Region of Waterloo

Environmental Study Report

Fischer-Hallman Road/Bearinger Road Improvements, Columbia Street West to Westmount Road North, City of Waterloo

Region of Waterloo Project Number 07221

WalterFedy Project 2015-0772-10

June 2020

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Fischer-Hallman Road/Bearinger Road Improvements

Columbia Street West to Westmount Road North

Environmental Study Report

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1.0 Introduction and Background

1.1 Project Initiation

The Region of Waterloo's 2018 Transportation Master Plan Update Moving Forward identified the need to widen Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North in the City of Waterloo in order to provide traffic capacity improvements and enhanced facilities for increased modes of transportation, including active transportation (e.g. walking, cycling, etc.) and transit. The need to widen this section of roadway was also identified in the Region's 2011 Transportation Master Plan. Funding for the proposed improvements is included in the Region's approved 2020 10-Year Transportation Capital Program.

In order to plan the proposed improvements, the Region initiated a Schedule C Class Environmental Assessment Study in 2017. The consulting firm WalterFedy was retained by the Region in 2017 to assist with the Study. A Key Plan of the Study Area was prepared as part of the Study (Figure 1).

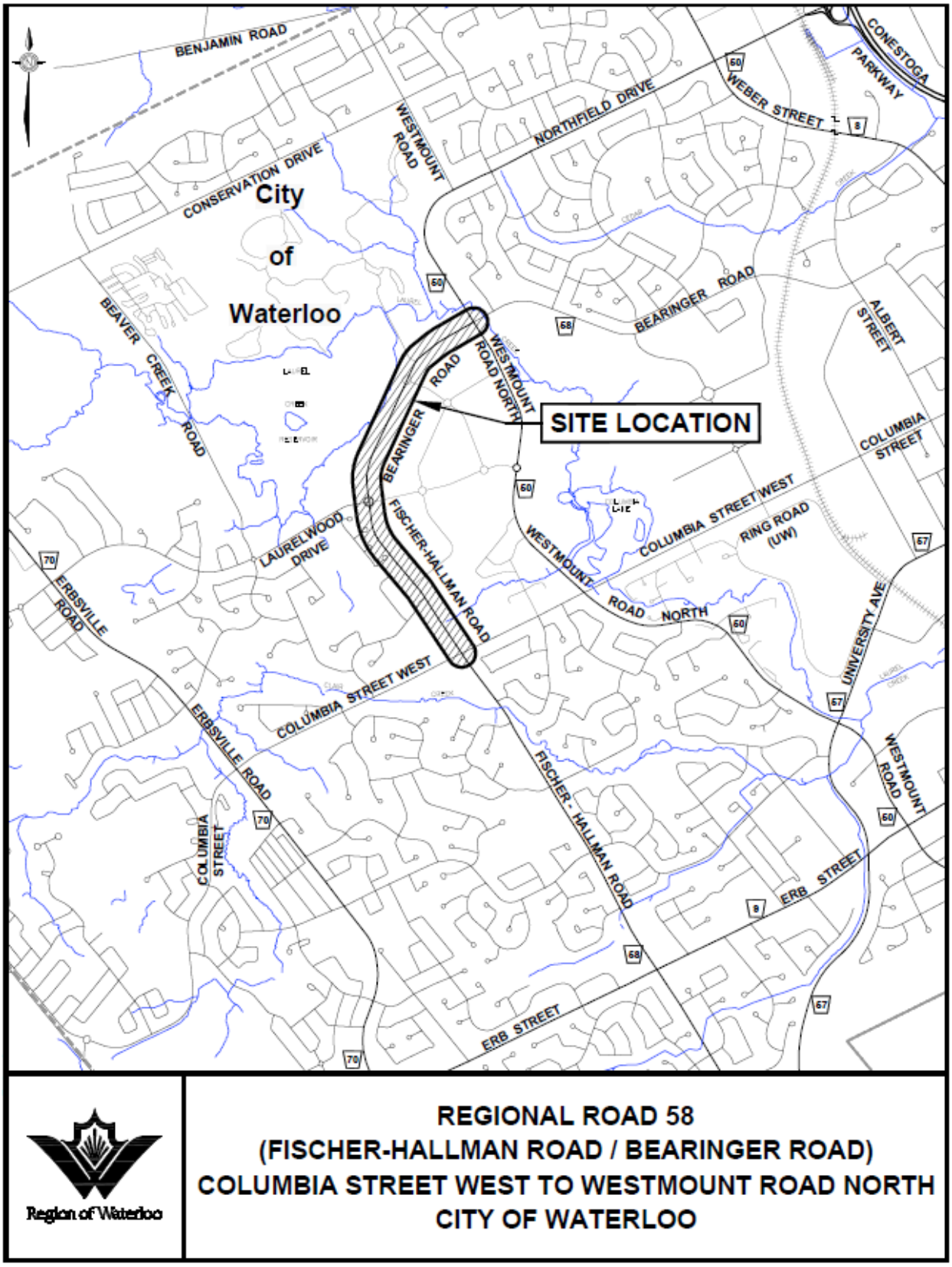


Figure 1 - Key Plan of Study Area

1.2 Study Process

The purpose of the Ontario Environmental Assessment Act is to provide for “the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in Ontario”. Environment is applied broadly and includes the natural, social, cultural, built, and economic components.

The key principles of successful environmental assessment planning include:

- Consultation with stakeholders and affected members of the public;
- Consideration of a reasonable range of alternatives;
- Assessment of the environmental impacts for each alternative;
- Systematic evaluation of alternatives; and
- Clear documentation of the process followed.

1.3 Municipal Class Environmental Assessment

A Municipal Class Environmental Assessment is a planning process approved under the Environmental Assessment Act which is used by municipalities to plan infrastructure enhancement projects while satisfying the requirements of the Act. Under the Class Environmental Assessment process, projects are planned in one of four ways depending on their scope, complexity, and potential for adverse environmental impacts.

Schedule A includes routine projects that are considered straight-forward and minimally impactful, such as maintenance, operations, and emergency activities. Such projects are designated as “pre-approved” under the Class Environmental Assessment and may proceed directly to implementation.

Schedule A+ includes routine projects that are considered straight-forward with minor or short-term impacts. Such projects are designated as “pre-approved” under the Class Environmental Assessment and may proceed directly to implementation; however, the proponent is required to advise area residents and stakeholders of the pending commencement of the project.

Schedule B includes projects with the potential for some adverse environmental impacts. Such projects must undergo a program of public, stakeholder, and agency consultation, and a detailed Project File documenting the planning process must be placed on the public record. Subsequently, the project is considered to be “approved” under the Class Environmental Assessment.

Schedule C includes larger and more complex projects with the potential for significant environmental impacts. Such projects must undergo a program of public, stakeholder, and agency consultation, including three points of formal public contact. A detailed Environmental Study Report must be completed and placed on the public record. Subsequently, the project is considered to be “approved” under the Class Environmental Assessment.

The planning component of the Class Environmental Assessment process includes five key phases:

Phase 1 - Identify the problem, deficiency, or opportunity, and develop a clear statement of the issues to be addressed.

Phase 2 - Identify alternative solutions which could be implemented to address the problem, deficiency, or opportunity. Establish a preferred solution based on an assessment of the impact of alternative solutions on the environment, including consideration of stakeholder input.

Phase 3 - Identify alternative concepts of implementing the preferred solution. Establish the preferred concept based on an assessment of potential impacts of the preferred concept on the environment, including consideration of stakeholder input.

Phase 4 - Compile relevant study information, including rationale, environmental considerations, consultation process, and recommendations into an Environmental Study Report. The document must be made available for review by interested or affected parties.

Phase 5 – Complete contract drawings and documents and proceed to construction and operation. Monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facilities.

Fischer-Hallman Road/Bearinger Road improvements from Columbia Street West to Westmount Road North are being planned as a Schedule C project.

1.4 Study Organization

This Class Environmental Assessment Study has been led by a Project Team consisting of staff and elected officials from the Region of Waterloo, the City of Waterloo, WalterFedy, and the Grand River Conservation Authority (Table 1).

Table 1 - Project Team

Name	Position	Firm/Agency
Justin Armstrong, P.Eng.	Senior Engineer	Region of Waterloo
Marcos Kroker, P.Eng.	Head, Transportation Expansion	Region of Waterloo
Tabot Eneme, P.Eng.	Transportation Planning Engineer	Region of Waterloo
Jim Erb	Regional Councillor (Waterloo)	Region of Waterloo
Royce Bodaly	City Councillor (Ward 2)	City of Waterloo
Mike Lupsa, P.Eng.	Senior Project Engineer	City of Waterloo
Christian Tinney and Trevor Heywood	Resource Planners	Grand River Conservation Authority
Scott Oliver, P.Eng. (until May 2019)	Senior Project Manager	WalterFedy
Dave Weiler P.Eng. (from May 2019)	Senior Project Manager	WalterFedy
Dan Schipper, P.Eng.	Senior Designer	WalterFedy

2.0 Study Objective

The 2011 Regional Transportation Master Plan and the 2018 update Moving Forward have identified the need to widen Fischer-Hallman Road/Bearinger Road from two to four lanes (two travel lanes in each direction) from Columbia Street West to Westmount Road North. Funding for the project is included in the Region's 2020 Transportation Capital Program.

The Region's Active Transportation Master Plan identifies this section of Fischer-Hallman Road/Bearinger Road as a candidate for the installation of active transportation facilities (e.g. pedestrians and cyclists).

The Context-Sensitive Regional Transportation Corridor Design Guidelines is a planning document which guides the design of Regional corridors. The guidelines identify design parameters for preferred features within the road allowance, such as vehicular traffic, cycling and/or pedestrian facilities, and boulevards, etc. In accordance with the guidelines, Fischer-Hallman Road/Bearinger Road is identified as a Neighbourhood Connector – Avenue. Designing Fischer-Hallman Road/Bearinger Road to support active transportation modes, including walking, cycling, and transit, is fundamental to this roadway classification.

Grand River Transit currently operates Route 13 along Fischer-Hallman Road from Columbia Street West to Laurelwood Drive and additional routes are planned for the future along this section of Fischer-Hallman Road/Bearinger Road. Accordingly, transit needs are a consideration in the assessment of alternatives in the Study.

The Regional Transportation Master Plan Update, Active Transportation Master Plan, and Corridor Design Guidelines all support complete and continuous active transportation facilities along this section of Fischer-Hallman Road/Bearinger Road for the full length of this project. Multi-use trails, sidewalks, and cycling facilities are all considered in this Class Environmental Assessment Study to satisfy this objective.

The purpose of this Class Environmental Assessment Study is to confirm the need for identified Regional Transportation Master Plan improvements, identify and evaluate alternatives to address the proposed improvements, identify and evaluate design concepts to determine a preferred alternative, and identify mitigating measures to minimize potential environmental impacts of the preferred alternative.

3.0 Existing Conditions

3.1 Built Environment and Municipal Infrastructure

Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North is primarily a two-lane roadway (one travel lane in each direction), with Fischer-Hallman Road between Columbia Street West and the Sobey's Plaza as a four-lane roadway. Sidewalk is present on the west side of Fischer-Hallman Road from Columbia Street West to Laurelwood Drive. Portions of the roadway have been fully or partially urbanized, although most of the road is currently constructed as a rural section with shoulders and drainage ditches.

The intersection of Fischer-Hallman Road and Columbia Street West is signalized and currently constructed with dedicated southbound left-turn and right-turn lanes. Existing northbound left-turn lanes on Fischer-Hallman Road provide access to the plaza at 450 Columbia Street West and Gatestone Boulevard. A pedestrian refuge island exists on Fischer-Hallman Road north of Gatestone Boulevard. The intersection of Fischer-Hallman Road and Laurelwood Drive is signalized and includes dedicated left-turn lanes on each leg, as well as a dedicated southbound right-turn lane. The intersection of

Bearinger Road and Westmount Road North is currently signalized and includes dedicated left- and right-turn lanes on each leg of the intersection, excluding the northbound leg of Westmount Road North, which does not have a dedicated right-turn lane. Adjacent land uses include the Laurel Creek Conservation Area to the north/west of Bearinger Road, the University of Waterloo Northwest Campus east of Fischer-Hallman Road and south/east of Bearinger Road, residential development west of Fischer-Hallman Road between Gatestone Drive and Laurelwood Dive, and commercial development west of Fischer-Hallman Road and immediately north of Columbia Street West. A Stormwater Management facility is located west of Bearinger Road, immediately north of Laurelwood Drive.

The Doreen Thomas Trail, a stone dust path, is located north of Bearinger Road within the Laurel Creek Conservation Area, which is within Grand River Conservation Authority lands. A 40-metre section of this trail extends into the Bearinger Road right-of-way from approximately 125 metres west of Westmount Road North to approximately 165 metres west of Westmount Road North. There is no existing sidewalk on the remaining portions of the right-of-way.

3.2 Natural Environment

The Study Area is located within the Laurel Creek sub-watershed in the northwest part of the City of Waterloo. The Laurel Creek Reservoir/Conservation Area is located adjacent to Bearinger Road, north of Laurelwood Drive. Mature trees and forested habitat extend close to the edge of Bearinger Road. The Sunfish Lake Laurel Creek Wetland Complex – a Provincially Significant Wetland, is found within the Study Area; however, there are no Areas of Natural and Scientific Interest located within the Study Area. Laurel Creek crosses beneath Westmount Road north of Bearinger Road.

As part of the Environmental Assessment Study, the firm LGL Limited was retained to complete a comprehensive natural environmental inventory of the Study Area, as well as an environmental impact study.

3.3 Utilities

Waterloo North Hydro lines are situated on the east side of Fischer-Hallman Road and on the south/east side of Bearinger Road, as well as on the west side of Fischer-Hallman Road from Columbia Street West to north of Laurelwood Drive. Hydro-One transmission lines cross the Fischer-Hallman Road right-of-way just south of Gatestone Boulevard.

There are two Union Gas high pressure distribution mains adjacent to the east side of Fischer-Hallman Road and the south/east side of the Bearinger Road right-of-way. The University of Waterloo northwest campus development guidelines indicate a greenway is proposed to incorporate the existing gas easement along Fischer-Hallman Road and Bearinger Road. One of the gas mains crosses Bearinger Road, west of Westmount

Road North and continues along the north side of Bearinger Road, while the other main continues along the south side of Bearinger Road. The City of Waterloo owns and operates two sanitary forcemains along Bearinger Road and have advised that the forcemains have been found to be in good condition and not in need of upgrades or rehabilitation.

4.0 Background Studies

Several background studies were completed in the early stages of this Class Environmental Assessment Study in order to establish a comprehensive inventory of existing site conditions. Additionally, a project-specific Transportation Study was completed by the Region of Waterloo in order to identify transportation improvements recommended to accommodate existing and forecasted traffic volumes.

4.1 Transportation Study

The need to widen Fischer-Hallman Road from two to four lanes was identified in the Region's 2018 Transportation Master Plan Update Moving Forward. The Master Plan identifies and prioritizes targeted roadway capacity improvements while accounting for increases in modal shift from automobiles to other modes of travel, including transit, cycling, and walking. The need to widen Fischer-Hallman Road/Bearinger Road to accommodate forecasted traffic volumes in the 2031 horizon year was identified.

The adjacent section of Fischer-Hallman Road south of Columbia Street West, as well as Westmount Road North north of Bearinger Road, have sidewalks and on-road bike lanes on each side of the road. Multi-use trails are located on the east side of Westmount Road North south of Bearinger Road and on the south side of Bearinger Road east of Westmount Road North. The Context-Sensitive Regional Transportation Corridor Design Guidelines is a planning document that guides the design of Regional corridors. The guidelines identify design parameters for necessary features within the road allowance such as vehicle lanes, cycling facilities, sidewalks, boulevards, etc. In accordance with the guidelines, Fischer-Hallman Road/Bearinger Road is identified as a Neighbourhood Connector – Avenue. Designing Fischer-Hallman Road/Bearinger Road to support active transportation modes, including walking, cycling, and transit, is fundamental to this road classification. The Regional Transportation Master Plan and Corridor Design Guidelines all support complete and continuous active transportation facilities on this section of Fischer-Hallman Road/Bearinger Road for the full length of this project. Multi-use trails or sidewalks and bike lanes on both sides of the road would satisfy that requirement.

Although the Region's Transportation Master Plan satisfies both Phases 1 and 2 of the Class Environmental Assessment process, including identifying that the preferred solution for Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North was to widen the roadway to provide four travel lanes, a project-specific Transportation Study was completed by the Region of Waterloo in 2019 in order to:

a) Review forecast travel volumes on this section of Fischer-Hallman Road/Bearinger Road and confirm the need to widen the roadway to provide four travel lanes;

b) Identify the need for intersection improvements required to ensure that all intersections within the Study Area operate at a satisfactory level of service based on forecasted 2031 traffic volumes;

c) Assess the benefits of constructing roundabouts in place of traffic control signals at existing signalized intersections; and

d) Confirm the need for active transportation facilities for pedestrians, cyclists, and transit users in order to encourage a shift in travel modes from vehicles to other modes.

The complete Transportation Study (Region of Waterloo, October 2019), along with related correspondence, is included in this Environmental Study Report (Appendix A). In addition to confirming the need for four through-lanes of vehicular travel, the Transportation Study recommends several intersection improvements to be implemented as part of the project, or separately, in order to accommodate forecasted 2031 traffic volumes. Geometric intersection improvements are recommended along Fischer-Hallman Road/Bearinger Road by 2031 (Table 2).

Table 2 - Recommended Intersection Improvements

Intersection	**Recommended Improvements**
Bearinger Road and Westmount Road North	▪ Provide dual eastbound left-turn lanes on Bearinger Road ▪ Provide a shared lane for eastbound through and eastbound right turn movements along Bearinger Road ▪ Extend storage lengths along the southbound left-turn and southbound right-turn lanes on Westmount Road from 70 m to 95 m and from 70 m to 125 m, respectively
Fischer-Hallman Road/Bearinger Road and Laurelwood Drive	▪ Provide a dedicated eastbound right-turn lane on Laurelwood Drive (City of Waterloo) with 15 to 20 metres of storage

Intersection	Recommended Improvements
Fischer-Hallman Road and Columbia Street West	▪ Provide a dedicated westbound right-turn lane with 30 metres of storage on Columbia Street West (City of Waterloo)
Fischer-Hallman Road and future private Street 'A'	▪ Connects the University of Waterloo Northwest Campus development on the east side of Fischer-Hallman Road across from Gatestone Boulevard providing right-in, right-out access only
Bearinger Road and future private Street 'C'	▪ Connects the University of Waterloo Northwest Campus development between Laurelwood Drive and Westmount Road North providing right-in, right-out access only

4.2 Natural Environmental Impact Study

A Natural Environment Impact Study was completed by LGL Limited for this Class Environmental Assessment Study to undertake a comprehensive inventory of natural environmental features within the Study Area and to identify recommendations for mitigating measures to minimize potential impacts to the natural environment associated with the project. Field inventories were conducted as part of the Environmental Impact Study to complete road mortality surveys, turtle nesting surveys, amphibian calling surveys, vegetation community surveys/delineation, general wildlife habitat characterization, and tree inventory.

The main natural heritage feature identified in the Study Area is the Laurel Creek Conservation Area, which is regulated by the Grand River Conservation Authority under Ontario Regulation 150/06. This area is designated as a Core Environmental Feature by the Region of Waterloo and contains the Sunfish Lake-Laurel Creek Provincially Significant Wetland Complex, as well as Laurel Creek itself. Laurel Creek flows from the reservoir in a southerly direction and crosses under Bearinger Road through a culvert east of the study limits. Laurel Creek supports a warm water fish community.

The Study Area includes an unevaluated wetland near the origin of a tributary of Laurel Creek located north of Columbia Street (Appendix B, Figures 3a, 3b, and 3c, pages 21 to 23). There are no Areas of Natural and Scientific Interest or known wildlife movement corridors within the Study Area. Currently, agricultural lands are present south/east of Bearinger Road across from the Conservation Area. Field studies determined that a small pond located near Westmount Road North and Bearinger Road, in the Laurel Creek Conservation Area, supports wildlife habitat for amphibians and turtles. Species at Risk are known to exist within the general area. As such, habitat screening and targeted surveys were conducted for Species at Risk populations. No concentrated areas of wildlife movement across the Fischer-Hallman Road/Bearinger Road corridor

were identified; however, some turtle mortalities were documented during field investigations. Accordingly, mitigation measures, including wildlife barrier protection fencing, are recommended to be included as part of this project.

A tree inventory was completed within the Study Area. The trees were assessed for overall health and significance. Minimizing tree impacts was a key criterion in the development and evaluation of design alternatives for this Study. Several strategies to minimize tree impacts during construction have been identified and will be implemented during construction. The complete Environmental Impact Study completed by LGL Limited is included with this Environmental Study Report (Appendix B). Section 15.0 of this Environmental Study Report includes specific recommendations contained within the Environmental Impact Study.

4.3 Stage 1 Archaeological Investigation

A Stage 1 Archaeological Investigation was completed by ASI Archaeological and Cultural Heritage Services, which is included with this Environmental Study Report (Appendix C). This Archaeological Study provided the following conclusions and recommendations:

- The Study Area exhibits archaeological potential (Appendix C, Figures 8, 9, and 10, Pages 26 to 28). These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed impacts to the property;
- Parts of the Study Area require test pit survey, according to professional judgement, to confirm disturbance;
- The remainder of the Study Area does not retain archaeological potential due to deep and extensive land disturbance, low and wet conditions, or slopes in excess of 20 degrees. These mapped lands do not require further archaeological assessment; and,
- Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

The investigation, consisting of hand-dug test holes at 5-metre intervals, are generally located on the north side of Fischer-Hallman Road/Bearinger Road between Laurelwood Drive and Westmount Road North. Stage 2 Archaeological Investigation will be completed during detailed design of this project. Depending on the results of the Stage 2 Archaeological Investigation, further Archaeological Investigation may be warranted.

4.4 Cultural Heritage Resource Assessment

A Cultural Heritage Resource Assessment was completed by ASI Archaeological and Cultural Heritage Services, which is included with this Environmental Study Report (Appendix D). ASI's report noted the following:

> "The Study Area is generally bounded by commercial, residential, and recreational areas to the west and north, and agricultural fields, vacant land pending development, and commercial/institutional establishments on the east and south.
>
> The results of background historical research and a review of secondary source material revealed a Study Area with a rural land use history dating back to the early-nineteenth century. A field review was conducted for the entire Study Area to confirm the location of previously identified cultural heritage resources and to document newly discovered ones.
>
> Background research, data collection, and field review was conducted for the Study Area and it was determined that no cultural heritage resources are located within or adjacent to the Fischer-Hallman Road EA Study Area. Based on the results of the assessment, the following recommendations have been developed:
>
> 1. Should future work require an expansion of the Study Area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources."

4.5 Stormwater Management Report - Laurelwood Stormwater Pond

There is an existing stormwater management pond located on the northwest corner of the Bearinger Road and Laurelwood Drive intersection. Stantec Consulting Ltd. was retained by the Region of Waterloo to complete a stormwater management report for the ultimate design of the Bearinger Road/Laurelwood Drive stormwater management facility in support of the proposed Schlegel Village Development located within the University of Waterloo's northwest campus lands, on the northeast corner of the Fischer-Hallman Road, Laurelwood Drive, and Bearinger Road intersection. Stantec's final report, dated February 6, 2014, addressed the need to enlarge the Laurelwood stormwater management facility to accommodate additional surface runoff from the proposed widening of Fischer-Hallman Road/Bearinger Road. From Stantec's report, the Laurelwood stormwater management facility was also designed to treat surface stormwater runoff from a portion of the existing and future widened Fischer-Hallman Road/Bearinger Road (Figure 2).

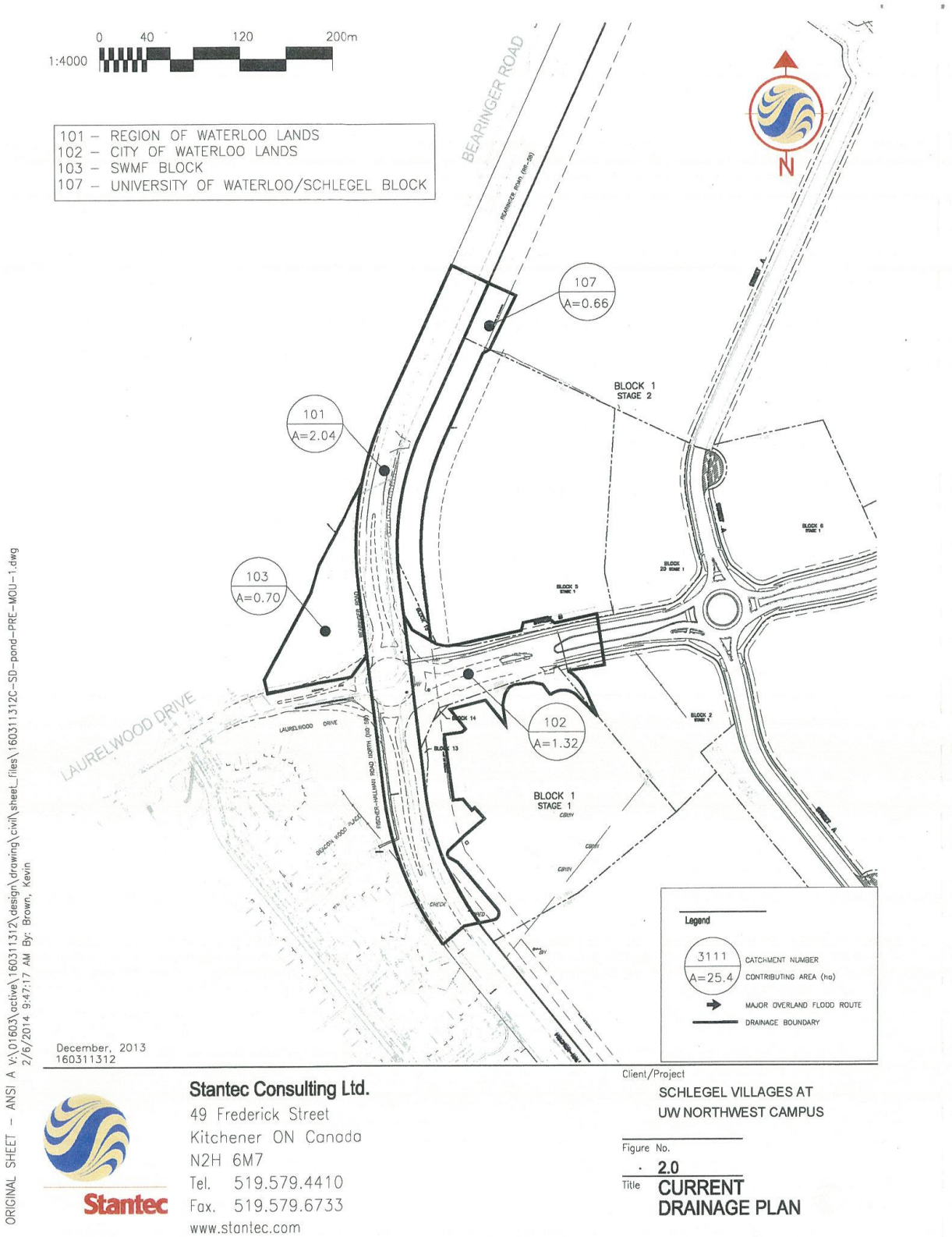


Figure 2 - Laurelwood Storm Pond Drainage Area

Construction of the expanded Laurelwood stormwater management pond was completed in 2015. The pond is now owned and maintained by the University of Waterloo with routine maintenance at the University of Waterloo's sole expense, and significant work to be completed at an agreed-upon cost-share between the University, Region of Waterloo, and City of Waterloo.

Section 15.4 of this report includes discussion on additional stormwater management measures to be included as part of this project.

4.6 Preliminary Acoustical Impact Assessment (Noise Study)

The Region of Waterloo has a Council-approved Noise Policy which governs the circumstances in which noise mitigation measures may be considered by Council in conjunction with Regional Road undertakings. For Regional road widenings, Part B of the Region's Noise Policy applies. Part B of the Noise Policy can be summarized as:

- Noise is calculated at a residence's Outdoor Living Area – typically defined as the backyard or patio within three metres of the rear wall of a residential unit.
- Noise is calculated using a Ministry of the Environment, Conservation and Parks model which calculates a 16-hour average noise level for the outdoor living area based on several factors, such as traffic volumes, distance from the outdoor living area to the noise source, and elevation differences between the outdoor living area and the centre of the road. The noise level used in the policy is not based on peak levels which may be recorded at a given location or time.

The Region will consider building and cost-sharing noise barrier with property owners if:

- The projected noise level 10 years beyond construction is calculated to exceed 65 dBa; or
- The projected noise level 10 years beyond construction is calculated to exceed 60 dBa and increase over existing noise levels by 5 dBa or more; and,
- By constructing noise barrier, projected noise is calculated to be reduced to 60 dBa or less and the reduction in projected noise is 5 dBa or more.

The preliminary Acoustical Impact Assessment (WalterFedy, 2019) completed as part of this Class Environmental Assessment Study is included with this Environmental Study Report (Appendix E). Based on conclusions of the preliminary Acoustical Impact Assessment, no new noise barriers or alterations to existing noise barriers along Fischer-Hallman Road are warranted under Part B of the Region's Noise Policy.

Under Part C of the Region's Noise Policy, the Region will consider building and cost sharing a noise barrier with affected property owners if:

- A resident requests a noise assessment;
- Existing noise levels are calculated to exceed 60dBa;
- Two-thirds of affected property owners are in agreement to build noise barrier (based on rear yard property length) in accordance with the Local Improvement Act; and
- All property owners pay 50% of the noise barrier cost based on length of wall installed at their property, with payments charged over a period of ten years in accordance with Local Improvement Act.

Residents may also decide to take other measures such as installing privacy fence, air conditioning, and/or window improvements at their own expense.

5.0 Notice of Study Commencement

As a first point of contact with the public and technical agencies, a notice of Study Commencement was published on August 15, 2017 in The Record, and on August 17, 2017 in the Waterloo Chronicle. A copy of the Notice was also sent to agencies and stakeholders including First Nations Communities. Public notices, including the Notice of Study Commencement, are included with this Environmental Study Report (Appendix F); the study agency and stakeholder contact list is also included (Appendix G).

6.0 Development of Preliminary Design Alternatives

The Project Team met to review background information, confirm objectives, and develop initial design alternatives for the project. The first Project Team meeting was held on September 17, 2017, and the second Project Team meeting was held on February 26, 2019. Project Team Meeting Minutes are included in this Environmental Study Report (Appendix H).

Based on discussion at these first two Project Team meetings, a series of initial design alternatives were developed for the project. Preliminary design alternatives included:

1) **Do Nothing** – this alternative includes reconstructing the road in its current two-lane configuration:
    - Fischer-Hallman Road from Columbia Street West to Laurelwood Drive – a semi-urban profile (sidewalk and curb-and-gutter on the west side)
    - Bearinger Road from Laurelwood Drive to Westmount Road North - Rural profile (ditch drainage)

2) **Widen the Road to Four Lanes and Add Separated Bike Lanes and Sidewalk** – this alternative widens this section of Fischer-Hallman Road/Bearinger Road to four undivided lanes and adds the following facilities:

   - Curb-and-gutter and a storm drainage system;
   - Additional street lighting;
   - 1.7-metre-wide, on-road, separated bike lanes along both sides; and
   - 1.8-metre-wide pedestrian sidewalks along both sides.

3) **Widen the Road to Four Lanes and Add Multi-Use Trail and Sidewalk** – this alternative widens this section of Fischer-Hallman Road/Bearinger Road to four undivided lanes and adds the following facilities:

   - Curb-and-gutter and a storm drainage system;
   - Additional street lighting;
   - 3.0- to 4.0-metre-wide multi-use trail along one side; and
   - 1.8-metre-wide pedestrian sidewalk along one side.

4) **Widen the Road to Four Lanes and Add Median, Separated Bike lanes, and Sidewalk** – this alternative widens this section of Fischer-Hallman Road/Bearinger Road to four divided lanes and adds the following facilities:

   - Curb-and-gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0-metre-wide median;
   - 1.7-metre-wide, on-road, separated bike lanes along both sides; and
   - 1.8-metre-wide pedestrian sidewalks along both sides.

5) **Widen the Road to Four Lanes and Add Median, Multi-Use Trail, and Sidewalk** – this alternative widens this section of Fischer-Hallman Road/Bearinger Road to four divided lanes and adds the following facilities:

   - Curb-and-gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0-metre-wide median;
   - 3.0- to 4.0-metre-wide multi-use trail along one side; and
   - 1.8-metre-wide pedestrian sidewalk along one side.

Cross-sections of all preliminary design alternatives developed were prepared (Figures 3 through 7, inclusive).

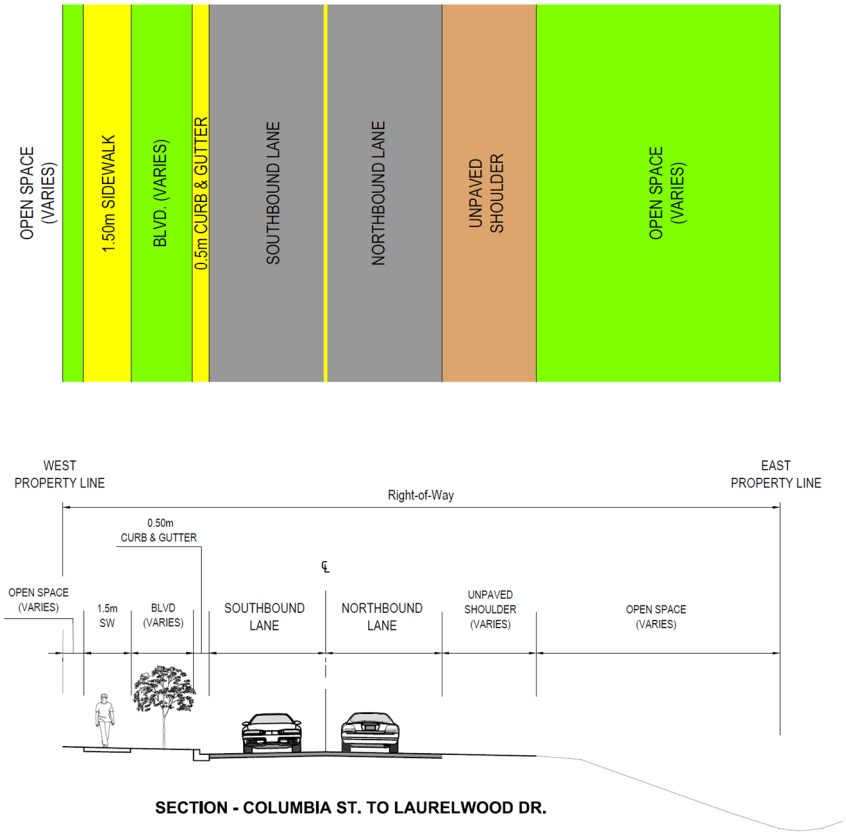


Figure 3 - Preliminary Design Alternative 1 – Do Nothing

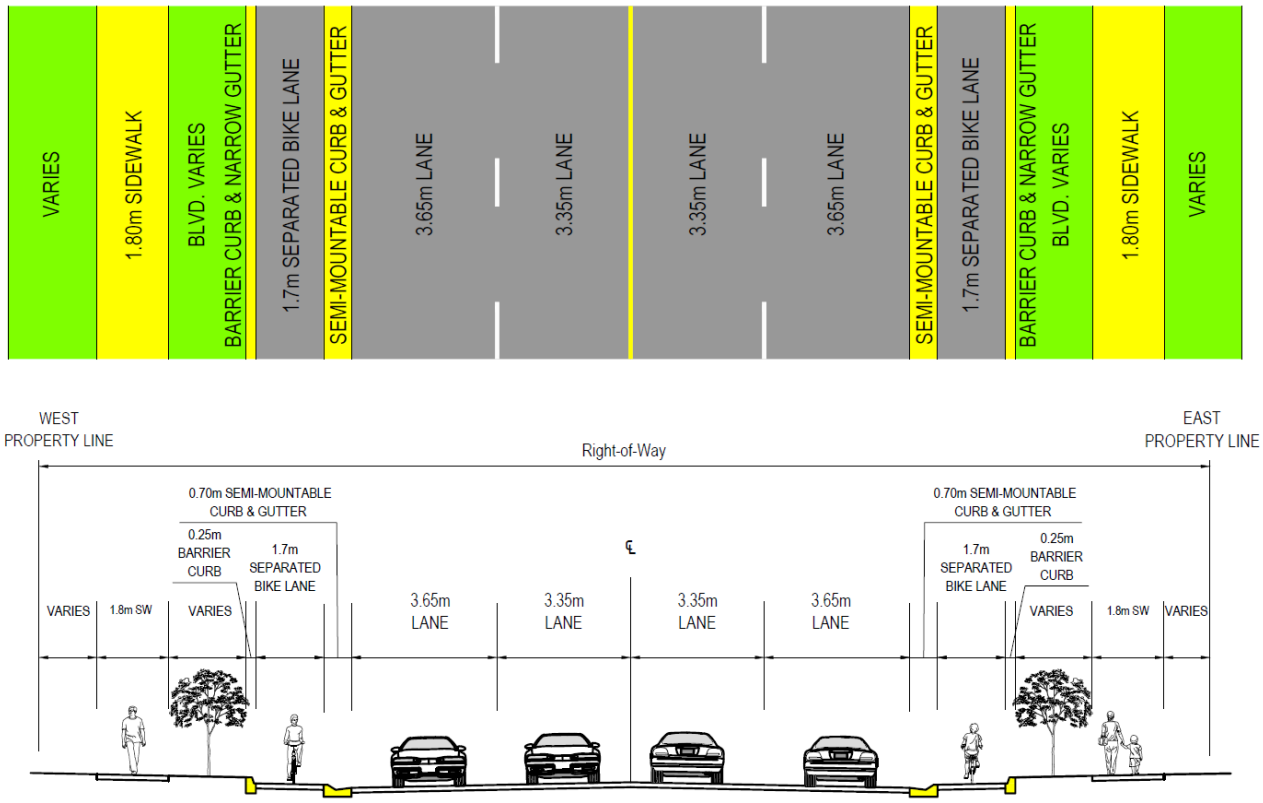
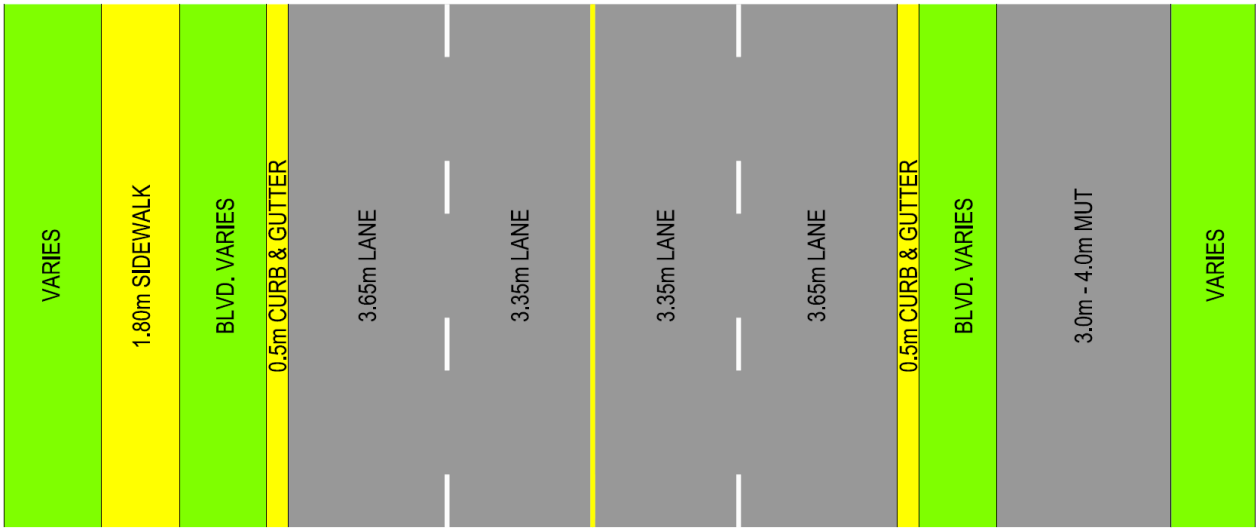


Figure 4 - Preliminary Design Alternative 2 – Widen the Road to Four Lanes and Add Separated Bike Lanes and Sidewalk



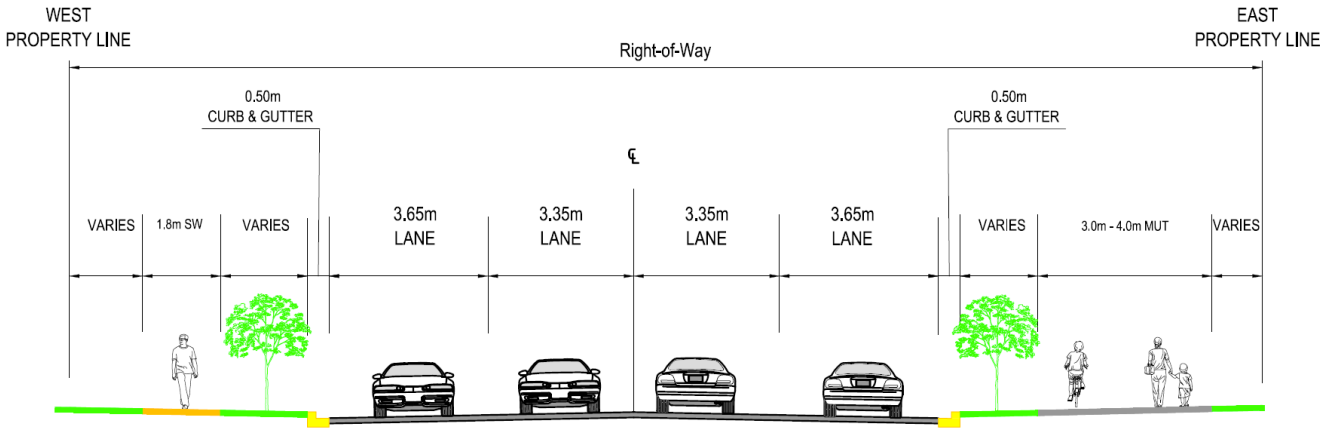


Figure 5 - Preliminary Design Alternative 3 – Widen the Road to Four Lanes and Add Multi-use Trail and Sidewalk

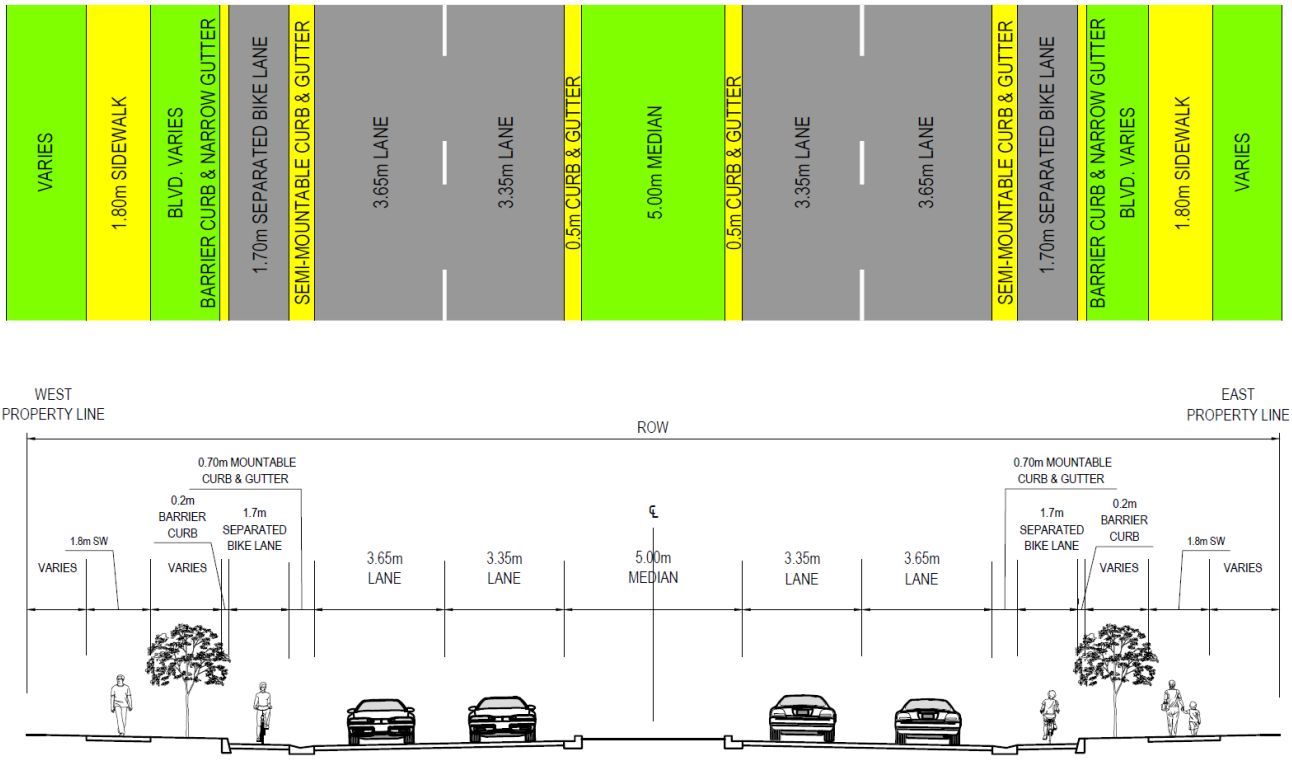


Figure 6 - Preliminary Design Alternative 4 – Widen the Road to Four Lanes and Add Median, Separated Bike Lanes, and Sidewalk

Figure 7 - Preliminary Design Alternative 5 – Widen the Road to Four Lanes, and Add Median, Multi-use Trail, and Sidewalk

7.0 Public Consultation Centre #1

The first Public Consultation Centre was held on May 7, 2019, from 5:00 to 8:00 p.m. at the Waterloo Public Library – John Harper Branch, 500 Fischer-Hallman Road, Waterloo. The purpose of the first Public Consultation Centre was to present the five preliminary design alternatives developed by the Project Team to the public for information and comment. Display boards of the design alternatives and other information were provided, and Project Team representatives were available to answer questions.

7.1 Notification

Notification for Public Consultation Centre #1 was provided through:

- Newspaper advertisements in The Record on April 30, 2019, and in the Waterloo Chronicle on April 25, 2019;
- Roadside sign boards; and
- Letters were delivered or mailed directly to area residents and agency contacts.

Copies of the newspaper advertisements for Public Consultation Centre #1 are included in this Environmental Study Report (Appendix F).

7.2 Public Consultation Centre #1 Information Package

In advance of the Public Consultation Centre, a Project Information Package was prepared by Region of Waterloo staff and provided to the Regional Planning and Works Committee, comprised of members of Regional Council, for information. The Public Consultation Centre #1 Information Package is included in this Environmental Study Report (Appendix I).

7.3 Public Comments Received and Project Team Responses

An estimated 57 people attended Public Consultation Centre #1, including 37 registered attendees. 24 written comments were received as a result of Public Consultation Centre #1.

8.0 Preliminary Evaluation of Design Alternatives

Following the first Public Consultation Centre, the Project Team met on September 5, 2019, to review the public comments received, develop a response for each comment, and evaluate the design alternatives based on appropriate environmental criteria (Appendix H).

The Project Team's response to each of the public comments received was consolidated and posted to the Region's website, and is included in this Environmental Study Report (Appendix J). The main themes of the public comments received were summarized (Table 3).

Table 3 - Public Consultation Centre #1 Comment Theme Summary

Theme	**Number of Comments**
Support for road widening to four lanes (all alternatives except Do Nothing)	8
Preference for multi-use trails	5
Request for noise barriers	4
Do not include a raised centre median	4
Do not widen the road to four lanes	3
Leave the existing Doreen Thomas Trail in place	3
Preference for dedicated bike lanes	2
No need for sidewalks/paths on both sides	2
Do not provide street lighting on the road	2

The Project Team evaluated each of the design alternatives based on relevant environmental criteria including:

- Natural environment;
- Socio-economic environment;
- Transportation environment; and
- Capital and maintenance costs.

The Project Team's initial evaluation of the preliminary design alternatives presented at the first Public Consultation Centre is included in this Environmental Study Report (Appendix K). Based on the evaluation, and considering public comments received, Design Alternatives 3 and 5 were modified to include boulevard multi-use trails on each side of the road within the Study Area. These new design alternatives, referred to as

Design Alternatives 3a and 5a, were then evaluated by the Project Team at the September 5, 2019 meeting. The Project Team's updated evaluation of the modified design alternatives is included in this Environmental Study Report (Appendix K). Through the development of Design Alternatives 3a and 5a, the centreline of Bearinger Road was shifted to the east as much as possible within the existing right-of-way in order to minimize impacts on the natural deciduous forest in the Laurel Creek Conservation Area. The Project Team unanimously endorsed Design Alternative 5a as the preliminarily preferred design concept for the improvements to Fischer-Hallman Road/Bearinger Road.

The Project Team agreed to present Design Alternative 5a to the public as the preferred design concept. Cross-sectional drawings of Design Alternatives 3a and 5a were prepared (Figures 8 and 9).

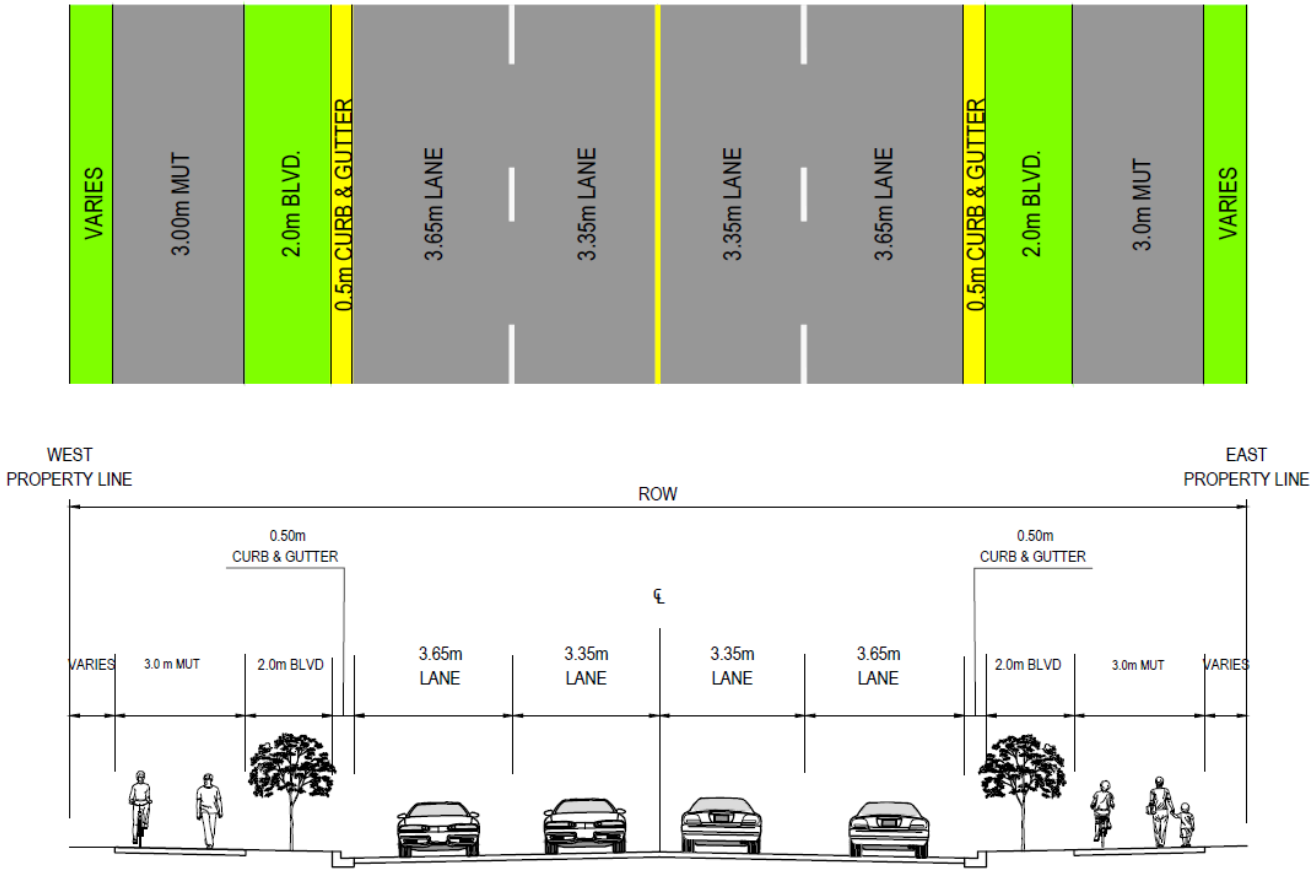


Figure 8 - Design Alternative 3a - Widen the Road to Four Lanes and Add Multi-use Trail on Each Side of the Road

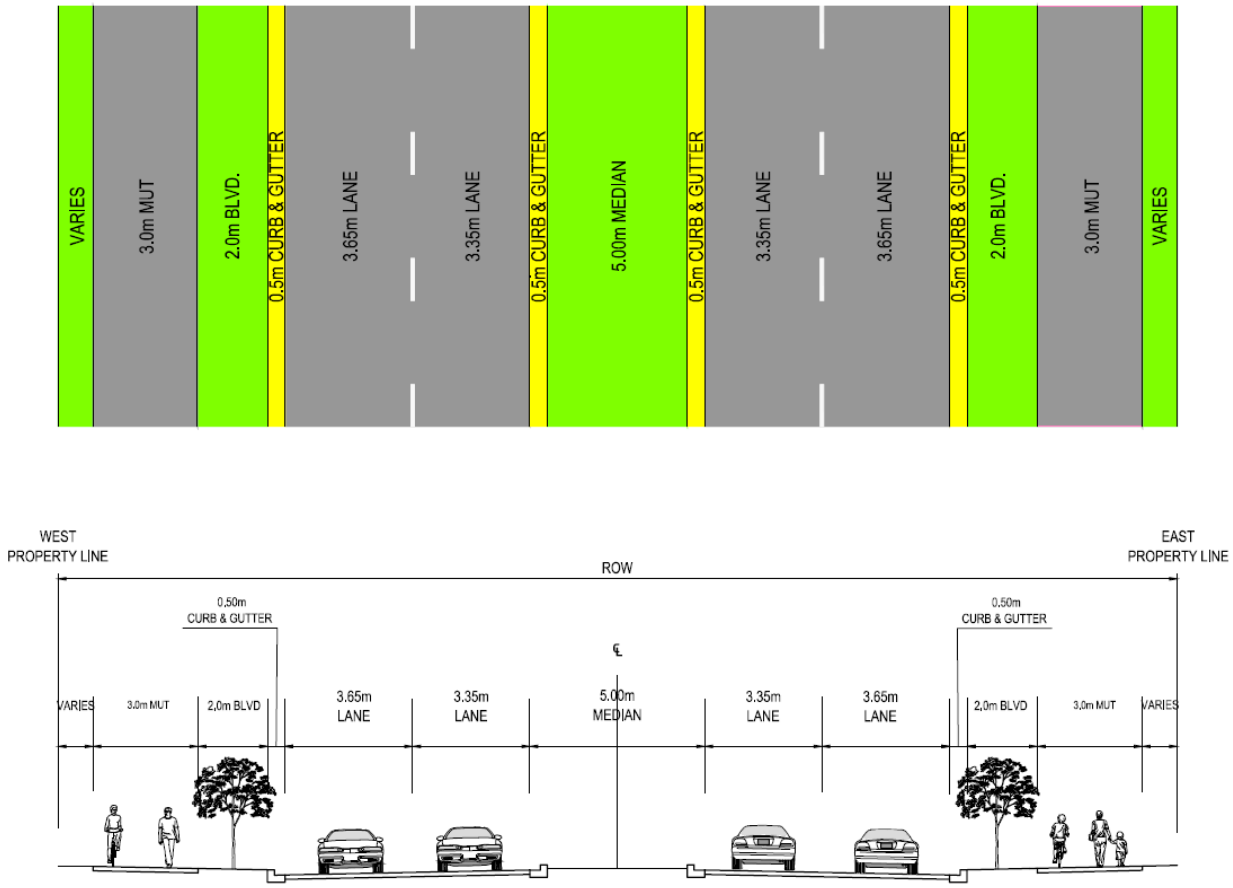


Figure 9 - Design Alternative 5a - Widen the Road to Four Lanes, and Add Median, Multi-use Trail on Each Side of the Road

9.0 Public Consultation Centre #2

The second Public Consultation Centre was held on November 4, 2019, from 4:30 to 7:30 p.m. at the Waterloo Public Library – John Harper Branch, 500 Fischer-Hallman Road, Waterloo. The purpose of the second Public Consultation Centre was to present the preferred design concept developed by the Project Team to the public for information and comment. Display boards of the design alternatives and other information were provided, and Project Team representatives were available to answer questions.

9.1 Notification

Notification for Public Consultation Centre #2 was provided through:

- Newspaper advertisements in The Record on October 25, 2019 and in the Waterloo Chronicle on October 24, 2019;
- Roadside sign boards; and
- Letters delivered or mailed directly to area residents and agency contacts.

A copy of the Public Notice for Public Consultation Centre #2 is included in this Environmental Study Report (Appendix F).

9.2 Public Consultation Centre #2 Information Package

In advance of the Public Consultation Centre, a Project Information Package was prepared by Region of Waterloo staff and provided to the Regional Planning and Works Committee, comprised of members of Regional Council, for information. The Public Consultation Centre #2 Information Package is included in this Environmental Study Report (Appendix I).

9.3 Public Comments Received and Project Team Responses

An estimated 50 people attended Public Consultation Centre #2, including 45 registered attendees. 8 written comments were received as a result of Public Consultation Centre #2. The main comments received were summarized (Table 4).

Table 4 - Public Consultation Centre #2 Comment Theme Summary

Theme	**Number of Comments**
Preference for Alternative 3a	3
Request for new Traffic Signals at 460/461 Columbia Street West	2
Maintain/protect Doreen Thomas Trail and the ecological buffer (trees) at Laurel Creek Conservation Area	2
Minimize street light intrusion on Laurel Creek Conservation Area	1
Do not include a raised Centre Median	1

The Project Team's response to each of the public comments received was consolidated and posted to the Region's website, and has been included in this Environmental Study Report (Appendix L).

10.0 Region's Active Transportation Advisory Committee

The Project Team preferred alternative was presented to the Region's Active Transportation Advisory Committee (ATAC) on December 17, 2019, by the Region's Project Manager. ATAC Committee members were supportive of the Preferred Design Alternative. The main feedback received at the ATAC meeting was a request to connect the existing on-road cycling lanes on Laurelwood Drive to the new boulevard multi-use trail on the west side of Fischer-Hallman Road. The minutes from the ATAC meeting are included in this Environmental Study Report (Appendix M).

11.0 Recommended Design Alternative

11.1 Description

Based on completed studies, and in consideration of public and agency comments received, the Project Team identified the following Recommended Design Alternative for this project:

- Reconstruct and widen Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North from two to four lanes to provide two through lanes of travel in each direction with a new 5.0-metre-wide continuous raised centre median (Figure 9);
- Fully urbanize Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North with new curb-and-gutter and storm sewers;
- Construct new boulevard multi-use trails on each side of Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North;
- Construct new eastbound dual left-turn lanes on Bearinger Road at Westmount Road North;
- Extend the storage lengths of the existing southbound left-turn and right-turn lanes on Westmount Road North at Bearinger Road;
- Recommend new dedicated right-turn lanes on westbound Columbia Street West at Fischer-Hallman Road and on eastbound Laurelwood Drive at Fischer-Hallman Road, both subject to City of Waterloo approval and funding allocation;
- Install a new watermain on Bearinger Road from Laurelwood Drive to the Beaver Creek Co-op entrance east of Westmount Road North;
- Provide wildlife protection fencing on/adjacent to the Laurel Creek Conservation Area lands in the vicinity of Westmount Road North to restrict wildlife crossings;

- Install new stormwater management measures to provide quantity and quality control of stormwater runoff;
- Provide new bus stops for Grand River Transit;
- Upgrade existing traffic control signals within the Study Area;
- Provide landscaping where feasible in boulevards and, potentially, centre median areas with a focus on enhancing the ecological buffer between the roadway and the Laurel Creek Conservation Area;
- When the University of Waterloo proceeds to further develop their Northwest Campus, the intersections of proposed private Streets A and C with Fischer-Hallman Road/Bearinger Road have been approved as right-in, right-out only.
- Provide new street lighting in accordance with the Region's Illumination Policy; and
- Recommend the City of Waterloo acquire property for the proposed dedicated eastbound right-turn lane on Laurelwood Drive and the proposed dedicated westbound right-turn lane on Columbia Street West, subject to approval and authorization of the City of Waterloo.

A plan view drawing of the Recommended Design Alternative was prepared (Figure 10). In addition, a summary of key design elements of the Recommended Design Alternative was prepared (Table 5).

FISCHER-HALLMAN ROAD / BEARINGER ROAD RECONSTRUCTION

(COLUMBIA STREET W. TO WESTMOUNT STREET N.)
OPTION 5a - 5.0m MEDIAN, 4 THROUGH LANES, NO BIKE LANES, 3.0m MULTI-USE TRAILS

NOV, 2019

Figure 10 - Recommended Design Alternative

Table 5 - Design Criteria

Criteria	Design Element	Notes
Design Speed	70 km/h	Neighbourhood Connector-Avenue
Posted Speed	60 km/h	
Right-of-way Width	35 m	
Lane Width (Inside)	3.35 m	
Lane Width (Outside)	3.65 m	
Left – Right Turn Width	3.25 m	
Centre Island Median Width	5.00 m	Including Curbs
Multi-use Trail Width	3.00 m	
Intersection Radius	Varies from 9 m to 15 m	
Cross Fall	2%	Non-super elevated sections
Super Elevation	3.6% maximum	TAC 2017, Table 3.2.5
Vertical Alignment	5% maximum	TAC 2017, Chapter 3.3.2.2
K crest	17	TAC 2017, Table 3.3.2
K sag	23	TAC 2017, Table 3.3.4

11.2 Property Requirements

Construction of new dedicated right-turn lanes on westbound Columbia Street West at Fischer-Hallman Road and on eastbound Laurelwood Drive will both require property acquisition. As the owner of Columbia Street West and Laurelwood Drive, the City of Waterloo would be responsible for the cost of that property acquisition in conjunction with the cost of the new turn lane construction. Preliminary Property Impact Plans were completed, and are included as part of this Environmental Study Report (Appendix N). Both parcels of land required are currently owned by the University of Waterloo. Should the City wish to approve and fund these new turn lanes, they would need to first acquire the lands identified on the preliminary property impact plans.

11.3 Utility Impacts

In order to accommodate the Recommended Design Alternative, approximately 40 overhead hydro poles will need to be relocated. This number could increase or decrease depending on the final alignment and grading established during the detailed design stage of this project.

The two Union Gas mains located beneath Fischer-Hallman Road and Bearinger Road do not require adjustment to accommodate the Recommended Design Alternative. During the detailed design stage, Union Gas will be consulted to determine the need for any protective measures during construction. During construction, Union Gas representatives will be present on site as work takes place in and around the gas mains.

12.0 Regional Planning and Works Committee Meeting

The Region's Planning and Works Committee considered staff Report TES-DCS-20-06 for the approval of the Recommended Design Alternative for Fischer-Hallman Road/Bearinger Road from Columbia Street West to Westmount Road North at the February 11, 2020, meeting. The staff report and Minutes of the Region's Planning and Works Committee meeting of February 11, 2020, as well as final Council approval of the Recommended Design Alternative at the February 19, 2020, meeting, are included in this Environmental Study Report (Appendix M).

13.0 Notice of Study Completion

A Notice of Study Completion was published on both June 9, 2020 and June 12, 2020 in The Record. A copy of the Notice was also sent to agencies and stakeholders including First Nations Communities the week of June 8-12, 2020. Public notices, including the Notice of Study Completion, are included with this Environmental Study Report (Appendix F); the study agency and stakeholder contact list is also included (Appendix G).

14.0 Project Schedule and Cost

Funding for construction of the Fischer-Hallman Road/Bearinger Road improvements is included for 2024/2025 in the Region's approved 2020 Transportation Capital Program. The Region reviews timing of planned capital projects each year through the development of its annual capital budget. Funding in the amount of $17.71 million in years 2020 through 2025 inclusive has been budgeted for this project.

15.0 Mitigating Measures

15.1 Wildlife Protection

Wildlife exclusion fencing (targeting small mammals, reptiles, and amphibians) will be installed along the north/west side of Bearinger Road (north/west of the proposed multi-use trail) as recommended in the Environmental Impact Study. Fencing details will be developed during the design stage of this project in consultation with the Grand River Conservation Authority. Additionally, any vegetation clearing will occur outside of the migratory bird nesting window for birds regulated under the Migratory Birds Convention Act (typically running from early April to late August to avoid the breeding season for the majority of the bird species, unless a pre-clearing nest search is undertaken to confirm the absence of bird nests).

15.2 Vegetation Protection

As noted, the Recommended Design Alternative has been developed by shifting Bearinger Road to the south/east to the greatest possible extent within the right-of-way in order to minimize impacts on trees within the Laurel Creek Conservation Area. In addition, Contract Documents will specify that care be taken when construction vehicles are operating in the vicinity of wetland and forested habitats present along the north/east side of Bearinger Road. Tree protection fencing will be placed outside of the dripline of trees and will be maintained to minimize impacts and ensure no construction activity occurs within tree protection zones.

15.3 Erosion and Sediment Control During Construction

Contract Documents will include requirements for the following measures to control erosion and sediment during construction:

- Installation, maintenance, monitoring, and removal of temporary erosion and sediment control measures, as well as the removal of sediment accumulated by the control measures;
- Sediment control(s) will be placed along watercourses, ditches, wetlands, and forest/woodland edges in areas of soil disturbance;
- Any dewatering discharge shall be directed to a sediment containment system (sediment basin, sediment bag, etc.) prior to release to adjacent watercourses and wetlands;
- The Contractor shall ensure that soil migration from the construction area is prevented, and that exposed soils are stabilized as soon as possible;

- Storage, stockpiling, and staging areas will be delineated prior to construction and inspected in accordance with the Erosion and Sediment Control Guideline for Urban Construction (2006);

- Construction material, excess material, construction debris, and empty containers will be stored at least 30 metres from watercourses/waterbodies and watercourse banks to prevent their entry into watercourses;

- Equipment refuelling, maintenance, and washing activities will be conducted at a pre-determined site located at an adequate distance (minimum 30 metres) from the watercourses and their banks located within the Study Area in order to prevent the entry of petroleum, oil, or lubricants or other deleterious substances (including debris, waste, rubble, or concrete material) into watercourses within the Study Area, or their release to the environment;

- All spills that could potentially cause damage to the environment should be reported to the Spills Action Centre of the Ministry of the Environment, Conservation and Parks. In the event of a spill, containment and clean-up will be completed quickly and effectively. In addition, a requirement for a Spill Prevention and Response Contingency Plan will be included in the Contract package to ensure that appropriate materials to absorb or contain any petroleum products/spills that may be accidentally discharged will be on site at all times; and

- Native and non-invasive seed mix, mulch, or an erosion control blanket will be placed in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization.

15.4 Stormwater Management Measures

The existing stormwater management pond at the northwest corner of Fischer-Hallman Road and Laurelwood Drive has been sized to accommodate stormwater runoff from the widened portion of Fischer-Hallman Road/Bearinger Road from 370 metres north of Laurelwood Drive to 220 metres south of Laurelwood Drive. For the areas of Fischer-Hallman Road and Bearinger Road where stormwater is not captured and directed to this pond, additional stormwater management measures were identified as part of this Class Environmental Assessment Study.

An initial meeting between WalterFedy, Region, and Grand River Conservation Authority staff was held on October 9, 2019. The purpose of this meeting was to discuss potential stormwater management options for the project. One of the key points discussed at this meeting included the potential of incorporating Low Impact Development measures into the project. The Region of Waterloo classifies lands in wellhead protection areas based on a vulnerability score of 0 to 10 (0 being least sensitive and 10 being most sensitive) with the objective of protecting groundwater quality, particularly in the most sensitive areas. A large part of Fischer-Hallman Road

and Bearinger Road within the Study Area has a vulnerability score of 8, which is considered to be very sensitive. Based on this rating and discussions between WalterFedy and the Region of Waterloo following the meeting, Low Impact Development measures involving options to recharge the groundwater with surface runoff from the roadway are not deemed to be desirable in this location due to road salt in the surface runoff. Accordingly, proposed measures to reduce stormwater runoff flows and improve stormwater quality will involve implementing storage measures to capture and treat stormwater runoff and 'end-of-pipe' treatment measures such as oil-grit separators. Typical stormwater storage measures include stormwater management ponds or online storage pipes. For this project, land constraints preclude the implementation of a new stormwater management pond, therefore online piped storage systems were identified as the preferred option. The on-line piped storage would be designed to ensure that post-construction peak flow rates do not exceed the pre-construction peak flow rates. Additionally, the storage provided along with possible end-of-pipe treatment measures would provide for an estimate 70% removal of total suspended solids. Detailed design of the system, once completed, will be submitted to the Grand River Conservation Authority, as well as the Ministry of Environment, Conservation and Parks, for review and approval.

15.5 Salt Management Measures

A salt management report was prepared as part of the planning for this project, and recommendations for measures to minimize the use of road salt are included in the Salt Management Road Design Assessment Form (Appendix O).

16.0 Commitment to Future Work

The following items will be completed during the detailed design stage of the project:

- Finalize the tree inventory along the preferred alignment, including updating existing tree inventory details;
- Complete a detailed Tree Preservation Plan which will include recommendations for tree preservation, removal, and mitigation measures in accordance with City of Waterloo requirements and Region of Waterloo policies;
- Determine the limits/extent and design of wildlife exclusion fencing with input from the Grand River Conservation Authority;
- Complete a bat cavity survey to identify trees supporting candidate maternal cavity roosts, focusing along the forest boundary sections of Bearinger Road;
- Obtain a permit from Grand River Conservation Authority for works located in regulated areas prior to construction, and ensure Contractor compliance with all conditions of the permit during construction;

- Complete a detailed landscape plan during the detailed design stage with a focus on providing a buffer between the roadway and the Laurel Creek Conservation Area;
- Develop a detailed design for stormwater management measures and obtain Grand River Conservation Authority and Ministry of Environment, Conservation and Parks approvals;
- Develop a street lighting design which meets the Region's Illumination Policy, while also considering minimizing light intrusion on the Laurel Creek Conservation Area; and
- Liaise with all affected utility agencies to identify all overhead and underground utilities which require relocation or protection to accommodate road construction.

APPENDIX A

Transportation Study

Region of Waterloo

Municipal Class Environmental Assessment

FISCHER-HALLMAN/BEARINGER ROAD WIDENING

(COLUMBIA STREET WEST TO WESTMOUNT ROAD)

PROJECT # 7221

TRANSPORTATION REPORT

OCTOBER 2019

Executive Summary

The 2018 Transportation Master Plan (TMP) identified this corridor for widening by 2031. Hence, the Region of Waterloo undertook a Schedule C Municipal Class Environmental Assessment (EA) to widen Fischer-Hallman Road/Bearinger Road (RR# 58) from Columbia Street West to Westmount Road North in the City of Waterloo. This roadway corridor is identified in the Regional Transportation Corridor Design Guidelines as a Neighbourhood Connector – Avenue, and it is intended to be used for moving people and goods through a combination of automobiles, public transit, cycling, and walking.

Fischer-Hallman Road/Bearinger Road had a two-lane rural cross section between Columbia Street West to Westmount Road North measuring approximately 2.13 km with a posted speed of 60 km/h. Traffic characteristics along the various segments were as follows:

Traffic Data – Fischer-Hallman/Bearinger Road (2016)

Road Segment	AADT	% Truck	% Heavy	Speed		
				Posted	Average	85th %ile
Columbia St W – Gatestone Blvd	16,500	0.8%	2.0%	60 km/h	61 km/h	68 km/h
Gatestone Blvd – Laurelwood Dr	15,700	0.5%	2.0%	60 km/h	68 km/h	73 km/h
Laurelwood Dr – Westmount Rd	14,000	0.8%	0.9%	60 km/h	59 km/h	65 km/h

Approximately 10% of the Annual Average Daily Traffic (AADT) along the corridor occurs during the AM or PM peak hours. Transit buses account for the higher heavy vehicle percentages between Laurelwood Drive and Columbia Street West.

Pedestrian and cycling activities along the corridor are very low partly due to the suburban nature of the surrounding environment and the lack of appropriate facilities to support active transportation. Besides, the 2016 counts were collected in the month of February which could be another reason for the low pedestrian and cycling activity observed along the corridor. In terms of transit, Grand River Transit (GRT) operates route #13 along the corridor between Laurelwood Drive and Columbia Street West. It runs on a 15 minute-headway during peak periods and 30 minute-headway during off peaks in both directions and begins as early as 5:30 am with the last trip leaving as late as 12:30 am. Other transit routes operating within the vicinity of the Study Area include routes #31and iXpress route #201.

One fatal collision occurred on Monday November 24, 2014 when a pedestrian was struck while attempting to cross Fischer-Hallman Road just south of Gatestone Boulevard. A pedestrian refuge island was installed on the north leg of the intersection of Fischer-Hallman Road & Gatestone Boulevard in February 2015 to mitigate this problem. Aside from that, there were no other unusual collision patterns observed along the corridor based on a review of the historic collision data.

Traffic operations and capacity analysis showed that the roadway operated at acceptable level of service based on 2016 base year volumes. However, with subdivisions planned within the Study Area (the University of Waterloo northwest campus subdivision being the major one), an increase in traffic volumes along the corridor is anticipated. With this in mind alongside deficiencies in Active Transportation facilities, the following problem statement was developed for the study:

> *The 2018 TMP identified Fischer-Hallman Road/Bearinger Road between Columbia Street West to Westmount Road for widening by 2031 to address future congestion in the area. Travel demand is expected to increase significantly due to future developments planned for the northwestern part of the City of Waterloo over the next few decades. An analysis of the "Do Nothing" alternative showed that by 2031, capacity constraints along the roadway and at the intersections will affect both private automobile and transit operations. The lack of active transportation facilities along the roadway has also been identified and documented. Therefore, a road expansion is required along Fischer-Hallman Road/Bearinger Road between Columbia Street West to Westmount Road to address these future capacity constraints, accommodate increases in travel demands, and address other identified needs.*

Although the University of Waterloo plans to develop its northwest campus subdivision, it was uncertain with regards to when it plans to have it fully developed. To assess traffic impact along the corridor, an "Ultimate" and an "Interim" traffic forecasts for the 2031 horizon year was developed based on a "Full" and a "Partial" development of the University of Waterloo northwest campus subdivision respectively. These forecasts were developed with the aid of the Regional Transportation Demand Model, a background traffic growth rate of 1.2%, and additional traffic obtained from Traffic Impact Studies (TIS) of future developments within the area.

The following three alternatives were developed and used to assess traffic impact on the corridor:

Alternative	Description	Detailed Description
A	'Ultimate Development of UofW' Without Roadway Improvements	This was the 'Do Nothing' alternative. It assumed full development of the UofW northwest campus subdivision by 2031 and assessed the traffic impact on the existing geometric features of the roadway/intersections based on an "Ultimate" traffic forecast developed for the 2031 horizon year based on background traffic growth plus that from the "Full" development of the UofW northwest campus subdivision.
B	'Interim Development' without Roadway Widening	This alternative assumed partial development of the UofW northwest campus subdivision by 2031. Traffic analysis performed under this alternative aimed at determining if the current two-lane cross-section of the roadway (plus geometric improvements at the intersections) would be adequate to accommodate the 2031 "Interim" traffic forecast which was based on background traffic growth plus that from the "partial" development of the UofW northwest campus subdivision the need to widen the roadway.
C	'Interim Development' With Roadway Widening	This alternative assumed partial development of the UofW northwest campus subdivision by 2031. It used the 2031 "Interim" traffic forecast to assess the traffic impact based on a four-lane cross-section of the roadway, alongside geometric and traffic operational improvements at the intersections.

Findings from the overall assessment of traffic operation and capacity analysis of the various alternatives are summarized below.

Alternative	Evaluation
A 'Ultimate Development' without Improvements (Not Recommended)	This was not a viable alternative. It does not provide sufficient capacity to address the anticipated deficiencies should the 'UofW' northwest subdivision be developed at full capacity. Besides, implementing the suggested improvements outlined in section 4.4 to address the capacity deficiencies will pose significant impacts to the environment with significant cost especially given the uncertainty surrounding the development of UofW's northwest campus subdivision.
B 'Interim Development' without Roadway Widening (Not Recommended)	This was not a viable alternative. It does not provide sufficient capacity to accommodate future traffic from background growth plus traffic from the partial development of the 'UofW' northwest campus subdivision. It does not align with the long-term planning objective to widen the roadway as established in the 2018 TMP.
C 'Interim Development' with Roadway Widening **(Recommended)**	This alternative calls for the widening of the roadway with intersection improvements and it has the most positive overall effect. Although it would require the most time for detailed planning, design and implementation, this alternative will address issues identified in the problem statement by providing infrastructure improvements to meet the roadway's future transportation needs.

Summary of Conclusions and Recommendations

Based on the traffic operations and capacity analyses, it was determined that the 'Ultimate Development without Improvements' & 'Interim Development without Roadway Widening' alternatives (i.e. alternative A & alternative B respectively) would not address the problems anticipated along the Fischer-Hallman Road/Bearinger Road corridor. However, the 'Interim Development with Roadway Widening' alternative (i.e. alternative C) would provide infrastructure improvements required to meet the corridor's future transportation needs as identified in the problem statement.

Considerations for Active Transportation facilities along the corridor should include one of the following alternatives:

- A 1.7 m wide on-road separated cycle track and a 1.8 m sidewalk on both sides of the road; or
- A 3.0 m to 4.0 m wide multi-use trail (MUT) on one side of the road and a 1.8 m sidewalk on the other side of the road.

Intersection Control Studies (ICS) were carried out at all the signalized intersections along the roadway. Upon completion, traffic signals were recommended to be maintained at these intersections. A signal warrant analysis was performed at Fischer-Hallman and Gatestone Boulevard according to *Justification 7* from the Ontario Traffic Manual Book 12. The results from the analysis did not warrant traffic signals at this intersection based on projected volumes to the year 2031.

As part of the University of Waterloo northwest campus subdivision development, it plans to have two new access off the Fischer-Hallman Road/Bearinger Road corridor. So far, discussions with planning staff from the University suggest that these accesses will be designed as right-in-right-out (RIRO) only. A raised center median may be implemented along the corridor should there be sufficient right-of-way. Although not warranted as a collision countermeasure, the center median could help improve traffic flow and provide room to accommodate elements of the roadway such as drainage, utilities, pedestrian refuge islands, landscaping, and more.

The 2019 Transportation Capital Program (TCP) identified Project 7221 for major reconstruction in 2021.

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Specific Recommendations at Intersections along Roadway

The following geometric improvements should be made at each of the respective intersections along the Fischer-Hallman Road/Bearinger Road corridor by 2031.

Intersection	Recommended Improvements
Bearinger Road & Westmount Road North	▪ Provide a dual eastbound left-turn lane on Bearinger Road; ▪ Provide a shared lane for eastbound through and eastbound right movements along Bearinger Road; and ▪ Extend storage lengths along the southbound left-turn and southbound right-turn lanes on Westmount Rd from 70 m to 95 m and from 70 m to 125 m respectively
Fischer-Hallman Road/Bearinger Road & Laurelwood Drive	▪ Provide a dedicated eastbound right-turn lane on Laurelwood Drive with a 15 to 20 m storage
Fischer-Hallman Road & Columbia Street West	▪ Provide a dedicated westbound right-turn lane with 30 m storage on Columbia Street West

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1. Introduction

1.1. Study Area

The 2019 Transportation Capital Program (TCP) identified Project 7221 for major reconstruction in 2021. The TCP allocated about $9.3 million to widen 2.13 kilometers of Fischer-Hallman Road/Bearinger Road (RR#58) between Columbia Street West and Westmount Road North. A Study Area bounded by Erbsville Road (to the west), Westmount Road (to the east), Columbia Street West (to the south) and Northfield Drive (to the north) was selected to assess demographic trends and changes in adjacent land uses that may have an impact on the roadway. Key intersections assessed along the roadway corridor included:

- Fischer-Hallman Road & Columbia Street West;
- Fischer-Hallman Road & Gatestone Boulevard;
- Fischer-Hallman Road/Bearinger Road & Laurelwood Drive; and
- Bearinger Road & Westmount Road North.

The Study Area for this project is shown in Figure 1.1-1.

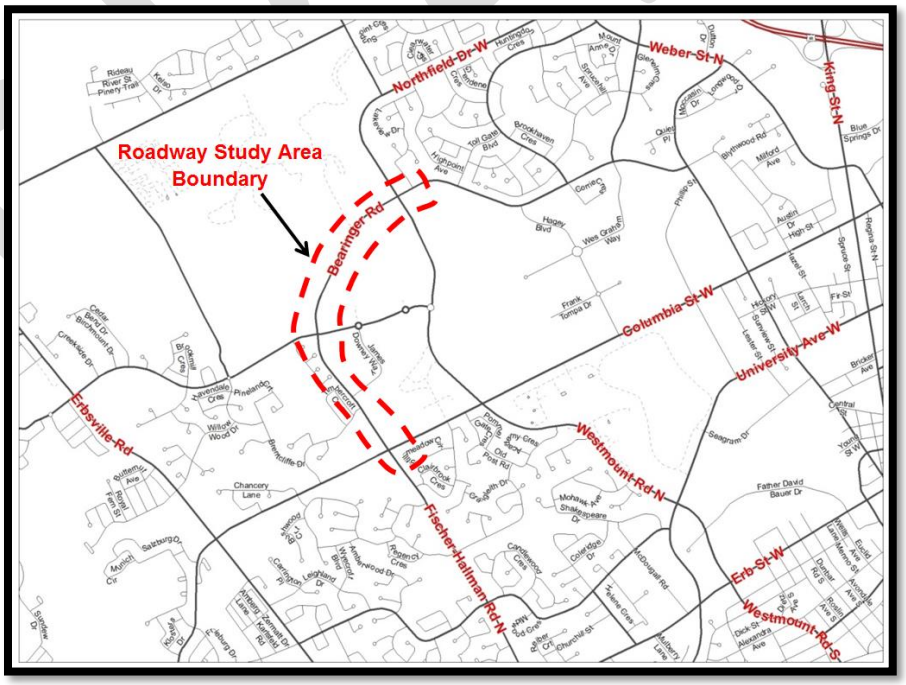

Figure 1.1-1: Study Area

1.2. Regional Policies in Study Area

Recommendations related to transportation planning as contained in the following regional policies were reviewed along the roadway corridor:

- 2015 Regional Official Plan (ROP);
- 2018 Transportation Master Plan (TMP);
- 2014 Active Transportation Master Plan (ATMP); and
- 2013 Regional Context-Sensitive Transportation Guidelines.

Key recommendations from each of the above Regional Policy documents with reference to the roadway corridor in particular and the Study Area at large are summarized in Table 1.2-1 below. More detailed information is provided in Appendix A – Regional and Area Municipal Policies.

Table 1.2-1: Recommendations from Regional Planning Policies

Regional Policies	Recommendations for roadway corridor
Regional Official Plan (ROP)	• Designated roadway allowance for Fischer-Hallman Road / Bearinger Road is 35 m (115 ft.) • Fischer-Hallman Road / Bearinger Road is planned to serve as a corridor for Regional transit and cycling route network • Reurbanization of the area calls for planning and developing more compact, vibrant and complete communities to accommodate walkable neighbourhoods with a better mix of employment, housing, shopping and services
2018 Transportation Master Plan (TMP)	• Fischer-Hallman Road/Bearinger Road (Columbia Street West to Westmount Road) has been identified in the 2018 for schedule 'C' widening within the 2019 - 2031 planning horizon • Where feasible and subject to a Class Environmental Assessment (Class EA) process, the 2010 RTMP also recommended the use of treatment measures such as centre medians and right-in/right-out accesses along Fischer-Hallman Road alongside roundabouts to provide safe and efficient traffic operations.
2014 Active Transportation Master Plan (ATMP)	• Fischer Hallman Road/Bearinger Road is identified in the 2014 ATMP as an Active Transportation route. • Active transportation facilities to be considered will include: Multi-use trails, Separated cycling facilities, and Sidewalks
2013 Corridor Design Guidelines (CDG)	• Fischer Hallman Road/Bearinger Road (Columbia Street W to Westmount Road) is identified as a **Neighborhood Connector: Avenue** in the 2013 CDG • Avenues are identified to have a preferred sidewalk width of 2.1 metres on both sides of the road with a landscape and furniture zone of 4 metres, where space allows.

1.3. Area Municipal Plans and Other Studies

Recommendations related to transportation planning as contained in the following regional policies were reviewed along the roadway corridor:

- City of Waterloo Official Plan (2012);
- City of Waterloo Transportation Master Plan (2011);
- University of Waterloo Campus Master Plan Update (2009);
- University of Waterloo Northwest Campus Development Design Guidelines (2012);
- University of Waterloo Northwest Campus Transportation Impact Study (2010); and
- Beaver Creek Meadows District Plan (2015)

Key recommendations from each of the above Area Municipal Policies and other studies with reference to the roadway corridor in particular and the Study Area at large are summarized in Table 1.3-1 below, with more detailed information provided in Appendix A – Regional and Area Municipal Policies.

Table 1.3-1: Recommendations from Area Municipal Plans and Other Studies

Other Policies	Recommendations within Study Area
City of Waterloo Official Plan (2012)	• Surrounding lands within the Study Area are designated for low-density residential development and open space, except for the University of Waterloo Northwest Campus lands which are designated as medium to high-density Institutional/Academic employment area. • Most of the Study Area is approved for medium to high-density land uses with buildings heights limited between 40 and up to 81 metres.
City of Waterloo Transportation Master Plan (TMP) 2011	• The City of Waterloo TMP is in line with the 2018 TMP's recommendation to widen this section of Fischer-Hallman Road/Bearinger Road between Columbia Street West and Westmount Road by 2031. • The City of Waterloo's TMP also plan on making major transportation improvements to its road network within the Study Area to support developments around the West Waterloo Commercial Centre, and to enhance transit and active transportation connections.
University of Waterloo Campus Master Plan Update (2009)	• The Draft Plan for the Northwest Campus subdivision approved by the Region of Waterloo in 2010 suggests there will be three new streets with accesses off the Fischer-Hallman Road / Bearinger Road corridor. • The City of Waterloo recently completed one of the proposed streets (i.e., the Laurelwood Drive Extension to Westmount Road). For the remaining two proposed accesses, one is planned to connect at Fischer-Hallman Road between Gatestone Blvd & Laurelwood Drive and the other is proposed to connect on Bearinger Road between Laurelwood Drive & Westmount Road
Other Pending Developments	• The University of Waterloo's Northwest Campus subdivision plans to be developed in two stages with development applications are well on the way for Stage 1 of the subdivision. This will bring significant traffic to Fischer-Hallman Road/Bearinger Road. However, no applications for a Subdivision Draft Plan have been submitted to the Region to develop Stage 2 of the subdivision and there are no plans of this happening in the nearest future • The Beaver Creek Meadows district plan was also considered in assessing its traffic impact on Fischer-Hallman Rd/ Bearinger Rd corridor as it will have an impact on the Fischer-Hallman Rd/Bearinger Rd & Laurelwood Drive intersection.

1.4. Approach and Methodology

The transportation assessment for this Class EA was done as follows:

- Three consecutive days of traffic counts were collected at all intersections along Fischer-Hallman Road/Bearinger Road between Columbia Street West and Westmount Road on February 16th 2016, February 17th 2016 and February 18th 2016. The average traffic volume from these counts was taken to represent the average weekday traffic volumes for the 2016 base year condition.
- Historic traffic counts at all intersections along Fischer-Hallman Road/Bearinger Road between Columbia Street West and Westmount Road were collected over the period between 2006 & 2016. These were used to estimate a background growth rate along the corridor that turned out to be 1.2% per year.
- With construction year set for 2021, 2031 was selected as the horizon year for traffic operation and capacity analysis. 2031 background traffic volume were estimated from the 2016 base year volumes using the background growth rate of 1.2% (for through movements) and 0.5% (for turning movements).
- Geometric adjustments were made to the Regional Transportation Demand VISUM Model to account for planned developments within the University of Waterloo northwest campus and improve the model's calibration within the Study Area. These included improvements to the roadway network, modification of some model parameters, and improvements to the centroid connectors.
- Development traffic volumes from traffic impact studies for various planned developments within the Study Area were then added to the 2031 background traffic to account and estimate the total traffic volumes along this roadway corridor for the 2031 horizon year. These forecasted volumes were then compared against volumes from the Regional Transportation Demand Model and further adjustments were made to the volumes where appropriate.
- Traffic operation and capacity analysis were performed using Synchro 9.2 to determine the operating characteristics at the various intersections for the 2016 base year and the 2031 horizon year.
- Operational deficiencies were identified and various scenarios for remediation were analyzed and proposed where feasible.
- Recommendations were developed based on operational performance at the intersections taking into consideration long-term plans within the area.

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2. Transportation Analysis Primer

Throughout this report, analysis will be performed and conclusions drawn about the operation of roads and intersections within the Study Area. This analysis makes use of industry standard performance measures. Summary tables for various scenarios, alternatives, or time horizons include these measures:

- Level of service (LOS) and delay
- Volume to capacity ratio (v/c)
- Queuing, or back of queue (BOQ), values

A description of each performance measurement is provided in the following few sections. Unfamiliar readers can reference these descriptions when interpreting analysis summary tables.

2.1. Volume to Capacity Ratio (v/c)

In traffic analysis, “volume” represents the number of vehicles used in the analysis. Volumes are typically reported for one hour intervals i.e., 500 vehicles per hour (500 vph).

Capacity is the theoretical maximum number of vehicles that can travel on a given facility. Capacity can be calculated for an entire road or for an individual movement through an intersection. Capacities depend on a large number of factors including:

- The road geometry
- The vehicle being used
- The drivers
- The number of accesses along the roadway

The volume to capacity ratio represents how “full” a road or movement through an intersection is. A v/c between 0.00 and 0.49 means that vehicles use less than half the capacity of the road. This is generally associated with good operating conditions. As the v/c approaches 1.00 traffic conditions worsen and at v/c = 1.00 the theoretical maximum number of vehicles is reached and operations are generally very poor.

When forecasting volumes, it is possible that an analysis will show a v/c of greater than 1.00. This indicates that more vehicles are expected than it is possible to serve.

A v/c greater than 1.00 is associated with very bad operations and extended traffic delays. When this happens, a road is often said to be “failing.”

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2.2. Level of Service (LOS) and Delay

Level of service attempts to describe the user experience on a transportation facility. The most common application of LOS is to driver experience. Table 2.2-1 describes LOS for both signalized and unsignalized (i.e., stop controlled) intersections. As is shown in this table, each LOS is associated with a particular amount of delay. This value represents the delay each individual driver would experience on average.

As a qualitative measure, LOS cannot be calculated directly. As such, an industry standard relationship is used to compare delay and driver experience. Delay is a quantitative measurement commonly calculated in traffic analysis. Delay translates into a qualitative statement about the experience of driving on that road using the thresholds identified in Table 2.2-1.

Table 2.2-1: Vehicle Level of Service Definitions

LOS	Signalized Intersections		Unsignalized Intersections	
	Description	Delay	Description	Delay
A	Very seldom does a vehicle wait longer than one red light. The approach appears open, turns are easily made, and drivers have freedom of operation.	≤10 sec	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤10 sec
B	An occasional green light is fully used and many greens approach full use. Many drivers begin to feel somewhat restricted within groups of vehicles approaching the intersection.	≤20 sec	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	≤15 sec
C	Intersection operation is stable but often has fully used greens. Drivers feel more restricted and occasionally may wait more than one red light. Queues may develop behind turning vehicles.	≤35 sec	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may have trouble completing their movement. This may occasionally impact on the stability of flow on the major street.	≤25 sec
D	Drivers experience increasing restriction and instability of traffic flow. There are substantial delays to vehicles during short peaks within the peak hour, but there is enough time with lower demand to permit occasional clearing of queues and prevent excessive backups.	≤55 sec	Long traffic delays occur. Drivers emerging from minor streets experience significant restriction and frustration. Drivers on the major street will experience congestion and delay.	≤35 sec
E	The capacity of the road is reached. There are long queues of vehicles waiting upstream of the intersection and delays to vehicles may extend to several signal cycles.	≤80 sec	Very long traffic delays occur. Operations approach the capacity of the intersection.	≤50 sec
F	Vehicle demand exceeds the available capacity and delays extending through the peak hour are experienced.	>80 sec	Vehicle demand exceeds the available capacity. Very long traffic delays occur frequently.	>50 sec

2.3. Queuing

Queue values are the length of the 95th percentile queue or, back of the 95th percentile queue (BOQ). The 95th percentile queue usually represents a practical maximum queue length and can assist in the design of roadway features such as turning lanes. Summary tables may give queue values with one of the three notes in Table 2.3-1. Analysis tables will repeat these notes, when needed, for ease of reference.

Acceptable queue lengths vary from location to location and depend more on the context of any given queue than on the length itself. For example, a 200-metre-long queue at an off ramp on a four lane provincial highway may be frustrating but it is not likely to have severe impacts on other drivers. Conversely, the same 200 metre queue at an intersection in a busy downtown setting may back up through other intersections block driveways or turning vehicles and may cause cascading congestion issues that impact many other drivers throughout the area.

Because of the context sensitive nature of queue assessment, interpretation may require more professional judgement than an assessment based on v/c or LOS. Issues one must consider include impacts to the broader network, operation of transit vehicles, and land access.

Table 2.3-1: Notes on Queuing Values

Note	Description
M	The length of the queue is metered by an upstream intersection. Due to operational restrictions at another intersection, the queue at this location is shorter than would otherwise be expected.
#	The 95th percentile volume, on which the 95th percentile queue is based, is greater than the available capacity. The queue length reported is the maximum after two signal cycles and should be adequate for design purposes.
~	This notation indicates that the 50th percentile volume is over capacity. Effectively this means that the average volume arriving will result in a queue that continuously lengthens until the volume arriving becomes consistently lower than the average peak volume. This situation represents a cascading congestion problem likely to have severe impacts on traffic operations.

2.4. Transportation Planning & Traffic Analysis Software Packages

The Regional travel forecasting model developed on the VISUM platform was used to forecast travel demand within the Study Area.

Synchro 9.2 was used to perform traffic operations and capacity analysis at all the intersections within the Study Area.

3. Existing Conditions

3.1. Roadway Description

Fischer-Hallman Road/Bearinger Road (RR# 58) is approximately 2.13 km from Columbia Street West to Westmount Road North. Along the roadway corridor, Fischer-Hallman Road changes to Bearinger Road north of Laurelwood Drive. Pedestrian crossings are available for all legs at the signalized intersections. A pedestrian refuge island is located along the roadway north leg of Gatestone Boulevard.

3.1.1. Fischer-Hallman Road

Fischer-Hallman Road is a north/south Regional road measuring approximately 0.96 km from Columbia Street West to Laurelwood Drive. Heading northbound, it intersects with:

- Columbia Street West (signalized intersection)
- Gatestone Boulevard (side street stop controlled intersection)
- Laurelwood Drive (signalized intersection)

The above intersecting streets are under the jurisdiction of the City of Waterloo. This segment of the roadway also has one right-in-right-out access to a gas station and two other accesses that allow for all turning movements into a shopping plaza located at the northwest corner of the Fischer-Hallman Road/Columbia Street West intersection. Dedicated northbound left-turn lanes are provided at the main and service entrances to the shopping plaza, and at Gatestone Boulevard.

A sidewalk is available along the west side of Fischer-Hallman Road (Columbia Street West – Laurelwood Drive) which is separated from the roadway by a curb-side grassy boulevard (except at the southbound approach at the intersection with Columbia Street West where the sidewalk is curb-face), while the east side consist of an unpaved gravel shoulder. There is a pedestrian refuge island located along the roadway north of Gatestone Boulevard.

The north leg of the Fischer-Hallman Road/Columbia Street West intersection has a median separating northbound and southbound traffic. This median extends approximately 100 m north of the intersection where the roadway narrows down to one-lane in each direction. The existing lane configuration and other amenities at Fischer-Hallman Road/Columbia Street intersection (as of 2019) are as follows:

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- Southbound on Fischer-Hallman Road: one left-turn lane, one right-turn lane, two through lanes, an on-route bike lane, and a bus stop for GRT route 13;
- Northbound on Fischer-Hallman Road: one left-turn lane, one channelized right-turn lane, two through lanes, an on-route bike lane, and a bus stop for GRT route 201;
- Eastbound on Columbia Street West: one left-turn lane, two through lanes (with the curbside lane serving as a 'defacto' right-turn lane), and an on-route bike lane; and
- Westbound on Columbia Street West: one left-turn lane, two through lanes (with the curbside lane serving as a 'defacto' right-turn lane), an on-route bike lane, and a bus stop for routes 13 & 31.

The existing lane configuration plus amenities at Fisher-Hallman Road/Bearinger Road/Laurelwood Drive intersection are as follows:

- Southbound on Bearinger Road: one left-turn lane, one right-turn lane and one through lane;
- Northbound on Fischer-Hallman Road: one left-turn lane, one shared through/right-turn lane and a bus stop for route 13;
- Eastbound on Laurelwood Drive: one left-turn lane, one shared through/right-turn lane, an on-route bike lane, and a bus stop for route 13; and
- Westbound on Laurelwood Drive: one left-turn lane, one right-turn lane, one through lane, and an on-route bike lane.

3.1.2. Bearinger Road

Bearinger Road is also a north/south Regional road along the corridor measuring approximately 1.17 km from Laurelwood Drive to Westmount Road North where it slightly turns to an east/west roadway. Heading northbound, this section of Bearinger Road intersects with Laurelwood Drive and Westmount Road North (both signalized intersections). The roadway has one-lane in each direction and it is fronted by trees on the west side and farmland along majority of its east side. Both east and west side of the roadway consist of unpaved gravel shoulder.

The existing lane configuration and amenities at Bearinger Road/Westmount Road North intersection (as of 2019) is as follows:

- Southbound on Westmount Road North: one left-turn lane, one right-turn lane, two through lanes, and an on-route bike lane;

- Northbound on Westmount Road North: one left-turn lane, two through lanes with the curbside lane acting as a ‘defacto’ shared through/right lane, and an on-route bike lane;
- Eastbound on Bearinger Road: one left-turn lane, one right-turn lane and one through lane; and
- Westbound on Bearinger Road: one left-turn lane, one right-turn lane, one through lane, and an on-route bike lane.

The existing lane configuration and amenities at Fischer-Hallman Road/Bearinger Road/Laurelwood Drive intersection remains the same as described earlier.

3.2. Existing Land Use

The land-use designation within the Study Area consists of residential, institutional and open space, as shown in Figure 3.2-1. There is a commercial area located at the northwest corner of the intersection of Fischer-Hallman Road and Columbia Street West. The residential area is composed of low-density residential homes while the institutional area is part of the University of Waterloo Northwest Campus. The Laurel Creek Reservoir is located on the northwest corner of the road segment between Laurelwood Drive and Westmount Road North.

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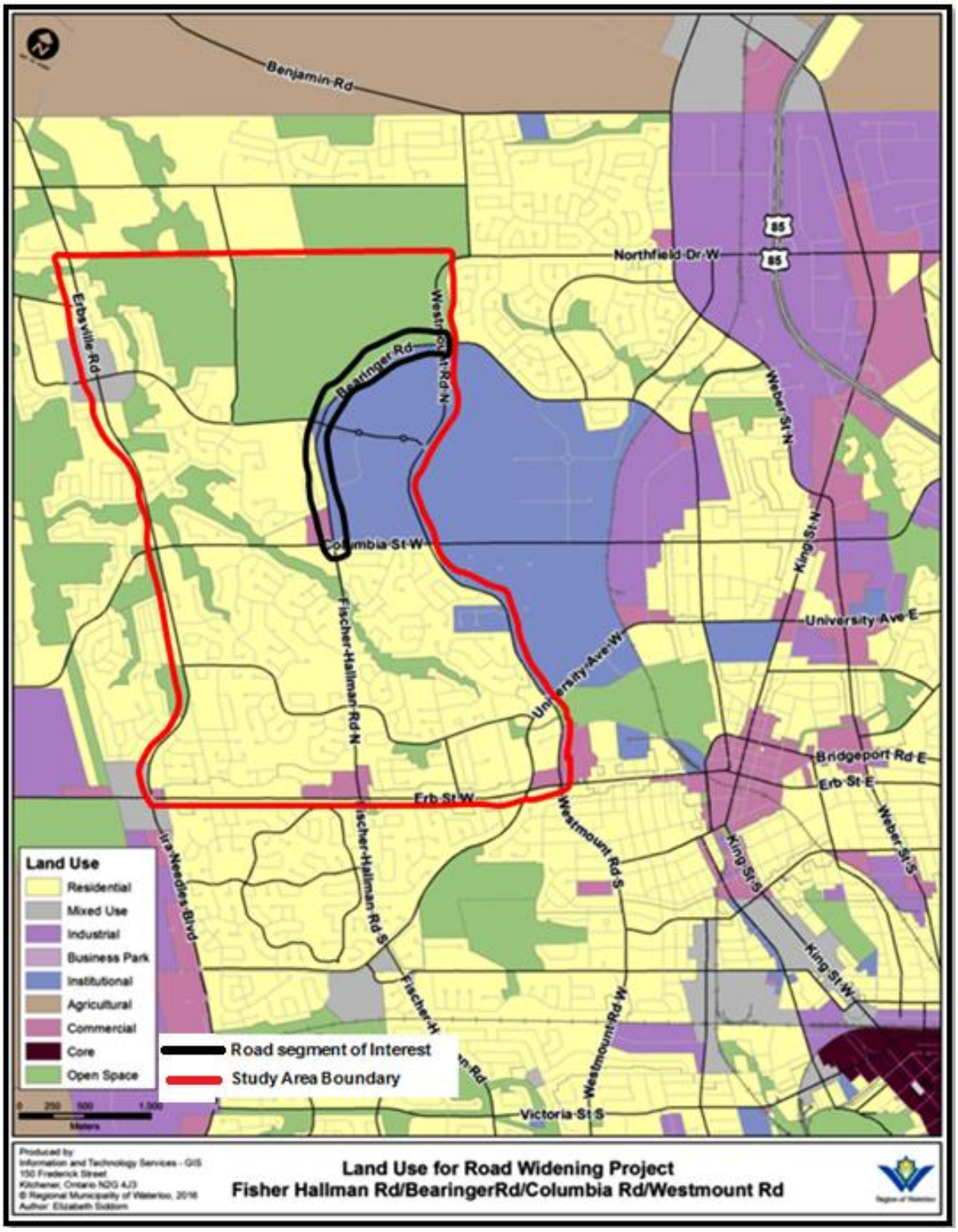

Figure 3.2-1: Study Area and Land Use

3.3. Existing Traffic Volumes and Levels of Service

3.3.1. Mode Share

The mode shares for trips originating from or destined to the Study Area between 2006 and 2016 were estimated from the Transportation for Tomorrow Survey (TTS) data and presented in Table 3.3-1. Sustainable modes were considered to be all other modes used for transportation except drivers of Single Occupant Vehicles (SOVs). The mode share for trips through the Study Area was not accounted.

Table 3.3-1: Mode Share for trips with origins/destinations within Study Area – TTS

Mode		PM Peak Period (14:30 - 17:30)		
		2006	2011	2016
	Cycle	0.9%	1.9%	2.4%
	Walk	10.9%	7.9%	6.0%
	Transit	5.7%	6.3%	5.4%
	Auto Passenger	15.2%	14.8%	13.4%
	Other*	4.4%	4.9%	3.7%
Sustainable Modes		**37.2%**	**35.8%**	**30.8%**
Single Occupant Vehicles (SOVs)		**62.8%**	**64.2%**	**69.2%**

*e.g. Motorcycle, Taxis, etc.

The use of sustainable modes of transportation has generally been on a decline over the 10-year period between 2006 & 2016 within the Study Area. Nonetheless, cycling has shown positive increase in mode share over the same time period. The reliance on SOVs has continued to increase over the 10-year period across the various horizon years as shown in Figure 3.3-1.

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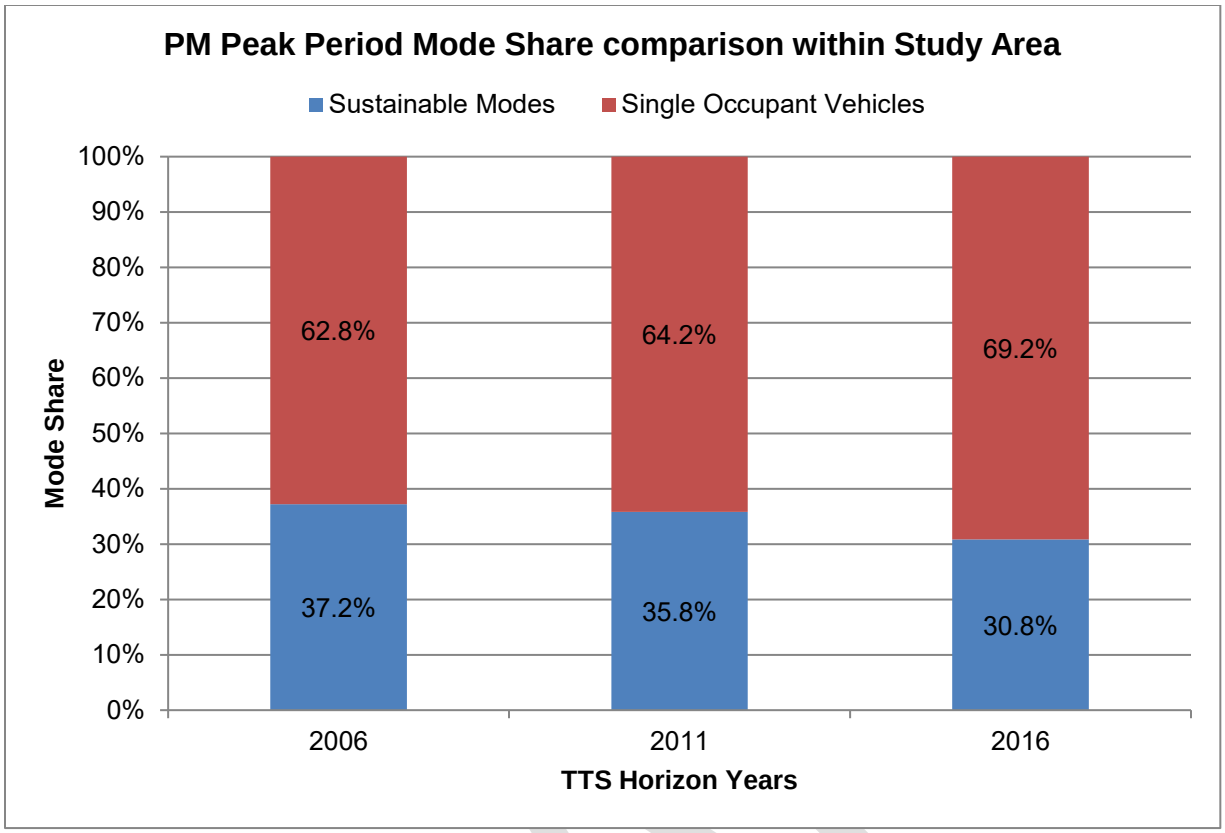

Figure 3.3-1: PM Peak Period Mode Share Comparison with Study Area

3.3.2. Annual Average Daily Traffic (AADT) & Speed

The AADT volumes along segments of the roadway corridor based on 2016 volumes are shown in Table 3.3-2. Traffic volumes have grown at an annual rate of 1.2% per annum along this roadway segment based on historic data collected between 2006 & 2016.

Table 3.3-2: 2016 AADT & Speed

Road Segment	From	To	AADT	Speed		
				Posted	Average	85th %ile
Fischer-Hallman Road	Columbia Street West	Gatestone Boulevard	16,500	60 km/h	61 km/h	68 km/h
Fischer-Hallman Road	Gatestone Boulevard	Laurelwood Drive	15,700	60 km/h	68 km/h	73 km/h
Bearinger Road	Laurelwood Drive	Westmount Road	14,000	60 km/h	59 km/h	65 km/h

3.3.3. Heavy Vehicle Traffic

Trucks and heavy vehicles are not prevalent along this section of the roadway. Table 3.3-3 below summarizes the percentage of trucks and heavy vehicles along segments of Fischer-Hallman Road/Bearinger Road (Columbia Street West – Westmount Road North).

Table 3.3-3: Truck & Heavy Vehicle percentages along segments on Fischer-Hallman/Bearinger Rd

Roadway	From	To	2016 AADT	% Truck	% Heavy
Fischer-Hallman Rd	Columbia St W	Gatestone Blvd	16,500	0.8%	2.0%
Fischer-Hallman Rd	Gatestone Blvd	Laurelwood Dr	15,700	0.5%	2.0%
Bearinger Rd	Laurelwood Dr	Westmount Rd N	14,000	0.8%	0.9%

The higher heavy vehicle percentages for the segments between Columbia Street West and Laurelwood Drive are mostly the transit buses that use this segment of the roadway. Otherwise, almost the entire section of this roadway experiences very low truck and heavy traffic volumes throughout the day.

3.3.4. Percent of AADT occurring in Peak Hour

Approximately 10% of the AADT along the Fischer-Hallman Road/Bearinger Road corridor occurs during the AM or PM peak hours. This is similar to the ratio observed at the Regional permanent count stations. Table 3.3-4 below presents the percent of AADT occurring in the AM and PM peak hours at each intersection by turning movements.

Turning movements with higher percentages experience high traffic demand only during the peak hour compared to other periods of the day. For example, a turning movement with a percent of 25% implies that 25% of the AADT volumes for that movement occur during the peak hour. For planning purposes, turning movements have been categorized based on their percentages as shown in Table 3.3-4 above. The higher percentages associated with some movements could be explained by several factors. During the traffic operation and level of service analysis, turning movements with capacity constraints will be compared against the results in Table 3.3-4 prior to making recommendation for geometric changes. This could help mitigate the need for unnecessary geometric improvements at the intersections

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Table 3.3-4: Percent of AADT occurring in Peak Hour

Intersection	Period	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Bearinger Road & Westmount Road	AM Peak	12%	15%	12%	8%	5%	6%	3%	9%	10%	17%	9%	5%
	PM Peak	7%	7%	8%	12%	17%	16%	16%	10%	10%	6%	13%	15%
	Average	9%	11%	10%	10%	11%	11%	9%	10%	10%	11%	11%	10%
Fischer-Hallman Rd/Bearinger Rd/Laurelwood Drive	AM Peak	15%	11%	13%	3%	3%	5%	7%	12%	6%	6%	5%	5%
	PM Peak	6%	10%	6%	11%	17%	8%	13%	6%	9%	11%	13%	16%
	Average	10%	11%	10%	7%	10%	6%	10%	9%	7%	8%	9%	11%
Fischer-Hallman Rd/Gatestone Blvd	AM Peak	16%	-	17%	-	-	-	3%	10%	-	-	7%	11%
	PM Peak	7%	-	6%	-	-	-	18%	8%	-	-	12%	13%
	Average	12%	-	11%	-	-	-	10%	9%	-	-	9%	12%
Fischer-Hallman Rd/Columbia St W	AM Peak	13%	18%	7%	4%	4%	4%	7%	11%	20%	15%	7%	4%
	PM Peak	8%	7%	7%	19%	15%	24%	10%	8%	6%	9%	14%	15%
	Average	10%	13%	7%	11%	10%	14%	8%	9%	13%	12%	10%	10%

xx% - Ratio > 13% (turning movement typically experience very high traffic volumes during peak hour and lower volumes during off peaks)
xx% - Ratio between 11% – 13% (turning movement typically experience high traffic volumes during peak hour and lower volumes during off peaks)
xx% - Ratio < 11% (turning movement typically experience evenly spread and continuous traffic volumes throughout the day with little or no outstanding peaks)

3.3.5. Turning Movement Volumes and Intersection Level of Service

Three days of traffic data were simultaneously collected at the following intersections between February 16th, 2016 & February 18th, 2016:

- Fischer-Hallman Road & Columbia Street West
- Fischer-Hallman Road & Gatestone Boulevard
- Fischer-Hallman Road/Bearinger Road & Laurelwood Drive
- Bearinger Road & Westmount Road North

The average of the three day counts were balanced to represent the 2016 base year traffic at the above intersections of interest as shown in Figure 3.3-2 and Figure 3.3-3 below and in Appendix B –Turning Movement Volumes.

