



CORPORATE ASSET MANAGEMENT MEMORANDUM

TO: MAYOR J. LEHMAN AND MEMBERS OF COUNCIL

FROM: M. BROWN, P. ENG., INFRASTRUCTURE PROGRAM ENGINEER

NOTED: K. OAKLEY, P. ENG., MANAGER OF CORPORATE ASSET MANAGEMENT
A. MILLER, RPP, GENERAL MANAGER OF INFRASTRUCTURE, AND GROWTH
MANAGEMENT
M. PROWSE, CHIEF ADMINISTRATIVE OFFICER

RE: PAVEMENT MANAGEMENT UPDATE

DATE: OCTOBER 19, 2020

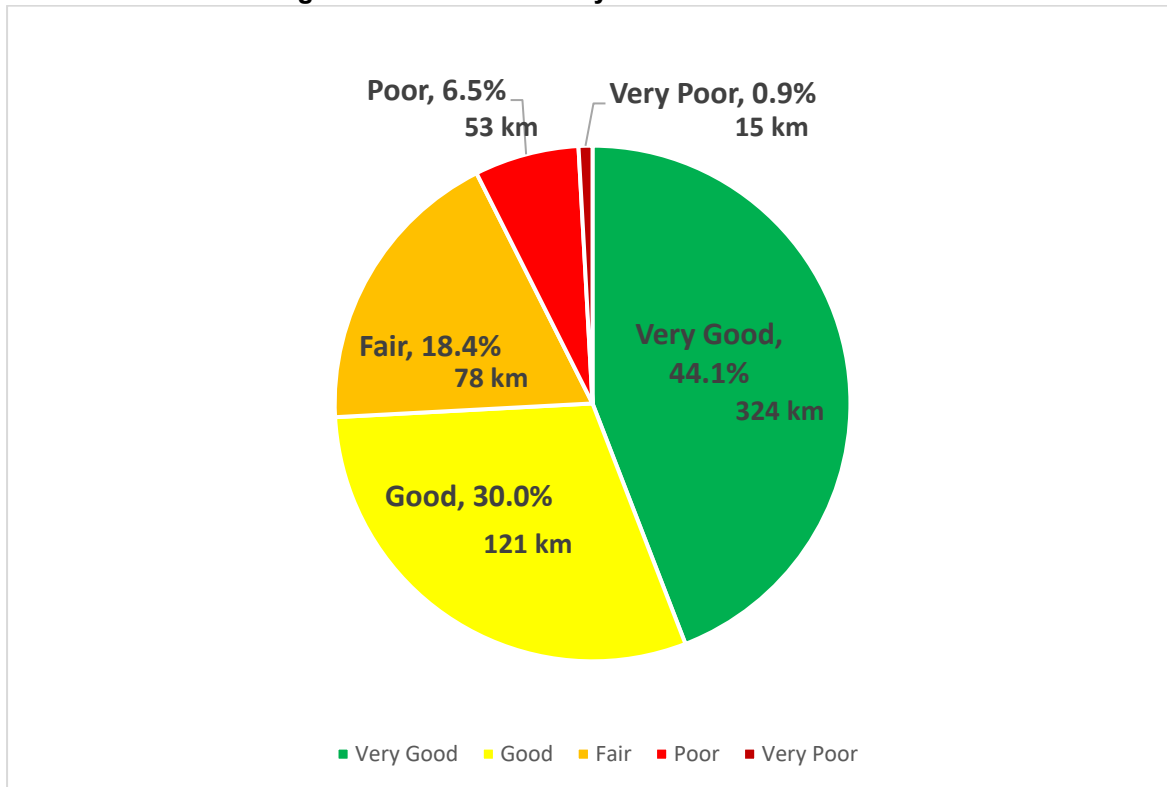
Background

The City of Barrie owns and operates 591 km of roads, with a total estimated replacement cost of just over \$1 billion. The City's roads form the basis for the transportation network which is critical for moving people and goods, serving families and businesses, and connecting the City.

In the fall of 2019, Council received a memorandum on a recent Pavement Condition Assessment project. The purpose of this memo is to update Council on further work that has been completed. The City aims to complete Pavement Condition Assessments every 4-5 years. This results in the assignment of a Pavement Condition Index for every road in the City. Pavement Condition Index (PCI) is a numerical index between 0 and 100 which is used to indicate the general condition of a pavement (with 0 representing total asset failure and 100 representing new pavement). Through the 2019 project, the City received updated PCI data for all roads within the City.

