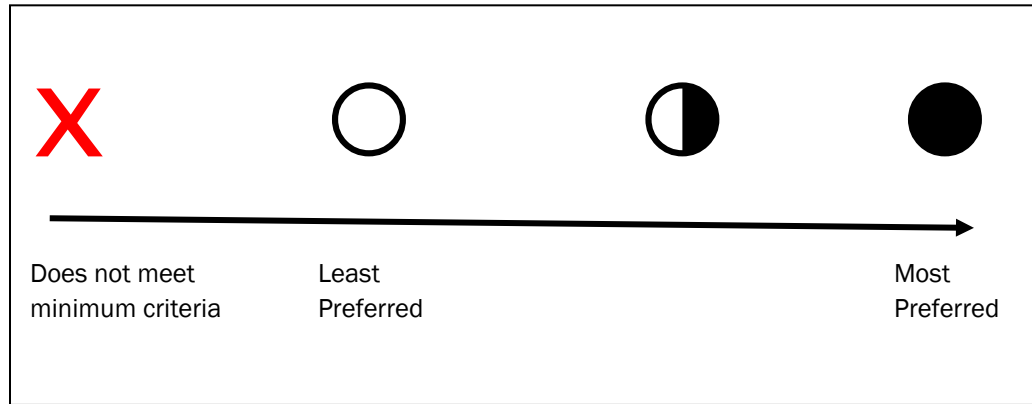
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TABLE 3: EVALUATION OF SCENARIOS FOR STUDY AREA A

Criteria	A1	A2	A3	A4	A5	A6	A7
	Do Nothing	All Grade Separated	All closed, except Edinburgh Level Crossing	All closed, except Edinburgh Grade Separated	All closed, except Edinburgh and Yorkshire Level Crossing	All closed, except Edinburgh Grade Separated and Yorkshire Level Crossing	Do Nothing, except Edinburgh Grade Separated
Local Traffic Circulation							
	All crossings are open so generally traffic patterns remain per existing, however long queues at Edinburgh Road will lead to issues with traffic infiltrating to local neighbourhoods	All crossings are open however grade separation will cut off many local roads significantly channeling traffic to major arterial intersections	Significantly channels traffic to major arterial intersections through local neighbourhoods	Significantly channels traffic to major arterial intersections through local neighbourhoods and further reduced local options due to grade separation at Edinburgh Road	Channels some local traffic from closed crossings to crossings that are open across the railway tracks	Channels some local traffic from closed crossings to crossings that are open across the railway tracks	As all crossings remain open to vehicular traffic, current traffic patterns generally maintained though reduced local options due to grade separation at Edinburgh Road
Connectivity							
	Keeping all crossings open maintaining connectivity across the railway	Keeps all crossings open maintaining connectivity across the railway however significantly reduces local road connectivity from the closure of local streets for grade separation	Significantly reduces connectivity across the railway	Significantly reduces connectivity across the railway	Reduces connectivity across the railway line though some crossings are still maintained	Reduces connectivity across the railway line though some crossings are still maintained, some local road connectivity impacts from grade separation at Edinburgh	Keeping all crossings open maintains connectivity across the railway, some local road connectivity impacts from grade separation at Edinburgh
Traffic Operations							
	Worsening queuing issues at the rail crossings. Specifically grade separation would be warranted at Edinburgh Road.	Grade separation results in significant closures of local roads forcing traffic to major arterial roads.	Significant closures forces traffic to major arterial roads.	Significant closures forces traffic to major arterial roads.	Some closures results in traffic rerouted to other streets but traffic operations performs better than A1-4.	Based on traffic operations, A6 performs better than A1-5 as grade separation at Edinburgh will reduce queuing issues.	Based on traffic operations, A7 performs better than A1-6 as grade separation at Edinburgh will reduce queuing issues.