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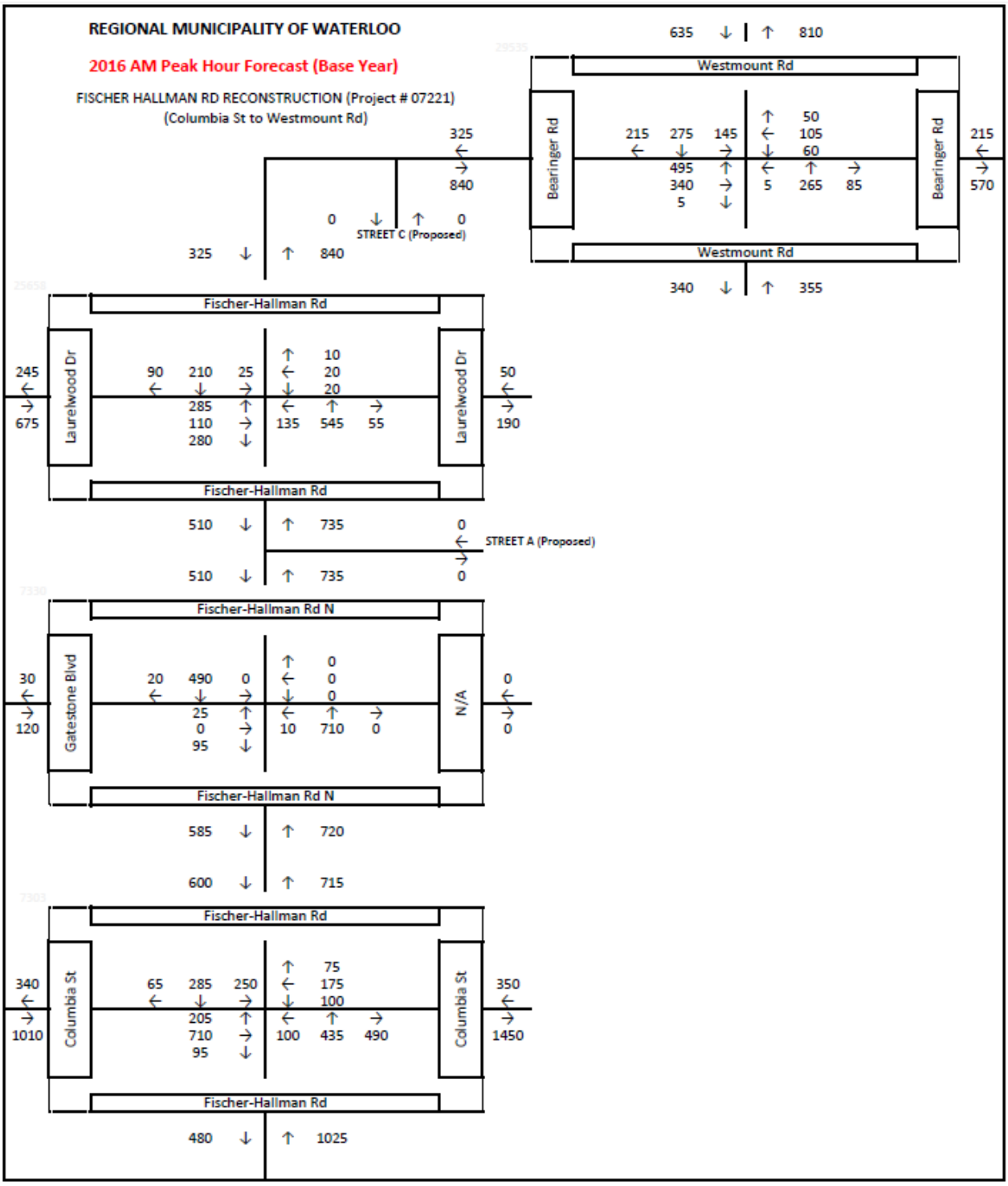

Figure 3.3-2: Existing Weekday Traffic – AM Peak Hour (2016 Base Year)

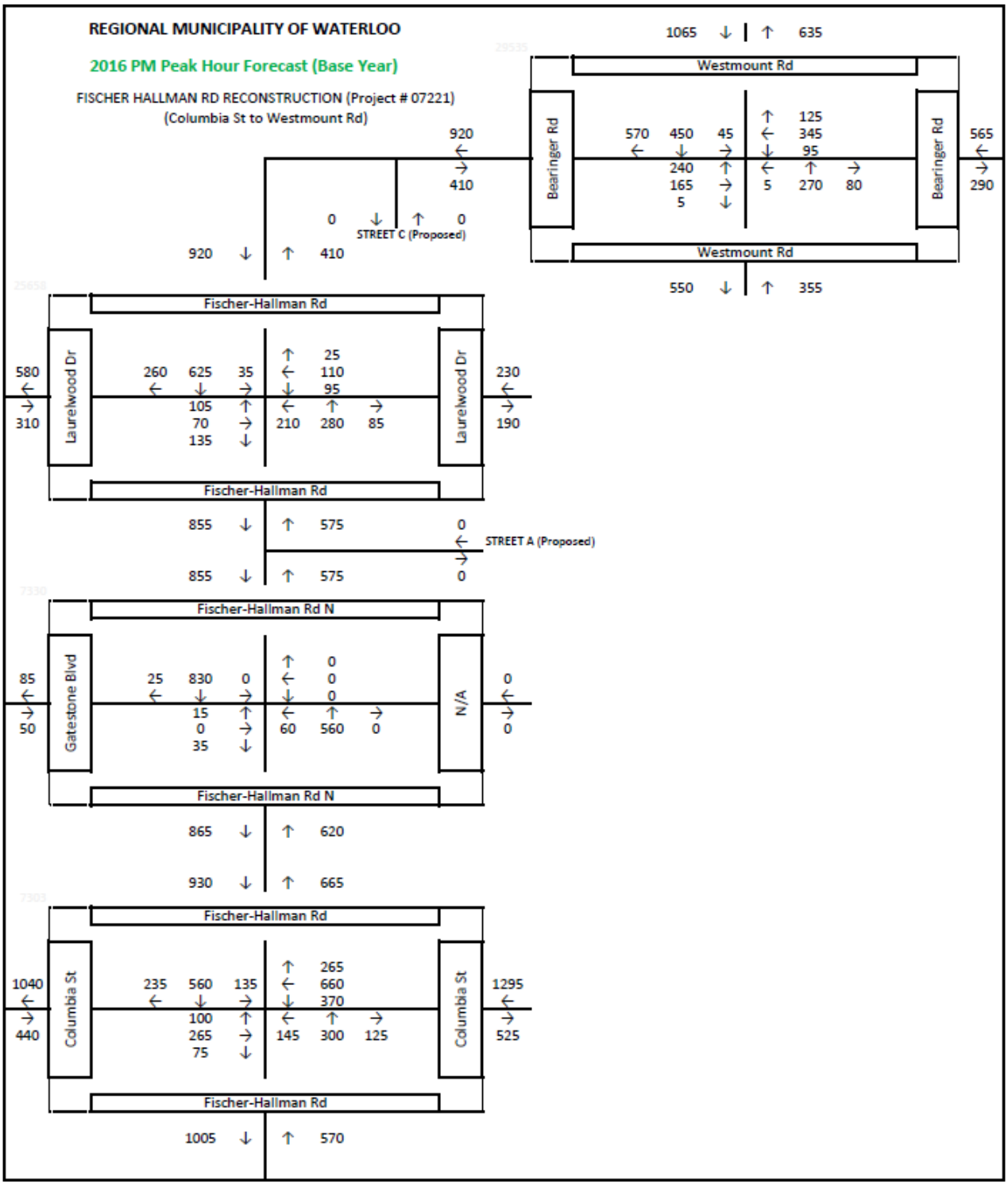

Figure 3.3-3: Existing Weekday Traffic – PM Peak Hour (2016 Base Year)

Traffic operations and capacity analysis were done at each intersection along the roadway corridor using weekday morning and afternoon peak hour traffic volumes to

identify deficiencies with existing intersection operations. The analysis indicated that all intersections in the corridor were operating at acceptable level of service with individual movements operating at 85 percent of capacity or less. The average intersection delay per vehicle was approximately 20.0 seconds during both the weekday AM and PM peak hours. However, the following turning movements in Table 3.3-5 were identified as having capacity deficiencies:

Table 3.3-5: Intersection Capacity Deficiencies – Existing Condition

Intersection Name	AM Peak Hour	PM Peak Hour
Bearinger Road / Westmount Rd	• Eastbound right (EBR) lane requires an extension of its storage length from 65 m to 85 m	• Southbound right (SBR) lane requires an extension of the storage length from 70 m to 80 m
Fischer-Hallman Rd / Columbia St W		• Westbound through (WBT) movement has a v/c = 1.0

A summary of the traffic operations are shown in Table 3.3-6 & Table 3.3-7 below. Detail results of the capacity analysis are presented in Appendix C – Synchro Results.

Table 3.3-6: Results – Traffic Operations (2016 AM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized)	LOS	B	B	A	B	C	A	C	D	x	D	C	A
	Delay (s)	13	15	0	10	22	0	32	38	x	50	29	2
	v/c	0.6	0.3	0.0	0.1	0.1	0.1	0.0	0.6	x	0.7	0.0	0.3
	Queue 95th (m)	81	65	0	10	28	0	4	43	x	#42	32	9
	Storage (m)	65		25	30		85	80		x	70		70
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive (Signalized)	LOS	C	B	x	B	B	A	A	B	x	B	B	A
	Delay (s)	33	18	x	19	16	0	9	15	x	14	14	3
	v/c	0.7	0.7	x	0.1	0.0	0.0	0.2	0.7	x	0.1	0.3	0.1
	Queue 95th (m)	61	54	x	7	6	0	18	100	x	7	35	7
	Storage (m)	85		x	30		35	90		x	60		60
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS	B			x	x	x	A	Free Flow		Free Flow		
	Delay (s)	13.4			x	x	x	9					
	v/c	0.23			x	x	x	0.0					
	Queue 95th (m)	7.2			x	x	x	0.0					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized)	LOS	C	D	x	C	C	x	B	C	A	C	C	A
	Delay (s)	26	39	x	28	23	x	18	31	1	25	26	2
	v/c	0.5	0.7	x	0.5	0.2	x	0.2	0.4	0.4	0.6	0.2	0.1
	Queue 95th (m)	50	115	x	26	29	x	23.	58	0	55	37	4
	Storage (m)	80		x	140		x	85		85	70		50

~: 50th percentile volume exceeds capacity #: 95th percentile volume exceeds capacity $: Delay exceeds 300s

Table 3.3-7: Results – Traffic Operations (2016 PM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized)	LOS	A	B	A	A	B	A	C	D	x	C	C	C
	Delay (s)	10	13	0	8	19	2	32	36	x	29	34	26
	v/c	0.4	0.2	0.0	0.1	0.4	0.2	0.0	0.6	x	0.2	0.5	0.9
	Queue 95th (m)	34	33	0	15	79	6	4	44	x	15	52	80
	Storage (m)	65		25	30		85	80		x	70		70
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive (Signalized)	LOS	C	B	x	C	C	A	B	A	x	A	B	A
	Delay (s)	26	13	x	30	22	0	16	6	x	10	18	3
	v/c	0.4	0.5	x	0.5	0.3	0.1	0.6	0.4	x	0.1	0.7	0.3
	Queue 95th (m)	24	23	x	23	23	0	#26	36	x	7	#106	11
	Storage (m)	85		x	30		35	90		x	60		60
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS	C			x	x	x	B	Free Flow		Free Flow		
	Delay (s)	21			x	x	x	10					
	v/c	0.2			x	x	x	0.1					
	Queue 95th (m)	5.5			x	x	x	0					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized)	LOS	C	C	x	C	C	x	C	C	A	C	C	A
	Delay (s)	24	30	x	35	34	x	28	31	0	23	35	6
	v/c	0.5	0.3	x	0.8	0.7	x	0.5	0.3	0.1	0.3	0.5	0.4
	Queue 95th (m)	23	44	x	#94	127	x	37	42	0	34	78	18
	Storage (m)	80		x	140		x	85		85	70		50

~: 50th percentile volume exceeds capacity #: 95th percentile volume exceeds capacity $: Delay exceeds 300s

3.4. Public Transit

Grand River Transit Route #13 is the only transit route that runs on Fischer-Hallman Road between Laurelwood Drive and Columbia Street West. Route #13 runs in parallel through the Study Area as:

- Route #13 – Laurelwood (The Boardwalk) connecting trips between the University of Waterloo ION Station and The Boardwalk
- Route #13 – Laurelwood (UW) connecting trips between The Boardwalk and the University of Waterloo ION Station.

Both routes operate on a15 minute-headway during peak periods and 30 minute-headway during off peaks in both directions and begin as early as 5:30 am with the last trip leaving as late as 12:30 am.

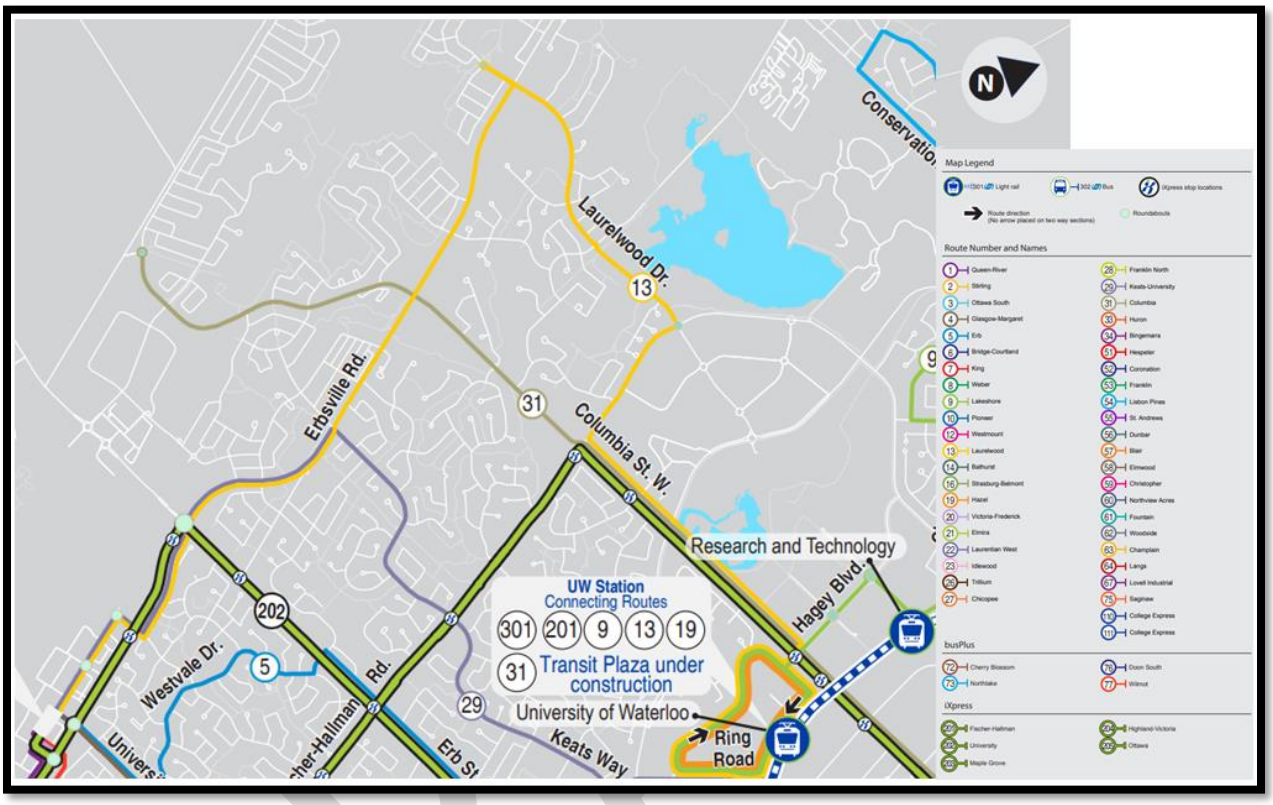

Figure 3.4-1: Grand River Transit Routes within Study Area (2019)

Figure 3.4-1 shows the Grand River Transit (GRT) routes operating in the vicinity of the Study Area. Other GRT routes that operated within this Study Area included routes 31, 92 and iXpress route #201. Following the opening of ION in June of 2019, GRT route #92 was retired, leaving just routes #13, 31 and iXpress route #201 to operate within the Study Area.

Contrary to the decline in the PM peak-period transit mode share reported in Section 3.3.1 above, there has been an overall consistent increase in daily transit usage over the years based on average weekday transit ridership activity collected in the fall between 2012 and 2018 within the Study Area at large and along Fischer-Hallman Road (between Columbia St W and Laurelwood Drive) as shown in Figure 3.4-2 below. Transit service improvements such as the introduction of Route #31 in 2013 and route #92 in 2014 may have contributed to an overall increase in transit activity within the area.

On average, approximately 1,030 people got on and off the bus per day at stops located along Fischer-Hallman Road between Laurelwood Drive and Columbia Street West based in data collected in fall of 2018. In summary, a continuous investment in transit within the area has the potential to increase transit ridership activities within the area.

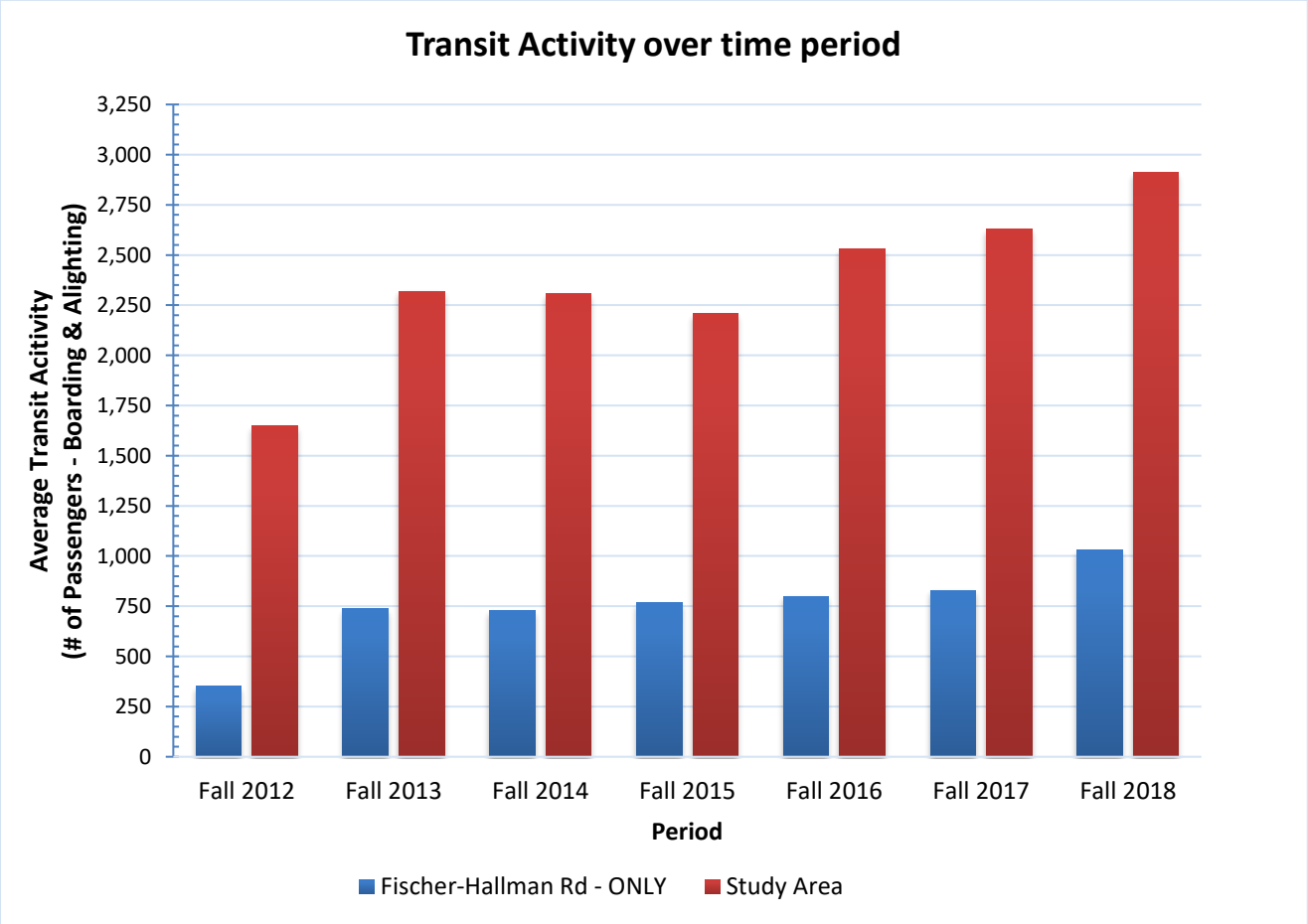

Figure 3.4-2: Transit Activity over time period

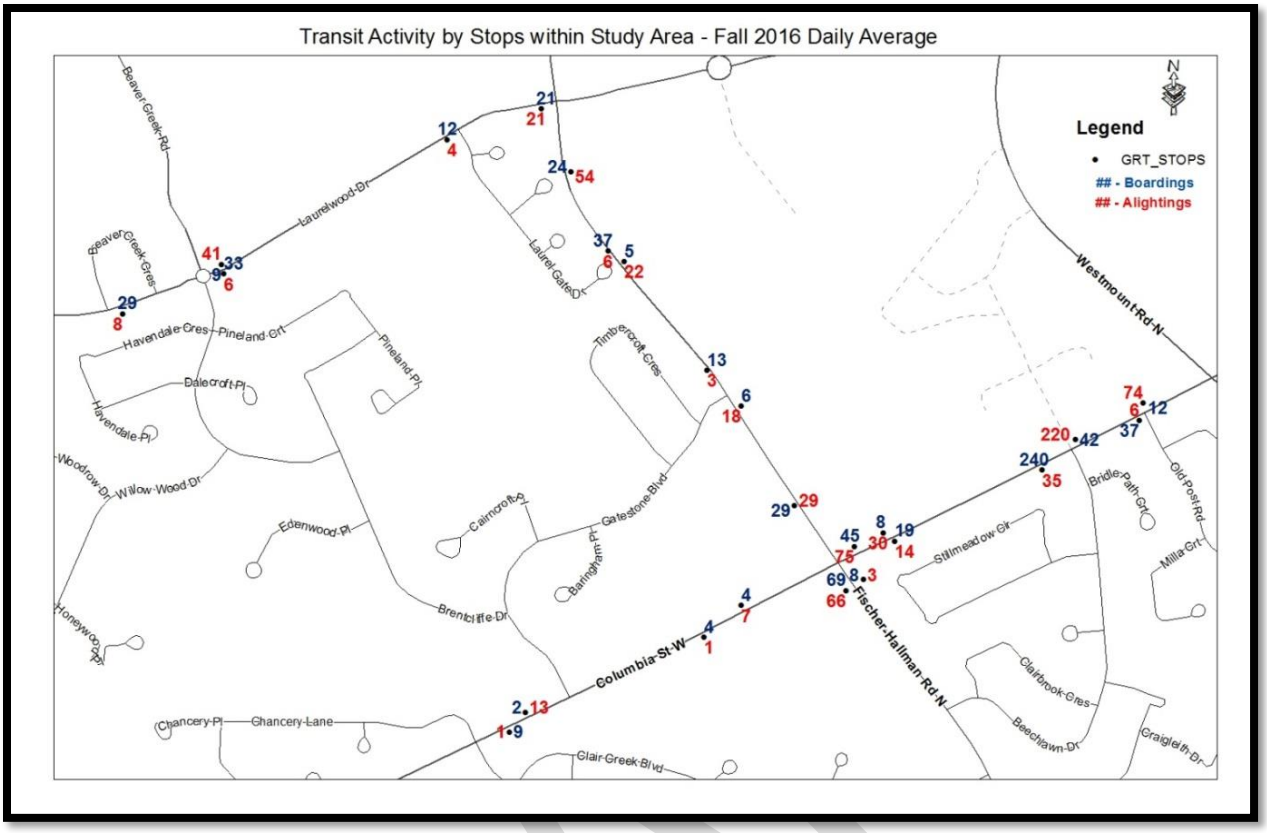

Figure 3.4-3: Transit Activity within Study Area – Fall 2016 Daily Average

3.5. Active Transportation

Portions of the roadway lack on-route active transportation facilities. Within the Study Area, the Doreen Thomas multi-use trail runs on the west side parallel to Bearinger Road between Laurelwood Drive and Westmount Road North. There exists a sidewalk on the west side of Fischer-Hallman Road between Columbia Street West and Laurelwood Drive and an unpaved shoulder on the east side. There are no active transportation facilities (neither sidewalks nor bike lanes) on Bearinger Road (between Laurelwood Drive to Westmount Road North). Pedestrian and cycling activities along Fischer-Hallman Road/Bearinger Road are very low considering the rural cross-section of the roadway along certain segments and the lack of appropriate active transportation facilities along the roadway. The average three day pedestrian and cyclist counts collected over an 8-hour auto peak period at all intersections along the roadway is shown in Table 3.5-1. These volumes may be lower than expected considering that the counts were collected in February.

Table 3.5-1: Pedestrian & Cyclist Traffic at Intersections within Study Area

Intersection	Period	Mode	East Leg	West Leg	North Leg	South Leg
			Average	Average	Average	Average
Fischer-Hallman Road & Columbia St W	8-Hour Total	Pedestrian	62	124	111	64
		Cyclist	1	1	4	1
Fischer-Hallman Road & Gatestone Blvd	8-Hour Total	Pedestrian	0	58	1	0
		Cyclist	0	1	4	1
Fischer-Hallman Road & Laurelwood Dr	8-Hour Total	Pedestrian	8	3	3	76
		Cyclist	1	4	2	1
Bearinger Road & Westmount Rd N	8-Hour Total	Pedestrian	7	2	7	1
		Cyclist	1	1	3	1

Fischer-Hallman Road & Columbia Street West is currently the busiest intersection in terms of pedestrian and cyclist traffic which could partly be due to the presence of the shopping plaza located on the northwest corner of the intersection. This is followed by the intersection of Fischer-Hallman Road & Laurelwood Drive which has a YMCA and City of Waterloo public library located at the southeast corner of the intersection. The development of the University of Waterloo Northwest Campus would lead to more pedestrian and cyclist traffic at this intersection. Opportunities to provide more cycling and pedestrian facilities should be considered.

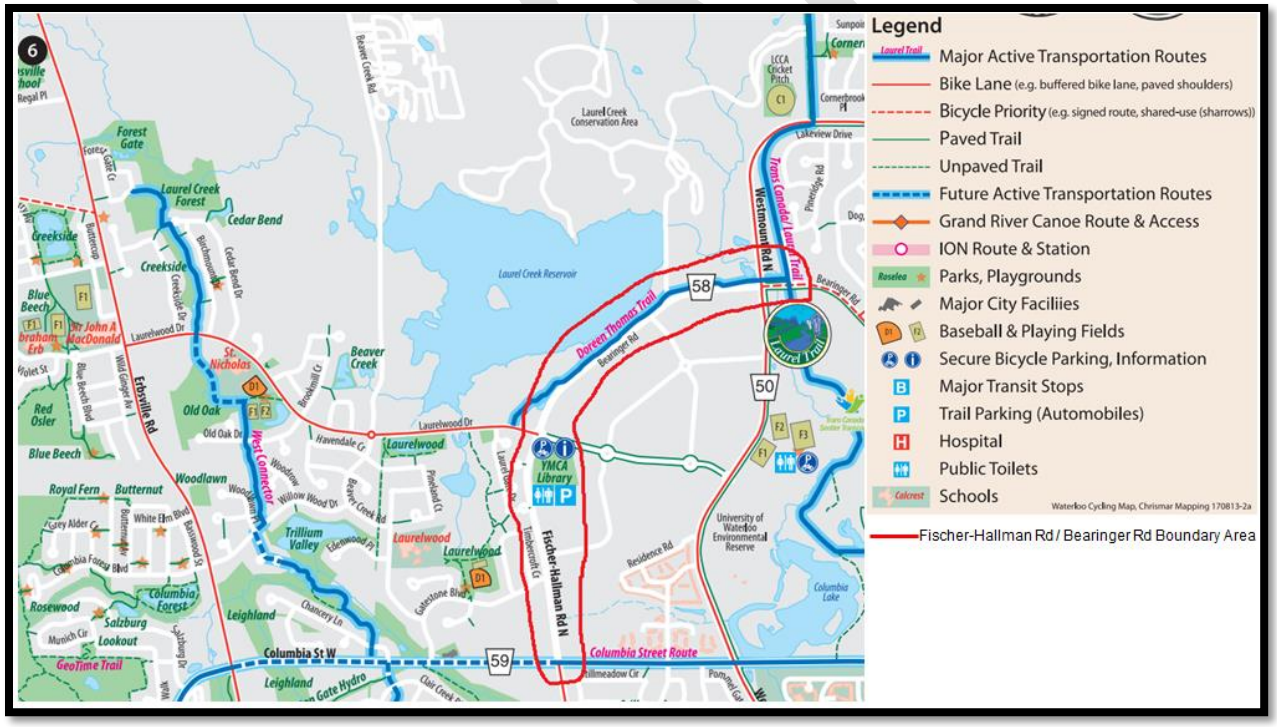

Figure 3.5-1: Existing Active Transportation Routes within Study Area (*Source: City of Waterloo*)

3.6. Collision Assessment

The most recent collision data along Fischer-Hallman Road/Bearinger Road (Columbia Street West and Westmount Road North) obtained for the five-year period between January 1, 2013 and December 31, 2017 are summarized in Table 3.6-1 & Table 3.6-2 below. The data was reviewed for abnormal collision patterns to determine if improvements would be needed along the roadway to address collision issues.

Table 3.6-1: Intersection Collision Data (2013 – 2017)

Intersection	Collisions	Notes
Bearinger Rd & Westmount Rd	44	26 rear-end and 4 angle collisions
Fischer-Hallman Rd & Laurelwood Dr	27	15 rear-end, 8 were attributed to turning movement
Fischer-Hallman Rd & Gatestone Blvd	3	
Fischer-Hallman Rd & Columbia St W	50	27 were rear-end, 11 were attributed to turning movement and 7 were sideswipe collisions

Table 3.6-2: Midblock Collision Data (2013 – 2017)

Midblock	Collisions	Notes
Westmount Rd – Laurelwood Dr	23	5 Single motor vehicle-animal collisions
Laurelwood Dr – Gatestone Blvd	8	3 Single motor vehicle-fixed object
Gatestone Blvd – Columbia St W	9	One fatal pedestrian collision on November 24, 2014

A fatal collision occurred on Monday November 24, 2014 when a pedestrian was struck while attempting to cross Fischer-Hallman Road just south of Gatestone Boulevard. A review of video footage from Grand River Transit was not conclusive in determining the actual events that resulted in the collision. A traffic signal assessment carried out following the warrant methodology established by provincial guidelines and documented in the Ontario Traffic Manual (OTM) Book 12 did not identify any unusual collision patterns observed at the Fischer-Hallman Road/Gatestone Boulevard intersection according to a memorandum to council filed under number T11-60/FAT (December, 2014). Nonetheless, a pedestrian refuge island was recommended to be installed on the north leg of this intersection in order to improve access for passengers utilizing the GRT stop northbound Fischer-Hallman Road at Gatestone Boulevard. The pedestrian refuge island was constructed in 2015.

Aside from the above fatal collision, there were no unusual collision patterns observed at the intersections along the roadway corridor and none of them appeared on the list of

top 100 intersections for vehicular collisions within the Region based on the 2017 Annual Collision Report.

Raised Center Median

Continuous raised center medians have been used elsewhere in the Region and tend to be an effective countermeasure to mitigate collisions from turning movements. However, since there are no driveways or side roads along the Fischer-Hallman Road/Bearinger Road corridor which serve as proxy to estimate collisions from turning movement, the need for a raised center median as a countermeasure to prevent collision along the roadway is not justified.

Nonetheless, should the right-of-way allowance permit, a continuous raised center median may be provided to maintain the characteristic of the roadway and make it consistent with the section of Fischer-Hallman Road, south of Columbia Street West. The center median could help improve traffic flow and provide room to accommodate elements of the roadway such as drainage, utilities, pedestrian refuge islands, landscaping, and more.

A graphical summary of the five year cumulative collisions observed along the corridor for the period between 2009 and 2017 based on location, collision type, road surface condition, and the impact type are shown in Figure 3.6-1 to Figure 3.6-5 below. The detailed collision reports along this corridor for five year periods between 2009 and 2017 are presented in Appendix D – Five-year Collision Summary Report.

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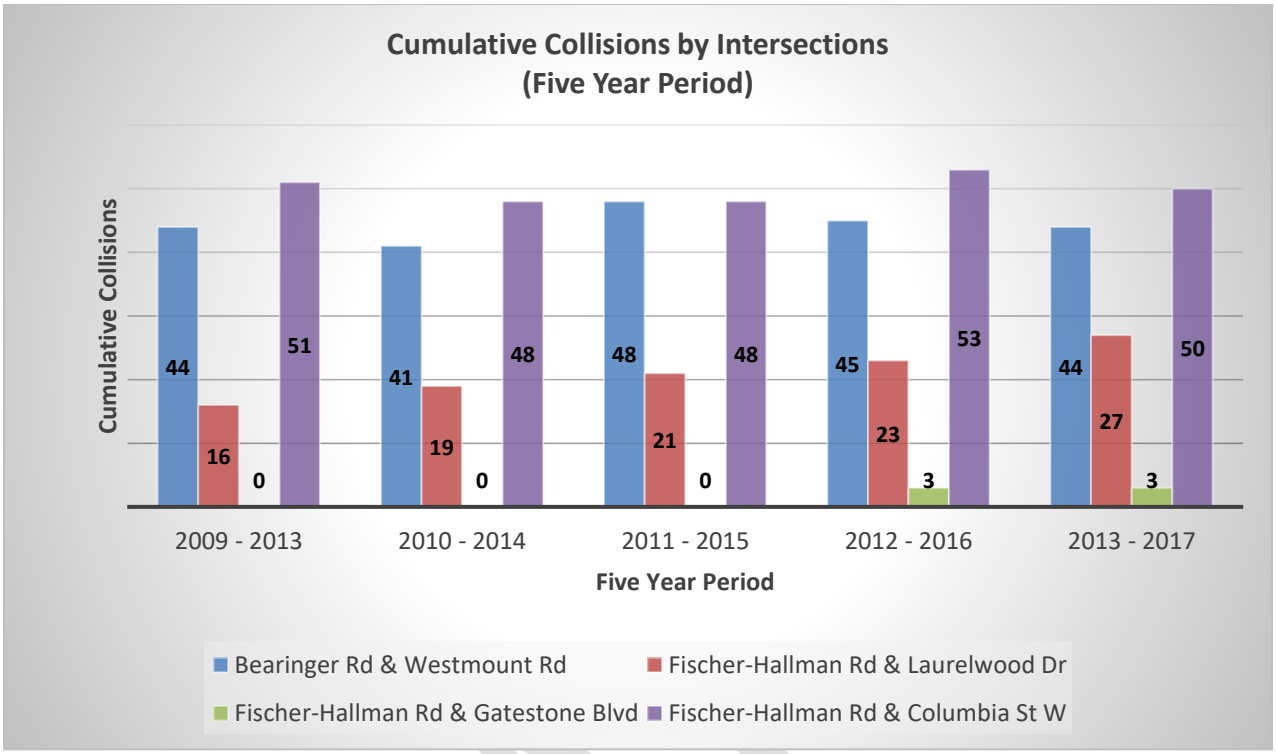

Figure 3.6-1: Cumulative Collisions by Intersections

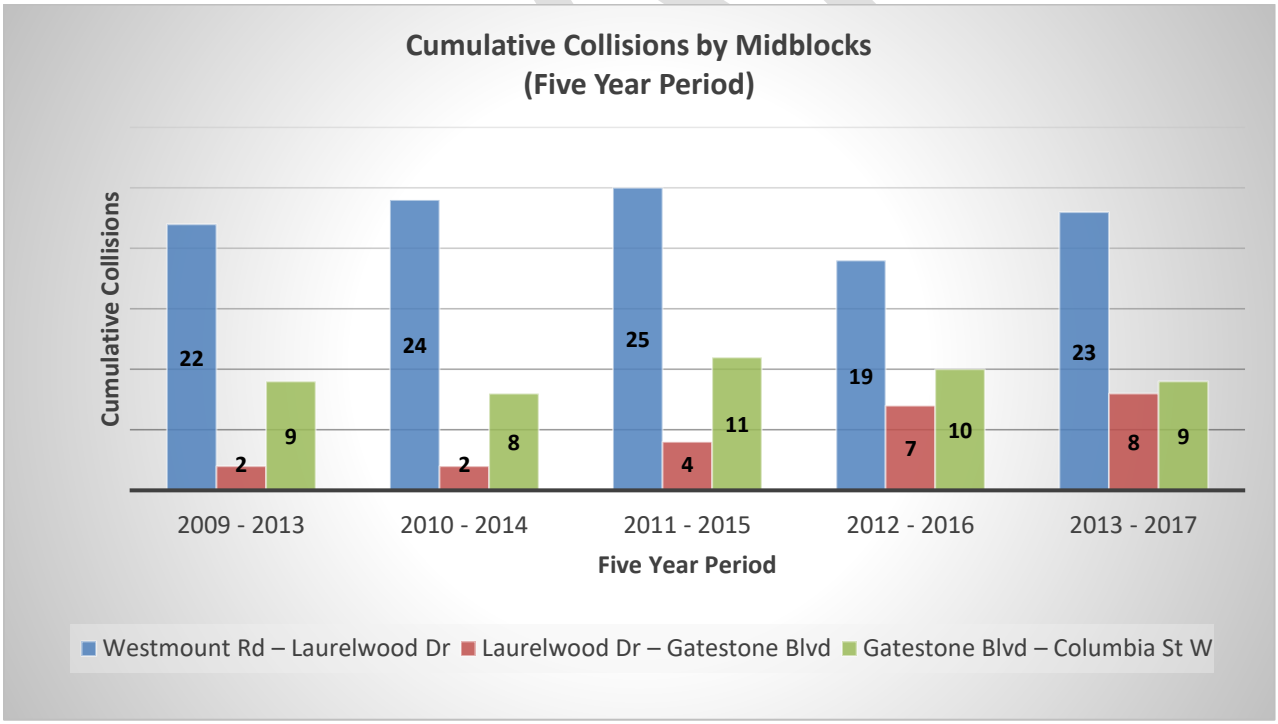

Figure 3.6-2: Cumulative Collisions by Midblocks

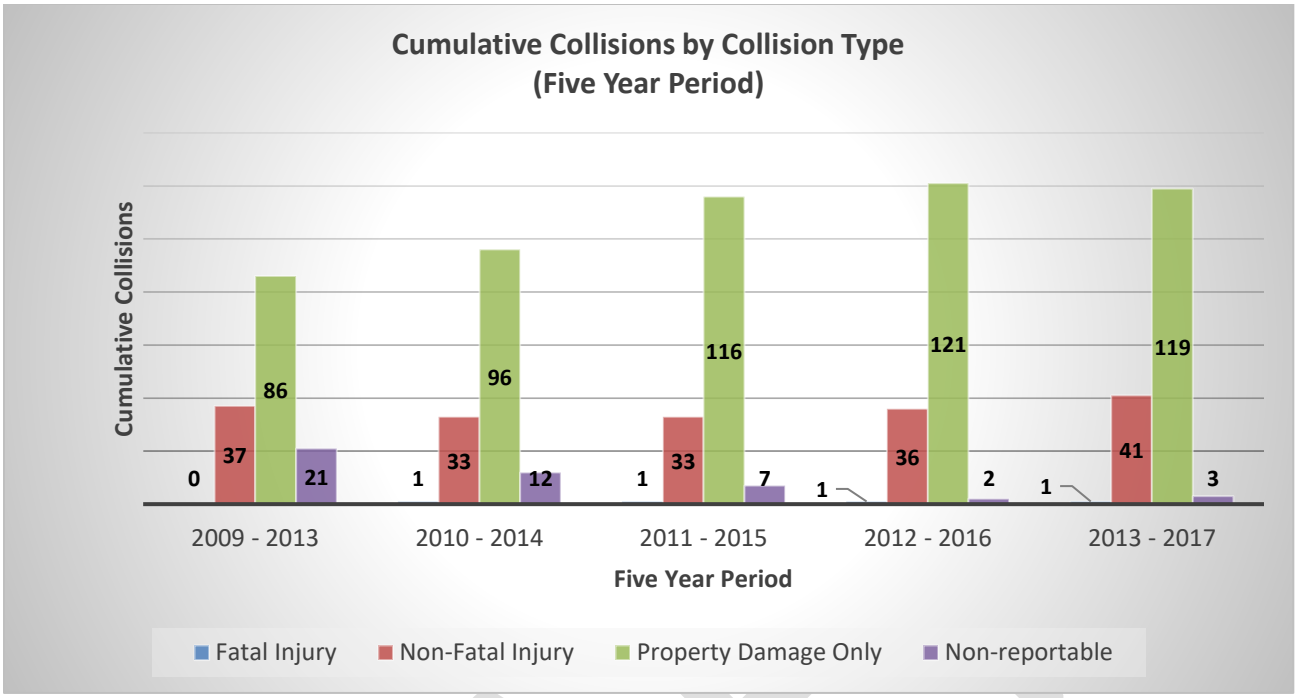

Figure 3.6-3: Cumulative Collisions by "Collision Type"

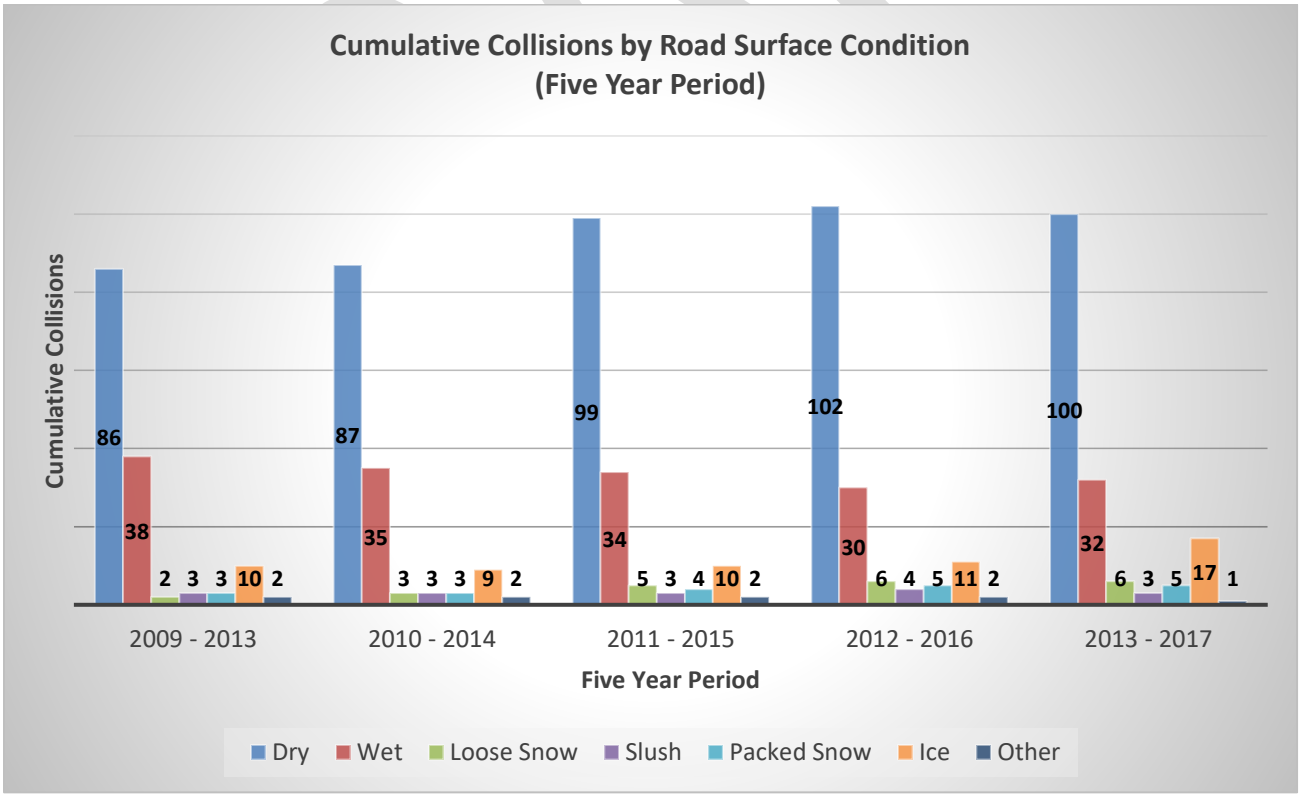

Figure 3.6-4: Cumulative Collisions by Road Surface Condition

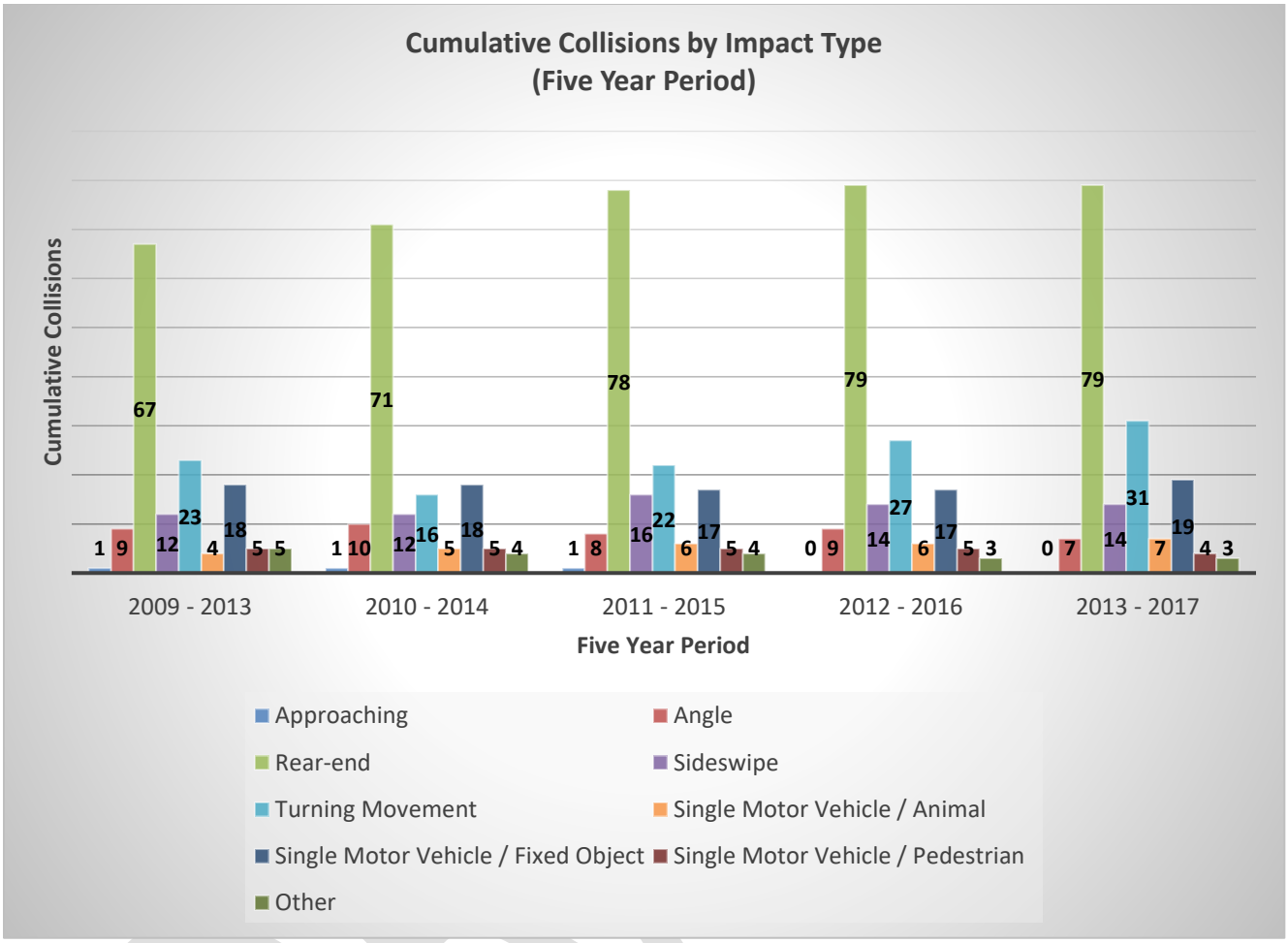

Figure 3.6-5: Cumulative Collisions by Impact Type

4. Future Conditions & Plans

4.1. Future Development

The 2011 base year and 2031 forecast year estimated population and employment within the Study Area are shown in Table 4.1-1. Population and employment are forecasted to grow on average at a rate of 1.7% and 5.2% per annum respectively by 2031. This growth will inevitably lead to an increase in travel demand within the Study Area. Adequate transportation services will need to be provided to meet this growth. Full detail of the population and employment forecast by traffic analysis zones is contained in Appendix E – Study Area Population and Employment Forecast.

Table 4.1-1: Population and Employment – Study Area

Year	Population	Employment
2011	25,440	2,617
2031	35,990	7,214
Change from 2011	10,550	4,597
% Change	1.7%	5.2%

4.2. Future Transportation needs within the Study Area

4.2.1. Roadway

Besides plans to widen Fischer-Hallman Road/Bearinger Road in anticipation of the future transportation needs, there have been other roadway widening/extensions completed within the Study Area. The City of Waterloo widened Columbia Street West from Erbsville Road to Fischer-Hallman Road and plans to construct a multi-use trail along the south side of Columbia Street West.

Intersection Control Studies (ICS) were carried out at all the signalized intersections along the Fischer-Hallman Road/Bearinger Road corridor. Upon completion, all the intersections within the roadway corridor were recommended to be maintained as signalized intersections:

- Bearinger Road & Westmount Road North;
- Fischer-Hallman Road/Bearinger Road & Laurelwood Drive; and
- Fischer-Hallman Road & Columbia Street West

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4.2.2. Active Transportation (AT)

Fischer-Hallman Rd/Bearinger Rd (between Columbia St. W & Westmount Rd) is identified in the 2018 TMP as a cycling route with the proposed facility type being a bike lane. The 2018 TMP goes further to recommend that a "protected" cycling infrastructure should be considered along the corridor as part of the EA process. Combinations of alternatives considered for AT facilities include:

- A 1.7 m wide on-road separated cycle track and a 1.8 m sidewalk on both sides of the road; or
- A 3.0 m to 4.0 m wide multi-use trail (MUT) on one side of the road and a 1.8 m sidewalk on the other side of the road.

Based on preliminary discussions, the University of Waterloo are open to having a MUT constructed on their property subject to an ownership/maintenance agreement being established with the Region. The City of Waterloo suggested for an asphalt MUT is to be constructed on both sides of the roadway, with the idea being to have the MUT on the west side of the road such that it will run between Westmount Road and Laurelwood Drive to complete part of a future planned trail system that will ultimately circumnavigate the entire Laurel Creek Conservation area.

The preferred AT facility (or combination of the above) will be determined as part of the EA process and would take into consideration the need to:

- Minimize the natural and social environmental impact on the Laurel Creek Reservoir as well as woodlot area located on the west side of Bearinger Road between Laurelwood Drive and Westmount Road;
- Minimize the amount of encroachment into adjacent private lands given the limited availability of right-of-way to accommodate AT facilities;
- Provide seamless connectivity to complement the City's plan to enhance trail connectivity within the Laurelwood/Beaver Creek/Conservation/Westmount area;
- Provide for smooth transitions at crossing points such as at intersections;
- Account for the capital cost as well as the operation and maintenance cost of the "Preferred" alternative

Although the Doreen Thomas 'stone-dust' trail located west of Bearinger Road is not considered as one of the alternatives for this EA, there may be an opportunity to evaluate it as one of the alternatives for AT given its proximity to the Study Area.

4.2.3. Transit

Grand River Transit (GRT) redesigned its routes to complement the ION Light Rail. GRT route #13 was retained along Fischer-Hallman Drive between Laurelwood Drive and Columbia Street West as well as route #31 and iXpress route #201 through the Study Area. GRT has identified the need to improve the following stops below. Figure 4.2-1 provides details on the stop locations and other amenities.

Northbound Stops (East of Fischer-Hallman Rd)

Stop #	Stop Location	GRT's Comments
4077	Fischer-Hallman Rd/Path to Laurel Gate	• Install a concrete landing pad at the existing location. • The preferred dimensions for the landing pad should be 9.5 m long by 3.5 m wide if applicable
4078	Fischer-Hallman Rd/Laurelwood Dr	• Install a concrete shelter pad at this stop location • The preferred dimensions should be 4.0m long by 2.5m wide if applicable

Southbound Stops (West of Fischer-Hallman Rd)

Stop #	Stop Location	GRT's Comments
1114	Fischer-Hallman Rd/Gatestone Blvd	• Install a concrete landing pad at the current stop location. • The preferred dimensions for the landing pad should be 9.5 m long by 3.5 m wide if applicable. • The pad will need to provide conduit that is extended to the nearest hydro source to accommodate a future shelter installation.
1115	Fischer-Hallman Rd / Columbia St W	• Install full size concrete landing pad in the boulevard. The preferred dimensions for the landing pad should be 9.5 m long by 3.5 m wide if applicable • Install a concrete shelter pad behind the sidewalk. The preferred dimensions should be 4.0m long by 2.5m wide if applicable. • The shelter pad will need to provide conduit that is extended to the nearest hydro source to accommodate a future shelter installation.

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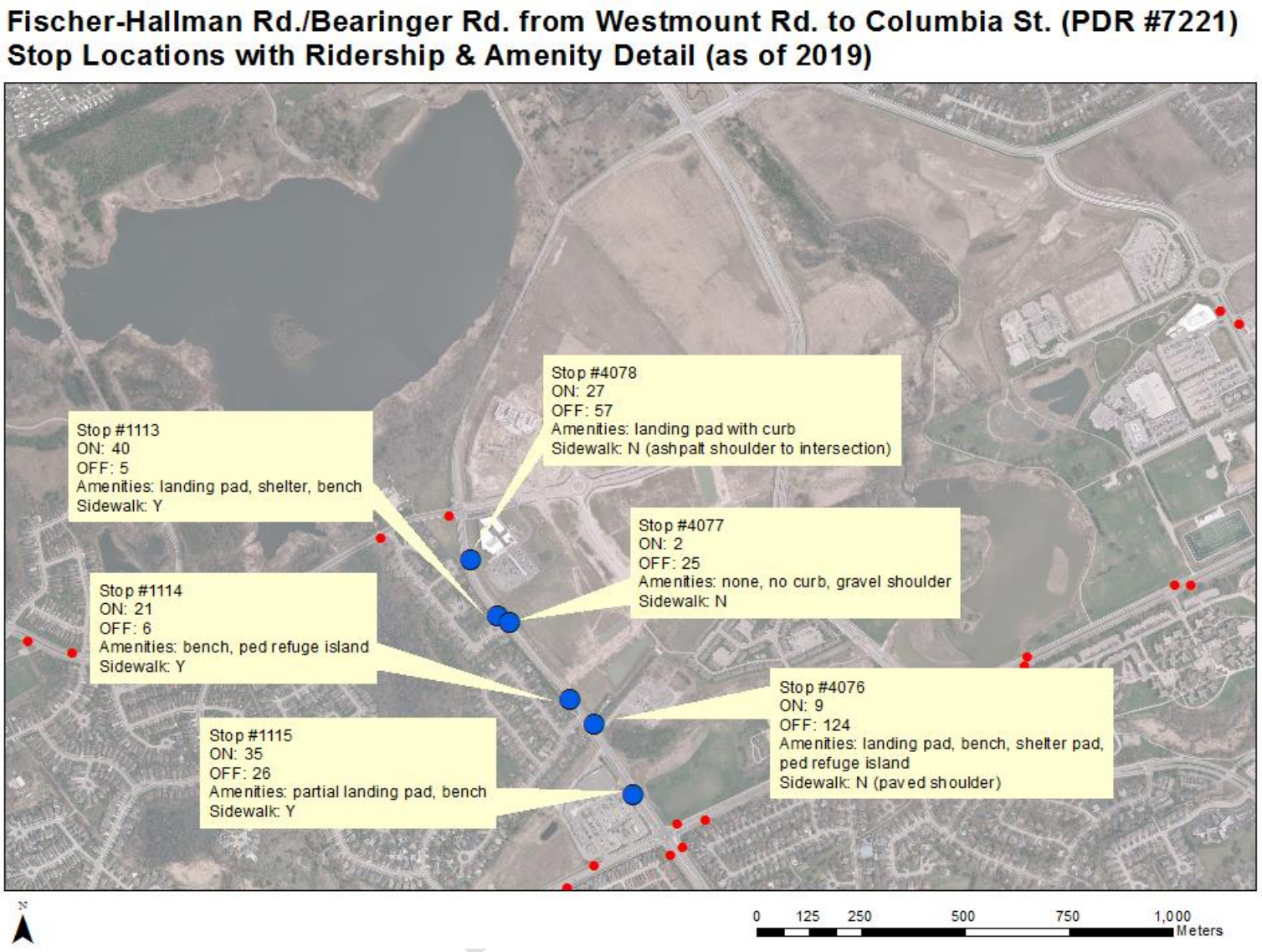

Figure 4.2-1: Transit Stop Locations with 2019 Ridership & other amenities

Although some considerations have been made to provide transit service to connect the Laurelwood area and the Lakeshore area along Fisher-Hallman Road/Bearinger Road, GRT does not have details regarding when service will operate along Bearinger Road between Laurelwood Dr & Westmount Rd.

For the rest of the Study Area, transit priority improvements are planned along Columbia Street West (Erbsville Road to Albert Street) which could result to an extension of transit service further west adding more buses on Columbia Street West. Fischer-Hallman Road (Highway 7/8 to Columbia Street West) has also been identified by the 2018 TMP as a future transit route with express service connecting the University of Waterloo, RIM Columbia Campus, Sunrise Centre, and Forest Glen Plaza Transit Terminal.

Within the next couple of years, GRT plans to provide more local transit service along Conservation Drive as the Beaver Creek subdivision continues being developed. Westmount Road, north of Columbia Street West may also get some service as GRT plans to serve the new area along the Laurelwood Drive extension between Westmount Road and Fisher-Hallman Road. The University of Waterloo plans to further extend the Laurelwood Drive Extension to Wes Graham Way which will serve as a dedicated transit and active transportation route as part of its Northwest campus expansion.

Future GRT Business Plans and transit network redesign will provide further concrete details of GRT plans for this area.

4.3. Potential New Intersections – Street A & Street C

The University of Waterloo (UofW) plans to develop its northwest campus subdivision plan following a two (2) stage development process. A framework for the various land uses required to develop the area is presented in section **Error! Reference source not found.** and **Error! Reference source not found.** in Appendix A – Regional and Area Municipal Policies. Although development applications for the various blocks identified in Stage 1 have been opened for submission, there has not been any application for a Subdivision Draft Plan submitted to the Region to develop Stage 2 of the subdivision and there are no plans of this happening in the nearest future based on feedback received from UofW's planning staff.

If fully developed, traffic to and from the UofW northwest campus will have an impact on Fischer-Hallman Rd/Bearinger Rd (Columbia St W to Westmount Rd). However, considering the uncertainty around the timelines of the various developments, an "interim" and an "ultimate" traffic forecast for the 2031 horizon year were developed as follows:

- The 2031 "Interim" forecast consist of 2031 background traffic plus traffic from Stage 1 development of UofW northwest campus; and
- The 2031 "Ultimate" forecast consist of 2031 background traffic plus traffic from a full development of UofW northwest campus

In anticipation of these developments, the University of Waterloo Northwest Campus Development Design Guidelines has identified the need for two new connections to Fischer-Hallman Road/Bearinger Road (Columbia Street West to Westmount Road North) following the full development of the University of Waterloo Northwest Campus. Discussions with planning staff from the University suggest that these accesses will be designed as right-in-right-out (RIRO) only.

4.4. Future Traffic Volumes and Intersection Level of Service

Traffic volumes were forecasted ten (10) years post construction. Weekday peak hour traffic volumes for the year 2031 were estimated using the Regional Transportation Demand Model and 2016 base year counts while accounting for:

- A background traffic growing at a rate of 1.2% (for through movements) and 0.5% (for turning movements);
- A full development of University of Waterloo Northwest Campus (Stage 1 & 2); and
- A full development of the Beaver Creek Meadows subdivision.

The above elements were used to develop the 2031 "Ultimate" forecast to represent the 10 years post construction (2031) weekday peak hour traffic volume forecast and used to assess the 'Do Nothing' alternative. Figure 4.4-1 & Figure 4.4-2 and in Appendix B – Turning Movement Volumes shows the turning movement volumes for the 2031 "Ultimate" forecast.

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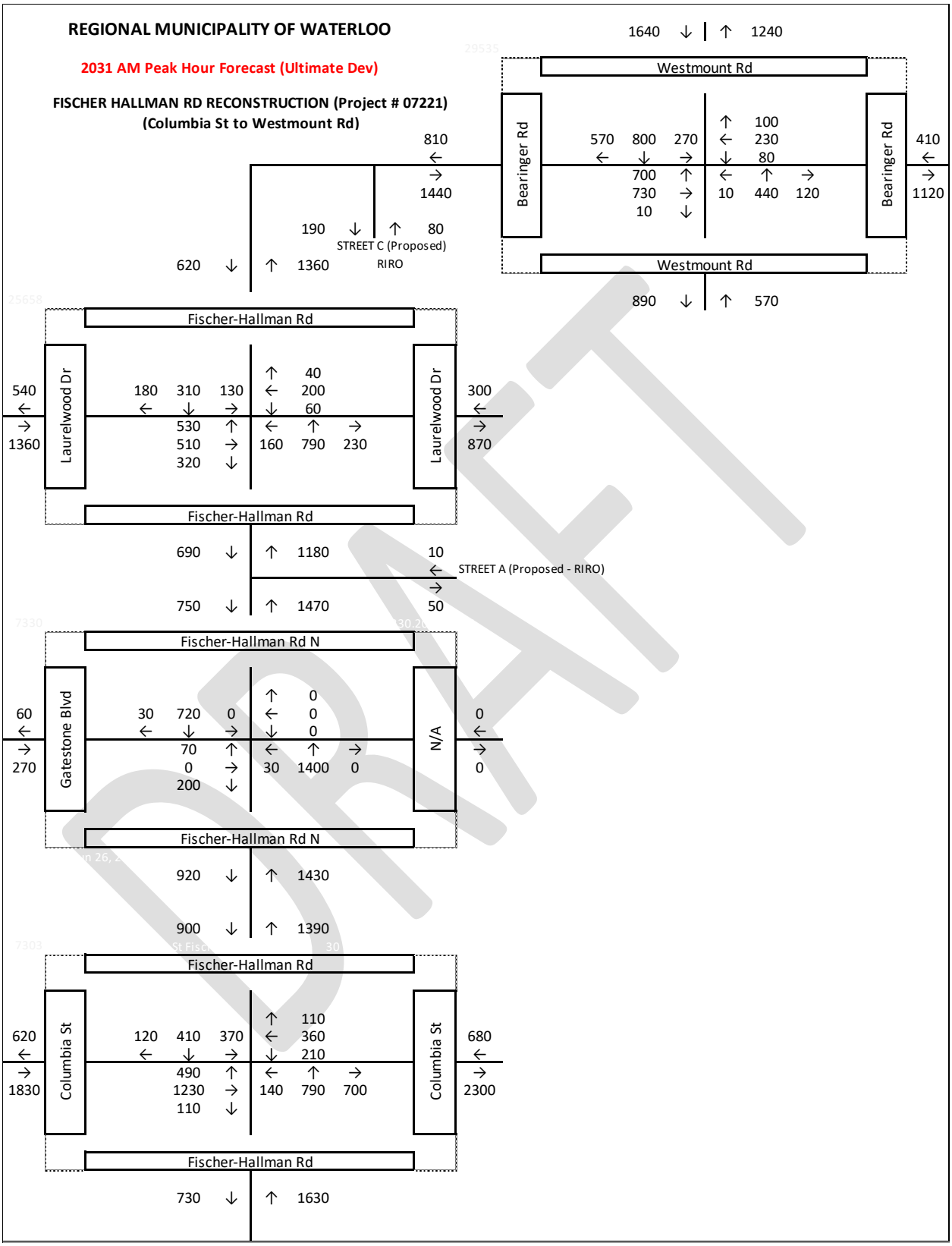

Figure 4.4-1: 2031 Weekday Peak Hour Traffic Volume Forecast (AM) – 'Do Nothing' Alternative

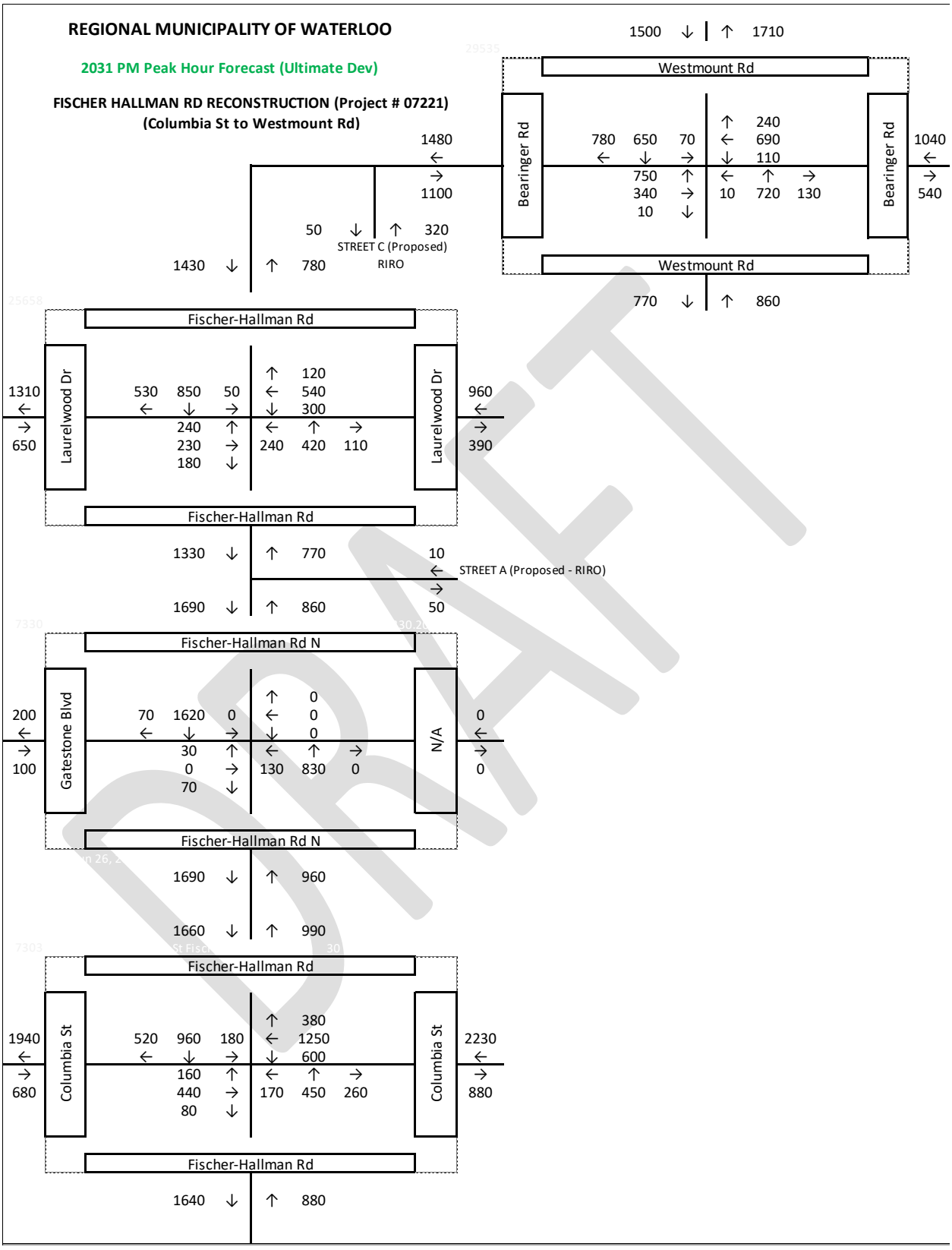

Figure 4.4-2: 2031 Weekday Peak Hour Traffic Volume Forecast (PM) – 'Do Nothing' Alternative

These weekday peak hour 2031 “Ultimate” traffic volumes (i.e., “Do Nothing” alternative) were used to carryout traffic operation and capacity analysis at each intersection along the roadway corridor based on the existing geometry (as of 2019) in order to identify deficiencies in future traffic operations. Although a timeline for the full development of the UofW northwest campus is unknown, the result of the traffic operations and capacity analysis discussed below highlights locations with constrains alongside some mitigation measures.

4.4.1.1. Bearinger Road & Westmount Road Intersection

The analysis showed that based on the 2031 “Ultimate” traffic condition on the existing lane configuration, the following movements will have limited capacity to accommodate 50th percentile queue during the weekday morning and/or afternoon peak hour (v/c >1.0):

- Eastbound left-turn
- Westbound through
- Northbound through
- Southbound left-turn
- Southbound right-turn

These movements will also experience excessive average delay greater than 130 seconds per vehicle, and will operate at a level of service F during the morning and afternoon weekday peak hours. To improve traffic operations at this intersection under this condition, the following geometric improvements would be required:

- A channelized southbound right-turn lane along Westmount Road
- A dual eastbound left-turn lane with an extension of its storage capacity along Bearinger Road
- A shared eastbound through/right-turn lane
- An extension of the storage capacity along the southbound left-turn lane along Westmount Road
- A shared westbound through/right-turn lane
- A dedicated northbound right-turn lane along Westmount Road
  Signal timing optimization

4.4.1.2. Fischer-Hallman Road/Bearinger Road & Laurelwood Drive

Results from the analysis showed that under the 2031 “Ultimate” traffic condition, the following movements will have limited capacity to accommodate 50th percentile queue during the weekday morning and/or afternoon peak hour (v/c > 1.0):

- Eastbound left-turn

- Eastbound through
- Westbound left-turn
- Westbound through
- Northbound left-turn
- Northbound through
- Southbound left-turn
- Southbound through

These movements will also experience excessive average delay greater than 105 seconds per vehicle, and will operate at a level of service F during the morning and afternoon weekday peak hours. To improve traffic operations at this intersection under this condition, the following geometric improvements would be required:

- A dedicated eastbound right-turn along Laurelwood Drive
- A dedicated northbound and southbound right-turn lanes along Fischer-Hallman Rd/Bearinger Rd respectively
- Signal timing optimization

4.4.1.3. Fischer-Hallman Road & Gatestone Boulevard

The shared eastbound left & right-turn lane at this unsignalized intersection will operate beyond capacity (v/c >2.0) and a level of service F with excessive delay greater than 300 seconds per vehicle during both morning and afternoon peak hours.

4.4.1.4. Fischer-Hallman Road & Columbia Street West

The analysis showed that under the 2031 traffic condition, the following movements will have limited capacity to accommodate 50th percentile queue either during the weekday morning or afternoon peak hour (v/c>1.0):

- Eastbound left-turn
- Eastbound through
- Westbound left-turn
- Westbound through
- Northbound left-turn
- Northbound right-turn
- All southbound movements

These movements are forecasted to experience excessive average delay greater than 140 seconds per vehicle and operate at a level of service F during the morning and afternoon peak hours. To improve traffic operations at this intersection under this condition, the following geometric improvements would be required:

- A dedicated WBRT lane with 30 m of storage along Columbia Street West;
- Increase eastbound left-turn storage along Columbia Street West to 170 m; and

- Increase southbound left-turn storage along Fischer-Hallman Road to 165
- Signal timing optimization.

A summary of the traffic operations for the 2031 horizon year based on the base year's road geometry are shown in Table 4.4-1 & Table 4.4-2 below with detailed results of the capacity analysis presented in Appendix C – Synchro Results.

The above countermeasures suggested to address the constraints at the intersections will result to intersections with larger footprints which will impact the natural and social environment (e.g. creeks, wetlands, vegetation, implementation of Active Transportation facilities), and increase the overall costs of the project. All these coupled with uncertainties surrounding the timeline for the full development of the UofW's northwest campus subdivision (Stage 1 & 2) do not justify the need to recommend the above road improvements by 2031. Hence, an interim traffic forecast for the 2031 horizon year based on a partial development of the University of Waterloo's northwest campus was developed and used to assess the capacity improvements needed for the roadway.

Table 4.4-1: Results – Traffic Operations (2031 Weekday AM Peak Hour) – 'Do Nothing' Alternative

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized) Cycle: 100 s **Intersection LOS: D**	LOS	F	C	A	B	C	A	C	D	x	F	C	A
	Delay (s)	101	32	0	18	28	1	29	38	x	235	31	6
	v/c	1.14	0.80	0.01	0.38	0.38	0.18	0.09	0.72	x	1.40	0.69	0.62
	Queue 95th (m)	~258	#215	0	16	57	2	6	66	x	~107	86	36
	Storage (m)	65		25	30		85	80		x	65		65
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive (Signalized) Cycle: 76 s **Intersection LOS: F**	LOS	F	F	x	E	B	A	B	F	x	F	B	A
	Delay (s)	255	248	x	58	19	0	12	122	x	306	18	4
	v/c	1.48	1.48	x	0.65	0.30	0.07	0.37	1.20	x	1.51	0.42	0.26
	Queue 95th (m)	~171	~242	x	#28	38	0	21	~264	x	~49	52	11
	Storage (m)	85		x	30		35	90		x	60		60
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS	F			x	x	x	A	Free Flow		Free Flow		
	Delay (s)	172.4			x	x	x	9.6					
	v/c	1.22			x	x	x	0.04					
	Queue 95th (m)	177			x	x	x	1.0					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized) Cycle: 120 s **Intersection LOS: F**	LOS	F	F	A	F	D	A	B	D	F	F	C	A
	Delay (s)	313	101	8	118	42	7	19	38	114	152	29	6
	v/c	1.61	1.11	0.22	1.08	0.65	0.21	0.34	0.67	1.16	1.23	0.32	0.21
	Queue 95th (m)	~241	~227	15	~94	111	13	31	110	~245	~154	54	13
	Storage (m)	80		35	140		0	85		85	70		50

~: 50th percentile volume exceeds capacity #: 95th percentile volume exceeds capacity $: Delay exceeds 300s

Table 4.4-2: Results – Traffic Operations (2031 Weekday PM Peak Hour) – 'Do Nothing' Alternative

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road Cycle: 150 s **Intersection LOS: F**	LOS	F	B	A	B	F	C	D	F	x	E	D	D
	Delay (s)	206	16	0	19	126	23	51	168	x	64	52	52
	v/c	1.35	0.30	0.01	0.30	1.14	0.45	0.10	1.24	x	0.61	0.68	0.97
	Queue 95th (m)	~375	69	0	19	~330	56	9	~216	x	#33	119	#320
	Storage (m)	65		25	30		85	80		x	65		65
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive Cycle: 110 s **Intersection LOS: F**	LOS	F	F	x	F	F	A	F	B	x	C	F	B
	Delay (s)	149	126	x	124	106	9	144	19	x	21	94	19
	v/c	1.18	1.14	x	1.13	1.09	0.26	1.17	0.60	x	0.16	1.10	0.71
	Queue 95th (m)	~100	~165	x	~119	~205	16	~101	107	x	15	~295	95
	Storage (m)	85		x	30		35	90		x	60		60
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS	F			x	x	x	C					
	Delay (s)	1058.2			x	x	x	24.0					
	v/c	2.85			x	x	x	0.43					
	Queue 95th (m)	97.6			x	x	x	16.6	Free Flow		Free Flow		
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West Cycle: 130 s **Intersection LOS: F**	LOS	F	D	A	E	F	B	F	D	A	D	E	F
	Delay (s)	176	43	2	71	236	13	225	39	7	50	63	102
	v/c	1.21	0.48	0.18	1.03	1.45	0.49	1.34	0.44	0.44	0.71	0.95	1.09
	Queue 95th (m)	~83	70	3	~206	~542	61	~93	69	21	#58	#176	~204
	Storage (m)	80		35	140		0	85		85	70		50

~: 50th percentile volume exceeds capacity #: 95th percentile volume exceeds capacity $: Delay exceeds 300s

4.5. Problem Statement – Needs Assessment & Justification

Needs Assessment

The needs for this section of Fischer-Hallman Road/Bearinger Road between Columbia Street West and Westmount Road North were established based on:

- The 2018 Transportation Master Plan which identified the roadway for widening by 2031.
- The Active Transportation Master Plan (ATMP) which identified the roadway for lacking pedestrian and cycling facilities.
- The traffic operation analysis which identified future capacity constraints, traffic congestion, delay and decrease in level of service along the roadway.
- The transportation planning assessment which identified the roadway as an alternative access route for future planned developments (such as the University

of Waterloo Northwest Campus and Beaver Creek Conservation) that would result to an increase in population and employment within the northwestern part of the City of Waterloo over the next few decades.

Opportunities

The widening of Fischer-Hallman Road/Bearinger Road between Columbia Street West and Westmount Road North would:

- Provide an opportunity to improve intersection operations and address future deficiencies identified along the roadway.
- Provide a four-lane cross-section to ease traffic flow while accommodating transit buses that make frequent stops to pick-up/drop off passengers.
- Support the extension of transit services to communities located in the northwestern corner of the City of Waterloo.
- Provide an opportunity to improve pedestrian and cycling facilities along the right-of-way.

Problem Statement

The 2018 TMP identified Fischer-Hallman Road/Bearinger Road between Columbia Street West to Westmount Road for widening by 2031 to address future congestion in the area. Travel demand is expected to increase significantly due to future developments planned for the northwestern part of the City of Waterloo over the next few decades. An analysis of the “Do Nothing” alternative showed that by 2031, capacity constraints along the roadway and at the intersections will affect both private automobile and transit operations. The lack of active transportation facilities along the roadway has also been identified and documented. Therefore, a road expansion is required along Fischer-Hallman Road/Bearinger Road between Columbia Street West to Westmount Road to address these future capacity constraints, accommodate increases in travel demands, and address other identified needs.

This project is scheduled for construction by 2021 according to the 2019 Transportation Capital Program (TCP).

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5. Alternative Development and Evaluation

Given the University of Waterloo (UofW) has no fixed timeline in place to fully develop its northwest campus subdivision, it was unlikely that the 2031 “Ultimate” traffic scenario would be realized by 2031. To this effect, an “Interim” forecast was developed for the 2031 horizon year which took into account the partial development of the UofW’s northwest campus subdivision. This section presents the findings following the assessment of the impact of the various stages of development of the UofW’s northwest campus subdivision on the transportation needs of the roadway corridor.

5.1. Description of Proposed Alternatives

Because of the uncertainty related to the timing for fully developing the UofW’s northwest campus subdivision and given UofW is a major trip generator within the Study Area, an “Ultimate” and an “Interim” traffic forecast was developed assuming “Full” and “Partial” development of the UofW northwest campus subdivision by 2031. The needs and recommendations for the roadway corridor were assessed based on three (3) different alternatives presented in Table 5.1-1.

Table 5.1-1: Proposed Alternatives

Alternatives	Description	Detailed Description
A	‘Ultimate Development of UofW’ Without Roadway Improvements	This was the ‘Do Nothing’ alternative. It assumed full development of the UofW northwest campus subdivision by 2031 and assessed the traffic impact on the existing geometric features of the roadway/intersections based on an “Ultimate” traffic forecast developed for the 2031 horizon year based on background traffic growth plus that from the “Full” development of the UofW northwest campus subdivision.
B	‘Interim Development’ without Roadway Widening	This alternative assumed partial development of the UofW northwest campus subdivision by 2031. Traffic analysis performed under this alternative aimed at determining if the current two-lane cross-section of the roadway (plus geometric improvements at the intersections) would be adequate to accommodate the 2031 “Interim” traffic forecast which was based on background traffic growth plus that from the “partial” development of the UofW northwest campus subdivision the need to widen the roadway.
C	‘Interim Development’ With Roadway Widening	This alternative assumed partial development of the UofW northwest campus subdivision by 2031. It used the 2031 “Interim” traffic forecast to assess the traffic impact based on a four-lane cross-section of the roadway, alongside geometric and traffic operational improvements at the intersections.

5.2. Targeted Levels of Service

Levels of service (LOS) targets were established based on the percent of AADT occurring in the PM peak hour presented in Table 3.3-4 and used to assess traffic operations for the afternoon peak hours. LOS targets were established based on the following criteria:

Percent of AADT occurring in PM Peak Hour	Target LOS
<11%	C
11% to 13%	D
>13%	E

Established LOS targets by turning movement for the PM peak hour are shown in Table 5.2-1 below. The LOS targets were set only for the PM peak hour given it is the busiest period of the day and it is also the basis for the Region's transportation demand model calibration. The intent was to use these 'LOS targets' as a base for assessing the traffic operation output for the various alternatives presented above.

Table 5.2-1: Targeted PM Peak Hour Levels of Service

INTERSECTION	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Bearinger Road & Westmount Road	C	C	C	D	E	E	E	C	C	C	D	E
Fischer-Hallman Rd/Bearinger Rd & Laurelwood Dr	C	C	C	D	E	C	D	C	C	D	D	E
Fischer-Hallman Rd/Gatestone Blvd	C			-	-	-	E	Free Flow		Free Flow		
Fischer-Hallman Rd/Columbia St W	C	C	C	E	E	E	C	C	C	C	E	E

5.3. Evaluation of Proposed Alternatives

5.3.1. Alternative A – 'Ultimate Development of UofW' Without Roadway Improvements – 2031

This was the 'Do Nothing' alternative. It assumed full development of the UofW northwest campus subdivision by 2031 (in addition to background traffic) and used the "Ultimate" 2031 traffic forecast to assess the traffic impact on the existing geometric characteristics of the roadway/intersections (i.e., two-lane cross-section without

intersection improvements). A comparison between the targeted LOS (established above) versus the LOS based on the results from the PM peak hour traffic operations and capacity analysis reported in Table 4.4-2 above is presented in Table 5.3-1 below:

Table 5.3-1: Targeted LOS vs. 'Do Nothing' Scenario LOS (2031 PM peak hour)

INTERSECTION	Scenario	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Bearinger Road & Westmount Road	Targeted LOS	C	C	C	D	E	E	E	C		C	D	E
	Calc. LOS	F	B	A	B	F	C	D	F		E	D	D
Fischer-Hallman Rd/Bearinger Rd & Laurelwood Dr	Targeted LOS	C	C		D	E	C	D	C		D	D	E
	Calc. LOS	F	F		F	F	A	F	B		C	F	B
Fischer-Hallman Rd/Gatestone Blvd	Targeted LOS	C			-	-	-	E	Free Flow		Free Flow		
	Calc. LOS	F			-	-	-	C	Free Flow		Free Flow		
Fischer-Hallman Rd/Columbia St W	Targeted LOS	C	C	C	E	E	E	C	C	C	C	E	E
	Calc. LOS	F	D	A	E	F	B	F	D	A	D	E	F

The outcome of this comparison exercise showed that maintaining the existing geometric characteristics of the roadway as a two-lane cross-section without intersection improvements is not a viable option because:

- It would not provide sufficient capacity to accommodate future travel demand generated from this area should the UofW northwest campus subdivision be fully developed. A total of 17 of the calculated PM peak hour LOS at all turning movements along the corridor were above the established targeted LOS for this alternative, translating to a compliance rate of 51%.
- Implementing the suggested improvements outlined in section 4.4 will pose significant impacts to the environment at great cost especially given the uncertainty surrounding the timing for fully developing the UofW's northwest campus subdivision.

For these reasons, the roadway improvements suggested under this alternative were not recommended to be carried forward along the Fischer-Hallman Rd/Bearinger Rd corridor between Columbia St W & Westmount Rd.

5.3.2. Alternative B – 'Interim Development' Without Roadway Widening – 2031

This alternative assumed partial development of the UofW northwest campus subdivision by 2031. This alternative used the "Interim" traffic forecast developed for the 2031 horizon year to assess the viability of a two-lane roadway cross-section (plus geometric improvements at the intersections) and determine its potential to accommodate background traffic plus that from the partial development of the UofW northwest campus subdivision and other anticipated developments in the area.

Figure 5.3-1 and Figure 5.3-2 show the 2031 "Interim" turning movement peak hour volume forecasts assuming the partial development of the UofW northwest campus subdivision plus background traffic.

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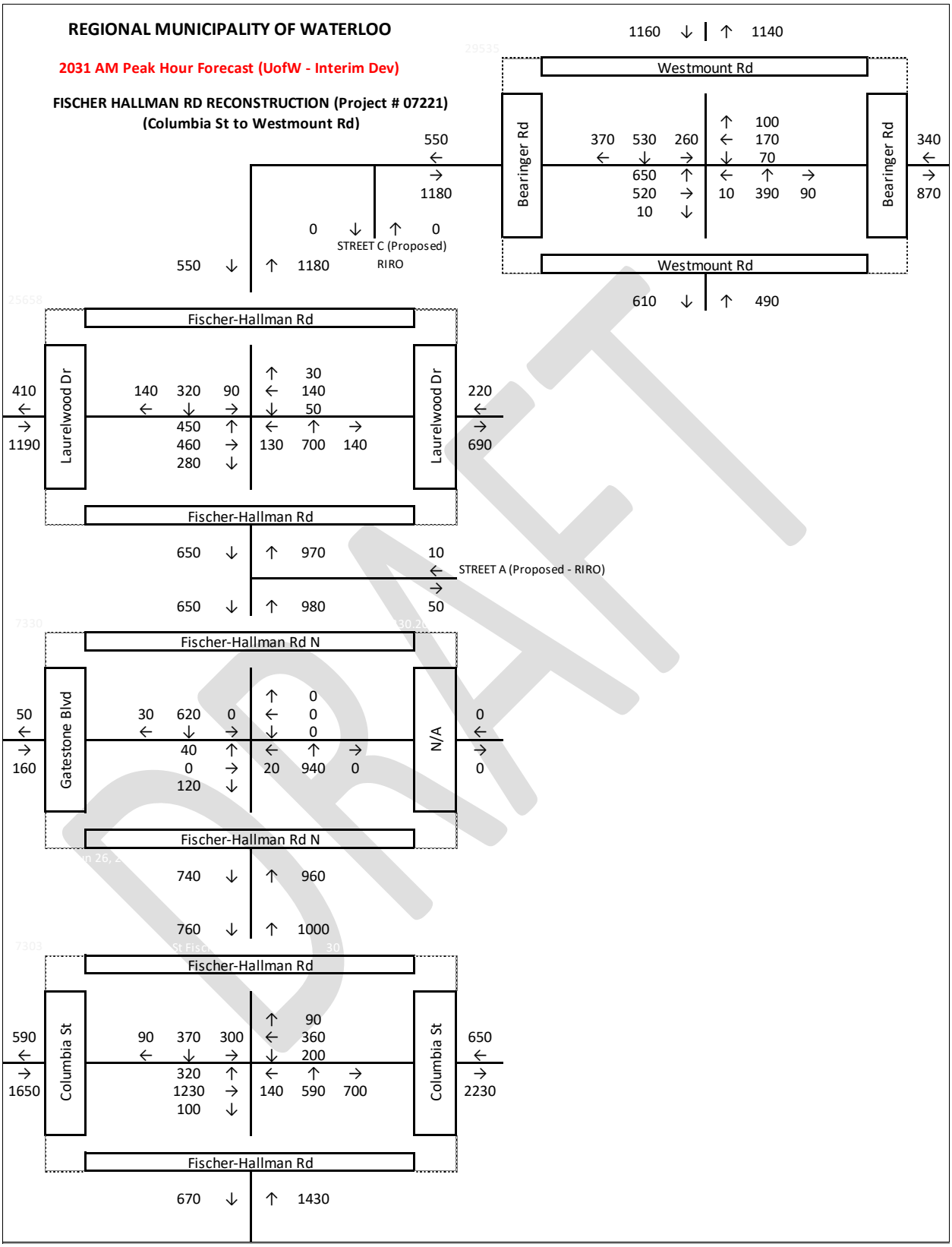

Figure 5.3-1: 2031 Peak Hour Forecast (AM) – 'Interim Development'

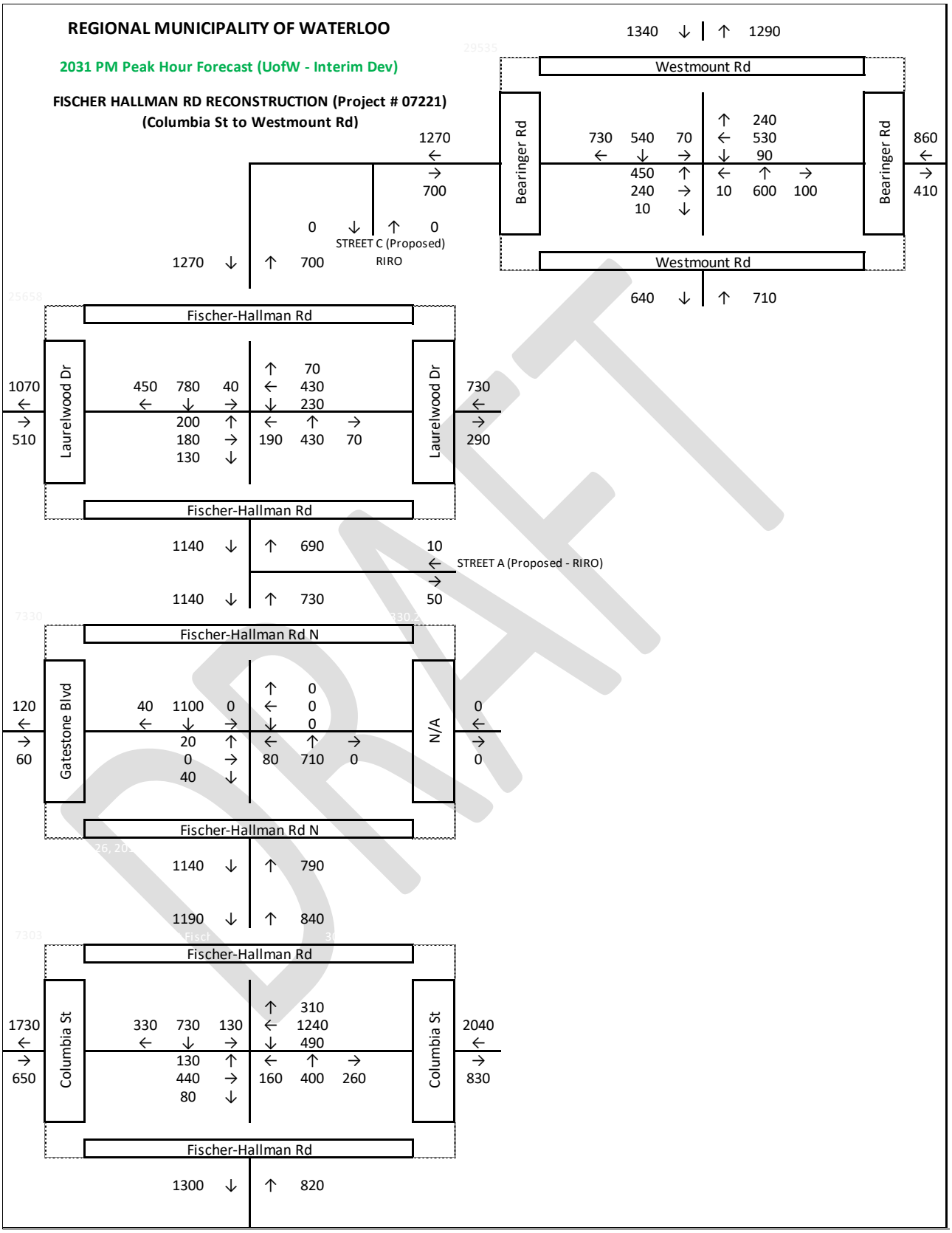

Figure 5.3-2: 2031 Peak Hour Forecast (PM) – 'Interim Development'

Traffic Operations and Capacity Analysis

A summary of the traffic operations based on "Interim" forecast without Roadway Widening for the 2031 horizon year are shown in Table 5.3-3 & Table 5.3-4. A comparison between the targeted LOS versus the LOS based on the results from the PM peak hour traffic operations and capacity analysis presented in Table 5.3-2 show that some turning movements will continue to operate below the 2031 targeted LOS. This will be characterized by high levels of intersection delays as a result of congestion and capacity constraints.

Table 5.3-2:Targeted LOS vs. LOS from 'Interim Development' without Roadway Widening Scenario (2031 PM Peak Hour)

INTERSECTION	Scenario	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Bearinger Road & Westmount Road	Targeted LOS	C	C		D	E		E	C		C	D	E
	Calc. LOS	D	B		B	C		C	D		D	C	D
Fischer-Hallman Rd/Bearinger Rd & Laurelwood Dr	Targeted LOS	C	C		D	E	C	D	C		D	D	
	Calc. LOS	E	D		D	E	A	E	B		C	D	
Fischer-Hallman Rd/Gatestone Blvd	Targeted LOS	C			-	-	-	E	Free Flow		Free Flow		
	Calc. LOS	E			-	-	-	B	Free Flow		Free Flow		
Fischer-Hallman Rd/Columbia St W	Targeted LOS	C	C		E	E		C	C	C	C	E	E
	Calc. LOS	E	D		D	D		F	D	A	C	D	C

The outcome of this comparison exercise showed that maintaining a two-lane cross-section with intersection improvements was not a viable alternative because:

- It does not provide sufficient capacity to accommodate future traffic demand that will be generated around this area as a result of background growth plus traffic from the partial development of the UofW northwest campus subdivision. A total of eleven of the calculated PM peak hour LOS at the various intersection turning movements along the corridor were above the established targeted LOS under this scenario, translating to a compliance rate of 63%.
- It does not align with the long-term planning objective to widen the roadway as established in the 2018 TMP

This alternative was not recommended as the preferred alternative for this section of the roadway. Detail results of the capacity analysis are presented in Appendix C – Synchro Results.

Table 5.3-3: Traffic Operation Analysis – 'Interim Development' without Roadway Widening (2031 AM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized) Cycle: 120 s **Intersection LOS: C**	LOS	D	B	x	B	C	x	D	D	x	**E**	C	A
	Delay (s)	53	20	x	18	22	x	37	49	x	**64**	30	2
	v/c	**0.98**	0.30	x	0.23	0.28	x	0.06	0.72	x	**0.90**	0.43	0.39
	Queue 95th (m)	#256	58	x	16	29	x	7	71	x	#84	63	10
	Storage (m)	65		x	30		x	80		x	65		65
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive (Signalized) Cycle: 120 s **Intersection LOS: D**	LOS	C	D	x	D	D	A	C	D	x	C	C	x
	Delay (s)	23	45	x	46	37	0	27	40	x	30	32	x
	v/c	0.67	**0.94**	x	0.37	0.29	0.06	0.42	0.79	x	0.46	0.47	x
	Queue 95th (m)	**95**	# 241	x	24	48	0	36	# 137	x	25	61	x
	Storage (m)	85		x	30		35	90		x	60		x
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS		C		x	x	x	A					
	Delay (s)		19		x	x	x	9					
	v/c		0.41		x	x	x	0.02	Free Flow		Free Flow		
	Queue 95th (m)		16		x	x	x	1					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized) Cycle: 120 s **Intersection LOS: D**	LOS	D	**F**		**E**	C	x	C	D	A	**E**	C	A
	Delay (s)	42	**103**		**66**	27	x	25	36	1	**65**	29	5
	v/c	0.81	**1.12**		**0.89**	0.37	x	0.38	0.51	0.5	**0.94**	0.30	0.16
	Queue 95th (m)	# 86	#246		#78	54	x	34	79	0	#103	47	10
	Storage (m)	80			140		x	85		85	70		50

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Table 5.3-4:Traffic Operation Analysis – 'Interim Development' without Roadway Widening (2031 PM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized) Cycle: 111 s **Intersection LOS: D**	LOS	D	B	x	B	C	x	C	D	x	D	C	D
	Delay (s)	53	15	x	15	34	x	31	49	x	38	31	36
	v/c	**0.93**	0.13	x	0.22	0.68	x	0.05	0.84	x	0.51	0.49	**0.93**
	Queue 95th (m)	#144	23	x	16	100	x	6	100	x	21	66	#217
	Storage (m)	65		x	30		x	80		x	65		65
Fischer-Hallman/ Bearinger Road/ Laurelwood Drive (Signalized) Cycle: 110 s **Intersection LOS: D**	LOS	**E**	D	x	D	**E**	A	**E**	B	x	C	D	x
	Delay (s)	**57**	52	x	45	**65**	3	**71**	14	x	22	36	x
	v/c	**0.85**	0.80	x	0.79	**0.91**	0.16	**0.92**	0.31	x	0.13	**0.89**	x
	Queue 95th (m)	**#70**	#104	x	#61	#153	4	#73	41	x	13	#168	x
	Storage (m)	85		x	30		35	90		x	60		x
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	LOS		E		x	x	x	B					
	Delay (s)		46		x	x	x	13					
	v/c		0.43		x	x	x	0.16	Free Flow		Free Flow		
	Queue 95th (m)		16		x	x	x	4					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized) Cycle: 120 s **Intersection LOS: D**	LOS	E	D	x	D	D	x	**F**	D	A	C	D	C
	Delay (s)	65	37	x	47	53	x	**96**	37	0	33	48	29
	v/c	0.83	0.52	x	0.94	0.99	x	**0.98**	0.42	0.18	0.46	0.79	0.70
	Queue 95th (m)	# 53	74	x	#145	#252	x	#70	58	0	38	112	75
	Storage (m)	80		x	140		x	85		85	70		50

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5.3.3. Alternative C – 'Interim Development' With Roadway Widening – 2031

This alternative assumed partial development of the UofW northwest campus subdivision by 2031. It assessed the traffic impact based on a four-lane cross-section of the roadway, alongside geometric and traffic operational improvements at the intersections using the "Interim" traffic forecast for the 2031 horizon year.

Provision for Capacity Improvements

The previous alternatives identified the need for geometric improvements to be made at some intersections along the roadway. To address these concerns, lane assignments shown in Table 5.3-5 were used to assess the traffic impact under this alternative. Signal timing adjustments were also made to accommodate certain movements with high demand.

Table 5.3-5:Lane Assignments – 'UofW Interim Development' with Roadway Improvements

Intersection	Suggested Lane Assignments											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (Signalized)	↰↰	↑→		↰	↑	↱	↰	↑	↑→	↰	↑↑	↱
Fischer-Hallman/Bearinger Road/Laurelwood Drive (Signalized)	↰	↑	↱	↰	↑	↱	↰	↑	↑→	↰	↑	↑→
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized)	↰	↱					↰	↑↑			↑	↑→
Fischer-Hallman Road & Columbia Street (Signalized)	↰	↑	↑→	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱

Traffic Operation Analysis

The "Interim" 2031 peak hour volume forecasts shown in Figure 5.3-1 and Figure 5.3-2 alongside the improved intersection geometries identified in Table 5.3-5 were used to carryout traffic operation and capacity analysis at each intersection along the roadway. The results from the analysis are discussed below.

A summary of the traffic operations output for the 2031 horizon year for this alternative are shown in Table 5.3-6 & Table 5.3-7 below. Detail results of the capacity analysis are presented in Appendix C – Synchro Results.

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Table 5.3-6:Traffic Operation Analysis 'UofW Interim Development' with Roadway Improvements (2031 AM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (signalized) Cycle: 140s Dual EBL **Intersection LOS: D**	LOS	E	C	x	C	C	x	D	E	x	E	C	A
	Delay (s)	61	28	x	21	29	x	46	61	x	58	34	9
	v/c	0.85	0.55	x	0.22	0.26	x	0.07	0.78	x	0.85	0.43	0.61
	Queue 95th (m)	112	150	x	18	37	x	8	87	x	#92	73	27.6
	Storage (m)	65		x	30		x	80		x	65		65
Fischer-Hallman Rd/Bearinger Road & Laurelwood Drive (Signalized) Cycle: 110 s Exclusive EBL,EBT,EBR **Intersection LOS: C**	LOS	C	C	A	D	D	A	C	C	x	C	C	x
	Delay (s)	23	22	6	47	44	1	22	34	x	23	25	x
	v/c	0.69	0.60	0.55	0.38	0.50	0.10	0.40	0.76	x	0.39	0.43	x
	Queue 95th (m)	85	92	16	22	46	0	32	#128	x	23	53	x
	Storage (m)	85			30		35	90		x	60		x
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized) **Intersection LOS: A**	LOS		C		x	x	x	A	Free Flow		Free Flow		
	Delay (s)		19		x	x	x	9					
	v/c		0.41		x	x	x	0.02					
	Queue 95th (m)		16		x	x	x	1					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized) Cycle: 120 s **Intersection LOS: D**	LOS	C	**F**	x	**E**	C	x	C	D	A	D	C	A
	Delay (s)	32	**94.5**	x	**76**	33	x	25	41	1	47	30	2
	v/c	0.75	**1.10**	x	**0.93**	0.44	x	0.39	0.60	0.50	**0.86**	0.31	0.16
	Queue 95th (m)	73	#242	x	#82	61	x	34	85	0	#90	49	4
	Storage (m)	80		x	140		x	85		85	70		50

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Table 5.3-7: Traffic Operation Analysis 'UofW Interim Development' with Roadway Improvements (2031 PM Peak Hour)

Intersection	Measure	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Westmount Road & Bearinger Road (signalized) Cycle: 110s Dual EBL **Intersection LOS: D**	LOS	D	B	x	B	C	x	C	D	x	C	C	C
	Delay (s)	45	18	x	15	33	x	31	48	x	31	29	34
	v/c	0.67	0.26	x	0.21	0.66	x	0.05	0.84	x	0.42	0.47	**0.96**
	Queue 95th (m)	66	52	x	17	98	x	6	99	x	20	63	#123
	Storage (m)	65		x	30		x	80		x	65		65
Fischer-Hallman Rd/Bearinger Road & Laurelwood Drive (Signalized) Cycle: 110 s Exclusive EBL,EBT,EBR **Intersection LOS: D**	LOS	D	D	A	C	D	A	D	B	x	C	D	x
	Delay (s)	54	39	9	26	53	3	51	16	x	26	55	x
	v/c	0.84	0.45	0.44	0.54	0.84	0.15	0.82	0.32	x	0.14	0.99	x
	Queue 95th (m)	#69	57	13	53	#137	4	#66	45	x	15	~191	x
	Storage (m)	85			30		35	90		x	60		x
Fischer-Hallman Road & Gatestone Boulevard (Unsignalized) **Intersection LOS: A**	LOS		E		x	x	x	B					
	Delay (s)		46		x	x	x	13					
	v/c		0.43		x	x	x	0.16	Free Flow			Free Flow	
	Queue 95th (m)		16		x	x	x	4					
	Storage (m)				x	x	x	60					
Fischer-Hallman Road/Columbia Street West (Signalized) Cycle: 120 s **Intersection LOS: D**	LOS	D	D	x	E	C	A	**E**	D	A	C	D	C
	Delay (s)	50	38	x	57	35	5	**62**	37	0	30	48	25
	v/c	0.75	0.54	x	**0.97**	0.83	0.40	0.84	0.41	0.18	0.42	0.79	0.66
	Queue 95th (m)	#45	74	x	#154	170	21	#63	58	0	36	112	69
	Storage (m)	80		x	140		0	85		85	70		50

5.3.3.1. Bearinger Road & Westmount Road

To maintain an acceptable level of service, the following geometric improvements are recommended at this intersection:

- Provide a dual eastbound left-turn lane on Bearinger Road;
- Provide a shared lane for eastbound through and eastbound right movements along Bearinger Road; and

- Extend storage lengths along the southbound left-turn and southbound right-turn lanes on Westmount Rd from 70 m to 95 m and from 70 m to 125 m respectively.

With these improvements, the intersection was optimized to run on a cycle length of 140 seconds (in the AM peak hour) and 110 seconds (in the PM peak hour) to achieve acceptable levels of service.

There's a culvert located approximately 80 meters north of the Bearinger Road & Westmount Road intersection. It is not anticipated that the recommended extension of the southbound left-turn and right-turn lanes along Westmount Road would require the widening of this culvert given there's sufficient right-of-way to accomplish this. Nonetheless, this impact should be reviewed during the detailed design stage of the Fischer-Hallman Rd/Bearinger Road EA.

5.3.3.2. Fischer-Hallman Road/Bearinger Road & Laurelwood Drive

To maintain an acceptable level of service, the following geometric improvement is recommended at this intersection:

- Provide a dedicated eastbound right-turn lane on Laurelwood Drive with a 15 to 20 m storage

With this improvement, the intersection was optimized to run on a cycle length of 110 seconds for both AM & PM peak hours to achieve acceptable levels of service.

Although results of the traffic operation analysis identified long queues along the westbound left-turn movement during the PM peak hour, no recommendations for geometric improvements were suggested as this was deemed to be non-critical. Besides, it was assumed that drivers could use other alternative routes (e.g. exit via Laurelwood Dr & Westmount Rd) to get to their destinations should long queues become evident along this movement during peak periods.

5.3.3.3. Fischer-Hallman Road & Gatestone Boulevard

This is the only 'unsignalized' intersection along this corridor. The result of the traffic operation and capacity analysis revealed that the eastbound movement will operate with poor levels of service (LOS E) during the PM peak hours due to delay experienced by motorists waiting to get onto Fischer-Hallman Road.

To address the issues of delays at this intersection, a signal warrant analysis was performed according to *Justification 7* from the Ontario Traffic Manual Book 12. Results from the analysis concluded that traffic signals will not be warranted at Fischer-Hallman and Gatestone Boulevard based on projected volumes to the year 2031. A report of the traffic control signal warrant analysis is presented in Appendix G – Intersection Screening Assessment.

5.3.3.4. Fischer-Hallman Road & Columbia Street West

To maintain an acceptable level of service, the following geometric improvement is recommended at this intersection:

- Provide a dedicated westbound right-turn lane with 30 m storage on Columbia Street West

With this improvement, the intersection was optimized to run on a cycle length of 120 seconds for both AM & PM peak hours to achieve acceptable levels of service.

The output from the traffic operations and capacity analysis at Fischer-Hallman Road & Columbia Street West identified the need to extend the southbound left-turn (SBL) lane from 70 m to 90 m and extend the southbound right-turn (SBR) lane from 50 m to 65 m in order to accommodate the 95th percentile queue from traffic during the AM peak hour and PM peak hour respectively. However, extending the storage lengths of these movements will overlap with existing driveways to/from the shopping plaza located at the northwest corner of the intersection. Given the volume-to-capacity ratios for these movements are < 1.0 and the extra storage demands are required only during particular peak hours, the need for additional storage is not justified. These movements will continue to operate under acceptable 'Levels-of-Service' based on the "Interim" traffic volumes anticipated to the year 2031.

Target LOS Comparison

A comparison between the targeted LOS versus the PM peak hour LOS for this alternative is presented Table 5.3-8.

Table 5.3-8:Targeted LOS vs. LOS from 'UofW' Interim Development' with Roadway Improvements (2031 PM Peak Hour)

INTERSECTION	Scenario	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Bearinger Road & Westmount Road	Targeted LOS	C	C		D	E		E	C		C	D	
	Calc. LOS	D	B		B	C		C	D		C	C	
Fischer-Hallman Rd/Bearinger Rd & Laurelwood Dr	Targeted LOS	C	C	C	D	E	C	D	C		D	D	
	Calc. LOS	D	D	A	C	D	A	D	B		C	D	
Fischer-Hallman Rd/Gatestone Blvd	Targeted LOS	C			-	-	-	E	Free Flow		Free Flow		
	Calc. LOS	E			-	-	-	B	Free Flow		Free Flow		
Fischer-Hallman Rd/Columbia St W	Targeted LOS	C	C		E	E	E	C	C	C	C	E	E
	Calc. LOS	D	D		E	C	A	E	D	A	C	D	C

This scenario was the preferred option from a traffic operation standpoint because:

- It provided sufficient capacity to accommodate future travel demand that will be generated around the area as a result of growth;
- It aligned with the long-term planning objective to widen the roadway as established in the 2018 TMP; and
- It provided acceptable LOS during PM peak hour (the busiest period of the day) that are within the targeted LOS for each turning movement at all intersection along the corridor. Only nine of the calculated PM peak hour LOS at the various turning movements were above the established targeted LOS under this scenario, translating to a compliance rate of 71%.

This was recommended as the preferred alternative for this section of the roadway.

5.4. Summary – Overall Land-use Scenario Evaluation

Three (3) evaluation criteria were used to assess the transportation needs along the corridor based on the various land-use scenarios planned for the area are described in Table 5.4-1 below.

Table 5.4-1:Evaluation Criteria

#	Criteria	Criteria Measure
1	Planning Objective	Do the transportation improvements under consideration meet the goals and objectives established in the 2018 TMP and other established development plans?
2	Traffic Analysis	Do the transportation improvements under consideration address future traffic deficiencies anticipated along the roadway? How well does the PM Peak Hour LOS comply with the 'Targeted LOS'?
3	Transit / Active Transportation Operations	Do the transportation improvements under consideration provide an opportunity to integrate more transit services and active transportation facilities along the roadway?

The result of the overall evaluation is summarized in Table 5.4-2. Each land-use scenario was ranked against each criterion based on a scoring system ranging between 0 (least preferred) and 2 (most preferred).

Table 5.4-2:Summary of Overall Alternative Evaluation

CRITERIA	Land Use Scenarios		
	A (‘Ultimate Development’ without Improvements)	**B** (‘Interim Development’ without Roadway Widening)	**C** (‘Interim Development’ with Roadway Widening)
Planning Objective	• Does not align with the long term planning objective established in the 2018 TMP for the road.	• Does not align with the long term planning objective established in the 2018 TMP for the road.	• Aligns with the long term planning objective established in the 2018 TMP for the road.
	0	0	2
Transit Operations	• No improvements to accommodate transit.	• Although capacity improvements at the intersections may improve flow, mid-block queues from future volumes may impede on smooth transit operations	• Provides potential to improve transit operations along roadway to neighbourhoods within the Study Area
	0	1:	2
Traffic Operations	• Does not address the future traffic deficiencies that will be experienced along the roadway as a result of growth and other developments • Future traffic congestion and gridlock would be inevitable • 51% PM Peak Hour LOS to ‘Targeted LOS’ compliance rate	• Does not address the future traffic deficiencies that will be experienced along the roadway as a result of growth • Future traffic congestion and gridlock would be inevitable • 63% PM Peak Hour LOS to ‘Targeted LOS’ compliance rate	• Improved traffic operations at intersections and along midblock segments compared to any other alternative • 71% PM Peak Hour LOS to ‘Targeted LOS’ compliance rate
	0	0	2
OVERALL	0	0	2

A summary of the overall scenario screening process is presented in Table 5.4-3. A widened roadway with intersection improvements will provide infrastructure needed to meet the roadway’s future transportation needs and also provide an opportunity to address issues identified in the problem statement.

Table 5.4-3:Overall Land Use Scenario Screening – Summary

Scenario	Evaluation
A 'Ultimate Development' without Improvements (Not Recommended)	This was not a viable alternative. It does not provide sufficient capacity to address the anticipated deficiencies should the 'UofW' northwest subdivision be developed at full capacity. Besides, implementing the suggested improvements outlined in section 4.4 to address the capacity deficiencies will pose significant impacts to the environment with significant cost especially given the uncertainty surrounding the development of UofW's northwest campus subdivision.
B 'Interim Development' without Roadway Widening (Not Recommended)	This was not a viable alternative. It does not provide sufficient capacity to accommodate future traffic from background growth plus traffic from the partial development of the 'UofW' northwest campus subdivision. It does not align with the long-term planning objective to widen the roadway as established in the 2018 TMP.
C 'Interim Development' with Roadway Widening **(Recommended)**	This alternative recommends widening the roadway with intersection improvements and it has the most positive overall effect. Although it would require the most time for detailed planning, design and implementation, this scenario will address issues identified in the problem statement by providing infrastructure improvements to meet the roadway's future transportation needs.

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6. Conclusions

The Fischer-Hallman Road/Bearinger Road corridor from Columbia Street West to Westmount Road North was identified in the 2018 TMP for a schedule 'C' widening by 2031, with construction scheduled to begin by 2021 according to the 2019 Transportation Capital Program (TCP).

Historic traffic counts collected between 2006 and 2016 revealed traffic has been growing along the roadway corridor at an average rate of 1.2% per year. Nonetheless, the corridor continued operating at acceptable level of service based on a traffic operations and capacity analysis completed using 2016 base year traffic volumes. Anticipated growth in population and employment will lead to an increase in settlement within the Study Area by 2031 as evident with ongoing development of the University of Waterloo's (UofW's) northwest campus subdivision. This alongside background growth will inevitably increase travel demand along the corridor, triggering the need for roadway for improvements.

Because of uncertainties surrounding the timeline to fully develop UofW's northwest campus subdivision, the Region's transportation planning model was calibrated and used to develop traffic forecasts based on:

- Background traffic growth plus 'Full' development of the UofW northwest campus subdivision ("Ultimate" forecast); and
- Background traffic growth plus 'Partial' development of the UofW northwest campus subdivision ("Interim" forecast)

The outcome of traffic operation and capacity analysis of the "Interim" traffic forecast for the 2031 horizon year recommended for the corridor to be widened with provisions for intersection improvements. Although this would require time for detailed planning, design and implementation, widening the roadway will provide infrastructure needed to meet the roadway's future transportation needs and also provide an opportunity to address issues identified in the problem statement.

Aside from growth in traffic, deficiencies in Active Transportation facilities for cycling and walking were also established. The 2018 TMP recommended for a "protected" cycling infrastructure to be considered along the corridor. As part of the EA, considerations for Active Transportation facilities along the corridor should include one of the following alternatives:

- A 1.7 m wide on-road separated cycle track and a 1.8 m sidewalk on both sides of the road; or

- A 3.0 m to 4.0 m wide multi-use trail (MUT) on one side of the road and a 1.8 m sidewalk on the other side of the road.

With regards to transit, GRT will continue to operate transit service along Fischer-Hallman Road between Laurelwood Drive and Columbia Street West and has no plans in the near future to operate transit service along Bearinger Road between Laurelwood Drive and Westmount Road at this time. The need for transit services for the rest of the corridor will be reviewed as part of future transit business cases.

A review of historic collision data did not identify any unusual collision patterns along the Fischer-Hallman Road/Bearinger Road corridor. One fatal collision occurred on Monday November 24, 2014 when a pedestrian was struck while attempting to cross Fischer-Hallman Road just south of Gatestone Boulevard. A pedestrian refuge island was installed on the north leg of the intersection of Fischer-Hallman Road & Gatestone Boulevard in February 2015 to mitigate this problem. A raised center median may be implemented along the corridor should there be sufficient right-of-way allowance. Although not warranted as a collision countermeasure, the center median could help improve traffic flow and provide room to accommodate elements of the roadway such as drainage, utilities, pedestrian refuge islands, landscaping, and more.

Intersection Control Studies (ICS) were carried out at all the signalized intersections along the roadway. Upon completion, all the intersections below within the roadway segment were recommended to be maintained as signalized intersections:

- Bearinger Road & Westmount Road North;
- Fischer-Hallman Road/Bearinger Road & Laurelwood Drive; and
- Fischer-Hallman Road & Columbia Street West

A signal warrant analysis was performed at Fischer-Hallman and Gatestone Boulevard according to *Justification 7* from the Ontario Traffic Manual Book 12. The results from the analysis did not warrant traffic signals at this intersection based on projected volumes to the year 2031.

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7. Recommendations

Recommendations to widen the Fischer-Hallman Road/Bearinger Road corridor between Columbia Street West & Westmount Road are based an “Interim” traffic forecast for the 2031 horizon year developed assuming a partial development of the University of Waterloo’s (UofW’s) northwest campus subdivision. This will provide infrastructure improvements required to address issues associated with the roadway’s future transportation needs as identified in the problem statement.

Recommendations for Active Transportation Improvements

As part of the EA, considerations for Active Transportation facilities along the corridor should include one of the following alternatives:

- A 1.7 m wide on-road separated cycle track and a 1.8 m sidewalk on both sides of the road; or
- A 3.0 m to 4.0 m wide multi-use trail (MUT) on one side of the road and a 1.8 m sidewalk on the other side of the road

Specific Recommendations at Intersections along Roadway

The Bearinger Road & Westmount Road North intersection should be modified to accommodate the following geometric improvements:

- Provide a dual eastbound left-turn lane on Bearinger Road;
- Provide a shared lane for eastbound through and eastbound right movements along Bearinger Road; and
- Extend storage lengths along the southbound left-turn and southbound right-turn lanes on Westmount Rd from 70 m to 95 m and from 70 m to 125 m respectively.