As stated in the previous Memo to Council, the results of the 2019 data collection indicate that Barrie's road network has an average PCI of 75 (good condition). The City of Barrie's overall road network PCI summary can be found below in Figure 1.

Figure 1: Condition of City of Barrie Road Network



Progress of Analysis since last Memo to Council

Since November 2019, Corporate Asset Management (CAM) staff have continued to review and analyze the pavement condition data. Staff have created a Road Condition Map that has been added to the Pavement Management [website](#) (refer also to Appendix A).

Significant effort has also been directed toward using the road condition data to develop medium term recommendations for the City's various pavement management programs; in particular, a 5-year Road Resurfacing candidate list and a 2-3 year End of Life Pavement Replacement Program candidate list (refer to Appendix B).

In addition, staff from CAM and Economic and Creative Development have been working with the condition data and candidate selection criteria to ensure that industrial roads within the City are receiving appropriate priority and balanced investment.

Creating these medium term candidate lists is an important step forward for the City of Barrie as this provides staff, councillors and residents with an understanding of the City's needs, and where work may be taking place several years into the future.



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Pavement Management Programs – Purpose and Candidate Selection

Road Resurfacing Program:

Resurfacing is considered preservation as it is a proactive approach. Timely application of partial depth resurfacing preserves and protects the road structure, preventing rapid deterioration in pavement and risks due to unsafe driving conditions.

Construction typically involves a milling machine that grinds off all, or a portion of the existing asphalt and then placement of a new asphalt surface. This work can usually be completed within a few days and is substantially less expensive than full road reconstruction.

Candidates for this program typically include pavement in fair to good condition, where the subsurface infrastructure (sewers and water mains) do not require any rehabilitation. Other factors that are considered in our risk analysis include social, environmental, service interruption and financial impact of asset failure; for pavement, this is primarily a function of road classification (which is also connected to traffic volumes). Other important principles that are contemplated include where the road is in its lifecycle, and how much value we might derive from the investment. For example, if interim work was required on a road, staff would try to design the rehab method to only last as long as needed/cost as little as possible, until the full reconstruction could happen.

Geotechnical investigations are used to confirm the specific treatment requirements for each location. This process is reviewed and updated annually to make sure that the candidate list is based on the most up-to-date information.

End of Life Pavement Replacement Program:

Some roads in the city have failed and are not delivering the expected or desired level of service, but for a variety of reasons they are not planned to be reconstructed in the short term. End of life treatments are intended to be relatively minor investment to achieve a service improvement until more permanent improvements are made. This program is aimed at roads where reactive maintenance activities (like pothole filling) and associated costs, are unusually high.

The process to determine the candidate list for the End of Life Pavement Replacement program has some similarities to the Road Resurfacing program, however, there are some significant differences. The primary difference is that candidate road segments are in very poor to poor condition (the road has stopped providing an adequate level of service to the public). The subsurface infrastructure can range in condition from good to poor. To maximize value, candidate locations that are in the early part of the 10-year capital plan are typically not considered for end of life treatment. Similar to the resurfacing program, prioritization within end of life candidates considers risk, traffic volumes, and operating and maintenance impacts, and geotechnical investigation is undertaken to confirm specific treatment recommendations.

Industrial Roads:

Council Motion **19-G-352** instructed staff from Economic and Creative Development Department and Corporate Asset Management Branch to develop a specific asset renewal strategy for key employment areas, which contemplates both road renewal and urbanization, and that the strategy be used to inform the development of the 2021 Capital Plan.

Staff considered various scenarios for an industrial roads strategy. One such option was the establishment of a stand-alone capital program focused on industrial roads, which would provide an allocated dollar amount annually. Ultimately, a stand-alone program would limit flexibility in the ability to select projects, as roads will vary in size and need, and associated costing.



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Staff believe the most effective and appropriate approach is to continue to prioritize and balance investment across all roads within the City's portfolio, while looking at how we prioritize candidates within existing programs.

Historically consideration of risk, and impact of pavement failure has focused on road classification and traffic volume. This hasn't always appropriately valued the broad community impact of industrial areas in the movement of goods and employment. In developing the candidate lists included in this memo, and in considering an industrial strategy for future years, Economic and Creative Development Department data has been leveraged. Data considers number of employers, distribution and employment concentration as an initial assessment of traffic volumes. Economic and Creative Development will be undertaking more frequent data collection from the employer base that may provide more data points for consideration.