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Criteria	A1	A2	A3	A4	A5	A6	A7
	Do Nothing	All Grade Separated	All closed, except Edinburgh Level Crossing	All closed, except Edinburgh Grade Separated	All closed, except Edinburgh and Yorkshire Level Crossing	All closed, except Edinburgh Grade Separated and Yorkshire Level Crossing	Do Nothing, except Edinburgh Grade Separated
Alignment with City Planning and Operation Guidelines							
	Does not align with TMP and Operation Guidelines (Edinburgh not GS, poor operations).	Partially aligns with TMP and Operation Guidelines (GS and warrant analysis met, but poor connectivity)	Does not align with TMP and Operation Guidelines (Edinburgh not GS, poor operations).	Partially aligns with TMP and Operation Guidelines (GS and warrant analysis met, but poor connectivity).	Partially aligns with TMP and Operation Guidelines (Edinburgh not GS, some connection maintained).	Generally aligns with TMP and Operation Guidelines (Edinburgh is GS, some connection maintained)	Best aligns with TMP and Operation Guidelines. Edinburgh is GS as per the City's TMP and meets warrant analysis.
Constructability							
	No additional work required.	Significant impacts and complex construction work such as subsurface infrastructure and construction staging / detour required.	Minimal additional work required.	No additional work at LRCs except at Edinburgh where grade separation will be a significant undertaking.	Minimal additional work required.	No additional work at crossings except at Edinburgh where grade separation will be a significant undertaking.	No additional work at crossings except at Edinburgh where grade separation will be a significant undertaking.
Property Impacts							
	No additional property required.	Significant property impacts to adjacent properties and homes.	No additional property required.	Significant property impacts at Edinburgh, however no property impacts at other crossings.	No additional property required.	Significant property impacts at Edinburgh, however no property impacts at other crossings.	Significant property impacts at Edinburgh, however no property impacts at other crossings.
Costs							
	No additional costs required.	Significant costs to construct.	Minimal additional costs required.	Significant costs for the Edinburgh grade separation but minimal costs at other crossings.	Minimal additional costs required.	Significant costs for the Edinburgh grade separation but minimal costs at other crossings.	Significant costs for the Edinburgh grade separation and no costs at other crossings.
Ranking	4 th	7 th	5 th	6 th	2 nd /3 rd	2 nd /3 rd	1 st



6.1.5 PREFERRED SCENARIO

Based on the evaluation, A7 is the preferred scenario and ranks 1st compared to the other scenarios. A7 includes grade separation of Edinburgh Road with an underpass structure; the grade separation would require the completion of an Environmental Assessment to determine optimal solution/design at this location. At the other LRCs in Study Area A, it is recommended that the existing conditions be maintained as is and “Do Nothing”. However, traffic operations and safety should continue to be monitored at the LRCs should there be changes at the intersection that may warrant improvements or change. If closure to vehicles is warranted at these LRCs, active transportation-only crossing should be considered.

6.2 Study Area B

6.2.1 ALTERNATIVE SCENARIOS

As Study Area B is comprised of only one LRC, the alternative scenarios are just comprised of what type of crossing should be implemented at the Watson Road LRC. Three scenarios were reviewed and carried forward to the future traffic analysis and are shown in **Table 4**.

TABLE 4: SCENARIOS FOR THE WATSON ROAD LRC

Scenario	Watson Road
B1	Do Nothing
B2	Closed Crossing
B3	Grade Separation

6.2.2 FUTURE TRAFFIC ANALYSIS

In comparison to existing conditions, the three (3) future scenarios result in higher volume to capacity (v/c) ratios, delays and queues, especially at the Watson Parkway and York Road intersection. At Watson Parkway and Starwood Drive, high delays and queue lengths are anticipated for the stop-controlled southbound movements.

Under scenarios B2 and B3, operations are worse for the Watson Parkway and York Road intersection, with several movements exceeding v/c ratio greater than 1. This is the result of additional traffic diverted along York Road and Watson Parkway due to the closures of the westbound right and eastbound left movements at the Watson Road and York Road intersection to support the closure and grade separation for each of the scenarios, respectively. It is also to be noted that the grade separation scenario B3 will have significant impacts at accesses of the developments along Watson Road specifically south of York Road.