The Fischer-Hallman Road/Bearinger Road & Laurelwood Drive intersection should be modified to accommodate the following geometric improvement:

- Provide a dedicated eastbound right-turn lane on Laurelwood Drive with a 15 to 20 m storage.

The Fischer-Hallman Road & Columbia Street West intersection should be modified to accommodate the following geometric improvement:

- Provide a dedicated westbound right-turn lane with 30 m storage on Columbia Street West.

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The University of Waterloo Northwest Campus Development Design Guidelines has identified the need for two new connections to the Fischer-Hallman Road/Bearinger Road corridor following the full development of the University of Waterloo Northwest Campus in the future. These accesses should be designed to accommodate Right-In-Right-Out (RIRO) movements.

A centre median may be implemented along the Fischer-Hallman Rd/Bearinger Rd corridor between Columbia Street W and Westmount Road to maintain consistency in the roadway cross-section should the right-of-way allowance permit.

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Appendix A – Regional and Area Municipal Policies

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Appendix B –Turning Movement Volumes & AADT

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Appendix C – Synchro Results

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Appendix D – Five-year Collision Summary Report

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Appendix E – Study Area Population and Employment Forecast

Exhibit 1: Study Area Population and Employment Forecast

TAZ ID	Population		Employment	
	2011	2031	2011	2031
1	215	512	4	1,675
10	0	0	545	654
11	2,009	2,126	59	63
13	1,780	1,879	85	101
14	1,447	1,520	36	45
140	1,437	1,884	0	0
141	10	315	7	231
142	1,417	1,387	161	172
160	1,793	1,866	44	49
163	0	620	0	117
164	173	1,030	1	152
165	28	61	0	0
303	0	0	0	1,516
415	407	425	273	322
416	6	3	76	89
418	0	0	231	253
579	1,285	3,118	13	10
580	1,418	1,313	74	76
581	216	229	0	0
582	147	150	0	0
583	390	516	6	6
1011	1,915	1,932	38	317
1015	25	27	0	0
1016	2,642	3,086	182	188
1017	73	272	5	38
1018	1,239	1,302	231	314
1019	6	3,857	39	19
1020	1,157	1,176	0	0
1075	169	800	57	67
1077	1,243	1,240	308	590
1078	713	965	0	0
1289	237	165	35	39
1326	0	0	7	8
1327	8	8	4	4
1365	966	1,475	96	99
1366	868	726	0	0

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Appendix F – Transit Passenger Activity

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Appendix G – Intersection Screening Assessment

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APPENDIX B

Environmental Impact Study

LGL LIMITED
environmental research associates

Municipal Class Environmental Assessment Schedule C

Fischer Hallman/Bearinger Road Widening

Natural Heritage Report - Existing Conditions & Impact Assessment

for:

WaterFedy

by:

LGL Limited
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Draft

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1.0 Introduction

The Regional Municipality of Waterloo (Region of Waterloo) is undertaking a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for road improvements to Regional Road 58- Fischer Hallman Road North, which transitions into Bearinger Road, in the City of Waterloo. The study limits extend between Columbia Street West to Westmount Road North; a distance of 2.13 kilometres (Figure 1). The Region of Waterloo has retained WalterFedy to undertake the preliminary and detailed design study as well as construction administration components. LGL Limited (LGL) is providing natural science services on behalf of WalterFedy. The need for these road improvements was identified in the Region of Waterloo's Transportation Master Plan (2011). This project will also include the installation from the 300 mm diameter regional watermain from Laurelwood Drive to Westmount Road.

Land uses the vicinity of the study area, include residential, employment-academic, commercial and natural areas. The study area is generally described as 50m north and south of the road ROW (or east and west, south of Laurelwood Drive). Natural heritage investigations and background reviews were conducted further beyond this area, in order to accurately define indirect impacts and constraints. While these areas are not expected to be impacted by the proposed improvements, the study team collected information on these areas to address indirect impacts. The study area is located within the Grand River Conservation Authority (GRCA) jurisdiction and within the Laurel Creek Watershed. The Laurel Creek Reservoir and Conservation Area (GRCA owned property) is located adjacent to the Fischer Hallman Road/ Bearinger Road north of Laurelwood Drive and west of Westmount Road.

1.1 Background Data

Primary and secondary source information reviews were undertaken to outline the land use planning applicable to the study area and to identify natural environment constraints. Background review helped to identify the constraints present within the study area. Field surveys were completed to further define these constraints. A list of resources reviewed are outlined below:

- Aerial photography, Google Earth and Google Maps, Accessed in August 2017.
- City of Waterloo. 2012. Official Plan. Office Consolidation August 2012.
- City of Waterloo. 2011. Transportation Master Plan.
- City of Waterloo. 2008. University of Waterloo Northwest Campus Environmental Impact Study Report.
- Grand River Conservation Authority. Grand River Information Network (GRIN) Web-GIS Application.

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- Grand River Conservation Authority (GRCA). Personal Communication with Kaitlyn Smith, Resource Planner.
- Land Information Ontario. 2019. AgMaps. Ontario Agricultural Information Atlas.
- MNRF Guelph District. Project Screening Letter, dated September 27, 2017.
- MNRF Guelph District. Personal Communication with Graham Buck, Management Biologist on May 7th, 2018.
- Region of Waterloo. 2013. Context Sensitive Regional Transportation Corridor Design Guidelines.
- Region of Waterloo. 2009. Official Plan. Office Consolidation June 2015.
- Region of Waterloo. 2011. Transportation Master Plan- Moving Forward 2031.
- Stantec Consulting Ltd. 2008. University of Waterloo Northwest Campus Environmental Impact Study. Prepared for University of Waterloo.
- The University of Waterloo. 2012. Northwest Campus Development Design Guidelines.

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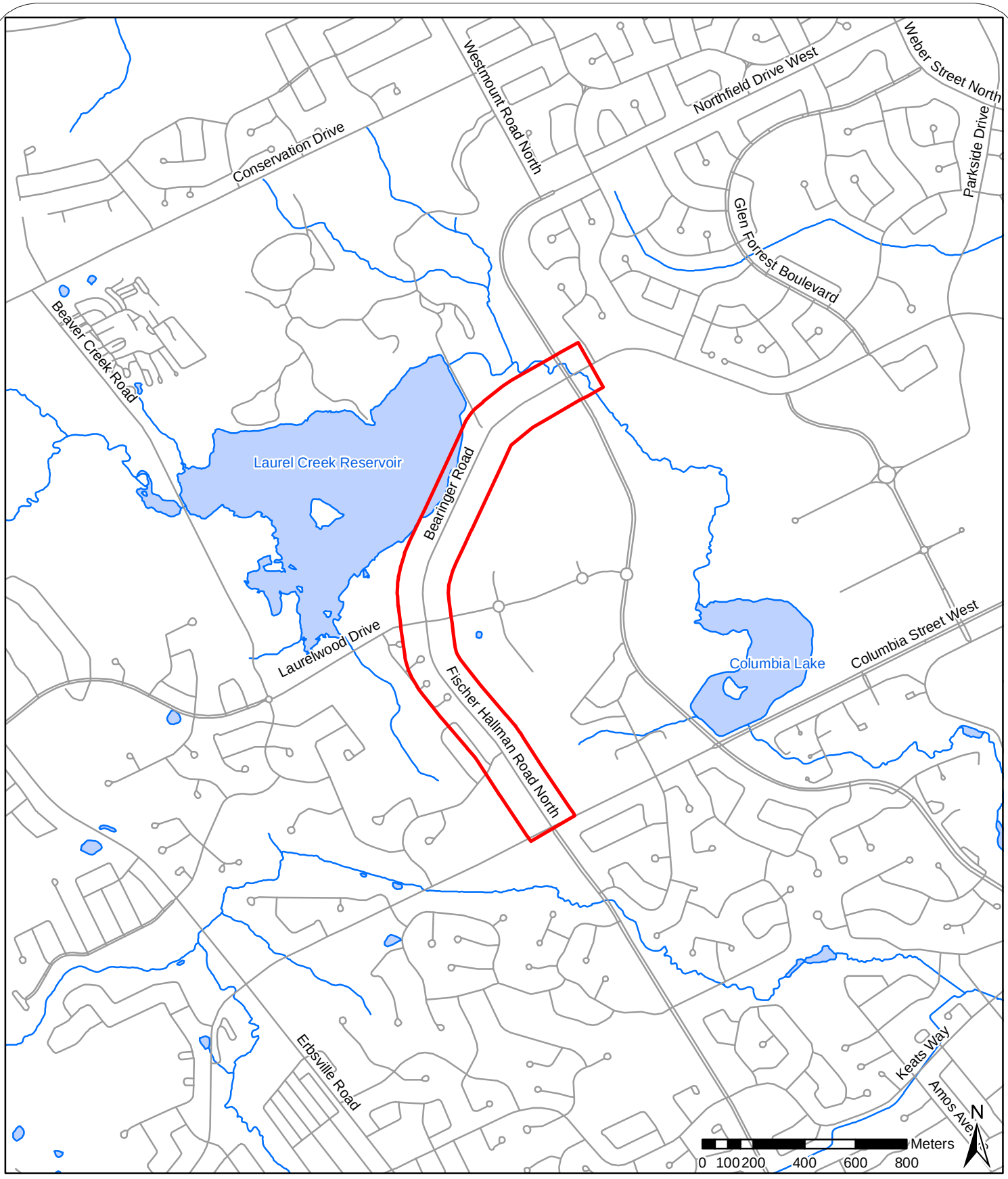

Fischer Hallman Road Widening

Key Map

Approximate Location of Study Area

LGL LIMITED
environmental research associates

Project	TA8735	Figure	1
Date	September 2019	Prepared By	KC
Scale	1:20,000	Verified By	EEB

2.0 Policy, Legislation and Planning Review

This chapter presents the context for land use and transportation planning applicable to Fischer Hallman/ Bearinger Road. The provincial and municipal (regional and local) policies that apply to the study area are described in the sections below.

2.1 Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) 2014 is issued under Section 3 of the *Planning Act* and provides policy direction on matters of provincial interest related to land use planning and development. The PPS 2014 seeks the development of land use patterns that promote a mix of housing, employment, parks and open spaces, and transportation choices that facilitate pedestrian mobility and other modes of travel as well as connectivity among transportation modes. Land use patterns, density, and mix of uses should minimize the distance and number of vehicle trips and support choices for public transit and other alternative transportation modes.

PPS requires that planning for transportation and infrastructure corridors considers significant resources such as natural heritage, agriculture, and cultural heritage resources. Section 2.1 of the PPS- Natural Heritage identifies natural heritage resources that are to be protected. Section 2.1.5 identifies that development and site alteration shall not be permitted within areas identified for protection, unless it has been demonstrated that there will be no negative impacts on the natural heritage features or their functions. The natural heritage reference manual (OMNR 2010) and the Significant wildlife Habitat Technical Guide (OMNR 2000, MNRF 2015) were prepared to provide guidance on identifying 'significant' natural features and interpreting the Natural Heritage section of the PPS. The identification of natural heritage and candidate significant wildlife habitat have been identified in this study as outlined further in the Existing Conditions section.

2.2 Migratory Birds Convention Act, 1994

Environment and Climate Change Canada is responsible for implementing the *Migratory Birds Convention Act*, 1994, (MBCA). The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round, migratory game birds are only protected from March 10 to September 1. The MBCA provides for the protection of migratory birds through the Migratory Birds Regulations and the Migratory Birds Sanctuary Regulations. The protection of Migratory Birds is addressed in the Mitigation section of this report.

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2.3 The Endangered Species Act, 2007

As part of the Ontario Endangered Species Act 2007 (ESA 2007), the Committee on the Status of Species at Risk in Ontario (COSSARO) was established to evaluate whether a plant or animal should be designated as at risk, and if determined to be at risk, the species status under the Act. Plants and animals that are added to the Species at Risk in Ontario List as Endangered, Threatened or Extirpated are automatically protected from being harmed or harassed. Special Concern species – those that are sensitive to human activities but not Threatened, Endangered or Extirpated – are not included in this protection but their status is occasionally reviewed to determine if any significant changes to a species population have occurred. Protection under the ESA (2007) restricts contact/impact to any species listed as Threatened or Endangered, or Extirpated. As of April 1, 2019, the Ministry of the Environment, Conservation and Parks (MECP) will be administering the Endangered Species Act, 2007 (ESA) in Ontario (previously administered by the Ministry of Natural Resources and Forestry). A Species at Risk (SAR) screening of all species listed as Threatened, Endangered or Special Concern known or having the potential to exist within the study area was completed as part of the background and field review (Appendix D).

2.4 GRCA Ontario Regulation 150/06

Ontario Regulation 150/06 of the *Conservation Authorities Act* (Grand River Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) attempts to ensure public safety, protect property with respect to natural hazards (including erosion and flooding), and safeguard watershed health by preventing pollution and destruction of sensitive environmental areas such as wetlands, shorelines, watercourses, and valleylands. This regulation provides the Grand River Conservation Authority (GRCA) with the authority to regulate interference and development within the regulated area in accordance with the *Crown Agency Act*, R.S.O. 1990, C.48, s.1, and the *Conservation Authorities Act*, R.S.O. 1990, C.27.

The study area lies within the jurisdiction of GRCA. GRCA's interactive mapping application and layers were consulted for this study. This mapping includes the regulation limits as well as other natural heritage information including watercourses, wetlands and GRCA properties, all of which have been mapped (see Figure 2). Laurel Creek Reservoir, Laurel Creek and an additional tributary of Laurel Creek (near Columbia Street) are regulated. Any work carried out within the Regulated area must be accordance with the requirements of GRCA by obtaining a permit. Consultation with the GRCA has occurred regarding reviewing background natural heritage review. It is anticipated that further consultation will occur moving into the detailed design phase, when permits will be acquired.

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2.5 Regional Municipality of Waterloo Official Plan, 2015

The Regional Official Plan (ROP)– Office Consolidation (January 2015) establishes the visions and means of accommodating growth by limiting outward growth, restricting higher density developments, maintaining effective transportation systems, protecting agricultural and environmental lands.

The Urban Area Map 3a identified in the Regional Official Plan shows the study area mostly within the 'Built-Up Area'. The lands located on the north-east side of Bearinger Road and Laurelwood Drive intersection, are designated as 'Urban Designated Greenfield Area'. Schedule 5a Regional Transit Network, shows Fischer Hallman/Bearinger Road within the 'Planned Transit Corridor' designation.

The Greenlands Network (Map 4) depicts the Laurel Creek Reservoir property as portions of the Laurel Creek floodplain as 'Core Environmental Features'. Policy 7.C.12 states that where the construction of a road on a new right-of-way, widening, or upgrade of an existing roadway is proposed within or on contiguous lands of a Core Environmental Feature, the submission of an Environmental Impact Statement or an appropriate study is required to ensure that appropriate mitigation measures are implemented and approved. The natural heritage system is discussed further in the Greenlands Network section (under Designated Features).

2.6 Regional Transportation Master Plan- Moving Forward 2031, 2011

In 2010, Regional Council approved the Regional Transportation Master Plan (RTMP). The RTMP is about moving goods, people, and shaping communities into a more compact form. One of the main goals of the plan was to create road improvements that not only facilitate the movement of goods and transit but alleviate and manage traffic congestion within the region.

The Region has identified the study area for significant transit improvements to 2031. Within the RTMP a road network plan was developed under four initiatives for road improvements to support transit, movement of goods, new and existing regional roads, and provincial highways. Under Exhibit 7-19 Road Improvements Priorities Map 10-20 Years**,** the study area is identified for **'**Road Widening' needs for the purposes of corridor protection.

High-level recommendations are made on lands near the study area in the RTMP. Due to the location of the Research and Technology Park (University of Waterloo), on Westmount Road, Columbia Street, and Fischer Hallman Road, increased traffic growth is expected that would require potential improvements to transit. Exhibit 9-4 Mature State Transportation Infrastructure Needs for Research and Technology Park Area identifies an opportunity for road widening and improvements to Westmount Road southwards. The RTMP also identifies the lands in the section of Westmount Road North and Fisher Hallman Road North to accommodate additional development. Exhibit

9-6 Mature State Improvements shows that an extension of Laurelwood Drive could undergo transit improvements.

2.7 City of Waterloo Official Plan, 2012

The City of Waterloo Official Plan – Office Consolidation (August 2012) designates the lands east of Fischer Hallman and south of Bearinger Road as 'Major Institutional' and 'Employment' under Schedule A Land Use Plan. Similarly, both Schedule 'A2' Employment Areas and Schedule 'B3' Designated Greenfield Areas designate the lands as 'Academic'. These agricultural fields are owned by the University of Waterloo and will be developed in the future as part of their Northwest Campus. Future development within the area is planned to be a mixture and concentration of post-secondary educational institutional uses. Permitted uses include a mix of institution, open space, and natural systems.

Schedule A Land Use Plan shows the lands west of Fischer Hallman designated as 'Low Density Residential' and 'Open Space.' The Official Plan aims to conserve low-density neighbourhoods outside of designated Nodes and Corridors.

Under Schedule 'A4' the Natural System is mapped, outlining Core Natural Features, supporting Natural Features and other Open Space Systems. The City of Waterloo OP states that in general, development and/or site alteration is not permitted within 'Core Natural Features' and must avoid environmental impacts on 'Supporting Natural Features.' In both instances, development and/or site alteration is permitted on lands adjacent to 'Core Natural Features' and 'Supporting Natural Features' if an Environmental Impact Statement demonstrates that buffers will protect the ecological integrity of 'Core Natural Features' and 'Supporting Natural Features'. (Policy 8.2.4 (6) and 8.2.5 (6)).

Additionally, Policy 8.2.5 (14) states that when the construction or upgrading of an existing roadway is proposed within or adjacent to 'Supporting Natural Features,' the Environmental Impact Statement will need to be approved by the City of Waterloo and other public agencies to ensure alternatives are evaluated and road improvements that reduce traffic are considered. The natural heritage system is discussed further in the Greenlands Network section (under Designated Features).

2.8 City of Waterloo Transportation Master Plan, 2011

The City of Waterloo Transportation Master Plan (TMP) was approved by City Council in 2011. Waterloo's TMP addresses all modes of transportation within the City. The policies under Waterloo's TMP closely align with the City's Strategic Plan, the City of Waterloo's Official Plan, and the Regional Transportation Master Plan- Moving Forward 2031. The purpose of Waterloo's TMP is to provide a strategy for the next 20 years that integrates the transportation system within the existing and planned infrastructure and

manages growth within the City. The City of Waterloo's TMP was prepared in conformance with the Class Environmental Assessment master planning process.

Fischer Hallman Road is recommended for road network capacity enhancement under Exhibit 10.1. Under Exhibit 10-2. Fischer Hallman From Columbia Street West to Westmount Road is identified within Road Improvements Priority Listing 10-20 Years for road widening.

One of the actions within the TMP was for the City of Waterloo to support the Region in the approval of the Municipal Class Environmental Assessments and construction improvements to Fischer-Hallman Road from Columbia Street to Westmount Road.

2.9 The University of Waterloo, Northwest Campus Development Design Guidelines (2012) and the Environmental Impact Study (2008)

The University of Waterloo Northwest Campus Development Design Guidelines provides specific policies on the future development within the Northwest Campus. The plan establishes a high-level structure of the campus by detailing main streets, development blocks, and public spaces. The direction offered within the guidelines will be further evaluated during the Site Plan Approval Process.

The campus area is bounded by Columbia Street West to the south, Fischer Hallman Road to the west, Bearinger Road to the north, and Westmount Road to the east. David Johnston Research and Technology Park is located east of the campus. In relation to the study area, the lands discussed in the Northwest Campus Development Design Guidelines are located on the north-east intersection of Fischer Hallman Road/ Bearinger Road and Laurelwood Drive.

Seven design principles set the foundation of the development for the design guidelines. Particularly, one principle encourages various modes of movement within the Northwest Campus. The street extending from Laurelwood Drive to Fischer Hallman Road intersection is known to function as the main street of the campus, effectively moving people throughout the campus. A potential layout option for the future buildings and connecting roads, on of which will connect with Bearinger Road, in between Laurelwood Drive and Westmount Road, as outlined in the Figure 3 series of this report. Information contained in the Environmental Impact Study was consulted as part of the background natural heritage review for this study.

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3.0 Existing Conditions

The following discussion outlines the existing environmental conditions within the study area and identifies natural heritage areas and/or features of environmental sensitivity and/or significance.

3.1 Physiography and Soils

The study area is located within the Waterloo Hills physiographic region. The region is made up of sandy hills, ridges of sandy till, and other kames with outwash and sand occupying the intervening hollows (Chapman and Putnam 1984). An important feature of Waterloo Hills is its presence of fine sand. Chapman and Putnam (1984) state that the soils of this region are well drained and have developed as mature Grey-Brown Earths.

The study area is entirely comprised of Brant-Waterloo, Burford-Fox, and Grand-Kirkland soils. Brant-Waterloo soils span Fischer Hallman Road North/ Bearinger Road from the northern limits of Columbia Street West to the west side of Westmount Road North. Immediately south of Laurelwood Drive, the study area crosses Burford- Fox soils. On the west side of the Bearinger Road and Westmount Road North intersection, the study area crosses through Grand- Kirkland soils. It should be noted that much of the study area has undergone development; therefore, the soil regime has likely been modified.

The Brant soils developed on well-drained lacustrine sediments of mainly loam and silt loam textures (E.W. Presant & R.E. Wicklund, 1971). The soils have high erodibility and are susceptible to frost. Waterloo soils consist of well-drained soils developed on deposits of fine sandy loams (E.W. Presant & R.E. Wicklund, 1971). The soils have low moisture-holding capabilities and are highly susceptible to frost.

Burford and Fox soils are coarse and medium textured soils that are well-drained, having low moisture-holding capacity and low fertility. The Grand and Kirkland soils occur on well-drained alluvial sediments with loam and silt loam textures (Grand) or alluvial sands (Kirkland) (E.W. Presant & R.E. Wicklund, 1971). The majority of these soils occur on the flood plains of rivers or major streams. Kirkland soils often contain small inclusions of other alluvial soils, mostly with sand or gravel parent materials and have low moisture-holding capacity and are susceptible to flooding.

3.2 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources and Forestry (MNRF), GRCA, The Regional Municipality of Waterloo and the City of Waterloo. A review of the MNRF Natural Heritage Information Centre (NHIC 2019) indicates that there are Provincially Significant Wetlands identified within 120 metres of the study area. GRCA indicate that both unevaluated and evaluated wetlands are present within the study area. Areas of Natural and Scientific

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Interest (ANSIs). Regionally designated Environmentally Significant Policy Areas (ESPA)/Sensitive Areas (ESAs) were not identified within the study area.

3.2.1 Provincial Significant Wetlands

The Natural Heritage Information Centre (NHIC) and Land Information Ontario (LIO) identify Sunfish Lake Laurel Creek Wetland Complex, a provincially significant wetland (PSW), on the north side of the Bearinger Road, west of Westmount Road. The wetland complex lies both inside and outside of the Laurel Creek Conservation Area and is 181 hectares in area. The wetland complex contains a variety of plant species and the wetland complex is comprised of 82% swamp, and 18% marsh. Ecological functions include colonial waterbird nesting, good winter cover for wintering songbirds and owls, fish spawning and rearing for Brook Trout (NHIC summary report, accessed on August 29, 2019).

3.2.2 Unevaluated and Evaluated Wetlands

Both unevaluated and evaluated wetlands were identified within the study area. Unevaluated wetlands (MNRF) were identified at the north-east corner of Fischer Hallman Road North and Columbia Street. These wetlands overlap with wetlands identified by the GRCA. An unnamed tributary of Laurel Creek appears to originate within this wetland as identified on the GRCA watercourse layer.

Evaluated (MNRF) wetlands were identified north of the study area near Sunfish Lake Laurel Creek Wetland Complex on the north-west corner of the Westmount Road North and Bearinger Road intersection.

3.2.3 Area of Natural and Scientific Interest

No Areas of Natural and Scientific Interest (ANSI) are present in the vicinity of the study area.

3.2.4 LIO Wooded Areas

Land information Ontario (LIO) mapping shows the presence of woodlands within a portion of the areas designated ‘Core Natural Features’ and ‘Supporting Natural Features,’ as outlined in the Greenlands Network (Section 2.5.7). Specifically, forested areas around the Laurel Creek Reservoir, along Laurel Creek (further downstream of Bearinger Road) a wooded slope located immediately north of the unevaluated wetland complex located north of Columbia Street West and south of Laurelwood Drive, further northwest of Fischer Hallman Road. This layer is mapped on Figure 2- Natural Heritage Resources.

3.2.5 Environmental Sensitive Landscapes

There is one Environmentally Sensitive Landscape (ESL) present near the study area. The Laurel Creek Headwaters is located further northwest and encompasses several

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core environmental features including some of the following: larger woodlands, PSWs and Significant valley features. There are no ESLs crossing or adjacent to the Fischer Hallman/Bearinger Road corridor (Region of Waterloo 2009).

3.2.6 Greenlands Network

Under Map 4 Greenlands Network, of The Region of Waterloo Official Plan (2015), the study area is depicted within lands designated as 'Core Environmental Features' just north of Fischer-Hallman/ Bearinger Road.

The Greenlands Network includes environmental features and the linkages among them. Core Environmental features include Provincially Significant Wetlands, Environmentally Sensitive Policy Areas, Regional Forests, Forests greater than 4 hectares, and Significant Valley Features.

Within the City of Waterloo Official Plan (2012), Natural Systems within the study area are designated as 'Open Space' and 'Parks and Other Green Space'. The 'Parks and Other Green Space' land use designation is significant in contributing to the connectivity and comprehensive nature of the open space system. The land use designation includes municipal parkland, trails, and open spaces such as environmental reserves, natural features, and conservation areas.

Schedule A4 Natural Systems provides a more refined version of the Region of Waterloo landscape level Greenlands Network described further above. A digital layer of these designations could not be obtained, but can be described as encompassing the following:

- Lands North of Fischer Hallman Road North/Bearinger Road (Laurel Creek Reservoir), with the exception of the SWM pond at Laurelwood Drive. Includes a tributary south of Laurelwood Drive (Core Natural Feature).
- The Laurel Creek riparian corridor along the majority of the reach extending from the reservoir to Bearinger Road, and another reach further south of Bearinger Road to a hydro easement located between Bearinger Road and Columbia Lake (Core Natural Feature), and
- A small area located just north of Bearinger Road, west of Westmount Road and the remaining area of the Laurel Creek corridor and around Columbia Road, located south of Bearinger Road (Parks and Other Greenspace).

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LEGEND

- Option 5a Impact Footprint
- Regulation Limit (GRCA)
- Conservation Area (GRCA)
- GRCA Wetland
- Provincially Significant Wetland (LIO)
- 30m Buffer
- Unevaluated Wetland (LIO)
- MNR Wooded Area
- Creek
- Lake

Fischer Hallman Road Widening

Designated Natural Features

LGL LIMITED
environmental research associates

Project	TA8735-00	**Figure**	2
Date	September, 2019	**Prepared By:**	KC
Scale	1:6,000	**Verified By:**	EEB

3.3 Trail Network

A 1.1 kilometre trail runs parallel to the north side of Bearinger Road between Westmount Road and Laurelwood Drive. This trail is managed by the GRCA and consists of limestone base and is used regularly by walkers and cyclists. The trail lies within the Bearinger Road ROW, within the vicinity of Westmount Road, however the remainder is on the Laurel Creek Reservoir property. The Trans Canada Trail is also present, which is located along the eastern boundary of the study area. This trail is orientated in a north-south direction and lies east of Westmount Road (just west of Pineridge Road), initiating in the north portion of the city and extending to University of Waterloo, crossing Bearinger Road.

3.4 Field Investigations

3.4.1 Data Collection and Protocol

Field investigations of the study area and surroundings were undertaken by LGL in order to quantify the natural heritage features along the road corridor. Table 1 provides a summary of the various field investigations that were conducted by LGL biologists between 2017 and 2019.

Table 1 Field Investigations conducted for along the Fischer Hallman/Bearinger Road Widening EA Study Area.

Ecological Component	Sample Method / Protocol	Field Staff	Survey Dates
Reptiles and Amphibians	Amphibian Calling surveys/ Marsh Monitoring Program	EEB TRH TRH	April 24, 2018 May 16, 2018 July 18, 2018
Reptiles and Amphibians	Turtle nesting surveys/MNRF protocol for Blanding's Turtle (MNRF 2012)	EEB / TRH AHF TRH EEB	June 5, 2018 June 13, 2018 June 18, 2018 June 24, 2018
Wildlife and Wildlife Habitat	General, preliminary wildlife screening	Various staff	June 14, 2017 June 5, 2018 April 20, 2018 April 30, 2018 May 19, 2017 June 13, 2018
Wildlife and Wildlife Habitat	Wildlife road mortality surveys *(Survey also conducted during all turtle nesting surveys (focused along Bearinger Road section).*	EEB TRH EEB	October 27, 2017 May 2, 2018 May 19, 2018
Wildlife and Wildlife Habitat	Breeding bird surveys/ Ontario Breeding Bird Atlas Survey Guide (2001).	JKS	June 26, 2019 July 3, 2019

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Ecological Component	Sample Method / Protocol	Field Staff	Survey Dates
Botanical Inventory, Vegetation and vegetation communities	Pedestrian survey using a plotless method/ Ecological Land Classification for Southern Ontario (Lee et al. 1998)	VLG JCN	June 14, 2017 September 3, 2019
Botanical Inventory, Vegetation and vegetation communities	Vegetation survey and screening for flora species at risk	VLG	June 14, 2017
Botanical Inventory, Vegetation and vegetation communities	Tree inventory survey	LMC / TRH	April 9, 2018 May 2, 2018
Aquatic Habitat	Aquatic Habitat assessment (Spring/Summer)/MTO Protocol- Fish Guide (MTO 2009)	EEB	May 17, 2017 September 3, 2019

Observers: AHF- Allison Featherstone, B.Sc., Senior Planning Ecologist
LMC- Lisa Catcher, B.A., ISA Certified Arborist
EEB- Erin Blenkhorn, B.Sc., Aquatic Biologist/Ecologist
JCN- Jennifer Noel, M.Sc., Senior Botanist
TRH- Todd Hagedorn, B.Sc., Field Biologist (former LGL staff)
JKS- Julia Shonfield, Ph.D., Terrestrial Ecologist
VLG- Victoria Garofalo, B.Sc., Botanist (former LGL staff)

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3.4.2 Aquatic Habitats and Communities

The study area is located within the Laurel Creek subwatershed and within the Grand River watershed. The study area is located within the jurisdiction of the Grand River Conservation Authority (GRCA) and the Ministry of Natural Resources and Forestry (MNRF), Guelph District.

The main channel of Laurel Creek originates within swamp and marshes located in southeastern Wellesley Township. The creek flows through the online Laurel Creek reservoir, located directly north of the Fischer Hallman study area. The creek is controlled by the dam located on the eastern side of the reservoir, flows under Westmount Road and then under Bearinger Road, and in a southerly direction towards Columbia Lake located on the University of Waterloo campus. Laurel Creek flows southerly through Waterloo and outlets to the Grand River within the vicinity of the Village of Bridgeport. Laurel Creek supports a warmwater thermal regime as outlined in Land Information Ontario database (ARA 2019).

The Laurel Creek reservoir is located within the Laurel Creek Conservation Area. The reservoir's main purpose is for flood control, low flow augmentation and for pollution abatement (GRCA 2014). The reservoir is drawn down in the late fall and maintained at a minimum level of 339.2 metres until the danger of peak spring flooding has passed. Forty percent of the reservoir has depths ranging from 1.5 m to 3 m, while the remaining 60 percent averages around 1 m deep (GRCA 2004). The reservoir supports a resident warmwater fish community; however is considered under-producing given the water level fluctuations (GRCA 2004).

3.4.3 Fisheries

LGL conducted a secondary source review of fisheries, which included a review of the Land Information Ontario (LIO) database and the Laurel Creek Management Plan (GRCA 1994). A list of fish species obtained from these background sources is found below in Table 2. The species list included in the Laurel Creek Management Plan, although historical, is from fisheries sampling conduced at Bearinger Road. The ARA data is a species list encompassing the whole system.

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Table 2 List of Fish Species in Laurel Creek.

Common Name	Scientific Name	Thermal Regime/Tolerance*	ARA data	Laurel Creek Management Plan (1995 fish survey)
Bluntnose Minnow	*Pimephales notatus*	warmwater, intermediate	X	
Brassy Minnow	*Hybognathus hankinsoni*	coolwater, intermediate	X	
Brown Bullhead	*Ameiurus nebulosus*	warmwater, intermediate	X	X
Central Mudminnow	*Umbra limi*	coolwater, tolerant	X	
Common Carp	*Cyprinus carpio*	warmwater, tolerant	X	X
Common Shiner	*Luxilus cornutus*	coolwater, intermediate		X
Creek Chub	*Semotilus atromaculatus*	coolwater, intermediate	X	
Eastern Blacknose Dace	*Rhinichthys atratulus*	coolwater, intermediate	X	
Fathead Minnow	*Pimephales promelas*	warmwater, tolerant	X	X
Iowa Darter	*Etheostoma exile*	coolwater, intermediate	X	
Johnny Darter/Tesselated Darter	*Etheostoma sp.*	coolwater, intermediate (to turbidity, siltation)	X	
Rainbow Darter	*Etheostoma caeruluem*	coolwater, intolerant (pollution, siltation)		X
Stonecat	*Noturus flavus*	warmwater, tolerant	X	
White Sucker	*Catostomus commersonii*	coolwater, tolerant	X	X

*- Thermal regime and tolerance information obtained from the Ontario Freshwater Fisheries Database (Eakins 2019).

3.4.4 Aquatic Species at Risk

A species at risk screening through aquatic species at risk mapping (DFO 2019), the Natural Heritage Information Centre (NHIC) database (MNRF 2019) has determined that there are no aquatic (fish or mussel) species at risk documented as present within Laurel Creek and reservoir.

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3.4.5 Aquatic Field Investigations Summary

LGL conducted spring and summer investigations along Laurel Creek as well as drainage features present in the study area. An aquatic assessment was conducted along Laurel Creek within approximately 50 m upstream and 100 m downstream of Bearinger Road, using the Ontario Ministry of Transportation (MTO) protocol Fish Guide principles (MTO 2009). Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) aquatic vegetation, (j) ground water seepage areas, and (k) visual fish observations.

3.4.5.1 Laurel Creek

Laurel Creek crosses two roads; Westmount Road within approximately 85m north of the Bearinger Road and Bearinger Road within 45 m east of Westmount Road, just beyond the road widening limits. Given its proximity to the project limits, an aquatic investigation of this creek was completed. The majority of the detailed measurements were taken on September 3, 2019.

Within 50m upstream of the Westmount Road culvert, channel depths are fairly deep (pool habitat). Flow is directed through an open-bottomed structure measuring approximately 8 m to 10 m wide, with an invert ranging between 1.35 m to 1.85 m high. Wetted dimensions through the culvert measured approximately 3 m to 5 m wide at the time of survey. There is a municipal water well with hose located just south of the culvert that continually contributes a small amount of groundwater to the channel.

Between Westmount Road and Bearinger Road, the creek meanders through a wetland. This section of stream was realigned back in the early 2000's to accommodate the Westmount Road extension. The stream previously flowed closer to Bearinger Road, where an existing pond is now present (immediately northwest of the intersection). Further downstream, the creek was dammed by beaver and as a result most of the channel was not wadable at the time of survey. The channel measured an average of 5m wide and over 85 cm deep. The channel likely supported pool and riffle morphology prior to the beaver dam being built.

Riparian vegetation within this reach includes Common Reed Grass (*Phragmites australis*), Rice Cut Grass (*Leersia oryzoides*), Reed Canary Grass (*Phalaris arundinacaea*), Joe Pye Weed (*Empatorium purpureum*), Spotted Jewelweed (*Impatiens capensis*), Bittersweet nightshade (*Solanum dulcamara*), Stinging Nettle (*Urtica dioica*), Blue Vervain (*Verbena hastata*) and shrubs including Gray Dogwood (*Cornus racemosa*) and Elderberry (*Sambucus canadensis*). Trees planted within this area as part of the realignment work includes Eastern White Cedar (*Thuja occidentalis*), Silver

Maple (*Acer saccharinum*) and Red Maple (*Acer rubrum*). Willow species and Black Locust (*Robinia pseudoacacia*) grow around the Bearinger Road inlet.

At the Bearinger Road culvert inlet (downstream of the beaver dam), wetted dimensions measured 3.95 m wide and a maximum of 10 cm deep (riffle). The Bearinger Road culvert is a double cell culvert measuring approximately 3 m wide and 1.6 m high (invert). The west cell appears to have been constructed to serve as the overflow channel however both cells conveyed flow at the time of survey. Substrates within this reach are comprised of small cobble and gravel. Downstream of Bearinger Road, the channel is very linear, flowing in between Westmount Road and the Trans Canada Trail. The channel averages approximately 4.4 m wide and between 25 cm and 30 cm deep (35-45 cm bankfull depth) and supports flat morphology with mostly sand substrates. Riparian vegetation is comprised of Himalayan Balsam, Spotted Jewelweed, Rice Cut Grass, Joe Pye-Weed, Stinging Nettle and sedge species. The channel narrows up slightly and riffle habitat is more prevalent within approximately 80 m downstream of Bearinger Road. Cobble substrates become dominant and some watercress (groundwater indictor species) were observed.

In the spring survey, a significant run of White Sucker was observed in this stream. In addition, mussel shells were observed downstream of Bearinger Road as well as in reaches upstream of Westmount Road. The mussel species were identified as Mucket (*Actinonaias ligamentina*).

3.4.5.2 Drainage Features

There are four drainage features identified within the project limits. Two of these features convey localized drainage from an agricultural field towards the Laurel Creek Conservation Area; while the other two features convey stormwater outflows only.

3.4.5.3 Tributary 1 of Laurel Creek

A wetland extends to the east edge of Fischer Hallman Road upstream of this tributary, and is shown on Figure 3a. A stormsewer outlets to this system at the road located at the bottom of the road slope. The concrete sewer outfall measures 50 cm diameter and some flow was observed existing this sewer at the time of a spring survey (May 19, 2017). A 1.5m x 1.5m x 20 cm deep pool was observed at the outlet, however no channel could be observed downstream of this point. Flow appears diffuse through wetland habitat dominated by dense Phragmites and cattail. A channel is shown initiating within approximately 240 m downstream of Fischer Hallman Road (reference: GRCA watercourse layer) as identified on Figure 3a. A channel was not observed in this location by LGL; however it appears that a channel may form downstream of this point, near Residence Road. This system eventually outlets to Laurel Creek (Columbia Lake).

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This tributary appears to support indirect fish habitat. There is no open channel present for fish within at least 250 m downstream of Fischer Hallman Road however contributions in the form of allochthonous materials and nutrients from the wetland may contribute to fish habitat present downstream.

3.4.5.4 Stormwater Pond Outlet Channel

This channel originates at the stormwater pond located at the corner of Laurelwood Drive and Bearinger Road (Figure 3b). A pool with rip rap banks lies within 1.5m of the outlet. Flow appears to be conveyed to a 1m wide and 25 cm deep channel, which was dry at the time of survey (September 3, 2019). Sand substrates line the channel and flow (when present) is direct through a 30 cm diameter corrugated steel culvert (CSP) underneath the Doreen Thomas Trail. No formal channel exists downstream of this point.

3.4.5.5 Drainage Features #1, 2

Drainage features 1 and 2 convey ephemeral flow from the agricultural fields present on the south side of Bearinger Road. Upstream/south of Bearinger Road, short rill features exist, however these systems are mostly cultivated through. At both locations, 30 cm diameter culverts convey flow under both Bearinger Road and under the Doreen Thomas Trail. No formal channel is present at feature #1 with the exception of a short 35 cm wide channel south of the trail. At drainage feature #2, a 40 cm wide channel exists with some flow noted (5 cm deep) during a May 19, 2017 survey. Flow within this watercourse dissipates into the Laurel Creek Reservoir wetland edge and may be considered indirect fish habitat Neither feature supports direct fish habitat

3.5 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area. A vegetation survey was conducted on June 14th, 2017 and September 3, 2019 to confirm the current condition, limits and extent of vegetation communities identified through review of aerial imagery and available resources along the Fischer Hallman Road North right-of-way. Natural vegetation features identified within the study area were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee et al. 1998). A plant list and a description of the general structure of vegetation communities were obtained during the field investigation. Plant species status was reviewed for Ontario (Oldham and Brinker 2009) and Waterloo (Riley, 1999 and Regional Municipality of Waterloo 2006). Vascular plant nomenclature follows Newmaster and Ragupathy (2012).

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3.6 Vegetation Communities

The Fischer Hallman Road is within the urban boundary and as such contains a mixture of residential, commercial with natural heritage features that are associated with Laurel Creek and/or the tributary of Laurel Creek. Vegetation communities within the study area are the result of secondary growth following past disturbance from previous land use such as agriculture and for neighbourhood and community hubs development in recent past. The area along the road is dominated by residential, commercial, power transfer stations and agricultural land use with the majority of the natural heritage features occurring along the Laurel Creek Reservoir and Laurel Creek. Many of the vegetation communities are cultural in nature either have resulted from restoration efforts or have colonized with non-native species following disturbance. Naturalized vegetation features within the Laurel Creek study area consist of:

- deciduous forest (FOD4A, FOD4B, FOD5-2, FOD6-1),
- cultural plantation (CUP3-3),
- cultural thicket (CUT1),
- cultural meadow (CUM1-1A, CUM1-1B),
- cultural woodland (CUW1A, CUW1B),
- meadow marsh (MAM2, MAM2-2, MAM2-10),
- shallow marsh (MAS2-1) and,
- open water aquatic (OAO).

These communities are described in further detail below in Table 3 as well as displayed in Figures 3a-c.

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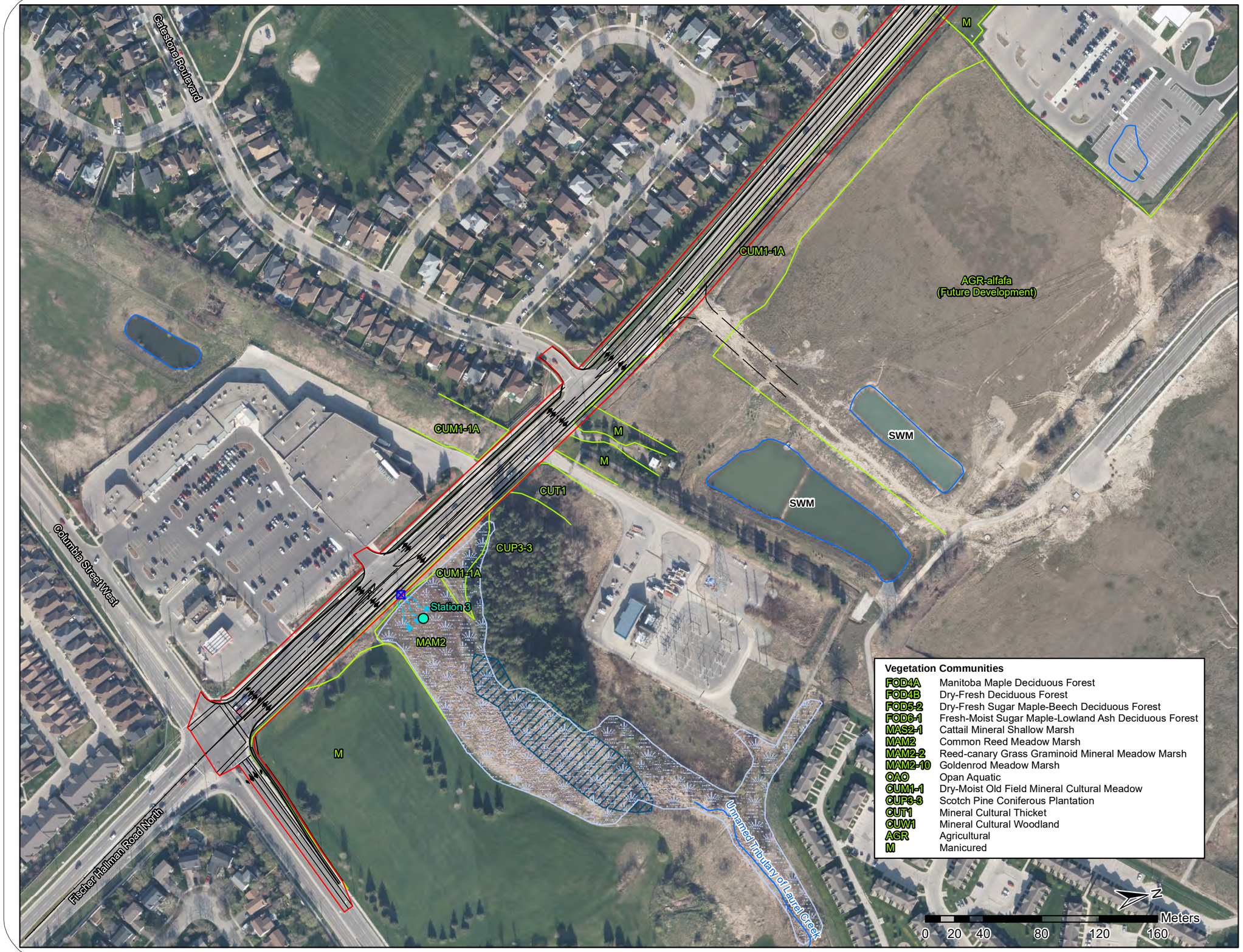

LEGEND

- Alternative 5a Impact Footprint
- Amphibian Monitoring Station
- Direct Fish Habitat
- Storm / Pond Outlet
- Culvert
- Ephemeral Drainage Feature
- ELC Communities Boundary
- Significant Wildlife Habitat
- Turtle Nesting Area
- SWM — Stormwater Management Pond
- Regulatory Floodplain (GRCA)
- Wetland (GRCA)
- Provincially Significant Wetland (LIO)
- 30m Wetland Buffer
- Unevaluated Wetland (LIO)
- Watercourse (GRCA)
- Waterbody (GRCA)

Amphibian Monitoring (LGL 2018)
Station 1 (4 species: SPPE, AMTO, GRTF, GRFR)
Station 2 (no frogs)
Station 3 (no frogs)

SPPE - Spring Peeper (L3)
AMTO - American Toad (L1)
GRTF - Grey Treefrog (L3)
GRFR - Green Frog (L1)

Watercourse Thermal Regime (LIO Aquatic Resource Area data)
Laurel Creek - warm water

Data Sources:
LGL field investigations, 2018.
Contains Information made available under Grand River Conservation Authority's Open Data Licence v2.0.
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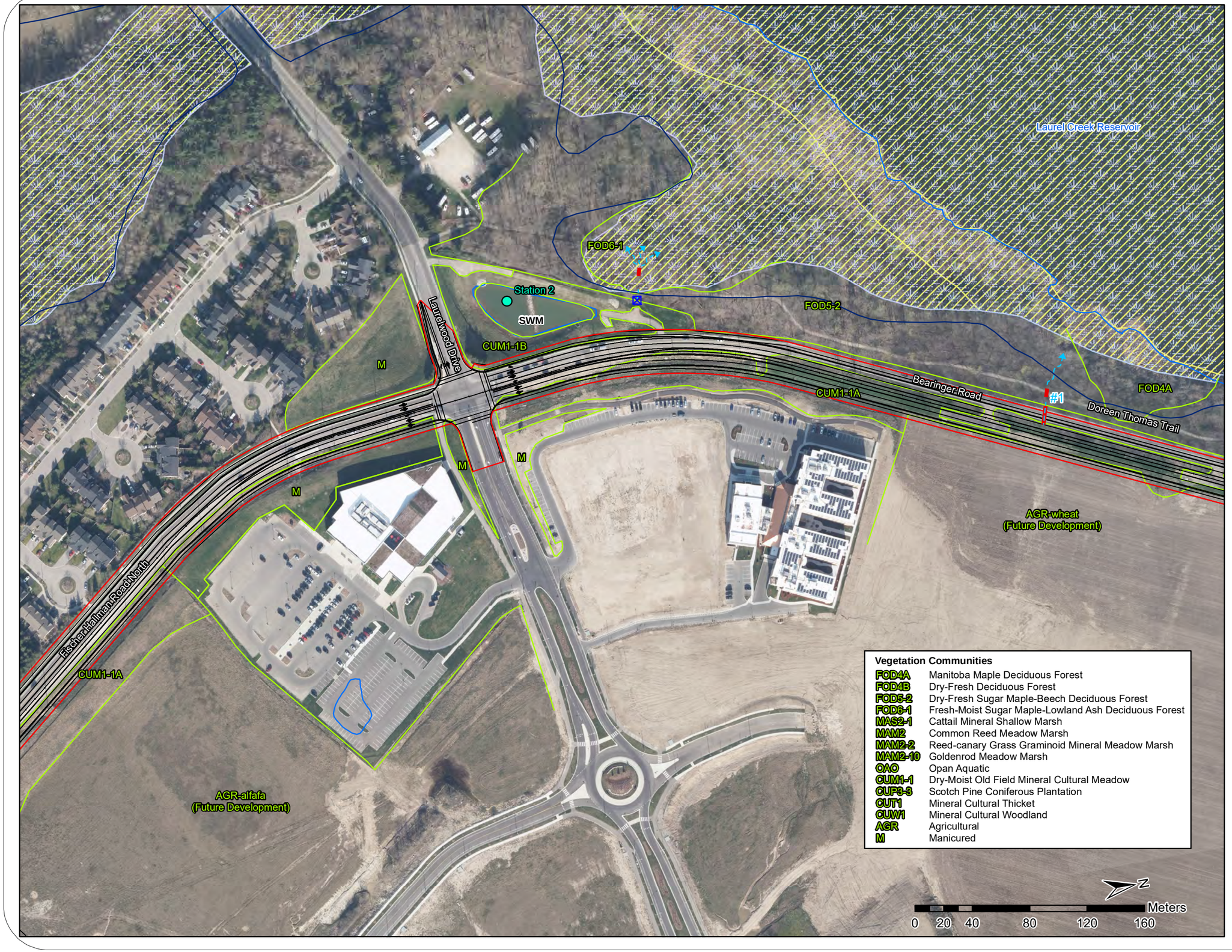
Fischer Hallman/ Bearinger Road Widening

Environmental Constraints

LGL LIMITED
environmental research associates

Project	TA8735-00	**Figure**	3a
Date	September 2019	**Prepared By:**	KC
Scale	1:2,500	**Verified By:**	EEB



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Watercourse Thermal Regime (LIO Aquatic Resource Area data)
Laurel Creek - warm water

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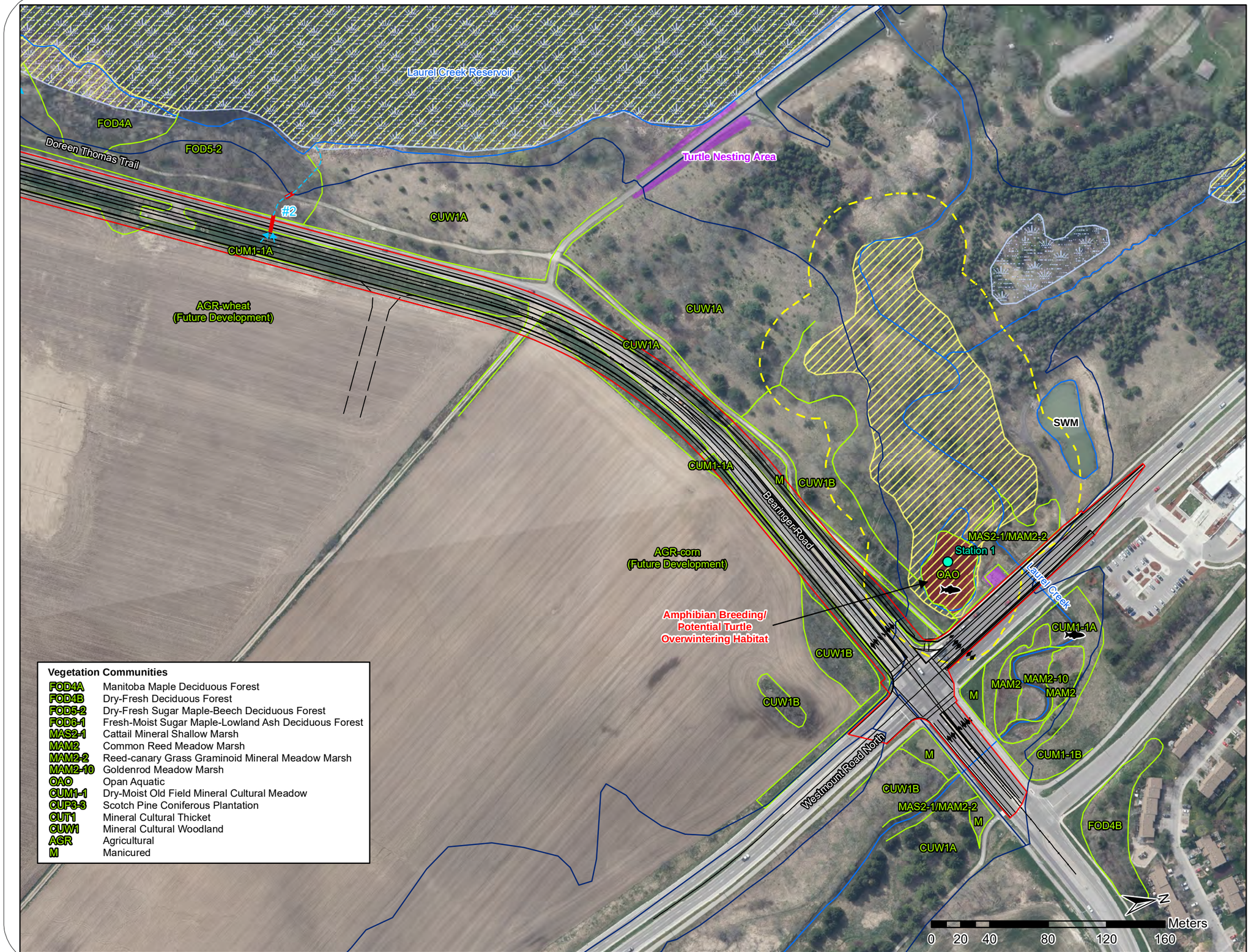
Fischer Hallman/ Bearinger Road Widening

Environmental Constraints

LGL LIMITED
environmental research associates

Project	TA8735-00	**Figure**	3b
Date	September 2019	**Prepared By:**	KC
Scale	1:2,500	**Verified By:**	EEB



Vegetation Communities

FOD4A	Manitoba Maple Deciduous Forest
FOD4B	Dry-Fresh Deciduous Forest
FOD5-2	Dry-Fresh Sugar Maple-Beech Deciduous Forest
FOD6-1	Fresh-Moist Sugar Maple-Lowland Ash Deciduous Forest
MAS2-1	Cattail Mineral Shallow Marsh
MAM2	Common Reed Meadow Marsh
MAM2-2	Reed-canary Grass Graminoid Mineral Meadow Marsh
MAM2-10	Goldenrod Meadow Marsh
OAO	Opan Aquatic
CUM1-1	Dry-Moist Old Field Mineral Cultural Meadow
CUP3-3	Scotch Pine Coniferous Plantation
CUT1	Mineral Cultural Thicket
CUW1	Mineral Cultural Woodland
AGR	Agricultural
M	Manicured

LEGEND

- Alternative 5a Impact Footprint
- Amphibian Monitoring Station
- Direct Fish Habitat
- Storm / Pond Outlet
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Laurel Creek - warm water

Data Sources:
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Fischer Hallman/ Bearinger Road Widening

Environmental Constraints

LGL LIMITED
environmental research associates

Project	TA8735-00	**Figure**	3c
Date	September 2019	**Prepared By:**	KC
Scale	1:2,500	**Verified By:**	EEB

Table 3 Summary of Ecological Land Classification for Vegetation Communities with the Fischer Hallman Study Area.

ELC Codes	Vegetation Types	Species Associations	Community Characteristics
TERRESTRIAL – NATURAL			
FOD	**DECIDUOUS FOREST**		
FOD4	**Dry-Fresh Deciduous Forest**		
FOD4A	Dry-Fresh Deciduous Forest	**Canopy:** dominated by Manitoba Maple (*Acer negundo*) with White Elm (*Ulmus americana*) and Red Ash (*Fraxinus pensylvanica*).	Tree cover > 60 % (FO). Deciduous trees > 75 % of canopy cover (D). Moderately dry to fresh soils with well to moderate drainage typically occurring in the upper to middle slope, (4).
FOD4B	Dry-Fresh Deciduous Forest	**Canopy**: composed of a mixture of trees Manitoba Maple (*Acer negundo*), White Ash (*Fraxinus americana*), Crab Apple (*Malus baccata c.v.*), Basswood (*Tilia americana*), Austrian Pine (*Pinus nigra*), Scotch Pine (*Pinus sylvestris)*, Russian Olive (*Elaeagnus angustifolia*), White Elm (*Ulmus americana*)	Tree cover > 60 % (FO). Deciduous trees > 75 % of canopy cover (D). Moderately dry to fresh soils with well to moderate drainage typically occurring in the upper to middle slope, (4).
FOD5	**Dry-Fresh Sugar Maple Deciduous Forest**		

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ELC Codes	Vegetation Types	Species Associations	Community Characteristics
FOD5-2	Dry-Fresh Sugar Maple Beech Deciduous Forest	Canopy: Sugar Maple (*Acer saccharum ssp. saccharum*) and Beech (*Fagus grandifolia*) dominant with White Ash (*Fraxinus americana*) and Black Cherry (*Prunus serotina*) **Understory**: Alternate-Leaved Dogwood (*Cornus alternifolia*), Common Buckthorn (*Rhamnus cathartica*) and choke cherry (*Prunus virginiana var. virginiana)* **Ground Cover:** is dominated by Periwinkle (*Vinca minor)* and Garlic Mustard (*Alliaria petiolata*)	Tree cover > 60 % (FO). Deciduous trees > 75 % of canopy cover (D). Sugar Maple dominant (5) and Beech (2). Dry to fresh soils with rapid to well drainage.
FOD6	**Fresh- Moist Maple Forest**		
FOD6-1	Fresh – Moist Sugar Maple – Ash	**Canopy:** Sugar Maple (*Acer saccharum*) and Red Ash (*Fraxinus pensylvanica*) dominant with associations of Black Maple (*Acer nigrum*), White Elm (*Ulmus americana*) and Black Ash (*Fraxinus nigra*). Ground cover is dominated by Ostrich Fern (*Matteuccia struthiopteris var. pensylvanica*), Sensitive Fen (*Onoclea sensibilis*), Spotted Touch-me-not (*Impatiens capensis*)	Tree cover > 60 % (FO). Deciduous trees > 75 % of canopy cover (D). Fresh to Moist soils with rapid to well drainage. Sugar Maple dominant (6) and Ash (-1).
TERRESTRIAL - CULTURAL			
CUP	**Cultural Plantation**		

Draft

ELC Codes	Vegetation Types	Species Associations	Community Characteristics
CUP3-3	Scotch Pine Coniferous Plantation	**Canopy**: Dominated by Scotch Pine (*Pinus sylvestris*), White Pine (*Pinus strobus*), Balsam Poplar (*Populus balsamifera*) **Understory:** dominated by Common Buckthorn (*Rhamnus cathartica*)	Communities resulting from or maintained by cultural or anthropogenic-based disturbances (CU). Tree Cover >60% (P). Coniferous Plantation (3) dominated by Scotch Pine (3).
CUM	**CULTURAL MEADOW**		
CUMI	**Mineral Cultural Meadow**		
CUM1-1A	Dry-Moist Old Field Meadow	**Ground Cover**: Awnless Brome (*Bromus inermis ssp. inermis*), Common Ragweed (*Ambrosia artemisiifolia*), Red Clover (*Trifolium pratense*), White Sweet Clover (*Melilotus alba*), Black Medic (*Medicago lupulina),* Canada Thistle (*Cirsium arvense*) and Canada Goldenrod (*Solidago canadensis*).	Tree cover and shrub cover < 25 % (CUM). This community can occur on a wide range of soil moisture regimes (Dry-Moist) (1-1). Grass and forb dominant. Community resulting from, or maintained by, anthropogenic-based influences.

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ELC Codes	Vegetation Types	Species Associations	Community Characteristics
CUM1-1B	Dry-Moist Old Field Meadow	**Ground Cover:** Awnless Brome (*Bromus inermis ssp. inermis*), Common Ragweed (*Ambrosia artemisiifolia*), Canada Goldenrod (*Solidago canadensis*). Planted species, Eastern White Cedar (*Thuja occidentalis*), Basswood (*Tilia Americana*) and Northern Catalpa (*Catalpa speciosa*) were planted throughout.	Tree cover and shrub cover < 25 % (CUM). This community can occur on a wide range of soil moisture regimes (Dry-Moist) (1-1). Grass and forb dominant. Community resulting from, or maintained by, anthropogenic-based influences. Clearing adjacent to Laurel Creek that was subject to woody species restoration.
CUT	**CULTURAL THICKET**		
CUT1	**Mineral Cultural Thicket**		
CUT1	Mineral Cultural Thicket	**Canopy:** dominated by Common Buckthorn (*Rhamnus cathartica*) and Riverbank Grape (*Vitis riparia*)	Cultural communities (CU). Tree cover ≤ 25% and shrub cover > 25 % (T). This community can occur on a wide range of soil moisture regimes on mineral soils (Dry-Moist) (1). Dominated by regenerating Common Buckthorn. Community resulting from, or maintained by, anthropogenic-based influences. Occurs under the power line and shrubs have been cut.

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ELC Codes	Vegetation Types	Species Associations	Community Characteristics
CUW	**CULTURAL WOODLAND**		
CUW1	**Mineral Cultural Woodland**		
CUW1A	Mineral Cultural Woodland	**Canopy:** composed of a mixture of tree species which include Norway Spruce (*Picea abies*), White Spruce (*Picea glauca*) and Black Walnut (*Juglans nigra*).	Cultural communities (CU). Tree cover between 35 and 60 % (W). This community can occur on a wide range of soil moisture regimes (Dry-Moist) (1). Community resulting from, or maintained by, anthropogenic-based influences.
CUW1B	Mineral Cultural Woodland	**Canopy**: dominated by Black Walnut (*Juglans nigra*) with associations of Black Locust (*Robinia pseudo-acacia*) and Eastern Cottonwood (*Populus deltoides*)	Cultural communities (CU). Tree cover between 35 and 60 % (W). This community can occur on a wide range of soil moisture regimes (Dry-Moist) (1). Community resulting from, or maintained by, anthropogenic-based influences.
WETLAND – NATURAL/CULTURAL			
MAM	**MEADOW MARSH**		

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ELC Codes	Vegetation Types	Species Associations	Community Characteristics
MAM2	Common Reed Mineral Meadow Marsh	**Ground Cover:** dominated by Common Reed Grass (*Phragmites australis*) with occasional Narrow-leaved Cattail (*Typha angustifolia*)	Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Mineral soil (2). Dominated by common reed grass. Wetland was once dominated by Cattail but is now replaced with Common Reed
MAS2-1/ MAM2-2	Reed Canary Meadow Marsh	**Ground Cover:** dominated by Reed Canary Grass (*Phalaris arundinacaea*) and Narrow-leaved-cattail (*Typha angustifolia*)	Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Mineral soil (2). Dominated by Reed Canary Grass (2) Associated with the east side of the floodplain of Mimico Creek.
MAM2-10	Forb Meadow Marsh	**Ground Cover**: dominated by a mixture of forb species such as: Canada Goldenrod (*Solidago canadensis*), Tall White Aster (*Aster lanceolatus ssp. lanceolatus),* Purple loosestrife (*Lythrum salicaria),* and Reed Canary Grass (*Phalaris arundinacaea*)	Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Mineral soil (2). Dominated by a mixture of forb species (-10) Associated with the floodplain of Laurel Creek.
OA	**OPEN WATER**		
OAO	**Open Water Aquatic**		

Draft

ELC Codes	Vegetation Types	Species Associations	Community Characteristics
OAO	Open water aquatic	No macrophyte vegetation cover	Permanently flooded area water greater than >2 m in depth (OAO).
OTHER	**MAN MADE**		
M	Manicured lawn and or planted trees	Areas where large expanses of grass are maintained with planted trees. Planted trees: Austrian Pine (*Pinus nigra*), White Spruce (*Picea glauca*), Russian Olive (*Elaeagnus angustifolia*)	Feature resulting from, or maintained by, anthropogenic-based influences.

Draft

3.6.1 Flora

A total of 161 vascular plant species were recorded within and surrounding Fischer Hallman Road as shown in Appendix B. Sixty-four plant species which represents 40% of the total flora are considered introduced and non-native to Ontario. They are typically found within the cultural communities such as the meadows and cultural woodlands along the study area. Three locally significant species, defined by the Region of Waterloo (ROW 2016) were observed within the study area. Two of the species, Black Walnut and White Spruce are considered native however they were planted within the cultural communities (CUW1A, CUW1B). These species were prevalent within the study area and as such, individual species are not mapped. Canada Snakeroot (*Asarum canadense*) was observed within the Maple Beech deciduous forest (FOD 5-2) surrounding Laurel Creek Reservoir. No species listed as Endangered, Threatened or Special Concern were identified within the study area.

3.6.2 Tree Inventory

Tree inventory was undertaken along the Fischer Hallman and Bearinger Road Right of Way within the study limits, plus a buffer of approximately 20m on April 9 and May 2, 2018. All trees 10 cm DBH and greater, with the exception of planted trees, all planted trees regardless of size were surveyed.

Trees (mostly landscape/amenity trees) growing along the west side of Fischer Hallman road, south of Laurelwood Drive, will also be inventoried at the Detailed Design stage.

The following was completed for each tree:

- Species identification, including screening for species regulated by the Ontario *Endangered Species Act*, 2007 (ESA);
- Measurements: diameter at breast height (DBH) and estimation of canopy dripline;
- Location: trees were assigned a numerical identifier using metal tags and their locations recorded using a TopCon GRS1 GPS unit. GPS accuracy is within 1-2 metres horizontal distance. If greater accuracy is required, the locations will need to be captured by an Ontario Land Surveyor for sub-metre accuracy; and,
- Health Assessment: trees were assessed as poor, fair or good based on qualities such as trunk integrity, crown structure, vigour, and dieback. Physical irregularities and defects were also noted for each tree.

Surveyed trees have been screened for rare species as referenced by the MNRF Natural Heritage Information Centre (NHIC), which includes classification of Endangered, Threatened, and Special Concern species both at a provincial and federal scale.

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3.6.3 Tree Inventory Results

A total of 506 trees were identified and assessed within the study area. Tree resources are summarized in **Appendix C** and the locations of each tree (by tree number) are presented in **the Tree Resources** figure within this appendix. Overall, trees within the study limits range in size from 10 to 80 cm+ DBH and are generally considered to be in good to fair condition except for ash species, the majority of which are in poor condition or dead. Sixty-six of these trees are in poor condition or dead. A larger number of these trees are ash (Fraxinus sp.) and are impacted by Emerald Ash Borer (*Agrilus planipennis*). As such, the City and GRCA have been observed removing or pruning hazardous trees along the road corridor between 2018 and 2019. As such, an update to this inventory is recommended at the detailed design.

3.7 Wildlife and Wildlife Habitats

Field investigations were conducted to document wildlife and wildlife habitat and to characterize the nature, extent and significance of wildlife usage within the study area between May and June of 2018. Wildlife investigations were focused within and adjacent to the Fischer Hallman/Bearinger Road ROW. Direct observations, calls and tracks were used to record wildlife present within the study area. Breeding bird surveys and an anuran call survey were also completed, in addition to turtle nesting surveys. The methodology and results of each these surveys are described in the following sections.

3.7.1 Wildlife Habitat

The study area is comprised of a mix of anthropogenic, agricultural and natural areas. The natural areas are largely associated with the Laurel Creek Conservation Area lands, as well as the riparian corridor present along Laurel Creek. As noted, the open fields located south of Fischer-Hallman/Bearinger Roads are currently in agricultural production or open/fallow fields. These fields will be developed in the future as the Northwest Campus of the University of Waterloo. Stormwater management ponds lie at the Laurelwood Drive and Fischer Hallman intersection, as well as approximately 150m north of Westmount/Bearinger Road and two larger ponds located east of Fischer Hallman, north of the hydro station.

The natural areas mentioned above appears to support the majority of the wildlife species observed in the areas, including forest/forest edge birds, amphibians and reptiles. Direct and indirect (i.e. tracks, scat) incidental observations of all wildlife species were recorded during surveys. Notable observations include:

- Evidence of deer tracks along the banks of Laurel Creek as well as several tracks running parallel to the south side of the Reservoir (west of the dam road).

- Snapping Turtle (*Chelydra serpentine*) and Midland Painted Turtle (*Chrysemys picta marginata*) were confirmed to utilize the wetland pocket located at the corner of Westmount Road/Bearinger Road;
- Beaver activity noted within the Laurel Creek system- one dam constructed between Westmount Road and Bearinger Road in September 2019.
- A large stick nest of an Osprey (*Pandion haliaetus*) is located on the hydro tower located 335m north of Columbia Street West;
- Chimney Crayfish (*Fallicambarus sp*.) (2 burrows) located within road edge cultural meadow habitat;
- Groundhog (*Marmota monax*) burrows within the CUW1B community, located in the southwest of the Westmount Road/Bearinger Road intersection;
- Eastern Wood Pewee (*Contopus virens*) (SC species) recorded in the deciduous forest community (FOD 5-2) located north of Bearinger Road (within Laurel Creek Conservation Area); and
- Barn Swallow (*Hirundo rustica*)) (THR species) recorded foraging over agricultural fields.

A full wildlife list of LGL observations is found in Appendix B.

3.7.2 Breeding Birds

As part of a general wildlife screening, surveys for breeding birds were conducted in the study area in the early summer of 2019. The area surveyed included habitat within 100m of Fischer Hallman/Bearinger Road from Columbia Street to Pineridge Road (east of Westmount Road). Any visual sightings and vocalizations of breeding birds was documented on the mornings of June 26, 2019 (for areas east of Westmount Road only) and July 3, 2019. Breeding evidence for bird species observed was documented, using the Ontario Breeding Bird Atlas protocol, as well as the location of active or inactive nests. Breeding evidence was classified based on the four levels of evidence used by the Ontario Breeding Bird Atlas (see references in Table 4 below).

On June 26, 10 species of birds were documented in the area east of Westmount Road. Of these 10 species, only the Barn Swallow is a species at risk, it is listed as 'threatened' by COSEWIC. It was observed foraging above Laurel Creek.

On July 3, 14 bird species were documented. There was evidence for probable breeding for Song Sparrow (*Melospiza melodia*) and Red-winged Blackbird (*Agelaius phoeniceus*), a permanent territory was presumed based on territorial song heard for both species on both survey visits (Table 4). There was evidence of possible breeding for American Goldfinch (*Carduelis tristis*), American Robin (*Turdus migratorius),* Brown-headed Cowbird (*Molothrus ater*), Common Yellowthroat (*Geothlypis trichas)*, House

Wren (*Troglodytes aedon*), and Red-eyed Vireo (*Vireo olivaceus*) based on either observing the species during the breeding season in suitable nesting habitat or hearing a singing male during one of the two visits (Table 4).

In addition to the 2019 site visits, a general wildlife survey was conducted within the breeding bird season on June 14, 2017. This survey was conducted between the hours of 0800-1400, within all of the natural vegetation communities present within the study area. A total of 21 birds were recorded on this date, including Eastern Wood Pewee (Special Concern), Barn Swallow and Warbling Vireo (*Vireo gilvus*) (Regionally Significant). The locations of these sightings are not mapped however the first two species were documented within FOD 5-2 community and the Barn Swallow was observed foraging over the SWM pond at Laurelwood Drive (CUM1-1b). In total, 27 birds have been recorded within the study area, during the breeding season.

Table 4 Breeding Bird Species Documented within the Study area by LGL Limited.

Scientific Name	Common Name	SARA[1]	ESA[1]	Legal Status[1]	Local Status[1]	BBE[2]	Informal LGL survey[3]
Corvus brachyhrynchos	American Crow			-		X	
Carduelis tristis	American Goldfinch			MBCA		S	X
Turdus migratorius	American Robin			MBCA		H	
Hirundo rustica	Barn Swallow		THR	MBCA		X	X
Poecile atricapillus	Black-capped Chickadee			MBCA		X	X
Cyanocitta cristata	Blue Jay			MBCA		X	X
Molothrus ater	Brown-headed Cowbird			-		H	X
Bombycilla cedrorum	Cedar Waxwing			MBCA		X	X
Spizella passerina	Chipping Sparrow			MBCA		S	X
Quiscalus quiscula	Common Grackle						X
Geothlypis trichas	Common Yellowthroat			MBCA		S	X
Contopus virens	Eastern Wood Pewee	SC	SC	MBCA			X
Tyrannus tyrannus	Eastern Kingbird			MBCA		X	
Sturnus vulgaris	European Starling			-		X	
Dumetella carolinensis	Gray Catbird			MBCA		X	
Myiarchus crinitus	Great-crested Flycatcher			MBCA			X
Passer domesticus	House Sparrow			-		H	X
Troglodytes aedon	House Wren			MBCA		S	
Charadrius vociferus	Killdeer			MBCA		X	X
Vireo olivaceus	Red-eyed Vireo			MBCA		S	X
Agelaius phoeniceus	Red-winged Blackbird			-		T	X

Scientific Name	Common Name	SARA[1]	ESA[1]	Legal Status[1]	Local Status[1]	BBE[2]	Informal LGL survey[3]
Myiarchus crinitus	Savannah Sparrow			MBCA			X
Melospiza melodia	Song Sparrow			MBCA		T	X
Actitis macularius	Spotted Sandpiper			MBCA			X
Vireo gilvus	Warbling Vireo			MBCA	RS		X
Sitta carolinensis	White-breasted Nuthatch			MBCA			X
Dendroica petechia	Yellow Warbler			MBCA			X

[1]For definitions of species ranks, refer to **Appendix B**.

[2]BBE - Breeding Bird Evidence (according to Bird Studies Canada):

Observed: X- Species observed in its breeding season (no evidence of breeding). Presumed migrants should not be recorded

Possible Breeding: H - Species observed in its breeding season in suitable nesting habitat.
S - Singing male present in its breeding season in suitable nesting habitat.

Probable Breeding: T - Permanent territory presumed through registration of territorial song on at least two days, a week or so apart, at the same place.
A - Agitated behaviour or anxiety calls of an adult.

Confirmed Breeding: NU - Used nest or egg shell found (occupied or laid within the period of study).
FY - Recently fledged young or downy young, including young incapable of sustained flight.
CF - Adult carrying food for young.
NE - Nest containing eggs.
NY - Nest with young seen or heard.

[3]Informal survey conducted by LGL during the Breeding Season (June 14, 2017; 0800-1400)

3.7.3 Reptiles and Amphibians

3.7.3.1 Anuran Surveys

Frog calling surveys were conducted at three wetlands/ponds located within the Fischer Hallman study area. These areas were chosen given their proximity to the road and the potential for amphibian road mortality to occur at these locations. Surveys were conducted using the Marsh Monitoring Protocol and a summary of the survey results are summarized in Tables 5 and 6 below.

Station 1 appears to support productive amphibian breeding habitat. Four species were heard at this pond during surveys; two of which were recorded with a Level 3 calling code (full chorus). No frogs were heard at Station 2 (Stormwater management Pond) or Station 3. Station 3, a marsh, supporting limited standing water in 2018, however

this station was chosen, as background information indicated that this station supported Green Frogs (Stantec 2008). Of interest, numerous Leopard frogs were abundant around Station 1, 2 and adjacent to Laurel Creek during pedestrian surveys conducted on Sept 6, 2019 although breeding within these areas was not confirmed.

Table 5 Anuran Survey Results.

Station	Location	Survey Date (2018)	Calling Level Code[1] Spring Peeper	Calling Level Code[1] American Toad	Calling Level Code[1] Gray Treefrog	Calling Level Code[1] Green frog
1	Pond to the northwest of Bearinger Road/Westmount Road	April 24 May 18 June 18	3 3 —	— 1 —	— 3 —	— — 1
2	SWM pond at Laurelwood Drive	April 24 May 18 June 18	— — —	— — —	— — —	— — —
3	Unnamed Tributary of Laurel Creek (wetland)	April 24 May 18 June 18	— — —	— — —	— — —	— — —

[1]Calling Level Code 1 – Individual calls do not overlap and calling individuals can be discretely counted.
[1]Calling Level Code 2 – Calls of individuals sometimes overlap but numbers can be estimated.
[1]Calling Level Code 3 - Calls are continuous and overlapping; no accurate or even reasonable estimate of numbers is possible.
— No individuals detected.

Table 6 Data for the Amphibian Calling Visits.

Visit #	Survey Details	Time	Temperature	Wind*	Cloud Cover
1	**April 24, 2018**	**21:26-22:00**	**10 °C**	**2**	**Overcast, light rain**
2	**May 18, 2018**	**21:15-21:42**	**12 °C**	**1**	**Clear**
3	**June 18, 2018**	**21:34-21:54**	**21°C**	**3**	**cloudy**

***Wind Levels recorded using Beaufort scale**

3.7.3.2 Turtle Nesting Surveys

MNRF recommended the completion of turtle nesting surveys to be conducted within the study area, given the known presence of this species within the general area

(MNRF letter September 27, 2017). MNRF confirmed that the Laurel Creek reservoir supports known overwintering habitat for Blanding's Turtle. This species nests in open habitats with low vegetative cover, high sun exposure and can include agricultural lands. Road shoulders and gravel roads, particularly areas bisecting wetlands, can also support attractive nesting areas although often result in high mortality of adult females from vehicle collisions and nest predation. The distance between nest sites and wetlands typically range between 100-242 meters (MECP 2019).

LGL conducted surveys within potential nesting habitat described above using the *Survey Protocol for Blanding's Turtle (Emydoidea blandingii) in Ontario* (MNRF 2012). The surveyed areas were reviewed with the MNRF, prior to the survey commencing. Surveys entailed walking transects within suitable open habitat and looking for evidence of depredated nests, recent excavations and nesting females. These surveys were conducted between 7 pm and 11 pm and scheduled after rainfall or wet periods over a total of 4 nights. The nesting period typically extends a three-week period and the surveys were initiated once nesting was confirmed as commencing within the area (via online forums). Road morality surveys were also conducted between Laurelwood Drive and Westmount Road during nesting surveys however, the road shoulders are very narrow and were not deemed to support ideal nesting habitats.

The nesting surveys extending within the following areas:

- One transect along the agricultural field edge along the south side of Bearinger Road;
- One transect along the Doreen Thomas Trail, focused within the open areas of trail located within 700m west of Westmount Road;
- One transect (~200m length) along the existing reservoir dam road, located within 80m north of the road ROW.

Numerous predated nests were observed in the previous year along the reservoir dam road and as such, this habitat was searched twice during a survey, to increase the likelihood of observing nesting turtles (as recommended in the protocol).

3.7.3.2.1 Nesting Survey Results

There were no nesting turtles observed during 2019 nesting surveys. The Bearinger road shoulder provides limited habitat given the lack of shoulder in many areas. Depending on the stage of growth and type of agricultural crop, marginal nesting opportunities appeared to exist on the south side of the road although no evidence of nests were found. In addition, there appeared to be little opportunity for nesting along the trail as the limestone is fairly compacted and well-shaded in most areas.

There were numerous predated nests (up to 70 excavations of predated nests) observed along the reservoir dam road over the survey period, however turtle species

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could not be confirmed. This area provides good quality nesting habitat, and traffic appears limited to mostly vehicles accessing the dam for maintenance purposes. A summary of the survey results is found in Appendix B. During an aquatic habitat survey conducted on September 6, 2019, an additional nesting habitat area was discovered next to Laurel Creek. An 8 m by 9 m gravel pad located around a pump showed evidence of predated nests. A Snapping Turtle was observed in the small open water pocket located directly east in early spring. The turtle nesting areas are shown on Figure 3.

3.7.4 Road Mortality/Movement Surveys

LGL conducted road mortality and movement surveys over the spring and fall between 2017 and 2018. The purpose of these surveys was to determine if there are concentrated movement areas of wildlife currently occurring across Fischer Hallman/Bearinger Road. This information was required to determine the need for wildlife conduits (culverts or bridges) with an upgraded (widened road) road design and other mitigation measures considered that reduce wildlife-vehicle collisions in the area.

Surveys were conducted in the early morning or evening over 6 days for a total of 9.25 hrs. Four of these surveys were conducted in a focused area between Laurelwood Drive and Westmount Road during turtle nesting surveys. The surveys entailed walking along the road shoulder, looking for signs of roadkill or moving animals. A summary of the survey conditions and results are displayed in Table 7 below and displayed on Figure 4. Two turtles, seven small to medium sized mammals and one deer was observed, for a total of 10 roadkill observed. These observations were spread out over the project area limits.

Table 7 Summary of Road Mortality Surveys (2017-2018) along Fischer Hallman Road and Bearinger Road.

Date	Time (start)	*Species Scientific Name*	Species Common Name	G-Rank	S-Rank	SARO	SARA	COSEWIC	Observer	Incidental	Dead on Road
2017-10-27	15:30	*Sciurus carolinensis*	Grey Squirrel	G5	S5				EEB		X
2017-10-27	16:00	*Rattus norvegicus*	Norway Rat	G5	SNA				EEB		X
2017-10-27	16:30	*Procyon lotor*	Northern Raccoon	G5	S5				EEB		X
2018-04-20	Inc	*Odocoileus virginianus*	White-tailed Deer	G5	S5				TRH	X	
2018-05-02	Inc	*Procyon lotor*	Northern Raccoon	G5	S5				TRH		X

Date	Time (start)	*Species Scientific Name*	Species Common Name	G-Rank	S-Rank	SARO	SARA	COSEWIC	Observer	Incidental	Dead on Road
2018-05-19	9:30	*Microtus sp.*	Meadow Vole	G5					EEB		X
2018-05-19	9:30	*Chelydra serpentina*	Snapping Turtle (juvenile)	G3TNR	S3	SC	SC	SC	EEB		X
2018-06-05	19:20	*Procyon lotor*	Northern Raccoon	G5	S5				EEB	X	X
2018-06-13	20:00	*Marmota monax*	Woodchuck	G5	S5				AHF	X	X
2018-06-24	20:30	*Chrysemys picta marginata*	Midland Painted Turtle	G5T5	S4		no status	SC	EEB	X	X

Inc= Incidental observations made during other surveys

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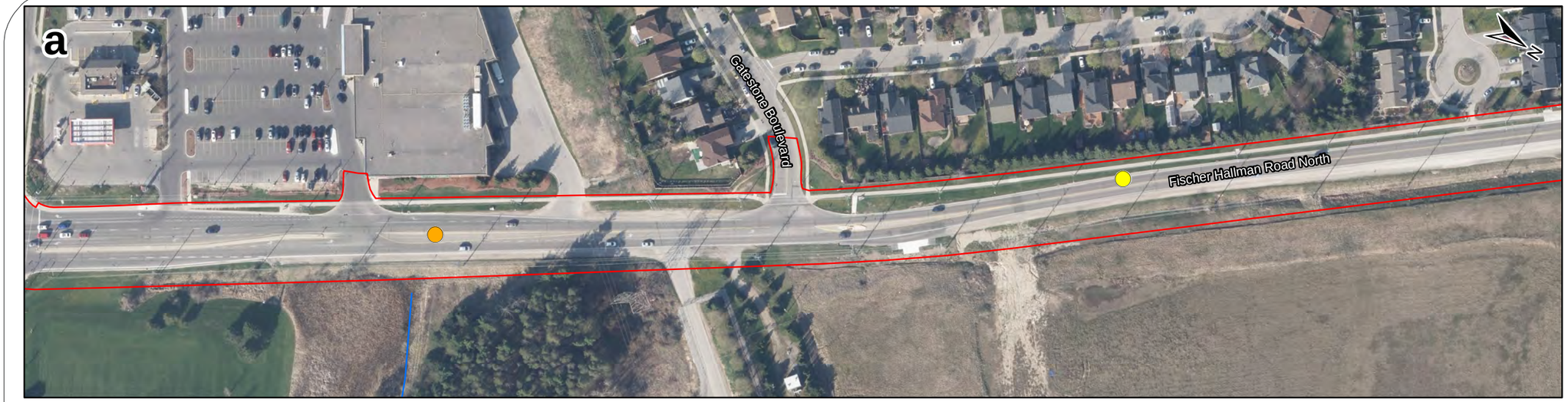

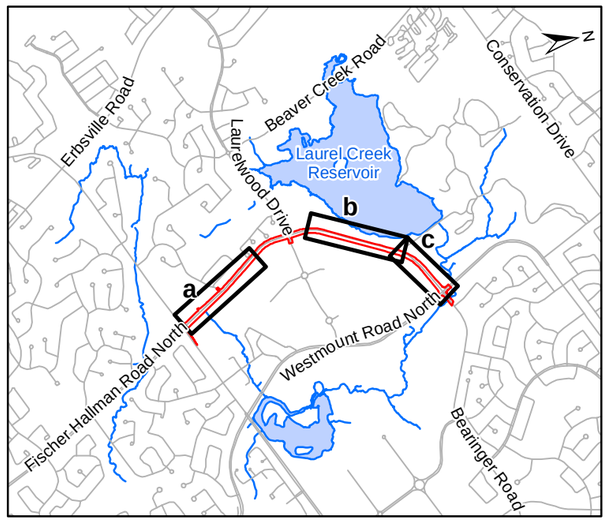

LEGEND

Option 2-5 Impact Footprint

Large Mammals

White-tailed Deer (*Odocoileus virginianus*)

Small Mammals

Gray Squirrel (*Sciurus carolinensis*)

Meadow Vole (*Microtus sp.*)

Northern Raccoon (*Procyon lotor*)

Norway Rat (*Rattus norvegicus*)

Woodchuck (*Marmota monax*)

Turtles

Midland Painted Turtle (*Chrysemys picta marginata*)

Snapping Turtle (*Chelydra serpentina*)

Meters

0 10 20 40 60 80

Fischer Hallman Road Widening

Wildlife Mortality Monitoring

LGL LIMITED
environmental research associates

Project	TA8735-00	**Figure**	4
Date	October, 2019	**Prepared By:**	KC
Scale	1:2,000	**Verified By:**	EEB

3.7.5 Significant Wildlife Habitat (Ecoregion 7E) Assessment

The PPS defines wildlife habitat as:

> "areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species."

Wildlife habitat is considered significant by the Province where it is:

> "ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. Criteria for determining significance may be recommended by the Province, but municipal approaches that achieve the same objective may also be used."

Significant Wildlife Habitat Criterion for Ecoregion 7E was reviewed for this study (MNRF 2015). Significant Wildlife Habitat (SWH) criterion provides recommended criteria for identifying Significant Wildlife Habitat (SWH), based on science and expert knowledge.

The following types of SWH were examined for the potential to occur on the study area:

- Seasonal concentration areas;
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and,
- Animal movement corridors.

3.7.5.1 Seasonal Concentration Areas

Seasonal Concentration Areas may include waterfowl stopover and staging areas (terrestrial and aquatic), colonial-nesting bird breeding habitat (as noted in the NHIC report), turtle wintering areas (wetlands and reservoir appear to support these functions), bat maternity colonies, migratory butterfly stopover areas, landbird migratory stopover areas, deer winter congregation areas, and raptor wintering areas.

The NHIC report available for the PSW, indicates the presence of colonial waterbirds nesting habitat within the PSW, with extends a much larger area beyond Laurel Creek Reservoir (NHIC 2019). In addition, potential turtle overwintering habitat appears present within the wetland pocket located immediately northwest of the Westmount Road and Bearinger Road intersection, given the early presence of Snapping Turtle detected here (April 30, 2018). In addition, MNRF has confirmed that the Laurel Creek

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Reservoir supports overwintering habitat for SAR turtles as discussed in the next section (MNRF 2017).

3.7.5.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

No rare vegetation communities, as defined in the SWH guide, have been documented within the study area. Specialized habitat for Wildlife include Waterfowl Nesting Areas, Woodland Raptor Nesting Habitat, seeps and springs, Amphibian Breeding Habitat and Woodland Area- Sensitive Bird Breeding Habitat.

3.7.5.2.1 Turtle Nesting Habitat

Turtle nesting habitat was identified in two areas; along the road extending between the Doreen Thomas Trail and the Reservoir Dam as well as a small gravel pad near a water pump, just south of Laurel Creek (See Figure 3c and Turtle nesting survey data further below). As these habitats represent anthropogenic habitats (road shoulder/ placed gravel around pumping station), their consideration as SWH may not qualify under the guidelines, however, the reservoir road is not a formal road supporting. Turtle species nesting within these areas are unknown, however it appears likely that at least one species, Snapping Turtle are using these areas. This SWH is mapped on Figure 3c.

3.7.5.2.2 Woodland Area- Sensitive Bird Breeding Habitat

The deciduous forest communities present north of Bearinger Road and surrounding the Laurel Creek Reservoir would support a small amount of interior habitat, just east of Laurelwood Drive, however most prevalent further northwest of the study area (west of Beaver Creek Road). Interior habitat is described as areas at least 100m from any edge (OMNR 2000). One forest interior bird, Red-eyed Vireo (*Vireo olivaceus*) was confirmed within the FOD 5-2 and 6-1 communities.

3.7.5.2.3 Amphibian Breeding (wetlands/woodlands)

One pond within the study area (station 1) was confirmed to support at least three species of amphibians, with two of these species (Spring Peeper and Gray Treefrog) in full chorus (Level 3 calling code), within the breeding season. This pond is quite small (approximately 40m x 25m), however diverse habitats exist in the area (woodland and creek corridor). Water levels appear to drop considerably in the summer, hence the prevalence of earlier spring breeders. This Candidate SWH is mapped on Figure 3c.

3.7.5.3 Habitat for Species of Conservation Concern

Habitats under this category are described as Marsh Bird Breeding habitat, Open Country Bird Breeding habitat, Shrub/Early Successional Bird Breeding habitat, Terrestrial Crayfish and Special Concern and Rare Wildlife Species.

One species listed within the marsh breeding bird habitat category; historical records of Black Tern were recorded within the area (NHIC record-1979). In addition, Green

Heron was observed along the Laurel Creek corridor in a September 2019 survey, although outside of breeding season. Virginia Rail and Sora, two other species listed in this category were included in the OBBA square for this area (OBBA 2001) (Appendix B). No open Country birds or Shrub/early successional birds, under the SWH definition were observed during breeding bird surveys conducted within the study area. Evidence of Terrestrial Crayfish were documented within the study area; two burrows were observed within cultural meadow habitat, located south of Fischer Hallman, within the road ROW. This habitat type is not listed under the suitable habitats listed in the SWH guide, which refers to mostly wetland communities (meadow marsh, shallow marsh, swamp thicket, deciduous swamp). Species listed as Special Concern are covered under the SAR screening analysis documentation (Appendix D). Regionally significant species were highlighted in the prospective flora and fauna sections of this report.

3.7.6 Species at Risk Screening

Correspondence with Guelph District MNRF identified occurrences of species listed as "Special Concern" under the ESA (2007) within the general study area. The species include Snapping Turtle (*Chelydra Serpintina*), Eastern Ribbonsnake *(Thamnophis sauritus),* Black Tern *(Chlidonias niger)* and Eastern Milksnake *(Thamnophis sauritus).* GRCA also confirmed the presence of Blanding's Turtle within the general area (personal communication with Kaitlyn Smith, GRCA Resource Planner). Blanding's turtle *(Emydoidea blandingii)* is listed as Threatened under the ESA (2007). It is presumed that most of these sightings originate from the areas around the Laurel Creek Reservoir.

LGL conducted a SAR screening for the study area, based on background species lists available from a number of sources. The results of field surveys as well as an analysis of habitats encountered was completed and recommended design and construction mitigation is listed in a SAR screening summary table, in Appendix D of this report. A shortened list of confirmed by LGL or likely present based on habitat conditions present in the study area and should be considered in project planning area, are listed below:

- Blanding's Turtle (known in area)
- Snapping Turtle (confirmed)
- Eastern Wood Pewee (confirmed)
- Barn Swallow (foraging habitat confirmed)
- Monarch
- Little Brown Myotis (potential habitat in area)
- Northern Myotis (potential habitat in area)
- Tri-coloured Bat (potential habitat in area)

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4.0 Technically Preferred Alternative

Land use within Fischer Hallman Road/ Bearinger Road Widening study area supports a mix of residential, commercial, agricultural (planned for future development) and conservation lands. The agricultural lands will be future employment lands; the future University of Waterloo Northwest Campus.

Fischer Hallman/ Bearinger Roads require upgrades in order to facilitate growth within the area and to conform to the Regional and City Transportation Master Plans and Design guidelines. The current road is a two-lane road with minimal shoulder in the road section between Laurelwood Drive and Westmount Road. The road ROW was established to accommodate for this future growth. Currently, the narrowest paved surface is a minimum of 8m wide between Laurelwood Drive and Bearinger Road. No sidewalks and minimal shoulder exist through this section. The road intersections at Columbia Street, Laurelwood Drive and Westmount Road support turning lanes and a slightly wider paved surface with sidewalks ranging between 17m- 28m wide. Between Laurelwood Drive, southerly to Columbia Street, shoulders are a little larger with a sidewalk along the west side of the road.

Several road options were identified during the EA, which include alignments that included segregated bike lanes, sidewalks and multi-use trail options, with and without medians. All alternatives included 4 lanes measuring 14 metres total width. The following road options were evaluated:

- Alternative 1- Do nothing
- Alternative 2- Four lanes, no median, separated bike lanes and sidewalk
- Alternative 3a- Four lanes, no median, multi-use trail on each side
- Alternative 4- Four lanes with median, separated bike lanes and sidewalk
- Alternative 5a- Four lanes with median, multi-use trail on each side

The alternatives were evaluated under the categories including socio-economic environment, natural environment, transportation needs and cost. Details of this evaluation is included in the Environmental Study Report (ESR). The preferred design was chosen as Alternative 5a. The existing Doreen Thomas Trail will be retained as is, with a slight realignment required, closer to Westmount Road.

Assessment of impacts to aquatic habitats, vegetation, wildlife and communities and trees is presented in the following section. Environmental protection/mitigation measures are provided in this report and include recommendations to minimize impacts to slopes, erosion/sedimentation, wildlife impacts and tree protection measures.

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5.0 Impact Assessment and Mitigation

This section focuses on the potential effects on significant environmental features and outlines the environmental protection/mitigation measures proposed to manage adverse effects related to aquatic and terrestrial ecosystems. Environmental effects are identified based on issues/concerns raised by property owners/members of the public, external agencies/stakeholders and the study team. The proposed environmental protection/mitigation measures will be reviewed and refined as necessary during detailed design.

5.1 Soils, Erosion and Sediment Control, and Surface Water

The improvements to Fischer Hallman Road have the potential to suspend soil particles, which could result in eroded materials inadvertently affecting vegetation, wildlife habitat and could impair surface water quality. Furthermore, an increase in runoff may promote erosion downstream thus impairing water quality with sediments. There is also the potential for the contamination of surface water from sources other than sediments (i.e. spills). Water quality treatment must be provided to maintain the existing quality of surface water within the study limits.

5.1.1 Soil Disturbance/Erosion

Although located within the Waterloo Hills physiographic region in southern Ontario, the study area is flat and comprised of sandy loams and silt loam soils that can be susceptible to erosion. Consequently, soil disturbance associated with construction activities may result in the erosion of, and sedimentation to receiving watercourses (i.e. Laurel Creek). Perched water tables may also be present in the area and therefore impacts relating to dewatering is possible. For this reason, an erosion and sedimentation control plan must be implemented during construction, using best practice erosion and sedimentation control measures to cover the installation, maintenance, and removal of the temporary erosion and sediment control measures and the removal of sediment accumulated by the control measures. This will minimize construction-related impacts on water quality fish of wetlands and fish habitat. Site-specific erosion and sedimentation control measures will be identified during detail design following the *Erosion and Sediment Control Guidelines for Urban Construction* (GGHA 2006). A full list of mitigation will be included in Section 6.0.

5.2 Aquatic Habitats and Communities

Improvements to Fischer Hallman Road and Bearinger Road will not result in direct impacts to fish and fish habitat. West of Westmount Road, the existing drainage features crossed do not support direct fish use. Laurel Creek lies within 45m east of Westmount Road, and supports warmwater fish species, however no upgrades to the current structure is required.

Lands regulated by the GRCA will be encroached along the road corridor and as such, a permit may be required from this agency.

Also, there are potential indirect impacts to downstream fish habitat present (namely Laurel Creek and reservoir), with the road improvements and these include:

- Temporary changes to water quality (sediment and contaminants); and,
- Changes in water temperature.

The Fish and Fish habitat protection provisions under Bill C-68 came into force on August 28, 2019. Under the previous legislation proponents self-assessed whether a proposed activity (e.g. installing a new culvert, or route maintenance projects) could require a full regulatory review under the Fisheries Act. Bill C-68 has developed 'Codes of Practice' to replace the self-assessment process. These codes outline the steps that need to be followed for more common operations to avoid the death of fish (by means other than fishing) and harmful alteration, disruption and destruction of fish habitat (abbreviated as HADD).

As there are no direct habitat impacts to fish habitat, a DFO review is not anticipated for this project. However, *the Codes of Practice* must be adhered to for works occurring adjacent to or upstream of fish habitat. Applicable measures will be included the Mitigation section of this report.

5.2.1 Temporary Change to Water Quality (Sediment and Contaminants)

The construction associated with the proposed widening works has the potential to alter water quality through on-site erosion of exposed materials (during construction) and the subsequent impairment of downstream water quality with sediments and the potential for other increased pollutant loads (oil, grease, road salts, etc.) associated with a wider road surface.

Changes to water quality will be mitigated through:

- The isolation of the work areas use ESC's during construction;
- The treatment of effluent from dewatering (if applicable) prior to its release back into the watercourse or wetland; and,
- Other water quality treatment measures used through storm water management controls (oil/grit separator, bioswales, or other Low Impact Development (LID) solutions).

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The roadside ditches will be filled in and roadside drainage crossings upgraded, with the intent of improving storm water quality, as roadway runoff will be directed to the median in order to capture and infiltrate stormwater flows. Other low impact development techniques will be considered moving into Detailed Design. In addition, all exposed areas should be vegetated as quickly as possible once the work is completed in order to reduce erosion potential.

5.2.2 Changes in Water Temperature

Stream water temperatures are impacted when vegetation (riparian) removals take place as well as run-off of super-heated water from paved surfaces. No riparian habitat will be removed along Laurel Creek or the reservoir and vegetation loss is mostly localized along the road section. A minimal area of meadow marsh vegetation will be encroached at Tributary 1 of Laurel Creek (just north of Columbia Street), however this is not anticipated to impact downstream fish habitats.

Further temperature impacts can be mitigated through the proposed storm water management techniques, including the use of infiltration technologies.

5.3 Vegetation and Vegetation Communities

The improvements to Fischer Hallman Road/Bearinger Road will result in the displacement of and disturbance to vegetation and vegetation communities. Effects on vegetation and vegetation communities may include:

- Displacement of/disturbance to vegetation and vegetation communities;
- Encroachment of designated natural areas; and,
- Displacement of/disturbance to rare, threatened or endangered vegetation and vegetation communities.

The following is an evaluation of potential impacts to vegetation and vegetation communities that will result from the improvements to Fischer Hallman Road.

5.3.1 Displacement of/Disturbance to Vegetation and Vegetation Communities

Within the study area, the road will be widened within the existing ROW with additional lanes designed on the east side of Fischer Hallman Road and on the south side of Bearinger Road. Widening in these directions generally minimizes impact to natural vegetation communities, particularly those present on the GRCA lands (Laurel Creek Reservoir). The assessment below is based on a preliminary footprint as final grading limits have not yet been defined.

Overall, the road improvements will result in the total loss of approximately 18,228 m^2 (1.8 ha) of vegetation communities. There will be some removal of treed habitat, mostly culturally influenced units (CUW1A, CUW1B, CUP), located near Westmount Road as well as additional grading required just east of the SWM pond at Laurelwood Drive,

accounting for 754 m^2 (0.075 ha) of treed habitat removal. The majority of impact will be to linear strip of cultural meadow vegetation present within the road ROW; 17469 m^2 (1.7 ha).

All of the vegetation communities identified within the study area are considered widespread and common in Ontario and secure globally. **Table 8** provides a summary of the vegetation removals required for the improvements to Fischer Hallman/Bearinger Road, and the extent of impacts are illustrated in **Figures 3a** to **3c.**

Table 8 Summary of Vegetation Impacts along Fischer Hallman Road and Bearinger Road.

Vegetation Community	**Estimated Area (m^2) to be Impacted**
Dry-Fresh Sugar Maple-Beech Deciduous Forest (FOD5-2)	14 m^2
Sub-total for Forest Communities	**14 m^2**
Dry-Moist Old Field Meadow (CUM1-1A, CUM 1-1B)	17469 m^2
Mineral Cultural Thicket (CUT1)	5m^2
Mineral Cultural Woodland (CUW1A and CUW1B)	726m^2
Cultural Plantation (CUP 3-3)	14m^2
Sub-total for Cultural Communities	**18214 m^2**
Manicured (M)	3507m^2
Agricultural Field	2688m^2
Sub-total for Human Influenced Lands	**6195m^2**
Summary of Estimated Area of Impacted Vegetation Communities	**24423 m^2**

There will be some encroachment towards the PSW and Candidate SWH (Turtle Overwintering/Amphibian Breeding Habitat) located at the northwest corner of Westmount Road and Bearinger Road. The existing road lies within a minimum of 25m of this feature and the Doreen Thomas Trail lies within 6.25m of this feature. The northern edge of the proposed Road widening (multi-use trail footprint) will extend within approximately 18m of the wetland. No direct impacts to the wetland community vegetation will occur here and the proposed road alignment will occur mostly within the manicured road edge and potentially into a portion of the cultural woodland community surrounding the pond. Minimizing grading limits in this area is strongly encouraged. Additional mitigation for managing the edge and edge vegetation may be warranted here.

No impacts to species listed as provincially or federally Endangered, Threatened or Special Concern or naturally growing regionally significant flora species are anticipated. Removal of select White Spruce and Black Walnut will occur, however compensation planting could replace these species.

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Overall, direct impacts to vegetation is minimized through the selection of the preferred alternative. Most of the habitat impacted are culturally influenced, and typically persist in areas that are regularly disturbed and as a result, contain a high proportion of invasive and non-native plant species that are disturbance tolerant. It is expected that plant species displaced and/or disturbed within the cultural communities due to the proposed construction will persist in the project area post-construction. Restoration shall include native species where feasible.

5.3.2 Tree Resources

A tree inventory was undertaken to determine impacts to tree resources as a result of the proposed improvements to Fischer Hallman Road and Bearinger Road. As final grading limits are unknown at this stage, a high-level assessment was conducted and this exercise was mostly used to compare the road alternatives. Trees recommended for removal include trees within the road footprint or trees that would not be able to withstand construction related impacts. It is estimated that a total of **96 trees** measuring 10 cm diameter at breast height (DBH) would at minimum, require removal in order to accommodate the future road widening. Trees with driplines extending within approximately 25 percent of the proposed road footprint will likely require some degree of root and/or canopy pruning or injuries. It is estimated that a total **35 trees** may be injured. And a total of **372 trees** inventoried have been identified for retention and will not be adversely affected by the proposed road improvements. The tree inventory figures found in Appendix C and illustrate the trees to be retained and removed. As a number of hazard trees are currently being removed along the road ROW, an update to the tree inventory will be required and a Tree Preservation Plan will also be prepared during the detailed design phase, in accordance with City of Waterloo requirements.

5.4 Wildlife and Wildlife Habitat

The widening of Fischer Hallman Road and Bearinger Road have the potential to result in impacts to wildlife and wildlife habitat including:

- displacement of/disturbance to wildlife and wildlife habitat;
- barrier effects and interruptions to wildlife passage corridors;
- disturbance to wildlife from noise, light and visual intrusion;
- potential impacts to migratory birds; and,
- displacement of/disturbance of rare, threatened or endangered wildlife or significant wildlife habitat.

5.4.1 Displacement of Wildlife and Wildlife Habitat

As noted, the widening of Fischer Hallman Road and Bearinger Road will impact primarily a linear cultural meadow and some manicured habitat present along the road

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ROW, which only appears to support non-sensitive wildlife or wildlife habitat with low habitat capabilities. There will be some direct removal of the edge of a cultural plantation and thicket in the south end (although minimal area), as well as the cultural woodland habitat present along the Laurel Creek Reservoir property, and the meadow marsh present just north of Columbia Street. In addition, a number of roadside trees (mostly planted) growing along the south side of Bearinger Road will be removed. These treed communities impacted may support urban nesting bird species, which could be displaced if vegetation is removed. As the habitats being removed are edge habitats, the majority of species residing in habitats within or directly adjacent to the ROW are tolerant of human disturbances/anthropogenic influences and are expected to persist post-construction.

The majority of the area south of Bearinger Road and east of Fischer Hallman Road will be future development (University of Waterloo Northwest Campus), therefore indirect impacts beyond the ROW are particularly limited under this future landscape.

5.4.2 Wildlife/Vehicle Conflicts

A pedestrian road mortality study was conducted to help determine the current level of wildlife and vehicle conflicts within the project limits. Over approximately six surveys, it was determined there are some conflicts are occurring, impacting mostly urban tolerant wildlife (i.e., raccoon, woodchuck). There did not appear to be particular crossing hotspots, and with the exception of the Laurel Creek bridge and creek corridor, there are no existing conduits present along the road corridor.

Two, dead on the road turtles (one juvenile Snapping Turtle, on Painted Turtle) were observed and this group would be particularly sensitive to increased traffic and a widened road surface given that they are slow moving and often attracted to road shoulders. The Painted Turtle roadkill was during nesting season of an adult, whereas the snapping turtle was newly hatched. Given that road mortality is a known threat to turtles, in addition to their delay to reach sexual maturity, all Ontario Turtle species are now designated under provincial or federal species at risk lists. As such, mitigation in the form of barrier fencing is recommended for consideration along a portion of the project limits along the north side of Bearinger Road to limit access to the road corridor.

5.4.3 Barrier Effects on Wildlife Passage

As mentioned in Section 5.4.2 above, there are no obvious wildlife corridors present within the project limits with the exception of the Laurel Creek, located east of the project limits. Land present along the south side of Bearinger Road and east of Fischer Hallman are mostly agricultural in nature and are slated for future development. Also commercial development already exists at Columbia Road, therefore the widened road will not function as increasing the barrier effect, particularly in light of the future development scenario.

5.4.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion have the potential to alter wildlife activities and patterns. The existing right-of-way is not well lit, particularly between Laurelwood Drive and Westmount Road. An increase in traffic and light intrusion (from new street lights) may have an impact on wildlife within the Laurel Creek Reservoir property and the Laurel Creek corridor. Visual intrusions will be minimal, as only some tree removals will be required along the north side of the road section. Commercial development (lights, noise impacts) already exists near Columbia Road, therefore further impacts from the road widening in this area is deemed minimal, and wildlife may have already become acclimatized to the noise, light and visual conditions associated with the urban setting. Fauna present are tolerant of human activities and will tend to persist.

Notwithstanding, future lighting should consider directional lighting so that no new light pollution is directed towards the retained natural heritage features.

There will be a greater amount of disturbance to wildlife through the construction phase, however these activities are considered to be temporary in nature and can be mitigated to some degree. Long-term negative effects on wildlife from construction noise, light, dust, etc., are not anticipated which appropriate mitigation.

5.4.5 Potential Impact to Migratory Birds

The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. Although no nests of migratory birds were documented within the study area, evidence of bird nesting behaviour was identified within the vicinity of the proposed construction activities.

The removal of vegetation within cultural meadow, cultural thicket/woodland and meadow marsh communities present in the project limits, will very likely impact migratory breeding birds that have previously used the area for nesting. All construction activities associated with the road improvements must be in compliance with the MBCA. To comply with the requirements of the MBCA, disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the act.

5.4.6 Displacement of Rare, Threatened or Endangered Wildlife

There is potential for species at risk wildlife to occur within the study area and vicinity. However, no direct impacts are anticipated to SAR habitat and potential impacts to SAR wildlife will be mitigated through construction mitigation as well as design mitigation outlined further below.

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Provisions shall be included to ensure that fencing is installed to inhibit wildlife from entering the work zone. In addition, it is recommended that mitigation aimed to exclude wildlife from entering the road corridor from the north be incorporated into the final road design. Given the presence of adjacent wetlands supporting turtle and amphibian habitat it will also be important to ensure high level stormwater treatment and not direct flows to the pond pocket located immediately northwest of Westmount Road. This pocket does not currently receive stormwater inputs.

Further consultation with MECP is recommended at detailed design regarding any general habitat protection measures that will be required for species at risk turtles, that are confirmed in the general area.

6.0 Mitigation Measures

The following design and construction mitigation measures are recommended in order to ensure protection and minimize impacts to downstream aquatic communities, vegetation and vegetation communities and wildlife and wildlife habitat for this project.

6.1 Road Design Mitigation

- Wherever possible during detail design, efforts will be made to minimize the removal of vegetation/vegetation communities present along the north side of Bearinger Road, adjacent to the Laurel Creek Reservoir property.
- The provision of wildlife exclusion fencing, targeting small mammals, reptiles and amphibians is recommended along the north side of Bearinger Road (north of the multi-use trail) along the section of road abutting the Laurel Creek Conservation Area, with further input from the GRCA. There is also paige wire fencing present along GRCA property boundary that could be upgraded in areas to accommodate to exclusion of these animals (i.e. attached small mesh along bottom portion of fence).
- Minimize grading impacts adjacent to the wetland (PSW) pocket located at the northwest corner of the Westmount Road/Bearinger Road intersection. The wetland currently supports Candidate SWH Turtle Overwintering and Woodland Amphibian Breeding.
- Restoration and edge management planting should be undertaken and implemented to mitigate impacts related to vegetation removals and/or impacts near to existing edges of natural areas.
- Landscape planning and planting should be undertaken and implemented to mitigate removals within landscaped/manicured areas, to beautify areas within the new right-of-way, provide additional shading. Landscaping planning and implementation shall be undertaken by experienced, qualified professionals.

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Maintenance and warranty for Landscaping should be in place for landscaping works undertaken.

- Roadway runoff should be directed to the existing storm water management (SWM) systems where technically feasible or additional options for on-site treatment considered (enhanced swales, infiltration).

6.1.1 Construction Mitigation

- Special care will be taken when construction vehicles are operating in the vicinity of wetland and forested habitats present along Fischer Hallman Road and Bearinger Road. Provisions should be included in the contract package to ensure that these more sensitive features are avoided and to prohibit/limit encroachment into these sensitive areas.
- Appropriate tree protection will be installed to protect trees to be retained, including safeguarding trees from construction operations, equipment and vehicles where such trees are not designated for removal under the contract.
- Standard erosion and sedimentation control measures must be followed during construction to cover the installation, maintenance, monitoring and removal of the temporary erosion and sediment control measures and the removal of sediment accumulated by the control measures.
- The development of a detailed Erosion and Sediment Control (ESC) Plan. This plan would include some of the following best management practices and ESC controls.
    - The contractor shall ensure that soil migration from the construction area is prevented, and that exposed soils are stabilized as soon as is possible.
    - Sediment controls shall be placed along watercourses, ditches, wetlands and forest/woodland edges in areas of soil disturbance.
    - Sediment barriers shall be constructed without gaps and without undermining to prevent sediment passage through, under or around barrier.

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- Any dewatering will have discharge directed to a sediment containment system (sediment basin, sediment bag, etc.) prior to release to adjacent watercourses and wetlands.
- Storage, stockpiling and staging areas will be delineated prior to construction and inspected in accordance with the *Erosion and Sediment Control Guideline for Urban Construction* (GGHA 2006).
- Construction material, excess material, construction debris, and empty containers will be stored at least 30 m distance from watercourses and watercourse banks to prevent their entry into watercourses.
- Equipment refuelling, maintenance and washing activities will be conducted at a pre-determined site located at an adequate distance (minimum 30 m) from the watercourses and their banks located within the study area to prevent the entry of petroleum, oil or lubricants (POL) or other deleterious substances (including any debris, waste, rubble or concrete material) into watercourses within the study area, or their release to the environment.
- All spills that could potentially cause damage to the environment should be reported to the Spills Action Centre of the MECP. In the event of a spill, containment and clean-up will be completed quickly and effectively.
- A Spill Prevention and Response Contingency Plan must be included in the contract package to ensure a Spill Prevention and Response Contingency Plan and the appropriate contingency materials to absorb or contain any petroleum products/spills that may be accidentally discharged will be on site at all times.
- The Contractor will be ultimately responsible for controlling sediment and erosion within the construction site. Sediment laden water shall not be allowed to discharge to wetlands and watercourses.

- Native and non-invasive seed mix, mulch or an erosion control blanket will be placed in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization.

6.1.1.1 Tree protection and Arboricultural Practices

The following general recommendations conform to good arboricultural practices and are designed to help ensure impacts to trees surrounding the work zone, and those identified to be retained are minimized. General recommendations include:

- Tree protection fencing must be installed as per the approved Tree Preservation Plan. Tree protection fencing should be placed at minimum 1 m outside of the dripline of trees to be maintained, to minimize impacts and ensure no

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construction activity shall occur within the tree protection zones. The contract administrator must review and approve the fencing prior to the commencement of any grading work and the fencing will be maintained until all construction is complete.

- Heavy machinery shall not be operated within the TPZ (including overhead swinging of machine arms).
- Construction materials, equipment, soil, construction waste or debris shall not to be stored within the TPZ or dripline of the trees identified for protection.
- No movement or parking of vehicles, placement of equipment or pedestrian traffic will occur within the TPZ.
- No grade changes shall occur within the TPZ unless approved by the Tree Protection Plan.
- Trees shall not have any rigging cables or hardware of any sort attached or wrapped around them, nor shall any contaminants be dumped within protected areas.
- All removals must be felled into the work zone to ensure that damage does not occur to trees within the TPZ.
- Should any additional, incidental or accidental tree injuries occur during construction, a qualified Arborist should be consulted to determine whether additional mitigation measures should be employed.
- For any City owned Trees required digging, around the defined TPZ, all excavations should use hand tools, air spades or trenchless techniques, to avoid damage to roots. The following root pruning measures shall be implemented:
    - Any root cutting should be done with a sharp handsaw or secateurs (clean, straight cuts), keeping the wound at a minimum;
    - Exposed roots should not be allowed to dry out, where roots are exposed, they should be covered by dampened mulch or topsoil to prevent desiccation;
    - A slow release deep root low nitrogen fertilizer should be applied to any trees requiring root pruning to increase vigour; and,
    - Backfilling should occur as soon as possible and should occur with clean native uncontaminated topsoil.
- No more than 25 percent of the roots within the dripline for any retained tree should be cut or damaged.