This new approach focuses on renewal of industrial roads. Urbanization would typically require full reconstruction of the right of way, costs about 3 times as much as pavement renewal only, and would be triggered when the subsurface infrastructure requires replacement. The sanitary sewers and water mains in many of the "south end" industrial roads are relatively young and still have life remaining, therefore renewal is the preferred strategy. Typically, when roads with a rural cross section are renewed, the existing pavement will be replaced with a wider surface, including a paved shoulder.

Industrial areas in the core of the city, have much older pipes, which require replacement. Many of these industrial roads have been identified for full reconstruction, and some appear in the City's capital plan through Neighbourhood Renewal Program projects.

Annual review:

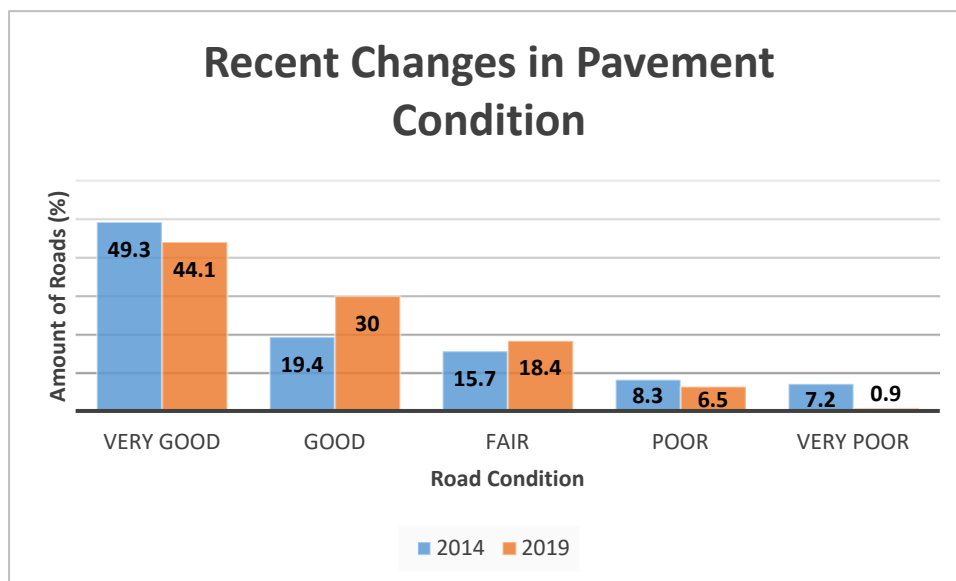
It is important to note that the candidate lists are not final lists of roads that will be rehabilitated. The candidates meet the initial criteria for the Road Resurfacing or End of Life programs and based on current data, are considered the most critical. Annually, City staff will refine this candidate list by obtaining geotechnical information which will provide additional data to determine whether certain locations are still viable and critical candidates. Upon analyzing the geotechnical investigation data, sections of roads on the below candidate lists may be removed from consideration, while others may be advanced.

The 5-year Road Resurfacing program candidate list (2021 - 2025) and the 2-3 year End of Life Pavement Replacement program candidate list (2021 - 2023) can be found in Appendix B as well as on the Pavement Management website.

Decisions on Funding and Balancing Investment

A comparison of the 2014 and 2019 condition data shows that the number of poor to very poor roads has been reduced while the City continues to maintain the fair to very good condition roads. While it is unfortunate that there are poor and very poor roads within the City, statistically, the number of these roads is very small. The majority of the City's roads are in fair to very good condition. This is to be expected as there has been a large amount of development and growth within the City over the past 20-30 years, meaning that many of the City's roads are relatively young and haven't had a chance to deteriorate to any significant degree. This is also directly attributable to the significant capital investment the City has made over the last few years, including in pavement preservation.

Figure 2: Recent Changes in Pavement Condition



Investing in preservation of the roads in fair to very good condition is a cost effective way to maintain the City's road network. The cost to rehabilitate roads in poor/very poor condition is much higher than the cost to preserve a good condition road. If pavement is considered to have cohorts based on age, then the City's aim is to prevent a large cohort from entering the poor/very poor condition bands at the same time. While it is inevitable that pavement will ultimately fail, from a financial perspective, the cost to rehabilitate should be deferred as much as possible, and smoothed over many years rather than be concentrated within a short time frame. More detailed information regarding the various pavement management strategies and programs that the City uses, is available on the Pavement Management [website](#).