Operations for the Watson Road rail crossing were evaluated for Scenario B1, and are acceptable from a v/c, delay and LOS perspective. However, queues under the 20km/h train speed assumption are expected to reach the York Road/Watson Road intersection.

6.2.3 GRADE SEPARATION WARRANT ANALYSIS

A Grade Separation Warrant Analysis was carried out for Watson Road in Study Area B for Scenario B1 (i.e., ‘Do Nothing’). Grade separation is warranted at Watson Road based on the queuing which are expected to impede operations at Watson Road at York Road. However, grade separation is not recommended due to the significant impacts it will have at accesses of the developments along Watson Road, specifically south of York Road.

6.2.4 PREFERRED SCENARIO

As this was just one crossing with simpler impacts to be considered, an evaluation table was not prepared for Watson Road.

B2 is not preferred as closing the Watson Road LRC would divert traffic to Watson Parkway, resulting in worse traffic operations. B3 is also not preferred as it would divert traffic to Watson Parkway, resulting in worse traffic operations and grade separation would result in significant property and access impacts, specifically south of York Road.

Based on the assessment, B1, the “Do Nothing” option is the preferred scenario. It is recommended that traffic operations and safety should continue to be monitored at the Watson Road LRC in the long term (15-25 years) should there be changes at the intersection that may warrant improvements or change.

7 Potential Active Transportation Crossings

The scope of this transportation feasibility study also includes reviewing three potential active transportation-only crossings. These three locations at Cityview Drive, Margaret Greene Park and Dublin Street were identified as key connections or destinations in the City of Guelph that could benefit from an active transportation connection. There are no formal crossings at these locations at this time, though there are signs that people cross at these locations despite not having any formal crossing infrastructure.

The three options for an active transportation-only crossing include (1) a level rail crossing with enhanced safety measures, (2) a AT-bridge and (3) an AT-tunnel. Level rail crossings are least impactful as no new crossing structure needs to be built. However, safety will need to be considered in the design, including what measures would be in place to enhance safety (gates, flashing lights, bollards). Overpasses, such as pedestrian bridges, have minimal impacts to the roadway itself but have large property footprint impacts on both sides of the railway because of the large room needed to implement a ramp that meets AODA standards. Underpasses, or tunnels, could work where the railway is significantly higher than adjacent land.

7.1 Cityview Drive

Cityview Drive is a north-south local road running from Grange Road to York Road with a single traffic lane. The road is split into Cityview Drive North and Cityview Drive South both north and south of the railway tracks, respectively. The proposed crossing point would be north of York Road (see Figure 5). There are no sidewalks along the road in this portion of the study area. The City of Guelph completed a land use study and urban design concept plan for the York Road/Elizabeth Street area. Based on a pedestrian and bicycle traffic survey completed by the City, there is a desire for an active transportation connection across the Cityview Drive rail track.

As the railway tracks are higher than Cityview Drive on both sides of the tracks, both an AT tunnel or bridge can be considered and should be reviewed through further design work to confirm what crossing is feasible.



FIGURE 5: EXISTING CONDITIONS OF THE PROPOSED CITYVIEW DRIVE AT CROSSING

7.2 Margaret Greene Park

Margaret Greene Park is a key recreation destination in the City of Guelph. The park is bounded on the south by the railway tracks but is cut off from the area to the south as there is no formal crossing. Based on paths created overtime by use, it appears that pedestrians cross the railway tracks at an unofficial crossing off Paisley Road in order to access the park.

At the proposed AT-only crossing location (see Figure 6), the railway tracks are significantly higher than the surrounding areas. A tunnel under the tracks could be feasible and would also have the least impacts as the grade difference is already present. Additional design work is to be carried out to determine technical feasibility and impacts of an underpass/tunnel.



FIGURE 6: EXISTING CONDITIONS OF THE PROPOSED CROSSING AT MARGARET GREENE PARK

7.3 Dublin Street

Dublin Street is a two-lane local road running north-south through the study area with sidewalks on both sides of the road. Dublin Street provides access to residential properties and has a speed limit of 50 km/h throughout the corridor except for the immediate area around Central Public School, where the posted speed limit is 30 km/h. The Dublin Street LRC was previously open to vehicles and active transportation users but was closed as it did not meet safety standards (see Figure 7).