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- Compensation for the removal of trees within the study area will be completed such that there should be no net loss of trees. Consultation with the GRCA is recommended for tree replacements that occur along then north side of Bearinger Road, adjacent to the Laurel Creek Reservoir property.

6.1.1.2 Wildlife Protection

- To comply with the requirements of the MBCA, disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the act.
- In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey must be conducted by a qualified avian biologist to identify and locate active nests of species covered under the MBCA. If an active nest is located, a mitigation plan shall be developed.
- Provisions shall be included to ensure that the Contractor does not block or prohibit wildlife access to culverts and to the wildlife corridor during construction.
- In the event that a SAR is observed on site, the observation will be immediately reported to the Environmental Inspector or Contract Administrator. SAR sightings will be reported to the MECP within 24 hrs.
- Equipment and vehicles must yield the right-of-way to wildlife. If wildlife is encountered during construction, site personnel are required to move away from the animal and wait for the animal to passively move off the construction site.

7.0 Detailed Design Commitments

The following list of commitments have been identified for inclusion at the detailed design stage in order to ensure all applicable permits are in place and the accurately define environmental impacts as well as develop appropriate compensation and enhancement measures:

- Finalization of the tree inventory along the preferred alignment and updating of the existing tree inventory details (which will update the hazard tree removals that have occurred along the road corridor).

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- Completion of a detailed Tree Preservation Plan which will include recommendations for tree preservation, removal and mitigation measures in accordance with City of Waterloo requirements.
- Further assessment of wildlife exclusion fencing design and extent, with input from the adjacent landowner (GRCA).
- Completion of a bat cavity survey to identify trees supporting candidate maternal cavity roosts, focusing along the forest boundary sections of Bearinger Road to confirm strategy for bat habitat mitigation and determine if a permit under the ESA, 2007 will be required.
- GRCA consultation with regards to permit(s) potentially required under Regulation 150/06.

8.0 Conclusion

Fischer Hallman Road/Bearinger Road requires widening between Columbia Street West and Westmount Road, within the City of Waterloo. The road widening is needed to support existing and future growth within the area. Several alternatives were evaluated as part of the Schedule C Municipal Class Environmental Assessment. All alternatives focused on widening east and south, utilizing the road right-of-way. Minimizing direct and indirect impacts to forest and wetland communities present on the Laurel Creek Reservoir property as well as impacts to the local wildlife, were included as evaluation criteria. Biophysical inventories were completed within the study area which included: turtle nesting surveys, wildlife mortality surveys, a drainage assessment; seasonal aquatic habitat assessments, breeding bird surveys, vegetation community assessments and a tree inventory/arborist assessment. Most features are contiguous to the Laurel Creek Reservoir, and the most significant crossing of the road alignment of the natural heritage features occurs at the Laurel Creek crossing. The balance of agricultural lands provide minimal ecological function.

The preferred alternative (Option 5a) will result in removal of a portion of a cultural woodland community, and minor removal of forest communities and wetland vegetation.

Overall, the road upgrades should result in minimal adverse environmental effects provided the environmental protection, design and construction mitigation measures identified in **Section 6.0** are implemented. The environmental protection/mitigation measures identified in this report must be incorporated into the contract package during detailed design to address potential environmental effects resulting from this project.

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Appendix A Project Correspondence

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Ministry of Natural Resources and Forestry

Ministère des Richesses naturelles et des Forêts

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Ontario

September 27, 2017

Erin Blenkhorn
Aquatic Biologist/Ecologist
LGL Limited
445 Thompson Drive, Unit 2
Cambridge Ontario
N1T 2K7

Re: Fischer Hallman Road (Regional Road 58) Widening and Improvements – Schedule C Project Municipal Class Environmental Assessment – City of Waterloo, Region of Waterloo - MNRF Preliminary Comments

Ms. Blenkhorn,

The Ministry of Natural Resources and Forestry (MNRF) Guelph District Office recently responded to LGL Limited's information request regarding the proposed Fischer Hallman Road (Regional Road 58) Widening and Improvements project in the City of Waterloo. It is understood that the project is being completed in accordance with a Municipal Class Environmental Assessment (EA) Schedule C Project under the *Environmental Assessment Act.*

Our August 31, 2017 response noted that Blanding's Turtle and Least Bittern are known for the EA study area. Blanding's Turtle and Least Bittern are listed as threatened under the *Endangered Species Act* (ESA), and both species receive individual and general habitat protection under the Act. We can provide the project team with the following additional comments on these species and their habitats to help inform the EA reporting:

- The Blanding's Turtle General Habitat Description (GHD) details how the species habitat has been categorized, in accordance with the policy 'Categorizing and Protecting Habitat under the *Endangered Species Act*'. Laurel Creek reservoir is known overwintering habitat for Blanding's Turtle. The reservoir, plus a 30 meter setback, is protected as Category 1 habitat for the species. All other suitable wetlands/ponds in the EA study area are protected as Category 2 habitat, and the areas between these wetlands as Category 3 habitat. It is recommended that the general habitat for the species be referenced in the EA reporting.

  Blanding's Turtles may also be using areas within the EA study area for nesting if suitable habitat is present. The GHD provides some direction on the types of habitats that may be suitable for nesting, and the typical proximity of nesting activity from Category 2 habitats. Nests are often created in open habitats with low vegetation cover and high sun exposure, and can include agricultural lands. Nests are also typically close to wetlands, with reported average distances between nests and the nearest wetland ranging from 100 to 242 meters. It is recommended that targeted nest surveys for Blanding's Turtle be completed in any suitable

habitats that may be directly or indirectly impacted by the project. This may include the agricultural lands south of Bearinger Road. Please see the attached for some technical guidance to support the development of targeted surveys for Blanding's Turtle nesting and nests.

- The most recent observation of Least Bittern for the Laurel Creek reservoir and the surrounding wetlands that the Ministry is aware of is from 2015. The MNRF considers the species to be present in the area based on this information. The general habitat for the species includes the wetland and open water communities associated with the reservoir, and the adjacent areas to these communities that are required to maintain the form and functions of these habitats. It is recommended that the general habitat for the species be referenced in the EA reporting.

We hope the above comments regarding Blanding's Turtle and Least Bittern are of assistance. Please contact the undersigned if further comment or clarification is required.

The MNRF would also appreciate the opportunity to review any environmental reporting completed in support of the EA when the information becomes available for review. This may be important to determine the potential implications of the ESA for the project, and for staff to understand how other provincial interests will be considered in the EA.

Regards,

Dave Marriott, District Planner
Ministry of Natural Resources and Forestry, Guelph District
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Phone: (519) 826-4926

cc: Barb Slattery, MOECC
Graham Buck, MNRF

City of Waterloo

Date Generated: August-30-17

Amphibian	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Jefferson Salamander *Ambystoma jeffersonianum*	END	Species Protection and Habitat Regulation	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Unisexual Ambystoma - Jefferson-dominated *Ambystoma laterale - jeffersonianum*	END	Species Protection and General Habitat Protection	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Bird	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Acadian Flycatcher *Empidonax virescens*	END	Species Protection and General Habitat Protection	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bald Eagle *Haliaeetus leucocephalus*	SC	N/A	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine.	Breed and Nest - April or May Some Migrate South when waterbodies freeze over	Follow Breeding Bird Survey Protocol
Bank Swallow *Riparia riparia*	THR	Species Protection and General Habitat Protection	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers.	Migrate South before Winter	Follow Breeding Bird Survey Protocol. Colony and Roost information should be recorded and submitted using Bird Studies Canada's Ontario Bank Swallow Project data forms (2010).
Barn Swallow *Hirundo rustica*	THR	Species Protection and General Habitat Protection	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol

Black Tern *Chlidonias niger*	SC	N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Bobolink *Dolichonyx oryzivorus*	THR	Species Protection and General Habitat Protection	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Canada Warbler *Cardellina canadensis*	SC	N/A	Generally prefers wet coniferous, decidiuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Arrive in Early May Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Cerulean Warbler *Setophaga cerulea*	THR	Species Protection and General Habitat Protection	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Chimney Swift *Chaetura pelagica*	THR	Species Protection and General Habitat Protection	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid-May Migrate South in September or Early October	Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009
Common Nighthawk *Chordeiles minor*	SC	N/A	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol

Eastern Meadowlark *Sturnella magna*	THR	Species Protection and General Habitat Protection	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Wood-Pewee *Contopus virens*	SC	N/A	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Least Bittern *Ixobrychus exilis*	THR	Species Protection and General Habitat Protection	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.
Louisiana Waterthrush *Seiurus motacilla*	THR	Species Protection and General Habitat Protection	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps	Migrate South for the Winter	Follow Breeding Bird Survey Protocol or Marsh Monitoring Protocol
Peregrine Falcon *Falco peregrinus*	SC	N/A	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	Active Year Round - Lay Eggs around Easter Hatching occurs around Mother's Day Young fledge around Father's	Visit ideal habitat locations and listen/look for individuals in the vicinity.
Red-Headed Woodpecker *Melanerpes erythrocephalus*	SC	N/A	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol
Wood Thrush *Hylocichla mustelina*	SC	N/A	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Migrate South for the Winter Arrive in Ontario in mid to late spring	Follow Breeding Bird Survey Protocol

Fish	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Black Redhorse *Moxostoma duquesnei*	THR	Species Protection and General Habitat Protection	Generally lives in moderately sized rivers and streams, with generally moderate to fast currents	Active Year Round	For information please contact your local MNRF office, CA or DFO
Silver Shiner *Notropis photogenis*	THR	Species Protection and General Habitat Protection	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	Spawning occurs in May and June	For information please contact your local MNRF office, CA and/or DFO
Insect	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Monarch Butterfly *Danaus plexippus*	SC	N/A	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Usually migrate south in late September and October	Watch for adults along roadsides and in open fields. Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
Rusty-patched Bumble Bee *Bombus affinis*	END	Species Protection and General Habitat Protection	Generally inhabits a range of diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas. It usually nests underground in abandoned rodent burrows	Active from early Spring to late Fall	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
West Virginia White *Pieris virginiensis*	SC	N/A	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	Watch for adults within moist, deciduous woodlands Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. Adults can be spotted from a distance; caterpillars must be searched for carefully by checking host plant
Mammal	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

Eastern Small-footed Myotis *Myotis leibii*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	Hibernates in caves and mines during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Little Brown Myotis *Myotis lucifugus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Northern Myotis *Myotis septentrionalis*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Tri-colored Bat *Perimyotis subflavus*	END	Species Protection and General Habitat Protection	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	Hibernates during winter	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Mollusc	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Wavy-rayed Lampmussel *Lampsilis fasciola*	THR	Species Protection and Habitat Regulation	Generally inhabit clear rivers and streams of a variety of sizes, where the water flow is steady and the substrate is stable	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Plant	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

American Ginseng *Panax quinquefolius*	END	Species Protection and General Habitat Protection	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Flowering begins in June and continues until August The fruit develop from July to August and ripen in August and September	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Butternut *Juglans cinerea*	END	Species Protection and General Habitat Protection	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Flowers from April to June. Fruits reach maturity during the month of September or October	Walk slowly and systematically in grid fashion through suitable habitat pausing every 30 meters for a detailed scan of trees within sight. Areas with dense foliage or many saplings will require a more intensive survey to detect sapling butternut. Use Butternut Health Assessment Protocol if planning on removing trees.
Reptile	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Blanding's Turtle *Emydoidea blandingii*	THR	Species Protection and General Habitat Protection	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Eggs are laid in June, with hatchlings emerging in late September and early October.	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Ribbonsnake *Thamnophis sauritus*	SC	N/A	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Northern Map Turtle *Graptemys geographica*	SC	N/A	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	Scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site Snorkel in desired aquatic habitat
Snapping Turtle *Chelydra serpentina*	SC	N/A	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	Scan offshore rocks and logs for basking turtles (10am-2pm) Snorkel in desired aquatic habitat Nesting Season: Search known or preferred nesting habitat areas for females

Erin Blenkhorn

From: Kaitlyn Smith <ksmith@grandriver.ca>
Sent: August 14, 2017 1:46 PM
To: Erin Blenkhorn
Subject: RE: Fischer Hallman Road Widening Study

Hi Erin,

GRCA staff have had an opportunity to review your background information request for the Fischer Hallman Road Widening Study (Columbia to Westmount) and can provide the following:

- Please contact the MNRF for information on evaluated wetlands, ANSIs, species at risk, and fish community composition.

- Occurrences of provincially rare species, including provincially and/or federally listed species at risk, can be obtained from the Natural Heritage Information Centre (MNRF) in Peterborough.
    - There are records of Eastern Milksnake, Eastern Ribbonsnake, and Snapping Turtle; all listed special concern by the province and which may still be present in the area.
    - There are records of Jefferson salamander polyploids in the study area, but they are quite dated. It appears that the only suitable breeding ponds are located on the GRCA Nature Centre property located west of Beavercreek Road.
    - There is a historical (1979) record of Black Tern, but this species has not been observed in the area in the last 20 years or so.

- Watercourse-level mapping for federally listed aquatic species at risk (i.e. mussels and fish) can be obtained from DFO by contacting Dave Balint (dave.balint@dfo-mpo.gc.ca) directly or online at the following link: http://www.dfo-mpo.gc.ca/species-especes/fpp-ppp/index-eng.htm. There are no known records of aquatic SARs for the reservoir or immediately downstream.

- Natural heritage information (vegetation mapping, SAR occurrences etc.) is also documented in the Laurel Creek Subwatershed Study and the North Waterloo Scoped Subwatershed Study, which are filed with the Region of Waterloo and the City of Waterloo.

- GRCA staff recently confirmed the presence of Blanding's Turtle on the Nature Centre property and the MNRF is aware of these records. There are also records of Snapping Turtle (special concern in Ontario) in the reservoir and females may nest on the shoulder of Bearinger Road (and possibly Fischer Hallman as well).

- Mapping layers for the GRCA Regulation Limit and Wetlands can be downloaded off of the Grand River Information Network (GRIN) located at the following link: https://data.grandriver.ca/ (under the Downloads section).

We trust that the above is of assistance to you. If you have any questions or concerns, please let me know.

Kind regards,

Kaitlyn Smith | *Resource Planner*
Grand River Conservation Authority
400 Clyde Road, PO Box 729, Cambridge ON N1R 5W6
Phone: 519-621-2763 x 2292 | *Fax:* 519-621-4945
www.grandriver.ca

From: Erin Blenkhorn [mailto:EBlenkhorn@lglcambridge.com]
Sent: August 4, 2017 10:23 AM
To: Ashley Graham
Subject: Fischer Hallman Road Widening Study

Hello Ashley,

I hope that all is well with you. I am a little unsure if Waterloo is in your jurisdiction, but thought I would send this along to you as a first contact.

LGL Limited is involved in the Fischer Hallman Road Widening and Improvements project. This is a Schedule C Class Environmental Assessment with study limits extending between Columbia Street W to Westmount Road W in Waterloo. The project was recently initiated in the spring of 2017 and LGL Limited was retained to conduct natural heritage and arborist assessments, as a sub-consultant to Walter Fedy for this Region of Waterloo project. I have attached a map of the study area. In terms of natural environment features present in the study area, we have identified the following:

- Laurel Creek, crossing Westmount Road and Bearinger Road, near the eastern limits of the study area
- A tributary of Laurel Creek originating on east side of Fischer Hallman, flowing easterly towards Columbia Lake (in study area)
- Laurel Creek Reservoir and Conservation Area (**GRCA lands**) immediately north of Fischer Hallman/Bearinger Rd.
- PSW in vicinity (north of study area)- Sunfish Lake Laurel Creek Wetland Complex.

We would like to request a background information request, consisting of the following:

- Fisheries records available for study area and information
- Mapped Regulation limits and GRCA wetland layers
- Any flora and fauna information you may have for study area (particularly interested in knowing if Blanding's Turtle have been observed in Laurel Creek Reservoir and vicinity).
- Other general information you may have with regards to animal movement to/from Laurel Creek and amphibian/reptile mortality records

We are particularly interested in knowing if any animal movement studies are available for the area along Bearinger/Fischer Hallman Road, just south of Laurel Creek Reservoir. This study initiated late in the spring and we weren't able to conduct a thorough road mortality/movement study, especially given the number of cold spring nights encountered. We feel that amphib/reptile movements and presence will be a key issue for this particular study.

Thanks for your time and happy long weekend!
Regards,

Erin Blenkhorn, B.Sc.
Aquatic Biologist/Ecologist

LGL Limited
environmental research associates
Visit us on the web at www.lgl.com

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Appendix B Flora and Wildlife Lists

Draft

Appendix B: Flora list for Fischer Hallman/Bearinger Road Widening

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status	ELC Communities													
								FOD4A	FOD4B	FOD5-2	FOD6-1	CUP3-3	CUM1-1A	CUM1-1B	CUT1	CUW1A	CUW1B	MAS2-1/MAM2-2	MAM2	MAM2-10	OAO
	EQUISETACEAE	**HORSETAIL FAMILY**																			
	Equisetum arvense	field horsetail	G5	S5						x	x		x							x	
	DENNSTAEDTIACEAE	**BRACKEN FERN FAMILY**																			
	Pteridium aquilinum var. latiusculum	eastern bracken-fern	G5T	S5							x										
	DRYOPTERIDACEAE	**WOOD FERN FAMILY**																			
	Matteuccia struthiopteris var. pensylvanica	ostrich fern	G5	S5							x										
	Onoclea sensibilis	sensitive fern	G5	S5							x										
	Polystichum acrostichoides	Christmas fern	G5	S5							x										
	PINACEAE	**PINE FAMILY**																			
*	*Larix decidua*	European larch	G?	SE2					x												
	Larix laricina	tamarack	G5	S5												x					
*	*Picea abies*	Norway spruce	G?	SE3												x					
	Picea glauca	white spruce	G5	S5			S									x					
*	*Pinus nigra*	Austrian pine	G?	SE2					x			x				x					
	Pinus strobus	eastern white pine	G5	S5										x		x					
*	*Pinus sylvestris*	scotch pine	G?	SE5					x			x				x					
	Tsuga canadensis	eastern hemlock	G5	S5							x										
	CUPRESSACEAE	**CEDAR FAMILY**																			
	Juniperus virginiana	eastern red cedar	G5	S5														x			
	Thuja occidentalis	eastern white cedar	G5	S5					x					x		x		x			
	ARISTOLOCHIACEAE	**DUCHMAN'S-PIPE FAMILY**																			
	Asarum canadense	wild ginger	G5	S5							x										
	RANUNCULACEAE	**BUTTERCUP FAMILY**																			
	Actaea pachypoda	white baneberry	G5	S5				x													
	Anemone canadensis	Canada anemone	G5	S5						x	x							x			
	Ranunculus sceleratus var. sceleratus	cursed buttercup	G5T5	S5						x											
	Thalictrum dioicum	early meadow-rue	G5	S5							x										
	BERBERIDACEAE	**BARBERRY FAMILY**																			
	Caulophyllum thalictroides	blue cohosh	G	S5							x										
	Podophyllum peltatum	may-apple	G5	S5							x										
	PAPAVERACEAE	**POPPY FAMILY**																			
	Sanguinaria canadensis	bloodroot	G5	S5						x	x										
	ULMACEAE	**ELM FAMILY**																			
	Ulmus americana	white elm	G5?	S5				x	x		x					x				x	
	MORACEAE	**MULBERRY FAMILY**																			
*	*Morus alba*	white mulberry	G?	SE5					x												
	URTICACEAE	**NETTLE FAMILY**																			
	Laportea canadensis	wood nettle	G5	S5							x										
	Pilea pumila	dwarf clearweed	G5	S5							x										
	JUGLANDACEAE	**WALNUT FAMILY**																			
	Carya cordiformis	bitternut hickory	G5	S5				x		x	x										
	Juglans nigra	black walnut	G5	S4			S									x	x	x			
	FAGACEAE	**BEECH FAMILY**																			
	Fagus grandifolia	American beech	G5	S5						x	x										
	BETULACEAE	**BIRCH FAMILY**																			
	Betula alleghaniensis	yellow birch	G5	S5							x										
	Betula papyrifera	white birch	G5	S5												x					
	Ostrya virginiana	ironwood	G5	S5						x	x										
	CARYOPHYLLACEAE	**PINK FAMILY**																			
*	*Saponaria officinalis*	bouncing-bet	G?	SE5										x							
	POLYGONACEAE	**SMARTWEED FAMILY**																			
*	*Rumex crispus*	curly-leaf dock	G?	SE5									x	x		x	x				
*	*Rumex obtusifolius ssp. obtusifolius*	bitter dock	G5	SE5							x										
	GUTTIFERAE	**ST. JOHN'S-WORT FAMILY**																			
*	*Hypericum perforatum*	common St. John's-wort	G?	SE5									x				x				
	TILIACEAE	**LINDEN FAMILY**																			
	Tilia americana	basswood	G5	S5					x	x	x			x		x					
	SALICACEAE	**WILLOW FAMILY**																			
	Populus balsamifera ssp. balsamifera	balsam poplar	G5T?	S5								x							x		
	Populus deltoides	cottonwood											x	x		x	x	x			
	Populus tremuloides	trembling aspen	G5	S5																	
	Salix petiolaris	slender willow	G4	S5										x							

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status	ELC Communities													
								FOD4A	FOD4B	FOD5-2	FOD6-1	CUP3-3	CUM1-1A	CUM1-1B	CUT1	CUW1A	CUW1B	MAS2-1/MAM2-2	MAM2	MAM2-10	OAO
	Salix sp.	willow		?														x	x		
*	*Salix X rubens*	reddish willow	HYB	SE4					x												
*	*Salix X sepulcralis*	hybrid willow	HYB	SE2												x					
	BRASSICACEAE	**MUSTARD FAMILY**																			
*	*Alliaria petiolata*	garlic mustard	G5	SE5						x	x										
*	*Hesperis matronalis*	dame's rocket	G4G5	SE5							x										
*	*Thlaspi arvense*	field penny-cress	G?	SE5													x				
	GROSSULARIACEAE	**GOOSEBERRY FAMILY**																			
	Ribes cynosbati	prickly gooseberry	G5	S5						x											
	ROSACEAE	**ROSE FAMILY**																			
	Agrimonia gryposepala	tall hairy agrimony	G5	S5						x											
*	*Aruncus dioicus*	dioecious goat's-beard	G5	SE1												x	x				
	Crataegus sp.	hawthorn								x	x					x					
	Geum canadense	white avens	G5	S5							x										
*	*Malus baccata*	Siberian crabapple	G?	SE1					x												
	Physocarpus opulifolius	ninebark	G5	S5					x												
	Prunus serotina	black cherry	G5	S5						x	x										
	Prunus virginiana var. virginiana	choke cherry	G5T?	S5				x			x										
*	*Rubus idaeus ssp. idaeus*	red raspberry	G5T5	SE1				x		x	x									x	
	Rubus occidentalis	thimble-berry	G5	S5					x												
	Rubus sp.	raspberry													x						
	Sorbus decora	showy mountain-ash	G4G5	S5					x							x					
	FABACEAE	**PEA FAMILY**																			
	Cercis canadensis	Canadian redbud	G5	SX					x												
*	*Coronilla varia*	variable crown-vetch	G?	SE5										x							
	Gleditsia triacanthos var. inermis	'shade master' honey locust		SE?														x			
*	*Lotus corniculatus*	bird's-foot trefoil	G?	SE5									x	x		x	x				
*	*Medicago lupulina*	black medick	G?	SE5							x									x	
*	*Melilotus alba*	white sweet-clover	G?	SE5																x	
*	*Melilotus officinalis*	yellow sweet-clover	G?	SE5										x							
*	*Robinia pseudo-acacia*	black locust	G5	SE5					x							x	x	x			
*	*Trifolium hybridum ssp. elegans*	alsike clover		SE5										x			x				
*	*Trifolium pratense*	red clover	G?	SE5										x		x					
*	*Vicia cracca*	tufted vetch	G?	SE5									x	x		x	x	x		x	
	ELAEAGNACEAE	**OLEASTER FAMILY**																			
*	*Elaeagnus angustifolia*	Russian olive	G?	SE3					x							x		x	x	x	
	LYTHRACEAE	**LOOSESTRIFE FAMILY**																			
*	*Lythrum salicaria*	purple loosestrife	G5	SE5														x		x	x
	ONAGRACEAE	**EVENING-PRIMROSE FAMILY**																			
	Circaea lutetiana ssp. canadensis	yellowish enchanter's nightshade	G5T5	S5						x	x										
*	*Epilobium hirsutum*	great hairy willow-herb	G?	SE5														x		x	
	Oenothera biennis	common evening-primrose	G5	S5										x							
	CORNACEAE	**DOGWOOD FAMILY**																			
	Cornus alternifolia	alternate-leaved dogwood	G5	S5							x					x					
	Cornus rugosa	round-leaved dogwood	G5	S5							x										
	Cornus sericea ssp. sericea	red-osier dogwood	G5	S5									x								
	RHAMNACEAE	**BUCKTHORN FAMILY**																			
*	*Rhamnus cathartica*	common buckthorn	G?	SE5				x	x		x	x	x		x	x					
	VITACEAE	**GRAPE FAMILY**																			
	Parthenocissus vitacea	inserted Virginia-creeper	G5	S5				x			x	x	x		x	x		x		x	
	Vitis riparia	riverbank grape	G5	S5						x	x	x			x			x		x	
	ACERACEAE	**MAPLE FAMILY**																			
*	*Acer ginnala*	amur maple	G?	SE1												x					
	Acer negundo	manitoba maple	G5	S5				x	x		x										
	Acer nigrum	black maple	G5Q	S4?							x										
*	*Acer platanoides*	norway maple	G?	SE5												x					
	Acer saccharinum	silver maple	G5	S5					x		x					x		x			x
	Acer saccharum var. saccharum	sugar maple	G5T?	S5						x	x										
	ANACARDIACEAE	**SUMAC FAMILY**																			
	Rhus hirta	staghorn sumac	G5	S5										x				x			
	Toxicodendron radicans ssp. negundo	poison-ivy	G5T	S5							x										
	Toxicodendron rydbergii	western poison-ivy	G5T	S5						x											

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status	ELC Communities													
								FOD4A	FOD4B	FOD5-2	FOD6-1	CUP3-3	CUM1-1A	CUM1-1B	CUT1	CUW1A	CUW1B	MAS2-1/MAM2-2	MAM2	MAM2-10	OAO
	GERANIACEAE	**GERANIUM FAMILY**																			
*	*Geranium robertianum*	herb-robert	G5	SE5						x	x			x							
	BALSAMINACEAE	**TOUCH-ME-NOT FAMILY**																			
	Impatiens capensis	spotted touch-me-not	G5	S5							x							x	x	x	
*	*Impatiens glandulifera*	glandular touch-me-not	G?	SE4												x					
	APIACEAE	**PARSLEY FAMILY**																			
*	*Daucus carota*	wild carrot	G?	SE5									x			x	x				
	Sanicula canadensis var. canadensis	Canada snakeroot	G5T5	S4			S				x										
	APOCYNACEAE	**DOGBANE FAMILY**																			
*	*Vinca minor*	periwinkle	G?	SE5						x											
	ASCLEPIADACEAE	**MILKWEED FAMILY**																			
	Asclepias syriaca	common milkweed	G5	S5									x			x	x		x	x	
	SOLANACEAE	**POTATO FAMILY**																			
*	*Solanum dulcamara*	bitter nightshade	G?	SE5							x										
	CONVOLVULACEAE	**MORNING-GLORY FAMILY**																			
*	*Convolvulus arvensis*	field bindweed	G?	SE5									x	x							
	HYDROPHYLLACEAE	**WATER-LEAF FAMILY**																			
	Hydrophyllum virginianum	Virginia water-leaf	G5	S5							x										
	LAMIACEAE	**MINT FAMILY**																			
*	*Mentha X piperita*	pepper mint	HYB	SE4										x							
	PLANTAGINACEAE	**PLANTAIN FAMILY**																			
*	*Plantago lanceolata*	ribgrass	G5	SE5										x			x				
*	*Plantago major*	common plantain	G5	SE5						x											
	OLEACEAE	**OLIVE FAMILY**																			
	Fraxinus americana	white ash	G5	S5					x												
	OLEACEAE	**OLIVE FAMILY**																			
*	*Fraxinus excelsior*	European ash	G?	SE2												x					
	Fraxinus nigra	black ash	G5	S5							x										
	Fraxinus pennsylvanica	red ash	G5	S5				x			x					x		x		x	
*	*Syringa reticulata*	japanese tree lilac							x												
	BIGNONIACEAE	**TRUMPET-CREEPER FAMILY**																			
*	*Catalpa speciosa*	northern catalpa	GU	SE1					x					x							
	RUBIACEAE	**MADDER FAMILY**																			
	Galium sp.	bedstraw												x		x					
	CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**																			
*	*Lonicera tatarica*	tartarian honeysuckle	G?	SE5					x							x					
	Sambucus nigra ssp. canadensis	common elderberry	G5	S5							x							x			
	Viburnum opulus var. americanum	high bush cranberry	G5T5	S5							x					x		x			
	DIPSACACEAE	**TEASEL FAMILY**																			
*	*Dipsacus fullonum ssp. sylvestris*	wild teasel	G?T?	SE5									x	x		x	x				
	ASTERACEAE	**ASTER FAMILY**																			
*	*Achillea millefolium var. millefolium*	common yarrow	G5T?	SE?									x								
	Ambrosia artemisiifolia	common ragweed	G5	S5										x							
*	*Anthemis arvensis*	corn chamomille	G?	SE5									x								
*	*Arctium minus*	common burdock	G?T?	SE5						x	x		x	x		x					
*	*Artemisia biennis*	biennial wormwood	G5	SE5												x					
	Aster lanceolatus ssp. lanceolatus	tall white aster	G5T?	S5					x							x				x	
	Aster lateriflorus var. lateriflorus	calico aster	G5T5	S5				x		x											
	Aster sp.	aster									x										
	Centaurea sp.	knapweed		SE?									x								
*	*Cichorium intybus*	chicory	G?	SE5										x		x	x				
*	*Cirsium arvense*	Canada thistle	G?	SE5									x	x		x	x			x	
*	*Cirsium vulgare*	bull thistle	G5	SE5									x	x		x	x				
	Erigeron philadelphicus var. philadelphicus	Philadelphia fleabane	G5T?	S5							x										
	Eupatorium maculatum var. maculatum	spotted joe-pye-weed	G5T5	S5														x		x	
	Euthamia graminifolia	flat-topped bushy goldenrod	G5	S5										x					x		
*	*Leucanthemum vulgare*	ox-eye daisy	G?	SE5										x							
	Rudbeckia hirta	black-eyed Susan	G5	S5										x							
	Solidago canadensis	canada goldenrod	G5	S5				x	x		x		x	x	x	x	x			x	
	Solidago flexicaulis	zig-zag goldenrod	G5	S5				x			x										
*	*Sonchus arvensis ssp. arvensis*	field sow-thistle	G?T?	SE5										x							

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status	ELC Communities													
								FOD4A	FOD4B	FOD5-2	FOD6-1	CUP3-3	CUM1-1A	CUM1-1B	CUT1	CUW1A	CUW1B	MAS2-1/MAM2-2	MAM2	MAM2-10	OAO
	Symphyotrichum novae-angliae	New England aster	G5	S5										x							
*	*Tanacetum vulgare*	common tansy	G?	SE5										x							
*	*Taraxacum officinale*	common dandelion	G5	SE5										x		x					
*	*Tussilago farfara*	coltsfoot	G?	SE5							x			x							
	ARACEAE	**ARUM FAMILY**																			
	Arisaema triphyllum ssp. triphyllum	small jack-in-the-pulpit	G5T5	S5							x										
	LEMNACEAE	**DUCKWEED FAMILY**																			
	Lemna sp.	duckweed																			x
	JUNCACEAE	**RUSH FAMILY**																			
	Juncus effusus ssp. solutus	soft rush	G5T?	S5										x							
	Juncus sp.	rush																x			
	CYPERACEAE	**SEDGE FAMILY**																			
	Carex pensylvanica	Pennsylvania sedge	G5	S5							x										
	Schoenoplectus tabernaemontani	American great bulrush	G?	S5																x	x
	Scirpus cyperinus	wool-grass	G5	S5														x			x
	POACEAE	**GRASS FAMILY**																			
*	*Bromus inermis ssp. inermis*	awnless brome	G4G5	SE5										x		x	x		x		
*	*Dactylis glomerata*	orchard grass	G?	SE5							x			x		x					
*	*Echinochloa crusgalli*	common barnyard grass	G?	SE5									x	x							
*	*Elymus repens*	quack grass	G?	SE5										x							
*	*Lolium pratense*	meadow fescue	G5	SE5									x	x							
	Phalaris arundinacea	reed canary grass	G5	S5									x				x	x	x	x	x
*	*Phragmites australis*	common reed	G5	S5														x	x	x	
	Poa pratensis ssp. pratensis	Kentucky bluegrass	G5T	S5										x		x					
*	*Setaria viridis*	green foxtail	G?	SE5										x							
	TYPHACEAE	**CATTAIL FAMILY**																			
	Typha angustifolia	narrow-leaved cattail	G5	S5										x				x			x
	Typha latifolia	broad-leaved cattail	G5	S5														x			
	LILIACEAE	**LILY FAMILY**																			
	Maianthemum racemosum ssp. racemosum	false Solomon's seal	G5T	S5							x										
	Maianthemum stellatum	star-flowered Solomon's seal	G5	S5							x										
	Trillium grandiflorum	white trillium	G5	S5						x	x										

Regional Municipality of Waterloo

S = locally significant

Appendix E1. Wildlife list for Fischer Hallman/Bearinger Road Widening

Type	Scientific Name	Common Name	Incidental observation	LGL Field Investigations					G-Rank	S-Rank	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	SWH-TG Area	Interior Species	Waterloo Region	Priority Species
				2017/05/19	2017/06/14	2018/05/07	2019/07/03	2019-06-26*												
Amphibian	*Lithobates clamitans*	Green Frog			X				G5	S5										
Amphibian	*Lithobates pipiens*	Northern Leopard Frog				X		X	G5	S5	NAR									
Bird	*Carduelis tristis*	American Goldfinch		X	X	X		X	G5	S5B					X	CP				level 3
Bird	*Hirundo rustica*	Barn Swallow			X4			X	G5	S4B	THR	no Sch	THR		X	CP				level 3
Bird	*Poecile atricapillus*	Black-capped Chickadee		X	X	X	X		G5	S5					X	CP				level 4
Bird	*Tyrannus tyrannus*	Eastern Kingbird			X		X		G5	S4B					X	CP				level 3
Bird	*Dumetella carolinensis*	Gray Catbird					X		G5	S4B					X	CP				level 4
Bird	*Butorides virescens*	Green Heron	X3						G5	S4B						CP			RS	
Bird	*Passerculus sandwichensis*	Savannah Sparrow		X	X				G5	S4B					X	CP	X (>50ha			level 1
Bird	*Actitis macularius*	Spotted Sandpiper			X				G5	S5					X	CP				level 3
Bird	*Corvus brachyhrynchos*	American Crow					X		G5	S5B										
Bird	*Turdus migratorius*	American Robin					X	X	G5	S5B					X					
Bird	*Icterus galbula*	Baltimore Oriole							G5	S4B					X					
Bird	*Ceryle alcyon*	Belted Kingfisher				X1			G5	S4B				P					RS	
Bird	*Cyanocitta cristata*	Blue Jay		X	X		X	X	G5	S5				P						
Bird	*Molothrus ater*	Brown-headed Cowbird			X		X	X	G5	S4B										
Bird	*Bombycilla cedrorum*	Cedar Waxwing			X		X	X	G5	S5B					X					
Bird	*Spizella passerina*	Chipping Sparrow			X			X	G5	S5B					X					
Bird	*Quiscalus quiscula*	Common Grackle			X				G5	S5B										
Bird	*Geothlypis trichas*	Common Yellowthroat		X	X		X	X	G5	S5B					X					
Bird	*Contopus virens*	Eastern Wood Pewee			X5				G5	S4B	SC	no Sch	SC		X					
Bird	*Sturnus vulgaris*	European Starling		X				X	G5	SNA										
Bird	*Myiarchus crinitus*	Great Crested Flycatcher		X	X				G5	S4B					X					
Bird	*Passer domesticus*	House Sparrow			X		X		G5	SNA										
Bird	*Troglodytes aedon*	House Wren					X		G5	S5B					X					
Bird	*Charadrius vociferus*	Killdeer			X		X		G5	S5B,S5N					X					
Bird	*Anas platyrhynchos*	Mallard				X			G5	S5					X					
Bird	*Cardinalis cardinalis*	Northern Cardinal							G5	S5					X					
Bird	*Vireo olivaceus*	Red-eyed Vireo			X		X		G5	S5B					X			X		
Bird	*Agelaius phoeniceus*	Red-winged Blackbird		X	X	X	X	X	G5	S4										
Bird	*Melospiza melodia*	Song Sparrow		X	X		X	X	G5	S5B					X					
Bird	*Vireo gilvus*	Warbling Vireo		X	X				G5	S5B					X				RS	
Bird	*Sitta carolinensis*	White-breasted Nuthatch			X				G5	S5					X		X (10ha			
Bird	*Dendroica petechia*	Yellow Warbler			X				G5	S5B					X					
Invertebrate	*Fallicambarus fodiens*	Chimney Crayfish	X																	
Invertebrate	*Calopteryx maculata*	Ebony Jewelwing	X						G5	S5										
Invertebrate	*Danaus plexippus*	Monarch	X						G5	S2N, S4B	END	SC-Sch1	SC	P						
Mammal	*Marmota monax*	Groundhog	dens			X1														
Mammal	*Procyon lotor*	Northern Raccoon	tracks						G5	S5				F						
Mammal	*Odocoileus virginianus*	White-tailed Deer	tracks						G5	S5				G						
Mammal	*Castor canadensis*	Beaver	dam in creek						G5	S5				F						
Reptile	*Chrysemys picta marginat*	Northern (Midland) Painted Turtle			X				G5T5	S5				P						
Reptile	*Chelydra serpentina*	Snapping Turtle				X2			G5	S3	SC	SC-Sch1	SC	G						

*** Watermain study area only**
X1- wetland pocket northwest of Westmount Road/Bearinger Road.
X2- wetland pocket northwest of Westmount Road/Bearinger Road. On April 30, 2018 (likely overwintering habitat given time of survey).
X3- Laurel Creek, east of Westmount Road
X4- Barn Swallows were observed foraging over CUM1-1B field at the northeast corner of Bearinger Rd/Laurelwood Dr intersection. No nests located on nearby buildings.
X5- Eastern Wood Pewees were heard singing within FOD5-2 community

Definitions

G-Rank (Global Rank)

G1- extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals or because of some factor (s) making it especially vulnerable
G2-very rare; usually between 5-20 occurrences in the range or with many individuals in fewer occurrences or because of some factor (s) making it vulnerable to extinction
G3- rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences but with a large number of individuals in some populations or may be susceptible to large-scale disturbances
G4-common; usually more than 100 occurrences, usually not susceptible to immediate threats
G5-very common; demonstrably secure under present conditions

S-Rank (Provincial Rank)

S1-critically imperiled; critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s) such as very steep declines making it especially vulnerable to extirpation from the state/province
S2-imperilled; imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines or other factors making it very vulnerable to extirpation from the nation or state/province
S3-vulnerable; vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines or other factors making it vulnerable to extirpation
S4-apparently secure; uncommon but not rare; some cause for long-term concern due to declines or other factors
S5-secure; common, widespread and abundant in the nation or state/province
SNA- not applicable; a conservation status rank is not applicable because species is not a suitable target for conservation activities
SZB-breeding migrants/vagrants
SZN-non-breeding migrants/vagrants

COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

NAR- not at risk; a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances
THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed
END-endangered; a wildlife species facing imminent extirpation or extinction
EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere
SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats
DD-data deficient; a wildlife species for which there is in adequate information to make a direct, or indirect, assessment of its risk of extinction

SARA (Species at Risk Act)

Schedule 1- official list of wildlife species at risk
THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed
END-endangered; a wildlife species facing imminent extirpation or extinction
EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere
SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

SARO (Species at Risk in Ontario)

END-Endangered; a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA
EXP-Extirpated; a species that no longer exists in the wild in Ontario but exists elsewhere
THR-Threatened; a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed
SC-Special Concern; a species with characteristics that make it sensitive to human activities or natural events

FWCA (Fish and Wildlife Conservation Act)

P - protected species
G - game species
F- Furbearing

MBCA (Migratory Birds Convention Act)
X - Migrant species with afforded protection

GRCA (Grand River Conservation Authority)
CP- conservation priority

SWH-TG (Significant Wildlife Habitat Technical Guide, 2000)

Conservation Priority
level 1-highest priority
level 4-lowest priority

Appendix E2. Turtle Nesting Survey Data Table

Date	Time	Survey Area	Weather				Observations	Turtles	Nest Excavations	Predated Excavations	Search Hr	Observer
			Temp.	Cloud Cover	Rain	Wind						
05/06/2018	7:20	Dam road walked twice. Walked south side of Bearinger and north side (via trail and roadside). Screen capture to right shows extent of excavations.	11°C	Overcast; 100% cloud cover	Light rain prior to survey	10-22 km/hr NW wind	• Nest excavations (turtle species not confirmed) along the west side of the road to dam (within a 70m section). • Gravel substrates, present in between placed boulders on top portion of road bank.		X	X	3.5 hr	EEB/ TRH
13/06/2018	19:30	Walked from gate to berm (litter open/suitable habitat), then across intersection and down road/edge from farm field. Parked at paved shoulders. Some shoulders (WP#1158) were too narrow to walk along. Walked along trail at grade as well.	Warm			Very windy	• No nesting turtles. • Approximately 35 predated excavations (presence of egg shells) from gate to berm (on east side). No excavations found within large stone substrate/rip rap. • Approximately 24 excavations were found on west side of road. • Deer tracks found at field edge. • 2 Chimney crayfish burrows found at WP#1159. • Monarch caterpillar and eaten milkweed found at WP#1161. • 2 shallow excavations (possibly turtle) found at WP#1162. • Groundhog hole found at WP#1163. • No nesting/excavations found around trail.		X	X	2 hr	AHF
18/06/2018	19:15	Dam road walked twice, rest of area once. Travelled along road with car slowly.	24°C		Rain prior to survey (24 hr)	17 km/hr NW winds	• No nesting turtles. • Approximately 50 nest-like excavations on east side of dam road. • 19 nest-like excavations on west side of dam road. (6 predated nests).		X	X	1.50 hr	TRH
24/06/2018	20:30	Travelled cornfield and dam road twice, travelled road shoulder	17°C; 94% humidity		Abundant rain (24 hr)		• No nesting turtles. • Approximately 8-10 newly predated nests along dam road. +H6:M7+H6:M73.			X	1.75 hr	EEB

AHF- Allison Featherstone, B.Sc., Senior Planning Ecologist
EEB- Erin Blenkhorn, B.Sc., Aquatic Biologist/Ecologist
TRH- Todd Hagedorn, B.Sc., Field Biologist (former LGL staff)

Appendix C Tree Inventory and Mapping

Draft

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
1	*Robinia pseudoacacia*	Black locust	18.0			g	g	g	3		x	x						x							4	x			
2	*Salix sp.*	Willow	14.0			g	g	g	3																4	x			
3	*Robinia pseudoacacia*	Black locust	40.0			p	f	f	6		x	x								x					7	x			leader split in 1/2
4	*Picea abies*	Norway spruce	79.0			g	g	g	5																6		x		
5	*Picea abies*	Norway spruce	49.0			g	g	g	4																5		x		
6	*Juglans nigra*	Black walnut	44.0			g	g	g	4											x					5	x			
7	*Picea abies*	Norway spruce	74.0			g	f	g	6																7	x			asymmetrical crown
8	*Picea abies*	Norway spruce	66.0			g	g	g	6																7		x		
9	*Picea abies*	Norway spruce	75.0			g	g	g	7																8		x		
10	*Robinia pseudoacacia*	Black locust	28.0			g	g	g	3																4	x			
11	*Robinia pseudoacacia*	Black locust	15.0			g	g	g	2																3	x			
12	*Populus deltoidesssp. deltoides*	eastern cottonwood	35.0			f	f	f	2	10															3		x		
13	*Populus deltoidesssp. deltoides*	eastern cottonwood	28.0			f	f	f	5											x					6			x	
14	*Acer platanoides*	Norway maple	18.0			g	g	g	2																3	x			
15	*Populus deltoidesssp. deltoides*	eastern cottonwood	70.0			f	f	f	5	10										x					6			x	
16	*Populus deltoidesssp. deltoides*	eastern cottonwood	56.0			g	g	g	5	10										x					6			x	
17	*Robinia pseudoacacia*	Black locust	30.0	26.0		g	g	g	5	10	x	x								x					6			x	
18	*Robinia pseudoacacia*	Black locust	22.0	12.0		f	f	f	3	20	x	x													4		x		
19	*Juglans nigra*	Black walnut	17.0			g	g	g	2																3		x		
20	*Acer saccharum ssp. saccharum*	Sugar maple	80+			p	p	p	6	70						x	x			x					7		x		leader broken
21	*Populus deltoidesssp. deltoides*	eastern cottonwood	44.0			f	f	f	4																5			x	
22	*Pinus sylvestris*	Scots pine	11.0			g	g	g	2																3	x			
23	*Pinus sylvestris*	Scots pine	11.0			g	g	g	2				l,e												3	x			
24	*Picea abies*	Norway spruce	16.0			g	g	g	4																5	x			
25	*Pinus nigra*	Austrian pine	53.0			f	p	p	5	90															6	x			
26	*Acer saccharinum*	silver maple	44.0	22.0		g	g	g	5		x	x								x					6	x			
27	*Populus deltoidesssp. deltoides*	eastern cottonwood	39.0			g	g	g	4	30										x					5		x		
28	*Populus deltoidesssp. deltoides*	eastern cottonwood	47.0			g	f	f	4											x					5		x		
29	*Picea abies*	Norway spruce	36.0			g	g	g	5																6		x		
30	*Robinia pseudoacacia*	Black locust	71.0			g	g	g	6																7		x		sloughing bark
31	*Picea abies*	Norway spruce	39.0			g	g	g	4																5		x		
32	*Thuja occidentalis*	Eastern white cedar	20.0			g	f	f	2	30															3		x		
33	*Thuja occidentalis*	Eastern white cedar	21.0			g	f	f	3	30															4		x		
34	*Picea abies*	Norway spruce	42.0			g	g	g	3	10															4		x		galls
35	*Thuja occidentalis*	Eastern white cedar	11.0			f	f	f	1	30															2		x		
36	*Thuja occidentalis*	Eastern white cedar	16.0			f	f	f	1	30															2		x		
37	*Populus deltoidesssp. deltoides*	eastern cottonwood	41.0			g	f	f	4	10															5		x		
38	*Picea abies*	Norway spruce	16.0			g	g	g	2																3	x			
39	*Picea abies*	Norway spruce	59.0			g	g	g	6											x					7	x			marked for removal
40	*Populus deltoidesssp. deltoides*	eastern cottonwood	41.0			p	p	p	2																3			x	marked for removal
41	*Populus deltoidesssp. deltoides*	eastern cottonwood	47.0			Dead																			1	x			marked for removal
42	*Populus deltoidesssp. deltoides*	eastern cottonwood	42.0			Dead																			1	x			
43	*Fraxinus pennsylvanica*	Red ash	14.0	14,10,12		g	g	g	4																5	x			
44	*Acer platanoides*	Norway maple	21.0			g	g	g	3																4	x			
45	*Acer saccharinum*	silver maple	39.0			g	g	g	6																7	x			
46	*Acer platanoides*	Norway maple	16.0			g	g	g	2																3	x			
47	*Picea abies*	Norway spruce	67.0			g	g	g	7																8	x			
48	*Populus deltoidesssp. deltoides*	eastern cottonwood	30.0			g	g	g	4	10															5		x		
49	*Populus deltoidesssp. deltoides*	eastern cottonwood	35.0			g	g	g	4	10															5			x	

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
50	*Picea abies*	Norway spruce	29.0			g	f	f	3															4		x		
51	*Picea abies*	Norway spruce	24.0	20.0		g	g	g	2	10														3		x		
52	*Picea abies*	Norway spruce	30.0			g	g	g	3	10														4		x		
53	*Picea abies*	Norway spruce	27.0			g	g	g	4	10														5		x		galls
54	*Picea abies*	Norway spruce	25.0			g	g	g	4	10														5		x		galls
55	*Picea abies*	Norway spruce	37.0			g	g	g	5															6		x		
56	*Populus deltoidesssp. deltoides*	eastern cottonwood	40.0			g	g	g	3											x				4	x			
57	*Picea abies*	Norway spruce	17.0			g	g	g	2	10														3		x		galls
58	*Fraxinus pennsylvanica*	Red ash	35.0			g	f	f	4											x				5	x			
59	*Populus deltoidesssp. deltoides*	eastern cottonwood	37.0			g	g	g	4	10										x				5	x			
60	*Picea abies*	Norway spruce	32.0			g	f	f	4	20														5		x		
61	*Picea abies*	Norway spruce	27.0			g	f	f	3	20														4			x	
62	*Picea abies*	Norway spruce	26.0			g	g	g	3	10														4		x		
63	*Thuja occidentalis*	Eastern white cedar	13.0			f	p	p	1	70														2		x		
64	*Picea abies*	Norway spruce	22.0			g	g	g	3															4		x		
65	*Picea abies*	Norway spruce	25.0			g	g	g	4															5		x		
66	*Picea abies*	Norway spruce	25.0			g	g	g	3	10														4			x	
67	*Picea abies*	Norway spruce	27.0			g	g	g	4															5			x	
68	*Picea abies*	Norway spruce	33.0			g	g	g	5															6			x	
69	*Populus deltoidesssp. deltoides*	eastern cottonwood	35.0			g	g	g	5															6	x			
70	*Prunus serotina*	Black cherry	12.0			g	g	g	3		x	x												4	x			
71	*Fraxinus pennsylvanica*	Red ash	40.0			f	f	f	5	30														6	x			
72	*Populus deltoidesssp. deltoides*	eastern cottonwood	40.0			f	f	f	5											x				6	x			
73	*Picea abies*	Norway spruce	28.0			g	g	g	4															5	x			
74	*Picea abies*	Norway spruce	21.0	9.0		g	g	g	4		x	x												5	x			
75	*Picea abies*	Norway spruce	35.0			g	g	g	5															6	x			
76	*Picea abies*	Norway spruce	26.0			g	g	g	3															4	x			
77	*Picea abies*	Norway spruce	25.0			g	g	g	4															5	x			
78	*Thuja occidentalis*	Eastern white cedar	17.0			f	f	f	2	30														3	x			
79	*Thuja occidentalis*	Eastern white cedar	17.0			f	f	f	2	30														3	x			
80	*Picea abies*	Norway spruce	28.0			g	g	g	4															5	x			
81	*Pinus sylvestris*	Scots pine	13.0			f	f	f	2	30														3	x			
82	*Thuja occidentalis*	Eastern white cedar	15.0			g	f	f	2	30														3	x			
83	*Prunus serotina*	Black cherry	16.0			g	g	g	2															3	x			
84	*Populus deltoidesssp. deltoides*	eastern cottonwood	46.0			Dead																		1	x			marked for removal
85	*Picea abies*	Norway spruce	26.0			g	g	g	3															4	x			
86	*Picea abies*	Norway spruce	43.0			g	g	g	4															5	x			
87	*Thuja occidentalis*	Eastern white cedar	14.0			f	f	f	2															3	x			
88	*Picea abies*	Norway spruce	20.0			f	f	f	2	30														3	x			
89	*Acer platanoides*	Norway maple	10.0			g	g	g	2															3	x			
90	*Fraxinus pennsylvanica*	Red ash	15.0			p	p	p	2	80										x				3	x			bark sloughing
91	*Tilia americana*	Basswood	13.0	12,13		g	g	g	4															5	x			
92	*Fraxinus pennsylvanica*	Red ash	12.0			p	p	p	3	80										x				4	x			bark sloughing
93	*Ulmus americana*	White elm	18.0			g	g	g	3											x				4	x			
94	*Malus pumila*	Apple	15.0			p	p	p	2															3	x			
95	*Fraxinus pennsylvanica*	Red ash	12.0			p	p	p	2	30										x				3	x			
96	*Picea abies*	Norway spruce	27.0	20.0		g	g	g	5															6	x			
97	*Tilia americana*	Basswood	12.0	8.0		f	f	f	3		x	x					x							4	x			
98	*Picea abies*	Norway spruce	20.0	13.0		g	g	g	4															5	x			

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
99	*Picea glauca*	White spruce	16.0			g	g	g	2															3	x			
100	*Picea glauca*	White spruce	12.0	6.0		g	g	g	2															3	x			
101	*Picea glauca*	White spruce	19.0			g	g	g	3															4	x			
102	*Fraxinus pennsylvanica*	Red ash	13.0			f	f	f	2															3	x			
103	*Fraxinus pennsylvanica*	Red ash	11.0			f	f	f	2															3	x			
104	*Thuja occidentalis*	Eastern white cedar	13.0			f	f	f	2	30									x					3	x			
105	*Fraxinus pennsylvanica*	Red ash	21.0			f	f	f	3	30											x			4	x			
106	*Thuja occidentalis*	Eastern white cedar	12.0			f	f	f	2	30														3	x			
107	*Picea glauca*	White spruce	15.0			g	g	g	2															3	x			
108	*Ulmus americana*	White elm	18.0			g	g	g	2															3	x			
109	*Thuja occidentalis*	Eastern white cedar	11.0			g	g	g	2	30														3	x			
110	*Fraxinus pennsylvanica*	Red ash	14.0			p	p	p	2	80											x			3	x			
111	*Fraxinus pennsylvanica*	Red ash	11.0			p	p	p	2	80											x			3	x			
112	*Fraxinus pennsylvanica*	Red ash	12.0			p	p	p	2	80											x			3	x			
113	*Fraxinus pennsylvanica*	Red ash	15.0			p	p	p	2	80											x			3	x			
114	*Ulmus americana*	White elm	15.0			g	g	g	2											x				3	x			
115	*Fraxinus pennsylvanica*	Red ash	12.0			p	p	p	2	80											x			3	x			
116	*Fraxinus pennsylvanica*	Red ash	20.0			f	f	f	3	40										x	x			4	x			
117	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	2	30								x			x			3	x			
118	*Acer saccharum ssp. saccharum*	Sugar maple	18.0			f	f	f	5									x						6	x			
119	*Acer saccharum ssp. saccharum*	Sugar maple	24.0			g	g	g	4															5	x			
120	*Acer saccharum ssp. saccharum*	Sugar maple	12.0			g	g	g	2															3	x			
121	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	3															4	x			
122	*Acer saccharum ssp. saccharum*	Sugar maple	17.0			f	g	g	3									x						4	x			bark sloughing
123	*Acer saccharum ssp. saccharum*	Sugar maple	11.0			g	g	g	2															3	x			
124	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	3															4	x			
125	*Acer saccharum ssp. saccharum*	Sugar maple	11.0			g	g	g	2															3	x			
126	*Prunus serotina*	Black cherry	13.0			g	g	g	2															3	x			
127	*Acer saccharum ssp. saccharum*	Sugar maple	12.0			g	g	g	2															3	x			
128	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	3															4	x			
129	*Acer saccharum ssp. saccharum*	Sugar maple	11.0			g	g	g	2															3	x			
130	*Acer saccharum ssp. saccharum*	Sugar maple	14.0			p	f	f	2									x						3	x			bark sloughing
131	*Acer saccharum ssp. saccharum*	Sugar maple	16.0			g	g	g	4															5	x			
132	*Fraxinus pennsylvanica*	Red ash	12.0			f	f	f	2		x	x												3	x			
133	*Fraxinus pennsylvanica*	Red ash	18.0			f	f	f	3				l,s											4	x			
134	*Acer saccharum ssp. saccharum*	Sugar maple	66.0			g	g	g	7										x					8			x	beech bark disease
135	*Fagus grandifolia*	American beech	59.0			f	g	g	8															9	x			
136	*Acer saccharum ssp. saccharum*	Sugar maple	64.0			g	g	g	7															8	x			
137	*Acer saccharum ssp. saccharum*	Sugar maple	39.0			f	f	f	5					x	x			x						6	x			
138	*Acer saccharum ssp. saccharum*	Sugar maple	44.0			g	g	g	6															7	x			
139	*Acer saccharum ssp. saccharum*	Sugar maple	49.0			f	f	g	5					x										6	x			
140	*Ulmus americana*	White elm	12.0			g	g	g	2															3	x			
141	*Acer saccharum ssp. saccharum*	Sugar maple	40.0			p	p	p	2	70					x		x	x						3	x			bark sloughing, one stem dead
142	*Acer saccharum ssp. saccharum*	Sugar maple	20.0			g	g	g	3															4	x			
143	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	2															3	x			
144	*Acer saccharum ssp. saccharum*	Sugar maple	16.0			g	g	g	4															5	x			
145	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	3									x						4	x			
146	*Acer saccharum ssp. saccharum*	Sugar maple	18.0			f	f	f	3									x						4	x			one stem dead
147	*Acer saccharum ssp. saccharum*	Sugar maple	19.0			g	g	g	3									x						4	x			

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
148	*Acer saccharum ssp. saccharum*	Sugar maple	14.0			g	g	g	3									x							4	x			
149	*Juglans nigra*	Black walnut	18.0			g	g	g	3																4	x			
150	*Acer saccharum ssp. saccharum*	Sugar maple	57.0			g	g	g	8																9	x			
151	*Acer saccharum ssp. saccharum*	Sugar maple	27.0			g	g	g	4																5	x			
152	*Acer saccharum ssp. saccharum*	Sugar maple	47.0			g	g	g	6																7	x			
153	*Acer saccharum ssp. saccharum*	Sugar maple	10.0			g	g	g	2																3	x			
154	*Acer saccharinum*	silver maple	35.0			g	g	g	5																6	x			
155	*Fraxinus pennsylvanica*	Red ash	12.0			g	g	g	2																3	x			
156	*Acer saccharinum*	silver maple	15.0			f	g	g	2																3	x			bent leader
157	*Acer saccharum ssp. saccharum*	Sugar maple	15.0	5.0		g	g	g	3		x	x													4	x			
158	*Acer saccharum ssp. saccharum*	Sugar maple	54.0			f	f	g	6							x	x					x			7	x			
159	*Fraxinus pennsylvanica*	Red ash	13.0			g	g	f	2																3	x			
160	*Fraxinus pennsylvanica*	Red ash	15.0			g	g	f	2																3	x			
161	*Fraxinus pennsylvanica*	Red ash	14.0			f	f	f	2																3	x			
162	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	2																3	x			
163	*Acer saccharum ssp. saccharum*	Sugar maple	32.0			g	g	g	4																5	x			
164	*Prunus serotina*	Black cherry	27.0			g	g	g	4				L, S												5	x			
165	*Ulmus americana*	White elm	37.0			p	p	p	5	95				x											6	x			Leader dead
166	*Acer saccharum ssp. saccharum*	Sugar maple	21.0			g	g	g	4																5	x			
167	*Acer saccharum ssp. saccharum*	Sugar maple	23.0			g	g	g	4																5	x			
168	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	2																3	x			
169	*Acer saccharum ssp. saccharum*	Sugar maple	20.0			g	g	g	4																5	x			
170	*Acer saccharum ssp. saccharum*	Sugar maple	55.0			g	g	g	6																7	x			
171	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			f	f	f	3									x							4	x			Grape competition
172	*Fraxinus pennsylvanica*	Red ash	31.0			f	f	f	5											x					6	x			
173	*Acer saccharum ssp. saccharum*	Sugar maple	24.0			g	g	g	4																5	x			
174	*Carpinus caroliniana*	blue beech	12.0			g	g	g	2				L, S												3	x			
175	*Fraxinus pennsylvanica*	Red ash	13.0			f	f	f	2				L, S												3	x			
176	*Prunus serotina*	Black cherry	13.0			f	f	f	2																3	x			
177	*Acer saccharinum*	silver maple	20.0			f	f	f	3																4	x			
178	*Acer saccharum ssp. saccharum*	Sugar maple	51.0			g	g	g	7									x							8	x			Bark Sloughing
179	*Fagus grandifolia*	American beech	20.0			f	f	f	4																5	x			Beech Bark Disease
180	*Fagus grandifolia*	American beech	17.0			f	f	f	3																4	x			Beech Bark Disease
181	*Picea glauca*	White spruce	30.0			g	g	g	5																6		x		
182	*Picea glauca*	White spruce	25.0			g	g	g	4																5		x		
183	*Picea glauca*	White spruce	23.0			g	g	g	4																5			x	
184	*Picea glauca*	White spruce	23.0			g	g	g	4																5			x	
185	*Picea glauca*	White spruce	27.0			g	g	g	4																5			x	
186	*Picea glauca*	White spruce	24.0			g	g	g	3																4		x		
187	*Picea glauca*	White spruce	17.0			g	g	g	3																4		x		
188	*Picea glauca*	White spruce	17.0			g	g	g	3																4			x	
189	*Picea glauca*	White spruce	21.0			g	g	g	3																4	x			
190	*Picea glauca*	White spruce	19.0			g	g	g	3																4			x	
191	*Quercus robur*	English Oak	6.0			f	f	f	1																2	x			
192	*Quercus robur*	English Oak	5.0			g	g	g	1																2	x			
193	*Quercus alba*	White Oak	6.0			g	g	g	1																2	x			
194	*Quercus alba*	White Oak	5.0			g	g	g	1																2	x			
195	*Quercus alba*	White Oak	5.0			g	g	g	1																2	x			
196	*Quercus alba*	White Oak	5.0			g	g	g	1									x							2	x			

Appendix C Tree Inventory

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Client: Walter Fedy Date: April 9 and May 2, 2018
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TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
197	*Quercus rubra*	Red Oak	4.0			g	g	g	1															2	x			
198	*Quercus rubra*	Red Oak	4.0			g	g	g	1															2	x			
199	*Quercus rubra*	Red Oak	4.0			g	g	g	1															2	x			
200	*Quercus rubra*	Red Oak	3.0			g	g	g	1															2	x			
201	*Quercus rubra*	Red Oak	4.0			g	g	g	1															2	x			
202	*Malus pumila*	Apple	7.0			g	g	g	2															3	x			
203	*Malus pumila*	Apple	7.0			g	g	g	2															3	x			
204	*Malus pumila*	Apple	5.0			g	g	g	2															3	x			
205	*Pinus nigra*	Austrian pine	33.0			g	g	g	4															5	x			
206	*Pinus nigra*	Austrian pine	12.0			g	g	g	2															3	x			
207	*Elaeagnus angustifolia*	Russian olive	20.0	19.0		g	f	f	4															5	x			Grape Competition
208	*Elaeagnus angustifolia*	Russian olive	17.0	10.0		p	p	p	2															3			x	Topped
209	*Picea glauca*	White spruce	27.0			g	g	g	2															3	x			
210	*Elaeagnus angustifolia*	Russian olive	11.0			f	f	f	3											x				4	x			
211	*Elaeagnus angustifolia*	Russian olive	26.0			f	f	f	3															4	x			
212	*Elaeagnus angustifolia*	Russian olive	16.0			f	f	f	3															4	x			
213	*Elaeagnus angustifolia*	Russian olive	18.0			f	f	f	3															4		x		
214	*Pinus sylvestris*	Scots pine	12.0			g	g	g	2															3	x			
215	*Pinus strobus*	White pine	24.0			g	g	g	3															4	x			
216	*Pinus sylvestris*	Scots pine	40.0			g	g	g	4															5	x			
217	*Pinus sylvestris*	Scots pine	35.0			f	f	f	3															4	x			
218	*Pinus sylvestris*	Scots pine	29.0			f	f	f	3							x								4	x			
219	*Pinus sylvestris*	Scots pine	22.0			f	f	f	3															4	x			
220	*Celtis occidentalis*	common hackberry	10.0			g	g	g	1															2	x			
221	*Pinus sylvestris*	Scots pine	23.0			g	g	g	3															4	x			
222	*Pinus sylvestris*	Scots pine	29.0			g	g	g	3															4	x			
223	*Pinus sylvestris*	Scots pine	30.0			g	g	g	3															4	x			
224	*Pinus sylvestris*	Scots pine	30.0			g	g	g	3															4	x			
225	*Pinus sylvestris*	Scots pine	28.0			g	g	g	3															4	x			
226	*Pinus sylvestris*	Scots pine	32.0			g	g	g	4															5	x			
227	*Pinus strobus*	White pine	37.0			g	g	g	5															6	x			
228	*Acer negundo*	Manitoba maple	16.0	8,10		f	f	f	4		x	x												5		x		
229	*Pinus strobus*	White pine	34.0			g	f	g	4															5		x		Pruned West Side
230	*Ulmus americana*	White elm	17.0	11.0		g	g	g	2															3	x			
231	*Pinus sylvestris*	Scots pine	23.0			g	g	g	4															5	x			
232	*Picea glauca*	White spruce	16.0			g	g	g	2															3	x			
233	*Picea glauca*	White spruce	28.0			g	g	g	4															5	x			
234	*Pinus nigra*	Austrian pine	37.0			g	g	g	4															5	x			
235	*Pinus nigra*	Austrian pine	18.0			f	f	p	3	40														4	x			
236	*Picea glauca*	White spruce	24.0			g	g	g	3															4	x			
237	*Picea glauca*	White spruce	17.0			g	g	f	3															4	x			
238	*Ulmus americana*	White elm	28.0			g	g	g	4											x				5		x		
239	*Elaeagnus angustifolia*	Russian olive	18.0			g	g	g	5															6		x		
240	*Populus deltoidesssp. deltoides*	eastern cottonwood	14.0			g	g	g	3															4		x		
241	*Populus deltoidesssp. deltoides*	eastern cottonwood	28.0			g	g	g	4											x				5		x		
242	*Fraxinus americana*	White ash	32.0			p	p	p	4	90											x			5		x		Bark Slough
243	*Fraxinus americana*	white ash	33.0			p	p	p	3	90											x			4		x		Bark Slough
244	*Fraxinus americana*	white ash	31.0			p	p	p	3	90											x			4		x		Bark Slough
245	*Fraxinus americana*	white ash	28.0			Dead																		1		x		

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																			Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
246	*Fraxinus americana*	white ash	39.0			Dead																			1		x		
247	*Ulmus americana*	White elm	25.0			g	g	g	4																5		x		
248	*Acer saccharum ssp. saccharum*	Sugar maple	45.0			Dead																			1		x		
249	*Fraxinus americana*	White ash	42.0			p	p	p	5	90											x				6		x		
250	*Fraxinus americana*	White ash	30.0			p	p	p	4	90											x				5		x		
251	*Fraxinus americana*	White ash	29.0			p	p	p	4	90											x				5		x		
252	*Fraxinus americana*	White ash	36.0	24.0		p	p	p	4												x				5		x		
253	*Fraxinus americana*	White ash	48.0	15.0		p	p	p	5												x				6		x		
254	*Fraxinus americana*	White ash	37.0			p	p	p	4												x				5		x		
255	*Ulmus rubra*	Slippery elm	31.0			g	g	g	6																7		x		
256	*Fraxinus americana*	White ash	16.0			p	p	p	3												x				4		x		
257	*Fraxinus americana*	White ash	25.0			p	p	p	4												x				5		x		
258	*Fraxinus americana*	White ash	15.0			p	p	p	2																3		x		
259	*Fraxinus americana*	White ash	52.0			p	p	p	5																6		x		
260	*Acer negundo*	Manitoba maple	27.0			g	g	g	4				l,s							x					5		x		
261	*Fraxinus pennsylvanica*	Red ash	33.0			f	f	f	4																5		x		
262	*Tilia americana*	Basswood	47.0			p	p	p	3											x					4		x		Leader Dead
263	*Tilia americana*	Basswood	55.0	41,39		p	f	f	7					x		x	x								8		x		
264	*Acer negundo*	Manitoba maple	22.0	13,20		g	g	g	4											x					5		x		
265	*Fraxinus americana*	white ash	55.0			p	p	p	6												x				7		x		
266	*Tilia americana*	Basswood	61.0	50,34		g	g	g	9		x	x						x		x					10		x		
267	*Fraxinus pennsylvanica*	Red ash	14.0	13.0		p	p	p	3												x				4		x		
268	*Fraxinus pennsylvanica*	Red ash	41.0			p	p	p	4												x				5		x		
269	*Tilia americana*	Basswood	36.0	25.0		g	g	g	6											x					7		x		
270	*Ulmus americana*	White elm	44.0			g	g	g	6																7		x		
271	*Fraxinus pennsylvanica*	Red ash	33.0	18.0		p	p	p	4												x				5		x		
272	*Acer saccharum ssp. saccharum*	Sugar maple	22.0			g	g	g	3																4		x		
273	*Fraxinus pennsylvanica*	Red ash	29.0			p	p	p	4												x				5		x		
274	*Fraxinus pennsylvanica*	Red ash	35.0			p	p	p	4												x				5		x		
275	*Fraxinus pennsylvanica*	Red ash	40.0			p	p	p	4												x				5		x		Topped
276	*Fraxinus pennsylvanica*	Red ash	19.0	17.0		p	p	p	4																5		x		
277	*Fraxinus pennsylvanica*	Red ash	37.0	27.0		p	p	p	4																5		x		
278	*Fraxinus pennsylvanica*	Red ash	36.0			p	p	p	4												x				5		x		
279	*Fraxinus pennsylvanica*	Red ash	46.0			p	p	p	4							x					x				5		x		
280	*Fraxinus pennsylvanica*	Red ash	46.0			f	f	f	5												x				6		x		
281	*Fraxinus pennsylvanica*	Red ash	27.0			g	g	g	3				I,S												4		x		
282	*Fraxinus pennsylvanica*	Red ash	53.0			g	f	f	5	30											x				6		x		
283	*Tilia americana*	Basswood	41.0	37.0		g	g	g	7	10	x	x													8		x		
284	*Fraxinus pennsylvanica*	Red ash	33.0			p	p	p	4	30										x	x				5		x		Bark Sloughing
285	*Fraxinus pennsylvanica*	Red ash	44.0			p	p	p	4	60										x	x				5		x		
286	*Fraxinus pennsylvanica*	Red ash	22.0			p	p	p	2	95										x	x				3		x		
287	*Fraxinus pennsylvanica*	Red ash	61.0			f	f	f	7	30										x	x				8		x		
288	*Fraxinus pennsylvanica*	Red ash	34.0			f	f	f	6	20										x	x				7		x		
289	*Fraxinus pennsylvanica*	Red ash	50.0			p	p	p	6	40						x	x			x	x				7		x		Bark Sloughing
290	*Robinia pseudoacacia*	Black locust	18.0	17,16,16		g	g	g	5		x	x													6		x		
291	*Juglans nigra*	Black walnut	20.0			g	g	g	5		x	x													6		x		
292	*Juglans nigra*	Black walnut	26.0	21.0		g	g	g	5																6		x		
293	*Juglans nigra*	Black walnut	17.0			g	g	g	4											x					5	x			
294	*Juglans nigra*	Black walnut	21.0			g	g	g	3	10															4	x			

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																			Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
295	*Juglans nigra*	Black walnut	13.0	11.0		f	f	f	4		x	x													5	x			
296	*Juglans nigra*	Black walnut	31.0			g	g	g	5	5	x	x													6	x			
297	*Juglans nigra*	Black walnut	29.0			g	g	g	4																5	x			
298	*Juglans nigra*	Black walnut	27.0			g	g	g	5	5	x	x													6	x			
299	*Juglans nigra*	Black walnut	12.0			g	g	g	2																3	x			
300	*Juglans nigra*	Black walnut	28.0	28.0		g	g	g	6		x	x													7	x			
301	*Juglans nigra*	Black walnut	18.0			g	g	g	4																5	x			
302	*Juglans nigra*	Black walnut	28.0			f	p	p	5	40															6	x			
303	*Juglans nigra*	Black walnut	14.0			p	p	p	3	80										x					4	x			
304	*Juglans nigra*	Black walnut	23.0			f	p	p	4	40															5	x			
305	*Juglans nigra*	Black walnut	29.0			g	g	g	4																5	x			
306	*Juglans nigra*	Black walnut	25.0			g	g	g	5																6	x			
307	*Juglans nigra*	Black walnut	26.0			g	g	g	5																6	x			
308	*Juglans nigra*	Black walnut	20.0			g	g	g	4	5															5	x			
309	*Juglans nigra*	Black walnut	22.0			g	g	g	4	5															5	x			
310	*Juglans nigra*	Black walnut	18.0			g	g	g	3																4	x			
311	*Juglans nigra*	Black walnut	23.0			g	g	g	4		x	x													5	x			
312	*Juglans nigra*	Black walnut	15.0			g	g	g	2																3	x			
313	*Juglans nigra*	Black walnut	21.0	10.0		g	g	g	3		x	x								x					4	x			
314	*Juglans nigra*	Black walnut	24.0			g	g	g	4	10															5	x			
315	*Juglans nigra*	Black walnut	15.0			g	g	g	3	10															4	x			
316	*Juglans nigra*	Black walnut	20.0	17.0		g	g	g	5																6	x			
317	*Juglans nigra*	Black walnut	25.0			g	g	g	6																7	x			
318	*Juglans nigra*	Black walnut	21.0	19.0		g	g	g	5		x	x													6	x			
319	*Juglans nigra*	Black walnut	32.0			g	g	g	7																8	x			
320	*Juglans nigra*	Black walnut	23.0			g	g	g	5	10															6	x			
321	*Juglans nigra*	Black walnut	13.0			f	f	f	3	30															4	x			
322	*Juglans nigra*	Black walnut	15.0			g	g	g	4	10															5	x			
323	*Juglans nigra*	Black walnut	23.0			g	g	g	6																7	x			
324	*Juglans nigra*	Black walnut	22.0	17.0		g	g	g	7	10	x	x													8	x			
325	*Juglans nigra*	Black walnut	26.0			g	g	g	5																6	x			
326	*Juglans nigra*	Black walnut	30.0			g	g	g	7																8	x			
327	*Juglans nigra*	Black walnut	14.0	13.0		f	f	f	3		x	x	l,3				x			x					4	x			
328	*Juglans nigra*	Black walnut	26.0			g	g	g	6																7	x			
329	*Juglans nigra*	Black walnut	31.0			g	g	g	6																7	x			
330	*Juglans nigra*	Black walnut	12.0			g	g	g	2	10															3	x			
331	*Juglans nigra*	Black walnut	25.0	25.0		g	g	g	7		x	x													8	x			
332	*Juglans nigra*	Black walnut	25.0	19,14,15		g	g	g	7		x	x								x					8	x			
333	*Thuja occidentalis*	Eastern white cedar	22.0			g	g	g	4																5	x			
334	*Juglans nigra*	Black walnut	26.0			g	g	g	4																5	x			
335	*Thuja occidentalis*	Eastern white cedar	11.0			f	p	p	3	70															4	x			
336	*Thuja occidentalis*	Eastern white cedar	13.0			p	p	p	3	90															4	x			
337	*Thuja occidentalis*	Eastern white cedar	15.0			g	g	g	2																3	x			
338	*Thuja occidentalis*	Eastern white cedar	16.0			g	f	f	3	30															4	x			
339	*Thuja occidentalis*	Eastern white cedar	21.0			g	f	f	3	30															4	x			
340	*Thuja occidentalis*	Eastern white cedar	14.0			g	f	f	3	30															4	x			
341	*Thuja occidentalis*	Eastern white cedar	13.0			g	f	f	3	30															4	x			
342	*Thuja occidentalis*	Eastern white cedar	21.0			g	f	f	3	30															4	x			
343	*populus deltoides*	Cottonwood	80+			g	g	g	7																8	x			

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
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Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																			Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
344	*Picea abies*	Norway spruce	21.0			g	g	g	5																6	x			
345	*Picea abies*	Norway spruce	47.0			g	g	g	6																7			x	
346	*Thuja occidentalis*	Eastern white cedar	10.0			g	g	g	2																3	x			
347	*Picea abies*	Norway spruce	40.0			g	g	g	5																6			x	
348	*Juglans nigra*	Black walnut	17.0			g	g	g	2																3	x			
349	*Thuja occidentalis*	Eastern white cedar	19.0			g	g	g	2																3	x			
350	*Pinus sylvestris*	Scots pine	20.0			p	p	p	2	90															3	x			
351	*Fraxinus pennsylvanica*	Red ash	45.0			f	f	f	6											x	x				7	x			
352	*Picea abies*	Norway spruce	29.0			f	p	p	4	70															5	x			
353	*Pinus sylvestris*	Scots pine	14.0			f	p	p	2	70															3	x			
354	*Picea glauca*	White spruce	13.0			g	g	g	3																4	x			
355	*Picea glauca*	White spruce	13.0	13.0		g	g	g	3																4	x			
356	*Fraxinus pennsylvanica*	Red ash	11.0			f	f	f	2											x	x				3	x			
357	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	2											x	x				3	x			
358	*Fraxinus pennsylvanica*	Red ash	12.0			f	f	f	2											x	x				3	x			
359	*Fraxinus pennsylvanica*	Red ash	14.0			f	f	f	2											x	x				3	x			
360	*Ulmus americana*	White elm	18.0	9.0		g	g	g	4																5	x			
361	*Fraxinus pennsylvanica*	Red ash	12.0			g	g	g	2																3	x			
362	*Malus pumila*	Apple	28.0	25,20		g	g	g	6																7	x			
363	*Fraxinus pennsylvanica*	Red ash	12.0			f	f	f	2																3	x			
364	*Thuja occidentalis*	Eastern white cedar	15.0			g	g	f	2	30															3	x			
365	*Ulmus rubra*	Slippery elm	15.0			g	g	g	4																5	x			
366	*Fraxinus pennsylvanica*	Red ash	21.0			g	g	g	4																5	x			
367	*Fraxinus pennsylvanica*	Red ash	20.0			f	f	f	4											x	x				5	x			
368	*Fraxinus pennsylvanica*	Red ash	25.0			f	f	f	4											x	x				5	x			
369	*Fraxinus pennsylvanica*	Red ash	21.0			f	f	f	4																5	x			
370	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	2																3	x			
371	*Fraxinus pennsylvanica*	Red ash	12.0			f	f	f	2																3	x			
372	*Fraxinus pennsylvanica*	Red ash	22.0			g	g	g	5																6	x			
373	*Prunus avium*	sweet cherry	35.0			g	g	g	6	10															7	x			
374	*Fraxinus pennsylvanica*	Red ash	10.0			f	f	f	2																3	x			
375	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	3																4	x			
376	*Fraxinus pennsylvanica*	Red ash	18.0			g	g	g	3																4	x			
377	*Malus pumila*	Apple	13.0			p	p	p	2							x	x			x					3	x			
378	*Fraxinus pennsylvanica*	Red ash	13.0			g	g	g	4																5	x			
379	*Acer saccharum ssp. saccharum*	Sugar maple	11.0	10.0		g	g	g	2																3	x			
380	*Tilia americana*	Basswood	11.0	10,8		g	g	g	4		x	x													5	x			
381	*Tilia americana*	Basswood	15.0	9.0		f	f	f	3		x	x						x		x					4	x			
382	*Fraxinus pennsylvanica*	Red ash	15.0			f	f	f	4											x					5	x			
383	*Acer negundo*	Manitoba maple	18.0			f	f	f	3	30			I,S						x						4	x			
384	*Fraxinus pennsylvanica*	Red ash	12.0			g	g	g	2																3	x			
385	*Ulmus rubra*	Slippery elm	11.0			g	g	g	2																3	x			
386	*Ulmus rubra*	Slippery elm	16.0			g	g	g	3																4	x			
387	*Tilia americana*	Basswood	23.0	18.0		g	g	g	5																6	x			
388	*Acer saccharinum*	silver maple	38.0			g	g	g	6																7	x			
389	*Ulmus americana*	White elm	14.0			g	g	g	2																3	x			
390	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	4																5	x			
391	*Ulmus americana*	White elm	15.0			g	g	g	3																4	x			
392	*Ulmus americana*	White elm	13.0			g	g	g	3																4	x			

Appendix C Tree Inventory

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Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
393	*Acer saccharum ssp. saccharum*	Sugar maple	19.0			g	g	g	4									x							5	x			
394	*Tilia americana*	Basswood	11.0			g	g	g	2																3	x			
395	*Fraxinus pennsylvanica*	Red ash	18.0			g	g	g	4																5	x			
396	*Acer negundo*	Manitoba maple	17.0	16.0		p	p	p	3		x	x													4	x			Leader Dead
397	*Acer negundo*	Manitoba maple	14.0			f	f	f	2				M,S							x					3	x			Grape Comp
398	*Acer negundo*	Manitoba maple	13.0			f	f	f	2				M,S							x					3	x			Grape Comp
399	*Ulmus americana*	White elm	47.0			g	g	g	7											x					8	x			
400	*Acer negundo*	Manitoba maple	31.0			g	g	g	6		x	x								x					7	x			
401	*Acer negundo*	Manitoba maple	20.0			g	g	g	4																5			x	
402	*Acer negundo*	Manitoba maple	19.0			g	g	g	3									x		x					4	x			
403	*Acer negundo*	Manitoba maple	15.0			g	g	g	3	10										x					4	x			
404	*Acer negundo*	Manitoba maple	25.0			g	g	g	4	10			L,W												5	x			
405	*Acer negundo*	Manitoba maple	16.0			g	g	g	3				L,W												4	x			
406	*Acer negundo*	Manitoba maple	10.0			g	g	g	3				L,W							x					4	x			
407	*Acer negundo*	Manitoba maple	17.0			g	g	g	4											x					5	x			
408	*Acer negundo*	Manitoba maple	15.0	14.0		g	g	g	4		x	x								x					5	x			
409	*Acer negundo*	Manitoba maple	27.0			f	f	f	5											x					6	x			Burls
410	*Acer negundo*	Manitoba maple	10.0			g	f	f	2	20										x					3	x			
411	*Acer negundo*	Manitoba maple	18.0	15.0		g	g	g	4		x	x													5	x			
412	*Acer negundo*	Manitoba maple	11.0	8.0		g	g	g	2	20	x	x								x					3	x			
413	*Acer negundo*	Manitoba maple	11.0	11.0		g	g	g	3	10	x	x													4	x			
414	*Ulmus americana*	White elm	38.0			g	g	g	7											x					8	x			
415	*Tilia americana*	Basswood	49.0	15.0		g	g	g	7																8			x	
416	*Acer negundo*	Manitoba maple	12.0			p	f	f	2				L,W							x					3	x			Leader Dead
417	*Ulmus americana*	White elm	16.0			g	g	g	3																4	x			
418	*Ulmus americana*	White elm	22.0			g	g	g	6																7			x	
419	*Ulmus americana*	White elm	33.0			g	g	g	8	10										x					9			x	
420	*Tilia americana*	Basswood	17.0			g	g	g	4																5	x			
421	*Tilia americana*	Basswood	20.0			g	g	g	4									x							5	x			
422	*Ulmus americana*	White elm	19.0			g	g	g	3																4	x			
423	*Ulmus americana*	White elm	24.0			g	g	g	5																6	x			
424	*Acer saccharum ssp. saccharum*	Sugar maple	10.0			g	g	g	2																3	x			
425	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	3																4	x			
426	*Fraxinus pennsylvanica*	Red ash	17.0			f	f	f	3											x	x				4	x			
427	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	3																4	x			
428	*Tilia americana*	Basswood	10.0			g	g	g	2																3	x			
429	*Acer saccharum ssp. saccharum*	Sugar maple	18.0			g	g	g	4																5	x			
430	*Ulmus rubra*	Slippery elm	18.0	9.0		f	f	f	4																5	x			
431	*Ulmus americana*	White elm	13.0			g	g	g	2																3	x			
432	*Fraxinus pennsylvanica*	Red ash	16.0			p	p	p	2	70										x	x				3	x			
433	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	4																5	x			
434	*Acer saccharum ssp. saccharum*	Sugar maple	17.0			g	g	g	4									x							5	x			
435	*Acer saccharum ssp. saccharum*	Sugar maple	11.0			g	g	g	2											x					3	x			
436	*Acer saccharum ssp. saccharum*	Sugar maple	33.0			g	f	f	5	30															6	x			
437	*Tsuga canadensis*	Eastern Hemlock	21.0			g	g	g	6																7			x	
438	*Ostrya virginiana*	Ironwood	30.0			g	g	g	7																8	x			
439	*Acer saccharum ssp. saccharum*	Sugar maple	14.0			g	g	g	3																4	x			
440	*Ulmus rubra*	Slippery elm	30.0			g	g	g	6	10															7			x	
441	*Fraxinus pennsylvanica*	Red ash	15.0			p	p	p	3											x	x				4	x			

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
442	*Acer saccharum ssp. saccharum*	Sugar maple	33.0			g	g	g	4															5	x			
443	*Prunus serotina*	Black cherry	16.0			g	g	g	3															4	x			
444	*Carya cordiformis*	Bitternut Hickory	26.0			g	g	g	5															6			x	
445	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	3															4			x	
446	*Acer saccharum ssp. saccharum*	Sugar maple	20.0			f	p	p	4	50				x										5	x			
447	*Fraxinus pennsylvanica*	Red ash	19.0			p	p	p	4	70										x	x			5			x	
448	*Acer saccharum ssp. saccharum*	Sugar maple	15.0			g	g	g	4															5	x			
449	*Prunus serotina*	Black cherry	39.0			g	g	g	4															5	x			
450	*Fraxinus pennsylvanica*	Red ash	12.0			p	p	p	2												x			3	x			
451	*Fraxinus pennsylvanica*	Red ash	15.0			g	g	g	2															3	x			
452	*Acer saccharum ssp. saccharum*	Sugar maple	17.0			f	f	f	3									x		x				4	x			
453	*Acer saccharum ssp. saccharum*	Sugar maple	21.0			g	g	g	4											x				5	x			
454	*Ostrya virginiana*	Ironwood	22.0			g	g	g	4															5	x			
455	*Acer saccharum ssp. saccharum*	Sugar maple	17.0			g	g	g	3															4	x			
456	*Acer saccharum ssp. saccharum*	Sugar maple	23.0			g	g	g	4															5	x			
457	*Ulmus rubra*	Slippery elm	28.0			g	g	g	5															6	x			
458	*Ostrya virginiana*	Ironwood	10.0			g	g	g	2															3	x			
459	*Acer saccharum ssp. saccharum*	Sugar maple	10.0			g	g	g	2															3	x			
460	*Acer negundo*	Manitoba maple	13.0	10.0		f	f	f	3		x	x												4	x			
461	*Acer saccharum ssp. saccharum*	Sugar maple	49.0			g	g	g	7									x		x				8			x	
462	*Acer saccharum ssp. saccharum*	Sugar maple	25.0			g	g	g	4															5	x			
463	*Fagus grandifolia*	American beech	25.0			g	g	g	5											x				6	x			Beech Bark Disease
464	*Fagus grandifolia*	American beech	26.0			g	g	g	5															6	x			Beech Bark Disease
465	*Tilia americana*	Basswood	11.0			g	g	g	2															3	x			
466	*Fagus grandifolia*	American beech	19.0			g	g	g	4															5	x			Beech Bark Disease
467	*Fagus grandifolia*	American beech	26.0			g	g	g	4															5	x			Beech Bark Disease
468	*Acer saccharum ssp. saccharum*	Sugar maple	28.0			g	g	g	5															6			x	
469	*Ostrya virginiana*	Ironwood	18.0			g	g	g	4															5	x			
470	*Ulmus rubra*	Slippery elm	43.0			g	g	g	7															8			x	
471	*Acer saccharum ssp. saccharum*	Sugar maple	12.0			g	g	g	2											x				3	x			
472	*Ulmus americana*	White elm	28.0			g	g	g	8															9			x	
473	*Acer saccharum ssp. saccharum*	Sugar maple	25.0			g	g	g	4															5	x			
474	*Tilia americana*	Basswood	13.0			g	g	g	3															4	x			
475	*Fraxinus pennsylvanica*	Red ash	18.0			p	p	p	4															5	x			
476	*Fraxinus pennsylvanica*	Red ash	14.0			g	g	g	2															3	x			
477	*Fraxinus pennsylvanica*	Red ash	13.0			g	g	g	2															3	x			
478	*Acer saccharum ssp. saccharum*	Sugar maple	35.0			g	g	g	7															8	x			
479	*Ulmus americana*	White elm	13.0			f	f	f	2											x				3	x			
480	*Fraxinus pennsylvanica*	Red ash	19.0			f	f	f	4															5			x	
481	*Fraxinus pennsylvanica*	Red ash	12.0			f	f	f	2															3	x			
482	*Fraxinus pennsylvanica*	Red ash	11.0			f	f	f	2															3	x			
483	*Fraxinus pennsylvanica*	Red ash	13.0			f	f	f	2															3		x		
484	*Acer saccharum ssp. saccharum*	Sugar maple	10.0			f	g	g	3									x						4	x			
485	*Acer saccharum ssp. saccharum*	Sugar maple	21.0			f	f	f	4									x						5	x			Leader Dead
486	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			g	g	g	3															4	x			
487	*Acer saccharum ssp. saccharum*	Sugar maple	11.0			g	g	g	2											x				3	x			
488	*Acer saccharum ssp. saccharum*	Sugar maple	21.0			g	g	g	4															5	x			
489	*Acer saccharum ssp. saccharum*	Sugar maple	12.0			g	g	g	2											x				3	x			
490	*Ulmus americana*	White elm	38.0			g	g	g	7															8		x		

Appendix C Tree Inventory

Project: TA8735 TREE INVENTORY
Client: Walter Fedy Date: April 9 and May 2, 2018
Collectors: LMC, TRH Area: Fischer Hallman Road/Bearinger Road between Columbia Street and Westmount Road, Waterloo

TAG#	Scientific Name	Common Name	DBH (cm)	Additional Stems	Estimation of DBH (x)	CONDITION																		Management				COMMENTS
						TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Hazard	ESA	Minimum TPZ (m)	Retain	Remove	Injure	
491	*Fraxinus pennsylvanica*	Red ash	17.0			g	g	g	3				L,S												4			x	
492	*Acer saccharum ssp. saccharum*	Sugar maple	18.0			p	f	f	3									x		x					4	x			Bark Sloughing
493	*Ulmus americana*	White elm	15.0			p	p	p	2									x		x					3	x			Leader Dead
494	*Acer saccharum ssp. saccharum*	Sugar maple	13.0			p	p	p	3									x		x					4	x			Bark Sloughing
495	*Pinus nigra*	Austrian pine	36.0			g	g	g	3																4	x			
496	*Picea glauca*	White spruce	12.0			g	g	g	2																3	x			
497	*Pinus nigra*	Austrian pine	32.0			g	g	g	4																5	x			
498	*Picea glauca*	White spruce	13.0			g	g	g	2																3	x			
499	*Pinus nigra*	Austrian pine	31.0			g	f	f	4	30															5	x			
500	*Picea glauca*	White spruce	17.0			g	g	g	2																3	x			
501	*Acer saccharum ssp. saccharum*	Sugar maple	28.0			g	g	g	4																5	x			Columnar
502	*Tilia cordata*	Littleleaf linden	17.0			g	g	g	2																3	x			
503	*Acer saccharum ssp. saccharum*	Sugar maple	26.0			g	g	g	4											x					5	x			
504	*Tilia cordata*	Littleleaf linden	11.0			g	g	g	2											x					3	x			
505	*Tilia cordata*	Littleleaf linden	18.0			g	g	g	3																4	x			
506	*Quercus rubra*	Red Oak	13.0			f	f	f	3	10										x					4	x			

Legend

DBH (cm)	Diameter at breast height
TI	Trunk Integrity
CS	Crown Structure
CV	Crown Vigour
DL (m)	Drip Line
CDB	Crown Dieback
EAB	Emerald Ash Borer
ESA/SARA	Species at Risk
TPZ	Tree Protection Zone
Lean Dir.	Lean Direction
	Memorial Tree
	Dead Tree
	Tree Recommended for Protection
	Kentucky Coffee Tree
	identification number not used

Condition

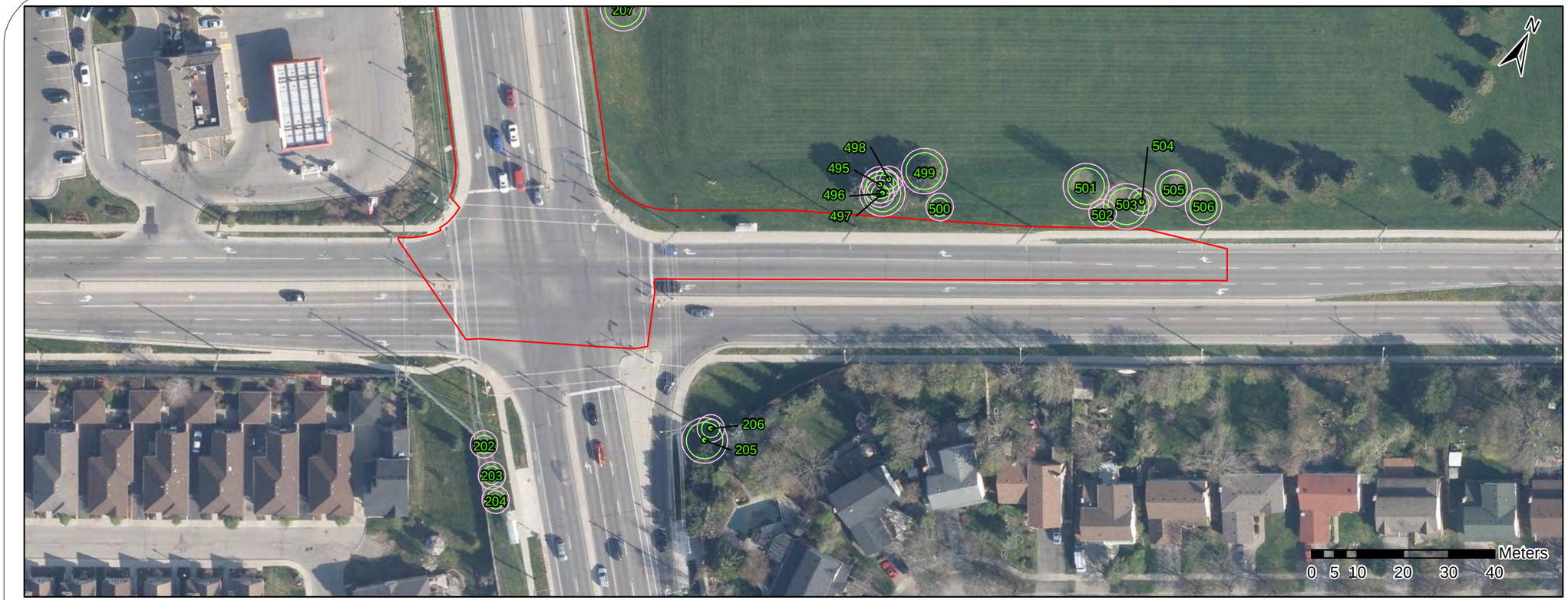
G	Good
F	Fair
P	Poor
D	Dead
L	Light
M	Moderate
H	Heavy
E	East
W	West
N	North
S	South
F	Frost
C	Compression
T	Tension
S	Shear Plane

Category **City of Toronto By-law Code**

1 Trees with diameters of 30 cm or more, situated on private property on the subject site.
2 Trees with diameters of 30 cm or more, situated on private property, within 6 m of the subject site
3 Trees of all diameters situated on City owned parkland within 6 m of the subject site.
4 On lands designated under the City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection, trees of all diameters situated within 10 meters of ay construction activity
5 Trees of all diameters situated within the City road allowance adjacent to the subject site.

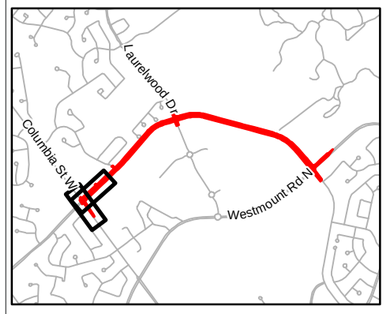
Reason for Removal

1 Trees interfere with proposed development (100%)
2 greater than 25% of canopy or roots are in conflict with development
3 trees are dead, dying or hazardous



LEGEND

- Alternative 5a Impact Footprint
- 26 Tree Identified for Retention
- 42 Dead Tree
- 54 Tree Identified for Removal
- 67 Tree with Potential Pruning Requirements
- Dripline
- Tree Protection Zone

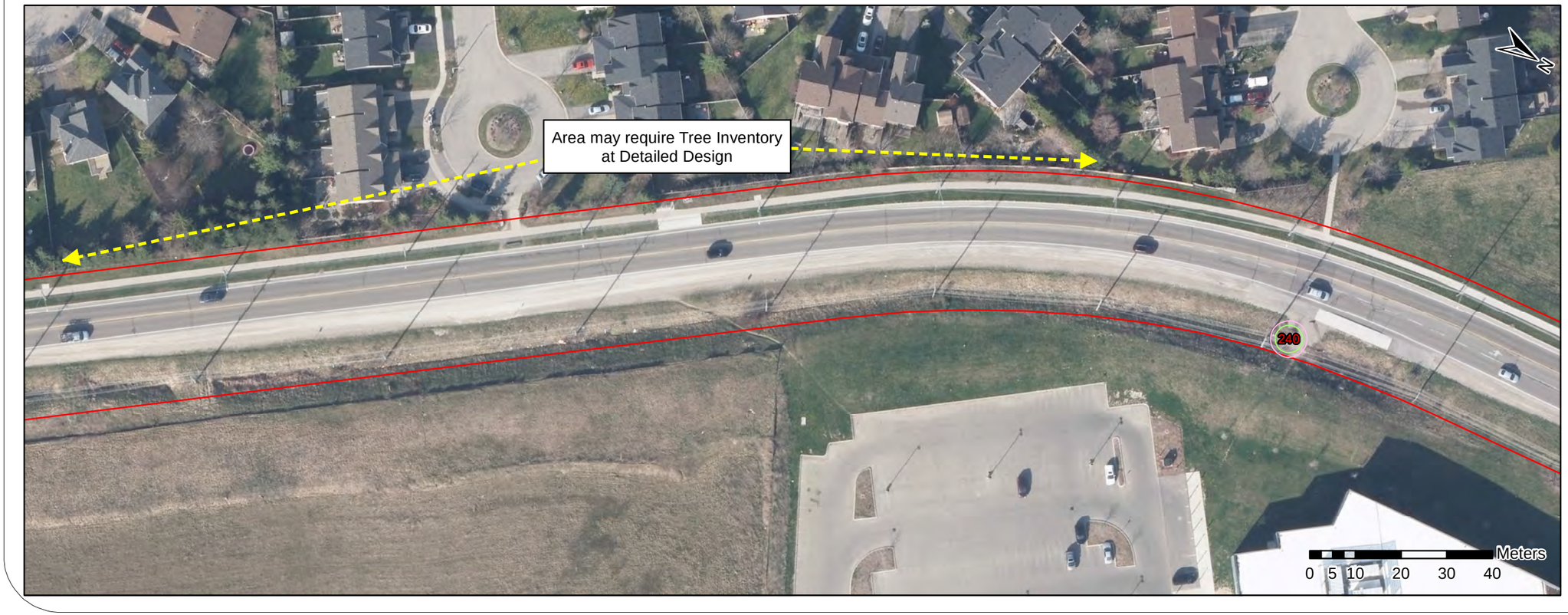


Fischer Hallman/ Bearinger Road Widening

Tree Protection & Removals

LGL LIMITED
environmental research associates

Project	TA8735	**Figure**	App C
Date	October, 2019	**Prepared By:**	KC
Scale	1:1,000	**Verified By:**	EEB



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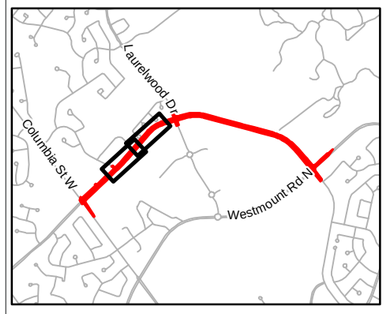

Fischer Hallman/ Bearinger Road Widening

Tree Protection & Removals

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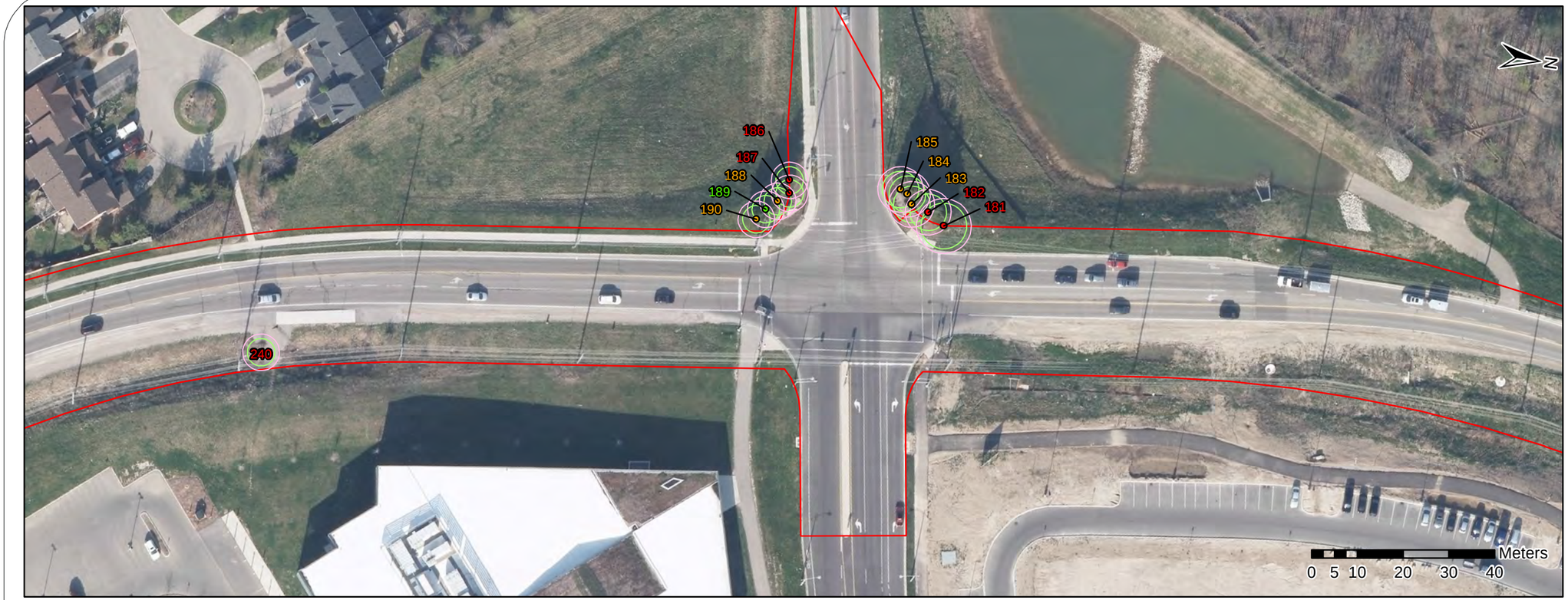
Scale	1:1,000	**Verified By:**	EEB



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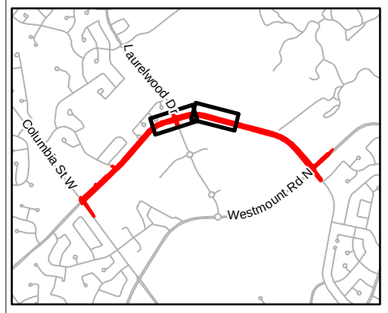

Fischer Hallman/ Bearinger Road Widening

Tree Protection & Removals

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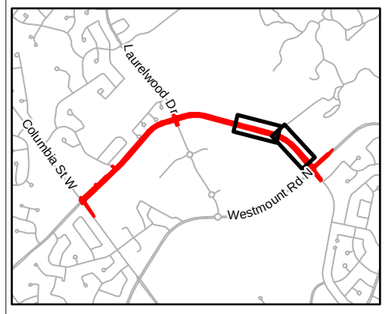

Fischer Hallman/ Bearinger Road Widening

Tree Protection & Removals

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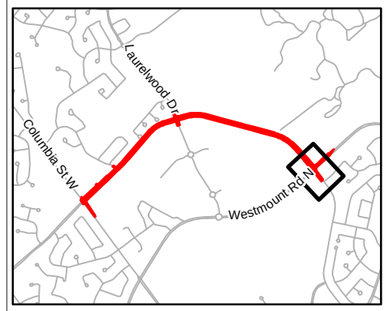

Fischer Hallman/ Bearinger Road Widening

Tree Protection & Removals

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environmental research associates

Project	TA8735	**Figure**	App C
Date	October, 2019	**Prepared By:**	KC
Scale	1:1,000	**Verified By:**	EEB

Appendix D Species at Risk Screening

Draft

Appendix D: SAR Summary Screening Table for the Fischer Hallman/Bearinger Road Class EA study area.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Vegetation	American Ginseng (*Panax quinquefolius*)							X	SARO – Endangered SARA - Endangered (Schedule 1)	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	No ginseng plants identified within the study area.	None
Vegetation	Butternut (*Juglans cinerea*)							X	SARO –Endangered SARA- Endangered (Schedule 1)	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldom, on dry, rocky and sterile soils. In Ontario, the Butternut Generally grows alone or in small groups in deciduous forests as well as in hedgerows	No butternut trees identified within the study area.	None
Bird	Acadian Flycatcher *(Empidonax virescens*)					X		X	SARO –Endangered SARA- Endangered (Schedule 1)	Large mature shady forests with ravines or swamps. Swamps that support this species are generally comprised of beech and maple trees.	Potential for habitat within mature forest communities along Laurel Creek Wetland Complex, Reservoir and tributary creek. Not detected during breeding bird surveys.	None

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Bald Eagle *(Haliaeetus leucocephalus)*							X	SARO – Special Concern SARA – N/A	Prefers deciduous and mixed deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine.	Potential for habitat within deciduous forest along Laurel Creek Reservoir however no nesting habitat observed.	None.
Bird	Bank Swallow (*Riparia riparia*)							X	SARO – Threatened SARA – Threatened (Schedule 1)	Nests in the vertical surfaces of silt and sand substrates. Often these surfaces are found on the banks of waterbodies or gravel pits.	No exposed/vertical banks observed during surveys.	None
Bird	Barn Swallow (*Hirundo rustica*)	X				X		X	SARO – Threatened SARA – Threatened (Schedule 1)	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Barn swallow observed foraging during LGL breeding bird survey around the SWM pond at Laurelwood Drive.	No breeding habitat impacted (structures or buildings supporting nests). Limited direct impacts to meadow habitat around the SWM pond (which will continue to support foraging opportunities). No further steps recommended.
Bird	Black Tern (*Chlidonias niger*)	1979 RECORD						X	SARO – Special Concern SARA – N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water.	Potential for nesting habitat in Cattail and Reed-canary Marsh vegetation communities. No intrusion into suitable habitat proposed.	None

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Bobolink (*Dolichonyx oryzivorus*)					X		X	SARO – Threatened SARA – Threatened (Schedule 1)	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Potential for habitat in current agricultural crops (alfalfa, wheat and corn), is low. The cultural meadow habitat is limited in area (linear swaths next to road). OBBA record may be from up to 10km away. Not observed during surveys.	None.
Bird	Canada Warbler (*Cardellina Canadensis*)							X	SARO – Special Concern SARA – Threatened (Schedule 1)	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Habitat for this species may be available within deciduous forest communities along Laurel Creek Wetland Complex, Reservoir and Laurel Creek. Not observed during surveys.	None.
Bird	Cerulean Warbler (*Setophaga cerulean*)					X		X	SARO – Threatened SARA – Endangered (Schedule 1)	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Potential habitat within the deciduous forest adjacent to the project works. OBBA record may be from up to 10km away. Not observed during surveys.	None.
Bird	Chimney Swift (*Chaetura pelagica*)					X		X	SARO – Threatened SARA – Threatened (Schedule 1)	Historically found in deciduous and coniferous forests, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	No buildings with chimneys found in project footprint. OBBA record may be from up to 10km away. Not observed during surveys.	None.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Common Nighthawk (*Chordeiles minor*)					X		X	SARO – Special Concern SARA – Threatened (Schedule 1)	Open, vegetation-free habitats. Examples include dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	Potential habitat present within the project footprint. OBBA record may be from up to 10km away. Surveys did not target this species.	Given the variable habitats this species can use, it is recommended that standard breeding bird window mitigation apply (see below). Limited construction disturbance in natural areas is recommended.
Bird	Eastern Meadowlark (*Sturnella magna*)					X		X	SARO – Threatened SARA – Threatened (Schedule 1)	This species occurs in grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Potential for habitat in current agricultural crops (alfalfa, wheat and corn), is low. The cultural meadow habitat is limited in area (linear swaths next to road). OBBA record may be from up to 10km away. Not observed during surveys.	None.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Eastern Wood-Pewee (*Contopus virens*)	X				X		X	SARO – Special Concern SARA – Special Concern (Schedule 1)	Mixed and deciduous forests in the mid-canopy layer near forest clearings and edges. Prefers forests with little understory vegetation, as well as forest clearings and edges.	Eastern Wood-Pewee is confirmed to be present within the study area (by LGL), with possible breeding occurring within deciduous forest communities (FOD 5-2) present north of Bearinger Road.	Minimal impacts to the deciduous forest (FOD) communities are proposed. However, vegetation clearing work should occur outside of the breeding bird window (April 1 – August 31). If it is determined clearing must occur during this window, a qualified biologist must be consulted to determine if works pose a disturbance effect to Migratory Birds before commencing construction. Pre-construction monitoring and nest/bird sweep would identify if present within the construction zone.
Bird	Grasshopper Sparrow (*Ammodramus savannarum*)					X			SARO – Special Concern SARA – Special Concern (Schedule 1)	Open grassland areas with well-drained, sandy soil. Prefers to nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape (COSSARO, 2014).	Potential habitat exists in current wheat crop and agricultural fields. OBBA record may be from up to 10km away. Not detected during surveys.	None.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Least Bittern (I*xobrychus exilis*)							X	SARO – Threatened SARA – Threatened (Schedule 1)	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	Potential for habitat in the vicinity of the Laurel Creek Wetland Complex, Reservoir and tributary creek. There is also potential habitat within Cattail and Reed-canary marsh vegetation communities. No intrusion into wetland communities proposed, and in particular the larger marsh habitat of the PSW.	Avoid potential habitat for this species by keeping construction disturbance outside of these vegetation communities.
Bird	Louisiana Waterthrush (*Seiurus motacilla)*							X	SARO – Threatened SARA – Threatened (Schedule 1)	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps.	Low potential for habitat as no steeply sloped ravines are present and Laurel Creek is a warm water system. Not detected during surveys.	None.
Bird	Peregrine Falcon (*Falco peregrinus*)					X		X	SARO – Special Concern SARA – Special Concern (Schedule 1)	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	Low potential for habitat as there are no steep cliffs or tall buildings within the study area. Not detected during surveys.	None.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Bird	Red-headed Woodpecker (*Melanerpes erythrocephalus*)					X		X	SARO – Special Concern SARA – Threatened (Schedule 1)	Open woodlands and woodland edges. Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks.	Potential habitat within the deciduous forest, cultural meadow and savannah vegetation communities impacted and adjacent to the project works. Not detected during surveys.	None
Bird	Wood Thrush (*Hylocichla mustelina*)					X		X	SARO – Special Concern SARA – Threatened (Schedule 1)	Mature deciduous and mixed woods with saplings and well-developed understory layers. Prefers large forest mosaics but may also nest in small forest fragments. Nests regularly in Sugar Maple and American Beech.	Potential habitat within the deciduous forest located north of Bearinger Road. Not detected during surveys.	None.
Fish	Black Redhorse (*Moxostoma duquesnei*)							X	SARO – Threatened SARA – N/A	Lives in moderately sized rivers and streams, with moderate to fast currents.	This reach of Laurel Creek is distanced from the Grand River, where Black Redhorse has been confirmed. The creek reach within the vicinity of the study area is only 4-5 m wide.	No further recommendations.
Fish	Silver Shiner (*Notropis photogenis*)							X	SARO – Threatened SARA – Special Concern	Prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients.	This reach of Laurel Creek is distanced from the Grand River, where Silver Shiner has been confirmed. The creek reach within the vicinity of the study area is only 4-5 m wide.	No further recommendations.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Mollusc	Wavy-rayed Lampmussel (*Lampsilis fasciola*)							X	SARO – Threatened SARA – Special Concern (Schedule 1)	Inhabit clear rivers and streams of a variety of sizes, where the water flow is steady and the substrate is stable.	Potential habitat within Laurel Creek exists, however not known to exist within this creek.	No further recommendations and no instream work occurring.
Reptile	Blandings Turtle (*Emydoidea blandingii*)	X	Confirmed on CA property		X			X	SARO – threatened SARA – Threatened (Schedule 1)	Found in freshwater lakes, permanent or temporary pools, streams, marshes and swamps. Prefer shallow water that is rich in nutrients, organic soil and dense vegetation (i.e. sphagnum, water lilies and algae).	Nesting turtle surveys results did not confirm evidence of Blanding's Turtle in the study area, however known presence of this species exists within the Laurel Creek Conservation Area.	Avoid potential habitat for this species by avoiding wetlands and minimizing encroachment into the wetland buffers. Nesting areas (for turtles) appear to be outside of the project footprint, however could be in proximity to construction works (i.e. next to Laurel Creek). Construction mitigation will be to install linear construction fence area on the north side of the construction limits. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.
Reptile	Eastern Ribbonsnake (*Thamnophis sauritus*)	X						X	SARO – Special Concern SARA – Special Concern (Schedule 1)	Their habitat is forests near water, particularly marsh habitat within a forest. Dense vegetation which provides cover and abundant exposure to sunlight is required.	Habitat for this species may be available within deciduous forest communities along Laurel Creek Wetland Complex, Reservoir and creek.	Fencing will keep wildlife out of the construction zone. Minimize disturbance into deciduous forest habitats north of Bearinger Road. No further action recommended at this time.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Reptile	Eastern Milksnake (*Lampropeltis Triangulum*)	X			X				SARO – NAR SARA – Special Concern (Schedule 1)	Wide range of habitats includes prairies, pastures, hayfields, wetlands and various forest types. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	Potential habitat within the deciduous forest, cultural meadow and savannah vegetation communities impacted and adjacent to the project works. Habitat for this species may be available along the entire Laurel Creek Wetland Complex.	Fencing will keep wildlife out of the construction zone. Minimize disturbance into deciduous forest habitats north of Bearinger Road. No further action recommended at this time.
Reptile	Northern Map Turtle (*Graptemys geographica*)							X	SARO – Special Concern SARA – Special Concern (Schedule 1)	They inhabit rivers and lakes that support molluscs (for prey). They show a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. They also require suitable basking sites (i.e. logs and rocks).	Nesting turtle surveys results did not confirm evidence of Map Turtle in the study area. Habitat appears present- in reservoir.	Avoid potential habitat for this species by avoiding wetlands and minimizing encroachment into the wetland buffers. Nesting areas (for turtles) appear to be outside of the project footprint, however could be in proximity to construction works (i.e. next to Laurel Creek). Construction mitigation will be to install linear construction fence area on the north side of the construction limits. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Reptile	Snapping Turtle (*Chelydra serpentina*)	X			X			X	SARO – Special Concern SARA – Special Concern (Schedule 1)	Aquatic setting such as lakes, ponds, bays and inlets. This is a highly aquatic species but may leave the water to seek out new aquatic habitats or to lay eggs (nesting sites usually occur on gravely or sandy areas along streams, including roads, dams and aggregate pits).	A juvenile Snapping turtle was observed during LGL wildlife mortality survey (along Bearinger Road). No nesting turtles found during detailed nesting surveys conducted (to target Blanding's Turtle). However predated nests found further north, along the reservoir dam road as well as adjacent to Laurel Creek north of the Westmount Road/Bearinger Road intersection. Species not confirmed, although given snapping turtle presence in area, likely that this species is nesting within areas noted above.	Avoid potential habitat for this species by avoiding wetlands and minimizing encroachment into the wetland buffers. Nesting areas (for turtles) appear to be outside of the project footprint, however could be in proximity to construction works (i.e. next to Laurel Creek). Construction mitigation will be to install linear construction fence area on the north side of the construction limits. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.
Amphibian	Jefferson Salamander (*Ambystoma jeffersonianum*)							X	SARO – Endangered SARA – Endangered (Schedule 1)	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Habitat for this species may be available within the fresh-moist deciduous forest community located on the south side of the reservoir, however no evidence of local presence.	Fencing will keep wildlife out of the construction zone. No further action recommended at this time. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Amphibian	Unisexual Ambystoma – Jefferson – dominated (*Ambystoma laterale - Jeffersonianum*)	X	Polyploids confirmed in general area but information dated (GRCA pers. Comm)					X	SARO – Endangered SARA – N/A	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Habitat for this species may be available within deciduous forest communities along Laurel Creek Wetland Complex, Reservoir and tributary creek.	Fencing will keep wildlife out of the construction zone. No further action recommended at this time. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.
Amphibian	Western Chorus Frog - Great Lakes/St. Lawrence Canadian Shield population (*Pseudacris triseriata*)				X				SARO – Special Concern SARA – Threatened (Schedule 1)	Wetlands including ponds, marshes, swamps, and drainage ditches. They will breed in roadside ditches, gravel pits and flooded swales in meadows. Terrestrial habitat needed includes lowlands such as clearings, meadows and pastures (Environment Canada, 2015).	Species not observed/heard via amphibian monitoring surveys conducted in the study area. Potential breeding habitat suitable for this species in the general area (Laurel Creek Wetland Complex, marsh vegetation communities, low areas in forest). The record may be from up to 10km away.	Fencing will keep wildlife out of the construction zone. No further action recommended at this time. Install a permanent fence within the study area, between Laurel Creek Conservation Area and Fischer Hallman Road/Bearinger Drive, for wildlife exclusion purposes.
Mammal	Eastern Small-footed Bat (*Myotis leibii*)							X	SARO – Endangered SARA – N/A	Overwintering habitat: Caves and mines that remain above 0 degrees. Maternal Roosts: Caves, tree cavities, rock outcrops, bridges and buildings (primarily under loose rocks on exposed rock)	No potential for hibernacula identified. Potential habitat occurs for Maternal roosting sites within trees located on either side of Bearinger Road. A formal snag survey will be conducted at detailed design	Tree clearing shall ensure compliance with the bat roosting timing window of May 1 to August 31 during bat maternity roosting season. If potential maternal roosting trees are identified, additional mitigation may be required, which may include the installation of bat boxes to mitigate loss of this habitat.

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Mammal	Little Brown Myotis (*Myotis lucifugus*)							X	SARO – Endangered SARA – Endangered (Schedule 1)	Overwintering habitat: Caves and mines that remain above 0 degrees. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm DBH).	No potential for hibernacula identified. Potential habitat occurs for Maternal roosting sites within trees located on either side of Bearinger Road. A formal snag survey will be conducted at detailed design.	
Mammal	Northern Myotis (*Myotis septentrionalis*)							X	SARO – Endangered SARA – Endangered (Schedule 1)	Overwintering habitat: Caves and mines that remain above 0 degrees. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm DBH). Occasionally found in structures (attics, barns etc.)	No potential for hibernacula identified. Potential habitat occurs for Maternal roosting sites within trees located on either side of Bearinger Road. A formal snag survey will be conducted at detailed design.	
Mammal	Tri-Coloured Bat (*Perimyotis subflavus*)							X	SARO – Endangered SARA – Endangered (Schedule 1)	Overwintering habitat: Caves and mines that remain above 0 degrees. Maternal Roosts: Often associated with clusters of dead leaves in large diameter Oak or Maple trees. May also use barns or similar structures.	No potential for hibernacula identified. Potential habitat occurs for Maternal roosting sites within trees located on either side of Bearinger Road. A formal snag survey will be conducted at detailed design.	

Type	Species	MNRF NHIC (Jan 2019)	GRCA communication	DFO SAR Mapping (2019)	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	Ontario Butterfly Atlas (2019)	City of Waterloo MNRF Screening List (Aug 2017)	Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Insect	Monarch Butterfly (*Danaus plexippus*)						X	X	SARO – Special Concern SARA – Special Concern (Schedule 1)	Caterpillars are found near milkweed plants and adults near wildflowers that supply nectar. Often found on abandoned farmland, meadows, open wetlands, prairies, roadsides, city gardens and parks (COSEWIC 2010).	A Monarch caterpillar was found on milkweed plant within cultural savannah vegetation community along Laurel Creek Reservoir.	Habitat will be impacted, as this species will use cultural meadow and roadside habitats. Recommended to include milkweed in seed mixes to ensure host plant is available in study area.
Insect	Rusty-patched Bumble Bee (*Bombus affinis*)							X	SARO – Endangered SARA – Endangered (Schedule 1)	Typically found in open habitats, such as mixed farmland, savannah, marshes, sand dunes, urban and lightly wooded areas. It is cold-tolerant and can be found at high elevations. Requires abundance of flowering plants for forage. They often build nests underground in old rodent burrows and hollow tree stumps or dead wood.	Potential for habitat in cultural savannah and marsh vegetation communities is low, as there is not an abundance of flowering plants. Typical habitat for this species of large grassland habitat is not available.	No further action recommended at this time.
Insect	West Virginia White (*Pieris virginiensis*)							X	SARO – Special Concern SARA – Special Concern	Lives in moist, deciduous woodlots. This butterfly requires a supply of toothwort, a small, spring-blooming plant that is a member of the mustard family, since it is the only food source for larvae (COSSARO, 2014).	Low potential for habitat as no toothwort is found in the study area.	No further action recommended at this time.

APPENDIX C

Stage 1 Archaeological Study

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
FISCHER-HALLMAN ROAD IMPROVEMENTS
COLUMBIA STREET TO WESTMOUNT ROAD NORTH
PART OF LOT 26, 29 AND 30, GERMAN CO. TRACT
(FORMER TOWNSHIP OF WATERLOO, COUNTY OF WATERLOO)
CITY OF WATERLOO, REGION OF WATERLOO, ONTARIO

ORIGINAL REPORT

Prepared for:

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Archaeological Licence #P1066 (Lytle)
Ministry of Tourism, Culture and Sport PIF# P1066-0040-2017
ASI File: 17EA-021

24 July 2017

ASI Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
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Stage 1 Archaeological Assessment
Fischer-Hallman Road Improvements
Columbia Street to Westmount Road North
Part of Lot 26, 29 and 30, German Co. Tract
(Former Township of Waterloo, County of Waterloo)
City of Waterloo, Region of Waterloo, Ontario

EXECUTIVE SUMMARY

Archaeological Services Inc. was contracted by WalterFedy to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Fischer-Hallman Road (Regional Road 58) Improvements Columbia Street West to Westmount Road North, City of Waterloo, Region of Waterloo, Ontario. This project involves the potential widening and improvements to Fischer-Hallman Road.

The Stage 1 background study determined that 12 previously registered archaeological sites are located within one kilometre of the Study Area. The property inspection determined that parts of the Study Area exhibit archaeological potential and will require Stage 2 assessment.

In light of these results, the following recommendations are made:

1. The Study Area exhibits archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed impacts to the property;

2. Parts of the Study Area require test pit survey according to professional judgement to confirm disturbance;

3. The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, or slopes in excess of 20 degrees. These lands do not require further archaeological assessment; and,

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

ASI

PROJECT PERSONNEL

Senior Project Manager:	Lisa Merritt, MSc. (P094) *Partner / Director* *Environmental Assessment Division*
Project Coordinator:	Sarah Jagelewski, Hon. BA (R405) *Archaeologist / Assistant Manager* *Environmental Assessment Division*
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Project Manager:	Eliza Brandy, MA (R1109) *Archaeologist / Project Manager* *Environmental Assessment Division*
Field Director:	Jessica Lytle
Report Preparation:	Eliza Brandy
Graphics:	Jonas Fernandez, MSc (R281) *Archaeologist / Assistant Manager - Fleet & Geomatics Specialist* *Operations Division*
Report Reviewer:	Lisa Merritt

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1.0 PROJECT CONTEXT

Archaeological Services Inc. (ASI) was contracted by WalterFedy to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Fischer-Hallman Road (Regional Road 58) Columbia Street West to Westmount Road North, City of Waterloo, Region of Waterloo, Ontario (Figure 1). This project involves the potential road widening and improvements to Fischer-Hallman Road.

All activities carried out during this assessment were completed in accordance with the *Ontario Heritage Act* (1990, as amended in 2009) and the 2011 *Standards and Guidelines for Consultant Archaeologists* (S & G), administered by the Ministry of Tourism, Culture and Sport (MTCS).

In the S & G, Section 1, the objectives of a Stage 1 archaeological assessment are discussed as follows:

- To provide information about the history, current land conditions, geography, and previous archaeological fieldwork of the Study Area;
- To evaluate in detail the archaeological potential of the Study Area that can be used, if necessary, to support recommendations for Stage 2 archaeological assessment for all or parts of the Study Area; and,
- To recommend appropriate strategies for Stage 2 archaeological assessment, if necessary.

This report describes the Stage 1 archaeological assessment that was conducted for this project and is organized as follows: Section 1.0 summarizes the background study that was conducted to provide the historical and archaeological contexts for the project Study Area; Section 2.0 addresses the field methods used for the property inspection that was undertaken to document its general environment, current land use history and conditions of the Study Area; Section 3.0 analyses the characteristics of the project Study Area and evaluates its archaeological potential; Section 4.0 provides recommendations; and the remaining sections contain other report information that is required by the S & G, e.g., advice on compliance with legislation, works cited, mapping and photo-documentation.

1.1 Development Context

All work has been undertaken as required by the *Environmental Assessment Act*, RSO (1990) and regulations made under the Act, and are therefore subject to all associated legislation. This project is being conducted in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (2000 as amended in 2007, 2011 and 2015).

The Regional Municipality of Waterloo (Planning and Development Department 1989) prepared an *Archaeological Facilities Master Plan* of the Regional Municipality of Waterloo. The purpose of this study was to identify and evaluate the archaeological resources in the Region and to study the feasibility of developing an archaeological facility. This document does not comment on the archaeological potential of the Columbia Street West Corridor study area.

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment was granted by WalterFedy, on behalf of the Region of Waterloo, on April 26, 2017.

1.2 Historical Context

The purpose of this section, according to the S & G, Section 7.5.7, Standard 1, is to describe the past and present land use and the settlement history and any other relevant historical information pertaining to the Study Area. A summary is first presented of the current understanding of the Indigenous land use of the Study Area. This is then followed by a review of the historical Euro-Canadian settlement history.

1.2.1 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (BP) (Ferris 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards and Fritz 1988) and populations now occupied less extensive territories (Ellis and Deller 1990).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 BP; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 BP and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Ellis et al. 1990, 2009; Brown 1995:13).

Between 3,000-2,500 BP, populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. Exchange and interaction networks broaden at this time (Spence et al. 1990:136, 138) and by approximately 2,000 BP, evidence exists for macro-band camps, focusing on the seasonal harvesting of resources (Spence et al. 1990:155, 164). It is also during this period that maize was first introduced into southern Ontario, though it would have only supplemented people's diet (Birch and Williamson 2013:13–15). Bands likely retreated to interior camps during the winter. It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From approximately 1,000 BP until approximately 300 BP, lifeways became more similar to that described in early historical documents. During the Early Iroquoian phase (AD 1000-1300), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson 1990:317). By the second quarter of the first millennium BP, during the Middle Iroquoian phase (AD 1300-1450), this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al. 1990:343). In the Late Iroquoian phase (AD 1450-1649) this process continued with the coalescence of these small villages into larger communities (Birch and Williamson 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed. By AD 1600, the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s, the

traditional enmity between the Haudenosaunee [1] and the Huron-Wendat (and their Algonkian allies such as the Nippissing and Odawa) led to the dispersal of the Huron-Wendat.

Samuel de Champlain in 1615 reported that a group of Iroquoian-speaking people situated between the Haudenosaunee and the Huron-Wendat were at peace and remained "la nation neutre". In subsequent years, the French visited and traded among the Neutral, but the first documented visit was not until 1626, when the Recollet missionary Joseph de la Roche Daillon recorded his visit to the villages of the Attiwandaron, whose name in the Huron-Wendat language meant "those who speak a slightly different tongue" (the Neutral apparently referred to the Huron-Wendat by the same term). Like the Huron-Wendat, Petun, and Haudenosaunee, the Neutral people were settled village agriculturalists. Several discrete settlement clusters have been identified in the lower Grand River, Fairchild-Big Creek, Upper Twenty Mile Creek, Spencer-Bronte Creek drainages, Milton, Grimsby, Eastern Niagara Escarpment and Onondaga Escarpment areas, which are attributed to Iroquoian populations. These settlement clusters are believed by some scholars to have been inhabited by populations of the Neutral Nation or pre- (or ancestral) Neutral Nation (Lennox and Fitzgerald 1990).

Between 1647 and 1651, the Neutral were decimated by epidemics and ultimately dispersed by the Haudenosaunee, who subsequently settled along strategic trade routes on the north shore of Lake Ontario for a brief period during the mid seventeenth-century. Compared to settlements of the Haudenosaunee, the "Iroquois du Nord" occupation of the landscape was less intensive. Only seven villages are identified by the early historic cartographers on the north shore, and they are documented as considerably smaller than those in New York State. The populations were agriculturalists, growing maize, pumpkins, and squash. These settlements also played the important alternate role of serving as stopovers and bases for Haudenosaunee travelling to the north shore for the annual beaver hunt (Konrad 1974).

After the dispersal, the Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario, including Teiaiagon, near the mouth of the Humber River; and Ganestiquiagon, near the mouth of the Rouge River. Their locations near the mouths of the Humber and Rouge Rivers, two branches of the Toronto Carrying Place, strategically linked these settlements with the upper Great Lakes through Lake Simcoe. The west branch of the Carrying Place followed the Humber River valley northward over the drainage divide, skirting the west end of the Oak Ridges Moraine, to the East Branch of the Holland River. Another trail followed the Don River watershed.

When the Senecas established Teiaiagon at the mouth of the Humber, they were in command of the traffic across the peninsula to Lake Simcoe and the Georgian Bay. Later, Mississauga and earliest European presence along the north shore, was therefore also largely defined by the area's strategic importance for accessing and controlling long established economic networks. Prior to the arrival of the Seneca, these economic networks would have been used by indigenous groups for thousands of years. While the trail played an important part during the fur trade, people would also travel the trail in order to exploit the resources available to them across south-central Ontario, including the various spawning runs, such as the salmon coming up from Lake Ontario or herring or lake trout in Lake Simcoe.

[1] The Haudenosaunee are also known as the New York Iroquois or Five Nations Iroquois and after 1722 Six Nations Iroquois. They were a confederation of five distinct but related Iroquoian–speaking groups - the Seneca, Onondaga, Cayuga, Oneida, and Mohawk. Each lived in individual territories in what is now known as the Finger Lakes district of Upper New York. In 1722 the Tuscarora joined the confederacy.

Due, in large part, to increased military pressure from the French upon their homelands south of Lake Ontario, the Haudenosaunee abandoned their north shore frontier settlements by the late 1680s, although they did not relinquish their interest in the resources of the area, as they continued to claim the north shore as part of their traditional hunting territory. The territory was immediately occupied or re-occupied by Anishinaabek groups, including the Mississauga, Ojibwa (or Chippewa) and Odawa, who, in the early seventeenth century, occupied the vast area extending from the east shore of Georgian Bay, and the north shore of Lake Huron, to the northeast shore of Lake Superior and into the upper peninsula of Michigan. Individual bands were politically autonomous and numbered several hundred people. Nevertheless, they shared common cultural traditions and relations with one another and the land. These groups were highly mobile, with a subsistence economy based on hunting, fishing, gathering of wild plants, and garden farming. Their movement southward also brought them into conflict with the Haudenosaunee.

Peace was achieved between the Haudenosaunee and the Anishinaabek Nations in August of 1701 when representatives of more than twenty Anishinaabek Nations assembled in Montreal to participate in peace negotiations (Johnston 2004:10). During these negotiations captives were exchanged and the Iroquois and Anishinaabek agreed to live together in peace. Peace between these nations was confirmed again at council held at Lake Superior when the Iroquois delivered a wampum belt to the Anishinaabek Nations.

In 1763, following the fall of Quebec, New France was transferred to British control at the Treaty of Paris. The British government began to pursue major land purchases to the north of Lake Ontario in the early nineteenth century, the Crown acknowledged the Mississaugas as the owners of the lands between Georgian Bay and Lake Simcoe and entered into negotiations for additional tracts of land as the need arose to facilitate European settlement.

During the American Revolution, Mississauga warriors supported the English military. Rebel forces destroyed the villages of the Six Nations Iroquois in New York and many people were forced to move to the Niagara area. When Six Nations Iroquois leaders learned that the English planned to make a peace treaty with the Americans and establish a boundary line that would give away their homelands they were angry. The English government offered to protect Six Nations Iroquois peoples and give them land within their boundaries. On August 8, 1783, Lord North instructed Governor Haldimand to set apart land for the Six Nations Iroquois and ensure that they carried on their hunting and fur trading with the British. On May 22, 1784, a tract of land along the Grand River was purchased by the British government from the Mississaugas who lived in the vicinity (Johnston 1964; Lytwyn 2005). The land set apart is called the Haldimand Tract. Joseph Brant led New York Iroquois loyalists (1600 people) to the Haldimand tract in 1784 and in the fall of 1784, Sir Frederick Haldimand formally awarded the tract to the Mohawks “and others of the Six Nations [Iroquois].” They were authorized to “Settle upon the Banks of the River” and were allotted “for that Purpose six miles [10 km] deep from each Side of [it] beginning at Lake Erie, & extending in the Proportion to [its] Head.” The precise boundaries of the grant were unclear as there was no survey; for example, the northern boundary of the original deed from the Mississaugas to the Crown stated that the line extended “from the creek that falls from a small lake into…the bay known by the name of Waghquata [Burlington Bay]…until it strikes the river La Tranche [Thames].” The 1790 survey by Augustus Jones intentionally failed to include the headwaters of the Grand, an action made all the more difficult to address given the unclear description of the extent in the original deeds (Johnston 1964; Lytwyn 2005).

Brant regarded the territory as his own to manage on behalf of the Confederacy and interpreted the proclamation as tantamount to full national recognition of the Mohawks and fellow tribesmen. This interpretation was strongly denied by the British (Johnston 1964; Lytwyn 2005). Appointed as Lieutenant Governor of the new colony of Upper Canada in 1791, Simcoe refused to permit the Six Nations Iroquois

to sell/lease any part of their reserve because they were arranged independently of the Crown. Brant, on the other hand, argued for the Six Nations Iroquois' need for an immediate assured income from land sales as they could no longer hope to survive by hunting exclusively. Simcoe thought that if such practices were permitted, it could lead to other Europeans attempting to seize control by any means of the better part of the Six Nations Iroquois' reserve and it was therefore unresolved as to whether Six Nations Iroquois people could dispose of their lands directly to whomever they chose (Johnston 1964; Lytwyn 2005).

In the first few years, Brant, who had been described, by some, as a Europeanized entrepreneur, took the initiative and invited white friends and acquaintances to the tract and provided them with rough land titles. Over the next 25 years (1784-1810), a considerable number of Europeans and Americans obtained similar leases authorizing them (in Brant's opinion) to occupy and improve lots overlooking the river (Johnston 1964; Lytwyn 2005). The subsequent Peter Russel administration (1797-1798) recognized the leases and the sales that Brant arranged with white settlers along the Grand River Valley. Trustees were appointed to act on the behalf of the Six Nations Iroquois with the authority to receive payment of purchases. On the other hand, some Six Nations Iroquois thought that the land sale practices violated the ancient principle that land was not a "commodity which could be conveyed" (Johnston 1964; Lytwyn 2005). A formal investigation of the matter was launched in 1812 although leases were not set aside. Due to problems of white encroachment including squatters without titles, settlers who bought land from individuals or through other transactions with Six Nations Iroquois, many of the leases were confirmed by the Crown in 1834-5. Unauthorized sales and agreements remained rampant (Johnston 1964; Lytwyn 2005).

In 1841, Samuel P. Jarvis (Indian Superintendent) informed the Six Nations Iroquois that the only way to keep white intruders off their land would be for them to surrender it to the Crown, to be administered for their sole benefit. With this plan, the Six Nations Iroquois would retain lands that they actually occupied and a reserve of approximately 8,094 ha. The surrender of land was made by the Confederacy in January, 1841 (Johnston 1964; Lytwyn 2005). Today, this history and those surrenders are still contested and there are numerous specific land claims that have been filed by the Six Nations Iroquois with the federal government in regard to lands within the Haldimand Tract (Johnston 1964; Lytwyn 2005).

The eighteenth century saw the ethnogenesis in Ontario of the Métis when Métis people began to identify as a separate group, rather than as extensions of their typically maternal First Nations and paternal European ancestry (Métis National Council n.d.). Living in both Euro-Canadian and Indigenous societies, the Métis acted as agents and subagents in the fur trade but also as surveyors and interpreters. Métis populations were predominantly located north and west of Lake Superior, however, communities were located throughout Ontario (MNC n.d.; Stone and Chaput 1978:607,608). During the early nineteenth century, many Métis families moved towards locales around southern Lake Huron and Georgian Bay, including Kincardine, Owen Sound, Penetanguishene, and Parry Sound (MNC n.d.). By the mid-twentieth century, Indigenous communities, including the Métis, began to advance their rights within Ontario and across Canada, and in 1982, the Métis were recognized as one of the distinct Indigenous peoples in Canada. Recent decisions by the Supreme Court of Canada (Supreme Court of Canada 2003, 2016) have reaffirmed that Métis people have full rights as one of the Indigenous people of Canada under subsection 91(24) of the Constitution Act, 1867.

1.2.2 Euro-Canadian Land Use: Township Survey and Settlement

Historically, the Study Area is located in part of Lot 26, 29 and 30, German Co. Tract, Former Township of Waterloo, County of Waterloo.

The S & G stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches, and early cemeteries are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the Ontario Heritage Act or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those that are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 m of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into the hinterlands. Early transportation routes followed existing Indigenous trails, both along the lakeshore and adjacent to various creeks and rivers (Archaeological Services Inc. 2006).

Township of Waterloo

The historic Township of Waterloo was originally known as Block Two of the Grand River land grant which was deeded to the Six Nations Iroquois by the British in 1784 for their loyalty to the Crown in the American War of Independence. In 1796, Block Two, a 38,045 ha tract, was acquired by Richard Beasley from Joseph Brant on behalf of the Six Nations. He subdivided and sold the land, with an approximately 24,281 ha tract of land going to the German Company of Pennsylvania, in November 1803 (Janusas 1988:2). Company members included Samuel and John Bricker; and Daniel, Jacob, and John Erb. The German Company of Pennsylvania had the lands surveyed by Augustus Jones to subdivide the land into 128 farm lots of approximately 181 ha each and 32 farm lots of approximately 34 ha each (Janusas 1988:96).

When Block Two was incorporated into the District of Gore (County of Halton) in 1816, it was named Waterloo Township, in honour of the battle that ended the Napoleonic Wars in Europe. It remained part of Halton County in the District of Gore until 1842 and then part of the District of Wellington. The County of Waterloo did not come into being until 1852 (Janusas 1988: 2).

The first immigrants to settle in Waterloo Township were almost exclusively German Mennonites from Pennsylvania, who had originally emigrated from Switzerland, Germany and France. Most of these settlers were farmers but many were tradesmen and millers. Later settlers were generally of Scottish, English, Irish, and continental German heritage, many of them farmers, but a majority of them were artisans and tradesmen. When the railway was laid through Waterloo Township in the mid-nineteenth century, it became the leading industrial center of Waterloo County (Janusas 1988: 10-12).

Abraham Erb purchased approximately 181 ha of land in 1805 and became the first settler in the City of Waterloo. He transferred a portion of his land and ownership of two mills to Jacob Snider in 1829. Snider's son inherited approximately 129 ha which he sold to John Hoffman and Isaac Weber, who sectioned and sold the lands in 1854, at which point the population of Waterloo began to expand (Janusas 1988: 102).

In the mid-1850s, the defining development of Waterloo Township and Waterloo County was the construction of the railway. The first railway line built into the township was a main line of the Grand Trunk Railway from Toronto, laid through in 1856. A number of other railway lines were soon laid across the township including: a Grand Trunk branch between Preston and Berlin in 1857; a Great Western line from Galt, Preston, and Guelph in 1857; a Grand Trunk branch between Berlin (Kitchener) and Galt in 1882; and a Grand Trunk Branch between Waterloo and Elmira in 1891.

City of Waterloo

The land which became the core of the City of Waterloo was settled in 1806 by Abraham Erb, a Mennonite from Pennsylvania, who became one of the first settlers in the township. He erected a saw mill in 1808 and grist mill in 1816 on Beaver Creek (now Laurel Creek), which attracted farmers from miles around who previously had to travel to Dundas for their flour. The majority of early settlers were of German origin. Early growth of the community was slow as Erb refused to sell off any of his land in small lots. In 1829 Jacob C. Snider bought 240 acres of Erbs land, including the mills. He built a steam power plant and added a distillery which encouraged more people to settle in the area. A community grew around the mills. In 1831 a post office was opened. Waterloo experienced a steady stream of immigrants between 1835 and 1855, mostly German craftsmen. In 1840 Henry Bowman opened the first hotel, tavern, and livery stable. In 1844 the Kuntz family established a brewery, the first large industry of its kind in the area, which would become the forerunner of Carling's Brewery. Jacob Bricker opened a foundry and machine shop in 1851 which produced agricultural implements. The business expanded rapidly and eventually grew into the Waterloo Manufacturing Company, whose agricultural products became world famous. Several stagecoach lines were established, which made transportation easier and brought many settlers to the area, resulting in rapid expansion. By 1855 the population had grown to 1,400 people and the community had two sawmills, a flour mill, foundry, cabinet factory, small weaving mill, potter's shop, distillery, brewery, harness shop, and a tree and garden nursery. Waterloo was incorporated as a village in 1857 and elevated to town status in 1876, with a population of approximately 1,700. The Waterloo branch of the Grand Trunk Railway was opened around this time, and later the Canadian Pacific Railway established a link to the town. Industries which arose in Waterloo during the nineteenth century flourished well into the twentieth century, such as prominent insurance companies and The Seagram Company Ltd. distillery from 1857 to 1992 (Historica Canada 2015; Mika and Mika 1983).

The first Evangelical missionaries arrived in 1837 and met at a large camp on the outskirts of Waterloo. In 1839 a permanent congregation, the first in Upper Canada, was organized and the first meeting-hall was built ten years later. It was replaced with a new structure in 1905. Many of Waterloo's early settlers were Mennonites, worshiping in private homes until the 1860's, when a church was constructed. Presbyterian services were held as early as 1864, with regular services being offered in the town hall in the 1880's. The first Presbyterian church was erected in 1888. The Catholic community erected a church around the turn of the century, with a convent for the Sisters of Notre Dame opened in 1895. In 1830 the first school in the community opened, beginning Waterloo's long history as an educational centre. In 1842 Abraham Erb donated part of his land for a schoolhouse, which was replaced by a new building in the 1860's. Waterloo College was formed in 1911 as the Evangelical Lutheran Seminary, becoming the Waterloo College in 1924. In 1890 the town established the Waterloo Park, using Abraham Erb's mill

pond as a centerpiece. Musical traditions include the county's first Saengerfest in 1874 as well as the establishment of the Waterloo Musical Society in 1882 (Historica Canada 2015; Mika and Mika 1983).

Benjamin Eby was one of the earliest settlers on the outskirts of Waterloo. His property along the Laurel Creek was later settled by Joseph S. Shantz, of Pennsylvania, on the west half of Lot 26, German Company Tract, in 1849 where he constructed a dam and a sawmill (Joseph Schneider Haus National Historic Site and Region of Waterloo n.d.). Two of his sons, Joseph Jr. and Menno, were later granted each a half of the lot. Menno was ordained at the David Eby Meeting House as deacon of the Mennonite Church for the Eby, Martin and Conestogo fields of labor in November, 1874 (Joseph Schneider Haus National Historic Site and Region of Waterloo n.d.).

Waterloo was incorporated as a city in 1948, with a population of 10,736. In 2014 the population was estimated at 132,300 people (City of Waterloo 2015; Historica Canada 2015; Mika and Mika 1983).

Erbsville

Erbsville was first settled by Samuel Erb in 1845 at the intersection of what is now Erbsville Road and Conservation Drive, where he built a sawmill on nearby Beaver Creek. Samuel's son, John L. Erb, continued the sawmill operation, until it was taken overby Charles Kreutziger. A survey plan of Erbsville was registered in 1861. At its height, Erbsville had a blacksmith shop, general store, schoolhouse, a church, a carpenter's shop, a cheese factory, and Baltzer Schnarr's British Crown Inn (Waterloo Region Museum 2017).

1.2.3 Historical Map Review

The 1861 Map of the County of Waterloo (Tremaine 1861) and the 1881 Illustrated Historical Atlas of Waterloo and Wellington Counties, Township of Waterloo page (H. Parsell & Co. 1881) were examined to determine the presence of historic features within the Study Area during the nineteenth century (Figures 2-3).

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases.

In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historic mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

Table 1: Nineteenth-century property owner(s) and historical features(s) within or adjacent to the Study Area

		1861		*1881*	
Con #	**Lot #**	**Property Owner(s)**	**Historical Feature(s)**	**Property Owner(s)**	**Historical Feature(s)**
German Co. Tract	26	Menno S. Shantz Joseph S. Shantz	House, mill pond House (2), saw mill, mill pond	D. Bearinger	House, saw mill, mill pond
	29	Abraham Keener Jos. Spets (?)	None	None	None
	30	Abraham Keener	None	Wm. Mitchell Noah Erb	House House

According to the 1861 map, Fisher-Hallman Road and Columbia Street West were historically surveyed transportation routes. Two structures are illustrated near the northern terminus of the Study Area, associated with Joseph Shantz's property on the southwest parcel of Lot 26. An additional structure, a saw mill, was located east of the mill pond and river, on the south side of the road. Menno Shantz owned the northwest parcel of Lot 26, however his structures are opposite the mill pond from the Study Area. The saw mill continues to be shown on the 1881 map, with Lot 26 then being owned by D. Bearinger, whose house was on the northwest corner of the intersection of Fischer-Hallman Road and Westmount Road North. To the east of this intersection was School House No. 25, one of the earliest schools in Waterloo. The 1881 map also illustrates that Laurelwood Drive was a historically surveyed road.

1.2.4 Twentieth-Century Mapping Review

The 1930 aerial photograph of the City of Waterloo and the 1969 National Topographic Series Waterloo Sheet were examined to determine the extent and nature of development and land uses within the Study Area (Figures 4-5).The photo illustrates that the Study Area remained within a rural agricultural landscape into the twentieth century. Both figures show the previous alignment of the intersection of Bearinger Road, Laurelwood Drive, and Fischer-Hallman Road, as well as a small clustered settlement is shown in the northern end of the Study Area near the river. The 1969 map illustrates a pumping station and a bridge carrying the road over the river adjacent to six structures.

A review of available Google satellite imagery shows the present intersection of Laurelwood Drive at Fischer-Hallman Road was realigned prior to 2005. The extension of Laurelwood Drive east to Westmount Road North, and associated commercial development on the east side of Fischer-Hallman Road, occurred around 2012. Residential subdivision development is also illustrated as being constructed prior to 2005 on the west side of Fischer-Hallman Road.

1.3 Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Study Area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the MTCS through "Ontario's Past Portal"; published and unpublished documentary sources; and the files of ASI.

1.3.1 Current Land Use and Field Conditions

A Stage 1 property inspection was conducted on June 16, 2017 that noted the Study Area is located along Fischer-Hallman Road, bounded by Columbia Street to the south and Westmount Road North to the northeast, in the City of Waterloo. The road is currently a two lane right-of-way (ROW) with sidewalks, and is called Bearinger Road north of Laurelwood Drive. The Study Area is adjacent to Laurel Creek Conservation Area and reservoir with the Doreen Thomas multi-use trail, as well as agricultural fields, a twentieth-century residential neighbourhood, and shopping plazas.

1.3.2 Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful indicator of archaeological potential. Accordingly, a description of the physiography and soils are briefly discussed for the Study Area.

The S & G stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP (Karrow and Warner 1990:Figure 2.16), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include: elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including; food or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S & G, Section 1.3.1).

The study area is situated within the Oxford Till Plains and Waterloo Hills physiographic regions of southern Ontario. The rolling terrain of ridges and hills of the Waterloo Hill region was formed as till and kame moraines. Flowing southward through the moraines is the Grand River spillway comprised of level alluvial terraces (Chapman and Putnam 1984: 136). North of Waterloo, the spillway channel splits into two channels that rejoin south of Kitchener. The present course of the Grand River follows the eastern channel while Schneider Creek follows the western channel. The study area is situated to the north of the southern confluence. Terrain in the study area is complex, varying from almost level to strongly sloping in the upland area that overlooks the large river valley.

Figure 6 depicts surficial geology for the Study Area. The surficial geology mapping demonstrates that the Study Area is underlain by till, modern alluvial deposits, and ice-contact stratified deposits (Ontario Geological Survey 2010). Natural soils could not be identified for part of the Study Area, however Figure 7 shows that the remaining areas consist mainly of poorly drained soils (Presant and Wicklund 1971).

The Study Area is within the Laurel Creek watershed, an area covering approximately 74 square kilometres through mostly urban areas with some of the upper portion within agricultural fields, woodlots and wetlands (Grand River Conservation Authority 2004). Laurel Creek drains from west to east, from the Township of Wellesley into the Grand River. Part of the Study Area is within the Laurel Creek Conservation Area, approximately 293 hectares northeast of Bearinger Road, west of Westmount Road North, which includes the Doreen Thomas Trail (connecting Laurelwood Drive to Westmount Road North) and the Laurel Creek Reservoir, created in 1966, adjacent to the Study Area (Grand River Conservation Authority 2004)

The Grand River was an important transportation route and a critical resource extraction area for generations of Indigenous people. Historically, the Grand River has been utilized as a navigable waterway, as a power source (such power sites served as settlement nuclei), and above Brantford as a course for driving logs (Chapman and Putnam 1984:98). It is also the focus of the Haldimand Tract; Joseph Brant was awarded six miles (10 km) on either side of the river (Johnston 1964:35-38; Lytwyn 2005). The Grand River (and its tributaries the Nith, Conestogo, Speed and Eramosa Rivers) was designated as a Canadian Heritage River in 1994 for its cultural history and recreation (Canadian Heritage River Systems 2016).

1.3.3 Previous Archaeological Research

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MTCS. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and approximately 18.5 km north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Study Area under review is located in Borden block *AiHd.*

According to the OASD, 12 previously registered archaeological sites are located within one kilometre of the Study Area (Ministry of Tourism, Culture and Sport 2016). A summary of the sites is provided below.

Table 2: List of previously registered sites within one kilometre of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type	Researcher
AiHd-21	Uni-Wat	Early Woodland	Camp	Roosa and Hill 1970; Roosa and Deller 1971; Redmond 1983
AiHd-24	Beechwood 1	Late Archaic	Scatter	MPP 1986
AiHd-25	Beechwood 2	Pre-Contact Indigenous	Scatter	MPP 1986
AiHd-27	Beechwood 3	Pre-Contact Indigenous	Scatter	MPP 1986
AiHd-28	Beechwood 4	Pre-Contact Indigenous	Scatter	MPP 1986
AiHd-57	Trillium North 1	Pre-Contact Indigenous	Findspot	MPP 1988

Borden #	Site Name	Cultural Affiliation	Site Type	Researcher
AiHd-58	Trillium North 2	Pre-Contact Indigenous	Findspot	MPP 1988
AiHd-59	Trillium North 3	Pre-Contact Indigenous	Scatter	MPP 1988
AiHd-60	Trillium North 4	Pre-Contact Indigenous	Scatter	MPP 1988
AiHd-65	Trillium North 9	Pre-Contact Indigenous	Findspot	MPP 1988
AiHd-80	Columbia Street - Corduroy Road	Euro-Canadian	Road	Janusas 1989
AiHd-98	Laurel Creek Reservoir	Pre-Contact Indigenous	Findspot	Janusas and Arnold 1992

MPP – Mayer, Pihl, Poulton and Associates Inc.

According to the background research, one previous report details fieldwork within 50 m of the Study Area.

ASI (2016) conducted a Stage 1 Archaeological Assessment (background research and property inspection) as part of the Columbia Street West Class EA, involving the widening and improvements to Columbia Street between Erbsville Road and Fischer-Hallman Road. Based on the results of the property inspection, it was determined that the majority of the study corridor had been subject to extensive and deep land alterations, and areas adjacent to the ROW were low and wet or exhibited excessive slope. Parts of the study area were recommended for test pit survey. Further, the Columbia Street-Corduroy Road site (AiHd-80) was considered to lay intact underneath the current Columbia Street roadbed, and it was recommended that construction within the limits of the site, plus a 50 metre buffer, should be subject to a program of archaeological monitoring.

2.0 FIELD METHODS: PROPERTY INSPECTION

A Stage 1 property inspection must adhere to the S & G, Section 1.2, Standards 1-6, which are discussed below. The entire property and its periphery must be inspected. The inspection may be either systematic or random. Coverage must be sufficient to identify the presence or absence of any features of archaeological potential. The inspection must be conducted when weather conditions permit good visibility of land features. Natural landforms and watercourses are to be confirmed if previously identified. Additional features such as elevated topography, relic water channels, glacial shorelines, well-drained soils within heavy soils and slightly elevated areas within low and wet areas should be identified and documented, if present. Features affecting assessment strategies should be identified and documented such as woodlots, bogs or other permanently wet areas, areas of steeper grade than indicated on topographic mapping, areas of overgrown vegetation, areas of heavy soil, and recent land disturbance such as grading, fill deposits and vegetation clearing. The inspection should also identify and document structures and built features that will affect assessment strategies, such as heritage structures or landscapes, cairns, monuments or plaques, and cemeteries.

The Stage 1 archaeological assessment property inspection was conducted under the field direction of Jessica Lytle (P1066) of ASI, on June 16, 2017, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Study Area. It was a visual inspection only and did not include excavation or collection of archaeological resources. Fieldwork was only conducted when weather conditions were deemed suitable, per S & G Section 2. Previously identified features of archaeological potential were examined; additional features of

archaeological potential not visible on mapping were identified and documented as well as any features that will affect assessment strategies. Field observations are compiled onto the existing conditions of the Study Area in Section 7.0 (Figures 8-10) and associated photographic plates are presented in Section 8.0 (Plates 1-17).

3.0 ANALYSIS AND CONCLUSIONS

The historical and archaeological contexts have been analyzed to help determine the archaeological potential of the Study Area. These data are presented below in Section 3.1. Results of the analysis of the Study Area property inspection are presented in Section 3.2.

3.1 Analysis of Archaeological Potential

The S & G, Section 1.3.1, lists criteria that are indicative of archaeological potential. The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (see Table 2);
- Water sources: primary, secondary, or past water source (Laurel Creek);
- Early historic transportation routes (Fischer-Hallman Road, Columbia Street, Laurelwood Drive);
- Proximity to early settlements (Waterloo, Erbsville); and

According to the S & G, Section 1.4 Standard 1e, no areas within a property containing locations listed or designated by a municipality can be recommended for exemption from further assessment unless the area can be documented as disturbed. The City of Waterloo Municipal Heritage Register was consulted and no properties within the Study Area are Listed or Designated under the Ontario Heritage Act.

These criteria are indicative of potential for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbance.

The Regional Municipality of Waterloo (Planning and Development Department 1989) prepared an *Archaeological Facilities Master Plan* of the Regional Municipality of Waterloo. The purpose of this study was to identify and evaluate the archaeological resources in the Region and to study the feasibility of developing an archaeological facility. This document does not comment on the archaeological potential of the Columbia Street West Corridor study area.

3.2 Analysis of Property Inspection Results

The property inspection determined that parts of the Study Area exhibit archaeological potential (Plates 7, 9-13; Figures 9-10: areas highlighted in green). These areas will require Stage 2 archaeological assessment by test pit survey at five metre intervals prior to any development. According to the S & G Section 2.1.2, test pit survey is required on terrain where ploughing is not viable, such as wooded areas, properties where existing landscaping or infrastructure would be damaged, overgrown farmland with heavy brush or rocky pasture, and narrow linear corridors up to 10 metres wide.

Parts of the Study Area require test pit survey according to professional judgement to confirm disturbance in accordance with the S & G Section 2.1.8 Standard 2 (Plates 2 and 5; Figures 8-9: areas in light orange).

Part of the Study Area was previously assessed and does not require further archaeological assessment (Figures 8: areas in dark orange).

The remainder of the Study Area has been subjected to deep soil disturbance events from the construction of the Fischer-Hallman Road, Laurelwood Drive, and Bearinger Road ROWs, as well as residential subdivisions and commercial centres, a stormwater management pond, and utility corridor along the length of the east side of Bearinger Road. According to the S & G Section 1.3.2 these areas do not retain archaeological potential (Plates 1-17; Figures 8-10: areas highlighted in yellow). Some lands within the Study Area are within low and wet conditions, and according to the S& G Section 2.1 do not retain archaeological potential (Plates 1, 2, Figure 8: areas highlighted in blue). These areas do not require further assessment.

3.3 Conclusions

The Stage 1 background study determined that 12 previously registered archaeological sites are located within one kilometre of the Study Area. The property inspection determined that parts of the Study Area exhibit archaeological potential and will require Stage 2 assessment.

4.0 RECOMMENDATIONS

In light of these results, the following recommendations are made:

1. The Study Area exhibits archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals, prior to any proposed impacts to the property;

2. Parts of the Study Area require test pit survey according to professional judgement to confirm disturbance;

3. The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, or slopes in excess of 20 degrees. These lands do not require further archaeological assessment; and,

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

NOTWITHSTANDING the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MTCS should be immediately notified.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

ASI also advises compliance with the following legislation:

- This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, RSO 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological field work on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act.*

- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.

- The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

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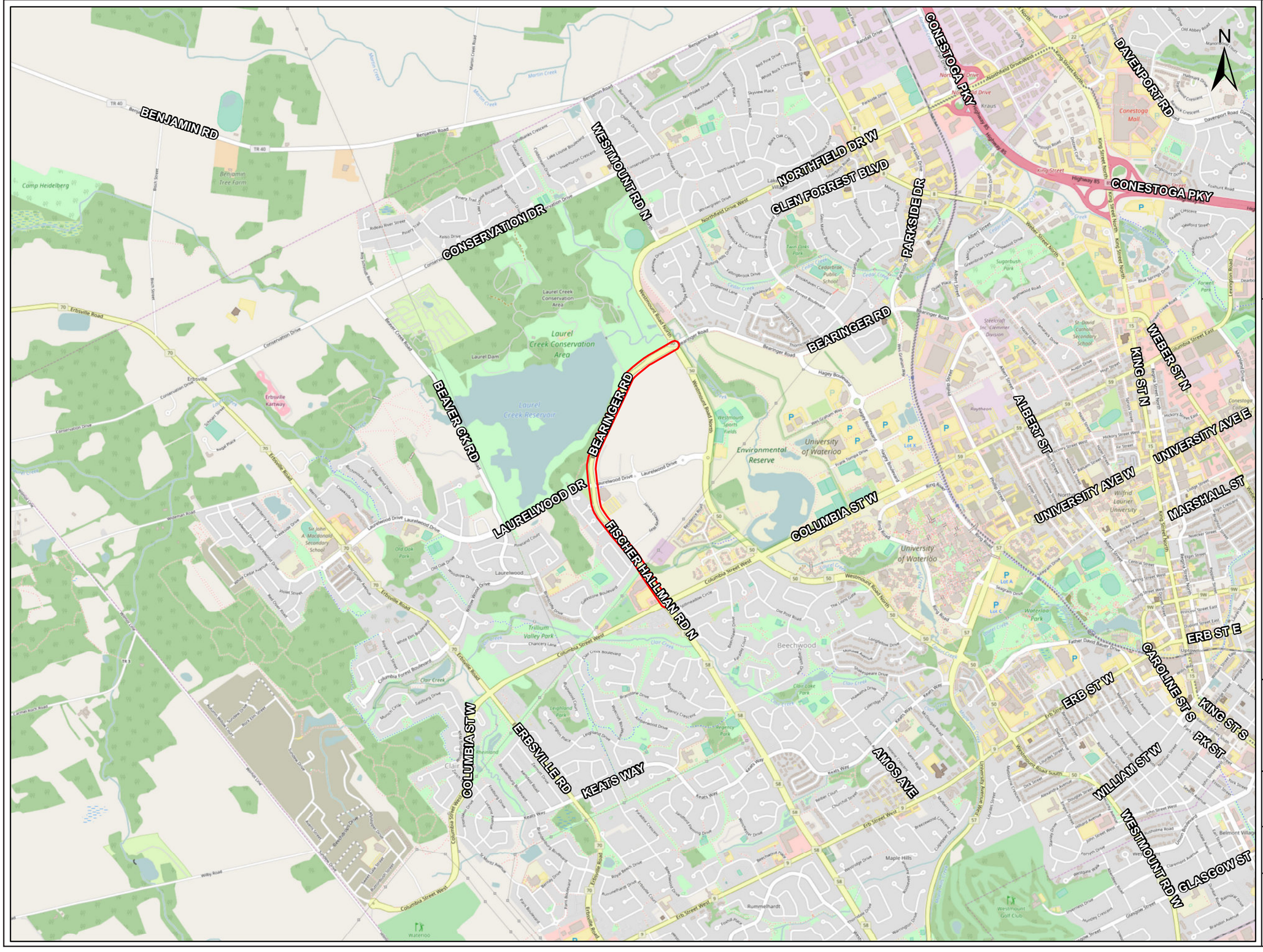
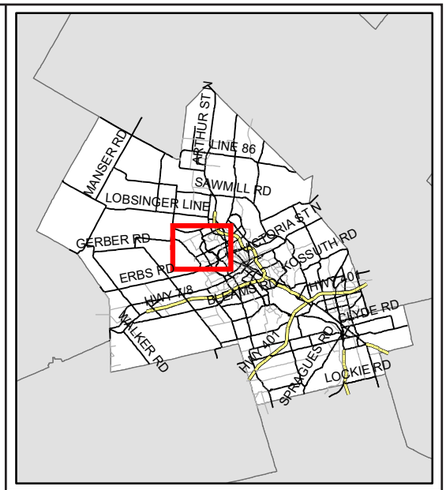
7.0 MAPS





Study Area

BASE:

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Kilometres

ASI PROJECT NO.: 17EA-021
DATE: 5/18/2017

DRAWN BY: JF
FILE: 17EA021_fig1

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Figure 1: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North - Location of the Study Area

Figure 2: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area (Approximate Location) Overlaid on the 1861 Map of the County of Waterloo

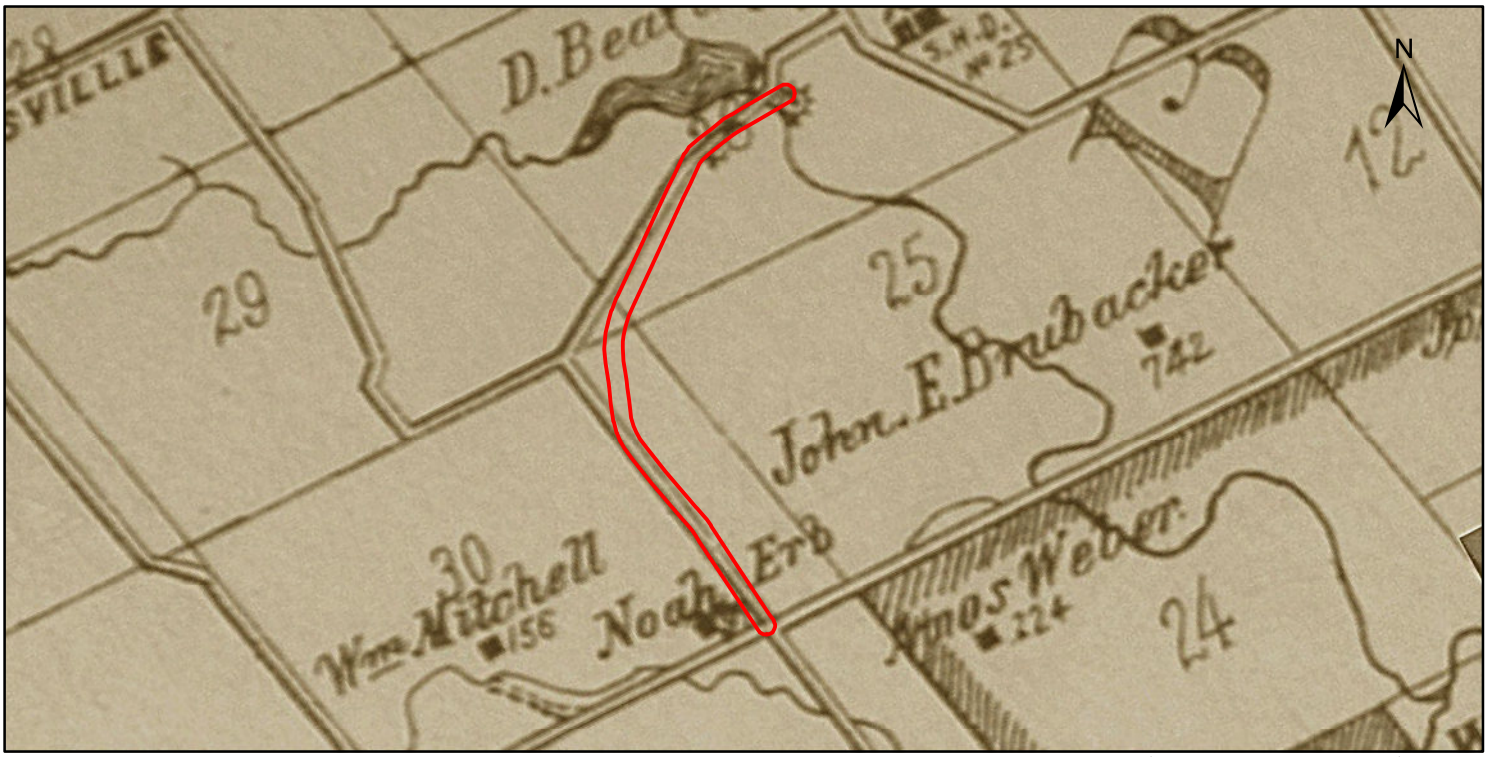

Figure 3: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area (Approximate Location) Overlaid on the 1881 Illustrated Historical Atlas of the Township of Waterloo

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Study Area

Base:
1861 Map of the County of Waterloo
1881 Illustrated Historical Atlas of the Township of Waterloo

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Metres

ASI PROJECT NO.: 17EA-021
DATE: 5/18/2017

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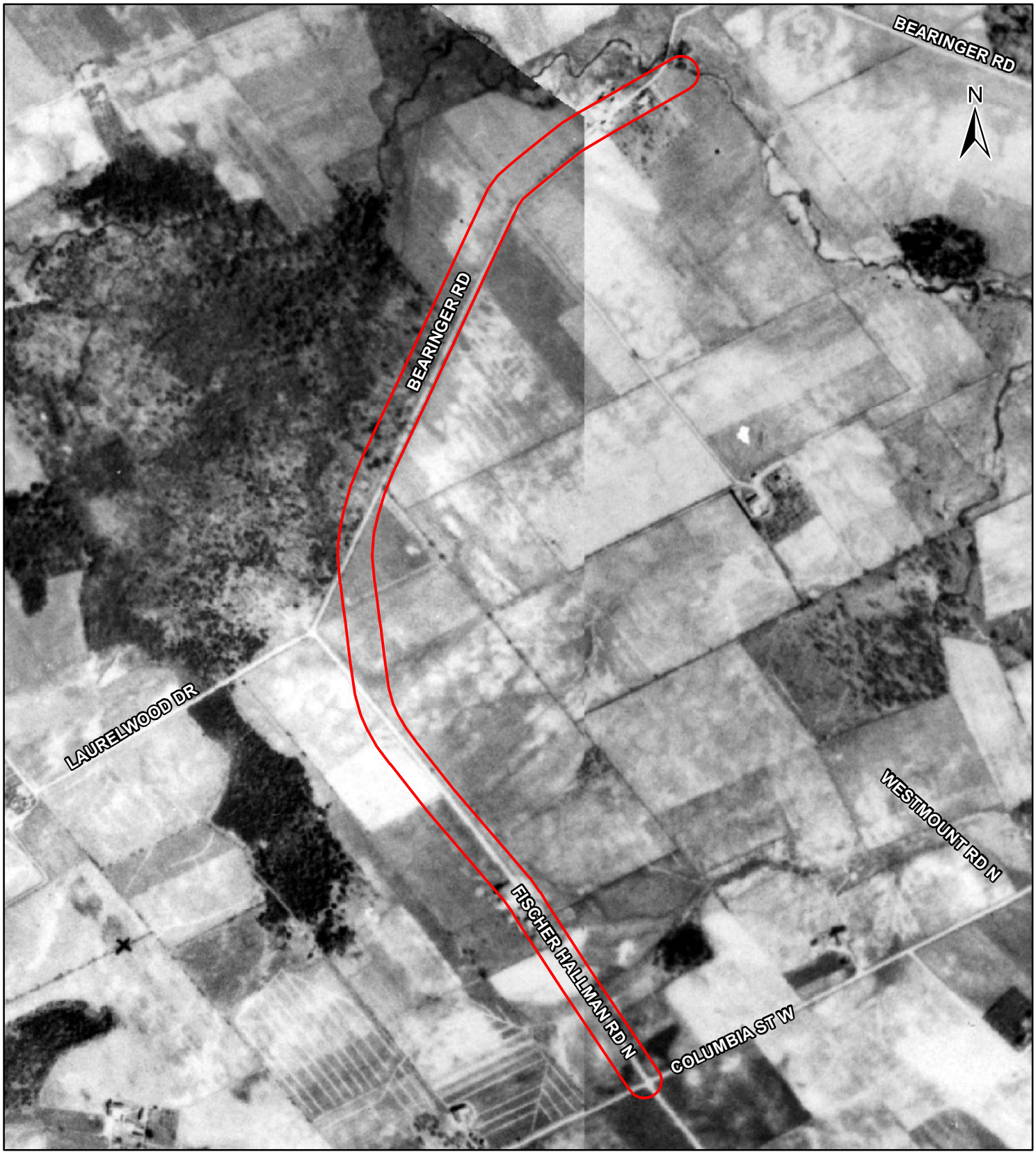

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Study Area

Base:
1930 Aerial Photo of Waterloo

0 250
Metres

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DATE: 6/16/2017

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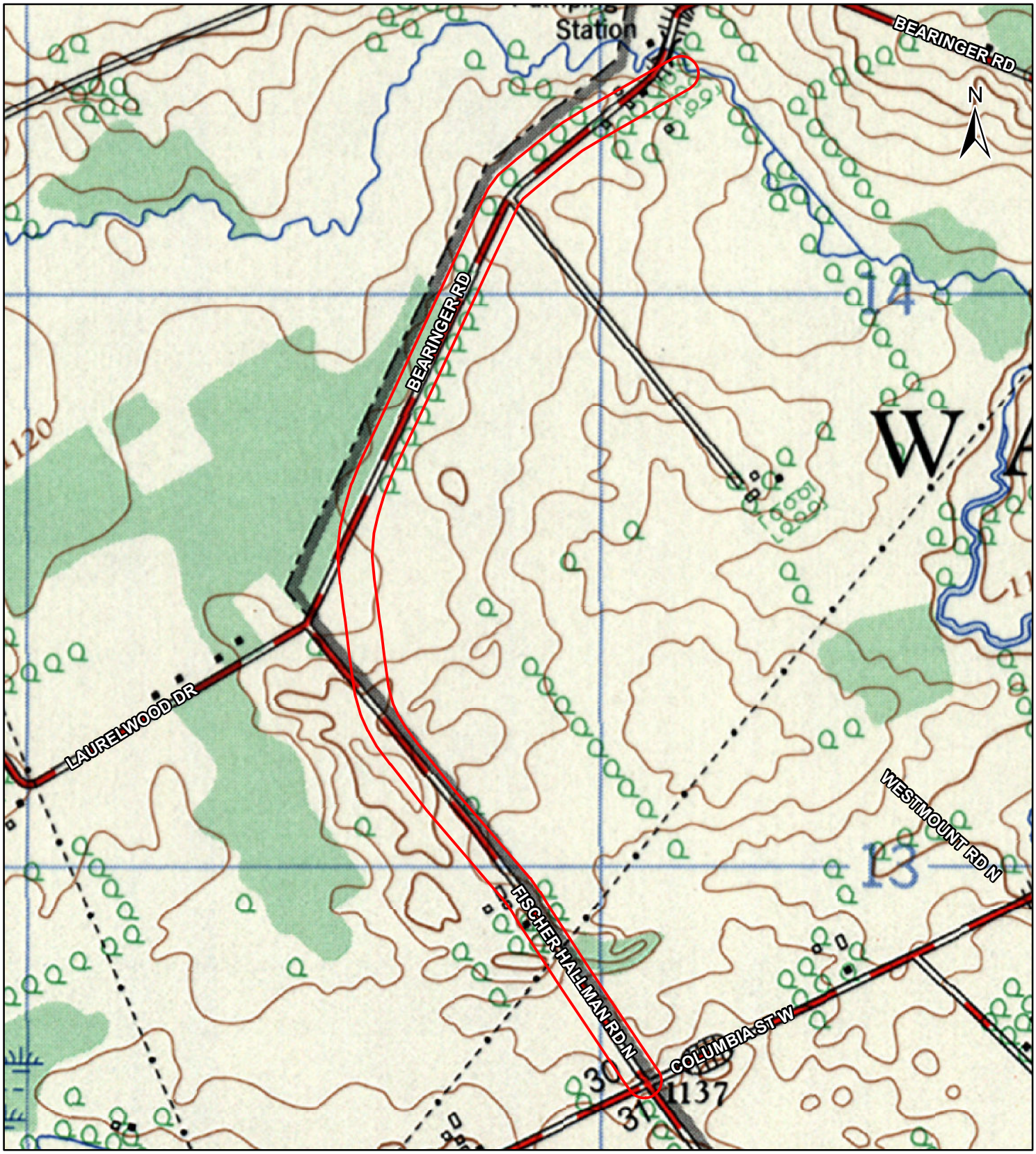
Figure 4: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area (Approximate Location) Overlaid on the 1930 Aerial Photo of Waterloo



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Study Area

Base:
Waterloo - Kitchener NTS
40P-7h 1969

0 250
Metres

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Figure 5: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area (Approximate Location) Overlaid on the 1969 National Topographic Series Waterloo Sheet

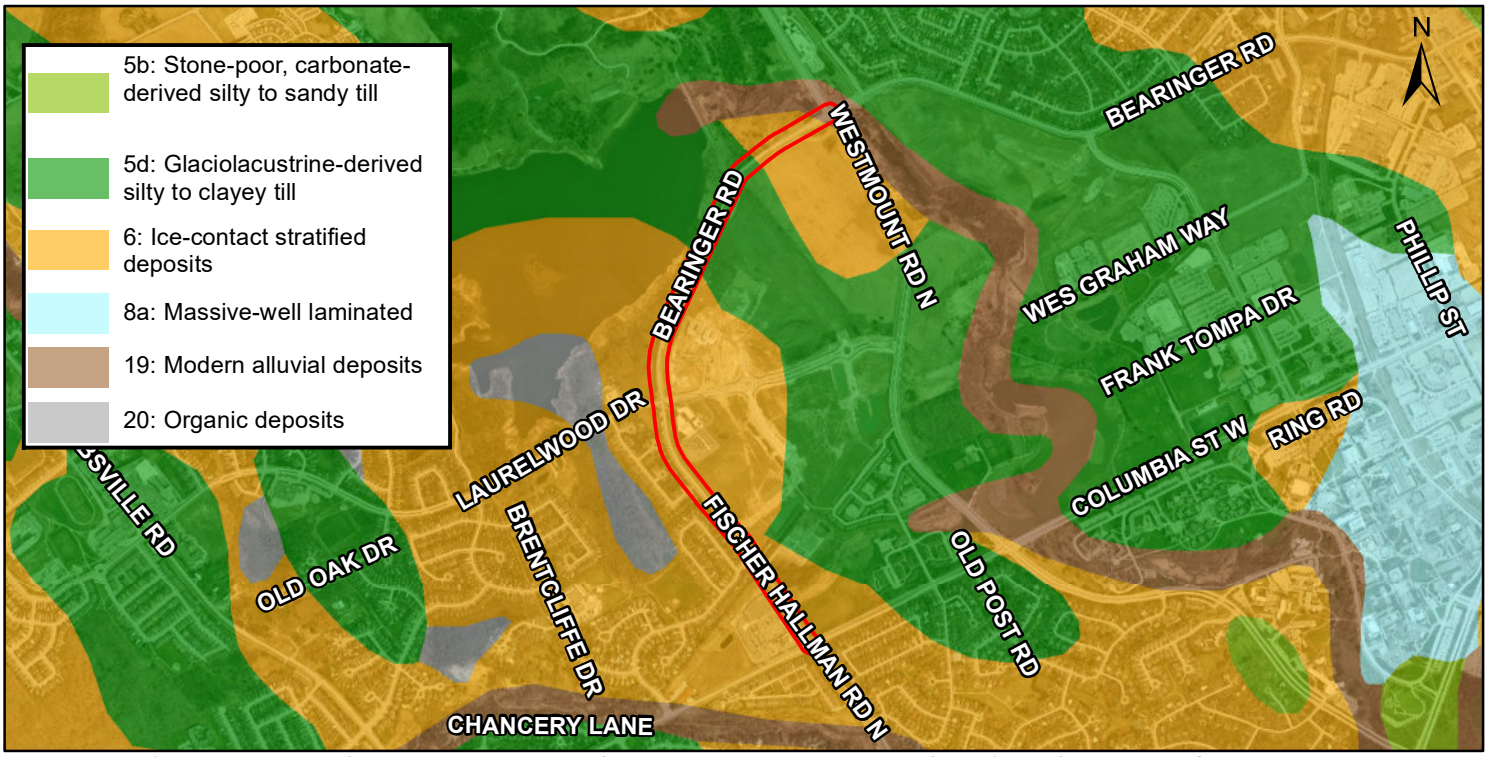

Figure 6: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area - Surficial Geology

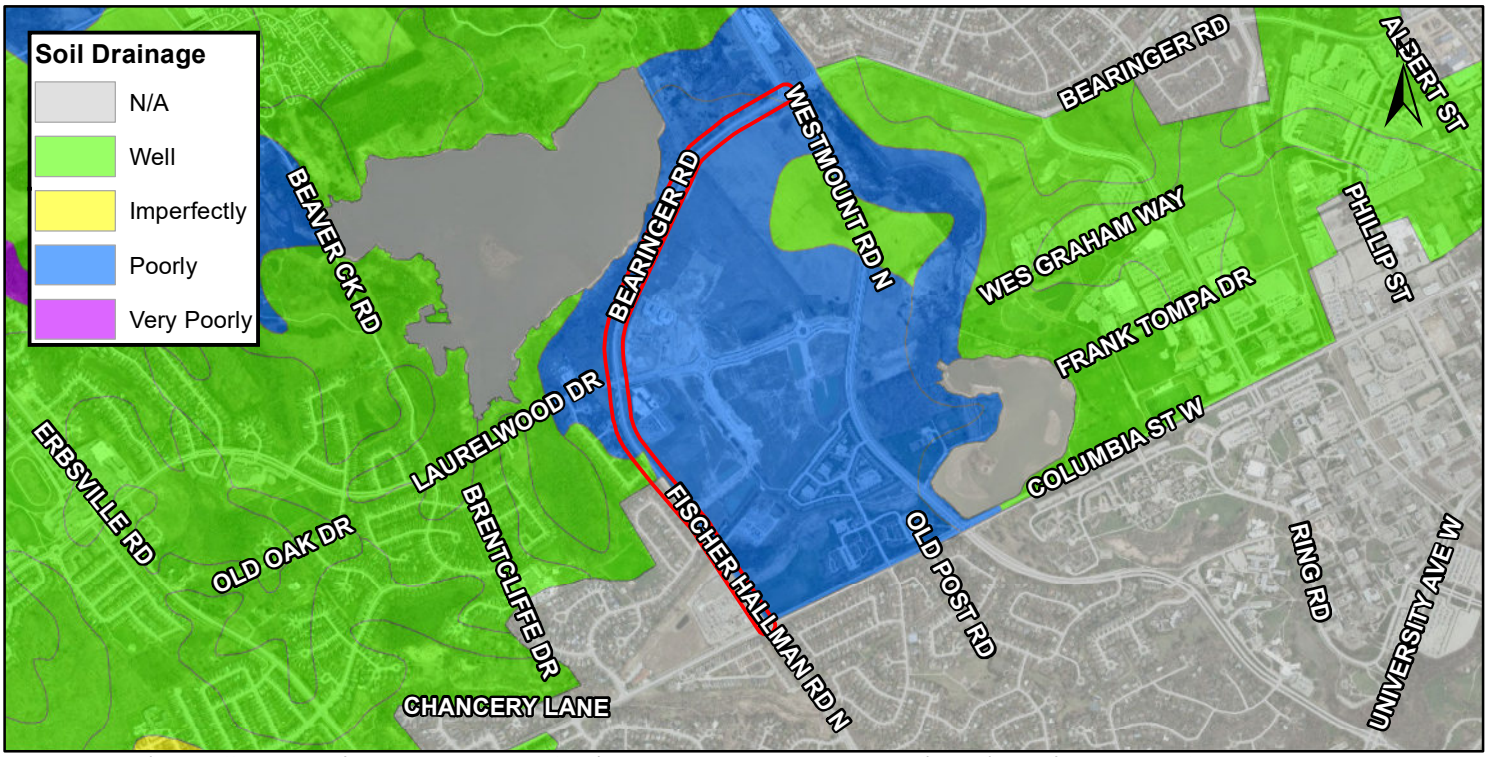

Figure 7: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area - Soil Drainage

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Study Area

Soil Data:
Guelph Geomatics Services,
Ontario Ministry of Agriculture
and AgriFood

0 500
Metres

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DATE: 6/19/2017

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Study

Photo Location and Direction

Stage 1 Assessment

Previously Assessed (ASI 2011) - No Stage 2 Required

Disturbed - No Stage 2 Required

Low and Wet - No Stage 2 Required

Requires Stage 2 Judgemental Test Pit Survey

Archaeological Potential - Requires Stage 2 Test Pit Survey

BASE:

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Metres

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Figure 8: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area – Results of the Property Inspection (Sheet 1)

Study

Photo Location and Direction

Stage 1 Assessment

- Previously Assessed (ASI 2011) - No Stage 2 Required
- Disturbed - No Stage 2 Required
- Low and Wet - No Stage 2 Required
- Requires Stage 2 Judgemental Test Pit Survey
- Archaeological Potential - Requires Stage 2 Test Pit Survey

BASE:

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Metres

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Figure 9: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area – Results of the Property Inspection (Sheet 2)

Study Area

Photo Location and Direction

Stage 1 Assessment

Previously Assessed (ASI 2011) - No Stage 2 Required

Disturbed - No Stage 2 Required

Low and Wet - No Stage 2 Required

Requires Stage 2 Judgemental Test Pit Survey

Archaeological Potential - Requires Stage 2 Test Pit Survey

BASE:

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Metres

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Figure 10: Fischer-Hallman Road Improvements Columbia Street to Westmount Road North Study Area – Results of the Property Inspection (Sheet 3)

8.0 IMAGES

Plate 1: Northwest view of Fischer-Hallman Rd; Area beyond disturbed ROW is sloped, no potential

Plate 2: Southeast view of Fischer-Hallman Rd; Area beyond disturbed ROW is sloped, no potential. Approaching the intersection the east side of the ROW requires Stage 2 judgemental test pit survey to confirm disturbance.

Plate 3: Northwest view of Fischer-Hallman Rd; Areas on both sides of the road are disturbed, no potential

Plate 4: South view of Fischer-Hallman Rd; Areas on both sides of the road are disturbed, no potential

Plate 5: Northwest view of Fischer-Hallman Rd at Laurelwood Drive; Area requires Stage 2 judgemental test pit survey to confirm disturbance.

Plate 6: North view of the MUP east of Bearinger Rd at Laurelwood Drive; Area is disturbed, no potential

Plate 7: Southwest view of Bearinger Rd; East side of the ROW is disturbed, no potential; West side of the ROW exhibits potential, requires Stage 2 test pit survey

Plate 8: Northeast view of Bearinger Rd utility corridor; Area between the road and hydro lines is disturbed, no potential

Plate 9: Southwest view of Bearinger Rd; East side of the ROW is disturbed, no potential; West side of the ROW exhibits potential, requires Stage 2 test pit survey

Plate 10: North view of Bearinger Rd; East side of the ROW is disturbed, no potential; West side of the ROW exhibits potential, requires Stage 2 test pit survey

Plate 11: Northeast view of Bearinger Rd; East side of the ROW is disturbed, no potential; West side of the ROW exhibits potential, requires Stage 2 test pit survey

Plate 12: Southwest view of Doreen Thomas Trail; Area beyond graded trail exhibits potential, requires Stage 2 test pit survey

Plate 13: West view of Bearinger Road at Westmount Rd N.; East side of the ROW is disturbed, no potential; West side of the ROW exhibits potential, requires Stage 2 test pit survey

Plate 14: North view of Laurelwood Creek at Westmount Rd. N.; Area is beyond Study Area limits

Plate 15: Google Maps Street View 2014 facing south: Corridor along east side of Bearinger Road between ROW and hydro lines was disturbed during sanitary forcemain installation

Plate 16: Google Maps Street View 2014 facing northeast: Corridor along east side of Bearinger Road between ROW and hydro lines was disturbed during sanitary forcemain installation

Plate 17: Google Maps Street View 2015 facing northeast: Corridor along east side of Bearinger Road between ROW and hydro lines was disturbed during sanitary forcemain installation

APPENDIX D

Cultural Heritage Resource Assessment

CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS AND IMPACT ASSESSMENT

FISCHER-HALLMAN ROAD FROM COLUMBIA STREET WEST TO WESTMOUNT ROAD NORTH
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

CITY OF WATERLOO,
REGIONAL MUNICIPALITY OF WATERLOO, ONTARIO

Prepared for:

Walterfedy
675 Queen Street, Suite 111
Kitchener, ON, N2M 1A1

ASI File: 17CH-018

June 2017 (Revised July 2017)

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CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS AND IMPACT ASSESSMENT

FISCHER-HALLMAN ROAD FROM COLUMBIA STREET WEST TO WESTMOUNT ROAD NORTH
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

CITY OF WATERLOO,
REGIONAL MUNICIPALITY OF WATERLOO, ONTARIO

EXECUTIVE SUMMARY

ASI was contracted by Walterfedy to conduct a Cultural Heritage Resource Assessment as part of the Fischer-Hallman Road from Columbia Street West to Westmount Road North Municipal Class Environmental Assessment study. The project involves the potential widening and improvements to Fischer-Hallman Road (Regional Road 58) from Columbia Street West to Westmount Road North in the City of Waterloo. The study area is generally bounded by commercial, residential, and recreational areas to the west and north, and agricultural fields, vacant land pending development, and commercial/institutional establishments on the east and south.

The results of background historical research and a review of secondary source material revealed a study area with a rural land use history dating back to the early-nineteenth century. A field review was conducted for the entire study area to confirm the location of previously identified cultural heritage resources and to document newly discovered ones.

Background research, data collection, and field review was conducted for the study area and it was determined that no cultural heritage resources are located within or adjacent to the Fischer-Hallman Road EA study area. Based on the results of the assessment, the following recommendations have been developed:

1. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources.

ASI

PROJECT PERSONNEL

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1.0 INTRODUCTION

ASI was contracted by Walterfedy to conduct a Cultural Heritage Resource Assessment as part of the Fischer-Hallman Road from Columbia Street West to Westmount Road North Municipal Class Environmental Assessment study. The project includes the potential widening and improvements to Fischer-Hallman Road (Regional Road 58) from Columbia Street West to Westmount Road North in the City of Waterloo. The study area is generally bounded by commercial, residential, and recreational areas to the west and north, and agricultural fields, vacant land, and commercial/institutional establishments on the east and south (Figure 1).

The purpose of this report is to present an inventory of cultural heritage resources, identify existing conditions of the Fischer-Hallman Road study area, identify impacts to cultural heritage resources, and propose appropriate mitigation measures. This research was conducted by John Sleath, Cultural Heritage Associate, under the senior project management of Annie Veilleux, Manager of the Cultural Heritage Division, both of ASI.

Figure 1: Location of the study area
Base Map:©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT

2.1 Legislation and Policy Context

This cultural heritage assessment considers cultural heritage resources in the context of improvements to specified areas, pursuant to the *Environmental Assessment Act*. This assessment addresses above ground cultural heritage resources over 40 years old. Use of a 40 year old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Transportation 2006; Ministry of Transportation 2007; Ontario Realty Corporation 2007). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

For the purposes of this assessment, the term cultural heritage resources was used to describe both cultural heritage landscapes[1] and built heritage resources. A cultural landscape is perceived as a collection of individual built heritage resources and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage resources are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

The analysis throughout the study process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines. Under the *Environmental Assessment Act* (1990) environment is defined in Subsection 1(c) to include:

- cultural conditions that influence the life of man or a community, and;
- any building, structure, machine, or other device or thing made by man.

The Ministry of Tourism, Culture and Sport is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario and has published two guidelines to assist in assessing cultural heritage resources as part of an environmental assessment: *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992), and *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1981). Accordingly, both guidelines have been utilized in this assessment process.

The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (Section 1.0) states the following:

> When speaking of man-made heritage we are concerned with the works of man and the effects of his activities in the environment rather than with movable human artifacts or those environments that are natural and completely undisturbed by man.

In addition, environment may be interpreted to include the combination and interrelationships of human artifacts with all other aspects of the physical environment, as well as with the social, economic and cultural conditions that influence the life of the people and communities in Ontario. The *Guidelines on*

[1] In the context of this assessment, a cultural heritage landscape is used as defined by the S*tandards and Guidelines for Conservation of Provincial Heritage Properties* (2010) and the *Provincial Policy Statement* (2014), and does not imply heritage designation within the Regional Municipality of Waterloo.

the Man-Made Heritage Component of Environmental Assessments distinguish between two basic ways of visually experiencing this heritage in the environment, namely as cultural heritage landscapes and as cultural features.

Within this document, cultural heritage landscapes are defined as the following (Section 1.0):

> The use and physical appearance of the land as we see it now is a result of man's activities over time in modifying pristine landscapes for his own purposes. A cultural landscape is perceived as a collection of individual man-made features into a whole. Urban cultural landscapes are sometimes given special names such as townscapes or streetscapes that describe various scales of perception from the general scene to the particular view. Cultural landscapes in the countryside are viewed in or adjacent to natural undisturbed landscapes, or waterscapes, and include such land uses as agriculture, mining, forestry, recreation, and transportation. Like urban cultural landscapes, they too may be perceived at various scales: as a large area of homogeneous character; or as an intermediate sized area of homogeneous character or a collection of settings such as a group of farms; or as a discrete example of specific landscape character such as a single farm, or an individual village or hamlet.

A cultural feature is defined as the following (Section 1.0):

> …an individual part of a cultural landscape that may be focused upon as part of a broader scene, or viewed independently. The term refers to any man-made or modified object in or on the land or underwater, such as buildings of various types, street furniture, engineering works, plantings and landscaping, archaeological sites, or a collection of such objects seen as a group because of close physical or social relationships.

The Minister of Tourism, Culture, and Sport has also published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (April 2010; Standards and Guidelines hereafter). These Standards and Guidelines apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest. They are mandatory for ministries and prescribed public bodies and have the authority of a Management Board or Cabinet directive. Prescribed public bodies include:

- Agricultural Research Institute of Ontario
- Hydro One Inc.
- Liquor Control Board of Ontario
- McMichael Canadian Art Collection
- Metrolinx
- The Niagara Parks Commission.
- Ontario Heritage Trust
- Ontario Infrastructure and Lands Corporation
- Ontario Lottery and Gaming Corporation
- Ontario Power Generation Inc.
- Royal Botanical Gardens
- Toronto Area Transit Operating Authority
- St. Lawrence Parks Commission

The Standards and Guidelines provide a series of definitions considered during the course of the assessment:

A provincial heritage property is defined as the following (14):

> Provincial heritage property means real property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.

A provincial heritage property of provincial significance is defined as the following (14):

> Provincial heritage property that has been evaluated using the criteria found in Ontario Heritage Act O.Reg. 10/06 and has been found to have cultural heritage value or interest of provincial significance.

A built heritage resource is defined as the following (13):

> …one or more significant buildings (including fixtures or equipment located in or forming part of a building), structures, earthworks, monuments, installations, or remains associated with architectural, cultural, social, political, economic, or military history and identified as being important to a community. For the purposes of these Standards and Guidelines, "structures" does not include roadways in the provincial highway network and in-use electrical or telecommunications transmission towers.

A cultural heritage landscape is defined as the following (13):

> … a defined geographical area that human activity has modified and that has cultural heritage value. Such an area involves one or more groupings of individual heritage features, such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form distinct from that of its constituent elements or parts. Heritage conservation districts designated under the Ontario Heritage Act, villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trails, and industrial complexes of cultural heritage value are some examples.

Additionally, the *Planning Act* (1990) and related *Provincial Policy Statement* (*PPS*), which was updated in 2014, make a number of provisions relating to heritage conservation. One of the general purposes of the *Planning Act* is to integrate matters of provincial interest in provincial and municipal planning decisions. In order to inform all those involved in planning activities of the scope of these matters of provincial interest, Section 2 of the *Planning Act* provides an extensive listing. These matters of provincial interest shall be regarded when certain authorities, including the council of a municipality, carry out their responsibilities under the *Act*. One of these provincial interests is directly concerned with:

> 2.(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest

Part 4.7 of the *PPS* states that:

> The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.
>
> Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.
>
> Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.
>
> In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.

Those policies of particular relevance for the conservation of heritage features are contained in Section 2- Wise Use and Management of Resources, wherein Subsection 2.6 - Cultural Heritage and Archaeological Resources, makes the following provisions:

> 2.6.1 Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

A number of definitions that have specific meanings for use in a policy context accompany the policy statement. These definitions include built heritage resources and cultural heritage landscapes.

A *built heritage resource* is defined as: "a building, structure, monument, installation or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Aboriginal community" (PPS 2014).

A *cultural heritage landscape* is defined as "a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association" (PPS 2014). Examples may include, but are not limited to farmscapes, historical settlements, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.

In addition, significance is also more generally defined. It is assigned a specific meaning according to the subject matter or policy context, such as wetlands or ecologically important areas. With regard to cultural heritage and archaeology resources, resources of significance are those that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people (*PPS* 2014).

Criteria for determining significance for the resources are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation (*PPS* 2014).

Accordingly, the foregoing guidelines and relevant policy statement were used to guide the scope and methodology of the cultural heritage assessment.

2.2 City of Waterloo Municipal Heritage Policies

The City of Waterloo provides cultural heritage policies in Section 4.7 of its Official Plan (November 2016 Consolidation). Cultural heritage policies relevant to this assessment are provided below:

4.7 Cultural Heritage Policies

Conservation of cultural heritage resources is an integral part of this Plan, recognizing that such resources contribute to Waterloo's identity, economic potential and quality of life. This Plan anticipates growth through intensification while recognizing the importance of conserving Waterloo's cultural heritage resources in a way that allows culturally significant buildings, structures and landscapes to be experienced and appreciated by existing and future generations.

4.7.1 General Policies

> (9) The City will, and the Regional Municipality of Waterloo is encouraged to, give consideration to the impact of modifications to Regional or City arterial and major collector roads and other road improvements in general, including re-alignment and road widening, on cultural heritage resources. Conservation of cultural heritage resources, especially in relation to the character of streetscapes and major crossroads or intersections, shall be encouraged.
>
> (10) Consideration shall be given to the effects of public works and development on cultural heritage resources prior to the approval of public works and development applications. Mitigation of any negative impacts shall be integrated into the design of such projects, where appropriate, in order to complement the character, scale, access to, and appearance of the heritage resource.

4.7.3 Heritage Impact Assessment

> (1) A Heritage Impact Assessment, prepared by a qualified heritage conservation professional, shall be required for all proposed development applications, or site alteration permit applications that includes or is adjacent to a protected heritage property. A Heritage Impact Assessment, prepared by a qualified heritage conservation professional, shall also be required for all proposed development applications, or site alteration permit applications that includes a listed, non-designated property
>
> (a) Where a Heritage Impact Assessment is required as part of a development application or site alteration permit application, the terms of reference for the Heritage Impact Assessment will be determined in consultation with the City.

4.7.4 Built Heritage Resources

> (1) Pursuant to the Ontario Heritage Act, Council may pass by-laws to designate a Built Heritage Resource. The designating by-law shall identify the extent of the property, contain procedures and timelines for alterations to and demolition of existing buildings and/or structures as well as the erection of new buildings and/or structures.

(2) Built Heritage Resources and their heritage attributes and features shall be conserved. Where Built Heritage Resources cannot reasonably be retained, consideration is to be given to the following in order of priority:

(a) on-site retention through adaptive re-use for built heritage that cannot be conserved intact;
(b) relocation to another site within the same development;
(c) relocation to a sympathetic site within the City;
(d) rescue and reuse of components; and,
(e) documentation of the resource.

4.7.5 Cultural Heritage Landscapes

(1) The City will identify and document any cultural heritage landscapes in accordance with the Regional Implementation Guideline for Cultural Heritage Landscape Conservation.
(2) The City will designate cultural heritage landscapes in this Plan.
(3) The City shall require the conservation of cultural heritage landscapes that are characteristic of the City or Region through the review of applications for development and/or site alteration.

2.3 Data Collection

In the course of the cultural heritage assessment, all potentially affected cultural heritage resources are subject to inventory. Short form names are usually applied to each resource type, (e.g. barn, residence). Generally, when conducting a preliminary identification of cultural heritage resources, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of cultural heritage resources in a particular geographic area.

Background historical research, which includes consultation of primary and secondary source research and historical mapping, is undertaken to identify early settlement patterns and broad agents or themes of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as retaining cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified cultural heritage resources. The field review is also used to identify cultural heritage resources that have not been previously identified on federal, provincial, or municipal databases.

Several investigative criteria are utilised during the field review to appropriately identify new cultural heritage resources. These investigative criteria are derived from provincial guidelines, definitions, and past experience. During the course of the environmental assessment, a built structure or landscape is identified as a cultural heritage resource if it is considered to be 40 years or older, and if the resource satisfies at least one of the following criteria:

Design/Physical Value:

- It is a rare, unique, representative or early example of a style, type, expression, material or construction method.
- It displays a high degree of craftsmanship or artistic merit.
- It demonstrates a high degree of technical or scientific achievement.
- The site and/or structure retains original stylistic features and has not been irreversibly altered so as to destroy its integrity.
- It demonstrates a high degree of excellence or creative, technical or scientific achievement at a provincial level in a given period.

Historical/Associative Value:

- It has a direct association with a theme, event, belief, person, activity, organization, or institution that is significant to: the City of Waterloo; the Province of Ontario; or Canada.
- It yields, or has the potential to yield, information that contributes to an understanding of the history of the: the City of Waterloo; the Province of Ontario; or Canada.
- It demonstrates or reflects the work or ideas of an architect, artist builder, designer, or theorist who is significant to: the City of Waterloo; the Province of Ontario; or Canada.
- It represents or demonstrates a theme or pattern in Ontario's history.
- It demonstrates an uncommon, rare or unique aspect of Ontario's cultural heritage.
- It has a strong or special association with the entire province or with a community that is found in more than one part of the province. The association exists for historical, social, or cultural reasons or because of traditional use.
- It has a strong or special association with the life or work of a person, group or organization of importance to the province or with an event of importance to the province.

Contextual Value:

- It is important in defining, maintaining, or supporting the character of an area.
- It is physically, functionally, visually, or historically linked to its surroundings.
- It is a landmark.
- It illustrates a significant phase in the development of the community or a major change or turning point in the community's history.
- The landscape contains a structure other than a building (fencing, culvert, public art, statue, etc.) that is associated with the history or daily life of that area or region.
- There is evidence of previous historical and/or existing agricultural practices (e.g. terracing, deforestation, complex water canalization, apple orchards, vineyards, etc.)
- It is of aesthetic, visual or contextual important to the province.

If a resource meets one of these criteria it will be identified as a cultural heritage resource and is subject to further research where appropriate and when feasible. Typically, detailed archival research, permission to enter lands containing heritage resources, and consultation is required to determine the specific heritage significance of the identified cultural heritage resource.

When identifying cultural heritage landscapes, the following categories are typically utilized for the purposes of the classification during the field review:

Farm complexes:	comprise two or more buildings, one of which must be a farmhouse or barn, and may include a tree-lined drive, tree windbreaks, fences, domestic gardens and small orchards.

Roadscapes:	generally two-lanes in width with absence of shoulders or narrow shoulders only, ditches, tree lines, bridges, culverts and other associated features.
Waterscapes:	waterway features that contribute to the overall character of the cultural heritage landscape, usually in relation to their influence on historical development and settlement patterns.
Railscapes:	active or inactive railway lines or railway rights of way and associated features.
Historical settlements:	groupings of two or more structures with a commonly applied name.
Streetscapes:	generally consists of a paved road found in a more urban setting, and may include a series of houses that would have been built in the same time period.
Historical agricultural landscapes:	generally comprises a historically rooted settlement and farming pattern that reflects a recognizable arrangement of fields within a lot and may have associated agricultural outbuildings, structures, and vegetative elements such as tree rows.
Cemeteries:	land used for the burial of human remains.

Results of the desktop data collection and field review are contained in Section 3.0, while Sections 4.0 and 5.0 contain conclusions and recommendations with respect to potential impacts of the undertaking on identified cultural heritage resources. Study area and photographic plate location mapping is provided in Section 7.0.

3.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT

This section provides a brief summary of historical research and a description of identified above ground cultural heritage resources that may be affected by the proposed undertaking.

3.1 Background Historical Summary

A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of physiography, as well as Indigenous and Euro-Canadian land use and settlement.

3.1.1 Physiography

The study area is situated within the Oxford Till Plains and Waterloo Hills physiographic region of southern Ontario (Chapman and Putnam 1984).

The rolling terrain of ridges and hills of the Waterloo Hill region was formed as till and kame moraines. Flowing southward through the moraines is the Grand River spillway comprised of level alluvial terraces (Chapman and Putnam 1984: 136). North of Waterloo, the spillway channel splits into two channels that rejoin south of Kitchener. The present course of the Grand River follows the eastern channel while Schneider Creek follows the western channel. The study area is situated to the north of the southern confluence. Terrain in the study area is complex, varying from almost level to strongly sloping in the upland area that overlooks the large river valley.

The study area is within the Laurel Creek watershed, an area covering approximately 74 square kilometres through mostly urban areas with some of the upper portion within agricultural fields, woodlots, and wetlands (Grand River Conservation Authority 2004). Laurel Creek drains from west to east, from the Township of Wellesley into the Grand River. Part of the study area is within the Laurel Creek Conservation Area, approximately 293 hectares northeast of Bearinger Road, west of Westmount Road North, which includes the Doreen Thomas Trail (connecting Laurelwood Drive to Westmount Road North) and the Laurel Creek Reservoir. Created in 1966 with the construction of the Laurel Dam, the Laurel Creek Reservoir and surrounding conservation area is adjacent to the northwest portion of the study area (Grand River Conservation Authority 2004).

3.1.2 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier, approximately 13,500 before present (BP) (Ferris 2013:13). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards and Fritz 1988), and populations now occupied less extensive territories (Ellis and Deller 1990:62-63).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines were then submerged. This period produces the earliest evidence of heavy wood working tools and is indicative of greater investment of labour in felling trees for fuel, to build shelter, or to produce tools, and is ultimately indicative of prolonged seasonal residency at sites (Brown 1995:13; Parker Pearson 1999:141). Between approximately 4,500-3,000 BP, there is evidence for construction of fishing weirs. These structures indicate not only the group sharing of resources, but also the organization of communal labour (Ellis *et al.* 1990; Ellis *et al.* 2009).

Between 3,000-2,500 BP, populations continued with residential mobility harvesting of seasonally available resources, including spawning fish. Exchange and interaction networks broaden at this time (Spence *et al.* 1990:136, 138) and by approximately 2,000 BP, evidence exists for macro-band camps, focusing on the seasonal harvesting of resources (Spence *et al.* 1990:155, 164). It is also during this period that maize was first introduced into southern Ontario, though it would have only supplemented people's diet (Birch and Williamson 2013:13-15). Bands likely retreated to interior camps during the winter.

From approximately 1,000 BP until approximately 300 BP, lifeways became more similar to those described in early historical documents. Populations in the study area would have been Iroquoian speaking though full expression of Iroquoian culture is not recognised archaeologically until the fourteenth century. During the Early Iroquoian phase (1000-1300), the communal site is replaced by the

village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson 1990:317). By the second quarter of the first millennium BP, during the Middle Iroquoian phase (1300-1450), this episodic community disintegration was no longer practised, and populations now communally occupied sites throughout the year (Dodd *et al.* 1990:343). In the Late Iroquoian phase (1450-1649), this process continued with the coalescence of these small villages into larger communities (Birch and Williamson 2013). Through this process, the socio-political organization of the Aboriginal Nations was developed, as described historically by the French and English explorers who first visited southern Ontario.

3.1.3 Historical Euro-Canadian Land Use: Township Survey and Settlement

Historically, the study area is located in part of Lot 26, 29 and 30, German Company Tract, Former Township of Waterloo, County of Waterloo.

Township of Waterloo
The historical Township of Waterloo was originally known as Block Two of the Grand River land grant, and was deeded to the Six Nations Iroquois by the British in 1784 for their loyalty to the Crown in the American War of Independence. In 1796, Block Two, a 38,045 ha tract, was acquired by Richard Beasley from Joseph Brant on behalf of the Six Nations. He subdivided and sold the land, with an approximately 24,281 ha tract of land going to the German Company of Pennsylvania, in November 1803 (Janusas 1988:2). Company members included Samuel and John Bricker, and Daniel, Jacob, and John Erb. The German Company of Pennsylvania had the lands surveyed by Augustus Jones to subdivide the land into 128 farm lots of approximately 181 ha each, and 32 farm lots of approximately 34 ha each (Janusas 1988:96).

When Block Two was incorporated into the District of Gore (County of Halton) in 1816, it was named Waterloo Township, in honour of the battle that ended the Napoleonic Wars in Europe. It remained part of Halton County in the District of Gore until 1842, at which time it became part of the District of Wellington. The County of Waterloo did not come into being until 1852 (Janusas 1988:2).

The first immigrants to settle in Waterloo Township were almost exclusively German Mennonites from Pennsylvania, who had originally emigrated from Switzerland, Germany, and France. Most of these settlers were farmers but many were tradesmen and millers. Later settlers were generally of Scottish, English, Irish, and continental German heritage, many of them farmers, but a majority of them were artisans and tradesmen. When the railway was laid through Waterloo Township in the mid-nineteenth century, it became the leading industrial center of Waterloo County (Janusas 1988:10-12).

Abraham Erb purchased approximately 181 ha of land in 1805 and became the first settler in the City of Waterloo. He transferred a portion of his land and ownership of two mills to Jacob Snider in 1829. Snider's son inherited approximately 129 ha, which he later sold to John Hoffman and Isaac Weber, who sectioned and sold the lands in 1854. The population of Waterloo began to expand as the land was subdivided throughout the mid-nineteenth-century (Janusas 1988:102).

In the mid-1850s, the defining development of Waterloo Township and Waterloo County was the construction of the railway. The first railway line built into the township was a main line of the Grand Trunk Railway from Toronto, laid through in 1856. A number of other railway lines were soon laid across the township including: a Grand Trunk branch between Preston and Berlin in 1857; a Great Western line

from Galt, Preston, and Guelph in 1857; a Grand Trunk branch between Berlin (Kitchener) and Galt in 1882; and a Grand Trunk Branch between Waterloo and Elmira in 1891.

City of Waterloo

The land which became the core of the City of Waterloo was settled in 1806 by Abraham Erb, a Mennonite from Pennsylvania, who became one of the first settlers in the township. He erected a saw mill in 1808 and grist mill in 1816 on Beaver Creek (now Laurel Creek), which attracted farmers from miles around who previously had to travel to Dundas for their flour. The majority of early settlers were of German origin. Early growth of the community was slow as Erb refused to sell off any of his land in small lots. In 1829 Jacob C. Snider bought 240 acres of Erbs land, including the mills. He built a steam power plant and added a distillery which encouraged more people to settle in the area. A community grew around the mills. In 1831 a post office was opened. Waterloo experienced a steady stream of immigrants between 1835 and 1855, mostly German craftsmen. In 1840 Henry Bowman opened the first hotel, tavern, and livery stable. In 1844 the Kuntz family established a brewery, the first large industry of its kind in the area, which would become the forerunner of Carling's Brewery. Jacob Bricker opened a foundry and machine shop in 1851 which produced agricultural implements. The business expanded rapidly and eventually grew into the Waterloo Manufacturing Company, whose agricultural products became world famous. Several stagecoach lines were established, which made transportation easier and brought many settlers to the area, resulting in rapid expansion. By 1855 the population had grown to 1,400 people and the community had two sawmills, a flour mill, foundry, cabinet factory, small weaving mill, potter's shop, distillery, brewery, harness shop, and a tree and garden nursery. Waterloo was incorporated as a village in 1857 and elevated to town status in 1876, with a population of approximately 1,700. The Waterloo branch of the Grand Trunk Railway was opened around this time, and later the Canadian Pacific Railway established a link to the town. Industries which arose in Waterloo during the nineteenth century flourished well into the twentieth century, such as prominent insurance companies and The Seagram Company Ltd. distillery from 1857 to 1992 (Historica Canada 2015; Mika and Mika 1983).

The first Evangelical missionaries arrived in 1837 and met at a large camp on the outskirts of Waterloo. In 1839 a permanent congregation, the first in Upper Canada, was organized and the first meeting-hall was built ten years later. It was replaced with a new structure in 1905. Many of Waterloo's early settlers were Mennonites, worshiping in private homes until the 1860s, when a church was constructed. Presbyterian services were held as early as 1864, with regular services being offered in the town hall in the 1880's. The first Presbyterian church was erected in 1888. The Catholic community erected a church around the turn of the century, with a convent for the Sisters of Notre Dame opened in 1895. In 1830 the first school in the community opened, beginning Waterloo's long history as an educational centre. In 1842 Abraham Erb donated part of his land for a schoolhouse, which was replaced by a new building in the 1860's. Waterloo College was formed in 1911 as the Evangelical Lutheran Seminary, becoming the Waterloo College in 1924. In 1890 the town established the Waterloo Park, using Abraham Erb's mill pond as a centerpiece. Musical traditions include the county's first Saengerfest in 1874 as well as the establishment of the Waterloo Musical Society in 1882 (Historica Canada 2015; Mika and Mika 1983).

Benjamin Eby was one of the earliest settlers on the outskirts of Waterloo. His property along the Laurel Creek was later settled by Joseph S. Shantz, of Pennsylvania, on the west half of Lot 26, German Company Tract, in 1849 where he constructed a dam and a sawmill (Joseph Schneider Haus National Historic Site and Region of Waterloo n.d.). Two of his sons, Joseph Jr. and Menno, were later granted each a half of the lot. Menno was ordained at the David Eby Meeting House as deacon of the Mennonite Church for the Eby, Martin and Conestogo fields of labor in November, 1874 (Joseph Schneider Haus National Historic Site and Region of Waterloo n.d.).

Waterloo was incorporated as a city in 1948, with a population of 10,736. In 2014 the population was estimated at 132,300 people (City of Waterloo 2015; Historica Canada 2015; Mika and Mika 1983).

3.1.4 Review of Historical Mapping

The 1861 *Map of the County of Waterloo* (Tremaine 1861) and the 1881 *Illustrated Historical Atlas of Waterloo and Wellington Counties* (H. Parsell & Co. 1881) were examined to determine the presence of historical features within the study area during the nineteenth-century (Figures 2 and 3).

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historical mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

Historically, the study area is located in the former Township of Waterloo, Waterloo County. Details of historical property owners and historical features in the study area are listed in Table 1.

Table 1: Fischer-Hallman Road Study Area – Nineteenth-century property owner(s) and historical features(s)

		1861		*1881*	
Con #	**Lot #**	**Property Owner(s)**	**Historical Feature(s)**	**Property Owner(s)**	**Historical Feature(s)**
German Co. Tract	26	Menno S. Shantz Joseph S. Shantz	House, mill pond House (2), saw mill, mill pond	D. Bearinger	House, saw mill, mill pond
	29	Abraham Keener Jos. Spets (?)	None	None	None
	30	Abraham Keener	None	Wm. Mitchell Noah Erb	House House

According to the 1861 map, Fisher-Hallman/ Bearinger Road and Columbia Street West were historically surveyed transportation routes. Two structures are illustrated near the northern terminus of the study area, associated with Joseph Shantz's property on the southwest parcel of Lot 26. An additional structure, a saw mill, was located east of the mill pond and river, on the south side of the road. Menno Shantz owned the northwest parcel of Lot 26, however his structures are opposite the mill pond from the study area. The saw mill continues to be shown on the 1881 map, with Lot 26 then being owned by D. Bearinger, whose house was on the northwest corner of the intersection of Fischer-Hallman Road and Westmount Road North. To the east of this intersection was School House No. 25, one of the earliest schools in Waterloo.

The 1881 map also illustrates that Laurelwood Drive was a historically surveyed road. The alignment of Fischer-Hallman/ Bearinger Road, while generally similar to the extant alignment, was originally further to the west at the intersection with Laurelwood Drive, as evident in each of the historical maps provided in this report (Figures 2-6).

In addition to nineteenth-century mapping, historical topographic mapping and aerial photographs from the twentieth century were examined. This report presents maps and aerial photographs from 1930, 1969, and 1994 (Figures 4-6). These do not represent the full range of maps consulted for the purpose of this study but were judged to cover the full range of land uses that occurred in the area during this period.

The 1930 aerial photograph of the City of Waterloo and the 1969 National Topographic Series Waterloo Sheet were examined to determine the extent and nature of development and land uses within the study area (Figures 4-5).The photo illustrates that the study area remained within a rural agricultural landscape into the twentieth century. Both figures show the previous alignment of the intersection of Fischer-Hallman/ Bearinger Road and Laurelwood Drive, as well as a small clustered settlement in the northern end of the study area near the river. The 1969 map illustrates a pumping station and a bridge carrying the road over the river adjacent to six structures.

The 1994 topographical maps confirm the study area retained a primarily rural character into the late-twentieth-century. Limited residential development is illustrated in the southwest portion of the study area, with increasing development also noted to immediate south of Columbia Street West. Laurel Creek Reservoir is depicted for the first time in this mapping, and is adjacent to a large segment of the northwestern portion of the study area (Figure 6).

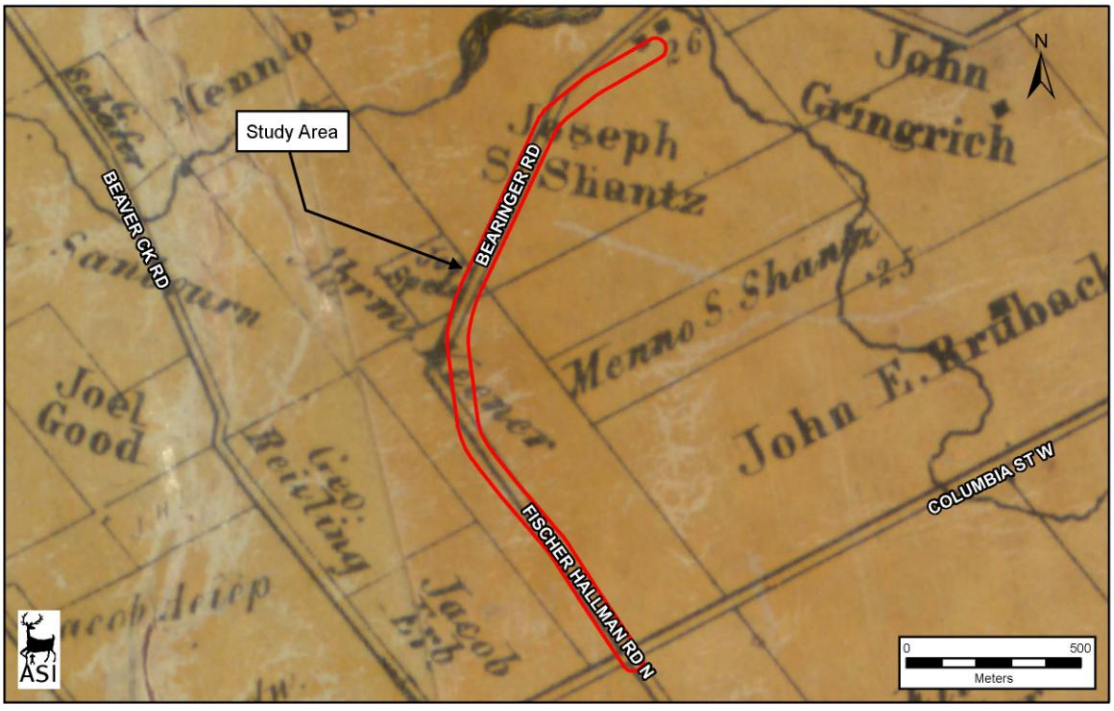

Figure 2: The study area overlaid on the 1861 *Tremaine* map

Base Map: Tremaine 1861

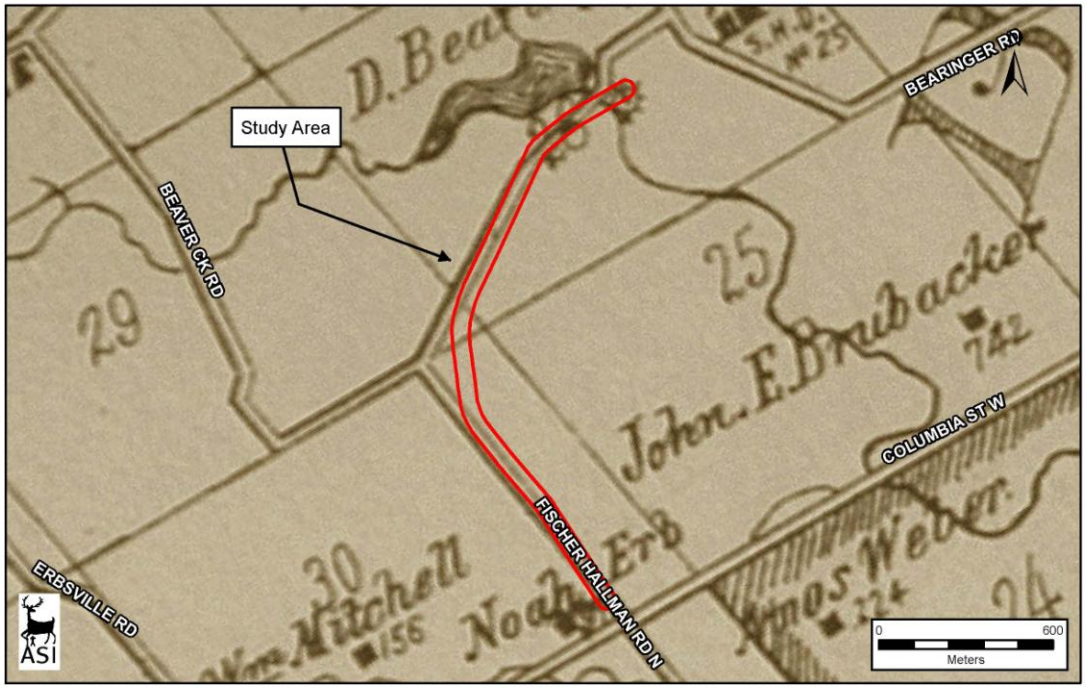

Figure 3: The study area overlaid on the 1881 *Illustrated Historical Atlas*
Base Map: H. Parsell and Co. 1881

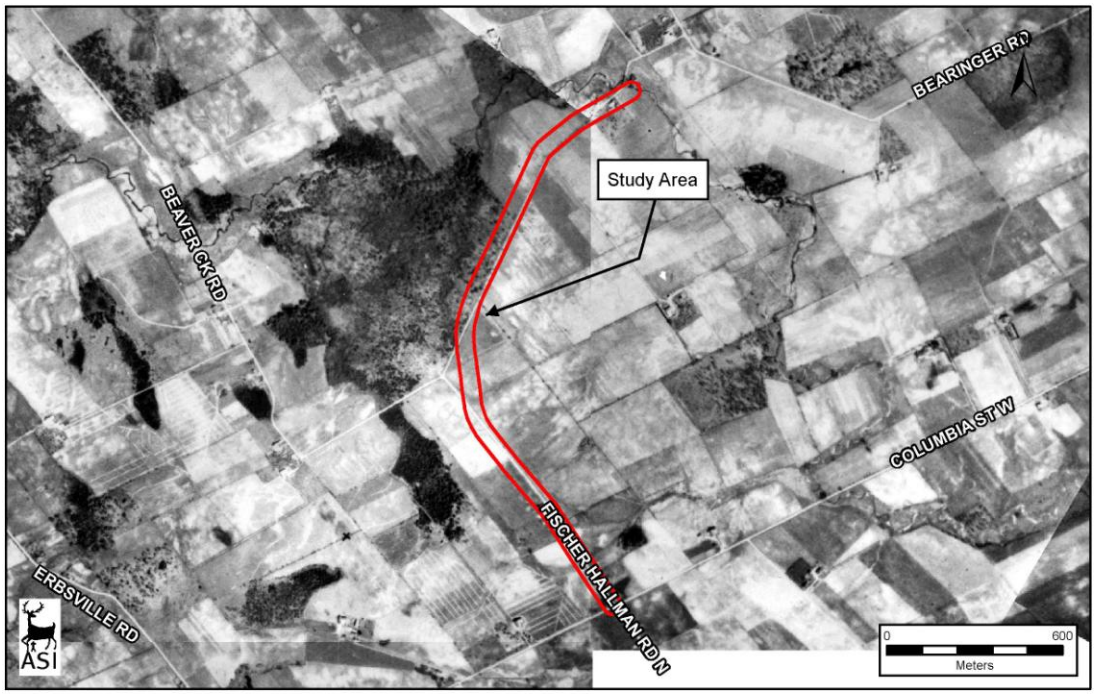

Figure 4: The study area overlaid on the 1930 aerial photograph of Waterloo
Base Map: Plates IM12, IM16, and IM40 (University of Waterloo Library 2008)

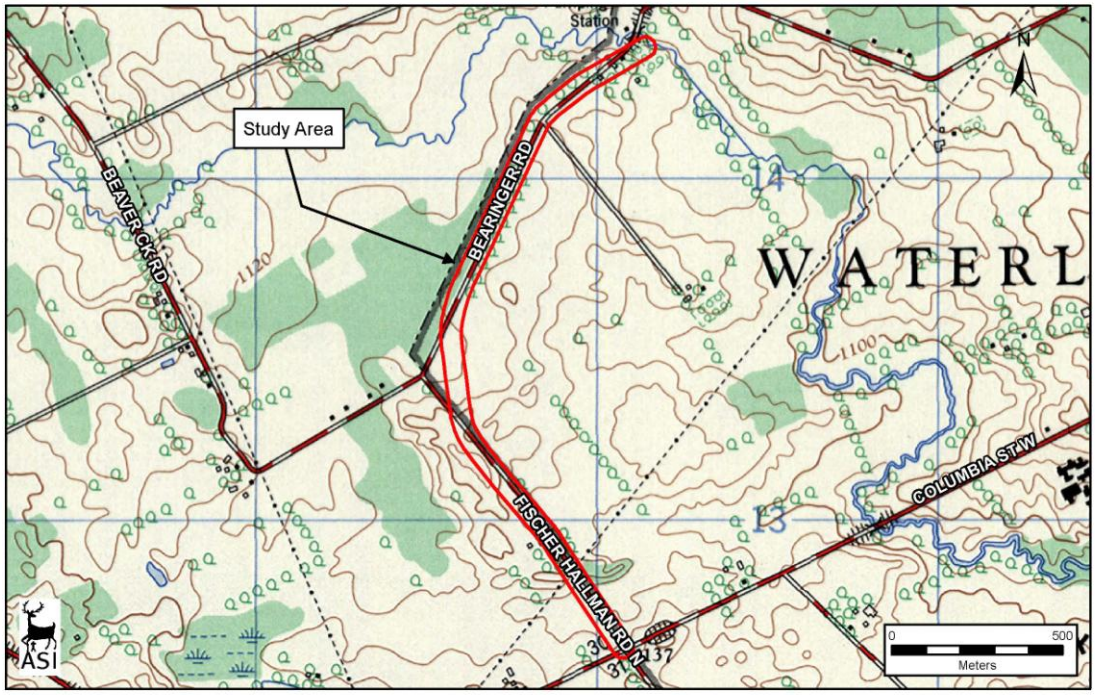

Figure 5: The study area overlaid on the 1969 Waterloo NTS map
Base Map: NTS Sheet 40P/07 (Department of Energy, Mines, and Resources 1969)

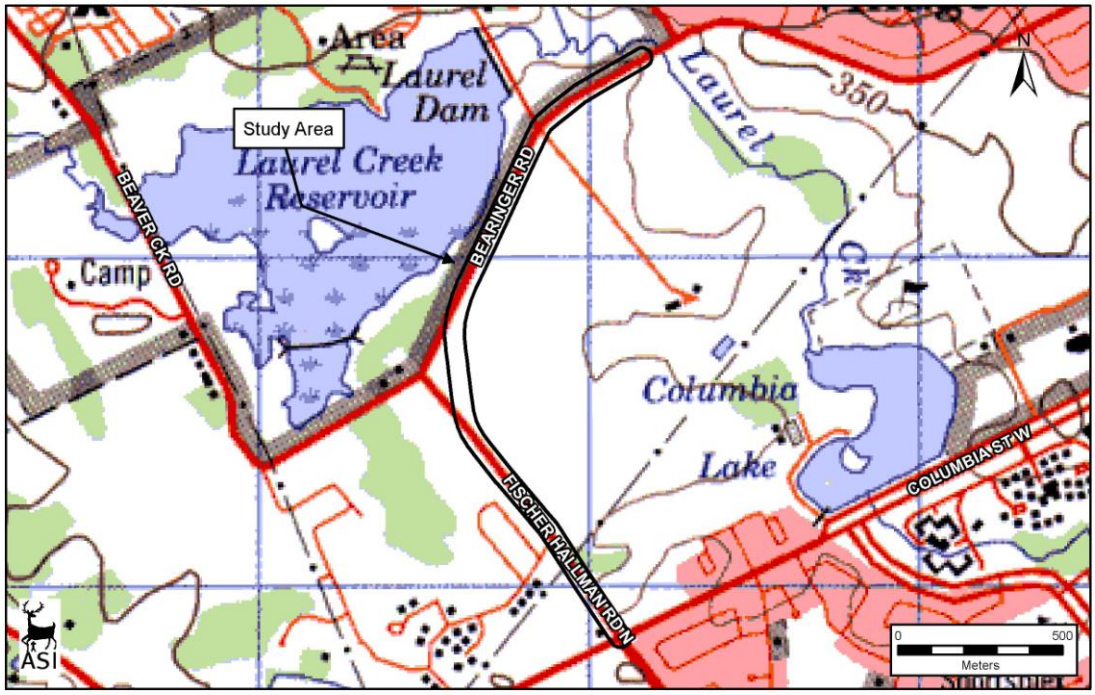

Figure 6: The study area overlaid on the 1994 Waterloo NTS map
Base Map: NTS Sheet 40P/07 (Department of Energy, Mines and Resources 1994)

3.2 Existing Conditions

3.2.1 Review of Existing Heritage Inventories

In order to make an identification of existing cultural heritage resources within the study area, a number of resources were consulted (MTCS 2016). They include:

- City of Waterloo's *Municipal Register of Cultural Heritage Resources*, which includes properties individually designated under Part IV of the *Ontario Heritage Act* and properties that are not designated but believed to be of cultural heritage value or interest (commonly referred to as "listed" properties).[2];
- The inventory of Ontario Heritage Trust easements[3];
- The Ontario Heritage Trust's *Ontario Heritage Plaque Guide*, an online, searchable database of Ontario Heritage Plaques[4];
- *Ontario's Historical Plaques* website[5];
- Inventory of known cemeteries/burial sites in the Ontario Ministry of Government and Consumer Services and the Ontario Geneaological Society's online databases[6];
- Parks Canada's *Canada's Historic Places* website: available online, the searchable register provides information on historic places recognized for their heritage value at the local, provincial, territorial, and national levels[7];
- Parks Canada's *Directory of Federal Heritage Designations*, a searchable on-line database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses[8];
- Canadian Heritage River System. The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage[9]; and,
- United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites[10].