As an existing crossing already exists at Dublin Street, maintaining a level rail AT-only crossing would be the least impactful. Some upgrades and improvements would be required to facilitate and meet safety standards for the crossing as there is no form of grade separation between AT users, such as pedestrians and cyclists, and trains that use the tracks. There is also a steep grade upwards towards the tracks (i.e., the tracks are higher than surrounding areas) and would need to be reviewed to determine if the grade can meet accessibility requirements. Metrolinx has indicated that the agency is not supportive of a level rail crossing at this location.



FIGURE 7: EXISTING DUBLIN STREET CROSSING

8 Recommendations and Next Steps

This is a feasibility study to determine what options are feasible at each of the LRCs and potential AT-only crossings. Further analysis, including additional design work and more site-specific review, is required to determine impacts and confirm feasibility. This section documents and summarizes the next steps before any of the recommendations of this study can be carried out.

8.1 Edinburgh Road Grade Separation

Based on Transport Canada's Grade Separation Warrant Analysis and the City of Guelph's TMP, grade separation of the Edinburgh Road LRC is warranted. An underpass is preferred for this crossing. The next step for the Edinburgh Road LRC is to complete an Environmental Assessment (EA) study to assess all possible options to cross the Metrolinx rail corridor, including the underpass option. While this transportation feasibility provides preliminary recommendations through consideration of transportation/traffic and property criteria, an EA study will look more closely at other impacts (neighbourhood connectivity, natural heritage, cultural heritage, archaeology, noise, etc.) and include site-specific studies for this LRC location.

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The City must undertake a Municipal Class Environmental Assessment (MCEA) to explore alternative solutions and alternative design concepts that are further developed than in this feasibility study, including development to a 30% preliminary design level. There will also be additional opportunities for public engagement and input as part of requirements under the EA process. It is anticipated that the Edinburgh Road grade separation would fall under Schedule 'C' of the MCEA, as the cost would exceed the cost limit of \$10.3M for a Schedule 'B' project.

8.2 Monitoring of LRCs

Based on traffic operation for the intersections, grade separation warrant analyses, and construction feasibility of the grade separation/pedestrian bridges, the LRCs at Alma Street, Yorkshire Street, Glasgow Street, and Watson Road can be maintained per existing conditions and can remain open in the short term (10-15 years).

In the long term (15-25 years), traffic may begin to worsen and operations deteriorate. Therefore, traffic operations and safety at the four LRCs mentioned above, specifically at Alma Street, should be monitored.

8.3 Active Transportation-Only Crossings

New AT-only crossings were reviewed at three locations: Cityview Drive, Margaret Greene Park, and Dublin Street. Based on a preliminary review of the crossing locations, **Table 5** indicates feasible/preferred crossing options. Nonetheless, further design work is required to confirm whether underpasses or overpasses can be accommodated based on existing grades.

TABLE 5: PRELIMINARY PREFERRED CROSSING OPTIONS FOR NEW AT-ONLY CROSSINGS

AT-Only Crossing Location	Preliminary Preferred Crossing Option
Cityview Drive	Underpass (Tunnel) or Overpass (Bridge)
Margaret Greene Park	Underpass (Tunnel)
Dublin Street	Level Rail Crossing

An AT-only underpass or overpass should be undertaken as an MCEA project. In the MCEA document, "Construction of underpasses or overpasses for pedestrian, cycling, recreational or agricultural use" is either a Schedule 'B' project if less than \$2.6M or a Schedule 'C' project if greater than \$2.6M. Based on the preliminary cost estimates for underpasses at the potential AT crossings which is greater than \$2.6M, it is recommended that if an AT underpass or overpass is pursued, a Schedule 'C' MCEA study should be completed. If it is determined that the construction costs of the underpass/overpass will be less than \$2.6M, the project can be completed as a Schedule 'B' study.