In addition, the following stakeholders were contacted to gather information on potential cultural heritage resources, active and inactive cemeteries, and areas of identified Indigenous interest within and/or adjacent to the study area:

- Michelle Lee, Heritage Planner, City of Waterloo, was also contacted to gather any information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email

[2] Reviewed 27 June, 2017 (http://www.waterloo.ca/en/contentresources/resources/government/MHC_property_register_June2017.pdf)
[3] Reviewed 27 June, 2017 (http://www.heritagetrust.on.ca/en/index.php/property-types/easement-properties)
[4] Reviewed 27 June, 2017 (http://www.heritagetrust.on.ca/Resources-and-Learning/Online-Plaque-Guide.aspx)
[5] Reviewed 27 June, 2017 (www.ontarioplaques.com)
[6] Reviewed 27 June, 2017 (http://vitacollections.ca/ogscollections/2818487/data?grd=3186 and https://www.consumerbeware.mgs.gov.on.ca/esearch/cemeterySearch.do?eformsId=0)
[7] Reviewed 27 June, 2017 (http://www.historicplaces.ca/en/pages/about-apropos.aspx)
[8] Reviewed 27 June, 2017 (http://www.pc.gc.ca/apps/dfhd/search-recherche_eng.aspx)
[9] Reviewed 27 June, 2017 (http://chrs.ca/the-rivers/)
[10] Reviewed 27 June, 2017 (http://whc.unesco.org/en/list/)

communication 20 and 22 June, 2017). Correspondence indicated that there are no previously identified cultural heritage resources within or adjacent to the study area. However, the Laurel Creek Conservation Area adjacent to the northwest portion of the study area is currently identified as a candidate for cultural heritage landscape under the City of Waterloo's Cultural Heritage Landscaping scoping study (still in preparation at the time of report submission).

- The Ministry of Tourism, Culture and Sport (email communication 20 and 21 June, 2017). Email correspondence confirmed that there are no additional previously identified heritage resources or concerns regarding the study area[11].

Based on the review of available provincial and federal data, there are no previously identified resources within and/or adjacent to the Fischer-Hallman EA study area.

3.2.2 Fischer-Hallman Road Study Area– Field Review

A field review of the study area was undertaken by John Sleath of ASI, on 30 May 2017 to document the existing conditions of the study area. The field review was preceded by a review of available, current and historical, aerial photographs and maps (including online sources such as Bing and Google maps). These large-scale maps were reviewed for any potential cultural heritage resources which may be extant in the study area. The existing conditions of the study area are described below. Identified cultural heritage resources are discussed in Section 3.4.3 and are mapped in Section 7.0 of this report.

The Fischer-Hallman Road study area is centered on the current alignment of Fischer-Hallman/Bearinger Road ROW between Columbia Street West in the south, and Westmount Road North in the north. The southern half of the study area is generally oriented northwest-southeast on Fischer-Hallman Road until the intersection with Laurelwood Drive, where the name of the roadway changes to Bearinger Road and is oriented to the northeast-southwest. The study area is generally located in a suburban area, bounded by farmland on the northeast, Laurel Creek Conservation Area on the northwest, residences and commercial establishment on the southwest, and open areas with several institutional structures on the southeast. The location and orientation of photographic plates (Plates 1-15) are provided in Figure 7.0.

The southern portion of the study area begins at the intersection of Fischer-Hallman Road and Columbia Street West, which are both four lanes in width with a central median and additional dedicated left and right hand turning lanes. Fischer-Hallman Road features cement curbs and sidewalks on the west side from Columbia Street West to Laurelwood Drive, while the rest of the roadway generally lacks cement curbs and features gravel shoulders. The southern portion of the study area is generally bound by a commercial plaza and residences on the west, and undeveloped grasslands with several institutional structures associated with the University of Waterloo and a public library on the east (Plates 1-7).

The study area is oriented to the northeast following the Bearinger Road ROW from the intersection with Laurelwood Drive northeast to the intersection with Westmount Drive North. The entire northwestern portion of the study area in this section is bound by Laurel Creek Conservation Area, with Laurel Creek Reservoir visible from the ROW. This section of the study area features agricultural lands and large tracts of undeveloped land surrounding a structure associated with the University of Waterloo to the southeast of the right of way (Plates 8-15).

[11] Contacted 20 June, 2017 at registrar@ontario.ca.

Plate 1: Intersection of Fischer-Hallman Road and Columbia Street West, looking east.

Plate 2: Fischer-Hallman Road, looking northwest from Columbia Street West.

Plate 3: Fischer-Hallman Road, looking southeast towards Columbia Street West

Plate 4: Fischer-Hallman Road, with commercial plaza at left and woodlot at right, looking northwest.

Plate 5: Residences to west and open field and entrance drive to the east, looking northwest.

Plate 6: Wide boulevard and residences on the west side of Fischer-Hallman Rd., looking northwest.

Plate 7: Wide gravel shoulder on east side of Fischer-Hallman Road, looking north.

Plate 8: Intersection of Fischer-Hallman Road and Laurelwood Drive, looking north.

Plate 9: Laurel Creek Conservation Area to west and open fields to east, looking northeast.

Plate 10: Narrow tree-lined section of Fischer-Hallman Road, looking northeast.

Plate 11: Laurel Creek Reservoir, looking west from Fischer-Hallman Road.

Plate 12: Laurel Creek Conservation Area to west and agricultural fields to east, looking northeast.

Plate 13: Intersection of Fischer-Hallman Road and Westmount Road North, looking northeast.

Plate 14: Northwest corner of the Intersection of Fischer-Hallman Road and Westmount Road North, looking west.

Plate 15: Agricultural fields southeast of Fischer-Hallman Road, looking southwest from Westmount Road North.

3.2.3 Fischer-Hallman Road Study Area– Identified Cultural Heritage Resources

Based on the results of the background research and field review, no cultural heritage resources (CHR) were identified within and/or adjacent to the Fischer-Hallman Road study area.

3.3 Screening for Potential Impacts

The proposed undertaking within the Fischer-Hallman Road EA study area will have no impacts on any known cultural heritage resources.

4.0 CONCLUSIONS

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating back to the early-nineteenth century. A review of federal registers and municipal and provincial inventories revealed that there are no previously identified features of cultural heritage value within the Fischer-Hallman Road from Columbia Street West to Westmount Road North East study area. Based on the results of the background research, data collection, and field review, no additional cultural heritage resources were noted. The following provides a summary of the assessment results.

Key Findings

- A field review of the study area confirmed that there are no cultural heritage resources within or immediately adjacent to the study area.

5.0 RECOMMENDATIONS

The background research, data collection, and field review conducted for the study area determined that no cultural heritage resources are located within or adjacent to the Fischer-Hallman Road from Columbia Street West to Westmount Road North East Class EA study area. Based on the results of the assessment, the following recommendations have been developed:

1. Should future work require an expansion of the study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential heritage resources.

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7.0 CULTURAL HERITAGE RESOURCE MAPPING

Figure 7: Location of photographic plates in Fischer-Hallman Road study area.

Figure 8: Location of photographic plates in Fischer-Hallman Road study area.

Figure 9: Location of photographic plates in Fischer-Hallman Road study area.

Figure 10: Location of photographic plates in Fischer-Hallman Road study area.

APPENDIX E

Preliminary Acoustical Impact Assessment

Region of Waterloo

ACOUSTICAL IMPACT ASSESSMENT

THE REGION OF WATERLOO

FISCHER-HALLMAN ROAD / BEARINGER ROAD IMPROVEMENTS (COLUMBIA STREET TO WESTMOUNT ROAD)

Region Project No.: 07221
WF Project No.: 2015-0772-10

November 1, 2019

DRAFT

WALTERFEDY

REGION OF WATERLOO

ACOUSTICAL IMPACT ASSESSMENT

Fischer-Hallman Road / Bearinger Road Improvements

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APPENDICES

Appendix A Noise Information Plan
Appendix B Traffic Data
Appendix C Calculation Results

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1.0 INTRODUCTION

WalterFedy was retained to conduct an Environmental Assessment (EA) report for the potential improvements of Fischer-Hallman Road/Bearinger Road between Columbia Street and Westmount Road in the Region of Waterloo. As part of the EA report, an Acoustical Impact Assessment Study is required to determine the acoustical impacts resulting from the potential improvements.

This study will identify the noise impacts at the sensitive receivers and determine the mitigation measures, if required, to be included as part of the works for the improvements of Fischer-Hallman Road and Bearinger Road.

This study will be completed in accordance with the Region's *Implementation Guidelines for Noise Policies – Part B: Existing Development Impacted by Proposed Regional Road Undertakings*.

2.0 NOISE LEVEL CRITERIA

A condition of the preparation of the EA report is to review the impacts of noise levels created from acoustical sources as a result of the potential improvements to Fischer-Hallman Road and Bearinger Road. The Region of Waterloo (ROW) has developed criteria that outline the allowable permissible acoustic levels for the surrounding sensitive receivers. "Sensitive receivers" are defined as land uses that may be adversely impacted by noise levels, and that must be planned and/or designed using appropriate land use compatibility principles Ministry of the Environment and Energy *Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning Guideline NPC-300*. The existing surrounding developments are located in the urban boundary of the City of Waterloo and, therefore, are assumed to be in a "Class 1 Area" (urban) as defined by the Ministry of Environment, Conservation and Parks (MECP).

2.1 Line Source Criteria

A "Line Source" is defined as a source of noise that traverses along a line such as a transportation corridor (i.e. roadways or railways). Acoustical impacts from these sources are to be determined at all sensitive receivers within the existing adjacent developments and are to be assessed as outlined by the guidelines stipulated by the ROW. The ROW criteria for noise levels resulting from improvements to line sources are summarized as follows:

- Where the projected noise level exceeds 65 dBA; or
- Where the projected noise level exceeds 60 dBA and the difference between the existing and projected noise levels is 5 dBA or more.

Should either of these criteria be exceeded, acoustical mitigation measures are to be integrated into the design of the roadway improvements, which is completed by incorporating the construction of acoustical barriers to protect the sensitive receivers.

3.0 SOURCE INFORMATION

Fischer-Hallman Road and Bearinger Road between Columbia Street and Westmount Road are Regional roads and are classified as a Neighbourhood Connector (Avenue) in the *Context Sensitive Regional Transportation Corridor Design Guidelines*. Neighbourhood connectors are typically continuous across several communities/neighbourhoods within the Region. Neighbourhood connectors balance active transportation (bicycles and pedestrians), transit, and vehicle movement, providing a higher level of priority (design and comfort) for pedestrians, cyclists, and transit users.

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Data for Fischer-Hallman Road and Bearinger Road was obtained from the Region of Waterloo and has been divided into separate road segments to accurately depict the impact due to annual average daily traffic (AADT). The following table shows the relevant information required for noise level calculations for each road segment. Refer to Appendix B for all collected traffic data.

Table 1: Roadway Data

Road Section	Year	AADT (vpd)	Speed Limit	Medium Trucks (%)	Heavy Trucks (%)	Road Grade	Day/Night Split
Columbia St. to Gatestone Blvd.	2019	17,090	60 km/h	0.8%	2.0%	1.5%	90% / 10%
	2031	20,140					
Gatestone Blvd. to Laurelwood Dr.	2019	16,270	60 km/h	0.5%	2.0%	1.5%	90% / 10%
	2031	19,870					
Laurelwood Dr. to Westmount Rd.	2019	14,500	60 km/h	0.8%	0.9%	1.5%	90% / 10%
	2031	18,960					

3.1 Sensitive Receivers

The existing developments surrounding Fischer-Hallman Road and Bearinger Road consist of a mix of uses, including residential, commercial, recreational, and undeveloped land. Due to the nature of commercial developments, the Regional criteria for acoustical impacts do not apply; the same accounts for both recreational and undeveloped lands. As such, only the residential receivers will be assessed as part of this report.

Residential developments adjacent to Fischer-Hallman Road and Bearinger Road are parts of larger subdivision blocks and, therefore, units back onto and flank the right-of-way. As such, the sensitive receiver locations are defined as the rear yards of these units, identified as outdoor living areas (OLA) per the MECP publication *NPC-300* for determination of daytime noise impacts, and the second storey window, at the face of the unit, for determination of night time noise impacts.

Acoustical barrier exists along the rear and flank of a number of lots along Fischer Hallman Road, as identified in the Noise Information Plan. Subsequently, nine locations have been identified for the purpose of determining the acoustical impacts and the distance setbacks for each receiver location is shown in the following table.

Table 2: Sensitive Receiver Locations

Unit Identifier	Receiver ID	Source to Receiver Distance (Existing)	Source to Receiver Distance (Preferred Alternative)
450 Gatestone Blvd.	A	22.22 m	27.89 m
426 Timbercroft Cr.	B	29.10 m	35.06 m
450 Timbercroft Cres.	C	38.47 m	44.52 m
385 Laurel Gate Dr.	D	19.70 m	25.62 m
386 Laurel Gate Dr.	E	19.20 m	25.12 m
219 Sandwood Pl.	F	17.03 m	22.92 m
218 Sandwood Pl.	G	22.54 m	28.54 m

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Unit Identifier	Receiver ID	Source to Receiver Distance (Existing)	Source to Receiver Distance (Preferred Alternative)
201 Deacon Wood Pl.	H	18.29 m	24.67 m
200 Deacon Wood Pl.	I	41.04 m	46.43 m

Refer to Appendix A, which contains the Noise Information Plan showing the location of each sensitive receiver.

4.0 NOISE IMPACT ASSESSMENT RESULTS

Sound levels produced from Fischer-Hallman Road and Bearinger Road have been calculated using the MECP's ORNAMENT prediction procedure to determine theoretical impacts. A computer program, STAMSON version 5.0, has been used for this analysis, which incorporates both ORNAMENT (road) and STEAM (rail) prediction methods.

Existing acoustical barriers exist along portions of the rear and flanks of existing units for a number of lots along Fischer-Hallman Road. For the purpose of calculating the acoustical impacts, the existing barrier will be ignored to determine "free-field" impacts and determine "worst-case" impacts at each receiver in order to compare to the Regional Policy.

"Free-field" acoustical impacts at each receiver location have been calculated and are shown in the following table. Calculation results are found in Appendix C.

Table 3 - Acoustical Impacts from Fischer-Hallman Road and Bearinger Road

Receiver Location ID	Noise Impact 2019 (Day)	Noise Impact 2031 (Day)	Diff. (dBA)	Noise Impact 2019 (Night)	Noise Impact 2031 (Night)	Diff. (dBA)
450 Gatestone Blvd.	61.5	60.5	-1.0	55.2	54.3	-0.9
426 Timbercroft Cr.	60.8	60.3	-0.5	53.1	54.0	+0.9
450 Timbercroft Cres.	58.8	58.6	-0.2	52.7	53.5	+0.8
385 Laurel Gate Dr.	63.1	62.3	-0.8	56.8	56.1	-0.7
386 Laurel Gate Dr.	63.8	63.3	-0.5	57.5	58.9	+1.4
219 Sandwood Pl.	64.6	63.4	-1.3	57.2	56.3	-0.9
218 Sandwood Pl.	62.3	61.5	-0.8	56.1	55.3	-0.8
201 Deacon Wood Pl.	63.9	62.6	-1.3	57.5	56.3	-1.2
200 Deacon Wood Pl.	58.0	58.0	0.0	52.0	52.0	0.0

As shown in the above table, acoustical impacts are below the 65 dBA level and less than a 5.0 dBA increase as outlined within Regional Policy and, therefore, will not require mitigation to reduce impacts. Additionally, it is to be noted that the night time impacts are within the allowable limits and mitigation measures will not be required.

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5.0 MITIGATION MEASURES

The results of the calculations indicate noise levels meet the allowable criteria outlined by the Region of Waterloo. As such, mitigation of acoustical impacts is not required to protect the existing OLA.

5.1 Acoustical Barriers

As noted above, acoustical barrier exists along the rear and flank of a number of lots along Fischer-Hallman Road. The following table identifies the location and heights of the existing acoustical barrier, and are shown in the Noise Information Plan.

Table 4: Existing Acoustical Barrier

Lot	Barrier Type	Barrier Height	Notes
450 Gatestone Blvd.	Red Durisol	1.5m	Barrier top is a wave and therefore lowest height to be used. Wrap around rear and front of lot.
426-428 Timbercroft Cres.	Wood	2.5m	Only extends along rear yards of these two lots. Barrier is falling over.
450 Timbercroft Cres.	Wood	1.8m	Wrap around both sides of lot.
385 Laurel Gate Dr.	Red Durisol	1.5m	Barrier top is a wave and therefore lowest height to be used. Wrap around rear of lot.
219-225 Sand Wood Pl.	Red Durisol	1.5m	Barrier top is a wave and therefore lowest height to be used.
218 Sand Wood Pl.	Red Durisol	1.5m	Barrier top is a wave and therefore lowest height to be used. Transition occurs half way through lot (1.9 to 1.5)
201 Deacon Wood Pl.	Red Durisol	1.8-1.9m	Barrier top is a wave and therefore lowest height to be used.
200 Deacon Wood Pl.	Wood	2.0m	Does not extend to protect rear yard.

As shown, existing barrier exists along Fischer-Hallman in areas that have been identified to have acceptable acoustical levels, as per the Regional Policy. However, acoustical impacts have been assessed with the inclusion of the existing barrier to determine the benefit, if any, of the existing barrier. The following table shows the calculated OLA impacts, including the barrier, based on 2031 traffic volumes.

Table 5: Calculated Impacts Including Existing Acoustical Barrier

Lot	Source to Receiver Distance	Barrier Height	Noise Impact (2031) Day	Notes
450 Gatestone Blvd.	27.89 m	1.5m	55.6 dBA	Noise Barrier to Remain
426 Timbercroft Cres.	35.06 m	2.5m	58.7 dBA	Barrier Not Required, Ex. Barrier to Remain
450 Timbercroft Cres.	44.52 m	1.8m	53.9 dBA	Barrier Not Required, Ex. Barrier to Remain
385 Laurel Gate Dr.	25.62 m	1.5m	57.6 dBA	Noise Barrier to Remain
386 Laurel Gate Dr.	25.12 m	N/A	58.9 dBA	Barrier Not Required

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Lot	Source to Receiver Distance	Barrier Height	Noise Impact (2031) Day	Notes
219 Sand Wood Pl.	22.92 m	1.5m	58.6 dBA	Noise Barrier to Remain
218 Sand Wood Pl.	28.54 m	1.5m	56.8 dBA	Noise Barrier to Remain
201 Deacon Wood Pl.	24.67 m	1.8-1.9m	57.5 dBA	Noise Barrier to Remain
200 Deacon Wood Pl.	46.43 m	N/A	52.0 dBA	Barrier Not Required

As the existing barriers provide additional mitigation, the existing acoustical barriers are to be maintained as shown in the Noise Information Plan.

It is to be noted that the existing acoustical barriers appear in good condition and maintain a minimum density of 20 kg/m². It is also noted that, during construction, these barriers should be inspected to ensure that there are no gaps or holes within or below the barrier, and any deficiencies should be repaired.

6.0 RECOMMENDATIONS AND CONCLUSIONS

Based on the discussion herein, the following recommendations are proposed for the existing residential sensitive receivers to provide mitigation to acoustical impacts and provide acoustical levels within the criteria specified by the Region of Waterloo.

- Acoustical impacts are such that acoustical barriers are not required to protect units along the Fischer-Hallman Road and Bearinger Road corridor in order to comply with the Regional Policy.
- Existing acoustical barriers appear in good condition and are to be maintained; during construction they should be assessed to ensure there are no holes or gaps within or below the barrier.
- Due to the nature of commercial, recreational and undeveloped lands, no additional mitigation measures are required for the surrounding developments.

Therefore, based on the findings outlined within this report, acoustical impacts will conform to the criteria specified within the Region's *Implementation Guidelines for Noise Policies – Part B: Existing Development Impacted by Proposed Regional Road Undertakings*.

All of which is respectfully submitted,

WALTERFEDY

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Civil Engineering
Associate

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519.576.2150 Ext. 276

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APPENDIX A

Noise Information Plan

Receiver Address	Reciever ID	Current Condition			Alternative 5A Condition (2031)			Difference in Acoustical Impacts (dBA)
		AADT (vpd)	OLA Distance (m)	Acoustical Impact (dBA)	AADT (vpd)	OLA Distance (m)	Acoustical Impact (dBA)	
450 Gatestone Blvd.	A	17,090	22.22	61.5	20,140	27.89	60.5	-0.9
426 Timbercroft Cr.	B	16,270	29.10	60.8	19,870	35.06	60.3	-0.5
450 Timbercroft Cres.	C	16,270	38.47	58.8	19,870	44.52	58.6	-0.2
385 Laurel Gate Dr.	D	16,270	19.70	63.1	19,870	25.62	62.3	-0.8
386 Laurel Gate Dr.	E	16,270	19.20	63.8	19,870	25.12	63.3	-0.5
219 Sandwood Pl.	F	16,270	17.03	64.6	19,870	22.92	63.4	-1.3
218 Sandwood Pl.	G	16,270	22.54	62.3	19,870	28.54	61.5	-0.8
201 Deacon Wood Pl.	H	16,270	18.29	63.9	19,870	24.67	62.6	-1.3
200 Deacon Wood Pl.	I	16,270	41.04	58.0	19,870	46.43	58.0	0.0

Region of Waterloo

date	issuance	no.
2019.11.01	ISSUED FOR NOISE STUDY	

customer
REGIONAL MUNICIPALITY OF WATERLOO

project
FISCHER-HALLMAN ROAD/ BEARINGER ROAD IMPROVEMENTS

title
ACOUSTICAL IMPACT ASSESSMENT PLAN

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job no.:	2015-0772-10
CAD file:	2015-0772-10_Noise Drawing
drawn by:	A.T.
checked by:	D.S.

sheet no.:
APP A

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APPENDIX B

Traffic Data

REGIONAL MUNICIPALITY OF WATERLOO - TRAFFIC DATA

Location Fischer-Hallman Road / Bearinger Road (Columbia St W to Westmount Rd)

Fischer-Hallman Rd / Bearinger Rd		AADT		Vehicle Classification			Speed (km/h)		
From	To	2019	2031	Passenger Cars	% Trucks	% Heavy	Posted	Average	85th %ile
Westmount Rd	Laurelwood Dr	14,500	18,960	98.3%	0.8%	0.9%	60	59	65
Laurelwood Dr	Gatestone Blvd	16,270	19,870	97.5%	0.5%	2.0%	60	68	73
Gatestone Blvd	Columbia St W	17,090	20,140	97.2%	0.8%	2.0%	60	61	68

Note

The above data should NOT be used for any other purpose other than to perform a noise study assessment needed for the Fischer-Hallman Rd/Bearinger Rd widening Environmental Assessment Study.

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APPENDIX C

Calculation Results

Filename: reca_c.te Time Period: Day/Night 16/8 hours
Description: Current Acoustical Impacts at Receiver A

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 15217/1691 veh/TimePeriod *
Medium truck volume : 124/14 veh/TimePeriod *
Heavy truck volume : 139/15 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17200
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.80
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.22 / 22.22 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 0.97 m

ROAD (0.00 + 61.48 + 0.00) = 61.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	66.03	0.00	-2.83	-1.72	0.00	0.00	0.00	61.48

Segment Leq : 61.48 dBA

Total Leq All Segments: 61.48 dBA

Results segment # 1: Fischer (night)

Source height = 0.97 m

ROAD (0.00 + 55.15 + 0.00) = 55.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.59	59.47	0.00	-2.71	-1.62	0.00	0.00	0.00	55.15

Segment Leq : 55.15 dBA

Total Leq All Segments: 55.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.48
(NIGHT): 55.15

Filename: reca_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Receiver A

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17818/1980 veh/TimePeriod *
Medium truck volume : 145/16 veh/TimePeriod *
Heavy truck volume : 163/18 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 20140
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.80
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.89 / 27.89 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 0.97 m

ROAD (0.00 + 60.53 + 0.00) = 60.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	66.72	0.00	-4.47	-1.72	0.00	0.00	0.00	60.53

Segment Leq : 60.53 dBA

Total Leq All Segments: 60.53 dBA

Results segment # 1: Fischer (night)

Source height = 0.97 m

ROAD (0.00 + 54.29 + 0.00) = 54.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.59	60.18	0.00	-4.27	-1.62	0.00	0.00	0.00	54.29

Segment Leq : 54.29 dBA

Total Leq All Segments: 54.29 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.53
(NIGHT): 54.29

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:05:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: reca_ub.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Rec A w Barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17818/1980 veh/TimePeriod *
Medium truck volume : 145/16 veh/TimePeriod *
Heavy truck volume : 163/18 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 20140
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.80
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.89 / 27.89 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 67.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 15.50 / 15.50 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 0.97 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+-------------
      0.97 !       1.50 !       1.20 !       1.30

ROAD (0.00 + 55.59 + 0.00) = 55.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90     67   0.59  66.72   0.00  -4.27  -1.62   0.00   0.00  -5.24  55.59
-------------------------------------------------------------------------------

Segment Leq : 55.59 dBA

Total Leq All Segments: 55.59 dBA

Results segment # 1: Fischer (night)
-----------------------------------

Source height = 0.97 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+-------------
      0.97 !       4.50 !       2.53 !       2.63

ROAD (0.00 + 54.29 + 0.00) = 54.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90     67   0.50  60.18   0.00  -4.03  -1.49   0.00   0.00  -1.14  53.53*
  -90     67   0.59  60.18   0.00  -4.27  -1.62   0.00   0.00   0.00  54.29
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.29 dBA

Total Leq All Segments: 54.29 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 55.59
                  (NIGHT): 54.29
```

Filename: recb_c.te Time Period: Day/Night 16/8 hours
Description: Current Acoustical Impacts at Rec B

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.10 / 36.20 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 60.77 + 0.00) = 60.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.00	0.00	-4.78	-1.46	0.00	0.00	0.00	60.77

Segment Leq : 60.77 dBA

Total Leq All Segments: 60.77 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 53.13 + 0.00) = 53.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	60.49	0.00	-6.04	-1.32	0.00	0.00	0.00	53.13

Segment Leq : 53.13 dBA

Total Leq All Segments: 53.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.77
(NIGHT): 53.13

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:07:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recb_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Rec B

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 35.06 / 36.20 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 60.29 + 0.00) = 60.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.87	0.00	-6.12	-1.46	0.00	0.00	0.00	60.29

Segment Leq : 60.29 dBA

Total Leq All Segments: 60.29 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 53.99 + 0.00) = 53.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	61.35	0.00	-6.04	-1.32	0.00	0.00	0.00	53.99

Segment Leq : 53.99 dBA

Total Leq All Segments: 53.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.29
(NIGHT): 53.99

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:09:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recb_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Rec B w barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 35.06 / 35.06 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -30.00 deg Angle2 : 20.00 deg
Barrier height : 2.50 m
Barrier receiver distance : 17.70 / 17.70 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+--------------
      1.19 !        1.50 !        1.34 !         1.44

ROAD (54.67 + 48.61 + 55.69) = 58.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90    -30   0.66  67.87   0.00  -6.12  -7.08   0.00   0.00   0.00  54.67
-------------------------------------------------------------------------------
  -30     20   0.52  67.87   0.00  -5.60  -5.64   0.00   0.00  -8.01  48.61
-------------------------------------------------------------------------------
   20     90   0.66  67.87   0.00  -6.12  -6.06   0.00   0.00   0.00  55.69
-------------------------------------------------------------------------------

Segment Leq : 58.67 dBA

Total Leq All Segments: 58.67 dBA

Results segment # 1: Fischer (night)
-----------------------------------

Source height = 1.19 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
      1.19 !        4.50 !        2.83 !         2.93

ROAD (48.68 + 49.87 + 49.66) = 54.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90    -30   0.58  61.35   0.00  -5.82  -6.85   0.00   0.00   0.00  48.68
-------------------------------------------------------------------------------
  -30     20   0.43  61.35   0.00  -5.27  -5.63   0.00   0.00  -4.68  45.77*
  -30     20   0.58  61.35   0.00  -5.82  -5.65   0.00   0.00   0.00  49.87
-------------------------------------------------------------------------------
   20     90   0.58  61.35   0.00  -5.82  -5.86   0.00   0.00   0.00  49.66
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.21 dBA

Total Leq All Segments: 54.21 dBA
```



```
TOTAL Leq FROM ALL SOURCES (DAY): 58.67
                  (NIGHT): 54.21
```

Filename: recc_c.te Time Period: Day/Night 16/8 hours
Description: Current Acoustical Impacts at Rec C

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.47 / 38.80 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 58.75 + 0.00) = 58.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.00	0.00	-6.79	-1.46	0.00	0.00	0.00	58.75

Segment Leq : 58.75 dBA

Total Leq All Segments: 58.75 dBA

Segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 52.66 + 0.00) = 52.66 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	60.49	0.00	-6.52	-1.32	0.00	0.00	0.00	52.66

Segment Leq : 52.66 dBA

Total Leq All Segments: 52.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.75
(NIGHT): 52.66

Filename: recc_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Rec C

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.52 / 38.80 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 58.57 + 0.00) = 58.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.87	0.00	-7.84	-1.46	0.00	0.00	0.00	58.57

Segment Leq : 58.57 dBA

Total Leq All Segments: 58.57 dBA

Segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 53.51 + 0.00) = 53.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	61.35	0.00	-6.52	-1.32	0.00	0.00	0.00	53.51

Segment Leq : 53.51 dBA

Total Leq All Segments: 53.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.57
(NIGHT): 53.51

STAMSON 5.0 COMPREHENSIVE REPORT Date: 01-11-2019 11:12:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recc_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impacts at Rec C w barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.52 / 35.80 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 1.80 m
Barrier receiver distance : 20.30 / 20.30 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+-------------
      1.19 !       1.50 !       1.37 !       1.47
```

ROAD (0.00 + 53.93 + 0.00) = 53.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.56	67.87	0.00	-7.38	-1.29	0.00	0.00	-5.28	53.93

Segment Leq : 53.93 dBA

Total Leq All Segments: 53.93 dBA

Segment # 1: Fischer (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	2.61	2.71

ROAD (0.00 + 54.06 + 0.00) = 54.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.47	61.35	0.00	-5.56	-1.12	0.00	0.00	-3.51	51.16*
-90	90	0.58	61.35	0.00	-5.97	-1.32	0.00	0.00	0.00	54.06

* Bright Zone !

Segment Leq : 54.06 dBA

Total Leq All Segments: 54.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.93
(NIGHT): 54.06

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:19:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recd_c.te Time Period: Day/Night 16/8 hours
Description: Current Aocustical Impact on Rec D

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.40 / 20.40 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 63.06 + 0.00) = 63.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.00	0.00	-2.22	-1.72	0.00	0.00	0.00	63.06

Segment Leq : 63.06 dBA

Total Leq All Segments: 63.06 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 56.78 + 0.00) = 56.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	60.49	0.00	-2.11	-1.61	0.00	0.00	0.00	56.78

Segment Leq : 56.78 dBA

Total Leq All Segments: 56.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.06
(NIGHT): 56.78

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:20:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recd_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Aocustical Impact on Rec D

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 25.62 / 25.62 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 62.29 + 0.00) = 62.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.87	0.00	-3.86	-1.72	0.00	0.00	0.00	62.29

Segment Leq : 62.29 dBA

Total Leq All Segments: 62.29 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 56.07 + 0.00) = 56.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	61.35	0.00	-3.67	-1.61	0.00	0.00	0.00	56.07

Segment Leq : 56.07 dBA

Total Leq All Segments: 56.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.29
(NIGHT): 56.07

STAMSON 5.0 NORMAL REPORT Date: 13-11-2019 13:47:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recd_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impact at Rec D w/ barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 25.62 / 25.62 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 67.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 9.00 / 9.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

↟Page 2

Results segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.39	1.39

ROAD (0.00 + 57.55 + 0.00) = 57.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	67.87	0.00	-3.67	-1.61	0.00	0.00	-5.04	57.55

Segment Leq : 57.55 dBA

Total Leq All Segments: 57.55 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.34	3.34

ROAD (0.00 + 56.07 + 0.00) = 56.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.49	61.35	0.00	-3.46	-1.48	0.00	0.00	-0.17	56.24*
-90	67	0.58	61.35	0.00	-3.67	-1.61	0.00	0.00	0.00	56.07

* Bright Zone !

Segment Leq : 56.07 dBA

Total Leq All Segments: 56.07 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.55
(NIGHT): 56.07

Filename: rece_c.te Time Period: Day/Night 16/8 hours
Description: Current Aocustical Impact on Rec E

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.20 / 19.30 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 63.76 + 0.00) = 63.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.00	0.00	-1.78	-1.46	0.00	0.00	0.00	63.76

Segment Leq : 63.76 dBA

Total Leq All Segments: 63.76 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 57.45 + 0.00) = 57.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	60.49	0.00	-1.73	-1.32	0.00	0.00	0.00	57.45

Segment Leq : 57.45 dBA

Total Leq All Segments: 57.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.76
(NIGHT): 57.45

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:23:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rece_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Aocustical Impact on Rec E

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 19954/2217 veh/TimePeriod *
Medium truck volume : 102/11 veh/TimePeriod *
Heavy truck volume : 409/45 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 22740
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 25.12 / 19.30 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 63.28 + 0.00) = 63.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	68.45	0.00	-3.72	-1.46	0.00	0.00	0.00	63.28

Segment Leq : 63.28 dBA

Total Leq All Segments: 63.28 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 58.85 + 0.00) = 58.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	61.89	0.00	-1.73	-1.32	0.00	0.00	0.00	58.85

Segment Leq : 58.85 dBA

Total Leq All Segments: 58.85 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.28
(NIGHT): 58.85

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:37:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: RecF_C.te Time Period: Day/Night 16/8 hours
Description: Current Aocustical Impact on Rec F

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 17.03 / 20.03 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 64.63 + 0.00) = 64.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.00	0.00	-0.92	-1.46	0.00	0.00	0.00	64.63

Segment Leq : 64.63 dBA

Total Leq All Segments: 64.63 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 57.19 + 0.00) = 57.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	60.49	0.00	-1.98	-1.32	0.00	0.00	0.00	57.19

Segment Leq : 57.19 dBA

Total Leq All Segments: 57.19 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.63
(NIGHT): 57.19

Filename: RecF_U.te Time Period: Day/Night 16/8 hours
Description: Ultimate Aocustical Impact on Rec F

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.92 / 25.92 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 63.36 + 0.00) = 63.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.87	0.00	-3.06	-1.46	0.00	0.00	0.00	63.36

Segment Leq : 63.36 dBA

Total Leq All Segments: 63.36 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 56.28 + 0.00) = 56.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	61.35	0.00	-3.75	-1.32	0.00	0.00	0.00	56.28

Segment Leq : 56.28 dBA

Total Leq All Segments: 56.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.36
(NIGHT): 56.28

STAMSON 5.0 NORMAL REPORT Date: 13-11-2019 10:02:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recf_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impact at Rec F w Barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.92 / 24.20 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 5.70 / 23.30 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+-------------
      1.19 !       1.50 !       1.47 !       1.57
```

ROAD (0.00 + 58.64 + 0.00) = 58.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	67.87	0.00	-2.91	-1.32	0.00	0.00	-5.00	58.64

Segment Leq : 58.64 dBA

Total Leq All Segments: 58.64 dBA

Results segment # 1: Fischer (night)

```
-----------------------------------
```

Source height = 1.19 m

Barrier height for grazing incidence

```
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+-------------
      1.19 !       4.50 !       1.22 !       1.32
```

ROAD (0.00 + 50.92 + 0.00) = 50.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.49	61.35	0.00	-3.09	-1.15	0.00	0.00	-6.18	50.92

Segment Leq : 50.92 dBA

Total Leq All Segments: 50.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.64
(NIGHT): 50.92

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:29:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recg_c.te Time Period: Day/Night 16/8 hours
Description: Current Aocustical Impact on Rec G

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.54 / 22.54 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 62.34 + 0.00) = 62.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.00	0.00	-2.94	-1.72	0.00	0.00	0.00	62.34

Segment Leq : 62.34 dBA

Total Leq All Segments: 62.34 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 56.09 + 0.00) = 56.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	60.49	0.00	-2.79	-1.61	0.00	0.00	0.00	56.09

Segment Leq : 56.09 dBA

Total Leq All Segments: 56.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.34
(NIGHT): 56.09

Filename: recg_u.te Time Period: Day/Night 16/8 hours
Description: Ulitmate Aocustical Impact on Rec G

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 28.54 / 28.54 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 61.51 + 0.00) = 61.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.87	0.00	-4.64	-1.72	0.00	0.00	0.00	61.51

Segment Leq : 61.51 dBA

Total Leq All Segments: 61.51 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 55.33 + 0.00) = 55.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	61.35	0.00	-4.41	-1.61	0.00	0.00	0.00	55.33

Segment Leq : 55.33 dBA

Total Leq All Segments: 55.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.51
(NIGHT): 55.33

STAMSON 5.0 NORMAL REPORT Date: 13-11-2019 13:49:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: recg_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impact at Rec G w/ barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 28.54 / 28.54 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 67.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Page 2

Results segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	1.50	1.42	1.52

ROAD (0.00 + 56.83 + 0.00) = 56.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	67.87	0.00	-4.41	-1.61	0.00	0.00	-5.02	56.83

Segment Leq : 56.83 dBA

Total Leq All Segments: 56.83 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.19	4.50	3.37	3.47

ROAD (0.00 + 55.33 + 0.00) = 55.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.49	61.35	0.00	-4.16	-1.48	0.00	0.00	-0.18	55.53*
-90	67	0.58	61.35	0.00	-4.41	-1.61	0.00	0.00	0.00	55.33

* Bright Zone !

Segment Leq : 55.33 dBA

Total Leq All Segments: 55.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.83
(NIGHT): 55.33

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:31:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rech_c.te Time Period: Day/Night 16/8 hours
Description: Current Aocustical Impact on Rec H

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 18.29 / 18.29 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 63.85 + 0.00) = 63.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.00	0.00	-1.43	-1.72	0.00	0.00	0.00	63.85

Segment Leq : 63.85 dBA

Total Leq All Segments: 63.85 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 57.53 + 0.00) = 57.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	60.49	0.00	-1.36	-1.61	0.00	0.00	0.00	57.53

Segment Leq : 57.53 dBA

Total Leq All Segments: 57.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.85
(NIGHT): 57.53

Filename: rech_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Aocustical Impact on Rec H

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 24.67 / 24.67 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 62.56 + 0.00) = 62.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.87	0.00	-3.59	-1.72	0.00	0.00	0.00	62.56

Segment Leq : 62.56 dBA

Total Leq All Segments: 62.56 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 56.33 + 0.00) = 56.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	61.35	0.00	-3.41	-1.61	0.00	0.00	0.00	56.33

Segment Leq : 56.33 dBA

Total Leq All Segments: 56.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.56
(NIGHT): 56.33

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 11:33:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rech_ueb.te Time Period: Day/Night 16/8 hours
Description: Ultimate Aocustical Impact on Rec H w barrier

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 24.67 / 24.67 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 67.00 deg
Barrier height : 1.80 m
Barrier receiver distance : 7.20 / 7.20 m
Source elevation : 0.00 m
Receiver elevation : 0.20 m
Barrier elevation : 0.10 m
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

```
------------+-------------+-------------+-------------
      1.19 !       1.50 !       1.45 !       1.55
```

ROAD (0.00 + 57.49 + 0.00) = 57.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.56	67.87	0.00	-3.37	-1.58	0.00	0.00	-5.42	57.49

Segment Leq : 57.49 dBA

Total Leq All Segments: 57.49 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

Barrier height for grazing incidence

```
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+-------------
      1.19 !       4.50 !       3.58 !       3.68
```

ROAD (0.00 + 56.33 + 0.00) = 56.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.47	61.35	0.00	-3.18	-1.45	0.00	0.00	-0.16	56.56*
-90	67	0.58	61.35	0.00	-3.41	-1.61	0.00	0.00	0.00	56.33

* Bright Zone !

Segment Leq : 56.33 dBA

Total Leq All Segments: 56.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.49
(NIGHT): 56.33

STAMSON 5.0 NORMAL REPORT Date: 01-11-2019 15:02:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: reci_c.te Time Period: Day/Night 16/8 hours
Description: Current Acoustical Impact at Rec I

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 14277/1586 veh/TimePeriod *
Medium truck volume : 73/8 veh/TimePeriod *
Heavy truck volume : 293/33 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 41.04 / 41.04 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 58.02 + 0.00) = 58.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.00	0.00	-7.26	-1.72	0.00	0.00	0.00	58.02

Segment Leq : 58.02 dBA

Total Leq All Segments: 58.02 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 51.98 + 0.00) = 51.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	60.49	0.00	-6.90	-1.61	0.00	0.00	0.00	51.98

Segment Leq : 51.98 dBA

Total Leq All Segments: 51.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.02
(NIGHT): 51.98

Filename: reci_u.te Time Period: Day/Night 16/8 hours
Description: Ultimate Acoustical Impact at Rec I

Road data, segment # 1: Fischer (day/night)

Car traffic volume : 17436/1937 veh/TimePeriod *
Medium truck volume : 89/10 veh/TimePeriod *
Heavy truck volume : 358/40 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 19870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 0.50
Heavy Truck % of Total Volume : 2.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fischer (day/night)

Angle1 Angle2 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 46.43 / 46.43 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fischer (day)

Source height = 1.19 m

ROAD (0.00 + 58.00 + 0.00) = 58.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.66	67.87	0.00	-8.15	-1.72	0.00	0.00	0.00	58.00

Segment Leq : 58.00 dBA

Total Leq All Segments: 58.00 dBA

Results segment # 1: Fischer (night)

Source height = 1.19 m

ROAD (0.00 + 51.99 + 0.00) = 51.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	67	0.58	61.35	0.00	-7.75	-1.61	0.00	0.00	0.00	51.99

Segment Leq : 51.99 dBA

Total Leq All Segments: 51.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.00
(NIGHT): 51.99

APPENDIX F

Public Notices

R0014437735

Region of Waterloo

Public Notice

Notices of Study Commencement

Municipal Class Environmental Assessment, Schedule 'C'

Fischer-Hallman Road (Regional Road 58) Improvements Columbia Street West to Westmount Road North, City of Waterloo

and

Bleams Road (Regional Road 56) Improvements Strasburg Road to Fischer-Hallman Road, City of Kitchener

Study Process

The Regional Municipality of Waterloo is undertaking two (2) Schedule 'C' Municipal Class Environmental Assessments (Class EAs) to consider improvements to the Fischer-Hallman Road (Regional Road 58) corridor from Columbia Street West to Westmount Road North in the City of Waterloo and the Bleams Road (Regional Road 56) corridor from Strasburg Road to Fischer-Hallman Road in the City of Kitchener.

Improvements along Fischer-Hallman Road (Regional Road 58) and Bleams Road (Regional Road 56) are being considered to improve active transportation facilities, as well as traffic capacity and operations to meet projected growth, along the corridors.

Public Consultation

As part of the Class EA process, prior to any approvals, the public and stakeholders will have an opportunity to review study findings and provide input on opportunities for improvement and associated recommendations. The first Public Consultation Centre for each project is expected to be held later this year to invite input regarding the study. In advance of completing the Class EA process, the public and stakeholders will also be notified of study completion and final recommendations for each project.

If you wish to be added to either project mailing list, or have any comments or questions regarding either study, please contact:

Justin Armstrong, P. Eng., Region of Waterloo, via phone at 519-575-4757 Ext. 3164 or email at juarmstrong@regionofwaterloo.ca.

All comments and information regarding these projects are being collected to assist the Region of Waterloo in making a decision. Under the **Municipal Act,** personal information such as name, address, telephone number and property location may be included in a submission and becomes part of the public record.

The full details of this notice and contact information is available on our Public Notices webpage at www.regionofwaterloo.ca. Click on the Public Notices link in the top right corner of the homepage.

If you have any trouble viewing this information or wish to obtain a full copy of any Public Notice, please contact the Regional Clerk's office at 519-575-4400 or email regionalclerk@regionofwaterloo.ca.

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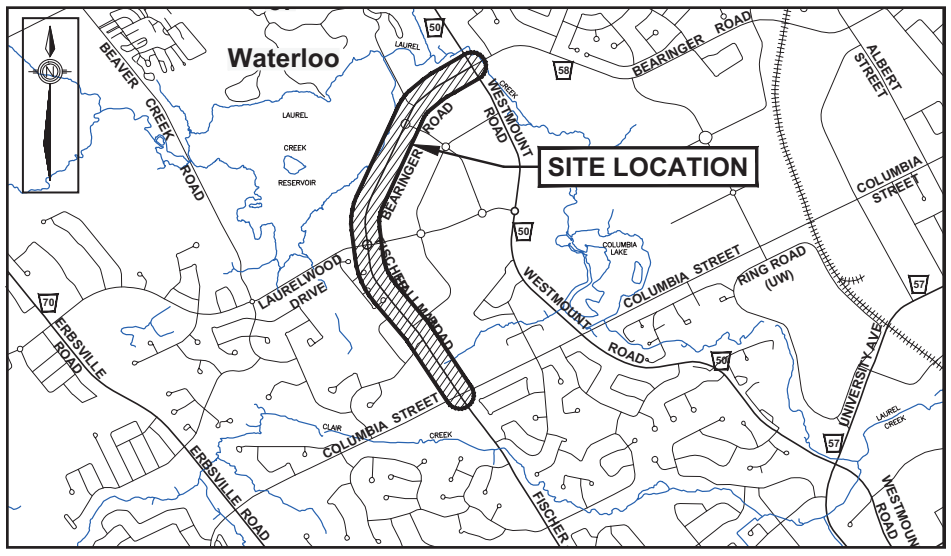
Region of Waterloo

Public Notice

Notice of Study Commencement

Fischer-Hallman Road (Regional Road 58) Improvements
Columbia Street West to Westmount Road North
City of Waterloo
Municipal Class Environmental Assessment, Schedule 'C'

The Regional Municipality of Waterloo is undertaking a Schedule "C" Municipal Class Environmental Assessment (Class EA) for improvements to the Fischer-Hallman Road (Regional Road 58) corridor from Columbia Street West to Westmount Road North in the City of Waterloo. Improvements along Fischer-Hallman Road (Regional Road 58) are being considered to improve active transportation facilities, as well as traffic capacity and operations to meet projected growth, along the corridor.



The study will be completed following the guidelines of the "Municipal Class Environmental Assessment", dated October 2000 (as revised 2011), for Schedule "C" projects. The Class EA planning process will consider the potential social, economical and environmental impacts of improvements on the study area.

As part of the Class EA process, prior to any approvals, the public and stakeholders will have an opportunity to review study findings, and provide input on opportunities for improvement and associated recommendations. The first Public Consultation Centre will be held later this year to invite input regarding the study. In advance of completing the Class EA process, the public and stakeholders will also be notified of study completion and final recommendations.

If you wish to be added to the project mailing list in order to receive further information, or have any comments or questions regarding the study, please contact either of the following:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street,
Kitchener, ON N2G 4J3
Phone: 519-575-4757 Ext. 3164
Email: juarmstrong@regionofwaterloo.ca

Scott Oliver, P.Eng.
Project Manager
WalterFedy
675 Queen St. S., Suite 111
Kitchener, ON N2M 1A1
Phone: 519-576-2150 Ext. 325
Email: soliver@walterfedy.com

All comments and information received from individuals, stakeholder groups, and agencies regarding this project are being collected to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Justin Armstrong at the Region of Waterloo.

ARTS FOCUS

Real essays don't fit a structure

A decade ago, when my son was in high school, I was horrified to discover that his essays had to fit a form; that they had to begin with a conclusion and then proceed with proof and certainties. It seemed to be closer to a science experiment and not the fresh unfurling of one's thoughts.

"Essayer" in French means "to try." In an essay, the writer is meant to allow their imagination to move forward on the page, without forgone conclusions — something of beauty that looks nothing like the formulaic high school essay.

One has to wonder if the so-called "essay" learned in school is the reason the essay gets so little attention.

To love an essay, to write an essay, one must unlearn those tragic lessons in conformity. Why, after all, would we want conformity in art?

The Best American Essays is a book that is published annually with the year's best essays, as chosen by the editor of each edition. Robert Atwan, the series editor, also writes about this annoyance — the school-taught essay. He writes that there are "no tidy conclusions" in an essay.

Names, for example, an essay by Paul Crenshaw in the 2016 edition of The Best American Essays, is a ripping examination of the demeaning treatment during combat training. Preparing for war, in the face of real fear, the essay ponders the purpose of humiliation as part of basic training. It's an essay that leaves more questions than answers.

Jonathan Franzen, the editor of the 2016 edition of The Best American Essays, writes about his early years as an essayist, recalling that an uncomfortable topic — his smoking habit — would "force me to take my measure. This is what essays do." He therefore chose last year's collection of essays based on the risk and the potential shame the writers undertook, which Franzen notes is the implicit understanding when beginning to write an essay.

One of my favourite essays, On Leavened Bread by Salman Rushdie — which appeared in a 1996 New Yorker magazine — is a short, yet beautifully contemplative piece that feels like a hymn to bread and water.

As we approach a total eclipse of the sun this weekend (Aug. 21), it might be appropriate to read Annie Dillard's well-known essay Total Eclipse, after she travelled to witness the 1979 event. Dillard's essay does not shrink from the preternatural feeling of observing this phenomenon. Dillard describes in her vivid prose the soul-shaking experience.

These essays take the reader down into the heart of the writers. Their subjects seem straightforward, yet they are anything but, as they tenderly take you along on these poignant journeys and recall their memories. Good essays read as the quiet words one admits to oneself after time has passed. Hours of reflection distil thoughts that may grant understanding, but not conclusions.

•••

Leslie Morgenson is a local writer. She can be reached by email at lesliemorgenson@gmail.com.

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WATERLOO REGION RECORD TUESDAY, APRIL 30, 2019

Region of Waterloo

Public Notice

We Want To Hear From You On These Upcoming Projects/Events In Your Area

The full details of any notices are available on our Public Notices webpage at www.regionofwaterloo.ca; click on the Public Notices link in the top right of the homepage.

If you have any trouble viewing this information or wish to obtain a full copy of any Public Notice, please contact the Regional Clerk's office at 519-575-4400 or email regionalclerk@regionofwaterloo.ca.

Public Consultation Centre #1 Schedule 'C' Class Environmental Assessment for Fischer-Hallman Road / Bearinger Road Improvements from Columbia Street West to Westmount Road North City of Waterloo

You are invited to our First Public Consultation Centre to provide your input into the planning of the Fischer-Hallman Road / Bearinger Road (Regional Road 58) Improvements

Date:	Tuesday, May 7, 2019
Time:	5:00 PM to 8:00 PM
Location:	Waterloo Public Library, Community Room 500 Fischer-Hallman Road Waterloo, Ontario

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
Phone: 519-575-4757 Ext. 3164
Email: juarmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Project Manager
WalterFedy
675 Queen Street S., Suite 111
Kitchener, ON N2M 1A1
Phone: 519-576-2150 Ext. 123
Email: dweiler@walterfedy.com

Notice of Public Consultation Centre King Street East and Sportsworld Drive Reconstruction Freeport Bridge to Highway 401 and King Street to Gateway Park Drive City of Kitchener

The Regional Municipality of Waterloo invites property owners, business owners and interested members of the public to attend a Public Consultation Centre for the King Street East and Sportsworld Drive Reconstruction project. The work being proposed includes the reconstruction of the road structure, storm sewer replacement, intersection improvements at the King Street/Sportsworld Drive and King Street/Tu Lane Street intersections, roadway illumination and the construction of active transportation facilities. Construction is currently expected to occur in phases in 2020, 2022 and 2023.

Interested parties are invited to attend an informal "drop-in" Public Consultation Centre at;

Date:	Thursday, May 2, 2019
Time:	5:00 PM to 8:00 PM
Location:	Region of Waterloo Operations Centre, 100 Maple Grove Road

If you are unable to attend the Consultation Centre and would like to make your views known, please submit your written comments by Friday, May 17, 2019 to:

Mr. Peter Linn, P.Eng.
Senior Project Manager
Regional Municipality of Waterloo
150 Frederick Street, 6th Floor Kitchener, ON N2G 4J3
Phone: 519-575-4757 ext. 3773
Fax: 519-575-4430
E-mail: plinn@regionofwaterloo.ca.

Waterloo Region Landfill Liaison Committee Meeting

The Region of Waterloo has established a Landfill Liaison Committee for the Waterloo Region Landfill Site.

All members of the public are invited to attend the committee meetings. The goal of the Committee is to identify operational problems that affect local residents such as litter, odour and noise and to resolve those issues in a cooperative manner.

The next meeting of the Waterloo Region Landfill Liaison Committee is scheduled for 7:00 p.m. on Tuesday, May 7, 2019 at the Waterloo Landfill Administration Building, Gate 1, 925 Erb Street West, Waterloo. If you require any additional information on the Liaison Committee or require accessible services to participate, please contact Linda Churchill at 519-575-4400 ext. 8421 between 8:30 a.m. and 4:30 p.m., Monday to Friday or email lchurchill@regionofwaterloo.ca.

Under the "Municipal Act", personal information such as name, address, telephone number, and property location that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to the person indicated above.

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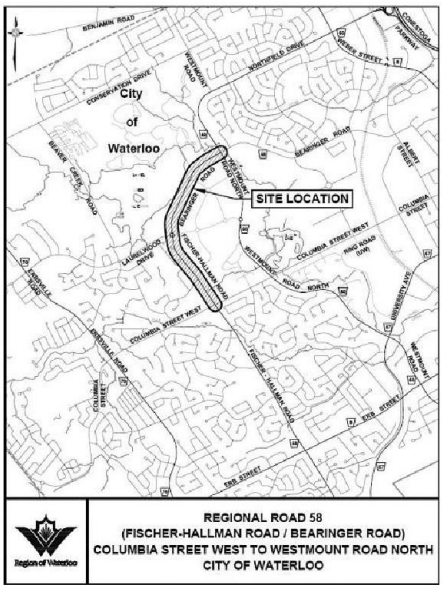
Region of Waterloo

Public Notice

Public Consultation Centre #1
Schedule 'C' Class Environmental Assessment for Fischer-Hallman Road / Bearinger Road Improvements from Columbia Street West to Westmount Road North City of Waterloo

You are invited to our First Public Consultation Centre to provide your input into the planning of the Fischer-Hallman Road / Bearinger Road (Regional Road 58) Improvements.

Date: **Tuesday, May 7, 2019**
Time: **5:00 PM to 8:00 PM**
Location: **Waterloo Public Library, Community Room**
500 Fischer-Hallman Road, Waterloo, Ontario



Background

The Region of Waterloo is undertaking a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for improvements to the Fischer-Hallman Road / Bearinger Road (Regional Road 58) corridor from Columbia Street West to Westmount Road North in the City of Waterloo. Improvements on Fischer-Hallman Road / Bearinger Road (Regional Road 58) are being considered to provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

The 2018 Regional Transportation Master Plan Update has identified the need to widen Fischer-Hallman / Bearinger Road to 4-lanes and add active transportation improvements for pedestrians, cyclists, and transit between Columbia Street West and Westmount Road North.

The Process

The study is being conducted in accordance with the requirements of a Municipal Class Environmental Assessment, which is an approved process under the Ontario Environmental Assessment Act (Last Amended 2010).

This is the First Public Consultation Centre and the Project Team will be presenting the needs and opportunities for improvements on Fischer-Hallman Road / Bearinger Road, as well as alternative solutions, to the public and will be seeking input. This Public Consultation Centre is designed to provide interested members of the public, local businesses, community, and agencies the opportunity to meet the Project Team, get an update on the project work completed to date, and discuss project issues.

Community Involvement

The Region of Waterloo encourages members of the public, stakeholder groups, and agencies to actively participate in this study by attending public consultation opportunities or contacting staff directly with comments or questions. If you wish to be added to the project mailing list, or would like further information on the project and any future public meetings, please visit our website at www.regionofwaterloo.ca or contact:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
Phone: 519-575-4757 Ext. 3164
Email:
juarmstrong@regionofwaterloo.ca

Dave Weiler, P. Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South,
Suite 111, Kitchener, ON N2M 1A1
Phone: 519-576-2150 Ext. 242
Email:
dweiler@walterfedy.com

Accessibility:

This event is accessible for people with disabilities. Accessible parking is available. If you require assistance to attend or participate in this meeting, or to access information in alternate formats, please contact Justin Armstrong at least five (5) days prior to the meeting.

All comments and information received from individuals, stakeholder groups, and agencies regarding this project are being collected to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number, and property information that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Justin Armstrong.

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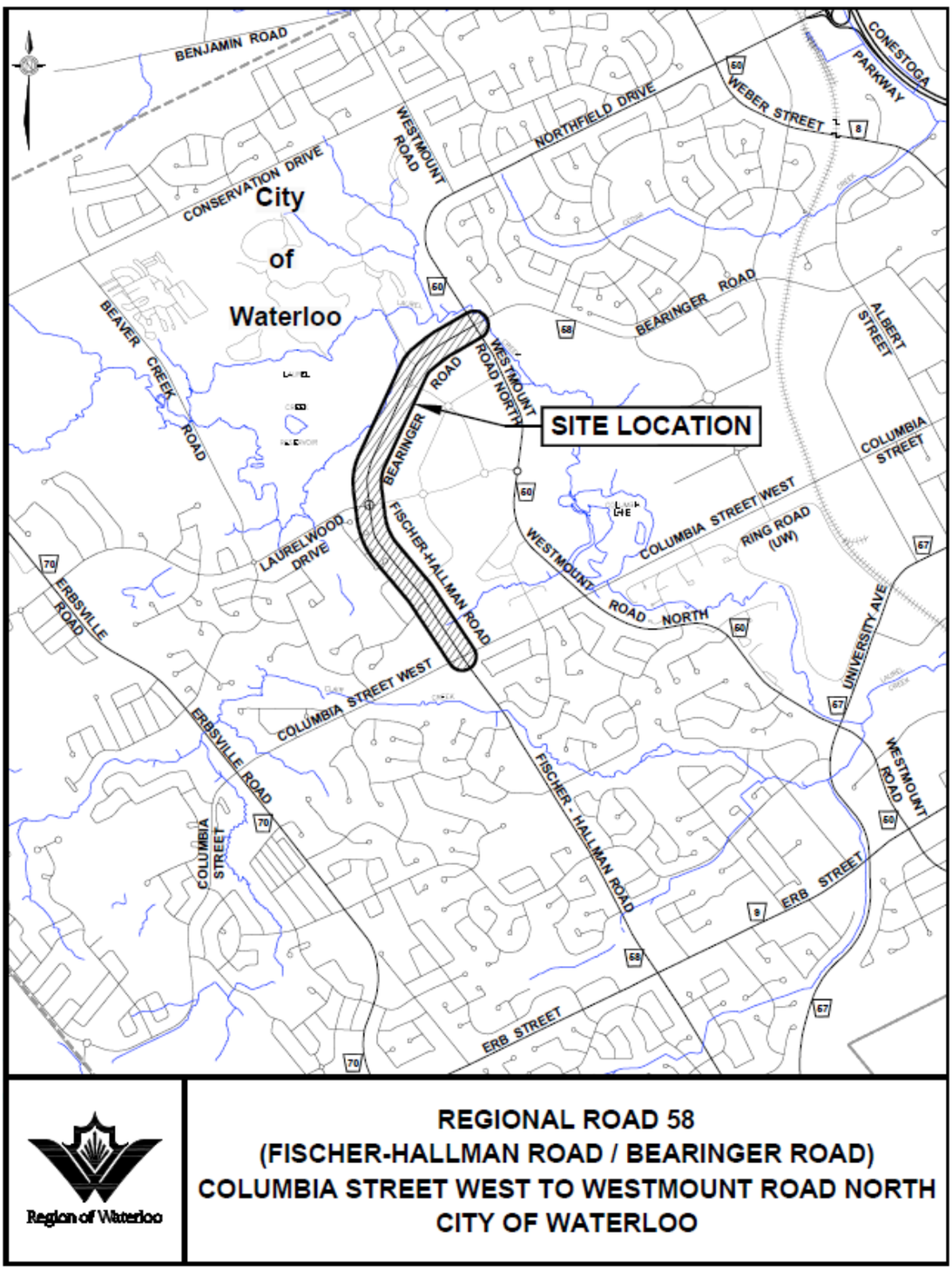
Region of Waterloo

Public Consultation Centre #2
Schedule 'C' Class Environmental Assessment for Fischer-Hallman Road / Bearinger Road Improvements from Columbia Street West to Westmount Road North in the City of Waterloo

You are invited to our Second Public Consultation Centre to provide your input into the planning of the Fischer-Hallman Road / Bearinger Road (Regional Road 58) Improvements.

Date: **Monday, November 4, 2019**
Time: **4:30 PM to 7:30 PM**
Location: **Waterloo Public Library, Community Room**
500 Fischer-Hallman Road
Waterloo, Ontario



Background

The Region of Waterloo is undertaking a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for improvements to the Fischer-Hallman Road / Bearinger Road (Regional Road 58) corridor from Columbia Street West to Westmount Road North in the City of Waterloo. Improvements on Fischer-Hallman Road / Bearinger Road (Regional Road 58) are being considered to provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

The 2018 Regional Transportation Master Plan Update has identified the need to widen Fischer-Hallman / Bearinger Road to 4-lanes and add active transportation improvements for pedestrians, cyclists, and transit between Columbia Street West and Westmount Road North.

The Process

The study is being conducted in accordance with the requirements of a Municipal Class Environmental Assessment, which is an approved process under the Ontario Environmental Assessment Act (Last Amended 2010).

This is the Second Public Consultation Centre and the Project Team will be presenting the needs and opportunities for improvements, as well as the preferred alternative solution, on Fischer-Hallman Road / Bearinger Road to the public and will be seeking input. This Public Consultation Centre is designed to provide interested members of the public, local businesses, community, and agencies the opportunity to meet the Project Team, get an update on the project work completed to date, and discuss project issues.

Community Involvement

The Region of Waterloo encourages members of the public, stakeholder groups, and agencies to actively participate in this study by attending public consultation opportunities or contacting staff directly with comments or questions. If you wish to be added to the project mailing list, or would like further information on the project and any future public meetings, please visit our website at www.regionofwaterloo.ca or contact:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
Phone: 519-575-4757 Ext. 3164
Email: juarmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Phone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

Accessibility:

This event will be accessible for people requiring accommodations. Accessible parking is available. If you require assistance to attend or participate in this meeting, or to access information in alternate formats, please contact Justin Armstrong at least five (5) days prior to the meeting.

All comments and information received from individuals, stakeholder groups, and agencies regarding this project are being collected to assist the Region of Waterloo in making a decision. Under the "Municipal Act", personal information such as name, address, telephone number, and property information that may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to Justin Armstrong.

Notice of Completion
Fischer-Hallman Road / Bearinger Road Improvements
City of Waterloo
Schedule 'C' Municipal Class Environmental Assessment

The Regional Municipality of Waterloo has undertaken a planning study in accordance with the Ontario Environmental Assessment Act following the approved process for Schedule 'C' projects under the "Municipal Class Environmental Assessment" (October 2000, as amended through 2015) to address transportation system improvements in the City of Waterloo. The Recommended Design Alternative includes the following key elements:

- Widen the road from 2 to 4 lanes of through vehicle traffic; and, add new
- 3 metre wide boulevard multi-use trail (MUT) along both sides of the road;
- Curb and gutter and a stormwater drainage system;
- 5.0 metre wide raised curb, grassed median; and
- Additional street lighting.

By copy of this Notice, the Environmental Study Report is being placed on the public record for a 30-day review period in accordance with the requirements of a Municipal Class Environmental Assessment. Subject to comments received as a result of this Notice, and receipt of necessary approvals, the project may proceed to construction subject to Regional Council approval.

An electronic version of the Environmental Study Report is available for review online at https://www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_07299_InfoSheet_3.pdf.

A printed copy of the Environmental Study Report is available for review through the Clerks Division at the following locations during regular business hours:

The Regional Municipality of Waterloo 150 Frederick Street, Kitchener, ON	The Corporation of the City of Waterloo 100 Regina Street South, Waterloo, ON

Interested persons may provide written comments to the Region's Clerk's Department within 30 calendar days from the date of this Notice. If concerns regarding this project cannot be resolved in discussion with the Region of Waterloo, a person or party may request that the Minister of Environment, Conservation and Parks make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order). Part II Order Requests must be made using a Part II Order Request Form, available online at http://www.forms.ssb.gov.on.ca and search for "Part II Order Request". Requests for a Part II Order must be received by the Minister of Environment, Conservation and Parks, 777 Bay Street, 5th Floor, Toronto, ON M7A 2J3, email minister.mecp@ontario.ca, and the Director of the Environmental Assessment Branch, Ministry of the Environment, Conservation and Parks, 135 St. Clair Avenue West, 1st Floor, Toronto, Ontario, M4V 1P5, email enviropermissions@ontario.ca by Thursday, July 9, 2020. A copy of the request must also be sent to the Region and Consultant Project Managers:

Justin Armstrong, P.Eng. Senior Engineer Regional Municipality of Waterloo 150 Frederick Street, 6th Floor Kitchener, Ontario N2G 4J3 Telephone: 519-575-4757 Ext. 3164 Email: juarmstrong@regionofwaterloo.ca	Dave Weiler, P.Eng. Senior Civil Project Manager WalterFedy 675 Queen Street South, Suite 111 Kitchener, ON N2M 1A1 Telephone: 519-576-2150 Ext. 242 Email: dweiler@walterfedy.com

This Notice was first issued Tuesday, June 9, 2020.

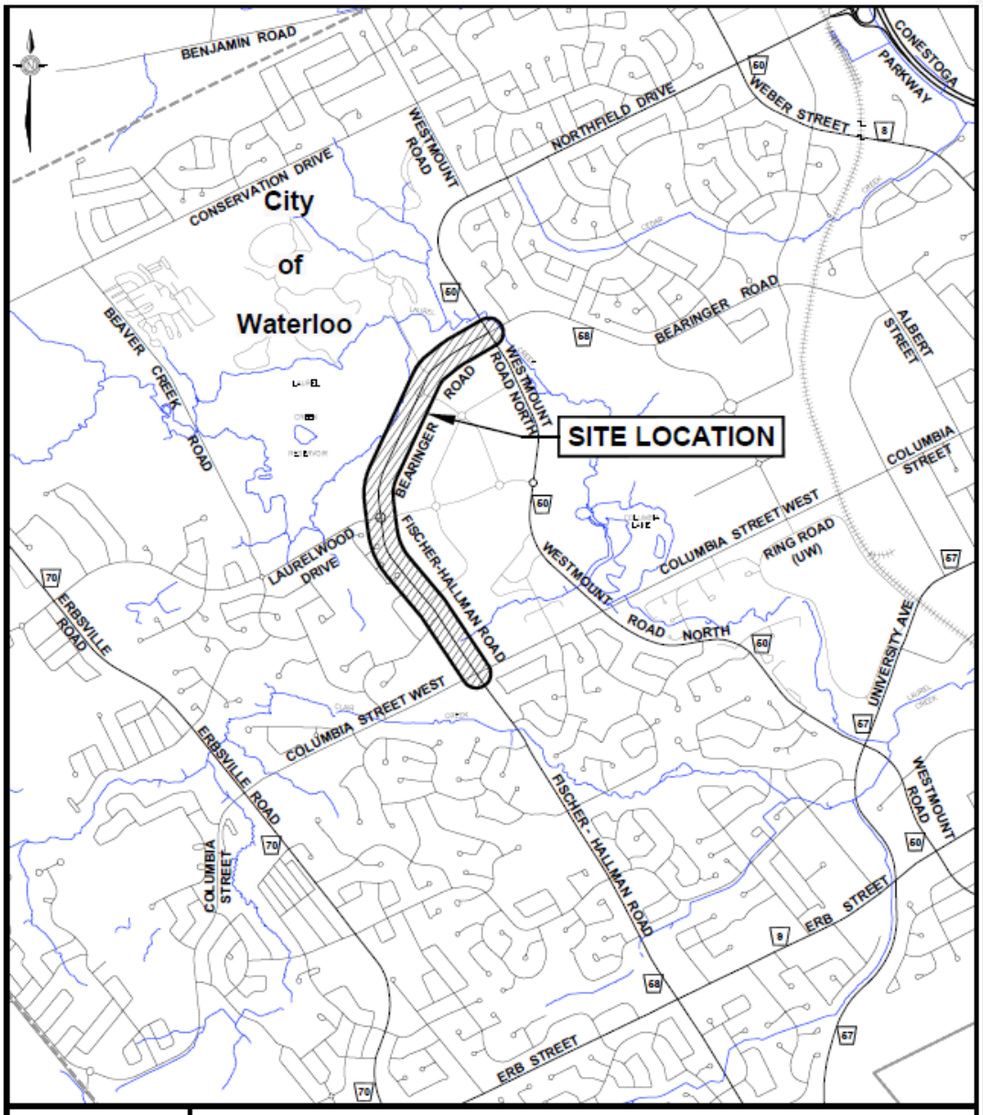
All comments and information received from individuals, stakeholder groups, and agencies regarding this project are being collected to assist the Region of Waterloo in making a decision. Under the

Commented [A1]: Terri, this is 30 calendar days from Tuesday, June 9, 2020 (below), which I've assumed as The Record publish date based on the Thursday, June 4, 2020 Ad Req to Clerks. Please correct, if needed.

Commented [A2]: See Comment above.

“Municipal Act”, personal information such as name, address, telephone number, and property location which may be included in a submission becomes part of the public record. Questions regarding the collection of this information should be referred to the person indicated above.

This notice is being provided pursuant to the Ontario Environmental Assessment Act, the Municipal Engineers Association’s Municipal Class Environmental Assessment, dated October 2000, as amended in 2007, 2011, and 2015, and the direction of the Ministry of the Environment, Conservation and Parks.



REGIONAL ROAD 58
(FISCHER-HALLMAN ROAD / BEARINGER ROAD)
COLUMBIA STREET WEST TO WESTMOUNT ROAD NORTH
CITY OF WATERLOO

APPENDIX G

Agency and Stakeholder Contact List

Organization	Contact	Title	Email	Mailing1	PostalCode	Phone	PCC 2 NOTIFICATION EMAIL
~~Region~~	~~Jane Mitchell~~	~~Regional Councillor (Waterloo)~~	~~JMitchell@regionofwaterloo.ca~~			~~519-575-4100 x3411~~	
Region	Jim Erb	Regional Councillor (Waterloo)	JErb@regionofwaterloo.ca			519-575-4404 x3411	X
~~City of Waterloo~~	~~Brian Bourke~~	~~City Councillor - Ward 2~~	~~brian.bourke@waterloo.ca~~			~~519-747-8784~~	
City of Waterloo	Royce Bodaly	City Councillor - Ward 2	royce.bodaly@waterloo.ca			519-575-0093	X
City of Waterloo	Mike Lupsa	Senior Project Engineer	mike.lupsa@waterloo.ca			519-886-2310 x30261	X
~~GRCA~~	~~Beth Brown~~		~~bbrown@grandriver.ca~~			~~519-621-2761~~	
GRCA	Trevor Heywood	Resource Planner	theywood@grandriver.ca			519-621-2763 x2292	X
UW	Rob Hunsperger (Primary)	Director, Design & Construction	rhunsperger@uwaterloo.ca			519-888-4567 x36903	X
~~UW~~	~~Harry Bakker (Secondary)~~		~~hbakker@uwaterloo.ca~~				
Region	Tabot Eneme	Engineer II, Transp. Planning	TEneme@regionofwaterloo.ca			519-575-4834	X
Region	Marcos Kroker	Head, Transp. Expansion	MKroker@regionofwaterloo.ca			519-575-4750	X
Region	Justin Armstrong	Region PM	JuArmstrong@regionofwaterloo.ca			519-575-4757 x3164	X
WalterFedy	Dave Weiler	Consultant PM	dweiler@walterfedy.com			519-576-2150	X

COMPANY/ ORGANIZATION	CONTACT	TITLE	DIVISION/ DEPARTMENT 1	ADDRESS 1	ADDRESS 2	CITY/PROVINCE	POSTAL CODE	TELEPHONE	FAX	E-MAIL / WEB SITE		PCC 2 NOTIFICATION EMAIL
FIRST NATIONS												
Haudenosaunee Confederacy Chiefs Council	Misty Hill	Office Administrator	Haudenosaunee Development Institute	16 Sunrise Court, Suite 600	P.O. Box 714	Ohsweken ON	N0A 1M0	519-445-4222	519-445-2389	hdi2@bellnet.ca.		x
Haudenosaunee Confederacy Chiefs Council	Hohahes Leroy Hill	Secretary		2634 6th Line Road, RR #2, Oshweken, ON		Ohsweken ON	N0A 1M0			~~jocke@sixnations.ca~~		x
Mississaugas of the New Credit First Nation	Fawn Sault	Consultation Manager	Department of Consultation and Accommodation	2789 Mississauga Road, RR#6, Hagersville, ON		Hagersville ON	N0A 1H0			Fawn.Sault@mncfn.ca	~~fawn.sault@newcreditfirstnation.ca~~	x
Mississaugas of the New Credit First Nation	Mark Laforme	Director	Department of Consultation and Accommodation	4065 Highway 6		Hagersville ON	N0A 1H0	905-768-4260		~~mc@mncfn.ca~~		x
Six Nations of the Grand River Territory	Ava Hill	Chief	Elected Council, Chief's Office	P.O. Box 5000	1695 Chiefswood Road	Ohsweken ON	N0A 1M0			avahill@sixnations.ca		x
Six Nations of the Grand River Territory	Lonny Bomberry	Lands & Resources Director	Land & Resources Department	P.O. Box 5000	1695 Chiefswood Road	Ohsweken ON	N0A 1M0			lonnybomberry@sixnations.ca		x
GOVERNMENT												
Department of Fisheries and Oceans Canada			Triage	867 Lakeshore Road		Burlington ON	L7S 1A1	855-852-8320		fisheriesprotection@dfo-mpo.gc.ca		x
Ministry of the Environment, Conservation and Parks	Barbara Slattery	EA/Planning Coordinator	West Central Region	119 King Street West, 12th Floor		Hamilton ON	L8P 4Y7	905-521-7640	905-521-7820	barbara.slattery@ontario.ca & eanotification.wcregion@ontario.ca		xx
Ministry of Agriculture, Food and Rural Affairs		Land Use Consultant		1 Stone Road West		Guelph ON	N1G 4Y2					
Ministry of Natural Resources		District Manager	Guelph District Office	1 Stone Road West		Guelph ON	N1G 4Y2	519-826-4955	519-826-4929			
Ministry of Tourism, Culture and Sport		Heritage Advisor	Program and Services Branch	401 Bay Street, Suite 700		Toronto ON	M7A 0A7	416-314-7120				
SCHOOL BOARDS+												
Waterloo Catholic District School Board		Manager	Planning Department	35 Weber Street West, Unit A		Kitchener ON	N2G 4G2	519-578-3660	519-569-4015			
Waterloo Region District School Board	Lauren Agar	Manager	Planning	51 Ardelt Avenue		Kitchener ON	N2C 2R5	519-570-0003		lauren_agar@wrdsb.on.ca		x
Waterloo Region District School Board	Sarah Galliher	Senior Planner	Planning Department	51 Ardelt Avenue		Kitchener ON	N2C 2R5	519-570-0003 Ext. 4439	519-576-0478	sarah_galliher@wrdsb.ca		
Student Transportation Services of Waterloo Region	Sue Carriere	Executive Assistant		540 Bingemans Centre Drive, Unit 602		Kitchener ON	N2B 3X9	519-744-7875 Ext. 221	519-744-7564	susan_carriere@stswr.ca		
Student Transportation Services of Waterloo Region	Leslie Maxwell	School Travel Planner		540 Bingemans Centre Drive, Unit 602		Kitchener ON	N2B 3X9	519-744-7575 Ext. 224		leslie_maxwell@stswr.ca		x
UTILITIES												
Allstream		Project Supervisor	OSP Network Implementation	50 Worcester Road		Etobicoke ON	M9W 5X2					
Atria Networks Inc.		Manager	Field Operations/Waterloo, Wellington, and Hamilton	301 Victoria Street South	P.O. Box 64	Kitchener ON	N2G 3W9	1-888-623-0623 Ext. 4516	519-570-2151			
Bell Canada		Coordinator, Waterloo	Access Network Provisioning	575 Riverbend Drive, 1st Floor		Kitchener ON	N2K 3S3	519-744-0212				
Rogers Cable Systems Inc.		System Planner		85 Grand Crest Place	P.O. Box 488	Kitchener ON	N2G 4A8					
Union Gas Ltd.			Distribution System Development	603 Kumpf Drive	P.O. Box 340	Waterloo ON	N2J 1K3	519-885-7513				
Waterloo-North Hydro Inc.				300 Northfield Drive East	P.O. Box 640	Waterloo ON	N2J 4A3	519-886-5090 Ext. 226				

Waterloo-North Hydro Inc.	Bryon Hartung	Supervisor - Overhead & Stations Engineering		526 Country Squire Road		Waterloo ON	N2J 4G8	519-886-5090 Ext. 5529		bhartung@wnhydro.com	x

REGION

Region of Waterloo	Kevan Marshall	TDM TravelWise, Principal Planner	Active Transportation Advisory Committee (ATAC), Staff Liaison	250 Strasburg Road		Kitchener ON		519-575-4400 Ext. 7349		Kmarshall@regionofwaterloo.ca	x

SPECIAL INTEREST

Waterloo Region Nature	Anita Smith	Conservation Director		95 Bridge Street West		Waterloo ON	N2K 1K8			thinkoutsidenbr@rogers.com	x

Location	Owner	Mailing1	Mailing2	Mailing3	CityProvince	PostalCod	Email	PCC 1 Comment No	PCC 2 NOTIFICATION EMAIL
290-292 Beaver Creek Rd	GRCA	PO BOX 729 STN GALT			CAMBRIDGE ON	N1R 5W6			
200-350 Columbia St W	UNIVERSITY OF WATERLOO	200 UNIVERSITY AVE W			WATERLOO ON	N2L 3G1			
440 Columbia St W	FCHT HOLDINGS (ONTARIO) C(	C/O FCR PROPERTY TAX DEI	4525 KINGSTON RD SUITE 2201		TORONTO ON	M1E 2P1			
450 Columbia St W	FCHT HOLDINGS (ONTARIO) C(	C/O FCR PROPERTY TAX DEI	4525 KINGSTON RD SUITE 2201		TORONTO ON	M1E 2P1			
200 Deacon Wood Pl	LIU JIAXIN	200 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
201 Deacon Wood Pl	STROBEL OLIVER	201 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
202 Deacon Wood Pl	YIP KA WUN	202 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
203 Deacon Wood Pl	CHEN LIANG	203 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
204 Deacon Wood Pl	GALLOWAY SAMANTHA	204 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
205 Deacon Wood Pl	KIM JONG WOO	205 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
206 Deacon Wood Pl	WU ZHIRUI	206 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
207 Deacon Wood Pl	POPESCU LIVIU OCTAVIAN	207 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
208 Deacon Wood Pl	GRANT LINDA FERN	208 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
209 Deacon Wood Pl	XIAO HUI	722 BROOKMILL PL			WATERLOO ON	N2V 2P1			
210 Deacon Wood Pl	BATTE DORIS EDITH	210 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
211 Deacon Wood Pl	HO PIN-HAN	211 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
212 Deacon Wood Pl	MAHMOODKHANI YAHYA	212 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
213 Deacon Wood Pl	DORS ROBERT KENNETH	213 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
214 Deacon Wood Pl	WANG WEI-YUN	214 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
215 Deacon Wood Pl Suite	COWAN FINANCIAL SERVICES	22 FREDERICK ST SUITE 300			KITCHENER ON	N2H 6M6			
217 Deacon Wood Pl	SUN JIE	217 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
219 Deacon Wood Pl	CHOUHAN SANDEEP	219 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
221 Deacon Wood Pl	LIN MIAOYU	221 DEACON WOOD PL			WATERLOO ON	N2T 2S1			
Fischer Hallman Rd	UNIVERSITY OF WATERLOO	200 UNIVERSITY AVE W			WATERLOO ON	N2L 3G1			
500 Fischer Hallman Rd	UNIVERSITY OF WATERLOO	200 UNIVERSITY AVE W			WATERLOO ON	N2L 3G1			
448 Gatestone Blvd	HORVATH-LUCID MELISSA	448 GATESTONE BLVD			WATERLOO ON	N2T 2J1			
450 Gatestone Blvd	MAHBOOB GHUFRAN	450 GATESTONE BLVD			WATERLOO ON	N2T 2J1			
Laurel Gate Dr	LAUREL VIEW HOMES INC	38 BERWICK AVE FLR 2ND			TORONTO ON	M5P 1H1			
385 Laurel Gate Dr	BREUGST ERIC ANDREW	385 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
386 Laurel Gate Dr	ALAM SHAFIQ	386 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
387 Laurel Gate Dr	WOLFE JEFFREY	387 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
388 Laurel Gate Dr	BRAUN KAREN LOUISE	388 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
389 Laurel Gate Dr	BARTH BENJAMIN	389 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
390 Laurel Gate Dr	AISSA JALAL	453 KNIGHTSBRIDGE CRT			WATERLOO ON	N2T 2G5			
391 Laurel Gate Dr	KOVACSIK ANDREW	391 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
392 Laurel Gate Dr	LI XUAN	392 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
393 Laurel Gate Dr	WANG LING	446 HAVENDALE CRES			WATERLOO ON	N2T 2T1			
394 Laurel Gate Dr	TIWANA TANVEER	394 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
395 Laurel Gate Dr	MACDONALD MARY-JO ANNE	518 LIGHTHOUSE PL			WATERLOO ON	N2K 4G7			
396 Laurel Gate Dr	ZHANG LIANGWEN	203 PINELAND CRT			WATERLOO ON	N2T 2S3			
397 Laurel Gate Dr	ZHOU JIAJUN	397 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
398 Laurel Gate Dr	CAO LI HONG	398 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
399 Laurel Gate Dr	NEDIMOVIC DRAGANA	522 BEECHWOOD DR 11			WATERLOO ON	N2T 2G9			
400 Laurel Gate Dr	LOK WAI-TING	400 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
401 Laurel Gate Dr	WAI PING MAH PATRICIA	401 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
402 Laurel Gate Dr	QIAO ZHENBANG	402 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
403 Laurel Gate Dr	JIA NING	415 OLD OAK DR			WATERLOO ON	N2T 2V5			
405 Laurel Gate Dr	MCINTYRE STEPHANIE-LYNN A	537 DUNBAR RD			WATERLOO ON	N2M 2X6			
407 Laurel Gate Dr	VOSS MICHELLE ANNE	S	407 LAUREL GATE DR		WATERLOO ON	N2T 2S6			
409 Laurel Gate Dr	IMTIAZ AHMED	409 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
411 Laurel Gate Dr	SIMPSON MARIA ELIZABETH	411 LAUREL GATE DR			WATERLOO ON	N2T 2S6			
470 Laurel Gate Dr	ZIMMERMAN LYNNE MARIE	470 LAUREL GATE DR			WATERLOO ON	N2T 2S1			

472 Laurel Gate Dr	DARLING CURTIS DANIEL	472 LAUREL GATE DR			WATERLOO ON	N2T 2S1			
474 Laurel Gate Dr	YIP KYE TUK	474 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
476 Laurel Gate Dr	LU JINGWEI	476 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
478 Laurel Gate Dr	BRADLEY WILLIAM PATRICK	478 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
480 Laurel Gate Dr	ZHOU DAWEI	480 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
482 Laurel Gate Dr	WANG KUN	509 WILLOW WOOD DR			WATERLOO ON	N2T 2S9			
484 Laurel Gate Dr	CHEN JENNIFER AMANDA	484 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
486 Laurel Gate Dr	NGUYEN MICHAEL ANH DUNG	486 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
488 Laurel Gate Dr	DENTON ROBERT JOHN	488 LAUREL GATE DR			WATERLOO ON	N2T 2R9			
490 Laurel Gate Dr	WU FAY FU XIA	34 FESTIVE PVT			OTTAWA ON	K2C 4A1			
Laurelwood Dr	UNIVERSITY OF WATERLOO	NEEDLES HALL	200 UNIVERSITY AVE W		WATERLOO ON	N2L 3G1			
218 Sandwood Pl	RAYEL MICHAEL	79 CORMACK DR			CLARENVILLE NL	A5A 1E2			
219 Sandwood Pl	YIP KA WUN	41 CATANO CRT			RICHMOND HILL (	L4S 2V4			
220 Sand Wood Pl	YANG LIN	6528 COURTLAND GROVE CRES			GREELY ON	K4P 1G6			
221 Sand Wood Pl	D H R FARMS INC	C/O DHARAM VINPAL	4206 TEMPERANCE RD	RR 3	WALLENSTEIN OI	N0B 2S0			
222 Sandwood Pl	2331016 ONTARIO INC	93 THE QUEENSWAY AVE SUITE 14			TORONTO ON	M0S 5A7			
223 Sand Wood Pl	HUANG JING	429 LAUREL GATE DR			WATERLOO ON	N2T 2S5			
224 Sand Wood Pl	STREET PATRICIO	224 SANDWOOD PL			WATERLOO ON	N2T 2S5			
225 Sandwood Pl	NEUFELDT, REINA CHRISTINE	225 SANDWOOD PL			WATERLOO ON	N2T 2S5	reina.neufeldt@gmail.com	19	X
	Kumarakulasingam, Narendran	225 Sandwood Pl	519-883-0885		Waterloo, ON	N2T 2S5	narenkum@gmail.com	22	X
226 Sandwood Pl	REITZEL HARRIET FRANCES	226 SAND WOOD PL			WATERLOO ON	N2T 2S5			
227 Sandwood Pl	CRUICKSHANK KEVIN ARTHUR	227 SAND WOOD PL			WATERLOO ON	N2T 2S5			
228 Sandwood Pl	DEAN KATHRYN ANN	228 SAND WOOD PL			WATERLOO ON	N2T 2S5			
229 Sand Wood Pl	PATRU ADRIAN CEZAR	229 SAND WOOD PL			WATERLOO ON	N2T 2S5	apatru97@gmail.com	8	X
230 Sandwood Pl	LEI YIMING	230 SANDWOOD PL			WATERLOO ON	N2T 2S5			
231 Sandwood Pl	CHAU EDWARD	231 SAND WOOD PL			WATERLOO ON	N2T 2S5			
232 Sandwood Pl	MORBEY ANTHONY J	232 SAND WOOD PL			WATERLOO ON	N2T 2S5			
233 Sandwood Pl	KIM JONG RAN	233 SANDWOOD PL			WATERLOO ON	N2T 2S5			
235 Sandwood Pl	YAN BIDE	235 SANDWOOD PL			WATERLOO ON	N2T 2S5			
180 Silver Wood Pl	BROWN EDWARD ROY	180 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
181 Silver Wood Pl	KESTLE TRACEY LEE	181 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
182 Silver Wood Pl	RAHAMAN BIBI SHAZEEDA	182 SILVERWOOD PL			WATERLOO ON	N2T 2R9			
183 Silver Wood Pl	NAHLIK DEBBIE LYNN	183 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
184 Silver Wood Pl	SMART HAZEL VERONICA	184 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
185 Silver Wood Pl	BANDURSKA KRYSTYNA	738 CEDAR BEND DR			WATERLOO ON	N2V 2R6			
186 Silver Wood Pl	IVAN ROGER	638 VIOLET ST			WATERLOO ON	N2V 2W2			
187 Silver Wood Pl	LIPPERT SUSAN MARIE	187 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
190 Silver Wood Pl	FRIM ROSE	190 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
191 Silver Wood Pl	LAND RICHARD JOHN	191 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
192 Silver Wood Pl	SHIRK JEFFREY ALLEN	192 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
193 Silver Wood Pl	CHEN BICHAO	361 HAVENDALE CRES			WATERLOO ON	N2T 2T4			
194 Silver Wood Pl	TIKKANEN NANCY ELAINE	194 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
195 Silver Wood Pl	ZHENG RONGAN	195 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
197 Silver Wood Pl	MCINTYRE DIANNE RUTH	197 SILVER WOOD PL			WATERLOO ON	N2T 2R9			
422 Timbercroft Cres	CHEN SHANGZHE	422 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
424 Timbercroft Cres	BLAIN RANDAL	424 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
426 Timbercroft Cres	TSINTARIS GEORGE MARIOS	426 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
428 Timbercroft Cres	KUCH KEVIN DONALD	428 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
430 Timbercroft Cres	QI JIA	430 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
432 Timbercroft Cres	FISHER JACOB JOHN	432 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
434 Timbercroft Cres	BRANDON, BARRETT KELLY & I	434 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1	ellen.bz10@gmail.com	17	X
436 Timbercroft Cres	ERTEL KAREN ANNE	436 TIMBERCROFT CRES			WATERLOO ON	N2T 2J1			
436 Timbercroft Cres	Scott, Nick	436 Timbercroft Cres	519-886-2625		Waterloo, ON	N2T 2J1	nickscott@rogers.com	15	X
438 Timbercroft Cres	SAVAGE, DARREN	438 TIMBERCROFT CRES	519-658-3313		WATERLOO ON	N2T 2J2	darren.savage@rogers.com	18	X
440 Timbercroft Cres	BALLANTYNE CRAIG VICTOR	440 TIMBERCROFT CRES			WATERLOO ON	N2T 2J2			

442 Timbercroft Cres	WANG YANWEI	442 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2	ywwang15@gmail.com		
444 Timbercroft Cres	EAKINS SHELLEY ANNE	444 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
446 Timbercroft Cres	BURNS NEIL GREGORY	446 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
448 Timbercroft Cres	CHAN SIU KIN	448 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
450 Timbercroft Cres	JOHNSON, SOWMYA & BRIAN	450 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2	sowmya33@gmail.com		
452 Timbercroft Cres	KOCKEN MORRIS DOMINICUS	452 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
454 Timbercroft Cres	SHU DONG	454 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
456 Timbercroft Cres	LAI YI-CHUN	456 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
458 Timbercroft Cres	LIN MINGZE	458 TIMBERCROFT CRES		WATERLOO ON	N2T 2J2			
	Doerken, Kristian					doerkenk@gmail.com		X
PM365 Inc.	George Tsintaris	PO Box 40150 Waterloo Squar	Property Management Services	Waterloo, ON	N2J 4V1	George.Tsintaris@pm365.ca		X
405 Cavendish Dr	Culp, Mark & Carolyn	405 Cavendish Dr		Waterloo, ON	N2T 2N6	mark@culp.ca	1	X
561 Grasslands Crt	Humphreys, Robert	561 Grasslands Crt	519-883-1840	Waterloo, ON	N2V 2R5	humphreys.all@sympatico.ca	2	X
590 Bearinger Rd	Wilton, Ghislaine	590 Bearinger Rd	226-581-1214	Waterloo, ON	N2L 6C4	thewiltons@outlook.com	3	X
799 Birchmount Dr	Korvemaker, Ben	799 Birchmount Dr	519-884-0436	Waterloo, ON	N2V 2R3	neb@itsa.drycold.ca	4	X
						korvemaker@gmail.com		
618 Red Pine Dr	Neugebauer, Frank	618 Red Pine Dr		Waterloo, ON	N2V 1R9	fneug@bell.net	5	X
645 Pineridge Rd	Radcliffe, Josalyn	645 Pineridge Rd	519-404-8897	Waterloo, ON	N2L 5N7	josalyn@gmail.com	6	X
527 Cairncroft Pl	Tausky, David & Jillian	527 Cairncroft Pl	519-888-0622	Waterloo, ON	N2T 2J5	datausky@gmail.com	7	X
						jtausky@gmail.com		
	Venkiteswaran, Jason					jason.venkiteswaran@gmail.co	9	X
655 Fern Rd	Pfeifle, Paula	655 Fern Rd		Waterloo, ON		paulapfeifle@gmail.com	10	X
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665 Keatswood Cres	Pfeifle, Alisa	665 Keatswood Cres		Waterloo, ON		alisapfeifle@hotmail.com		
	Turner, Susan (Susie)	("Laurelwood Neighbourhood")		Waterloo, ON		susan.janet.turner@gmail.com	11	X
57-461 Columbia St W	Henry, Brian	57-461 Columbia St W	519-885-4425	Waterloo, ON	N2T 2P5	bhenry@golden.net	12	X
17-590 Bearinger Rd	Nagel, Linda & Carl	17-590 Bearinger Rd	519-886-0662	Waterloo, ON	N2L 6C4	lsnagel@hotmail.com	13	X
						cfnagel@uwaterloo.ca	14	X
412 Lakeview Dr	McLaren, Louise	412 Lakeview Dr		Waterloo, ON		randlmclaren@sympatico.ca	16	X
591 Fern Rd	Beckberger, Trudy & Brian	591 Fern Rd		Waterloo, ON		trudybeckberger@gmail.com	20	X
516 Brookmill Cres	Dix, Kevin	516 Brookmill Cres		Waterloo, ON		jkdix@hotmail.com	21	X
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32 Academy Cres	d'Ailly, Alannah	32 Academy Cres		Waterloo, ON	N2L 5H7	alannah.dailly@gmail.com	23	X
	Slofstra, Emily	CycleWR, Chair				hello@cyclewr.ca	24	X
	Bazler, Andrea					abazler@gmail.com		X
6-461 Columbia St W	Kopes, William	6-461 Columbia St W	519-747-2706		N2T 2P5			
9-461 Columbia St W	Bradley, Davina & Peter	9-461 Columbia St W	519-573-0879	Waterloo, ON	N2T 2P5	davinad@rogers.com		
12-461 Columbia St W	Ralphs, Janet	12-461 Columbia St W	519-884-8021	Waterloo, ON	N2T 2P9	ralphsbj@gmail.com		
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491 Timbercroft Cres	Sonder, Nicolas	491 Timbercroft Cres	519-722-9598	Waterloo, ON	N2T 2J3	nicolas.sonder@outlook.com		
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552 Havelock Dr	Jedlovsky, Andy	552 Havelock Dr		Waterloo, ON		ajedlovsky@rogers.com		
265 Westcroft Pl	Kayser, H.	265 Westcroft Pl		Waterloo, ON				
304 Conservation Dr	White, Bill & Doreen	304 Conservation Dr		Waterloo, ON		bill_doreen_white@rogers.com		
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559 Springwater Dr	Rowe, Janine	559 Springwater Dr		Waterloo, ON		jandjrowe@rogers.com		
23-590 Bearinger Rd	Hergott, Derek	23-590 Bearinger Rd		Waterloo, ON		thehergotts@gmail.com		
518 Cairncroft Pl	Fomest, Barb & Brian	518 Cairncroft Pl		Waterloo, ON				
41 English Cres	Zielinski, John	41 English Cres		Plattsville, ON		avernar@gmail.com		
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617 Mountain Maple Ave	Navarre, Andres	617 Mountain Maple Ave		Waterloo, ON		andresnavarre@hotmail.com		
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11-590 Bearinger Rd	Brouwer, Kathy & John	11-590 Bearinger Rd		Waterloo, ON		kathypbrouwer@gmail.com		

440 Gatestone Blvd	Hulls, Mike	440 Gatestone Blvd		Waterloo, ON		mike@hulls.me
667 Pinerow Cres	El-rayani, Yousef	667 Pinerow Cres				usfmabruk@gmail.com
601 Bluenose Cres	Canhoto, Joe	601 Bluenose Cres				joe.canhoto@gmail.com
388 Gatestone Blvd	Cope, Claire	388 Gatestone Blvd				ccope3@netzero.net
184 Dalecroft Pl	Williams, Martin	184 Dalecroft Pl				jamwilliams@primus.ca
200 University Ave W	Fleifel, Eliana	200 University Ave W	Comm.s Coord., Sustainable Development Solutions Network (SDSN) Canada	Waterloo, ON	N2L 3G1	eliana.fleifel@uwaterloo.ca

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A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;

- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;

- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant information;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigate any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Ministry of the Environment, Conservation and Parks
Drinking Water and Environmental Compliance Division
West Central Region

119 King Street West, 12th Floor
Hamilton, Ontario L8P 4Y7
Tel.: 905 521-7640
Fax: 905 521-7820

Ministère de l'Environnement de la Protection de la nature et des Parcs
Division de la conformité en matière d'eau potable et d'environnement
Direction régionale du Centre-Ouest

119 rue King Ouest, 12e étage
Hamilton (Ontario) L8P 4Y7
Tél.: 905 521-7640
Téléc.: 905 521-7820

May 17, 2019

Mr. J. Armstrong
Region of Waterloo

Mr. S. Oliver
WalterFedy

Dear Messrs. Armstrong and Fedy:

Re: **Fischer-Hallman Road/Bearinger Road Improvements**
ColumbiaSstreet to Westmount
Region of Waterloo
MEA Class EA – Schedule "C"
Response to Notice of Commencement

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Region of Waterloo has indicated that its study is following the Schedule C process as provided by the MEA Class EA in order to determine optimal improvements to the identified road section to enable active transportation opportunities and address traffic capacity and road conditions and operations.

A map of the study area has been prepared which shows water wells, the Laurel Creek Reservoir, wetlands and a wellhead protection area in immediate proximity to Fischer-Hallman Road. It is expected that the EA study will identify and assess the impacts of any proposed construction on these features.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before the Region of Waterloo may proceed with this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of consultation to project proponents while retaining oversight of the process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under section 35 of Canada's *Constitution Act 1982*. Where the Crown's duty to consult is triggered in relation to your proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the

delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown`s preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project.

Six Nations of the Grand River Territory **1695 Chiefswood Road** **P.O. Box 5000** **Ohsweken, ON N0A 1M0**	Chief Ava Hill Tel: (519)445-2201 or avahill@sixnations.ca Email: arleenma@sixnations.ca and Lonny Bomberry, Lands and Resources Director at lonnybomberry@sixnations.ca
Haudenosaunee Confederacy Chiefs Council **2634 6th Line Road** **R.R. #2** **Ohsweken, ON N0A 1M0**	Hohahes Leroy Hill, Secretary jocko@sixnations.ca
Mississaugas of the New Credit **2789 Mississauga Road** **RR #6** **Hagersville, ON N0A 1H0**	Fawn Sault Consultation Manager Email: Fawn.Sault@newcreditfirstnation.com

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link:
https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process

Additional information related to Ontario's *Environmental Assessment Act* is available online at:
www.ontario.ca/environmentalassessments

You must contact the Director of Environmental Assessment and Permissions Branch (Director) under the following circumstances subsequent initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation has reached an impasse;
- A Part II Order request or elevation request is expected.

The Director can be notified either by email, mail or fax using the information provided below:

Email:	enviropermissions@ontario.ca Subject: Potential Duty to Consult

Fax:	416-314-8452
Address:	Environmental Assessment and Permissions Branch 135 St. Clair Avenue West, 1st Floor Toronto, ON, M4V 1P5

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role the Region of Waterloo will be asked to play should additional steps and activities be required.

As of July 1st 2018, a standardized form is to be used by anyone who believes that the environmental assessment process was incomplete, incorrect in that it failed to follow the required process. The required form can be found on the Forms Repository website (http://www.forms.ssb.gov.on.ca/) by searching "Part II Order" or "012-2206E (the form ID number). Once completed, the form is then to be sent to both the Minister and Director of the Environmental Assessment and Permissions Branch. Their addresses are:

Minister
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th floor
Toronto, ON M7A 2J3
Minister.mecp@ontario.ca

Director, Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Ave. West, 1st Floor
Toronto, ON M4V 1P5
MOECCpermissions@ontario.ca

Please send a draft copy of the Environmental Study Report (ESR) to me allowing for a minimum of 30 days for our technical review. This concludes our comments. Please continue to provide all Notices using the new email address: eanotification.wcregion@ontario.ca Should you have any questions or require clarification, please contact me either at (905) 521-7864 or at Barbara.slattery@ontario.ca

With best regards,

EA/Planning Coordinator

Encl.

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From: David Weiler
Sent: Thursday, January 30, 2020 3:43 PM
To: barbara.slattery@ontario.ca
Cc: Erin Blenkhorn; Justin Armstrong
Subject: FW: EA report review
Attachments: TA8735-2019DRAFTFischerHallmanNaturalHeritageReportAndImpactAssessment_reduced.pdf

Hello Barbara,

Re: Fischer Hallman Road/Bearinger Road, Columbia Street to Westmount Road, Waterloo
Schedule 'C' Class EA Study

Please find the attached Environmental Impact Study (EIS) prepared by LGL Limited in support of the above referenced project. As per your May 17, 2019 letter to Justin Armstrong, Region of Waterloo regarding this project, we will provide you with a copy of our draft Environmental Study Report when prepared in a few weeks. The EIS has already been provided to the Grand River Conservation Authority and we are waiting for any comments they have. LGL has suggested that the EIS also be submitted to the MECP for comment at this point, prior to our completion of the ESR.

Thank you and we would appreciate if the MECP could provide any comments on the EIS by February 21, 2020 if possible.

Dave Weiler

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, On
N2M 1A1

Office: 519-576-2150 ext. 242
Cell: 519- 496-6424

From: Erin Blenkhorn <eblenkhorn@lgl.com>
Sent: January 30, 2020 2:38 PM
To: David Weiler <dweiler@walterfedy.com>
Subject: FW: EA report review

Hi David,

I found the correct contact at MECP- see below. I have also attached a slightly revised copy of the report (there was no reference to Fischer Hallman/Bearinger Road on the title page). I am so sorry about that!

I have attached here.

I will let you follow up!

Erin

Erin Blenkhorn, B.Sc.
Aquatic Biologist/Ecologist

LGL Limited
environmental research associates
Visit us on the web at www.lgl.com

445 Thompson Drive, Unit 2
Cambridge Ontario N1T 2K7
Tel 519-622-3300 ext.25 Fax 519-622-3310

From: Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>
Sent: January 30, 2020 2:23 PM
To: Hughes, Jordan (MECP) <Jordan.Hughes@ontario.ca>; Erin Blenkhorn <eblenkhorn@lgl.com>
Subject: RE: EA report review

Thank you Jordan. Erin if you could please send a copy of this report to me – is this available in electronic format? I will have our SAR staff review the report so that I can get comments back to you. It would also be helpful if you could give me an idea of when you would like comments back by in order to be able to maintain your intended timelines.

Barb Slattery, EA/Planning Coordinator
Ministry of the Environment, Conservation and Parks
West Central Region
(905) 521-7864

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888.

From: Hughes, Jordan (MECP) <Jordan.Hughes@ontario.ca>
Sent: January 30, 2020 2:14 PM
To: eblenkhorn@lgl.com
Cc: Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>
Subject: EA report review

Hello Erin,

Please send your draft Environmental Study Report to Barb Slattery, Regional EA Coordinator for the West Central Region at the MECP.

I have copied her on this email to facilitate communication.

Kind regards,

Jordan Hughes | Project Evaluator
Environmental Assessment Services | Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation & Parks
135 St. Clair Avenue West, 1st Floor, Toronto, ON M4V 1P5
☎: 416-314-8229 / ✉: *jordan.hughes@ontario.ca*

If you have any accommodation needs or require communication supports or alternate formats, please let me know.
Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.

From: Erin Blenkhorn <eblenkhorn@lgl.com>
Sent: Thursday, January 30, 2020 2:05 PM
To: Species at Risk (MECP)
Cc: Rudzki, Kristina (MECP)
Subject: EA report review

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hello there,

We are looking for a contact to send a draft version of the following report for agency preliminary review:

Municipal Class Environmental Assessment, Schedule C
Fischer-Hallman/Bearinger Road Widening
Natural Heritage Report- Existing Conditions and Impact Assessment
Region of Waterloo

The Environmental Study Repot will be filed this winter, followed by the 30 day review period.

We were previously in contact with Dave Marriot, Planner at Guelph MNRF with regards to SAR consultation.

Thank-you in advance for your assistance.

Sincerely,

Erin Blenkhorn, B.Sc.
Aquatic Biologist/Ecologist
LGL Limited
environmental research associates

Visit us on the web at www.lgl.com

445 Thompson Drive, Unit 2
Cambridge Ontario N1T 2K7
Tel 519-622-3300 ext.25 Fax 519-622-3310

From: Shelley Forwell
Sent: Thursday, May 23, 2019 11:12 AM
To: David Weiler
Subject: FW: Fischer-Hallman Acknowledgement letter
Attachments: Fischer-Hallman Columbia to Westmount Cacklet.docx; Fischer-Hallman Columbia to Wesmount.pdf; A Proponent's Introduction to the Delegated Aspects of Consultation with....pdf

Shelley Forwell
Business Unit Leader, Civil
Kitchener
Ext. 241

From: Slattery, Barbara (MECP) <barbara.slattery@ontario.ca>
Sent: May 17, 2019 11:38 AM
To: Justin Armstrong <JuArmstrong@regionofwaterloo.ca>; Scott Oliver <soliver@walterfedy.com>
Subject: Fischer-Hallman Acknowledgement letter

With regards,

Barb Slattery, EA/Planning Coordinator
Ministry of the Environment, Conservation and Parks
West Central Region
(905) 521-7864

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From: Justin Armstrong <JuArmstrong@regionofwaterloo.ca>
Sent: Tuesday, April 30, 2019 5:55 PM
To: David Weiler
Cc: Dan Schipper
Subject: FW: Fischer-Hallman Road / Bearinger Road Improvements - Schedule C, Class EA
Attachments: DOCS_ADMIN-#2484340-v1-EA_-_NOTICE_OF_STUDY_COMMENCMENT_-_AUGUST_2017_-_....pdf; DOCS_ADMIN-#2978688-v1-EA__NOTICE_-_PCC_1_ADV__NOTICE_APR__2019_-_FISCHE....pdf

Dave,

For file, this email notification was sent to the following and no undeliverable messages were received:

- Six Nations of the Grand River – Chief Ava Hill (avahill@sixnations.ca) and Director of Land & Resources, Lonny Bomberry (lonnybomberry@sixnations.ca), and
- Mississaugas of the New Credit – Consultation Manager, Fawn Sault (Fawn.Sault@newcreditfirstnation.com).

An undeliverable message was received for the email addresses we had on file for:

- Haudenosaunee Confederacy Chiefs Council (HDCC) – Secretary, Hohahes Leroy Hill (jocko@sixnations.ca; joco@sixnations.ca; and resource@execulink.com).

As such, I've sent a message through the HDCC website requesting a current contact.

Justin Armstrong, P.Eng.
Senior Project Manager, Transportation Expansion
Design & Construction Division
Region of Waterloo
P: 519-575-4757 Ext. 3164 | F: 519-575-4430 | TTY: 519-575-4608
JuArmstrong@regionofwaterloo.ca

From: Justin Armstrong
Sent: Tuesday, April 30, 2019 5:47 PM
To: Justin Armstrong
Cc: dweiler@walterfedy.com; dan schipper (dschipper@walterfedy.com)
Subject: Fischer-Hallman Road / Bearinger Road Improvements - Schedule C, Class EA

Hello,

The Region of Waterloo is engaging in a Schedule C, Class Environmental Assessment (EA) for improvements to Fischer-Hallman Road / Bearinger Road from Columbia Street West to Westmount Road North in the City of Waterloo.

For related project information, please refer to the Region's website: https://www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_07221_InfoSheet.pdf. Also, please find attached the Notices of Study Commencement and Public Consultation Centre (PCC) 1.

In the event you have comments regarding the project, please let us know and we will ensure your comments are captured accordingly.

Justin Armstrong, P.Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street
Kitchener, ON N2G 4J3
Phone: 519-575-4757 Ext. 3164
Email: juarmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Phone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

If you require any additional information related to this project, please don't hesitate to contact us.

Best regards,

Justin Armstrong, P.Eng.
Senior Project Manager, Transportation Expansion
Design & Construction Division
Region of Waterloo
P: 519-575-4757 Ext. 3164 | F: 519-575-4430 | TTY: 519-575-4608
JuArmstrong@regionofwaterloo.ca

From:	Justin Armstrong <JuArmstrong@regionofwaterloo.ca>
Sent:	Tuesday, April 30, 2019 5:17 PM
To:	'Slattery, Barbara (MECP)'; 'eanotification.wcregion@ontario.ca'
Cc:	David Weiler; Dan Schipper
Subject:	Region of Waterloo - MEA Class EA - Fischer Hallman Road (Columbia to Westmount)
Attachments:	streamlined_ea_project_information_form_2.xlsx; 20_V1_WAT_Aug17 - Region.pdf; DOCS_ADMIN-#2497526-v1-KW_RECORD_-_AUGUST_15_2017_-_POINTER_AD_FOR_NOTICES_OF_STUDY_COMMENCEMENT.PDF; 04-25-2019 Waterloo Chronicle - Fischer-Hallman-Bearinger PCC 1 Notice.jpg; DOC043019-04302019170257.pdf

Good evening Barb,

I wanted to ensure that you have received the Notice of Study Commencement for the Fischer-Hallman Road / Bearinger Road Improvements Schedule C Class EA. The Study Limits are Fischer-Hallman Road / Bearinger Road from Columbia Street West to Westmount Road North in the City of Waterloo.

In addition to the Streamlined EA Project Information Form, attached are Notice of Study Commencement and Notice of Public Consultation Centre (PCC 1) advertisements published in the Waterloo Chronicle and Waterloo Region Record to-date. PCC 1 will be held next Tuesday, May 7, 2019.

Please be advised that notification will also be provided to the following communities – identified in your Bleams Road Improvements Schedule C Class EA Acknowledgment letter dated March 7, 2019:

- Six Nations of the Grand River – Chief Ava Hill (avahill@sixnations.ca) and Director of Land & Resources, Lonny Bomberry (lonnybomberry@sixnations.ca);
- Haudenosaunee Confederacy Chiefs Council – Secretary, Hohahes Leroy Hill (jocko@sixnations.ca); and
- Mississaugas of the New Credit – Consultation Manager, Fawn Sault (Fawn.Sault@newcreditfirstnation.com).

If you require additional information, please don't hesitate to contact me.

Best regards,

Justin Armstrong, P.Eng.
Senior Project Manager, Transportation Expansion
Design & Construction Division

Region of Waterloo
P: 519-575-4757 Ext. 3164 | F: 519-575-4430 | TTY: 519-575-4608
JuArmstrong@regionofwaterloo.ca

From: Dan Schipper [mailto:dschipper@walterfedy.com]
Sent: Friday, November 09, 2018 11:54 AM
To: eanotification.wcregion@ontario.ca
Cc: Scott Oliver; Justin Armstrong
Subject: Region of Waterloo - MEA Class EA - Fischer Hallman Road (Columbia to Westmount)

Please find attached submitted notice for streamlined environmental assessments as per the requirements.

Should you require any additional information or clarification, please do not hesitate to contact me.

Regards,

Dan Schipper, P.Eng.
Practice Lead, Municipal Development, Civil
Associate

WALTERFEDY
675 Queen St. S., Suite 111
Kitchener, ON N2M 1A1
519.576.2150 x276
800.685.1378

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APPENDIX H

Project Team Meeting Minutes

WALTERFEDY

CONFERENCE REPORT # 01

To:	Region of Waterloo 150 Frederick St., 6th Fl., Kitchener ON N2G 4J3	Project No:	2015-0772-10	Date:	September 14, 2017
		Project:	Fischer-Hallman Rd - Columbia St to Westmount Rd Reconstruction		
		Meeting Date:	September 12, 2017		
Attn:	Justin Armstrong	From:	Scott Oliver	Page:	1 of 4

Present:

Justin Armstrong (JA), Region of Waterloo
Marcos Kroker (MK), Region of Waterloo
Dan Schipper (DS), WalterFedy
Scott Oliver (SO), WalterFedy

PLEASE NOTE: If the information contained in this report does not agree with your record of the conference, or if there are any omissions, will you kindly advise us, otherwise we will assume the contents to be correct.

Action	Item	Milestone

1.1&1.2 Project Introduction and Roles/Communications

- Region's Project Manager is Justin Armstrong
- WalterFedy's Project Manager is Scott Oliver
- Dan Schipper to be the design Engineer
- Marcos Kroker shall aid JA as required
- Main point of contact will be between JA and SO
- GRCA planner for this project (point of contact) to be Kaitlyn Smith (ksmith@grandriver.ca)

1.3 Agreement

- WalterFedy has received the PO from the Region.
- Two Sections to PO (not to be combined)
    a. EA, Design and Tendering; and
    b. Contract Administration and Inspection

1.4 Project Scope

- Project to include the reconstruction of Regional Road 58 (Fischer-Hallman Road North and Bearinger Road) from Columbia Street to Westmount Road.
- Existing storm sewer to be reviewed and new storm sewer to be added as required.
- New 300-mm-diameter watermain to be added from Laurelwood Drive to Westmount Road, to be coordinated with Regional staff.

JA
- A future connection from the northern University of Waterloo (U of W) lands to Bearinger Road has been identified as possibly required. JA to contact U of W to obtain plans for future development.

JA
- Region conducting roundabout screening for all major intersections and JA to send findings for roundabout(s) and preliminary design(s) when completed.

DS
- It is anticipated that the EA will recommend the reconstruction of four lanes. Prior to the first team meeting, WalterFedy to develop the following options:
    - Do Nothing;
    - Four lanes w/ median and bike lanes (segregated);
    - Four lanes w/ median and boulevard multi-use trail (BMUT);
    - Four lanes, no median, and bike lanes (segregated); and

Action	Item	Milestone
	• Four lanes, no median, and boulevard multi-use trail (BMUT).	
	• Existing City of Waterloo owned sanitary duel forcemain is located in the right-of-way. No current plans for replacement, to be confirmed with City Staff.	
DS	• Two existing large gas mains are located within the project limits. Coordinate with Union Gas and may require daylighting during the design phase.	
JA	• JA to send any additional historic Geotechnical Reports to WalterFedy.	
JA	WF to prepare scope and coordinate for obtaining geotechnical services. WalterFedy to obtain three quotes for Geotechnical Investigation services.	
	• Initial review of the corridor it has been identified that Hydro relocates are possible and will be confirmed during design. Coordination with Waterloo North Hydro to be identified early if possible.	
JA	• Lighting design to be completed by WalterFedy. JA to confirm and send Region's lighting requirements to WalterFedy.	
JA	• Project team, with U of W, to review the possibility of utilizing the existing multi-use trail located at 250 Laurelwood Drive. Coordinate with U of W staff.	
JA	• JA to contact U of W to obtain a Project Team member from the University.	
DS/SO	• During the EA process and preliminary design, WalterFedy to determine daylight locations and coordinate having them completed.	
JA	• JA to obtain and provide, if available, any relevant plans for 450 Columbia Street West (Sobeys Plaza).	
DS/SO	• WalterFedy to review the existing drainage patterns and outline all existing storm outlets prior to the first project team meeting.	
JA	• JA to review records for existing sewer CCTV reports and provide to WalterFedy, if any.	
DS	• WalterFedy to complete a traffic impact noise assessment based on the guidelines stipulated for widening projects (increase of 5 dBA or greater than 65 dBA).	
	• Project team to review existing trail (stonedust) along Bearinger Road within the Laurelwood Conservation Area and determine if it can be integrated into the road configuration and trail system.	
	• Coordination with Ontario Hydro will be required for the existing corridor crossing Fischer Hallman Road (approximately at the Sobeys Plaza). Upon initial review, there does not appear to be conflicts with their current plants (i.e. towers, lines, etc.)	
	1.5 <u>Project Schedule</u>	
	• Schedule provided during RFP is still applicable. EA to be completed by end of 2018. Final design in 2019.	
	• Construction currently scheduled for 2020.	

Action	Item	Milestone

1.6 Region of Waterloo Supplied Information

- Region has supplied the terranet property fabric, existing plan and profile drawings, PDR, CAD standards, and titlebocks.
- JA to provide sewer CCTV reports (if available) for existing storm sewers. — JA
- JA to prepare, maintain and provide project mailing list. — JA
- Roundabout screening/Intersection control studies to be provided when completed — JA
- Forecasted traffic volumes for ultimate buildout (for Noise Study) will be included in the Region's traffic study.
- GHD's FH/Laurelwood roundabout detailed design to be provided when completed. — JA
- JA to provide the Laurelwood Drive SWM Facility background info.

1.7 Project Mailing Requirements

- JA has published the Initial Notice of Project in The Record and Waterloo Chronical newspapers.

1.8 Summary of Work Completed

- Majority of the topographical survey is completed. Columbia Street is currently under construction. Columbia Street construction to be completed prior to finalizing the topo.
- Cultural Heritage Resource Assessment: Existing Conditions & Impact Assessment has been completed by ASI.
- Stage 1 Archaeological Assessment has been completed by ASI
- Environmental works have begun and LGL has completed:
  - Reconnaissance level survey;
  - One wildlife mortality spring survey; and
  - Vegetation and wildlife community survey

1.9 Anticipated Next Steps and Timing

- Complete Base plan.
- WalterFedy to provide options and cross-sections for four lanes. Options to include with and without a centre median. Bike lanes and BMUT are to be included.
- Stage 2 Archaeological Assessment shall be scheduled
- Development of Land acquisition parcels (if required).

1.10 Other Business

- WalterFedy to confirm stationing with Malcom Lister. — DS
- The University has ownership of mostly all of the lands to the east of the project limits including the SWM pond at the intersection of Laurelwood and the parcel of land on the southwest corner of the Laurelwood intersection.
- Scope of work for our traffic consultant shall generally be a peer review.
- The Regional Transportation Master Plan should be updated by spring 2018.

Action	Item	Milestone
JA/SO	1.11 Next Meeting • The first project team meeting to be scheduled in October at WalterFedy's office. WalterFedy to arrange scheduling. Awaiting University contact from JA prior to scheduling.	

WALTERFEDY

J. Scott Oliver, P.Eng.
Civil Engineering
Associate

soliver@walterfedy.com
519.576.2150 Ext. 325
JSO/ajw

DISTRIBUTION

Justin Armstrong, Region of Waterloo	JuArmstrong@regionofwaterloo.ca
Marcos Kroker, Region of Waterloo	MKroker@regionofwaterloo.ca
Dan Schipper, WalterFedy	
Scott Oliver, WalterFedy	
File	

WALTERFEDY

MEETING MINUTES - PROJECT TEAM MEETING # 02

To:	Regional Municipality of Waterloo 150 Frederick Street Kitchener, ON N2G 4J3	Project No:	2015-0772-10	Date:	March 8, 2019
		Project:	Fischer-Hallman Rd. and Bearinger Road Improvements (Columbia St. to Westmount Rd.) Schedule C Environmental Assessment (EA)		
		Meeting Date:	February 26, 2019		
Attn:	Justin Armstrong, P. Eng.	From:	Dan Schipper	Page:	1 of 4

Present:

Jim Erb - Regional Councillor (Waterloo)
Royce Bodaly - City of Waterloo Councillor (Ward 2)
Justin Armstrong - Region of Waterloo (RMW)
Marcos Kroker - Region of Waterloo (RMW)
Tabot Eneme - Region of Waterloo (RMW)
Mike Lupsa - City of Waterloo (CW)
Dan Schipper – WalterFedy (WF)
Scott Oliver – WalterFedy (WF)
Julia Salvini - Salvini Consulting (SC)
Richard Turner - GSP
Sowel Kang - LGL (Teleconference)
Rob Hunsperger - University Waterloo (UW)

PLEASE NOTE: If the information contained in this report does not agree with your record of the conference, or if there are any omissions, will you kindly advise us, otherwise we will assume the contents to be correct.

Action	Item		Milestone
Info	2.1.0	Completed introductions of the Project Team members and welcomed Regional Councillor Jim Erb and City of Waterloo Councillor Royce Bodaly to the Project Team as municipal council representatives.	
Info	2.2.0	The Region (Justin) outlined the project team mandate and explained the Environmental Assessment (EA) process for this project.	
Info	2.3.0	WF (Dan) provided project limits and scope. Project is 2.13 km in length and will include the improvement (road widening) of Regional Road 58 (Fischer-Hallman (FH) Road and Bearinger Road) from Columbia Street to Westmount Road. A new 300-mm-diameter Regional watermain is to be added from Laurelwood Drive to Westmount Road.	
Info	2.4.0	The project team provided a summary of work completed to date, with a number of highlights as follows: • The Region and their Consultant (CIMA+) have completed Intersection Control Studies (ICS) for each of the Fischer-Hallman/Columbia, Fischer-Hallman/Laurelwood, and Bearinger/Westmount intersections. These ICSs recommended signalized intersections for the 2031 horizon and were endorsed by the Region's Roundabout Coordinating Committee (RCC) on June 26, 2018. • The Region of Waterloo Traffic Impact Study (TIS) is nearing completion and requires a few updates based on discussions during this meeting. Tabot indicated that a copy should be available shortly (Spring 2019). • The Region (Tabot) outlined a number of intersection improvements that will be evaluated as part of the study, which will be specified within the completed TIS. • Councillor Bodaly informed the group that a traffic count and study has been completed for Gatestone Blvd. and the findings are to be presented to Waterloo Council next month (March 2019). Once the report is presented, data will be available for circulation to the Project Team. • The University of Waterloo (Rob) identified that future development of the University of Waterloo (UW) lands to the east, particularly Phase 2 north of Laurelwood Dr., of the project are in various states of planning. The lands south of Laurelwood Dr. are currently under development with a proposed "Street A" connection to Fischer-Hallman Road. The lands	
Mike			

north of Laurelwood Dr. are not in the current planning forecast (>20 years), but will have a future “Street C” connection to Bearinger Road. UW (Rob) identified that these two future connections are planned as right-in/right-out (RIRO) movements and will be private access/streets and not public right-of-way.

- The City of Waterloo (Mike) identified the concept of placing a multi-use trail (MUT) on the west side of Fischer-Hallman (between Columbia St. and Laurelwood Dr.) to replace the existing sidewalk. This would allow for off-street cycle facilities to be located on both sides of the project corridor, which would be completed through the proposed MUT on the east side and the existing MUT through the Laurel Creek Conservation Lands. City and GRCA staff confirmed through correspondence between November 2017 and February 2018 that both are agreeable to public use of the trail including paving in order for the City to maintain it. The Region (Marcos) identified that the cost of a new MUT (between Columbia and Laurelwood) and formalizing (i.e. paving) the existing Laurel Creek Conservation Area trail would be paid by the City of Waterloo. The City of Waterloo (Mike) to review internally with City Staff and determine feasibility. Region, City, and GRCA staff to meet.

Mike
RMW/CW/
GRCA

- The University of Waterloo (Rob) identified that the existing MUT located on the land northeast of the intersection of Laurelwood and Fischer-Hallman could be utilized as part of the proposed MUT along the eastern side and provide connectivity to the University lands. The Region (Marcos) identified that a maintenance easement would have to be placed over the MUT to allow for maintenance by Regional operations.
- Natural environment constraint mapping has been completed (LGL) for the project limits and a report is currently being prepared and will be available shortly (Spring/Summer 2019).

LGL

- A vegetation and vegetation communities field survey was conducted in 2017 (LGL).
- Fisheries habitat is limited to Laurel Creek and the small pond. Laurel Creek’s thermal regime is **warmwater**.
- Arborist surveys have been completed which have focused on trees located on the Fischer-Hallman Road section and the eastern limits of the Study Area at Bearinger Road and Westmount Road. LGL has not completed surveys in the southern end of the project limits or along a very densely wooded section on the northern side of Bearinger Road. LGL noted that it appears that the City of Waterloo has been taking down some dying trees along Bearinger Road (eastern side) and would expect removals of the large trees present on the western side (mostly dying ash). As such, re-inventory may be required.

TBD

- Wildlife mortality surveys have been completed over two years (2017/18) during turtle nesting periods. It does not appear to be a hotspot. Fairly sparse mortalities of herpetofauna (reptiles/amphibians of a particular habitat). One dead Snapping Turtle (juvenile) in the Fall of 2017 and one dead Painted Turtle in June 2018 (in the proximity of the reservoir).
- Blanding’s Turtle nesting surveys were completed along potential nesting habitat areas (i.e. exposed open fields, road shoulder, limestone trail, in areas exposed to sun) on four occasions in June 2018. No nesting was observed along or in the road corridor. Generally speaking, the shoulder is very narrow in most areas, and hard packed, and there are no embankment slopes (flat grade), that the animals tend to prefer. No evidence of nesting along the trail sections, because the trail is hardpacked from travel, as it is frequently used by cyclists and pedestrians. There is turtle nesting occurring along the slopes of a road leading to the reservoir dam. Turtle species could not be confirmed, but

there was evidence of 50 ‘excavations’ that were predated. As such, this area is a nesting hotspot.

- An early basking survey was also conducted in 2018, which confirmed Snapping Turtle and Painted Turtle are resident species of the small pond (OAO) located in the northwestern corner of the Westmount Road and Bearinger Road intersection.
- The tree species “Butternut” was not identified, but will be reconfirmed.

LGL

- A question was asked about Monitoring Station 3 and what findings were identified and based on the constraints mapping – an amphibian survey was completed and no frogs were observed.

Info

2.5.0 WF displayed and explained the cross-sections of the five alternatives for review, which include the following:

1 - Do nothing (no cross-section prepared);
2 - Four lanes, no median, bike lanes (separated cycle track), and sidewalk;
3 - Four lanes, no median, MUT (east), and sidewalk (west);
4 - Four lanes with median, bike lanes (separated cycle track), and sidewalk;
5 - Four lanes with median, MUT (east) and sidewalk (west).

Project Team

2.6.0 WF circulated a copy of the preliminary Alternative Solutions Evaluation Matrix to the Project Team. The evaluation criteria include Natural Environment, Social/Cultural Environment, Transportation, and Cost. It was noted that the factors identified in the evaluation matrix are not weighted as each factor carries the same weight. An updated matrix will be distributed to Project Team members for review in advance of the next meeting.

Info

2.7.0 Project Schedule:

- Prepare for Public Consultation Centre (PCC) #1, including information package and display boards (March 2019).
- Conduct PCC #1 (May 2019). YMCA is a possible location..
- Project Team Meeting #3 (June/July 2019).
- Conduct PCC #2 (Summer/Fall 2019).
- (Tentative) Team Meeting #4 (Fall/Winter 2019).
- Complete EA by end of 2019.
- Detailed Design in 2020 with Utility Relocation/s and Property Acquisition to follow.
- Construction in 2021.

2.8.0 A couple of items were addressed under other business, which include:

- Councillor Bodaly (Royce) informed the group that a three podium, five tower high-rise development is scheduled for construction on Columbia Street (between the existing commercial plaza and the fire hall). He identified this development as highly contentious for the surrounding residents. He also asked if this development has been integrated into the traffic planning of the TIS. The Region (Tabot) identified that the development had been included, but inquired if a traffic study had been completed for the development as part of the site plan process. It was unknown if a traffic study had been completed and the City of Waterloo (Mike), Councillor Bodaly, and WF will confirm.

Mike/Royce /WF

Info

- Councillor Bodaly (Royce) informed the group that there are a well-organized community groups potentially impacted by the project scope and that the Project Team should be prepared for good attendance at each PCC.

2.9.0 The next Project Team meeting (#3) will be held following PCC #1. Approximate date: June 2019.

WALTERFEDY

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Associate

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DISTRIBUTION

All present;
Erin Blenkhorn - LGL
Christian Tinney – GRCA

WALTERFEDY

MEETING MINUTES - PROJECT TEAM MEETING # 3

Project No: 2015-0772-10 0722

Description: Fischer-Hallman Rd and Bearinger Road Improvements, Columbia Street to Westmount Road

Meeting Date: September 5, 2019

Location: WalterFedy Office, Conestoga Room

Present:

Jim Erb - Regional Councillor (JE)
Royce Bodaly – City of Waterloo Councillor (RB)
Justin Armstrong – Region of Waterloo (JA)
Marcos Kroker – Region of Waterloo (MK)
Dan Schipper – WalterFedy (DS)
Tabot Eneme – Region of Waterloo (TE)
Mike Lupsa – City of Waterloo (ML)
Dave Weiler – WalterFedy (DW)

PLEASE NOTE: If the information contained in this report does not agree with your record of the conference, or if there are any omissions, will you kindly advise us, otherwise we will assume the contents to be correct.

Item No.	Item	Action
1.	Introductions/Review · DW introduced himself as WalterFedy's new Project Manager for this project due to Scott Oliver's retirement · DW presented a PowerPoint slideshow reviewing work completed to date. A copy of the presentation is attached to these Minutes.	Info.
2.	Discussion During the presentation, discussions ensued around a number of questions/comments from team members as noted below: · ML confirmed that the City of Waterloo currently has no approved budget for the City's share of the project costs, including new turn lanes on City Roads, storm sewers or boulevard trails. DS to provide the City with cost estimates for the City's share.	DS

- Discussion ensued around environmental impacts associated with the construction. The following items were discussed: INFO

    - Ø The Environmental Impact Study is not yet fully complete, but it will include recommendations for wildlife fencing at the Laurel Creek Conservation Lands, tree protection, and stormwater management. Details will be developed during the design stage of the project in consultation with the Grand River Conservation Authority. INFO
    - Ø It was noted that the design alternatives were developed by implementing a significant 'shift' of the roadway to the south to minimize impacts to roadway trees on the north side of Bearinger Road.
    - Ø As DW reviewed the Noise Study results, the following discussion took place:
        - § DS confirmed that the Noise Study accounts for the existing noise wall that are in place today.
        - § RB asked if the Noise Study could be reviewed in future years (ie 5 years) if development takes place sooner than anticipated. JA/MK responded indicating that the Noise Study could be reviewed in 5 years' time under Part 'B' of the Noise Policy. JA noted that under Part 'C" of the Noise Policy, the abutting residents could approach Council to construct a noise wall on a cost-shared basis between the residents and the Region subject to certain conditions being satisfied DS
        - § It was noted that any noise wall would need to reduce noise levels by at least 5 dBA.
        - § It was noted that the 2031 traffic forecast has recently been reduced as it is now expected that the north U of W Campus will not see development activity for 20 years. Therefore, the forecast Noise levels in abutting outdoor areas will be lower than the current Noise Study projections INFO

    - Ø As the design alternatives were reviewed, RB asked about potentially reducing or eliminating the median east of Laurelwood Drive to reduce tree impacts. It was noted that with the shifting of the road to south, most tree impacts were reduced, even with a INFO

median. Additionally, the median already narrows by design approaching Westmount Road to accommodate the dual left-turn lane

- Ø JE asked about the earlier decision to recommend traffic control signals rather than roundabouts. MK summarized the process used and results for the prior studies which found that traffic signals were preferred over roundabouts along this section of Fischer Hallman Road. One of the main factors in this determination was that there is no history of frequent or serious collisions along this stretch of Fischer Hallman Road.

- Ø JE asked about the rationale for extending the watermain east of Bearinger Road. JA explained that the watermain requires extension to connect to an existing main near the Beaver Creek Co-op due to pressure zone changes and redundancy in the system. The watermain will be constructed and funded by the Region and then turned over to the City of Waterloo.

- Ø As the 5 design alternatives were reviewed by the group, there was agreement amongst members that Design Alternative 5a, which includes a 5-metre-wide raised centre median and asphalt boulevard multi-use trails on each side of the road would be the preferred option to present to the public at the next public meeting.

3. Next Steps

- The second Public Consultation Centre (PCC) will tentatively be held on Thursday October 24th from 5:00 to 8:00 pm in the same room as the first PCC (Waterloo Public Library room)
- Regional Committee/Council approval is anticipated in January 2020
- The Environmental Study Report is planned to be filed in February 2020
- Construction is tentatively scheduled for 2021 and 2022.

WALTERFEDY

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DW/

Distribution: all present, John Holowackyj

FISCHER HALLMAN ROAD IMPROVEMENTS

COLUMBIA STREET TO WESTMOUNT ROAD, WATERLOO

PROJECTTEAMMEETINGNO.3September5,2019

WALTERFEDY

PURPOSE OF **THIS PROJECT**

- Replace the pavement structure
- Increase traffic capacity by adding new travel lanes and turn lanes at intersections
- Provide dedicated cycling and pedestrian facilities
- Provide new Regional watermain from Laurelwood Drive to east of Westmount Road
- Urbanize the roadway with new curbs and storm sewers
- Upgrade existing traffic control signals
- Construct new bus stop landings and pads for Grand River Transit
- Improve roadway geometrics where feasible
- Mitigate any adverse environmental impacts

PROJECT **DIRECTION**

PROJECT **FUNDING**

	SOURCE	BUDGET	YEARS	DETAILS
Region of Waterloo	sportation Capital Program	$18.8 Million	2020-2024	• Urbanization and widening • Cycling and destrian facilities • Intersection improvements • Utility relocations • Storm sewers • Landscaping
Region of Waterloo	Water Services Budget	$1.8 Million	2021-2023	• Regional watermain
City of Waterloo	Capital Program	??	??	• Intersection improvements • Storm sewers • Boulevard Trail

- A ‘Project Team’ has been established to guide the project through the planning and design phases.
- The project Team is responsible, “To guide and direct transportation capital projects by making sound project recommendations that balance technical, environmental, and social needs, and meet the expectations and requirements of the public, Region Council, and approving authorities.”

- Councillor Royce Bodaly, City of Waterloo Ward 2
- Councillor Jim Erb, Region of Waterloo
- Justin Armstrong, Senior Project Manager, Region of Waterloo
- Marcos Kroker, Head, Transportation Expansion Program, Region of Waterloo
- Tabot Eneme, Transportation Planner, Region of Waterloo

- John Holowackyj, Water Services, Region of Waterloo
- Mike Lupsa, Design & Construction Project Manager, City of Waterloo
- Dave Weiler, Project Manager, WalterFedy
- Dan Schipper, Project Engineer, WalterFedy

Work completed to date includes:

- Notice of Study Commencement published o Technical agencies contacted o Stage 1 Archeological Assessment o Cultural Heritage Resource Assessment o Environmental Impact Study
- Traffic Study (including Intersection Control Studies for roundabouts) o Noise Study
- Topographical Survey and Base Plan Preparation o Development of 5 design alternatives o Public Consultation Centre May 7, 2019 o Preliminary Evaluation of design alternatives

- **Archeological** - Stage 2 investigation required at a small number of locations generally on the north side between Laurelwood Drive and Westmount Road

- **Cultural Heritage** - No heritage properties (designated or listed) or other culturally significant features within the project limits

- **Environmental Impact Study**

- Tree Protection measures recommended during construction
- Wildlife fencing recommended to prevent turtles from crossing the road
- Sediment and Erosion Control measures

RESULTS OF **STUDIES/INVESTIGATIONS**

COMPLETED

Noise Study (Preliminary)

Receiver Location ID	Noise Impact 2019 (Day)	Noise Impact 2031 (Day)	Diff. (dBA)	Noise Impact 2019 (Night)	Noise Impact 2031 (Night)	Diff. (dBA)
450 Gatestone Blvd.	61.0	62.4	+1.4	54.8	56.2	+1.4
426 Timbercroft Cr.	59.9	61.35	+1.45	53.2	54.6	+1.4
450 Timbercroft Cres.	59.35	60.8	+1.45	52.7	54.1	+1.4
385 Laurel Gate Dr.	62.2	63.6	+1.4	55.9	57.3	+1.4
386 Laurel Gate Dr.	62.2	63.6	+1.4	55.9	57.3	+1.4
219 Sandwood Pl.	63.1	64.6	+1.5	56.0	57.4	+1.4
218 Sandwood Pl.	63.1	64.6	+1.5	56.0	57.4	+1.4
201 Deacon Wood Pl.	62.4	63.8	+1.4	56.1	57.5	+1.4
204 Deacon Wood Pl.	57.8	59.25	+1.45	51.8	53.2	+1.4

RESULTS OF **STUDIES/INVESTIGATIONS**
COMPLETED

Traffic Study Recommendations

Intersection	Recommended Improvements
Bearinger Road & Westmount Road North	Provide a dual eastbound left-turn lane on Bearinger Road (single or separate phase?) Provide a shared lane for eastbound through and eastbound right movements along Bearinger Road Extend storage lengths along the southbound left-turn and southbound right-turn lanes on Westmount Rd from 70 m to 95 m and from 70 m to 125 m respectively

Fischer-Hallman Road/Bearinger Road & Laurelwood Drive	Provide a dedicated eastbound right-turn lane on Laurelwood Drive with a 15 to 20 m storage (City of Waterloo cost)
Fischer-Hallman Road & Columbia Street West*	Provide a dedicated westbound right-turn lane with 30 m storage on Columbia Street West (City of Waterloo cost)

PRELIMINARY DESIGN **ALTERNATIVES**

Five design alternatives were developed:

1 - Do Nothing – reconstruct the road in its current 2-lane configuration

2 - Widen the Road to 4-lanes (Undivided) and Add Separated Cycle Tracks and Sidewalk

- Ø Includes 1.7 metre wide on-road, separated cycle tracks along both sides and 1.8 metre wide pedestrian sidewalks along both sides.

3 - Widen the Road to 4-lanes (Undivided) and Add Multi-Use Trail and Sidewalk

- Ø Includes 3.0 – 4.0 metre wide multi-use trail along one side and 1.8 metre wide pedestrian sidewalk along one s

4 - Widen the Road to 4-lanes and Add Median, Separated Cycle Tracks, and Sidewalk

- Ø Includes 5.0 metre wide median, 1.7 metre wide on-road, separated cycle tracks along both sides and 1.8 metre wide pedestrian sidewalks along both sides.

5 - Widen the Road to 4-lanes and Add Median, Multi-Use Trail, and Sidewalk

- Ø Includes 5.0 metre wide median, 3.0 – 4.0 metre wide multi-use trail along one side, and 1.8 metre wide pedestrian sidewalk along one side.

MAY 7, 2019 **PUBLIC**

Public Consultation Centre (PCC) No. 1

Held: Tuesday, May 7, 2019 from 5:00 p.m. to 8:00 p.m.
Waterloo Public Library – John M. Harper Branch,
Community Room
500 Fischer-Hallman Road

Attendance: Approximately 57 people attended the PCC and 37 people formally signed in

- 8 Comment Sheets were received at the PCC
- An additional 16 comment sheets/e-mails were received following the PCC
- Comments were varied with no strong themes arising

	Number of Comments
Support for widening to 4 lanes (any option)	8
Preference forMulti-UseTrails	5
Request for Noise Barriers	4
Do not include a raised Centre Median	4
Do not widen the Road to 4lanes	3
e the existing Doreen Thomas Trail in place	3
rence for Dedicated Cycling Tracks	2
eed for sidewalks/paths on both sides	2
ot provide streetlighting on the Road	2

Group Review of Draft Project Team Responses

Group Discussion to Identify Preferred Design Alternative

- Public Consultation Centre No. 2 – October 24th?
- Regional Committee/Council Approval – January 2020

NEXT STEPS

- Environmental Study Report –February 2020
- Additional Studies (Geotechnical, Archeological Stage 2)
- Detailed Design
- Construction (2021/2022) – staging to be confirmed

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WALTERFEDY

MEETING MINUTES - PROJECT TEAM MEETING # 4

Project No: 2015-0772-10 0722

Description: Fischer-Hallman Rd and Bearinger Road Improvements, Columbia Street to Westmount Road, Waterloo

Meeting Date: December 12, 2019

Location: WalterFedy Office, Speed River Room

Present:

Jim Erb - Regional Councillor (JE)
Royce Bodaly – City of Waterloo Councillor (RB)
Justin Armstrong – Region of Waterloo (JA)
Marcos Kroker – Region of Waterloo (MK)
Dan Schipper – WalterFedy (DS)
Tabot Eneme – Region of Waterloo (TE)
Mike Lupsa – City of Waterloo (ML)
Dave Weiler – WalterFedy (DW)

PLEASE NOTE: If the information contained in this report does not agree with your record of the conference, or if there are any omissions, will you kindly advise us, otherwise we will assume the contents to be correct.

Item No.	Item	Action
1.	**PCC No. 2 November 4, 2019** • An estimated 50 residents attended and 45 residents formally signed-in • 8 written comments sheets were received. The main themes raised in the written comments related to: o protecting the Doreen Thomas Trail and the Laurel Creek Conservation Area o preserving and enhancing roadway trees/landscaping o request for new traffic signals at 460/461 Columbia Street o concern about additional traffic from the proposed development at 460 Columbia Street o concern about difficulty making turning movements from Gatestone Boulevard to Fischer Hallman Road	INFO
2.	**Discussion** The Project Team (PT) reviewed the public comments received and the draft Project Team responses to these comments.	

The following key points were discussed:

- The PT consensus was that overall there was a high level of public support for the proposed improvements and the Project Team's Preferred Design Alternative 5a. (4 travel lanes, boulevard multi-use trails on each side of the roadway and a 5 metre wide raised centre median) INFO
- The public request for traffic signals at 460/461 Columbia Street is outside of the scope of this Class EA Study; however, this request has been forwarded to the appropriate City staff for review
- The detailed design of Fischer Hallman Road will address key issues including tree protection, enhanced landscaping, stormwater management and wildlife protection measures such as exclusion fencing
- Based on the traffic study completed for this project, no changes are warranted or proposed to the intersection of Gatestone Boulevard and Fischer Hallman Road as part of this project. It was noted that the intersection could be re-evaluated after the widening of Fischer Hallman Road is complete to review the need for traffic signals or new turn lanes
- It was noted that some area residents whose properties back onto Fischer Hallman Road may pursue noise barriers through Part 'C' of the Region's Noise Policy (cost of noise wall shared equally between Region and abutting property owners)
- The City of Waterloo has jurisdiction over Columbia Street, Gatestone Boulevard and Laurelwood Drive. City staff have confirmed that they do not wish to include any new turn lanes on these streets as part of this project.
- The PT unanimously supported Design Alternative 5a as the Recommended Design Alternative for the project.

3.0 **Next Steps** INFO

- JA will be presenting the project to the Region's ATAC Committee on December 17th
- The project approval report is tentatively scheduled to go the Region's Planning and Works Committee on February 11th, and to Regional Council on February 18th, 2020.

- Subject to Regional Council approval, the Notice of Completion will be filed once the Environmental Study Report (ESR) is completed
- The ESR will be placed on the public record for a 30-day period during which time any member of the public may request a Part II Order or 'Bump-Up'
- Detailed design will commence in 2020
- Construction is now scheduled for 2023 and 2024 in the Region's draft 2020 Transportation Capital Program

Minutes prepared by D. Weiler. Please bring any errors or omissions to his attention.

WALTERFEDY

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Distribution: all present, John Holowackyj

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APPENDIX I

Public Consultation Centre Information Packages

Region of Waterloo

Fischer-Hallman Road/Bearinger Road Improvements from Columbia Street West to Westmount Road North City of Waterloo Public Consultation Centre #1 Information Package

What: The Region of Waterloo is undertaking a Municipal Class Environmental Assessment (EA) of Fischer-Hallman/Bearinger Road to determine improvements for the corridor.

Where: Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North in the City of Waterloo.

Why: To provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

When: 2021 Construction (2019 Region Transportation Capital Program).

Who: Region of Waterloo Project Manager

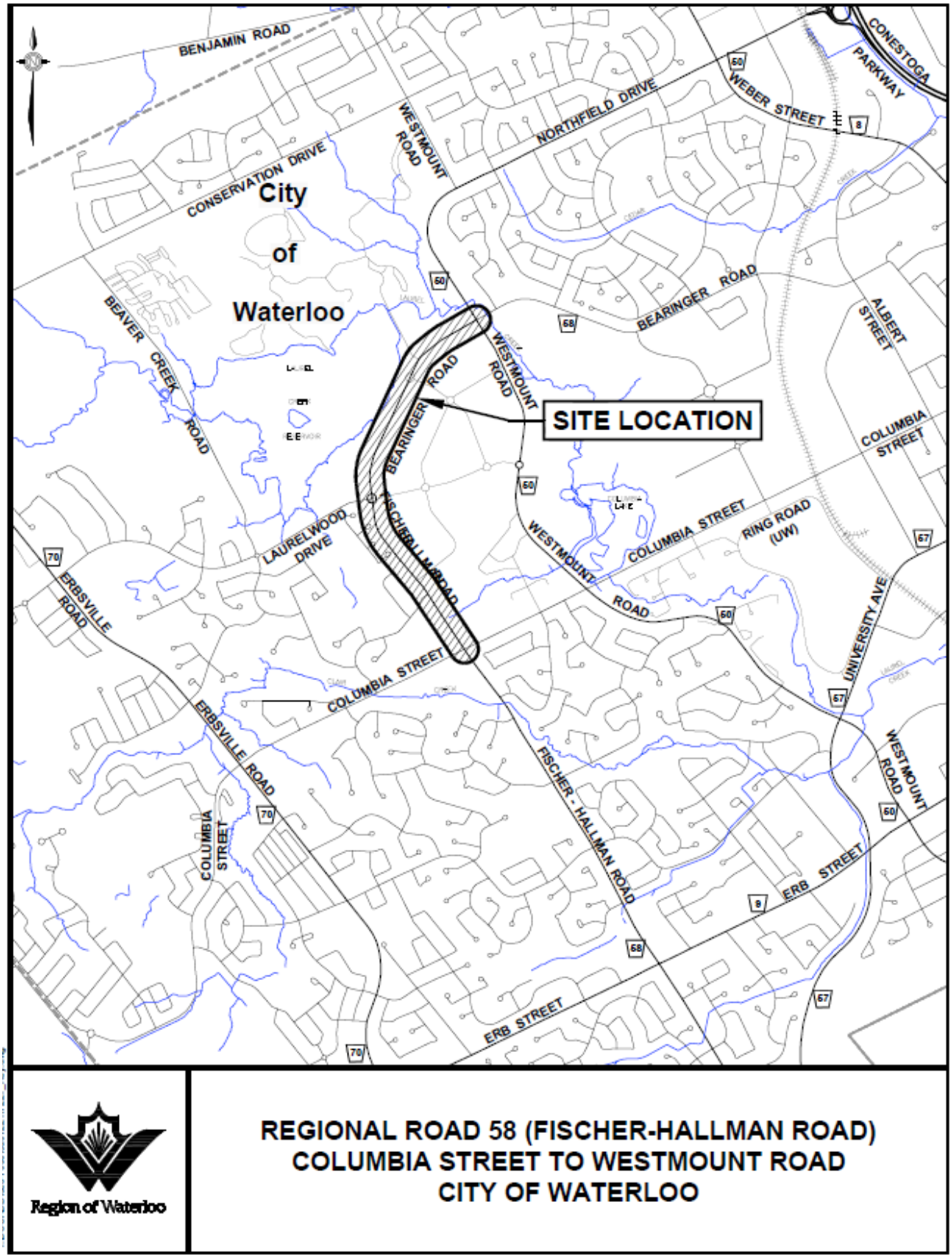
Justin Armstrong, P. Eng.
Region of Waterloo
Phone: (519) 575-4757 Ext. 3164
Email: JuArmstrong@regionofwaterloo.ca

Public Consultation Centre #1
Tuesday, May 7, 2019 from 5:00 p.m. to 8:00 p.m.
Waterloo Public Library – John M. Harper Branch, Community Room
500 Fischer-Hallman Road
Waterloo, Ontario

There is a comment sheet at the back of this package. Please fill it out and share your comments with us.

Document Number: 2910212

KEY PLAN



Document Number: 2910212

1. Why is the Region considering this project?

The 2018 Regional Transportation Master Plan Update has identified this section of Fischer-Hallman Road/Bearinger Road for widening from 2 to 4 lanes to provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

2. Who is directing this project?

The planning and design for this project is being directed by staff from the Region of Waterloo and City of Waterloo, along with Region of Waterloo (Waterloo) Councillor Jim Erb and City of Waterloo (Ward 2) Councillor Royce Bodaly. Staff from the Grand River Conservation Authority (GRCA), as well as the University of Waterloo (UW) are also included on the Project Team. The consulting engineering firm WalterFedy has been retained by the Region of Waterloo to provide planning and preliminary design services during the study phase of this project, as well as detailed design, contract administration, and inspection services through the construction phase.

3. How is this project being planned?

This project is being planned in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) process. The Municipal Class EA process is a planning and decision-making process approved under the Environmental Assessment Act that is used by municipalities to plan public infrastructure projects in order that potential environmental impacts are considered before a project is approved. It requires consultation with the public, involved stakeholders, and agencies in consideration of alternatives and their potential impacts on the project environment.

This project is being planned as a Schedule ‘C’ Class EA project which applies to larger, more complex projects with the potential for significant environmental impacts (natural, social, cultural and economic) and requires multiple opportunities for public input.

This project is in the early phase of the Class EA process and this initial Public Consultation Centre is being held for members of the public to become aware of the project and to provide input into the project for further development of alternatives and their environmental impacts.

4. What is the purpose of this Public Consultation Centre?

The purpose of this Public Consultation Centre is to have interested groups and individuals learn about and provide input on:

a) The needs and opportunities for improvements on Fischer-Hallman/Bearinger Road;

b) The project environment (natural, social, cultural/heritage, and economic);

c) The alternative solutions for improvements being considered by the Project Team;

d) How the alternative solutions for improvements will be evaluated and how a preferred alternative will be identified; and

e) Future public input opportunities planned.

Region and project consultant staff are available at this Public Consultation Centre to answer any questions you may have. We request that you fill out the Comment Sheet attached to the back of this Information Package and either put it in the Comment Box at the Public Consultation Centre or send it to the address noted on the Comment Sheet. Your comments will be considered by the Project Team in conjunction with all other relevant information in recommending a preferred alternative for this project.

5. Are active transportation upgrades or road widening being considered?

Yes, both active transportation upgrades and road widening are being considered in accordance with the following Regional master plans and guidelines.

The adjacent sections of Fischer-Hallman Road to the south and Westmount Road to the north have sidewalks and on-road bike lanes, with a multi-use trail on the east side of Westmount Road to the south and on the south side of Bearinger Road to the east.

The 2018 Regional Transportation Master Plan Update has identified the need to widen Fischer-Hallman/Bearinger Road to 4-lanes and add active transportation improvements for pedestrians, cyclists, and transit between Columbia Street West and Westmount Road North.

The Context Sensitive Regional Transportation Corridor Design Guidelines (CDG) is a planning policy document that guides the design of Regional roads. The CDG identifies design parameters for necessary features within the road allowance such as vehicle lanes, cycling facilities, sidewalks, and boulevards. In accordance with the CDG, Fischer-Hallman/Bearinger Road is identified as a “Neighbourhood Connector – Avenue”. Designing Fischer-Hallman/Bearinger Road to support active transportation modes, including walking and cycling, is a fundamental character of this road classification.

Transit (GRT) routes are planned for the future and will also be considered in this study.

The Regional Transportation Master Plan and Corridor Design Guidelines all support complete and continuous active transportation facilities on this section of Fischer-Hallman/Bearinger Road for the full length of this project. Boulevard multi-use trails or sidewalks and cycle tracks on both sides of the road would satisfy that requirement.

6. What alternatives are being considered for this project?

The alternative solutions for improvements currently being considered by the Project Team are listed below and are included in Appendix A:

1) **Do Nothing** – this alternative would include reconstructing the road in its current 2-lane configuration:

   - Fischer-Hallman Road from Columbia Street West to Laurelwood Drive
     - Semi-Urban (sidewalk and curb and gutter on the west side)
   - Bearinger Road from Laurelwood Drive to Westmount Road North
     - Rural (ditch drainage)

2) **Widen the Road to 4-lanes and Add Separated Cycle Tracks and Sidewalk** – this alternative would widen this section of Fischer-Hallman/Bearinger Road to 4-lanes (undivided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 1.7 metre wide on-road, separated cycle tracks along both sides; and
   - 1.8 metre wide pedestrian sidewalks along both sides.

3) **Widen the Road to 4-lanes and Add Multi-Use Trail and Sidewalk** – this alternative would widen this section of Fischer-Hallman/Bearinger Road to 4-lanes (undivided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 3.0 – 4.0 metre wide multi-use trail along one side; and
   - 1.8 metre wide pedestrian sidewalk along one side.

4) **Widen the Road to 4-lanes and Add Median, Separated Cycle Tracks, and Sidewalk** – this alternative would widen this section of Fischer-Hallman/Bearinger Road to 4-lanes (divided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0 metre wide median;
   - 1.7 metre wide on-road, separated cycle tracks along both sides; and
   - 1.8 metre wide pedestrian sidewalks along both sides.

5) **Widen the Road to 4-lanes and Add Median, Multi-Use Trail, and Sidewalk**– this alternative would widen this section of Fischer-Hallman/Bearinger Road to 4-lanes (divided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0 metre wide median;
   - 3.0 – 4.0 metre wide multi-use trail along one side; and
   - 1.8 metre wide pedestrian sidewalk along one side.

Widening this section of Fischer-Hallman/Bearinger Road to 4-lanes is common to all alternatives but the Do Nothing alternative.

7. Who will be responsible for clearing snow on new multi-use trails, sidewalks, and/or separated cycle tracks?

In this section of Fischer-Hallman/Bearinger Road, most residential properties are back-lotted, meaning they don't have driveways onto Fischer-Hallman/Bearinger Road. Snow clearing of active transportation facilities such as multi-use trails and sidewalks for back-lotted properties is performed by the City of Waterloo. For front-lotted properties, which have driveways onto Fischer-Hallman/Bearinger Road, snow clearing is the responsibility of the property owner.

Snow clearing of separated cycle tracks will be done by municipal road plowing equipment or by other municipal snow clearing equipment, depending on how the separated cycle tracks are designed.

8. Will the posted speed be changed?

The existing posted speed limit is 60km/hr. along Fischer-Hallman/Bearinger Road between Columbia Street West and Westmount Road North. No change to the posted speed is being considered at this time in order to maintain a uniform and consistent posted speed along the entire Regional corridor.

9. Are noise barriers being considered for this project?

The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four lanes.

A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along

Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project.

Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier.

A summary of Part B and Part C of the Region's Noise Policy is contained in Appendix B.

10. Is any private property required for this project?

One of the goals of the planning and design process for this project is to minimize the impact on adjacent properties and the need to acquire private property. An initial review of the existing road allowance indicates that along the road corridor the width of the road right-of-way is sufficient for all options being considered: this includes along the Laurel Creek Conservation Area (GRCA). The Region may need to obtain temporary access at some locations along the right-of-way limit for construction grading activities. Identification of property needs will be completed during the evaluation of alternatives as the study proceeds and will be confirmed during detailed design, following completion of the study.

In areas where property or temporary access is required, the property owner will be contacted directly by the Region of Waterloo legal services staff. Compensation would be provided at fair market rates based on recent similar area sales. Please refer to Appendix C for further information on the property acquisition process.

11. How is the natural environment being considered?

As part of the environmental inventory for the project, a Natural Environment Impact Study (EIS) has been initiated including a records review documenting the natural features within the study area. Field inventories were undertaken and will be included in the EIS to include results from: road mortality surveys, turtle nesting surveys, amphibian calling surveys, vegetation community surveys/delineation, general wildlife habitat characterization, and a tree inventory. The EIS is expected to be completed in Fall 2019 and, once complete, will be available on the Region's website.

The main natural heritage feature identified in the study area is the Laurel Creek Conservation Area, which is regulated by the Grand River Conservation Authority (GRCA) under Ontario Regulation 150/06. This area is designated as a Core Environmental Feature by the Region of Waterloo and contains the Sunfish Lake-Laurel Creek Provincially Significant Wetland Complex (PSW), as well as Laurel Creek.

Laurel Creek flows from the reservoir in a southerly direction and crosses under Bearinger Road via a structure just east of the study limits. Laurel Creek supports a warm water fish community. No direct impacts are anticipated to Laurel Creek from this project.

The study area includes an unevaluated wetland near the origin of a tributary of Laurel Creek located just north of Columbia Street. There are no Areas of Natural and Scientific Interest (ANSI) or known wildlife movement corridors within the study area. Existing agricultural lands are present on the south side of Bearinger Road, across from the Conservation Area.

Field studies determined that a small pond located near Westmount Road and Bearinger Road (in Laurel Creek Conservation Area) supports candidate significant wildlife habitat for amphibians and turtles. Species at Risk are known to exist within the general area and habitat screening and targeted surveys are being conducted for Species at Risk. To date, no concentrated areas of wildlife movement across the road corridor have been identified; however some turtle mortalities have been documented, and as such wildlife mitigation measures will be considered for future road design mitigation recommendations.

A tree inventory has been completed within the study area. The trees were assessed for overall health and significance and will be included in tree protection plans. Where trees may be impacted or removed, a compensation strategy will be developed as part of the tree management and landscaping design.

Information gathered through background review and field investigations, combined with technical input from reviewing agencies, will be used to inform the evaluation of alternatives from a natural environment perspective, as well as determining mitigation strategies to avoid or minimize impacts to natural heritage.

12. How is the cultural/heritage/archaeological environment being considered?

A Cultural Heritage Resource Assessment was completed in July 2017. A review of available cultural heritage resource inventories revealed that there are no listed or designated cultural heritage resources within or adjacent to the study area. No additional resources were identified through field review. There are no impacts to any cultural heritage resources anticipated as a result of the proposed undertaking. Should the study area change, additional work may be required to confirm potential impacts to cultural heritage resources.

A Stage 1 Archaeological Assessment was also completed in July 2017. The background study determined that twelve (12) previously registered archaeological sites are located within one kilometre of the study area. The property inspection determined that parts of the Study Area exhibit archaeological potential and, if proposed to be impacted, will require Stage 2 Archaeological Assessment by test pit or pedestrian survey, prior to any proposed construction. The remainder of the study area does not retain archaeological potential based on prior assessment, having been subjected to deep soil disturbance events, or being within low and wet conditions.

Once a Preferred Alternative has been selected, impacts and mitigation measures for cultural heritage resources will be confirmed.

13. What is the estimated cost of this project?

The cost of this project will depend on the approved improvement alternative, as well as necessary infrastructure relocations and property acquisitions. Funding of $9.315 million for improvements on Fischer-Hallman/Bearinger Road is included in the Region's 2019 10-Year Transportation Capital Program.

14. What is the project schedule and what are the next steps for improvements on Fischer-Hallman/Bleams Road?

The Project Team will review the public comments received from this Public Consultation Centre and use them as input for completion of the Fischer-Hallman Road Class Environmental Assessment. An assessment of the potential impacts of each alternative on the project environment will be completed and the Project Team will evaluate the alternatives for presentation of a Preferred Alternative for improvements at a second Public Consultation Centre to be held in the Fall of 2019 for further public review and input. After consideration of the technical information completed and all public input received, the Project Team will present a recommendation to Regional Council in the Winter/Spring of 2020 for approval of an improvement alternative that best meets the needs of the public while minimizing the impact on the project environment.

Pending project approval by Regional Council, detailed design and property acquisition (if required) is scheduled in the 2019 Region Transportation Capital Program to be completed throughout 2020, with utility relocations in late 2020, and construction commencing in 2021.

15. How will I receive further notification regarding this project?

Property owners and tenants abutting the project site and members of the public registering at this Public Consultation Centre will receive all forthcoming public correspondence, and will be notified of all future meetings.

16. How can I provide my comments?

In order to assist the Project Team in addressing any comments or concerns you might have regarding this project, we ask that you fill out the attached Comment Sheet and leave it in the comment box provided at the registration table. Alternatively you can mail, fax, or email your comments to the Project Team member listed below, no later than Tuesday, May 21, 2019.

We thank you for your involvement and should you have any questions or concerns please contact one of the following:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 Ext. 3164
Fax: 519-575-4430
Email: JuArmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Telephone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

17. How can I view project information following the PCC?

All of the PCC display materials and other relevant project information, notifications of upcoming meetings and contact information are available for viewing at the Region of Waterloo municipal office as identified above. Alternatively, you may visit the Region's website at www.regionofwaterloo.ca.

Comment Sheet
Regional Municipality of Waterloo
Fischer-Hallman Road Improvements
Public Consultation Centre #1 – Tuesday, May 7, 2019

Please complete and hand in this sheet so that your comments can be considered for this project. If you cannot complete your comments today, please take this home and mail, fax, or email your comments by Tuesday, May 21, 2019 to:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 Ext. 3164
Fax: 519-575-4430
Email: JuArmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Telephone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

Comments regarding this project:

Name:

Address:

Postal Code:

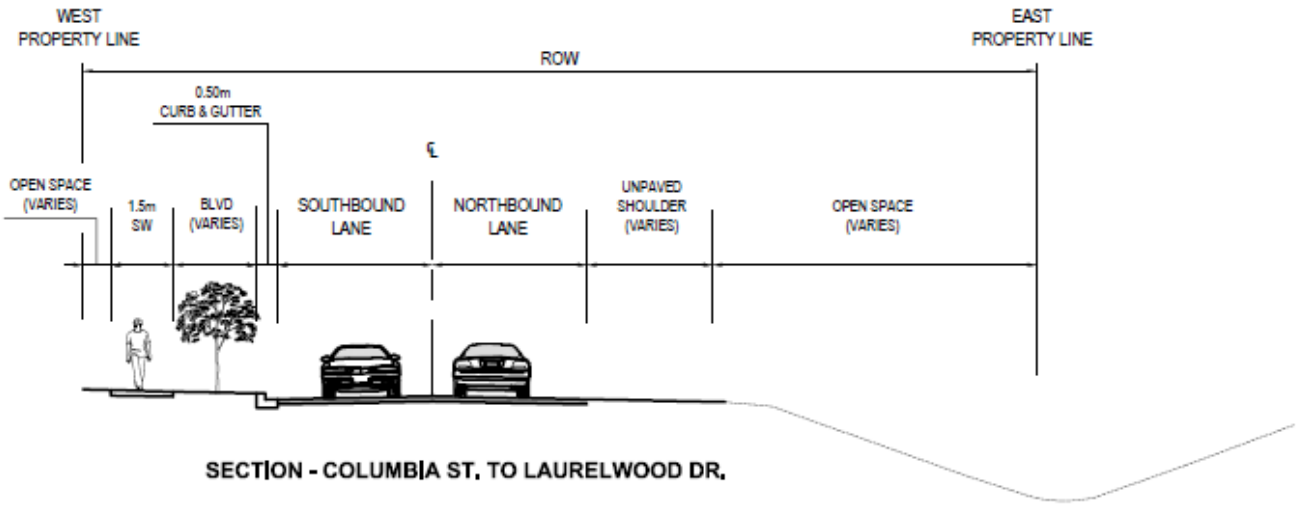
Phone: **Email:**

Collection Notice:

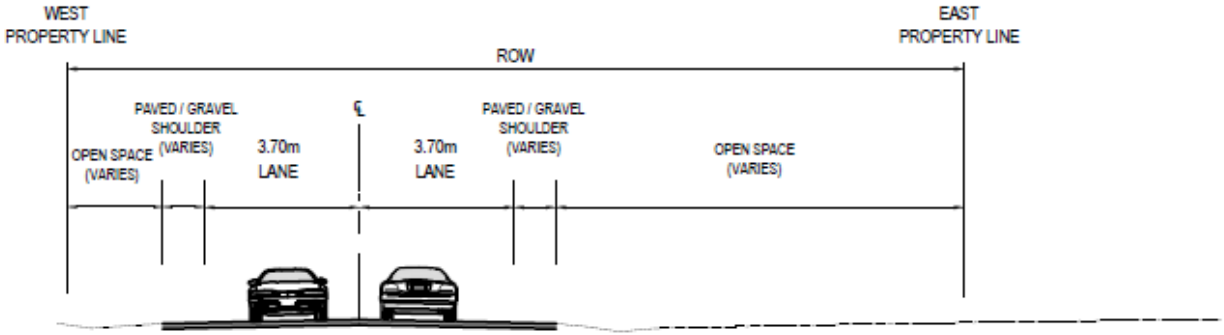
All comments and information received from individuals, stakeholder groups, and agencies regarding these projects and meetings are being collected to assist the Region of Waterloo in making a decision. Under the “Municipal Act”, personal information (such as name, address, telephone number, and property location) which may be included in a submission becomes part of the public record. Questions regarding the collection should be forwarded to the staff member noted above.

Document Number: 2910212

Appendix A – Design Alternative #1 – Do Nothing



SECTION - COLUMBIA ST. TO LAURELWOOD DR.



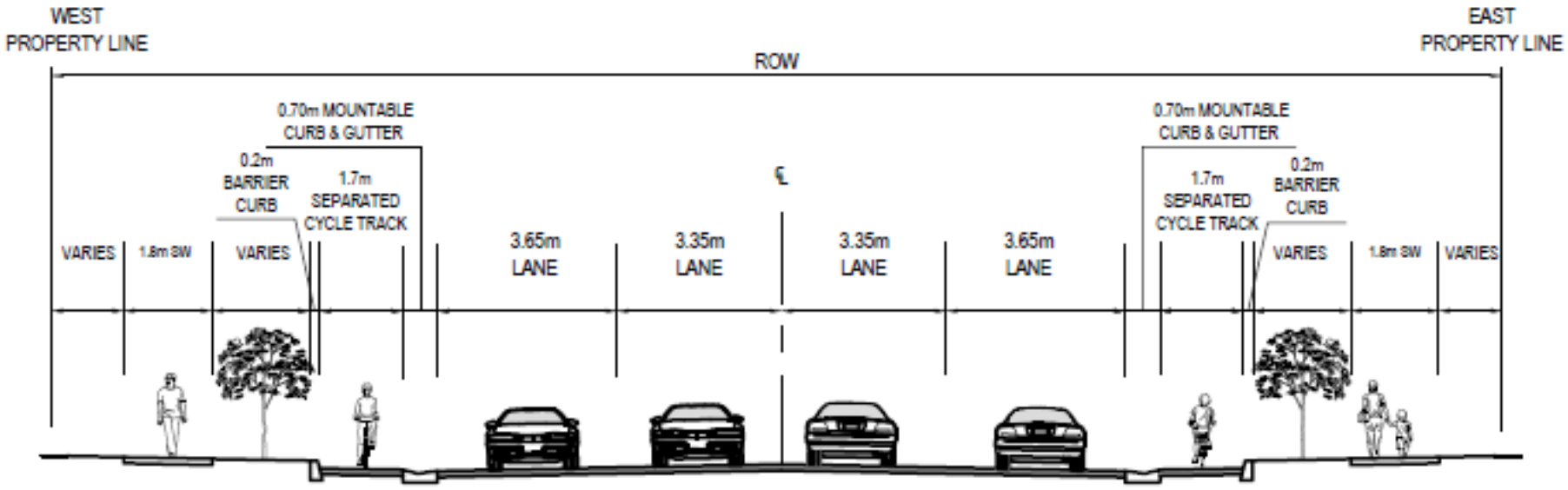
SECTION - LAURELWOOD DR. TO WESTMOUNT RD.

FISCHER-HALLMAN RD./ BEARINGER RD. IMPROVEMENTS
ALTERNATIVE 1

"DO NOTHING"

Appendix A – Design Alternative #2

Widen the Road to 4-lanes and Add Separated Cycle Track and Sidewalk

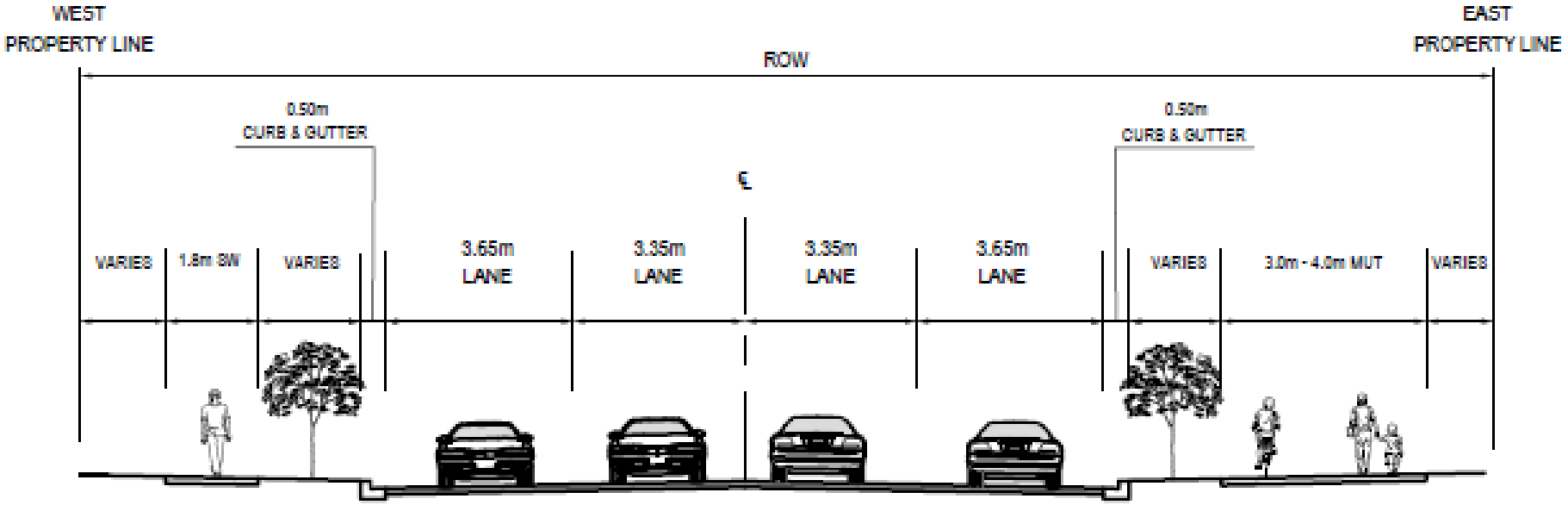


FISCHER-HALLMAN RD./ BEARINGER RD. IMPROVEMENTS
ALTERNATIVE 2

4 THROUGH LANES, 1.7m SEPARATED CYCLE TRACK AND 1.8m SIDEWALKS

Appendix A – Design Alternative #3

Widen the Road to 4-lanes and Add Multi-Use Trail (MUT) and Sidewalk

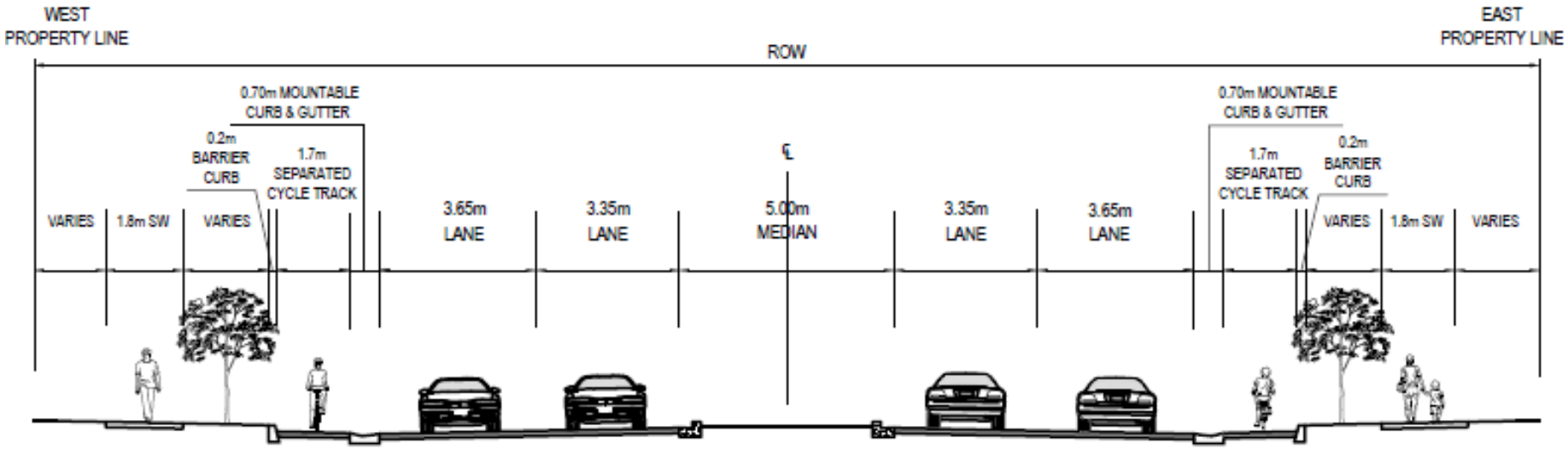


FISCHER-HALLMAN RD./ BEARINGER RD. IMPROVEMENTS
ALTERNATIVE 3

4 THROUGH LANES, 3.0m - 4.0m MULTI-USE TRAIL (EAST) AND 1.8m SIDEWALK (WEST)

Appendix A – Design Alternative #4

Widen the Road to 4-lanes and Add Median, Separated Cycle Track, and Sidewalk



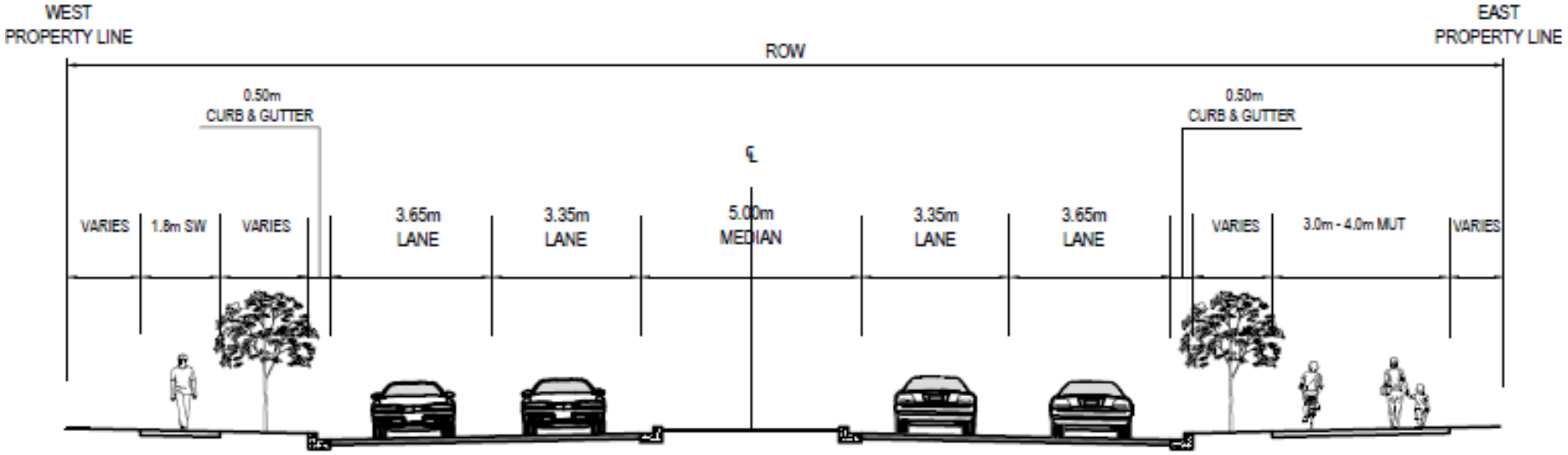
FISCHER-HALLMAN RD./ BEARINGER RD. IMPROVEMENTS

ALTERNATIVE 4

4 THROUGH LANES, 5m MEDIAN, 1.7m SEPARATED CYCLE TRACK AND 1.8m SIDEWALKS

Appendix A – Design Alternative #5

Widen the Road to 4-lanes and Add Median, Multi-Use Trail (MUT), and Sidewalk



FISCHER-HALLMAN RD./ BEARINGER RD. IMPROVEMENTS

ALTERNATIVE 5

4 THROUGH LANES, 5m MEDIAN, 3.0m - 4.0m MULTI-USE TRAIL (EAST) AND 1.8m SIDEWALK (WEST)

Appendix B

Region of Waterloo Noise Policy Information Sheet

Summary of Region of Waterloo Noise Policy

The Region's Noise Policy is made up of three Parts:

Part A: New Developments Impacted By Noise from Roads & Railways

Part B: Existing Development Impacted By Proposed Region Road Widenings

Part C: Existing Development Impacted By Noise from Existing Region Roads

- § Since there is no new development, only Parts B or C apply to this project.

Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North is proposing to:

- ü Widen Fischer-Hallman/Bearinger Road – therefore Part B applies.
  - § Noise is calculated at a residence Outdoor Living Area – typically defined as the backyard or patio within 3 metres of the rear wall of a residential unit.
  - § Noise is calculated using a Ministry of the Environment, Conservation and Parks (MECP) model that calculates a 16-hour average noise level for the outdoor living area based on several factors, such as traffic volumes, distance from the outdoor living area to the noise source, and elevation differences between the outdoor living area to the centre of the road. The noise level used in the policy is not based on peak levels that may be recorded at a given location/time.

Part B of Region Noise Policy – Road Widenings

The Region will consider building and paying for noise barrier if:

- ü The projected noise level 10 years beyond construction is calculated to exceed 65 dBa; or
- ü The projected noise level 10 years beyond construction is calculated to exceed 60 dBa and increase over existing noise by 5dBa or more; and,
- ü By constructing noise barrier, projected noise is calculated to be reduced to 60 dBa or less and reduction in projected noise is 5 dBa or more.

Part C of Region Noise Policy – No Road Widenings – Request Driven

The Region will consider building and Cost Sharing noise barrier construction if:

- ü A resident requests a noise barrier; and
- ü Existing noise levels are calculated to exceed 60dBa; and

- ü Two thirds (2/3) of affected property owners are in agreement to build noise barrier (based on rear yard property length) in accordance with the *Local Improvement Act*; and
- ü All property owners pay 50% of the noise barrier cost based on length of wall installed at their property with payments charged over a period of ten (10) years (in accordance with *Local Improvement Act*).

Residents may also decide to take **other measures** such as installing a privacy fence, air conditioning, and/or window improvements at their own expense.

Appendix C

Property Acquisition Process Information Sheet

The following information is provided as a general overview of the property acquisition process and is not legal advice. Further, the steps, timing, and processes can vary depending on the individual circumstances of each case.

Once the Class Environmental Assessment is complete and the Environmental Study Report outlining the Recommended Design Concept has been approved, the property acquisition process and the efforts of Regional Real Estate staff will focus on preparation for acquiring the required lands to implement the approved design. Regional staff cannot make fundamental amendments or changes to the approved design concept.

Property Impact Plans

After the project has been approved and as it approaches final design, the project planners will generate drawings and sketches indicating what lands and interests need to be acquired from each affected property to undertake the project. These drawing are referred to as Property Impact Plans (PIP).

Initial Owner Contact by Regional Real Estate Staff

Once the PIPs are finalized and available, Regional Real Estate staff will retain an independent appraiser to provide preliminary valuations of the land requirements and their effect on the value of the property. As this process nears completion Real Estate staff will contact the affected property owner/s by telephone and mail to introduce themselves and set-up initial meetings to discuss the project, appraisals, and proposed acquisitions.

Initial Meetings

The initial meeting is attended by the project engineer and the assigned real estate staff person to brief the owner on the project, what part of their lands are to be acquired or will be affected, what work will be undertaken, when, with what equipment, etc. and to answer any questions. The primary purpose of the meeting is to listen to the owner and identify issues, concerns, effects of the proposed acquisition on remaining lands and businesses that can be feasibly mitigated and/or compensated, and how the remaining property may be restored. These discussions may require additional meetings. The goal of staff is to work with the owner to reach mutually agreeable solutions.

Goal – Fair and Equitable Settlement for All Parties

The goal is always to reach a fair and equitable agreement for both the property owner and the Region. Such an agreement will provide compensation for the fair market value of the lands and address the project impacts (such as repairing or replacing landscaping, fencing, paving, etc.) such that the property owner will receive the value of the lands acquired and the restoration of their remaining property to the condition it was prior to the Project.

The initial meetings will form the basis of an initial offer of settlement or agreement of purchase and sale for the required lands or interests.

Steps Toward Offer of Settlement or Agreement of Purchase and Sale

The general steps toward such an offer are as follows;

1) the Region will obtain an independent appraisal of the fair market value of the lands and interests to be acquired, and an appraisal of any effect on the value of the rest of the property resulting from the acquisition of the required lands and interests;
2) compensation will be estimated and/or works to minimize other effects will be defined and agreed to by the property owner and the Region;
3) reasonable costs of the owner will be included in any compensation settlement;
4) an offer with a purchase price and any other compensation or works in lieu of compensation will be submitted to the property owner for consideration; and
5) an Agreement will be finalized with any additional discussion, valuations, etc. as may be required.

Depending on the amount of compensation, agreements may require the approval of Council. The approval is undertaken in Closed Session which is not open to the public to ensure a level of confidentiality.

Expropriation

Due to the time constraints of these projects, it is the practice of the Region to commence the expropriation process in parallel with the negotiation process to ensure that lands and interests are acquired in time for commencement of the Project. Typically, over 90% of all required lands and interests are acquired through the negotiation process. Even after lands and interests have been acquired through expropriation an agreement on compensation can be reached through negotiation, this is usually referred to as a ‘settlement agreement’.

Put simply, an expropriation is the transfer of lands or an easement to a governmental authority for reasonable compensation, including payment of fair market value for the transferred lands, without the consent of the property owner being required. In the case of expropriations by municipalities such as the Region of Waterloo, the process set out in the Ontario *Expropriations Act* must be followed to ensure that the rights of the property owners provided under that *Act* are protected.

For information on the expropriation process, please refer to *Expropriation Information Sheet*.

The following information is provided as a general overview of the expropriation process and is not legal advice. For complete information, reference should be made to the Ontario Expropriations Act as well as the more detailed information in the Notices provided under that Act.

Expropriation Information Sheet

What is Expropriation?

Governmental authorities such as municipalities, school boards, and the provincial and federal governments undertake many projects which require them to obtain land from private property owners. In the case of the Regional Municipality of Waterloo, projects such as the construction or improvement of Regional Roads sometimes require the purchase of land from private property owners. In many cases, the Region of Waterloo only needs a small portion of the private property owner's lands or an easement for related purposes such as utilities, although in certain instances, entire properties are required.

Usually the governmental authority is able to buy the land required for a project through a negotiated process with the affected property owners. Sometimes, however, the expropriation process must be used in order to ensure that the land is obtained within a specific timeline. Put simply, an expropriation is the transfer of lands or an easement to a governmental authority for reasonable compensation, including payment of fair market value for the transferred lands, without the consent of the property owner being required. In the case of expropriations by municipalities such as the Region of Waterloo, the process set out in the Ontario **Expropriations Act** must be followed to ensure that the rights of the property owners provided under that *Act* are protected.

Important Note: The Region of Waterloo tries in all instances to obtain lands needed for its projects through a negotiated agreement on mutually acceptable terms. Sometimes, the Region of Waterloo will start the expropriation process while negotiations are underway. This dual approach is necessary to ensure that the Region of Waterloo will have possession of all of the lands needed to start a construction project on schedule. However, it is important to note that Regional staff continues to make every effort to reach a negotiated purchase of the required lands on mutually agreeable terms while the expropriation process is ongoing. If agreement is reached, expropriation proceedings can be discontinued and the land transferred to the Region of Waterloo in exchange for payment of the agreed-upon compensation.

What is the process of the Region of Waterloo under the Expropriations Act?

- Regional Council considers a request to begin an application under the **Expropriations Act** to obtain land and/or an easement for a specific Regional project. No decision is made at this meeting to expropriate the land. This step is simply direction for the Region of Waterloo to provide a "Notice of Application for Approval to Expropriate" to affected property owners that the process has started to seek approval to expropriate the land.
- As stated in the Notice, affected property owners have 30 days to request a Hearing to consider whether the requested expropriation is "fair, sound and reasonably necessary in the achievement of the objectives" of the Region of Waterloo. This Hearing is conducted by a

provincially-appointed Inquiry Officer. Prior to the Hearing, the Region of Waterloo must serve the property owner with a Notice setting out its reasons or grounds for the proposed expropriation. **Compensation for lands is not determined at this Hearing.** The Inquiry Officer can order the Region of Waterloo to pay the property owner up to $200.00 as compensation for the property owner's costs in participating in this Hearing, regardless of the outcome of the Hearing.

- If a Hearing is held, a written report is provided by the Inquiry Officer to the property owner and the Region of Waterloo. Council must consider the Report within 90 days of receiving it. The Report is not binding on Council and Council may or may not accept the findings of the Report. After consideration of the Report, Council may or may not approve the expropriation of the land or grant approval with modifications. A property owner may wish to make written and/or verbal submissions to Council at the time that it is considering the Report.
- If no Hearing is requested by the property owner, then Council may approve the expropriation of the land after expiry of a 30 day period following service of the Notice of Application for Approval to Expropriate.
- If Council approves the expropriation then, within 3 months of this approval, the Region of Waterloo must register a Plan at the Land Registry Office that describes the expropriated lands. The registration of this Plan automatically transfers title of the lands to the Region of Waterloo, instead of by a Deed signed by the property owner.
- Within 30 days of registration of the Plan, the Region of Waterloo must serve a Notice of Expropriation on the affected property owner advising of the expropriation. Within 30 days of this Notice, the property owner may serve the Region of Waterloo with a Notice of Election selecting the valuation date under the *Expropriations Act* for calculation of the compensation.
- In order to obtain possession of the expropriated lands, the Region of Waterloo must also serve a Notice of Possession setting out the date that possession of the land is required by the Region of Waterloo. This date has to be 3 months or more from the date that this Notice of Possession is served on the affected property owner.
- Within 3 months of registration of the Plan, the Region of Waterloo must provide the affected property owner with payment for the full amount of the appraised fair market value of the expropriated land or easement and a copy of the appraisal report on which the value is based. If the property owner disagrees with this amount, and/or claims other compensation and/or costs under the *Expropriations Act*, the compensation and/or costs matter may be referred to a provincially-appointed Board of Negotiation in an effort to reach a mediated settlement and/or an appeal may be made to the Ontario Municipal Board (OMB) for a decision. In any event, the Region of Waterloo continues in its efforts to reach a negotiated settlement with the affected property owner prior to the OMB making a decision.

Fischer-Hallman Road / Bearinger Road Improvements from Columbia Street West to Westmount Road North in The City of Waterloo
Public Consultation Centre #2
Information Package

What: The Region of Waterloo is undertaking a Municipal Class Environmental Assessment (EA) of Fischer-Hallman Road / Bearinger Road to determine needed corridor improvements.

Where: Fischer-Hallman Road / Bearinger Road from Columbia Street West to Westmount Road North in The City of Waterloo.

Why: To provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

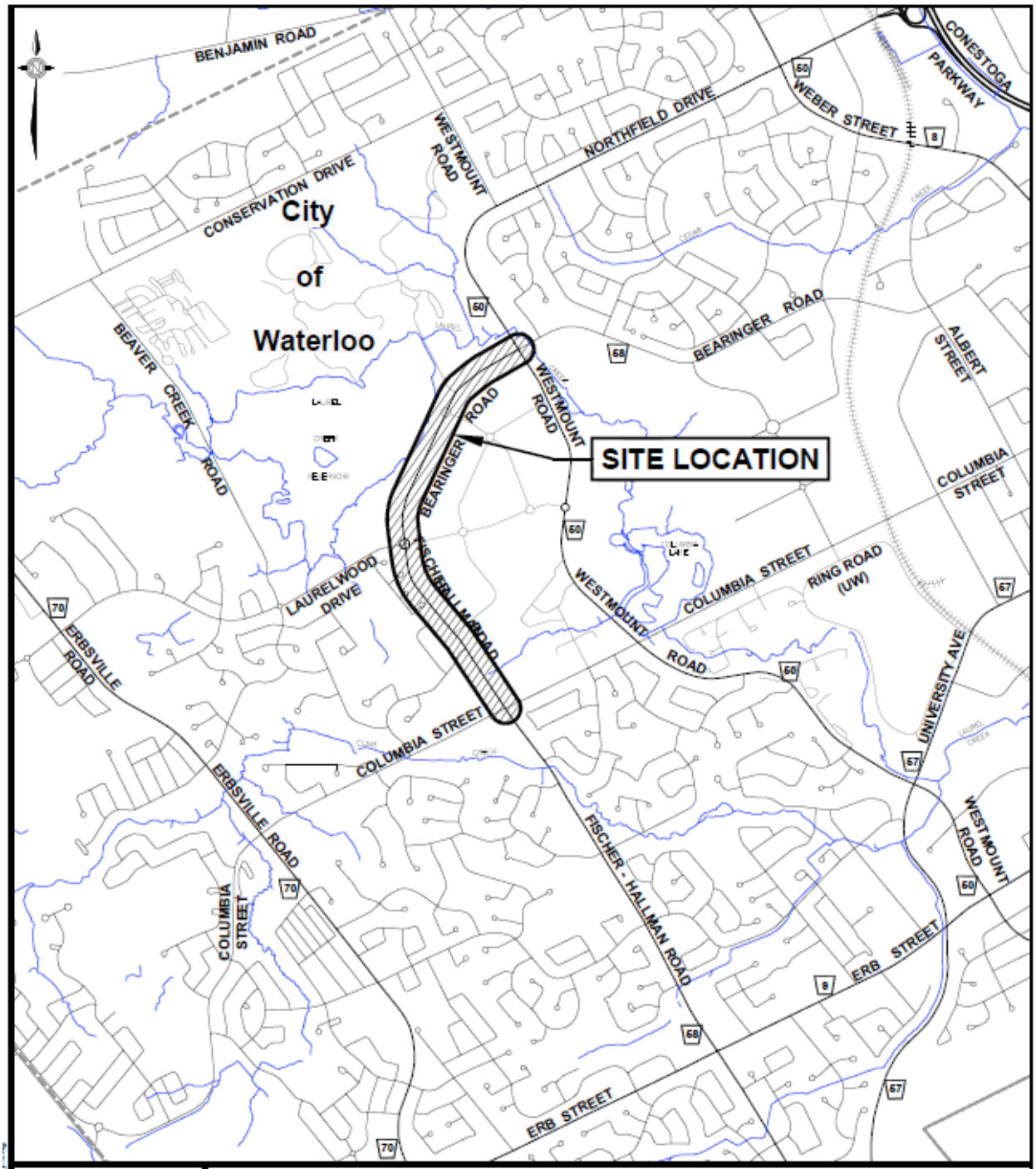
When: 2021-2022 Construction.

Who: Region of Waterloo Project Manager
Justin Armstrong, P. Eng.
Region of Waterloo
Phone: (519) 575-4757 Ext. 3164
Email: JuArmstrong@regionofwaterloo.ca

Public Consultation Centre #2
Monday, November 4, 2019 from 4:30 p.m. to 7:30 p.m.
Waterloo Public Library – John M. Harper Branch, Community Room
500 Fischer-Hallman Road
Waterloo, Ontario

There is a comment sheet at the back of this package. Please fill it out and share your comments with us.

KEY PLAN


BENJAMIN ROAD
CONSERVATION DRIVE
City
of
Waterloo
WESTMOUNT ROAD
NORTHFIELD DRIVE
WEBER STREET
CONESTOGA PARKWAY
BEAVER CREEK ROAD
BEARINGER ROAD
ALBERT STREET
SITE LOCATION
COLUMBIA STREET
LAURELWOOD DRIVE
FISCHER-HALLMAN ROAD
RING ROAD (UW)
UNIVERSITY AVE
ERBSVILLE ROAD
ERB STREET
REGIONAL ROAD 58 (FISCHER-HALLMAN ROAD)
COLUMBIA STREET TO WESTMOUNT ROAD
CITY OF WATERLOO
Region of Waterloo

1. Why is the Region considering this project?

The 2018 Regional Transportation Master Plan Update has identified this section of Fischer-Hallman Road / Bearinger Road for widening from 2 to 4 lanes to provide road improvements for traffic growth and active transportation improvements for pedestrians, cyclists, and transit along the corridor.

In addition, pavement rehabilitation, storm water management (i.e. storm sewers) improvements, and upgrades to the Regional watermain network are needed along the corridor.

2. Who is directing this project?

The planning and design for this project is being directed by staff from the Region of Waterloo and City of Waterloo, along with Region of Waterloo (Waterloo) Councillor Jim Erb and City of Waterloo (Ward 2) Councillor Royce Bodaly. Staff from the Grand River Conservation Authority (GRCA), as well as the University of Waterloo (UW) are also included on the Project Team. The consulting engineering firm WalterFedy has been retained by the Region of Waterloo to provide planning and preliminary design services during the study phase of this project, as well as detailed design, contract administration, and inspection services through the construction phase.

3. How is this project being planned?

This project is being planned in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) process. The Municipal Class EA process is a planning and decision-making process approved under the Environmental Assessment Act that is used by municipalities to plan public infrastructure projects in order that potential environmental impacts are considered before a project is approved. It requires consultation with the public, involved stakeholders, and agencies in consideration of alternatives and their potential impacts on the overall project environment.

This project is being planned as a Schedule ‘C’ Class EA project which applies to larger, more complex projects with the potential for significant environmental impacts (natural, social, cultural and economic) and requires multiple opportunities for public input.

The 2018 Regional Transportation Master Plan Update fulfills the requirements of the first two phases of the Fischer-Hallman Road / Bearinger Road Class EA by: (1) establishing the need and justification for Fischer-Hallman Road / Bearinger Road Improvements and (2) evaluating alternative methods of addressing corridor needs, including stakeholder consultation.

This study is undertaking Phase 3: Alternatives for the Preferred Solution, which will be followed by Phase 4: The Environmental Study Report documenting the identification of alternative solutions based on needs and opportunities, evaluation of those alternative solutions in the context of several criteria, and selection of a preferred alternative solution.

4. What is the purpose of this 2nd Public Consultation Centre (PCC)?

The purpose of this 2nd Public Consultation Centre is for the public to provide input on:

a) The needs and opportunities for improvements on Fischer-Hallman Road / Bearinger Road;

b) The alternative solutions considered by the Project Team for Fischer-Hallman Road / Bearinger Road;

c) The criteria used to evaluate alternative solutions for improvements; and

d) The Project Team preferred alternative.

Region and project consultant staff are available at this Public Consultation Centre to answer any questions you may have. We request that you fill out the Comment Sheet attached to the back of this Information Package and either put it in the Comment Box at the Public Consultation Centre or send it to the address noted on the Comment Sheet. Your comments will be considered by the Project Team in conjunction with all other relevant information in recommending a preferred alternative for this project.

5. Are active transportation upgrades or road widening being considered?

Yes, both active transportation upgrades and road widening are being considered in accordance with the following Regional master plans and guidelines.

The adjacent sections of Fischer-Hallman Road to the south and Westmount Road to the north have sidewalks and on-road bike lanes, with a multi-use trail on the east side of Westmount Road to the south and on the south side of Bearinger Road to the east.

The 2018 Regional Transportation Master Plan Update has identified the need to widen Fischer-Hallman/Bearinger Road to 4-lanes and add active transportation improvements for pedestrians, cyclists, and transit between Columbia Street West and Westmount Road North.

The Context Sensitive Regional Transportation Corridor Design Guidelines (CDG) is a planning policy document that guides the design of Regional roads. The CDG identifies design parameters for necessary features within the road allowance such as vehicle lanes, cycling facilities, sidewalks, and boulevards. In accordance with the CDG, Fischer-Hallman/Bearinger Road is identified as a “Neighbourhood Connector – Avenue”. Designing Fischer-Hallman/Bearinger Road to support active transportation modes, including walking and cycling, is a fundamental character of this road classification.

Transit (GRT) routes are planned for the future and will also be considered in this study.

The Regional Transportation Master Plan and Corridor Design Guidelines all support complete and continuous active transportation facilities on this section of Fischer-Hallman/Bearinger Road

for the full length of this project. Boulevard multi-use trails or sidewalks and cycle tracks on both sides of the road would satisfy that requirement.

6. Who will be responsible for the winter maintenance of new multi-use trails, sidewalks, and/or bike lanes?

Maintenance of new active transportation facilities along Regional roads is the responsibility of the local municipality (City of Waterloo for this project).

7. Will the posted speed limit be changed?

The existing posted speed limit is 60km/h along Fischer-Hallman Road / Bearinger Road between Columbia Street West and Westmount Road North. No change to the posted speed is being considered at this time in order to maintain a uniform and consistent posted speed along the corridor.

8. Are noise barriers being considered for this project?

The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four lanes.

A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project.

Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier.

A summary of Part B and Part C of the Region's Noise Policy is contained in Appendix A.

9. How has the natural environment been considered for this project?

As part of the environmental inventory for the project, a Natural Environment Impact Study (EIS) is being finalized including a background records review and documenting the natural features within the study area. Field inventories were completed and will be included in the EIS to include results from road mortality surveys, turtle nesting surveys, amphibian calling surveys, vegetation community surveys/delineation, general wildlife habitat characterization, and a tree inventory.

The EIS is expected to be finalized in Fall 2019 and, once complete, will be available on the Region's website.

The main natural heritage feature identified in the study area is the Laurel Creek Conservation Area, which is regulated by the Grand River Conservation Authority (GRCA) under Ontario Regulation 150/06. This area is designated as a Core Environmental Feature by the Region of Waterloo and contains the Sunfish Lake-Laurel Creek Provincially Significant Wetland Complex (PSW), as well as Laurel Creek.

Laurel Creek flows from the reservoir in a southerly direction and crosses under Bearinger Road via a structure just east of the study limits. Laurel Creek supports a warm water fish community. No direct impacts are anticipated to Laurel Creek from this project.

The study area includes an unevaluated wetland near the origin of a tributary of Laurel Creek located just north of Columbia Street. There are no Areas of Natural and Scientific Interest (ANSI) or known wildlife movement corridors within the study area. Existing agricultural lands are present on the south side of Bearinger Road, across from the Conservation Area.

Field studies determined that a small pond located near Westmount Road and Bearinger Road (in Laurel Creek Conservation Area) supports possible wildlife habitat for amphibians and turtles. Species at Risk are known to exist within the general area and habitat screening and targeted surveys are being conducted for Species at Risk. To date, no concentrated areas of wildlife movement across the road corridor have been identified; however some turtle mortalities have been documented and as such wildlife mitigation measures (e.g. wildlife exclusion fencing) will be considered for future road detailed design.

A tree inventory has been completed within the study area. The trees were assessed for overall health and significance and will be included in tree protection plans. Where trees may be impacted or removed, a compensation strategy will be developed as part of the tree management and landscaping design. Any vegetation clearing required for the preferred alternative will occur outside of the nesting window for birds listed under the Migratory Birds Convention Act.

Information gathered through background review and field investigations, combined with technical input from reviewing agencies, was used to inform the evaluation of alternatives from a natural environment perspective, as well as determining mitigation strategies to avoid or minimize impacts to natural heritage.

If the Preferred Alternative is determined to impact wildlife or their habitats, mitigating measures will be identified in the Environmental Study Report (ESR) to be filed with the Ministry of the Environment, Conservation, and Parks (MECP).

10. How has the cultural / heritage / archaeological environment been considered for this project?

A Cultural Heritage Resource Assessment was completed in July 2017. A review of available cultural heritage resource inventories revealed that there are no listed or designated cultural heritage resources within the study area. No additional resources were identified through field review. There are no impacts to any cultural heritage resources anticipated as a result of the proposed improvements.

A Stage 1 Archaeological Assessment was also completed in July 2017. The background study determined that twelve (12) previously registered archaeological sites are located within one kilometre of the study area. The property inspection determined that parts of the Study Area exhibit archaeological potential and, if proposed to be impacted, will require Stage 2 Archaeological Assessment by test pit or pedestrian survey, prior to any proposed construction. The remainder of the study area does not retain archaeological potential based on prior assessment, having been subjected to deep soil disturbance events, or being within low and wet conditions.

Potential archaeological impacts and mitigation measures for cultural heritage resources will be included in the Environmental Study Report to be filed with the Ministry of the Environment, Conservation and Parks.

11. What alternatives were presented at PCC #1 on May 7, 2019?

The alternative solutions for improvements considered by the Project Team are described below and cross-sections are provided in Appendix B:

1) **Do Nothing** – this alternative would include reconstructing the road in its current 2-lane configuration:

   - Fischer-Hallman Road from Columbia Street West to Laurelwood Drive
     - Semi-Urban (sidewalk and curb and gutter on the west side)
   - Bearinger Road from Laurelwood Drive to Westmount Road North
     - Rural (ditch drainage)

2) **Widen the Road to 4-lanes and Add Separated Bike Lanes and Sidewalk** – this alternative would widen this section of Fischer-Hallman / Bearinger Road to 4-lanes (undivided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 1.7 metre wide on-road, separated cycle tracks along both sides; and
   - 1.8 metre wide pedestrian sidewalks along both sides.

3) **Widen the Road to 4-lanes and Add Multi-Use Trail and Sidewalk** – this alternative would widen this section of Fischer-Hallman / Bearinger Road to 4-lanes (undivided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 3.0 – 4.0 metre wide multi-use trail along one side; and
   - 1.8 metre wide pedestrian sidewalk along one side.

4) **Widen the Road to 4-lanes and Add Median, Separated Bike Lanes, and Sidewalk** – this alternative would widen this section of Fischer-Hallman / Bearinger Road to 4-lanes (divided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0 metre wide median;
   - 1.7 metre wide on-road, separated cycle tracks along both sides; and
   - 1.8 metre wide pedestrian sidewalks along both sides.

5) **Widen the Road to 4-lanes and Add Median, Multi-Use Trail, and Sidewalk** – this alternative would widen this section of Fischer-Hallman / Bearinger Road to 4-lanes (divided) and add the following facilities:

   - Curb and gutter and a storm drainage system;
   - Additional street lighting;
   - 5.0 metre wide median;
   - 3.0 – 4.0 metre wide multi-use trail along one side; and
   - 1.8 metre wide pedestrian sidewalk along one side.

Widening this section of Fischer-Hallman / Bearinger Road to 4-lanes is common to all alternatives except Alternative #1, the Do Nothing alternative, and satisfies Regional goals.

12. How were the alternatives presented at PCC #1 evaluated?

The Project Team identified evaluation criteria in order for each of the alternatives to be compared. The evaluation criteria were: Natural Environment, Socio-Economic Environment; Transportation; and Cost. Each evaluation criteria included specific factors and indicators to determine the impacts / benefits of each alternative.

Alternative #1, the ‘Do Nothing’ alternative, was screened out because it does not satisfy Region objectives for the corridor as identified in the 2018 Regional Transportation Plan Update (“Moving Forward”) and Corridor Design Guidelines (CDG). Specifically, the need to widen to manage future traffic growth and forecasted intersection operational deficiencies, as well as adding active transportation and transit facilities are not addressed by the ‘Do Nothing’ alternative.

Following PCC #1, the Project Team reviewed public and agency input, as well as the various inventories and identified constraints, in order to finalize the evaluation of the alternatives.

The evaluation criteria, factors, indicators, and results can be found in Appendix C.

13. Were there changes to the Alternatives presented at PCC #1 prior to PCC #2?

The Project Team reviewed public and agency input following PCC #1. Comments in support of and against widening the road and providing active transportation facilities were received. Support of the proposed improvements acknowledged the benefits of accommodating growth in the area and facilitating alternate modes of transportation (i.e. active transportation and transit facilities), with a preference for multi-use trail buffered from the roadway for young families (children), casual cyclists, and other mode users (e.g. roller blading, scooters, and skateboards), as well as the elderly. Support against was based on concerns with existing and future noise levels, as well as potential Laurel Creek Conservation Area (Grand River Conservation Authority lands) impacts. The most common themes, based on number or frequency, of comments were:

- Minimizing Conservation Area impacts (i.e. habitat, wildlife, and the Doreen Thomas trail);
- Providing buffered, continuous, and 'connected' active transportation facilities;
- Traffic operations at Fischer-Hallman Road and Gatestone Boulevard; and
- Minimizing impact to existing development (i.e. noise).

A summary of the *Public Consultation Centre 1 Comments and Responses* can be found on the Region's website: https://www.regionofwaterloo.ca/en/living-here/resources/Documents/Future-Construction/DC_07221_InfoSheet.pdf.

The Project Team evaluated the alternatives presented at PCC #1 based on that information and set the following guidelines:

- Minimize impacts to adjacent property;
- Provide buffered, continuous, and 'connected' active transportation facilities; and
- Investigate existing, and future, traffic conditions at Gatestone Boulevard.

In response to public comments to:

1. Minimize impacts to the Laurel Creek Conservation Area

   The design alternatives were developed by shifting Bearinger Road southerly as much as possible within the existing right-of-way. In addition, wildlife and habitat mitigating measures will be included in final reporting for this Class Environmental Assessment (EA)

study phase and reflected in future detailed design and construction phases of the project. Except as noted in Item 15 below, no existing property taking has been identified as a requirement at this time. Further, no impacts to existing infrastructure, i.e. the GRCA Doreen Thomas Trail, are expected at this time.

2. Provide buffered, continuous, and 'connected' active transportation facilities

   Alternative #s 3 and 5 were revised to include multi-use trail along both sides of the entire corridor (Alternative #s 3a and 5a) and no longer include sidewalk within the corridor. Connectivity to existing facilities within the project limits and at the project limits will be refined through future detailed design.

3. Investigate existing traffic operations at Fischer-Hallman Road and Gatestone Boulevard

   Further investigation by the Project Team was warranted. As part of the Transportation Study, signal warrant analysis was performed at Fischer-Hallman and Gatestone Boulevard according to *Justification 7* from the Ontario Traffic Manual. The results from the analysis showed that traffic signals were not warranted at this intersection based on forecasted 2031 traffic volumes. The pedestrian refuge will be maintained at Gatestone Boulevard.

14. What is the Project Team Preferred Alternative?

Based on the evaluation of revised alternatives, including public and agency input, as well as the various inventories and identified constraints, Alternative #5a (Widen to 4-lanes and Add Median and Multi-Use Trail) has been identified as the Project Team's Preferred Alternative.

Alternative #5a rated the highest of all five options overall. In addition, with Alternative #1 ('Do Nothing') screened out, Alternative #5a rated as well as or better than each of Alternative #s 2, 3a, and 4 across each of the (major) evaluation criteria.

15. Is any private property required for the Preferred Alternative?

One of the goals of the planning and design process is to minimize the impact on adjacent properties and the need to acquire private property. An initial review of the existing road allowance indicates that along the road corridor the width of the road right-of-way is sufficient for all alternatives considered: this includes along existing residential and Conservation Area property lines.

There are expected property taking needs expected along Columbia Street West at Fischer-Hallman Road and Laurelwood Drive at Fischer-Hallman Road required by the City of Waterloo to accommodate an additional turn lane at each location based on forecasted traffic needs.

The Region may need to obtain temporary access at some locations along the right-of-way limit for construction grading activities, which will be confirmed through future detailed design. There is no private property acquisition expected from existing residential or Conservation Area lands

as a result of the Preferred Alternative preliminary design at this time. However, property needs, including temporary access, will be confirmed through detailed design following completion of the study.

In areas where property or temporary access is required, the property owner will be contacted directly by the Region of Waterloo's Land Purchasing Officer. Compensation would be provided at fair market rates based on recent similar area sales. Please refer to Appendix D for further information on the property acquisition process.

16. What is the estimated cost of this project?

The cost of this project will depend on the approved improvement alternative, as well as necessary infrastructure relocations and property acquisitions including temporary access. Funding in the amount of $17.71 million for improvements on Fischer-Hallman / Bearinger Road is included in the Region's 2020 Draft Transportation Capital Program. Funding includes approximately $1.0 million for active transportation facilities (i.e. multi-use trails).

17. What is the project schedule and what are the next steps for improvements on Fischer-Hallman Road / Bearinger Road?

The Project Team will review the public comments received from this Public Consultation Centre and use them as input for completion of the Fischer-Hallman Road / Bearinger Road Class Environmental Assessment.

After consideration of all technical information completed and public input received, the Project Team will present a recommendation to Regional Council in early 2020 for approval of an improvement alternative that best meets the needs of the public while minimizing the impact on the overall project environment.

Pending project approval by Regional Council, detailed design and utility relocations are scheduled in the 2020 Draft Region Transportation Capital Program to be completed throughout 2019 and 2020, with construction starting in 2021.

18. How will I receive further notification regarding this project?

Property owners and tenants abutting the project site and members of the public registering at this Public Consultation Centre will receive all forthcoming public correspondence, and will be notified of all future meetings.

19. How can I provide my comments?

In order to assist the Project Team in addressing any comments or concerns you might have regarding this project, we ask that you fill out the attached Comment Sheet and leave it in the comment box provided at the registration table. Alternatively you can mail, fax, or email your comments to the Project Team members listed below, no later than Monday, November 18, 2019.

We thank you for your involvement and should you have any questions or concerns please contact one of the following:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 Ext. 3164
Fax: 519-575-4430
Email: JuArmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Telephone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

20. How can I view project information following the PCC?

All of the PCC display materials and other relevant project information, notifications of upcoming meetings, and contact information are available for viewing at the Region of Waterloo municipal office as identified above. Alternatively, you may visit the Region's website at www.regionofwaterloo.ca.

Comment Sheet
Regional Municipality of Waterloo
Fischer-Hallman Road / Bearinger Road Improvements
Public Consultation Centre #2 – Monday, November 4, 2019

Please complete and hand in this sheet so that your comments can be considered for this project. If you cannot complete your comments today, please take this home and mail, fax, or email your comments by Monday, November 18, 2019 to:

Justin Armstrong, P. Eng.
Senior Project Manager
Region of Waterloo
150 Frederick Street, 6th Floor
Kitchener, ON N2G 4J3
Telephone: 519-575-4757 Ext. 3164
Fax: 519-575-4430
Email: JuArmstrong@regionofwaterloo.ca

Dave Weiler, P.Eng.
Senior Project Manager – Municipal
WalterFedy
675 Queen Street South, Suite 111
Kitchener, ON N2M 1A1
Telephone: 519-576-2150 Ext. 242
Email: dweiler@walterfedy.com

Comments regarding this project:

Name:

Address:

Postal Code:

Phone: **Email:**

Collection Notice:

All comments and information received from individuals, stakeholder groups, and agencies regarding these projects and meetings are being collected to assist the Region of Waterloo in making a decision. Under the “Municipal Act”, personal information (such as name, address, telephone number, and property location) which may be included in a submission becomes part of the public record. Questions regarding the collection should be forwarded to the staff member noted above.

Appendix A

Summary of Region Noise Policy

The Region's Noise Policy is made up of three Parts:

Part A: **New development** impacted by existing roads and railways.

Part B: **Existing development** impacted by proposed Regional road widenings.

Part C: **Existing development** impacted by noise from existing Regional roads.

Since there is no new development proposed, only **Parts B or C** may apply to this project.

The Fischer-Hallman Road / Bearinger Road Class Environmental Assessment from Columbia Street West to Westmount Road North is proposing to:

- ü **Widen** Fischer-Hallman Road / Bearinger Road between Columbia Street West and Westmount Road North – therefore Part B applies.
  - § Noise is calculated at a residence **outdoor living area** – typically defined as the backyard or patio within 3 meters of the rear wall of a residential unit.
  - § Noise is calculated using a Ministry of the Environment, Conservation and Parks (MECP) model that calculates a 16-hour average noise level for the outdoor living area based on several factors, such as traffic volumes, distance from the outdoor living area to the centre of the road, and elevation differences between the outdoor living area to the centre of the road. The noise level used in the policy is not based on peak levels that may be recorded at a given location/time.

Part B of Region Noise Policy – Road Widening

The Region will consider designing and constructing a noise barrier if:

- ü The projected noise level in 10 years is calculated to exceed 65 dBa; or
- ü The projected noise level in 10 years is calculated to exceed 60 dBa and increase the existing noise level by 5dBa or more.

By constructing a noise barrier, projected noise is required to be calculated to be reduced to 60 dBa or less and reduced by 5dBa or more.

Part C of Region Noise Policy – No Road Widening – Existing Condition

The Region will consider cost-sharing (50-50) noise barrier design and construction if:

- ü A resident raises a noise concern; and

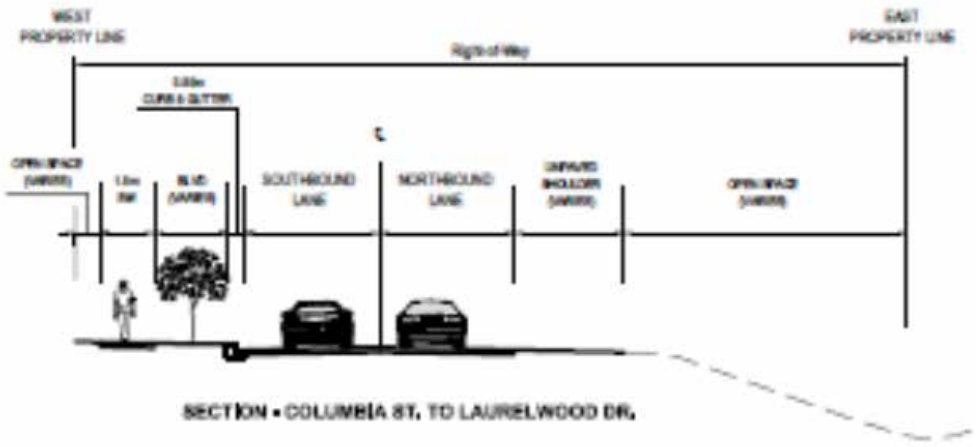
- ü Existing noise levels are calculated to exceed 60dBa.

If two-thirds (2/3) of affected property owners representing at least 50% of the property value are in agreement to build a noise barrier, all property owners will be responsible to pay 50% of the noise barrier cost (based on length of wall installed along their property line) with payments charged over a period of ten (10) years (in accordance with Local Improvement Act).

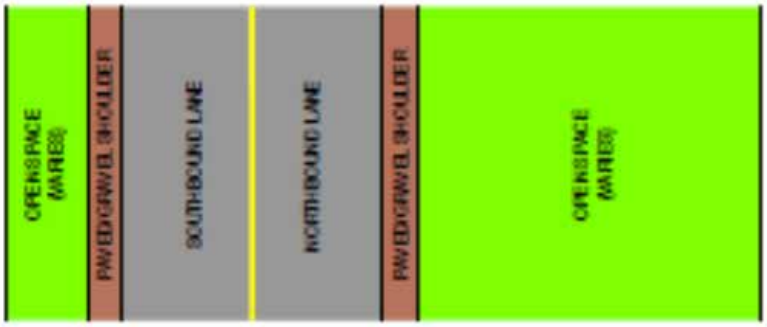
Residents may also decide to take other measures such as installing a privacy fence, air conditioning, and/or window improvements at their own expense.

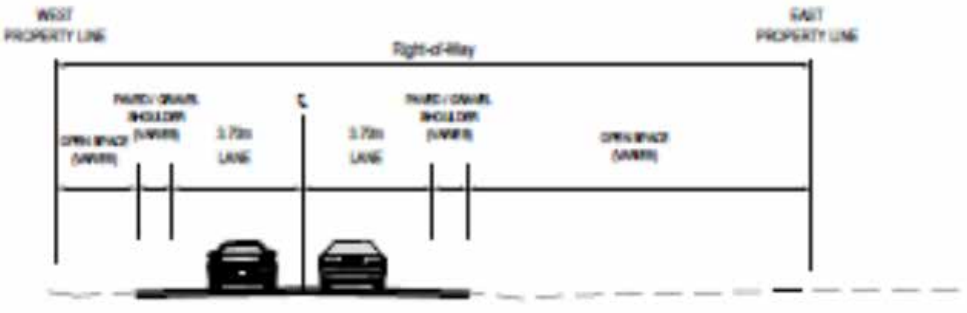
Appendix B – Design Alternative #1

Do Nothing



SECTION - COLUMBIA ST. TO LAURELWOOD DR.

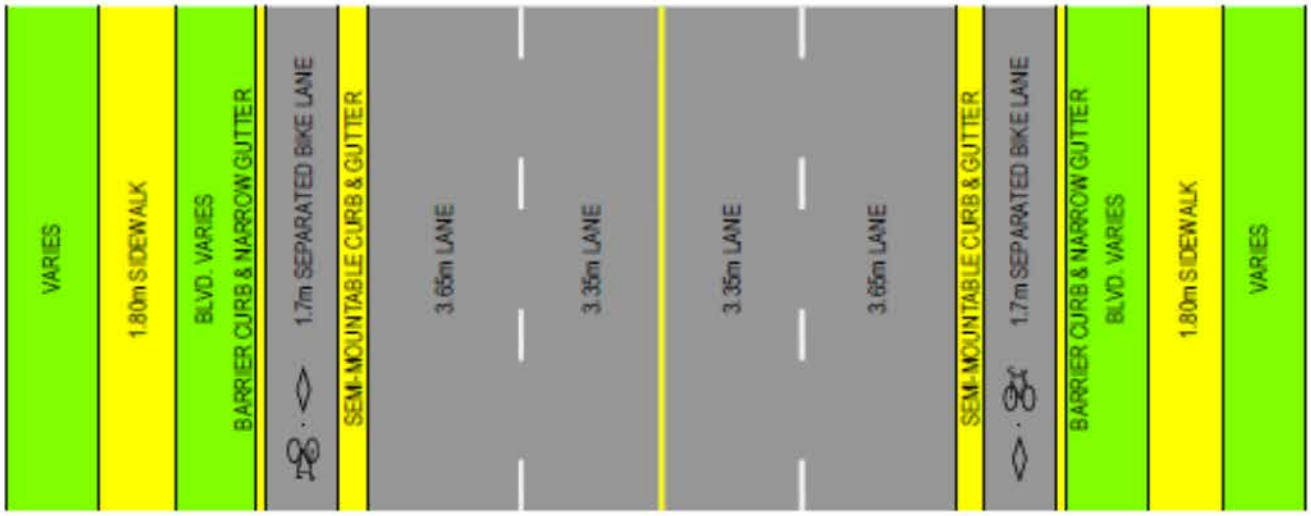


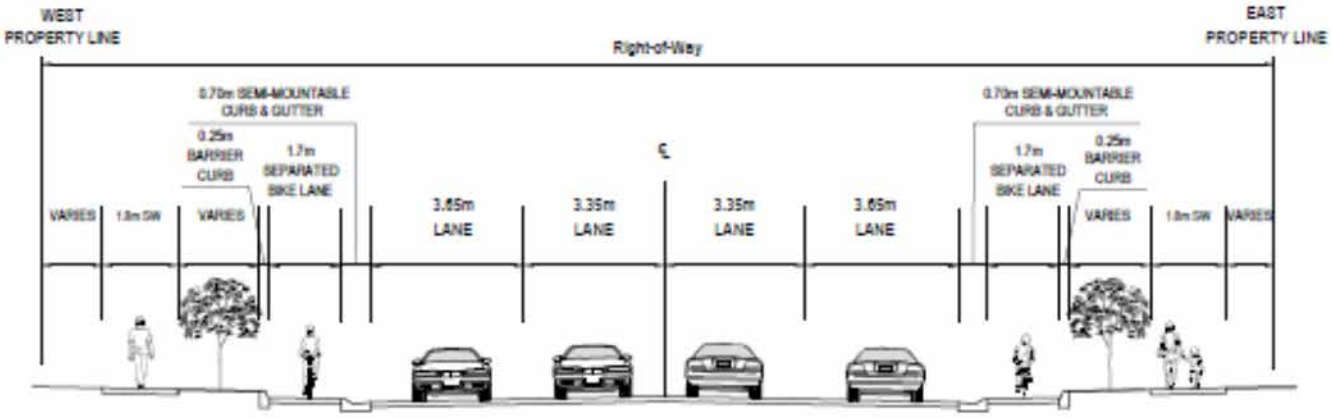


SECTION - LAURELWOOD DR. TO WESTMOUNT RD.

Appendix B – Design Alternative #2

Widen the Road to 4-lanes and Add Separated Bike Lanes and Sidewalk



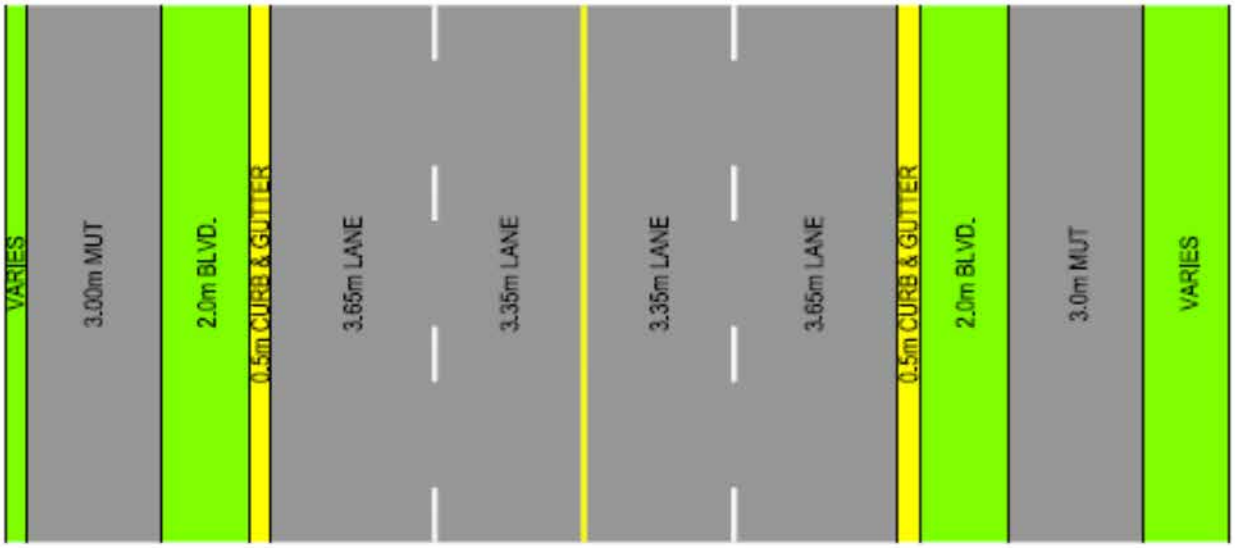


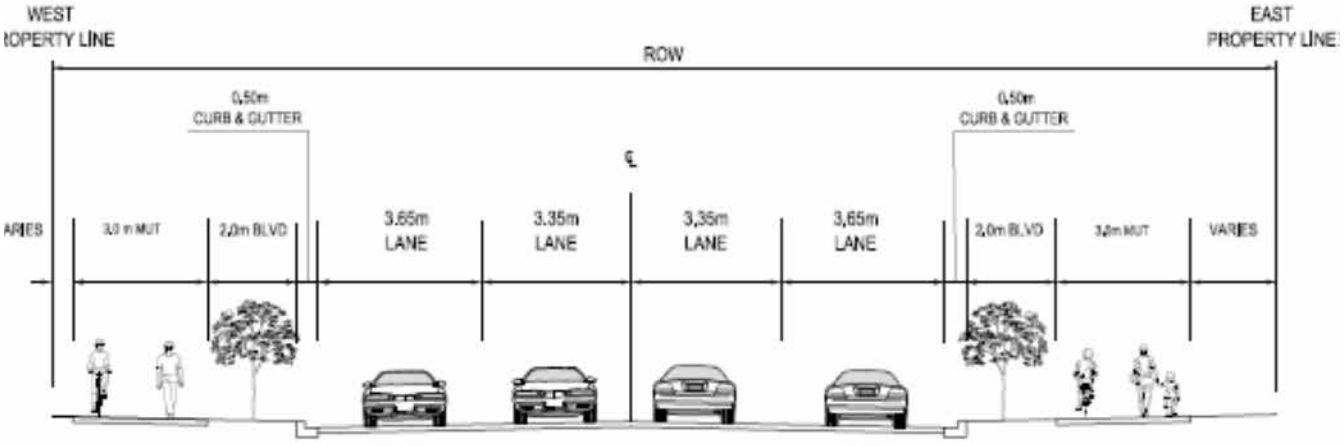
FISCHER-HALLMAN RD./ BEARINGER RD. RECONSTRUCTION
OPTION 2

4 THROUGH LANES, 1.7m SEPARATED BIKE LANES, 1.8m SIDEWALKS

Appendix B – Design Alternative #3a

Widen the Road to 4-lanes and Add Multi-Use Trail (MUT)

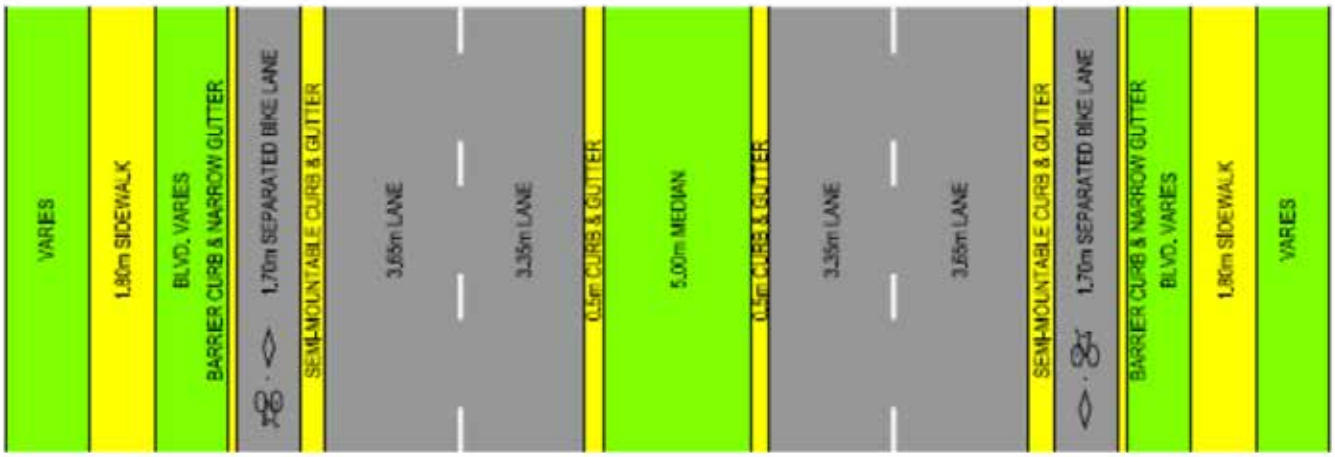


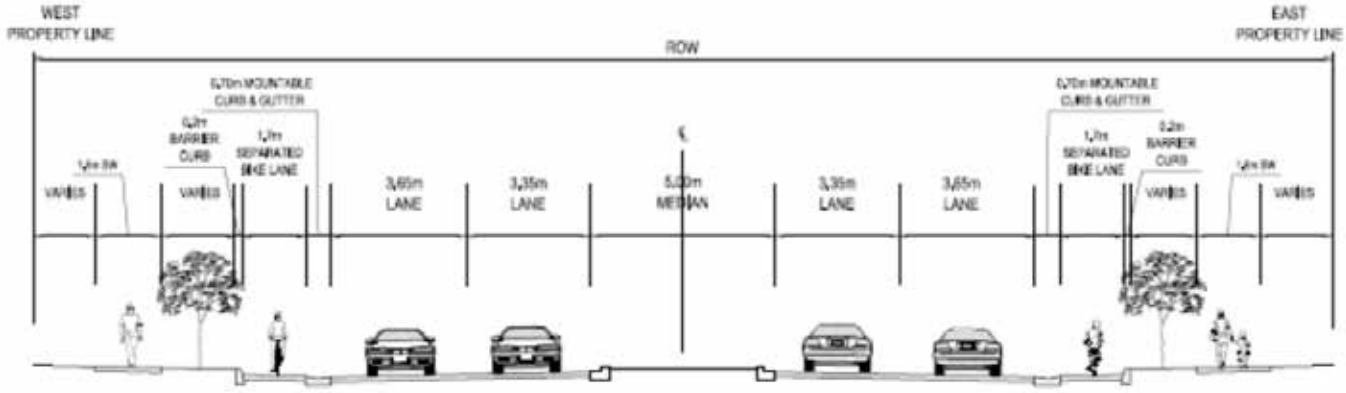


FISCHER-HALLMAN RD./ BEARINGER RD. RECONSTRUCTION
OPTION 3a
4 THROUGH LANES, NO BIKE LANES,
3.0m MULTI-USE TRAILS

Appendix B – Design Alternative #4

Widen the Road to 4-lanes and Add Median, Separated Bike Lanes, and Sidewalk

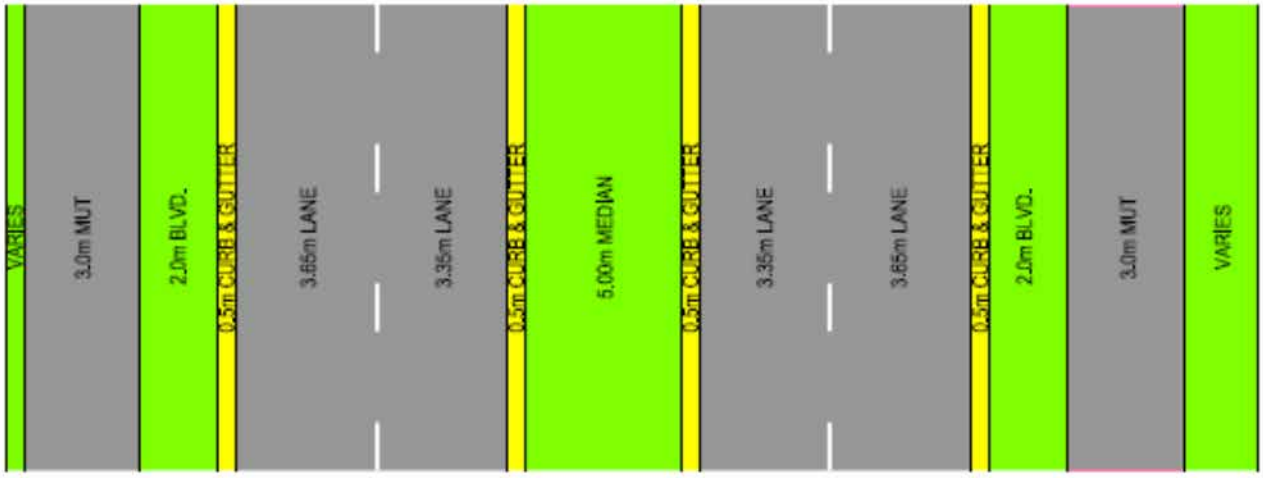


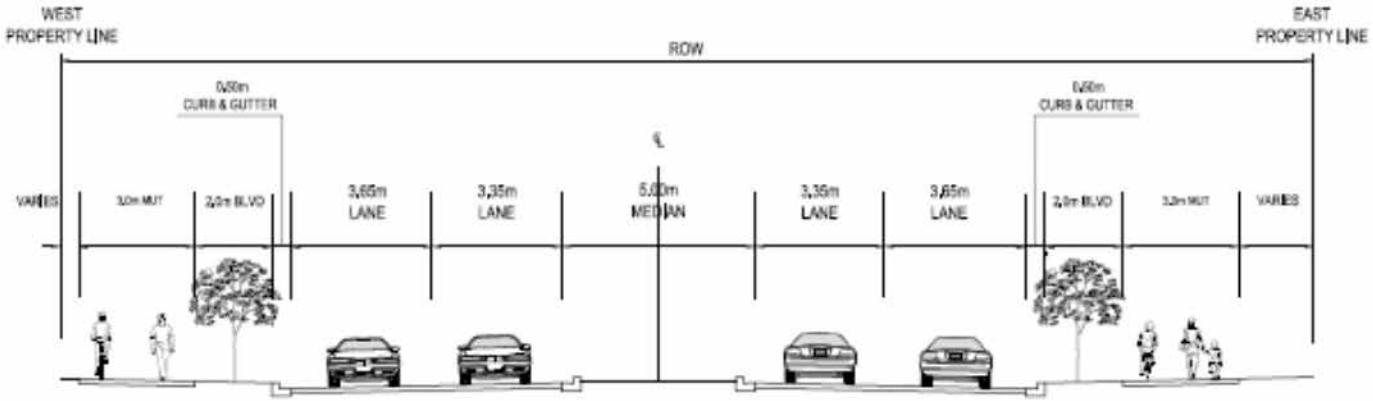


FISCHER-HALLMAN RD./ BEARINGER RD. RECONSTRUCTION
OPTION 4
5m MEDIAN, 4 THROUGH LANES, 1.7m SEPARATED BIKE LANES, 1.8m SIDEWALKS

Appendix B – Design Alternative #5a

Widen the Road to 4-lanes and Add Median and Multi-Use Trail (MUT)





FISCHER-HALLMAN RD./ BEARINGER RD. RECONSTRUCTION
OPTION 5a
5m MEDIAN, 4 THROUGH LANES, NO BIKE LANES, 3.0m MULTI-USE TRAILS

Appendix C – Project Team Evaluation of Alternatives (Natural Environment)

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Natural Environment How does the alternative affect existing trees, vegetation, and wildlife?	Ø No changes to existing conditions Ø No removal of existing trees required Ø No widening of pavement; therefore, less roadway width for terrestrial wildlife crossing Ø Roadside ditches remain, providing infiltration of stormwater Ø No cultural or heritage impacts Ø Maintaining existing road capacity will lead to additional idling, queuing, etc.; reduced relative air quality	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 921 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 63 planted trees on eastern side require removal to facilitate multi-use asphalt trail (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 534 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 1093 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 63 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 925 m² of deciduous forest habitat
	VERY GOOD	FAIR - GOOD	GOOD	GOOD	GOOD

Appendix C – Project Team Evaluation of Alternatives (Socio-Economic Environment)

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Socio-Economic Environment How does the alternative affect the residential and commercial properties abutting the road (driveways, access, property impacts, noise, air quality, streetscaping / beautification potential and archaeological / heritage resources)?	Ø No improvements for pedestrians, cyclists, or other recreational activities Ø Maintains current access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Increasing traffic congestion (delay) leads to poorer relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion (delay) leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Multi-use trail provides additional comfort level for recreation cyclists Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion (delay) leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for additional, future landscaping and more aesthetically pleasing roadway Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Multi-use trail provides additional comfort level for recreation cyclists Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for additional, future landscaping and more aesthetically pleasing roadway Ø No expected cultural or heritage impacts
	FAIR	GOOD	GOOD - VERY GOOD	GOOD - VERY GOOD	VERY GOOD

Appendix C – Project Team Evaluation of Alternatives (Transportation)

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Transportation How does the alternative serve the expected vehicular, transit, pedestrian, and cycling traffic in terms of travel delay, safety, and emergency access?	Ø Does not satisfy the Region's Transportation Master Plan with respect to vehicular, pedestrian, or cycling facilities Ø Does not provide adequate capacity for vehicular traffic Ø Does not improve conditions for Emergency Services, Transit Ø Does not improved conditions for cyclists or pedestrians	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated bike lane provides some separation from vehicular traffic, but buses stop in these lanes Ø Sidewalk provides dedicated facility for pedestrians along the length of the corridor	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a more separated off-road facility for cyclists Ø Provides wider boulevards than Alternative 5a	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated bike lane provides some separation from vehicular traffic, but buses stop in these lanes Ø Sidewalk provides dedicated facilities for pedestrians along the length of the corridor Ø Raised centre median provides physical separation of between two-directional (opposing) traffic, increasing safety Ø Raised centre median provides potential refuge for pedestrians crossing the road mid-block	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a separated off-road facility for cyclists Ø Raised centre median provides physical separation of between two-directional traffic, increasing safety Ø Raised centre median provides a refuge for pedestrians crossing the road mid-block Ø Less separation between travel lanes and multi-use trails than Alternative 3a
	POOR	GOOD	GOOD – VERY GOOD	GOOD - VERY GOOD	VERY GOOD

Appendix C – Project Team Evaluation of Alternatives (Cost / Overall)

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Cost What is the total cost of the alternative, including the cost for road construction, utility and street-lighting relocations, property acquisitions, traffic signal improvements, and landscaping?	Ø Approximately $5.7M Capital Cost Ø Increased costs for movement of goods and services as congestion increases Ø No change to maintenance costs for road, pedestrian/ cycling facilities or landscaping Ø Increased traffic over fewer travel lanes increases frequency of required maintenance	Ø Approximately $15.3M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/ cycling facilities and landscaping	Ø Approximately $14.5M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $15.7M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $15.2M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping
	GOOD	GOOD	GOOD	GOOD	GOOD
OVERALL EVALUATION	**FAIR - GOOD**	**GOOD**	**GOOD**	**GOOD**	**GOOD – VERY GOOD**
OVERALL RANKING	**5**	**4**	**2**	**3**	**1**

Appendix D

Property Acquisition Process Information Sheet

The following information is provided as a general overview of the property acquisition process and is not legal advice. Further, the steps, timing, and processes can vary depending on the individual circumstances of each case.

Once the Class Environmental Assessment is complete and the Environmental Study Report outlining the Recommended Design Concept has been approved, the property acquisition process and the efforts of Regional Real Estate staff will focus on preparation for acquiring the required lands to implement the approved design. Regional staff cannot make fundamental amendments or changes to the approved design concept.

Property Impact Plans

After the project has been approved and as it approaches final design, the project planners will generate drawings and sketches indicating what lands and interests need to be acquired from each affected property to undertake the project. These drawing are referred to as Property Impact Plans (PIP).

Initial Owner Contact by Regional Real Estate Staff

Once the PIPs are finalized and available, Regional Real Estate staff will retain an independent appraiser to provide preliminary valuations of the land requirements and their effect on the value of the property. As this process nears completion Real Estate staff will contact the affected property owner/s by telephone and mail to introduce themselves and set-up initial meetings to discuss the project, appraisals, and proposed acquisitions.

Initial Meetings

The initial meeting is attended by the project engineer and the assigned real estate staff person to brief the owner on the project, what part of their lands are to be acquired or will be affected, what work will be undertaken, when, with what equipment, etc. and to answer any questions. The primary purpose of the meeting is to listen to the owner and identify issues, concerns, effects of the proposed acquisition on remaining lands and businesses that can be feasibly mitigated and/or compensated, and how the remaining property may be restored. These discussions may require additional meetings. The goal of staff is to work with the owner to reach mutually agreeable solutions.

Goal – Fair and Equitable Settlement for All Parties

The goal is always to reach a fair and equitable agreement for both the property owner and the Region. Such an agreement will provide compensation for the fair market value of the lands and address the project impacts (such as repairing or replacing landscaping, fencing, paving, etc.)

such that the property owner will receive the value of the lands acquired and the restoration of their remaining property to the condition it was prior to the Project.

The initial meetings will form the basis of an initial offer of settlement or agreement of purchase and sale for the required lands or interests.

Steps Toward Offer of Settlement or Agreement of Purchase and Sale

The general steps toward such an offer are as follows;

1) the Region will obtain an independent appraisal of the fair market value of the lands and interests to be acquired, and an appraisal of any effect on the value of the rest of the property resulting from the acquisition of the required lands and interests;
2) compensation will be estimated and/or works to minimize other effects will be defined and agreed to by the property owner and the Region;
3) reasonable costs of the owner will be included in any compensation settlement;
4) an offer with a purchase price and any other compensation or works in lieu of compensation will be submitted to the property owner for consideration; and
5) an Agreement will be finalized with any additional discussion, valuations, etc. as may be required.

Depending on the amount of compensation, agreements may require the approval of Council. The approval is undertaken in Closed Session which is not open to the public to ensure a level of confidentiality.

Expropriation

Due to the time constraints of these projects, it is the practice of the Region to commence the expropriation process in parallel with the negotiation process to ensure that lands and interests are acquired in time for commencement of the Project. Typically, over 90% of all required lands and interests are acquired through the negotiation process. Even after lands and interests have been acquired through expropriation an agreement on compensation can be reached through negotiation, this is usually referred to as a ‘settlement agreement’.

Put simply, an expropriation is the transfer of lands or an easement to a governmental authority for reasonable compensation, including payment of fair market value for the transferred lands, without the consent of the property owner being required. In the case of expropriations by municipalities such as the Region of Waterloo, the process set out in the Ontario *Expropriations Act* must be followed to ensure that the rights of the property owners provided under that *Act* are protected.

For information on the expropriation process, please refer to ‘Expropriation Information Sheet’.

The following information is provided as a general overview of the expropriation process and is not legal advice. For complete information, reference should be made to the Ontario Expropriations Act as well as the more detailed information in the Notices provided under that Act.

Expropriation Information Sheet

What is Expropriation?

Governmental authorities such as municipalities, school boards, and the provincial and federal governments undertake many projects which require them to obtain land from private property owners. In the case of the Regional Municipality of Waterloo, projects such as the construction or improvement of Regional Roads sometimes require the purchase of land from private property owners. In many cases, the Region of Waterloo only needs a small portion of the private property owner's lands or an easement for related purposes such as utilities, although in certain instances, entire properties are required.

Usually the governmental authority is able to buy the land required for a project through a negotiated process with the affected property owners. Sometimes, however, the expropriation process must be used in order to ensure that the land is obtained within a specific timeline. Put simply, an expropriation is the transfer of lands or an easement to a governmental authority for reasonable compensation, including payment of fair market value for the transferred lands, without the consent of the property owner being required. In the case of expropriations by municipalities such as the Region of Waterloo, the process set out in the Ontario **Expropriations Act** must be followed to ensure that the rights of the property owners provided under that *Act* are protected.

Important Note: The Region of Waterloo tries in all instances to obtain lands needed for its projects through a negotiated agreement on mutually acceptable terms. Sometimes, the Region of Waterloo will start the expropriation process while negotiations are underway. This dual approach is necessary to ensure that the Region of Waterloo will have possession of all of the lands needed to start a construction project on schedule. However, it is important to note that Regional staff continues to make every effort to reach a negotiated purchase of the required lands on mutually agreeable terms while the expropriation process is ongoing. If agreement is reached, expropriation proceedings can be discontinued and the land transferred to the Region of Waterloo in exchange for payment of the agreed-upon compensation.

What is the process of the Region of Waterloo under the Expropriations Act?

- Regional Council considers a request to begin an application under the **Expropriations Act** to obtain land and/or an easement for a specific Regional project. No decision is made at this meeting to expropriate the land. This step is simply direction for the Region of Waterloo to provide a "Notice of Application for Approval to Expropriate" to affected property owners that the process has started to seek approval to expropriate the land.

- As stated in the Notice, affected property owners have 30 days to request a Hearing to consider whether the requested expropriation is "fair, sound and reasonably necessary in the achievement of the objectives" of the Region of Waterloo. This Hearing is conducted by a provincially-appointed Inquiry Officer. Prior to the Hearing, the Region of Waterloo must serve the property owner with a Notice setting out its reasons or grounds for the proposed expropriation. **Compensation for lands is not determined at this Hearing.** The Inquiry Officer can order the Region of Waterloo to pay the property owner up to $200.00 as compensation for the property owner's costs in participating in this Hearing, regardless of the outcome of the Hearing.
- If a Hearing is held, a written report is provided by the Inquiry Officer to the property owner and the Region of Waterloo. Council must consider the Report within 90 days of receiving it. The Report is not binding on Council and Council may or may not accept the findings of the Report. After consideration of the Report, Council may or may not approve the expropriation of the land or grant approval with modifications. A property owner may wish to make written and/or verbal submissions to Council at the time that it is considering the Report.
- If no Hearing is requested by the property owner, then Council may approve the expropriation of the land after expiry of a 30 day period following service of the Notice of Application for Approval to Expropriate.
- If Council approves the expropriation then, within 3 months of this approval, the Region of Waterloo must register a Plan at the Land Registry Office that describes the expropriated lands. The registration of this Plan automatically transfers title of the lands to the Region of Waterloo, instead of by a Deed signed by the property owner.
- Within 30 days of registration of the Plan, the Region of Waterloo must serve a Notice of Expropriation on the affected property owner advising of the expropriation. Within 30 days of this Notice, the property owner may serve the Region of Waterloo with a Notice of Election selecting the valuation date under the *Expropriations Act* for calculation of the compensation.
- In order to obtain possession of the expropriated lands, the Region of Waterloo must also serve a Notice of Possession setting out the date that possession of the land is required by the Region of Waterloo. This date has to be 3 months or more from the date that this Notice of Possession is served on the affected property owner.
- Within 3 months of registration of the Plan, the Region of Waterloo must provide the affected property owner with payment for the full amount of the appraised fair market value of the expropriated land or easement and a copy of the appraisal report on which the value is based. If the property owner disagrees with this amount, and/or claims other compensation and/or costs under the *Expropriations Act*, the compensation and/or costs matter may be referred to a provincially-appointed Board of Negotiation in an effort to reach a mediated settlement and/or an appeal may be made to the Ontario Municipal Board (OMB) for a decision. In any event, the Region of Waterloo continues in its efforts to reach a negotiated settlement with the affected property owner prior to the OMB making a decision.

APPENDIX J

Public Consultation Centre #1 Comments and Project Team Responses

No.	Comment	Project Team Response
1.	Please attempt to leave existing walking trail on north side of Bearinger as is, with trees between road and trail. No need to pave this trail; stone dust is fine since winter maintenance is not needed. i.e. people can walk the sidewalks/ multi-use trail in winter (in future). I walk this trail often and prefer to walk in "forest" environment; lots of wild flowers exist along this trail.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Doreen Thomas Trail is owned by the Grand River Conservation Authority (GRCA) and will not be removed as part of this project. The Project Team will meet with GRCA and City staff to discuss options for the trail, including potentially incorporating the trail as part of the Fischer-Hallman road improvements.
2.	My preference if for either option #2 or #4. Options #3 and #5 I dislike because shared cycle/pedestrian trails are inherently unsafe, as some users don't seem to understand their responsibilities (some pedestrians wander, and some cyclists ride too fast, too close to pedestrians). Option #1 of doing nothing is out of the question as the narrow stretch doesn't work with only one lane in each direction. As is, right now this stretch of road is somewhat unsafe for cyclists.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team notes that a shared multi-use trail to serve both pedestrians and cyclists (if included in the Preferred Design Alternative) would be marked with a yellow line in the middle to guide users. A multi-use trail also encourages interested, but cautious cyclists.
3.	• More consultation with Natural Resources (nature division). • In an effort to protect our land (wetlands) while supporting growth and expansion. • Nature here is in big trouble as well as a possible negative impact in regards to floods i.e. soft terrain →hard terrain. • *previous floods. • Having relocated from Toronto's "backyard" 3 years now it's been my observation that trees planted in trenches die against any and all road medians. • Added street lights are negative for wildlife. • Huge threat to wildlife moreover there's already a trail for bikes and pedestrians along conservation side.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team has arranged for a comprehensive study of the natural environment as part of this project in order to identify any potential environmental impacts as a result of proposed improvements, and to recommend mitigating measures to minimize those impacts. The recommended mitigating measures will be included as part of the Preferred Design Alternative. Roadway illumination requirements will be reviewed as part of detailed design and comply with the Region's Illumination Policy and applicable standards. Modern LED roadway illumination has less light spill onto adjacent property than traditional/historical roadway illumination and can be further mitigated by shields at the lamp heads.
4.	• What about closing Bearinger between Laurelwood and Westmount, using/upgrading Laurelwood between Fischer-Hallman and Westmount? • Possibly replace all the light with more traffic circles to keep traffic flowing more. • Traffic both directions on Laurelwood between Erbsville and Fischer-Hallman is terrible every morning. Can this improve at all?	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The 2018 Regional Transportation Master Plan (RTMP) Update identifies and prioritizes recommended roadway capacity improvements to meet forecast traffic demands on Regional arterial roadways. The RTMP incorporates targets for modal shift from vehicles to other means of travel (including transit, cycling, and walking) consistent with Transportation Association of Canada (TAC) Design Guidelines. The RTMP identifies the need to widen Fischer-Hallman Road/Bearinger Road from 2 to 4 lanes between Columbia Street and Westmount Road based on forecast traffic volumes. The Project Team is conducting this Environmental Assessment (EA) Study to identify a Preferred Design Alternative in order to address the

No.	Comment	Project Team Response
		recommendations in the RTMP and provide the best overall solution based on all environmental criteria. Under Region roundabout policy, each existing signalized intersection within the project limits pre-screened in for further study. As a result, Intersection Control Studies (ICSs) were completed for the existing signalized intersections to assess the benefits of constructing roundabouts in place of traffic control signals. The ICSs found that traffic signals were preferred over roundabouts at these intersections (Columbia Street, Laurelwood Drive, and Westmount Road) based on a present value analysis of 20-year costs.
5.	This project is long overdue. I would welcome a roundabout at the Westmount-Bearinger intersection. This would go a long way to improve traffic flow in rush hour and quiet times.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. An Intersection Control Study (ICS) was completed to consider a roundabout at the intersection of Fischer-Hallman Road and Westmount Road. This study found that traffic signals were preferred over a roundabout at this location.
6.	• Disappointed there are no options that maintain 2 lanes but add sidewalk and bike lanes. • Many people have remarked about the significance of Laurelwood to Westmount stretch – the beauty and country road, tree-lined environment is of great value to many. This section is part of many of my own great experiences travelling through – and is of cultural value to me and my family. • In addition, I have seen great diversity of plant, amphibian (frogs!), and mammal life on the trail, vulnerable to any construction that would occur. • In the ponds nearby, I have seen heron, muskrat, and many waterfowl; I have also seen deer cross the road between Laurelwood/Westmount to enter the Columbia Lake area. • Please prioritize the wildlife at risk of great impact in addition to the great benefit of public natural spaces to our community (mental health and connections to nature). • Prioritize pedestrian/cycle traffic will be important as we build a future less reliant on fossil fuels. Prioritizing vehicle traffic (while a new road was already recently opened from Westmount to Laurelwood) it is not the direction I would like to see from my city representatives. • Please also consider with “as an option” simply adding safe bike lanes from Columbia to Laurelwood.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team developed the design alternatives to address the recommendations of the 2018 Regional Transportation Master Plan (RTMP) Update, which proposes widening Fischer-Hallman from 2 to 4 lanes between Columbia Street and Westmount Road to accommodate forecast traffic volumes and improve operations. All design alternatives developed by the Project Team (excluding the ‘Do Nothing’ alternative) include dedicated facilities for pedestrians and cyclists in addition to widening the roadway to 4 lanes. The Project Team has arranged for a comprehensive study of the natural environment as part of this project in order to identify any potential environmental impacts as a result of proposed improvements, and to recommend mitigating measures to minimize those impacts. The recommended mitigating measures will be included as part of the Preferred Design Alternative.
7.	• I recognize the need to move from 2 to 4 lanes, there is often significant congestion. • I bike to/from work in the study area – the roads as they currently are, are unsafe for cyclists. • I feel dedicated bike lanes are important. Mixed use trails are ok for families/etc. but for commuters or those getting exercise at the YMCA, dedicated bike lanes	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team notes that a shared multi-use trail to serve both pedestrians and cyclists (if included in the Preferred Design Alternative) would be marked with a yellow line in the middle to guide users.

No.	Comment	Project Team Response
	are best.	
8.	• Design #5 would be most preferred. • Big concerns about a potential roundabout at Laurelwood Drive YMCA Kids, Seniors. • Columbia upgrade between Fischer-Hallman and Erbsville is a successful project to be considered as a model. • Thank you for considering our input.	The Project Team acknowledges this comment and will consider it in developing a Preferred Design Alternative. As a result of an Intersection Control Study (ICS) of the Fischer-Hallman Road, Laurelwood Drive, and Bearinger Road intersection, the Project Team is recommending a signalized intersection at that location.
9.	It was nice to speak with you at the open house event on May 7th. I have summarised my responses and opinions to the proposed alternatives for Fischer-Hallman: - I was disappointed to see that no alternative included a multi-use trail on both sides of Fischer-Hallman. There are several user cases that demand multi-use trails on both sides. For example, direct connectivity for young cyclists or not-fully-confident cyclists from Laurelwood and Beechwood neighbourhoods to the Library-YMCA facility. Any side with only a sidewalk will be used by both young cyclists and not-fully-confident cyclists as well as pedestrians. This created unnecessary conflict. I observed this on my way to the open house on May 7th: two young children on bicycles and a parent struggling to cycle on the sidewalk with the children while pedestrians also used the sidewalk. - I do not think a median is appropriate on this section of Fischer-Hallman because it gives too may visual cues that the speed limit should be higher than 60km/h. We have plenty of experience from the expansion of Fischer-Hallman from 2 lanes to 4 lanes south of Columbia more than a decade ago. The typical cruising speed on this road is well above 60 km/hr and is likely above 70km/hr. The road there feels like a highway and motorists respond to these cues. Painted diamond lanes and cycle tracks are inappropriate with such speeds. Visual friction needs to be employed to control motor vehicle speeds. - The inclusions of cycle tracks is important to build out a network of cycle tracks however they are not appropriate for all cyclists and thus appropriate alternatives need to be provided. As mentioned above young cyclists or not-fully-confident cyclists will not use cycle tracks. There must be an alternative on each side of the road for these users. In the absence of alternatives like a multi-use trail because design tells people to ride on the sidewalk regardless of municipal bylaw. Additionally, cycle tracks must be well planned else there will be gaps and barriers such as in the newly built eastbound cycle track on Columbia St approaching the Bennington-Chancery roundabout. There the cycle track pinches out and there is no curb cut to allow cyclists to use the multi-use trail and cross ride. The westbound cycle track does not suffer from this design flaw. - Great care needs to be taken at every intersection because this is the location of the most conflicts between road users. For example, will there be cross rides for users of the multi-use trails? With the corner radii be kept as small as possible	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Region is still considering a multi-use trail (MUT) on both sides of Fischer-Hallman Road and Bearinger Road within the project limits. The Project Team notes that a shared MUT to serve both pedestrians and cyclists (if included in the Preferred Design Alternative) would be marked with a yellow line in the middle to guide users. The Project Team notes that a centre median would significantly reduce the likelihood of a mid-block head-on/cross-over collision. Also, a centre median will reduce the number of movements for conflict at future UW accesses along the corridor between Columbia Street and Laurelwood Drive, as well as Laurelwood Drive and Westmount Road. Lastly, a centre median is not expected to require any additional property at this time. A centre median also provides an opportunity to enhance the environment by providing measures to infiltrate stormwater, thereby reducing the quantity of stormwater runoff and improving its quality. The Project Team's Preferred Design Alternative will identify all proposed intersection improvements within the project limits, including new turn lanes, treatments to facilitate pedestrian accessibility, and measures to enhance cycling, such as cross-rides, at suitable locations.

No.	Comment	Project Team Response
	to reduce the speed of motor vehicles that are being turned? How will the cycle tracks on Columbia west of Fisher-Hallman and multi-use trails south of Columbia be integrated into the section of Fischer-Hallman under study? I look forward to seeing more detailed designs at the next stage of the process.	
10.	I live in North Lakeshore. I hope that the trail on the side of the Laurel Creek Conservation Area will remain. It's nice to have a green space for a walk (or bike ride).	The Project Team acknowledges this comment and will consider it in developing a Preferred Design Alternative. This trail is owned by the Grand River Conservation Authority (GRCA) and will not be removed as part of this project. The Project Team will meet with GRCA and City staff to discuss options for the trail, including potentially incorporating the trail as part of the Fischer-Hallman road improvements.
11.	I was hoping to drop by the public consultation session yesterday evening but was unable to make it, and I am wondering if there are ways to engage/provide input on the upcoming assessment outside of yesterday's meeting? I cycle daily between the Gatestone/Fischer Hallman area and Northfield/Parkside, and would definitely be a strong supporter of bike lanes along the Bearinger road stretch between the YMCA location and Westmount Rd.	The Project Team acknowledges this comment and will consider it in developing a Preferred Design Alternative.
12.	• I prefer Option 3. • I see no need for 2 sidewalks. • I also see no need for a center median. • There are raised bicycle lanes on Columbia now but most cyclist are using the multiuse trail on the south side. • Don’t spend taxpayer money on things that won’t be used or not a necessity.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team notes that a centre median would significantly reduce the likelihood of a mid-block head-on/cross-over collision. Also, a centre median will reduce the number of movements for conflict at future UW accesses along the corridor between Columbia Street and Laurelwood Drive as well as Laurelwood Drive and Westmount Road. Lastly, a centre median is not expected to require any additional property at this time. The Project Team notes that a shared multi-use trail to serve both pedestrians and cyclists (if included in the Preferred Design Alternative) would be marked with a yellow line in the middle to guide users. The Region of Waterloo has several guiding policies, including the Pedestrian Charter and Context Sensitive Corridor Design Guidelines, which recommend that dedicated pedestrian facilities be provided on each side of the road on Regional roadways.
13.	Comments: After attending this and asking questions and thinking about options I have two comments: 1) There should NOT be a new multi-use path on the north side of Fisher Hallman Road, the side closest to the lake and current GRCA path. The reason is that if one is built on the north side of the new road, it would actually duplicate the GRCA path! More importantly it would increase the fragility of that natural already existing public path. **Instead** put a full-size multi-use path on the south side only (where	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The GRCA path will not be removed as part of this project. The Region of Waterloo has several guiding policies, including the Pedestrian Charter and Context Sensitive Corridor Design Guidelines, which recommend that dedicated pedestrian facilities be provided on each side of the road on Regional roadways. The proposed configuration of the cycling and pedestrian facilities for this project will be identified in the Preferred Design Alternative following the Project Team’s evaluation of the

No.	Comment	Project Team Response
	cornfields/Seniors complex, library/YMCA are. Then it would be clear, simple, manageable for car drivers, (no wondering if someone is going to dart across the 4 lane road via the median, etc.) cyclists, wheelchair and scooter users, runners, pet walkers, families with children, etc. It would also be wide enough for folks going both ways on the one path to pass each other safely. (I heard at the Consultation that if two multi-use paths would be considered, that they each would be slightly smaller in width. I think one full-scale (= at least to that currently on east side of Westmount Rd between Bearinger and Westmount Rd). Additionally there can be a lot of trees, shrubs, etc. planted between the single multi-use path and the four lanes of traffic. 2) The goal of that single multi use path (in comment #1) would be to create a connecting loop in the future. UW would provide the closing gap on the west side of Westmount Road between the traffic circle and intersection of Bearinger and Westmount. In other words, although all the buildings do not exist yet on the university property, the library, the YMCA and the Schlegel seniors complex DO EXIST! So whether runners starting from the Y, or families on a walk/bike from Lakeshore Neighbourhood , all can simply focus on exercise and not fear for their safety. Having lived in the neighbourhood for 35 years, I witness daily the lines and lines of cars turning at Northfield to go to the library/Y/neighbourhoods, etc. Whatever is left of the GRCA current path needs protecting. If you put a multi-use path on that side the integrity of the natural area between the lake and the road WILL be completely destroyed, in my opinion.	alternatives and consideration of all public comments received.
14.	Here are my comments on the proposals highlighted at the public consultation held on May 7, 2019. I had a very informative discussion with Dan Schipper and he was very helpful clarifying the various options for me. He mentioned a possible '6th' option that was being discussed, but not presented. It consisted of two multi-use trails (one on each side of the roadway). That option appeals to me the most as a cyclist with these considerations: • Unless there is a safety or other purposeful need for a median, I would prefer no median and use that significant amount of land to enhance the width of the multi-use trails on both sides and if possible enlarge the boulevards as well so that the trails can be set further from traffic and provide more space for healthy trees to grow. In addition, it would provide more space for snow clearing and less possible damage to these same trees. Plows and snow have essentially wiped out the trees along Bearinger Road (already replanted twice) on the south side because the boulevard is just too narrow between the trail and street. (Plows also regularly throw snow onto the north side sidewalks along Bearinger	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team notes that a centre median would significantly reduce the likelihood of a mid-block head-on/cross-over collision. Also, a centre median will reduce the number of movements for conflict at future UW accesses along the corridor between Columbia Street and Laurelwood Drive as well as Laurelwood Drive and Westmount Road. Lastly, a centre median is not expected to require any additional property at this time.

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	Road every winter because the boulevard is too narrow and it can be hours or days before it is cleared again for pedestrians. I walked to work in the winter for 35 years and this was a regular occurrence.) • The median is basically 'unusable' land and may serve an aesthetic purpose but if that is all then I think pedestrians and cyclists would make much better use of it. • Riding next to traffic even on raised bike lanes with rolled curb, though better than a painted line bike lane, is still daunting on higher speed roads and make no mistake, cars regularly travel 70+ km/h along this road all the time. I only expect this to get worse with the improvements. I feel much safer on totally separated multi-use trails and use them exclusively even if a separate bike lane is present.	
15.	**27 July 2018**: Hi Justin, I found your name on the Region of Waterloo website for the above mentioned project. My family recently moved to Timbercroft Crescent in Waterloo, backing on to Fischer-Hallman Road. I am interested in joining the mailing list for updates to the project Fischer-Hallman Road (Regional Road 58) Improvements. Also, do you have information regarding the sound barrier to be constructed between the residences on Timbercroft and Fischer-Hallman when it is widened in the coming years? **21 May 19:** Hi Justin, Thank you for your efforts to collect feedback from residents in the area near Fischer-Hallman Road prior to the improvements. Per the information session, I have some feedback that I hope can help you improve plans to maintain a livable neighbourhood near the subject area. I have 3 primary concerns that would effect my family's quality of life once the project is complete: 1. Road Noise. As our property backs on to Fischer-Hallman, road noise is already very loud. We enjoy spending time on our deck and in the backyard, however, noise levels currently are very loud and make normal conversation difficult. Increasing the volume of traffic will only make this issue worse. Can you share the Noise Study that was completed in this area? My family and our neighbours believe that a Noise Barrier is warranted and required. 2. Left turn from Gatestone Blvd to Fischer-Hallman Rd northbound. This is a difficult and dangerous intersection. There are blind corners due to the bend in the road and vehicles travel very fast as well as bus stops just north of the intersection creates visibility challenges. A pedestrian island in the middle of Fischer-Hallman is also very dangerous when crossing the road. Additional traffic volumes or lanes on the road will make left turns and pedestrian crossings more difficult and	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four. A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project. Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier. Previous analysis has indicated that warrants are not met for either a dedicated left turn lane on Gatestone Boulevard or a signalized intersection at Gatestone Boulevard. Updated analysis will be completed as part of the Transportation Report and reflected in the Project Team's Preferred Alternative to be presented at the second Public Consultation Centre (PCC 2).

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	dangerous than already are. 3. Doreen Thomas Trail and Laurelwood Creek Conservation Area. We frequently use the trail along Bearinger Rd for recreational activity and commuting. This area is beautiful and an important nature area in our neighbourhood. We would really like to see the trail be maintained with trees on both sides, helping to create a buffer from the roadway. Our family is concerned about the extra noise and pollution that may impact the wildlife and enjoyment of this area. I hope this feedback helps to improve your planning process.	
16.	**17 May 19:** I attended the public consultation and wish to mention my preferred design. I like alternative 2 with a MAJOR change. Move the trees from between cyclists and pedestrians to between cyclists and cars. I am amazed that with the way people drive their cars in bike lanes that the separation wouldn't become automatic when designing new roads. Other than that, I like the way it looks. **19 May 19:** In my previous email I forgot to mention street lights. I would like to see no street lights on the new road. The less lighting along natural areas the better. Not only is it better for the movement of wildlife, but drivers also drive more slowly (I don't know why). This has been evident along Westmount Road where it runs from Columbia to Bearinger. Unfortunately, someone decided to light the roundabout which is not helpful. Please help to maintain some of our critter corridors in the city. We need to make those other than car drivers a priority in this world.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. A landscaping/tree planting plan will be developed during the detailed design stage of the project. Detailed design follows the planning (EA/study) phase and is prior to construction (implementation). Roadway illumination requirements will be reviewed as part of detailed design and comply with the Region's Illumination Policy and applicable standards. Modern LED roadway illumination has less light spill onto adjacent property than traditional/historical roadway illumination and can be further mitigated by shields at the lamp heads.
17.	Please accept this email in response of the proposed expansion of Fischer Hallman Road. We have lived in our present home backing onto Fischer Hallman for over 20 years and were the original owners. We have seen many changes and do understand for reasons of volume that making it a 4 lane as necessary. After seeing the proposed plans we do see that esthetically it will be lovely. The concern being the noise issue which already is an issue but with the proposed expansion will again increase. As told to us using averages to determine if a sound barrier would be helpful and concluding not deemed necessary I ask for that to be re visited. Please allow a different technique to be used in determining this or come and sit in our backyard for a relaxing supper. Also for the sake of safety as well since volume of vehicles will be increasing a lot. I do know that if you had a family member living in a house backing into Fisher hallman or perhaps yourself more consideration would be out into this decision so I am asking you to treat this as such. Thank you I advance for considering a noise barrier for the few homes along this stretch!	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four. A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project. Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier.

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18.	Just a note to follow up and make sure my voice is heard as a Waterloo Resident backing on to Fischer Hallman Road. Three items that definitely need to be addressed before your next public meeting: 1. A large sound barrier wall will be needed to be built and worked into your budget. Sound is already too loud in the homes and backyards along Fisher Hallman. 2. At the intersection of Gatestone Blvd and Fischer Hallman there will need to be a traffic Circle or stop light intersection. This is a very dangerous intersection and difficult to manuvere out of Gatestone Blvd, especially turning north. 3. No of the project should be begun unless a proper environmental investigation is complete. Thank you for allowing the residents to voice their concerns around the new increase in traffic flow in this area.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four. A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project. Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier. Previous analysis has indicated that warrants are not met for either a dedicated left turn lane on Gatestone Boulevard or a signalized intersection at Gatestone Boulevard. Updated analysis will be completed as part of the Transportation Report and reflected in the Project Team's Preferred Alternative to be presented at the second Public Consultation Centre (PCC 2).
19.	I am writing to comment on the proposed improvements for Fisher-Hallman based on the Public Consultation materials provided (Tuesday May 7, 2019). I would appreciate more direct attention to safety considerations at the intersection of Laurelwood Dr. and Fisher-Hallman/Bearinger. This is a route young families, including my own, travel regularly on foot and bicycle as well as with strollers given the YMCA and library facility. There is also an increasing number of elderly pedestrians in wheelchairs (motorized, etc) as the new Schlegel homes facility expands. None of the plans at this point appear to give careful attention to pedestrian crossing and safety, and the east-west crossing is very important to the Laurelwood community. I would prefer an improvement project that included single lane traffic with enhanced bus pull-outs and bicycle paths (or multi-purpose use paths) to keep the	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. Specific intersection improvements, including proposed improvements at the intersection of Fischer-Hallman Road and Laurelwood Drive, will be identified as part of the Project Team's Preferred Design Alternative. The Project Team developed the design alternatives to address the recommendation of the Region's Transportation Master Plan, which identified widening Fischer-Hallman to 4 lanes between Columbia Street and Westmount Road to accommodate forecast traffic volumes without undue levels of congestion. All of the design alternatives developed by the Project Team (excluding the 'do-nothing' alternative) include dedicated facilities for pedestrians and cyclists in addition to widening the roadway to 4 lanes.

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	width of street relatively narrow given the above consideration. It would also promote the idea of trying to move away from car-centered urban design. This seems reasonable given Westmount Rd. is close and is relatively lightly travelled. The doubling of the width of the road, in four of the proposals, will make the intersection more difficult for pedestrians with young children or the elderly to cross easily. It becomes a physical barrier to what should be considered part of the community and suggests that the priority in planning and thinking is on commuters and cars rather than thinking about the health of the neighborhood and community life. If the project goes ahead with a doubling in size, I also have significant concerns about the noise level and its effects on back living areas. I would appreciate further consideration regarding what happens for properties close to the road, including areas where there are currently barriers constructed.	The Project Team developed the design alternatives to address the recommendations of the 2018 Regional Transportation Master Plan (RTMP) Update, which proposes widening Fischer-Hallman from 2 to 4 lanes between Columbia Street and Westmount Road to accommodate forecast traffic volumes and improve operations. All design alternatives developed by the Project Team (excluding the 'Do Nothing' alternative) include dedicated facilities for pedestrians and cyclists in addition to widening the roadway to 4 lanes. The Region has a Noise Policy that is used to determine when noise barriers such as noise walls or berms would be recommended as part of an upcoming project. Part B of the Region's Noise Policy applies when a road widening is being considered. For this project, Part B of the Region's Noise Policy would apply if Fischer-Hallman/Bearinger Road is widened from two lanes to four. A noise study has been completed following Part B of the Region's Noise Policy for Fischer-Hallman/Bearinger Road within the project limits assuming a 4-lane road with forecasted traffic volumes in 2031. Based on the noise study results, noise barriers are not recommended along Fischer-Hallman/Bearinger Road from Columbia Street West to Westmount Road North as part of this project. Part C of the Region's Noise Policy could be applied because noise barriers are not recommended under Part B of the Noise Policy. Under Part C, a noise barrier may be considered under certain circumstances if property owners are willing to share in the cost of a noise barrier.
20.	We attended the open house on May 7, 2019 for the road improvements for Fischer-Hallman Road/Bearinger Road improvements from Columbia Street to Westmount Road North. We would like to provide comments regarding this project. Our recommendation would be Option 3. This widens the road to 4 lanes to allow for improved traffic flow. With the multi use trail, the bicycles are physically separated from the cars to improve their safety. The wider path also improves travelling for pedestrians, especially for those with younger children in strollers, wagons or tricycles. Will the multi use trail be an extension of the Trans Canada trail? Will it be integrated with the existing trail that runs from Benjamin Road along Westmount Road to Bearinger Road today? Is there any concern about animals such as turtles and frogs crossing the road to	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team retained an environmental specialty firm as part of this Class Environmental Assessment Study to complete an Environmental Impact Study (EIS). The EIS includes an inventory of existing natural conditions (wildlife and vegetation), identifying potential natural environment impacts associated with the road widening, and identifying recommended mitigating measures to be included as part of the project. An assessment of amphibian wildlife, including turtles and frogs, was included as part of the EIS. This study found that the number of existing amphibian crossings of Fischer-Hallman Road, as well as the mortality rate, was low. However, in order to further reduce the potential for amphibian crossings, the EIS recommends that wildlife protection (e.g. fencing) be installed in the vicinity of Fischer-Hallman Road/Bearinger Road and Westmount Road in order to help prevent wildlife, particularly turtles and frogs, from crossing the road. The exact location and extent of the fencing will be determined during the detailed design phase of the project.

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	and from the fields?	
21.	My wife and I discussed this proposal and agreed on a number of points: • If you plan to add roundabouts at any existing intersection (a feature not explicitly mentioned in the package, but apparently always uppermost in the minds of the members of the Planning Department), then DO NOTHING. In particular, there is no need for a roundabout at the crossroads with Laurelwood Drive. o I have heard rumours in the past of such a change, and it is not an appealing prospect. Small one-lane roundabouts may have their place, but the drivers of this region do not cope well with two-lane roundabouts, and the intersection at Laurelwood Drive was recently improved with a traffic light which serves very well, so there is no reason to go to the expense of redesigning and redeveloping that intersection. o The Key Plan map in the package seems to show existing roundabouts as small circles, and there is a dark one drawn in over the Laurelwood intersection. PLEASE DO NOT DO THIS. My wife particularly dislikes roundabouts and avoids Ira Needles Boulevard because of them, saying that they are risky and do not improve traffic flow as advertised, particularly the one at Erb Street. o Roundabouts are also more challenging to safe pedestrian crossings, and the YMCA and Library attract a lot of these. Also, pedestrian crossings foul up the flow through the roundabout, forcing vehicles to stop not just outside, but inside the circle, unless the pedestrian crossing is well back from the circle, leaving space for vehicles to stop without blocking the circulation. Unfortunately, pedestrians are resistant to walking the extra steps to these offset crossing points and often just skirt the main circle. o Admittedly, a bit of work to improve the sight lines for motorist turning right from Laurelwood to Fischer-Hallman would be welcome, since pedestrians waiting to cross are hidden until you are practically on top of them, and since too many don't think to use the crossing button, a driver can think that a safe turn can be made when it can't. • In general terms, for the safety of all concerned, the multi-use trail provides greater separation between motorized traffic and cyclists and would be much preferred. Also, the "separated cycle track" is likely to become a dumping ground for the snowplows, and since the Region has hopes of increased trips by bicycle, the multi-use trail would be more effective all year round. • A considerable cost could be saved if no sidewalk were to be constructed on the west property line between Laurelwood and Westmount. There are no points now where pedestrian traffic can connect on that side and it is unlikely that there ever will be, considering that the conservation area is there. The east side may eventually pick up traffic as the lands east of the YMCA and Library and the seniors' development are filled in along Laurelwood and all through that tract of land (the Key Plan shows additional streets and roundabouts to the north of	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. Under Region roundabout policy, each existing signalized intersection within the project limits pre-screened in for further study. As a result, Intersection Control Studies (ICSs) were completed for the existing signalized intersections to assess the benefits of constructing roundabouts in place of traffic control signals. The ICSs found that traffic signals were preferred over roundabouts at these intersections (Columbia Street, Laurelwood Drive, and Westmount Road) based on a present value analysis of 20-year costs. The Project Team notes that a centre median would significantly reduce the likelihood of a mid-block head-on/cross-over collision. Also, a centre median provides will reduce the number of movements for conflict at future UW accesses along the corridor between Columbia Street and Laurelwood Drive as well as Laurelwood Drive and Westmount Road. Lastly, a centre median is not expected to require any additional property at this time.

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	Laurelwood in this area and developments there obviously may add foot traffic someday, and yes, I see the planned roundabout on Bearinger.) But the reality is that there is already a multi-use trail of sorts on the GRCA land which I have not seen to be heavily used, so why double it? If the Region feels the need to have more open access to this trail, then it should work out something with the GRCA. Forcing all non-vehicular traffic to the east property line would not be very onerous as I imagine many of those travellers originating from the neighbourhoods off Northfield and Bearinger (beyond Westmount) might be headed for the YMCA or Library in any case. • I don't see a strong case one way or the other regarding the presence of a median, other than that the presence of one can make it easier to provide a separated left-turn lane without putting wiggles in the lanes going through. If you are determined to add roundabouts, then that is obviously not a factor. Does a median reduce accidents where vehicles cross the centre line in a cost-effective way? I have always wondered why I have not heard of more accidents of this sort along Bearinger in its current two-lane configuration, especially with its curves blinded by trees and hills. Perhaps the narrowness has a traffic calming effect and people are more careful because they know they need to be. Opening the road to four lanes may make people less cautious and thus a median might be needed to counterbalance the effect of drivers let off the leash.	
22.	Thank you for the presentation of the alternatives and for the public consultation held on May 7, 2019 at the Stork YMCA. It was disappointing to not see an alternative consisting of the existing 2 lanes plus improvements for cyclists (such as bike paths on both sides of the road). Given the well established scientific reports about the extent of climate change and species extinction due to human activity, it is disappointing that neither the Region of Waterloo nor the planners thought to come up with a plan that would provide incentives for residents to shift their transportation modes to more environment-friendly ones. This is in stark contrast to public comments by elected Region of Waterloo officials about their commitment to future generations and environmentally sustainable living at various public events. The plans exhibited showed no awareness whatsoever of the need to reduce the Region's contribution to the collapse of the planet (Please note that the lead article of the Globe and Mail of May 7th was about the extinction of one million species due to human-induced development). Second, the planners seem to conceive of residents (and the elected Region officials of their constituents) primarily as commuters. The plans showed no inkling that the the areas affected by road widening and the YMCA are home to, and part of a community of people. There were no questions about, or any consideration given to how road widening would affect the behaviour and quality of life of the community (many of whom walk along Fischer-Hallman and also to the YMCA),	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The 2018 Regional Transportation Master Plan (RTMP) Update identifies and prioritizes recommended roadway capacity improvements to meet forecast traffic demands on Regional arterial roadways. The RTMP incorporates targets for modal shift from vehicles to other means of travel (including transit, cycling, and walking) consistent with Transportation Association of Canada (TAC) Design Guidelines. The RTMP identifies the need to widen Fischer-Hallman Road/Bearinger Road from 2 to 4 lanes between Columbia Street and Westmount Road based on forecast traffic volumes. The Project Team is conducting this Environmental Assessment (EA) Study to identify a Preferred Design Alternative in order to address the recommendations in the RTMP and provide the best overall solution based on all environmental criteria (i.e. Natural Environment; Socio-Economic Environment; Transportation; and Cost).

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	raise noise and pollution levels, induce a sense of separation of the YMCA from the community ,and change the aesthetics and small community feeling of this area. The human community element is missing from the design element (there are environmental and archaeological assessments for example but no community assessments). The lack of attention to the community was also evident in the lack of any plans to erect noise barriers or to work with homeowners affected by the widening to mitigate adverse effects. While the planners' commitments to various standards are understandable, their commitments are only to meeting required standards and not toward meeting the social and health needs of those affected. Doubling the road would increase noise and pollution levels, create a more 'highway' feel, and reduce the incentive for my family and myself to walk to the YMCA, use the Doreen Thomas trail, and walk along Fischer-Hallman. It would create incentives for us to use our car more to get to places close-by (such as Laurelwood Plaza) and make our community feel more like one of those generic, anonymous and depressing places on the side of major thoroughfares. Road widening would also signal the Region's as well as the planners' firm commitment to hastening the destruction of our planet and to making life unsustainable for our children, grandchildren and future generations. Given all of this, I would strongly prefer an improvement plan that kept the existing two lane (single lane each way) configuration but with additions for bike paths and/or multi-use paths along with bus pull-outs.	
23.	I prefer to see no centre median. It would be great to encourage slower speeds by design. I like the row of trees between roadway and pedestrians. Thank you for the active transportation options – I like the multi-use trail that can accommodate either walking or cycling.	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Project Team notes that a centre median would significantly reduce the likelihood of a mid-block head-on/cross-over collision. Also, a centre median provides will reduce the number of movements for conflict at future UW accesses along the corridor between Columbia Street and Laurelwood Drive as well as Laurelwood Drive and Westmount Road. Lastly, a centre median is not expected to require any additional property at this time.
24.	I was just going through the plans for the Fischer-Hallman improvements, and wanted to provide some input from an all-ages-and-abilities cycling perspective. I just have a few questions/comments. 1) In this area, a mountable roll curb might not be appropriate. There will be many families cycling in this area, and roll curbs do not provide sufficient protection from motor vehicles. It is also likely that the bike lanes would be used as parking. Was any thought given to fully protected bike lanes in this area? 2) There are a number of sidewalks from the subdivision on the west to F-H Rd,	The Project Team acknowledges these comments and will consider them in developing a Preferred Design Alternative. The Region is still considering a multi-use trail (MUT) on both sides of Fischer-Hallman Road and Bearinger Road within the project limits. The Project Team notes that a shared MUT to serve both pedestrians and cyclists (if included in the Preferred Design Alternative) would be marked with a yellow line in the middle to guide users. The Region is still considering retaining the existing facility at Gatestone Boulevard.

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	and I'd assume that currently people cross at those locations for easier access to the library. What will be done to facilitate safe mid-block crossings between Laurelwood and Columbia? 3) Was any consideration given to having a MUT on both sides of F-H Rd? Or a raised bike path beside the sidewalk, with a boulevard between the cars and the vulnerable road users? This form of in-boulevard bicycle path provides protection from motor vehicles, but also separates pedestrians and cyclists/scooter users, and would be a safer spin on Alternative #4. 4) If a MUT is selected, will cross-rides be installed at Laurelwood? Or if that intersection will become a roundabout, would Dutch-style cycling/pedestrian priority be possible? Thank you for taking the time to respond. Apologies if any of these questions were answered in the public documents-- I find the PDFs sometimes don't load very quickly and I end up missing a page here and there.	The Preferred Design Alternative will identify all planned intersection improvements, accessibility measures for pedestrians, and cross-rides for cyclists where suitable. Cross-rides would be recommended to connect MUT to MUT across signalized (e.g. Laurelwood) intersections. As a result of an Intersection Control Study (ICS) of the Fischer-Hallman Road, Laurelwood Drive, and Bearinger Road intersection, the Project Team is recommending a signalized intersection at that location. The Preferred Design Alternative will identify all planned intersection improvements, accessibility measures for pedestrians, and cross-ride facilities for cyclists, where suitable.

APPENDIX K

Project Team Evaluation of Preliminary Design Alternatives

Evaluation of Design Alternatives for Fischer-Hallman Road Improvements from Columbia Street West to Westmount Road North

WALTERFEDY

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Cycle Tracks and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.	**ALTERNATIVE 3** Widen the Road to 4-Lanes and Add Multi-Use Trail and Sidewalk · Curb and gutter, and a storm drainage system · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail on one side; · 1.8-metre-wide sidewalk on one side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Cycle Tracks, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 5** Widen the Road to 4-Lanes and Add Median, Multi-Use Trail, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.
Transportation How does the alternative serve the expected vehicular, transit, pedestrian, and cycling traffic in terms of travel delay, safety, and emergency access?	Ø Does not satisfy the Region's Transportation Master Plan with respect to vehicular, pedestrian, or cycling facilities Ø Does not provide adequate capacity for vehicular traffic Ø Does not improve conditions for Emergency Services, Transit Ø Does not provide enhanced facilities for cyclists or pedestrians	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated cycle tracks provide some physical separation from vehicular traffic, but buses stop in this lane Ø Sidewalks provide dedicated facility for pedestrians along the length of the corridor	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a separated off-road facility for cyclists Ø Sidewalk provides dedicated facility for pedestrians along the length of the corridor Ø Southbound cyclists required to cross road to access multi-use trail on eastern side of road	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated cycle tracks provide some separation from vehicular traffic, but buses stop in this lane Ø Sidewalks provide dedicated facilities for pedestrians along the length of the corridor Ø Raised centre median provides physical separation of between two-directional traffic, increasing safety Ø Raised centre median provides a refuge for pedestrians crossing the road mid-block	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a separated off-road facility for cyclists Ø Sidewalk provides dedicated facility for pedestrians along the length of the corridor Ø Southbound cyclists required to cross road to access multi-use trail on eastern side of road Ø Raised centre median provides physical separation of between two-directional traffic, increasing safety Ø Raised centre median provides a refuge for pedestrians crossing the road mid-block
	POOR	GOOD	GOOD – VERY GOOD	GOOD - VERY GOOD	VERY GOOD

Updated May 29, 2019

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Cycle Tracks and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.	**ALTERNATIVE 3** Widen the Road to 4-Lanes and Add Multi-Use Trail and Sidewalk · Curb and gutter, and a storm drainage system · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail on one side; · 1.8-metre-wide sidewalk on one side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Cycle Tracks, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 5** Widen the Road to 4-Lanes and Add Median, Multi-Use Trail, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.
Natural Environment How does the alternative affect existing trees, vegetation, and wildlife?	Ø No changes to existing conditions Ø No removal of existing trees required Ø No widening of pavement; therefore, less roadway width for terrestrial wildlife crossing Ø Roadside ditches remain, providing infiltration of stormwater Ø No cultural or heritage impacts	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better air quality Ø More opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 921 m² of deciduous forest habitat (polar dominated) Ø No cultural or heritage impacts	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff Ø 56 planted trees on eastern side require removal to facilitate sidewalk and multi-use asphalt trail (ash, basswood) Ø Less traffic congestion leads to better air quality Ø More opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 190 m² of deciduous forest habitat (polar dominated) Ø No cultural or heritage impacts	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 1093 m² of deciduous forest habitat (polar dominated) Ø No cultural or heritage impacts	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 475 m² of deciduous forest habitat (polar dominated) Ø No cultural or heritage impacts
	GOOD	FAIR - GOOD	FAIR - GOOD	GOOD	GOOD

Updated May 29, 2019

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Cycle Tracks and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.	**ALTERNATIVE 3** Widen the Road to 4-Lanes and Add Multi-Use Trail and Sidewalk · Curb and gutter, and a storm drainage system · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail on one side; · 1.8-metre-wide sidewalk on one side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Cycle Tracks, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 5** Widen the Road to 4-Lanes and Add Median, Multi-Use Trail, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.
Socio-Economic Environment How does the alternative affect the residential and commercial properties abutting the road (driveways, access, property impacts, noise, air quality, streetscaping / beautification potential and archaeological / heritage resources)?	Ø No improvements for pedestrians, cyclists, or other recreational activities Ø Maintains current access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Increasing traffic congestion leads to air pollution Ø Some increase in traffic noise levels due to increased traffic volumes over time	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Decreased traffic congestion improves air pollution Ø Some increase in traffic noise levels due to increased traffic volumes over time	Ø Community benefits from new pedestrian and cycling facilities Ø Multi-use trail provides additional comfort level for recreation cyclists Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Decreased traffic congestion improves air pollution Ø Some increase in traffic noise levels due to increased traffic volumes over time	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Decreased traffic congestion improves air pollution Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for enhanced landscaping and more aesthetically pleasing roadway	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Decreased traffic congestion improves air pollution Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for enhanced landscaping and more aesthetically pleasing roadway
	FAIR	GOOD	GOOD - VERY GOOD	GOOD - VERY GOOD	VERY GOOD

Updated May 29, 2019

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Cycle Tracks and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.	**ALTERNATIVE 3** Widen the Road to 4-Lanes and Add Multi-Use Trail and Sidewalk · Curb and gutter, and a storm drainage system · Additional street lighting; · 3.0 to 4.0-metre-wide multi-use trail on one side; · 1.8-metre-wide sidewalk on one side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Cycle Tracks, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, on-road, separated cycle tracks along both sides; · 1.8-metre-wide pedestrian sidewalks along both sides.	**ALTERNATIVE 5** Widen the Road to 4-Lanes and Add Median, Multi-Use Trail, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 3.0 to 4.0-metre-wide multi-use trail along one side; · 1.8-metre-wide pedestrian sidewalk along one side.
Cost What is the total cost of the alternative, including the cost for road construction, utility and street-lighting relocations, property acquisitions, traffic signal improvements, and landscaping?	Ø Approximately $5.75M Capital Cost Ø Increased costs for movement of goods and services as congestion increases Ø No change to maintenance costs for road, pedestrian/ cycling facilities or landscaping	Ø Approximately $15.3M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/ cycling facilities and landscaping	Ø Approximately $14.0M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $15.75M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $14.7M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping
	FAIR	FAIR	FAIR	FAIR	FAIR
OVERALL EVALUATION	**FAIR**	**GOOD**	**GOOD**	**GOOD – VERY GOOD**	**GOOD – VERY GOOD**
OVERALL RANKING	**5**	**4**	**3**	**2**	**1**

Project Team Evaluation of Design Alternatives for Fischer-Hallman Road / Bearinger Road Improvements from Columbia Street West to Westmount Road North – Updated September 7, 2019

WALTERFEDY

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Transportation How does the alternative serve the expected vehicular, transit, pedestrian, and cycling traffic in terms of travel delay, safety, and emergency access?	Ø Does not satisfy the Region's Transportation Master Plan with respect to vehicular, pedestrian, or cycling facilities Ø Does not provide adequate capacity for vehicular traffic Ø Does not improve conditions for Emergency Services, Transit Ø Does not improved conditions for cyclists or pedestrians	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated bike lane provides some separation from vehicular traffic, but buses stop in these lanes Ø Sidewalk provides dedicated facility for pedestrians along the length of the corridor	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a more separated off-road facility for cyclists Ø Provides wider boulevards than Alternative 5a	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Separated bike lane provides some separation from vehicular traffic, but buses stop in these lanes Ø Sidewalk provides dedicated facilities for pedestrians along the length of the corridor Ø Raised centre median provides physical separation of between two-directional (opposing) traffic, increasing safety Ø Raised centre median provides potential refuge for pedestrians crossing the road mid-block	Ø Addresses the Region's Transportation Master Plan with respect to vehicular, pedestrian, and cycling facilities Ø Addresses future traffic capacity needs of the corridor Ø Reduces congestion and improves conditions for Emergency Services and Transit Ø Multi-Use Trail provides a separated off-road facility for cyclists Ø Raised centre median provides physical separation of between two-directional traffic, increasing safety Ø Raised centre median provides a refuge for pedestrians crossing the road mid-block Ø Less separation between travel lanes and multi-use trails than Alternative 3a
	POOR	GOOD	GOOD – VERY GOOD	GOOD - VERY GOOD	VERY GOOD

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Natural Environment How does the alternative affect existing trees, vegetation, and wildlife?	Ø No changes to existing conditions Ø No removal of existing trees required Ø No widening of pavement; therefore, less roadway width for terrestrial wildlife crossing Ø Roadside ditches remain, providing infiltration of stormwater Ø No cultural or heritage impacts Ø Maintaining existing road capacity will lead to additional idling, queuing, etc.; reduced relative air quality	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 921 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 63 planted trees on eastern side require removal to facilitate multi-use asphalt trail (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø More opportunity for tree planting in boulevard Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 534 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 56 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 1093 m² of deciduous forest habitat	Ø Roadside ditches are filled in, removing benefits of sediment removal from storm water runoff Ø Increased storm water runoff can be mitigated with stormwater management techniques Ø 63 planted trees on eastern side require removal to facilitate sidewalk (ash, basswood) Ø Less traffic congestion leads to better relative air quality Ø Opportunity for tree planting in boulevard Ø Median provides opportunity for installing measures to capture/ infiltrate stormwater (low impact development techniques) Ø Wider roadway reduces success of slow-moving wildlife crossing Ø Minor encroachment into disturbed wetland just north of Columbia Street Ø Requires removal of approximately 925 m² of deciduous forest habitat
	VERY GOOD	FAIR - GOOD	GOOD	GOOD	GOOD

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Socio-Economic Environment How does the alternative affect the residential and commercial properties abutting the road (driveways, access, property impacts, noise, air quality, streetscaping / beautification potential and archaeological / heritage resources)?	Ø No improvements for pedestrians, cyclists, or other recreational activities Ø Maintains current access to adjacent neighbourhoods, but increasingly congested Ø No property acquisition required Ø Increasing traffic congestion (delay) leads to poorer relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion (delay) leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Multi-use trail provides additional comfort level for recreation cyclists Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion (delay) leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for additional, future landscaping and more aesthetically pleasing roadway Ø No expected cultural or heritage impacts	Ø Community benefits from new pedestrian and cycling facilities Ø Multi-use trail provides additional comfort level for recreation cyclists Ø Relieves traffic congestion facilitating access to adjacent neighbourhoods Ø No property acquisition expected Ø Decreased traffic congestion leads to better relative air quality Ø Some increase in traffic noise levels due to increased traffic volumes over time Ø Median provides opportunity for additional, future landscaping and more aesthetically pleasing roadway Ø No expected cultural or heritage impacts
	FAIR	GOOD	GOOD - VERY GOOD	GOOD - VERY GOOD	VERY GOOD

	ALTERNATIVE DESIGN CONCEPT				
	ALTERNATIVE 1 "Do Nothing" – Reconstruct the Road in its Current Configuration · Reconstruct the road in its current configuration with any minor geometric improvements required	**ALTERNATIVE 2** Widen the Road to 4-Lanes and Add Separated Bike Lanes and Sidewalks · Curb and gutter, and a storm drainage system; · Additional street lighting; · 1.7m separated bike lane on both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 3a (New)** Widen the Road to 4-Lanes and Add Multi-Use Trail on each side · Curb and gutter, and a storm drainage system · Additional street lighting; and · 3.0 to 4.0-metre-wide multi-use trail on each side.	**ALTERNATIVE 4** Widen the Road to 4-Lanes and Add Median, Separated Bike Lanes, and Sidewalk · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; · 1.7-metre-wide, separated bike lane along both sides; and · 1.8-metre-wide pedestrian sidewalk along both sides.	**ALTERNATIVE 5a (New)** Widen the Road to 4-Lanes and Add Median and Multi-Use Trail on each side · Curb and gutter, and a storm drainage system; · Additional street lighting; · 5.0-metre-wide median; and · 3.0 to 4.0-metre-wide multi-use trail on each side
Cost What is the total cost of the alternative, including the cost for road construction, utility and street-lighting relocations, property acquisitions, traffic signal improvements, and landscaping?	Ø Approximately $5.7M Capital Cost Ø Increased costs for movement of goods and services as congestion increases Ø No change to maintenance costs for road, pedestrian/ cycling facilities or landscaping Ø Increased traffic over fewer travel lanes increases frequency of required maintenance	Ø Approximately $15.3M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/ cycling facilities and landscaping	Ø Approximately $14.5M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $15.7M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping	Ø Approximately $15.2M Capital Cost Ø Reduced costs for movement of goods and services as congestion decreases Ø Increased maintenance costs for road, pedestrian/cycling facilities and landscaping
	GOOD	GOOD	GOOD	GOOD	GOOD
OVERALL EVALUATION	**FAIR - GOOD**	**GOOD**	**GOOD**	**GOOD**	**GOOD – VERY GOOD**
OVERALL RANKING	**5**	**4**	**2**	**3**	**1**

APPENDIX L

Public Consultation Centre #2 Comments and Project Team Responses

No.	Comment	Project Team Response
1	Would like to ensure that the Doreen Thomas/GRCA trail remains as much as possible. It is nice to keep as much vegetation as possible between the trail and the road. Near Laurelwood Drive, make it obvious to find the trail (currently it might be a bit hidden). Some people park near Westmount Road for GRCA trail. Might be difficult in future.	The GRCA Doreen Thomas Trail will remain. Under the Preferred Design Alternative 5a, the road widening will take place largely to the south of the existing roadway, minimizing tree and vegetation removal. Wayfinding signage will be included in the Region corridor, per Region standards. Additional trail signage may be coordinated by the City of Waterloo and/or GRCA. The Project team has forwarded this comment for their review and action.
2	Alternative 3A would work with 4 lanes and multi use trail. I don't think it needs separate bike lanes. I would like to see traffic lights on Columbia at #461 as we are unable to access Columbia easily, and almost impossible to turn left. An alternative would be a mini traffic island. When the new apartments are built there will be over 500 new people/families which will make leaving our condos at 461 even more difficult.	The Project Team's Preferred Alternative 5a includes a multi-use boulevard trail on each side of the road, which will serve both pedestrians and cyclists as a mixed-use facility. 461 Columbia Street is not within the Project Study area and Columbia Street is a City of Waterloo road. The Project Team has forwarded the request for traffic signals at Fischer-Hallman Road and the 461 Columbia Street West access, as well as at Columbia Street West and the 461 Columbia Street West access, to the appropriate Region and City of Waterloo divisions for their consideration.
3	Use of clover instead of grass which turns to weeds after one year. Does not need to be cut as often and is more drought resistant.	The Project Team will develop and review proposed landscaping measures during the detailed design stage.
4	• Will be much safer for cyclists and pedestrians ✓ • I'd like to see a roundabout at Fischer-Hallman/Columbia as it's very difficult to exit 461 Columbia in either direction but especially left turns. With a roundabout we could turn right – go round the roundabout and come back. • The new apartments at 460 Columbia will further impact our exiting onto Columbia, but they have the advantage of making a right turn going round the roundabout at Bennington Gate and returning. • If no roundabout is in the cards (please please) then perhaps a traffic light at 460/461 Columbia. Most of our complex are senior citizens! • I think the plans look great and I'm looking forward to walking and biking on the new trails. • Alt 3A would be my preferred choice. Bikers can use the multi use trail on both sides of the road.	The Project Team's Preferred Alternative 5a includes a multi-use boulevard trail on each side of the road, which will serve both pedestrians and cyclists as a mixed-use facility. The recommended transportation improvements for this project are based on this Region of Waterloo's Traffic Study. This Traffic Study did not recommend a roundabout at Fischer Hallman Road and Columbia Street as the traffic signals were found to have lower capital, operating, and societal costs over a 20-year period than a roundabout. 461 Columbia Street is not within the Project Study area and Columbia Street is a City of Waterloo road. The Project Team has forwarded the request for traffic signals at Fischer-Hallman Road and the 461 Columbia Street West access, as well as at Columbia Street West and the 460/461 Columbia Street West accesses, to the appropriate Region and City of Waterloo divisions for their consideration.
5	Please consider our impacts on the natural (multi-use trail) environment when considering winter maintenance. Mainly road/trail salt management *reduce salt signage posted*. Effects on road de-icing salt will kill the amphibians/reptiles over a very short period of time ☹ Design alternative #3A	The City of Waterloo undertakes winter maintenance on behalf of the Region for Fischer-Hallman Road and Bearinger Road within the Project Study area. The City and Region have policies in place to reduce the use of road salt, while still adequately maintaining roadways during the winter.
6	It is a very well thought out project. The engineer who explained it to me said there would be a plan to restore the environmental destruction caused by its construction in a 2:1 ratio. However, what about the damage that will be caused by increased motor traffic? This road is very close to an environmental reserve	The Project Team notes that the proposed widening of Fischer Hallman Road/ Bearinger Road was found to be required based on the Region's 2018 Transportation Master Plan (TMP) Update. The Region's TMP has aggressive targets to encourage modal shift from automobiles to other forms of transportation, including transit, cycling, and walking. The Region has invested heavily over the

No.	Comment	Project Team Response
	that is extremely important to Waterloo's ecosystem. Wouldn't it be worth it to try different means of reducing traffic first, such as introducing a bus route?	past several years in both transit and active transportation infrastructure; however, the widening of Fischer Hallman Road/Bearinger Road is still required based on future forecast traffic volumes along this section of roadway to adequately accommodate traffic. GRT Route 13 (Laurelwood) currently services Fischer-Hallman Road between Laurelwood Drive and Columbia Street West. This route is expected to be maintained and stop amenities will be reviewed during the detailed design stage. GRT planning through 2021 does not currently include service along Bearinger Road between Laurelwood Drive and Westmount Road North.
7	• … I agree that the road is a source of congestion and poses significant safety concerns in its current configuration: as you probably already know the road is very narrow, there's no room to pull over, and it has some visibility issues around the bends and dips. It is particularly dangerous when cyclists, pedestrians, and parked cars are present, or when UW research staff pull in/out of the largely hidden driveways. Many drivers speed along this section of the road. Personally, I would not feel safe cycling there as some drivers can be aggressive and/or become frustrated due to the configuration of the road with no room to pass slow moving or stationary vehicles/people. Luckily, there is a good bike/walking trail along the north/west side of the road (Doreen Thomas Trail) that is well used, including by me. • In the design, I'd like to see: ▪ four lanes for motor vehicles, ▪ as many of the existing trees preserved as practical (with plans to restore the canopy/ treed laneway that currently exists). ▪ pedestrian and cycling paths paths should be elevated/separated from motor vehicle traffic, perhaps making use of the existing trail (it doesn't have to be right on the road after all.) • On somewhat related note: are there any plans to ever build a pedestrian/cycling bridge across Laurel Creek to connect Westmount Sports Field with Laurel Trail? I think this would add to the cycling/pedestrian connectivity of Waterloo and help encourage a lot of the many people who live in the Laurel Creek, Clair Hills, and surrounding areas to bike to school/work in UW, the Research and Tech part and points beyond as it's much nicer to have separated paths such as the Doreen Thomas Trail and Laurel Trail than to bike alongside motor vehicles.	The Project Team notes that its Preferred Design Alternative 5a includes widening of Fischer Hallman Road/Bearinger Road to four lanes, minimizing tree and vegetation removal, separated cycling and pedestrian boulevard trails, and plans to reinstate trees which are required to be removed. The City of Waterloo is responsible for Laurel Trail and Westmount Sports Field and the Project Team has forwarded the suggestion to construct a pedestrian/cycling bridge link to the City for its consideration.
8	• The plans for the improvements to Bearinger Road focus on accommodating traffic, but largely miss another function of this road – namely, its function as the ecological boundary of the conservation area. • Incorporating the conservation area boundary into the design will enhance the ecological function of the conservation area and minimize future ecological conflicts between this high capacity road and the surrounding area.	The Project Teams' response to these suggestions is as follows: 1. The Project Team agrees with the suggestion and wildlife exclusion fencing will be provided along the north side of Bearinger Road as part of the project. The exact limits and type of fencing will be determined during the detailed design stage in consultation with the Grand River

No.	Comment	Project Team Response
	• Designing the roadway as an ecological boundary should include the following elements: 1. Fencing along the north side of the roadway as a barrier to keep wildlife inside the conservation area and prevent them from accessing the roadway. 2. Noise abatement plantings along the fence area to minimize the noise disruption to wildlife inside the conservation area 3. A road lighting system which minimizes light pollution inside the conservation area 4. Dense plantings in conjunction with (2) to prevent vehicle lights from penetrating the conservation area. • An effective boundary will enhance the ecological functioning of the conservation area and minimize future conflicts with the roadway. • Given that a large number of trees will be removed for the road construction and the obligation to undertake compensatory plantings, the opportunity exists to replace these trees with tree and shrub plantings which enhance this ecological boundary function as per the above.	Conservation Authority, which owns the Laurel Creek Conservation lands. 2. The Project Team's Recommended Design Alternative includes planting new trees along the Fischer Hallman Road and Bearinger Road corridors. A landscape plan will be developed during the detailed design stage of the project. 3. A street lighting needs assessment and design will be determined during the detailed design stage of the project. The Project Team notes the suggestion to minimize light pollution in the Conservation lands and will consider this when completing the street light design. 4. The landscape plan referenced under (2) above will take this suggestion into consideration. The Project Team agrees with the suggestion to enhance the ecological boundary function through the use of strategically designed landscape plantings.
9	• My home address is ___ Timbercroft Crescent, and is right back to Fischer-Hallman road. Thanks a lot for all the nice work to make this project possible. Overall, we all believe that this is going to be a great project, which should greatly improve the traffic condition in the area, especially for the rush hour. All the people driving by will certainly benefit from it. • For the past seven years, we take the intersection at Gatestone Blvd at Fischer-Hallman every day to go to work, to send kids to library, to bring them to arena of McCormick or RIM park for hockey, and to pursue all other activities. Among all of our uses of that intersection, 2/3 of time we made left turns. Overall, we found it is fairly easy to make a left turn if it is before 7:30am, between 10:00am~11:00am, between 1:00pm~2:30pm, after 7:30pm, or generally anytime during the weekends. However, the left turn could be very challenging for anytime other than the above, which is the time people really need to drive out efficiently. The wait time could be as long as two and half minutes for a single left turn. With doubling the number of lanes to four, which will consequently double the traffic (yes, more people will choose to use Fischer-Hallman road due to its increasing convenience), each left turn driver will likely have to deal with four lines of traffic (Actually five, including the left turn lane from Fischer-Hallman road to Gatestone Blvd), and this will impose certain pressure to the driver. And this is not a situation everyone can easily handle either. A foreseeable scenario would be, at rush hour, a left turn driver would either need to wait for 5 minutes for a left turn in an optimum condition, or one or two minutes (not so patiently) to squeeze into traffic like crazy, which will greatly increase the chance of accidents in the	A Transportation Study was completed by the Region of Waterloo as part of the project planning. The intersection of Gatestone Boulevard and Fischer Hallman Road was assessed to identify the need for enhanced traffic operational measures, including both new auxiliary travel lanes and new traffic control signals. This assessment is based on applying forecast traffic volumes to determine projected queue lengths and travel delays. These parameters are then compared to established criteria to determine the need for any new auxiliary lanes or upgraded traffic control measures, such as traffic control signals. The Transportation Study concluded that neither additional auxiliary lanes nor traffic control signals were warranted for the intersection of Fischer Hallman Road and Gatestone Boulevard. Roundabout screening is undertaken when an improvement to an existing intersection is being proposed (e.g. new auxiliary lanes, traffic signals, etc.) or a new intersection is being proposed. The Project Team notes that the intersection could be re-assessed for traffic signals following construction of the Fischer Hallman Road improvements.

No.	Comment	Project Team Response
	area. Moreover, at rush hours, a lot of residents from Timbercroft Crescent and Gatestone Blvd need to go to work, and, at this case, a long backup line should be predictable. • All in all, after talking to a lot of people of the neighborhood, including Nick, Daren, Kelly and a lot of others who probably already contacted with you on this, we highly suggest the City will consider to add some kind of traffic control at this intersection, either a traffic light (A successful case would be McGarry Dr @ Fischer-Hallman and some others around the cities) or a roundabout. • Furthermore, possibly mentioned by our neighbors already, at the way out of Gatestone Blvd, a separate right turn lane is highly suggested. This will greatly reduce the waiting time of the right turn vehicle. Otherwise, in the scenario we postulated above, with a left turn vehicle ahead, it will be frustrating to wait in line for 5 minutes to make a single right turn. • We understand a third party traffic investigation has been pursued, but we are not certain that the investigation has consider enough on the rush hour traffic. At this point, even an averaging of the traffic does not make a lot sense as averagely speaking, except 401, the traffic of all roads (including Columbia road, Northfield Dr, and even Fischer-Hallman itself) could be light. • Please kindly consider our comments and suggestions. Bottom line is that none of us here wants to be locked up in during the rush hour, and none of us wants to make only right turns to take a detour South when they really need to head North.	

APPENDIX M

Regional Committees/Council Reports

Regional Municipality of Waterloo

Active Transportation Advisory Committee

Minutes

Tuesday, December 17, 2019

5:00 p.m.

Room 110, Regional Administration Building

150 Frederick Street, Kitchener

Present were: Chair C. Klein, D. Brotherston*, M. Cowan, A. Cullen, K. Kiefer*, G. Lorentz*, R. Mattix, T. Osland, A. Quin, K. Schimmelfing and M. Shipley

Members Absent: K. Alexander, J. Gibbins, and K. Schnuelle

Also Present: J. Armstrong, J. Belanger, and D. Spencer

Declarations of Pecuniary Interest under the "Municipal Conflict of Interest Act"

None declared.

Approval of Minutes of Meeting – November 19, 2019

Moved by A. Quin

Seconded by R. Mattix

That the minutes of the Active Transportation Advisory Committee of November 19, 2019, be approved.

Carried

New Business

a) Fischer-Hallman Road / Bearinger Road Improvements Update – J. Armstrong

*K. Kiefer entered the meeting at 5:03 p.m.

Justin Armstrong, Senior Engineer, provided a presentation on the road widening and active transportation facilities that are proposed for the corridor. A copy of the presentation is appended to the original minutes. He provided an overview of the existing facilities and explained that multi-use trails are proposed for both sides of Fischer-Hallman Road/Bearinger Road throughout the project.

Responding to questions, J. Armstrong stated that the Grand River Conservation Authority does not want to pave over the existing stone dust trail in the area and that goat paths along the road indicate that people are already taking a shorter route.

The Committee questioned the Region's standard of installing cross rides only in the direction of multi-use trails rather than allowing them to connect across the road as well. J. Armstrong stated that during the detailed design phase staff can look at options for getting users from the on road cycling lanes to the multi-use trails.

The Committee supported the recommended active transportation facilities and encouraged staff to address the cross rides in the detailed design.

*J. Armstrong left the meeting at 5:30 p.m

Information/Correspondence

a) Membership Update – T. Brubacher

Tim Brubacher, Committee Clerk, informed the Committee that Regional Council has appointed four new members to the Committee beginning in January being Dawn Clelland, Anne Crowe, Michael Jeans, and Margaret Santos. He thanked C. Klein, D. Brotherston, K. Schimmelfing, and B. Robinson for their service to the Committee and the Region.

b) Message from Chair – C. Klein

C. Klein provided remarks on his term as the Chair. He encouraged Committee members to remember to balance their approaches between idealism and pragmatism when approaching issues. He encouraged staff to be open to change and take Committee suggestions as a challenge.

*G. Lorentz entered the meeting at 5:36 p.m.

*D. Brotherston left the meeting at 5:39 p.m.

Agenda Items for Next Meeting – January 21, 2020

a) Regional Roundabouts – S. van De Keere

b) Fairway Rd. Improvements – J. Lane

Adjourn

Moved by R. Mattix

Seconded by A. Quin

That the meeting adjourn at 5:41 p.m.

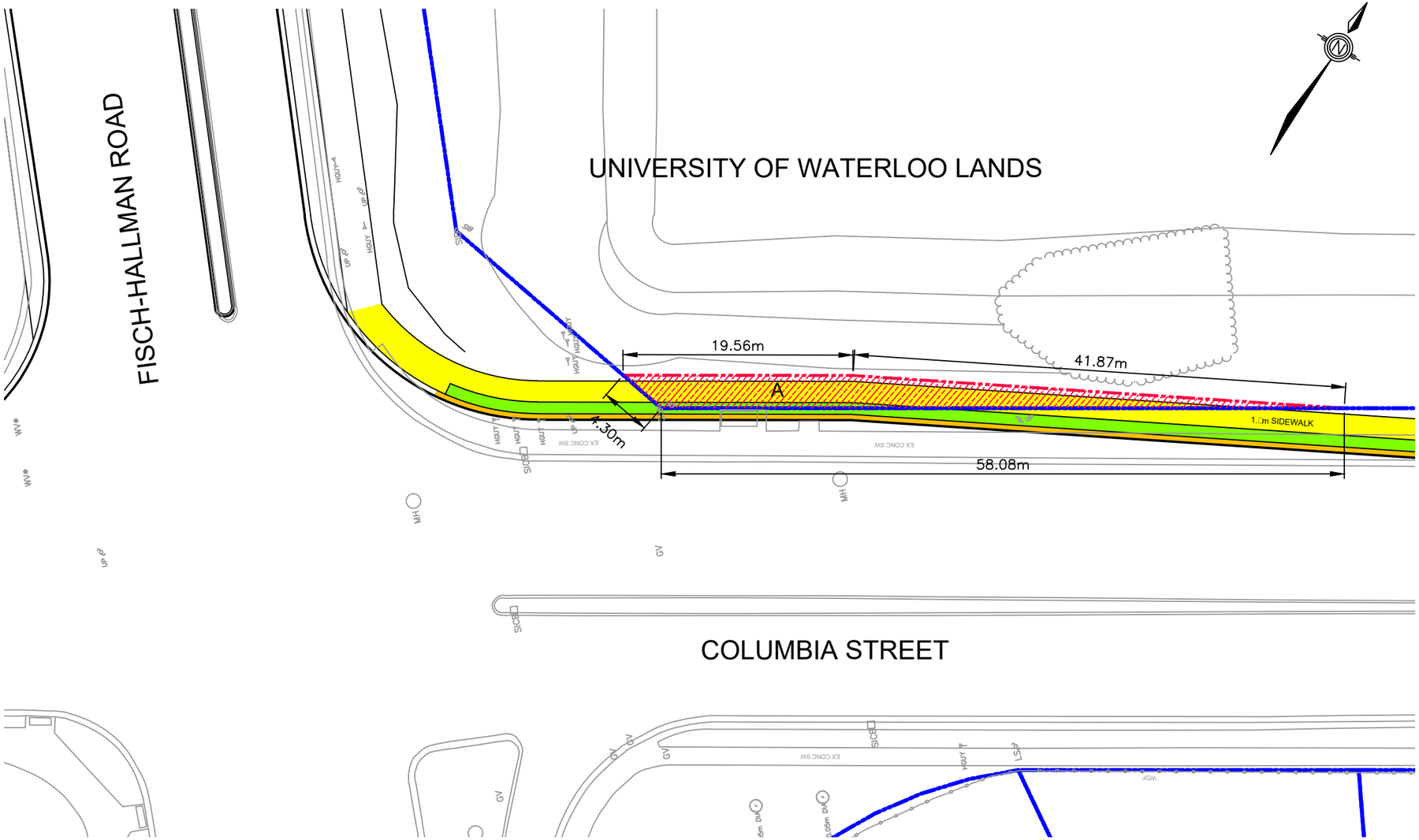
Carried

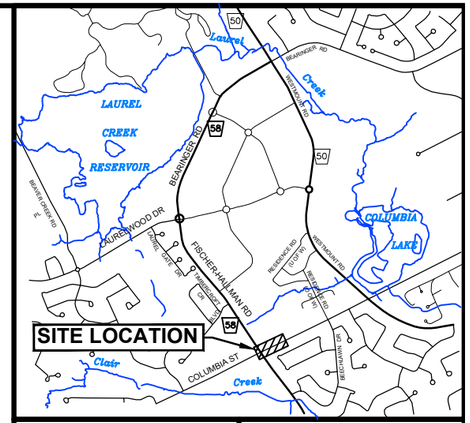
Committee Chair, C. Klein

Committee Clerk, T. Brubacher

APPENDIX N

Preliminary Property Impact Plans





PART N□	AREA
A	108.3 m²

LEGEND

- PROPOSED CONCRETE CURB
- PROPOSED 1.0m WIDE GRASS BOULEVARD
- PROPOSED CONCRETE SIDEWALK
- PROPOSED FEE SIMPLE A□UISITION
- PROPOSED ROAD RIGHT-OF-WAY, PROPERTY LINE (FEE SIMPLE)
- EXISTING ROAD RIGHT-OF-WAY, PROPERTY LINE

Region of Waterloo

PLAN SCALE□	1□400
DATE□	NOV 2019
DRAWN BY□	T.Y.L
FILE N□	□□□□□

FISCH-HALLMAN RD / BEARING RD IMPROVEMENTS
PROPERTY AC□UISITION PLAN

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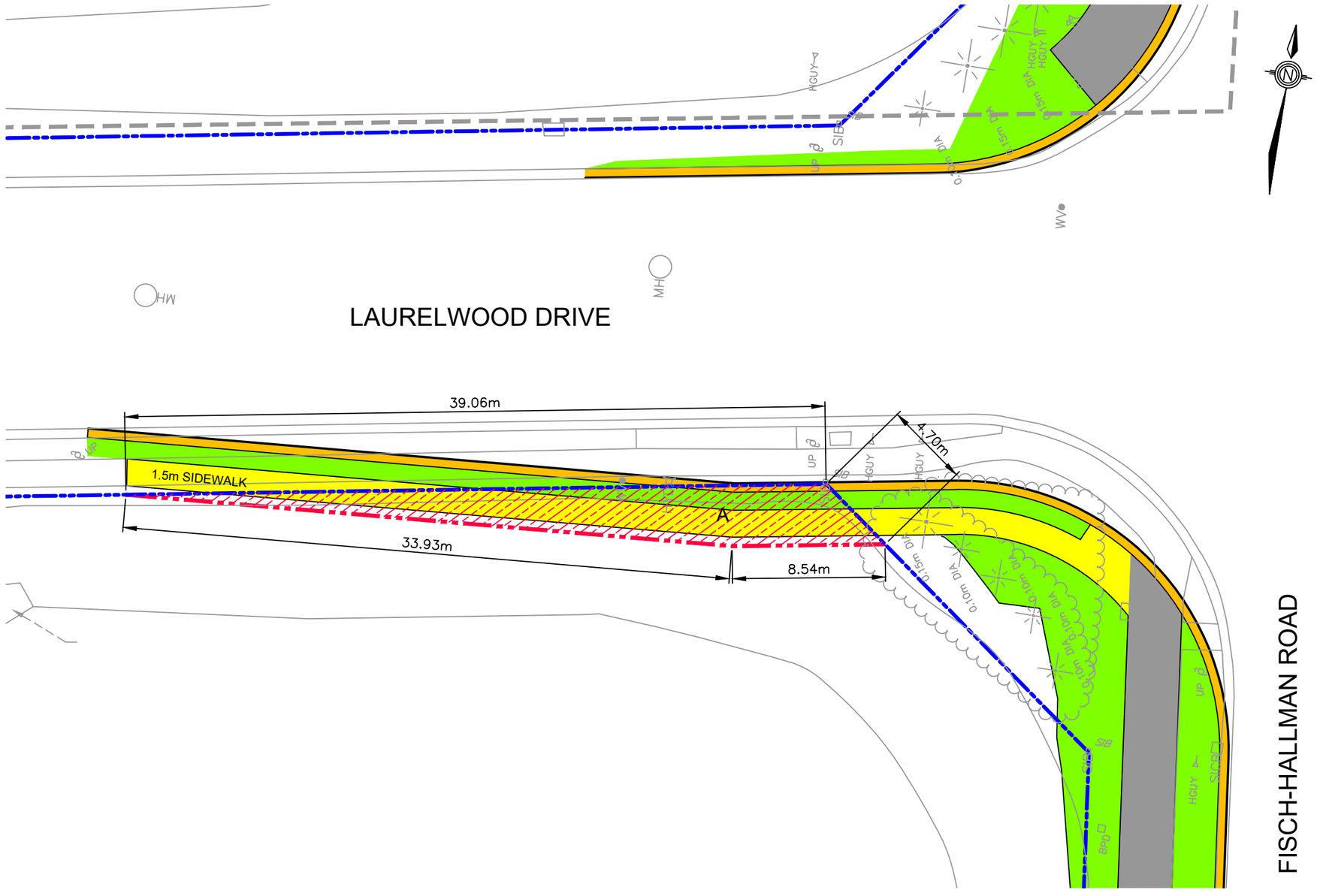

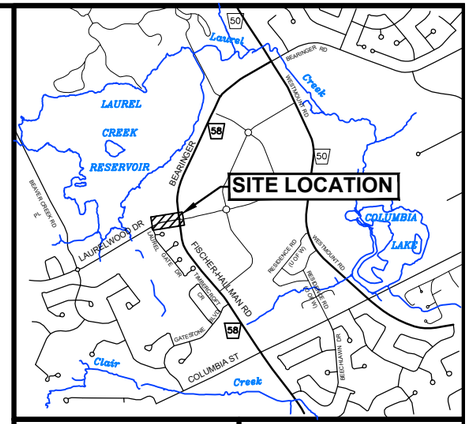

PART N□.	AREA
A	80.6 m²

LEGEND

- PROPOSED CONCRETE CURB
- PROPOSED 1.0m WIDE GRASS BOULEVARD
- PROPOSED CONCRETE SIDEWALK
- PROPOSED MULTI - USE TRAIL
- PROPOSED FEE SIMPLE A□UISITION
- PROPOSED ROAD RIGHT-OF-WAY, PROPERTY LINE
- EXISTING ROAD RIGHT-OF-WAY, PROPERTY LINE

Region of Waterloo

PLAN SCALE□ 1□250

DATE□ NOV 2019

DRAWN BY□ T.Y.L

FILE N□ □□□□□

FISCH-HALLMAN RD / BEARING RD IMPROVEMENTS PROPERTY AC□UISITION PLAN

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APPENDIX O

Salt Management Road Design Assessment Form

Region of Waterloo	Source Protection Guidance Document	DOC#	
		Issue Date	
		Revision Date	
		Approved by	

Salt Management
Road Design Assessment Form

Background: Assessing potential measures to minimize winter maintenance requirements and the use of road salt/de-icing chemicals during the planning stage of a transportation project is advisable regardless of whether the project is located in an urban or rural area. This assessment is particularly important for planning new roadways, expansion of existing roadways, and in situations where the project is located in a sensitive wellhead protection area.

Application: This form is to be used by Project Managers during the planning/Class EA stage of applicable Transportation Capital Projects in order to identify design elements and features that can be incorporated into the project to minimize snow drifting, winter maintenance requirements (including use of salt and de-icing materials), and associated impacts on area groundwater and surface water drinking water sources. It is not necessary to complete this form for routine maintenance type projects such as asphalt patching, asphalt resurfacing, streetscaping, culvert repair/replacement, routine bridge maintenance/rehabilitation, and infill sidewalk construction.

Consultation: In completing this assessment, the Project Manager is to consult with:

Transportation Project Development and/or Water Services staff to:

i) Identify known wellhead protection areas, sensitive environmental features, and salt-vulnerable areas in the vicinity of the proposed project; and

ii) Obtain input regarding potential mitigating measures, design features, or special studies/investigations to be undertaken to assist in establishing best practice measures to be incorporated into the project.

Transportation Operations staff to:

i) Review the history of any snow drift/winter maintenance issues;

ii) Determine if special systems for monitoring pavement temperatures (ie RWIS system) should be considered as part of the project; and

iii) Determine if project modifications are required to manage road drainage, snow drifting, or snow storage

The completed Salt Management Assessment Form for each project shall be relied upon to ensure that all identified design features, mitigating measures, and winter operations recommendations will be incorporated into the project. Project Managers shall provide a copy of the completed Salt Management Assessment Form to Water Services staff. If specific recommendations for winter maintenance activities/operations have been identified, the Project Manager shall also provide a copy to Transportation Operations staff.

General Project Information

Project Manager: Justin Armstrong

Date: April 2020

Project Number: 07221

Description:

The 2018 Regional Transportation Master Plan Update identified this section of Fischer-Hallman / Bearinger Road for widening from 2- to 4-lanes due to traffic growth. It also identifies this road section for active transportation facilities.

Scheduled Years of Construction: 2024 – 2025 (2020 Transportation Capital Program).

General Description of Proposed Improvements under Consideration:

i) Roadway Location – Urban / Rural environment

- Fischer-Hallman / Bearinger Road between Columbia Street West and Westmount Road North is an existing 2-lane road with a primarily rural cross-section (i.e. gravel shoulders and ditch drainage) – some urbanization (i.e. curb and gutter, storm sewer, sidewalk, etc.) exists between Columbia Street West and Laurelwood Drive.

- Widening from 2- to 4-lanes and urbanization (curb and gutter, storm sewers, street lighting, and MUT) is proposed for the corridor.

ii) Roadway/Intersections/Medians:

- The existing Fischer-Hallman / Bearinger Road right-of-way is expected to be maintained.

- There are expected property taking needs expected along Columbia Street West at Fischer-Hallman Road and Laurelwood Drive at Fischer-Hallman Road required by the City of Waterloo to accommodate an additional turn lane at each location based on forecasted traffic needs.

- The Region may need to obtain temporary access at some locations along the right-of-way limit for construction grading activities, which will be confirmed through future detailed design.

- There is no private property acquisition expected from existing residential or Conservation Area lands as a result of the Preferred Alternative preliminary design at this time. However, property needs, including temporary access, will be confirmed through detailed design.

- A typical cross-section of the Regional Council approved design alternative is included with this assessment (Figure A).

iii) Structures:

- Existing and proposed sewer, water, street lighting, hydro, and utilities to be confirmed through detailed design.

- There are no existing retaining walls, bridges, or culverts within the project limits.

- There are four (4) existing fences, three (3) existing noise walls, and two (2) existing guide rails within the project limits.

iv) Boulevards / Pedestrian Facilities:

- There is existing concrete sidewalk on the west side of Fischer-Hallman Road between Columbia Street West and Laurelwood Drive.

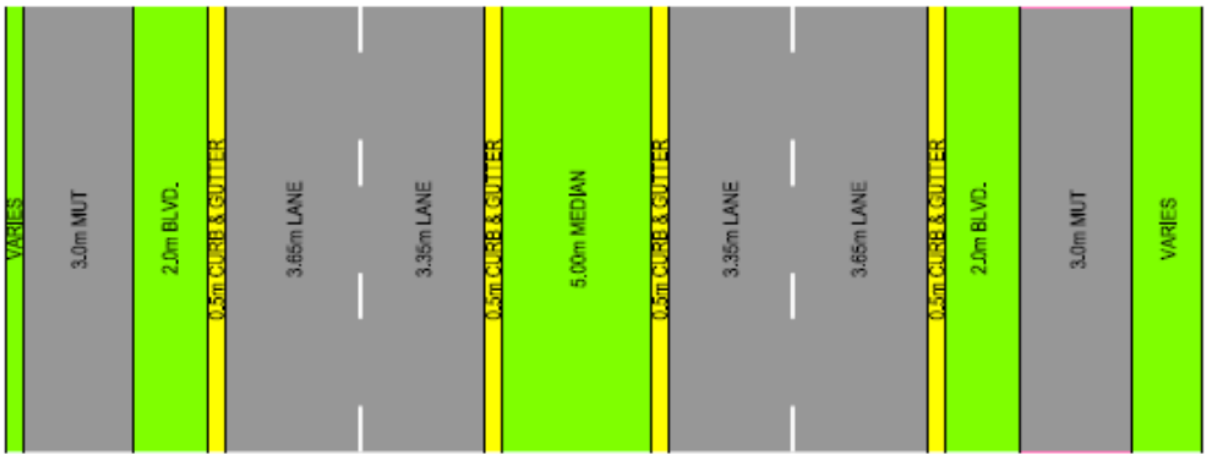
- Boulevard width varies along the corridor. During detailed design, the MUT will be evaluated as close to property line as feasible in order to provide as much snow storage area as possible.

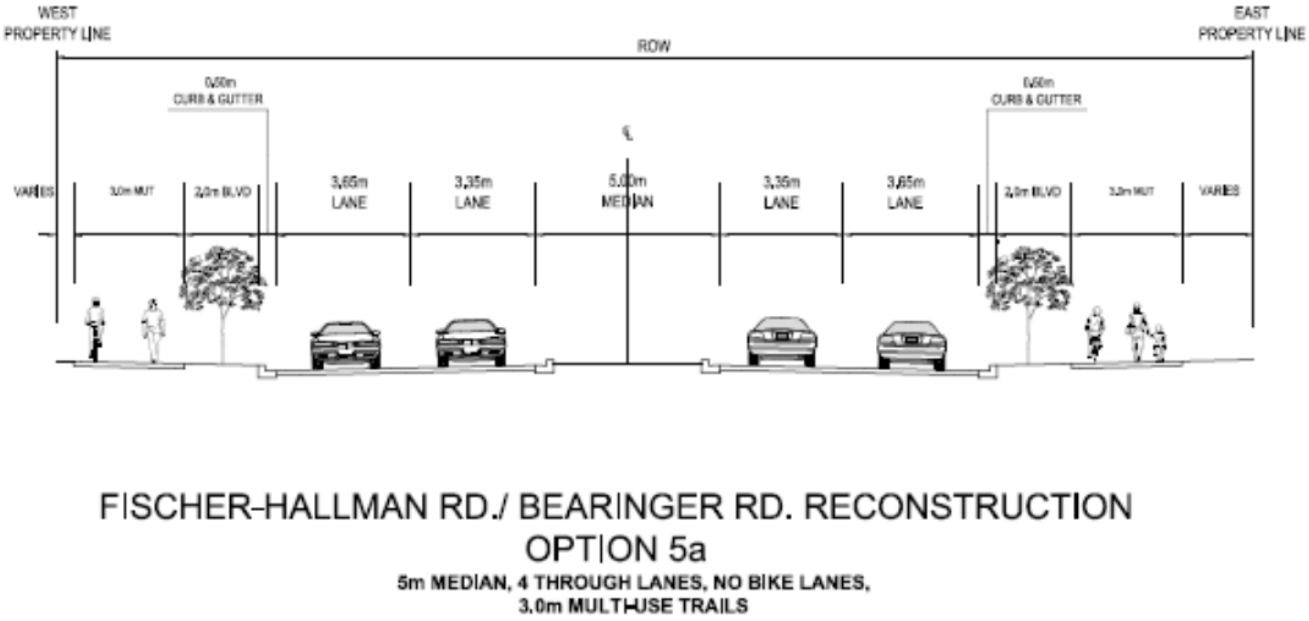
- 3m wide asphalt multi-use trail (MUT) is proposed along both sides of the corridor within the project limits.

v) Other: N/A.

Adjacent Land Use (Current / Future):

Existing land use is mixed with commercial, residential, green space (Laurel Creek Conservation Area), and institutional (e.g. Schlegel Village, Library, UW lands).



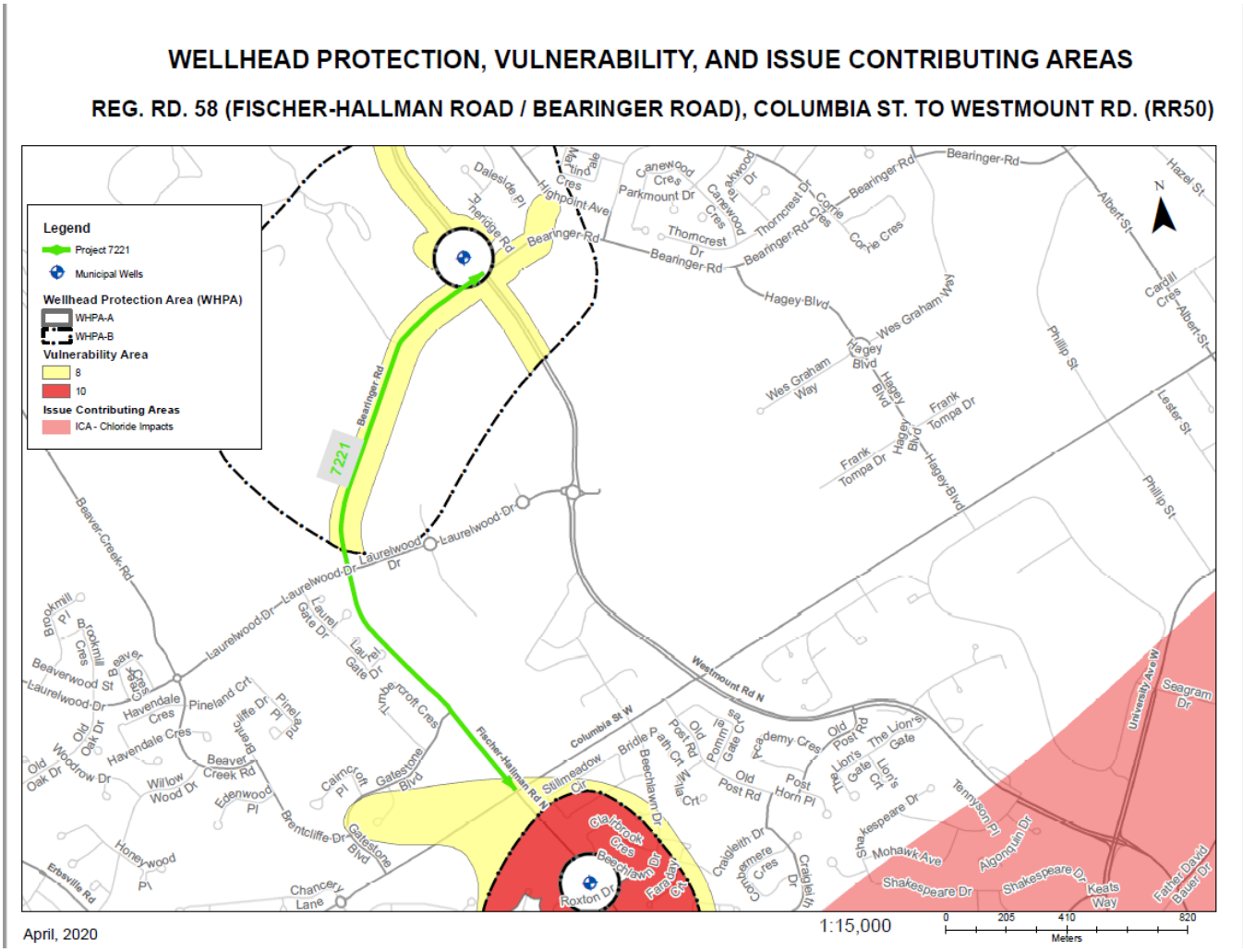


FISCHER-HALLMAN RD./ BEARINGER RD. RECONSTRUCTION
OPTION 5a
5m MEDIAN, 4 THROUGH LANES, NO BIKE LANES,
3.0m MULTIUSE TRAILS

Figure A. Regional Council approved design alternative (typical cross-section).

Natural Environmental Features (To be obtained from Water Services Staff):

The existing well head protection areas for this well have a vulnerability score of 6 in the northern part of the road and less than 6 on the southern. However, the area of the proposed upgrades is within one of our updated well protection areas and has a vulnerability of 8 along the roads and 6 in the adjacent areas (see map below). As the elevated vulnerability score is along the road corridor, this indicates that LIDs are not suitable. Technically proponents are only required to adhere to existing mapping and that a detailed hydrogeology study could be undertaken to address impact. I would suggest that because this is a Region road and that we have updated mapping, that any study would need to be very comprehensive for us to consider it.



PART 1. Protection of Drinking Water Sources

Background

Salt-laden runoff can have impacts on the natural environment. The nature and extent of these impacts is site specific and may be temporary or can persist for long periods of time. The most

significant potential long-term impact of salt-laden runoff is impairment of drinking water sources, including the integrated water supply for the cities of Cambridge, Kitchener, Waterloo, Elmira, New Hamburg, and 16 smaller rural communities. In some areas, the concentration of chloride in the groundwater and streams may reach levels sufficient to impair the quality of groundwater or alter aquatic habitat. The suitability of groundwater for potable use and irrigation can be significantly impaired by the infiltration of salt captured by roadway runoff.

Much of the salt that is placed on a road during snow and ice control operations eventually runs off with the roadway drainage. This drainage enters the environment through three (3) primary pathways:

1. Through overland drainage or storm sewer systems, ultimately discharging to nearby surface water;

2. Through ground infiltration, potentially entering groundwater; and

3. Through spray caused by traffic and wind, potentially affecting adjacent vegetation and agricultural crops.

If any of these pathways introduce high salt concentrations to salt vulnerable areas, then adverse impacts may occur. It should be noted that Low-Impact Development (LID) primarily uses exfiltrtion, which would not necessarily be recommended in (chloride) sensitive areas.

Source Protection Policies: Risk Management Plans

The following policy in the Grand River Source Protection Plan under the *Clean Water Act, 2006* requires a Risk Management Plan **to be developed during detailed design** for the application of road salt on new roads to protect drinking water sources:

RW-CW-35

To ensure the existing and/or future application of road salt does not become or ceases to be a significant drinking water threat where this activity is or would be a significant threat, this activity shall be designated for the purpose of Section 58 of the *Clean Water Act, 2006* and a Risk Management Plan shall be required within the following areas and for the following activities:

a. Existing:

i. Application of Salt on Roadways;

ii. In Wellhead Protection Areas A and B where the vulnerability is equal to ten (10); and/or

iii. Where a Chloride and/or a Sodium Issue has been identified, in Wellhead Protection Areas B, C, D, and E where the vulnerability is greater than or equal to six (6).

b. Future:

i. Application of Salt on Roadways that would occur as the result of the approval of a *Planning Act, Condominium Act,* or Ontario Building Code application or upon completion of an Environmental Assessment in accordance with the Environmental Assessment Act;

ii. In Wellhead Protection Area B, where the vulnerability is equal to ten (10); and/or

iii. Where a Chloride and/or a Sodium Issue has been identified, in Wellhead Protection Areas B, C, D, and E where the vulnerability is greater than or equal to six (6).

The Risk Management Plan for application of salt on roadways shall include, as minimum, measures to ensure application rate, timing, and location reduce the potential for surface water runoff and groundwater infiltration, and meet the objectives of Environment Canada's Code of Practice for Environmental Management of Road Salts including identification of areas where significant threats can occur as Vulnerable Areas and management practices in these areas.

The following is an example of a Risk Management Plan for the storage and application of salts on roads:

DOCS_ADMIN-#1412212-Region Salt management plan template - roads

Best Practices for Protection of Groundwater and Surface Water Environment

- a source water impact assessment (hydrogeological study) should be completed prior to construction in order to identify potential impacts to surface water and groundwater as a result of the roadway. As a minimum, the assessment should include a review of the impacts of salt-laden runoff on surface water or groundwater sources, wetlands, and sensitive aquatic habitat and make recommendations to mitigate any adverse impacts.

- Salt vulnerable areas and Wellhead Protection Areas need to be identified and the potential for salt-impacted drainage to affect these vulnerable areas must be assessed prior to construction. Special design modifications to the road and traditional stormwater management measures may be warranted to protect these salt vulnerable areas. Measures may include the use of “kill strips” or clay-lined boulevards, conveyance ditches, and stormwater ponds where appropriate, or the use of storm sewers or “super pipes” to convey drainage outside vulnerable areas.

- Replace roads with soft shoulders or a “rural” cross-section within wellhead protection areas with curb and gutter systems. Consider the location of catchbasins (e.g. “high side” catchbasins) to reduce runoff/icing across the cross-section and the subsequent need for salt/de-icing.to reduce runoff and refreezing.

- Consider placing discharge locations for storm sewers, super pipes, or stormwater ponds downgradient of production wells.

(e.g. “kill strip”) or clay-lined boulevards within wellhead protection areas.

Additional measures considered to Protect Groundwater and Surface Water

1) Provide stormwater quantity control through stormwater detention measures to ensure that peak storm outlet flows post construction do not exceed pre-construction levels

2) Provide stormwater quality control through end-of-pipe treatment to reduce total suspended solids

3) Provide on-site spill containment measures during construction to mitigate adverse environmental impacts in the event of a spill

PART 2: Snow Drift, Snow Accumulation Management, and Winter Operations Considerations

Background

Snow drifting will occur when a driftable source of snow exists in an open area upwind of a roadway and when the local wind speed (measured approximately 1 metre above ground) exceeds the threshold speed of 15 km/h. Reduced wind speed areas will be caused by obstructions to the wind such as changes in grade, vegetation, plowed snow banks, safety barriers, bridge abutments, etc. The reduced wind speed zones around these obstructions will accumulate snow that will affect the roadway and/or bridge if the obstructions are close enough to the travel lanes. Refer to drawings appended to this Form for illustrations of snow drift management considerations.

Best Practices:

- Avoid changes in grade on the upwind side of the road
- Avoid obstacles on the upwind side of the road (trees, fencerows, utility poles).
- If possible, align roadway to take advantage of position of winter sun and reduce shadow effect of trees and maximize exposure to sun.
- Preferably the top of pavement should be approximately 1 metre above typical snow depths in the area.
- Communicate with transportation road patrol early in the project to identify if sections of an existing road are prone to drifting and design accordingly.
- If possible eliminate the need for safety barriers, and therefore, the obstruction that causes snow drifting with slope flattening of fill side slopes. For minimum side slope without guide rail, refer to TAC's 2017 Geometric Design Guide for Canadian Roads. Ideally, side slope should be flattened for effective snow accumulation.
- Generally, a road cross-section totally on fill without significant terrain features upwind is more likely to blow clear of snow than any other design configuration.
- Wide ditches provide storage for plowed snow which otherwise would be piled along the edge of the roadway and would promote more snow accumulations.
- Locate berms upwind of the roadway, setback 7 times the berm height.
- To obtain the maximum snow collection capacity, maximize the berm height and ensure berm slopes are as steep as practical.
- Flatten upwind backslope (ideally 7:1 or flatter) to minimize drifted accumulations on roadway.

- As a general rule of thumb a 50% solid obstruction (snow fencing, vegetation) should be placed a distance of 15 times its height from the edge of roadway, on level ground. A solid obstruction (buildings, double vegetation) should be placed 10 times its height on level ground.
- Where feasible and cost-effective, consider using snow fences (living or structural) to reduce snow accumulation on roadways or to trap salt spray and prevent it from traveling far from the roadway.
- Good roadway drainage will lead to reduced ice accumulation, and as such reduced salt usage (this includes intersecting roadways and accesses as well as the main roadway).
- Snow storage in an urban environment is often a challenge and consideration should be given to providing ample room for temporary snow storage.
- Channelization (in the form of raised medians and islands) should be designed to ensure that snow removal equipment is not impeded.

Additional Design Features Measures to Minimize Snow Drift and Ice Accumulation

1) Maintain a wind-break between Bearinger Road and the Reservoir to ac as a windbreak

Drawings of Snow Drift Management Considerations

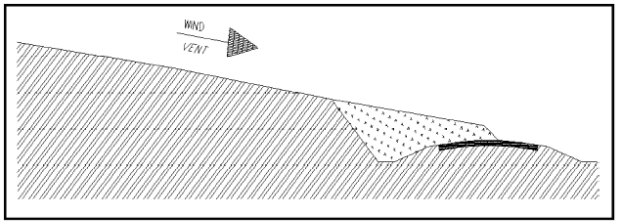


Figure 1 – *Snow accumulation problem caused by change in grade.*

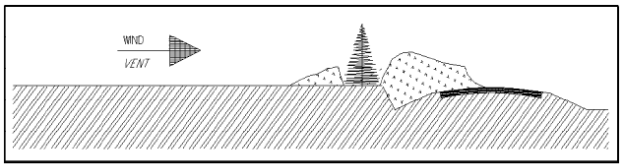


Figure 2 – *Snow accumulation problem caused by trees.*

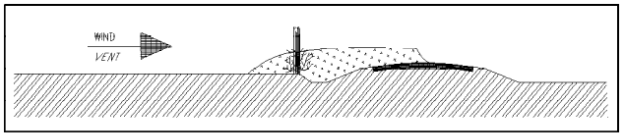


Figure 3 – *Snow accumulation problem caused by fencerow obstruction.*

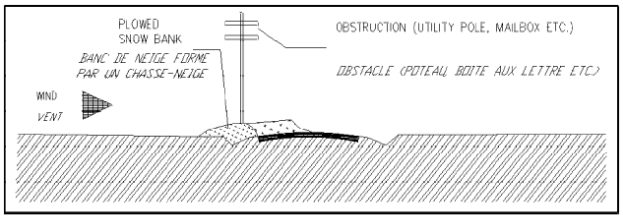


Figure 4 – *Snow accumulation problem caused by utility pole obstruction.*

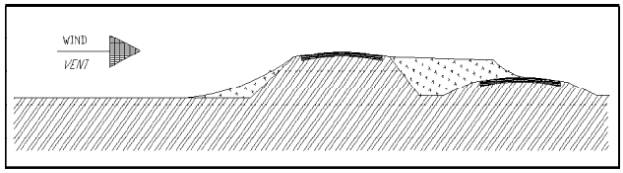


Figure 5 – *Elevated roadway causes snow accumulation on adjacent lanes.*

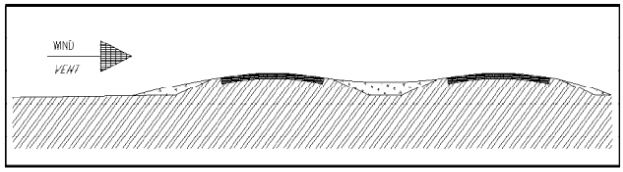


Figure 6 – *Traveled surfaces at same elevation minimize snow accumulation on roadway.*

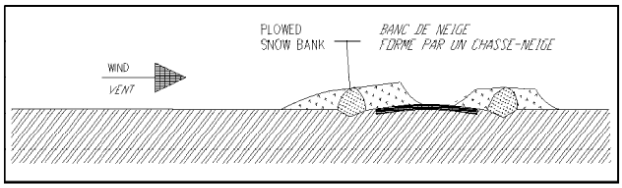


Figure 7 – *Lack of storage causes plowed snow banks along road.*

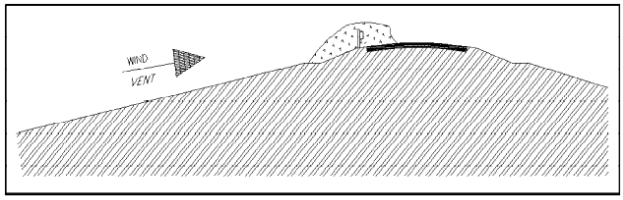


Figure 8 – *Safety barrier causes snow accumulations along road.*

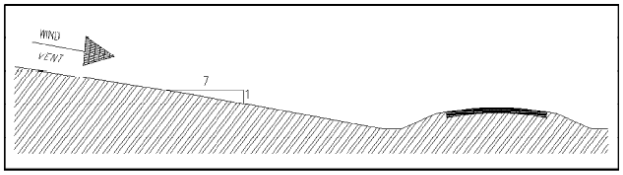


Figure 9 – *Flatten backslopes.*

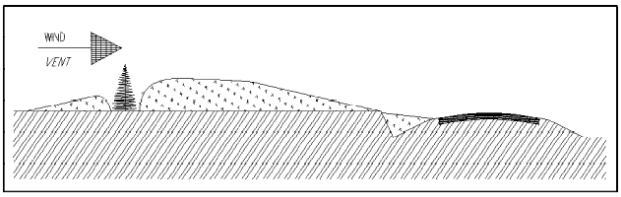


Figure 12 – *Properly located trees will reduce snow accumulation on road.*

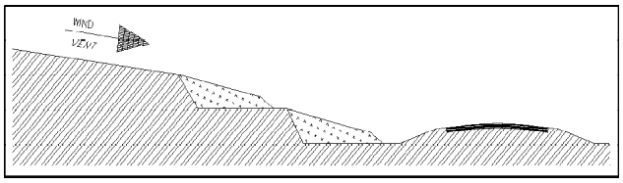


Figure 10 – *Use wide cut to store drifted snow.*

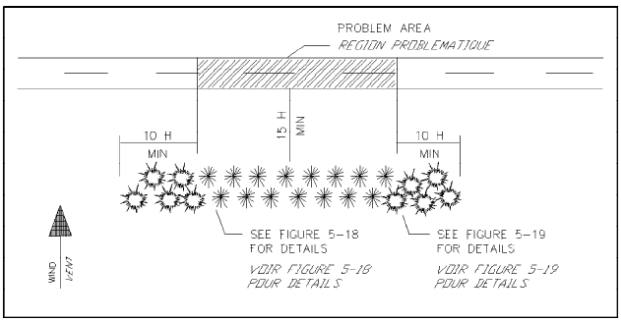


Figure 13 – *Details of typical landscape layout.*

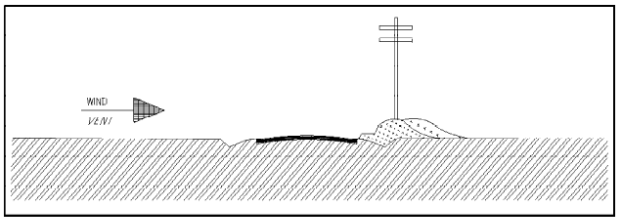


Figure 11 – *Locate obstruction on down wind side of road.*