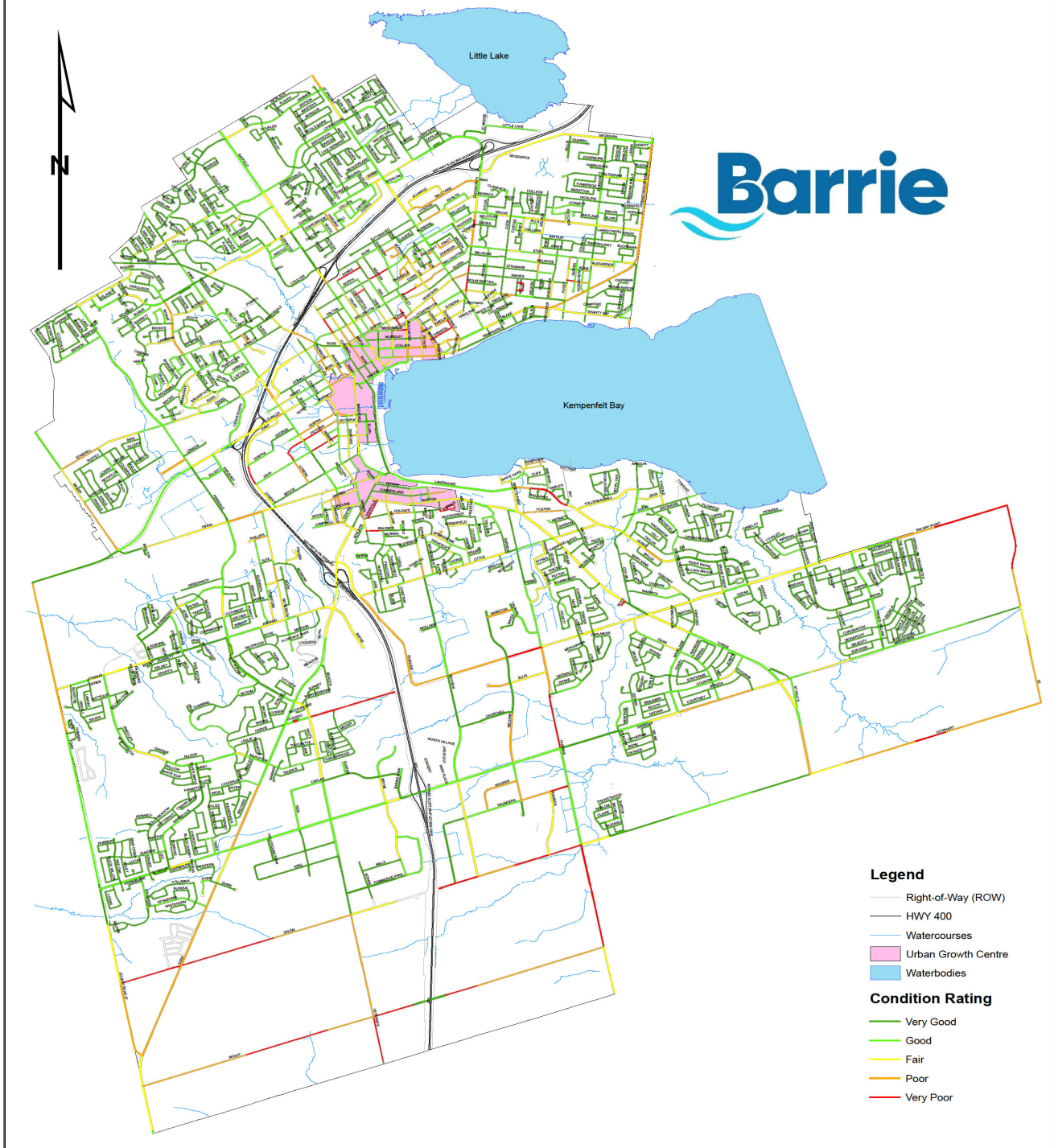
Conclusion

The City has made significant advancements in gathering and analyzing pavement condition data, to inform decision makers and educate and inform residents, City staff and Council. The data and pavement software that was obtained during the last Pavement Condition Assessment has allowed CAM staff to produce longer-range candidate locations for the Road Resurfacing and End of Life Pavement Replacement programs.

Although all road rehabilitation needs are important, the City unfortunately does not have the finances to be able to complete all necessary work that is required. Recognizing that eventually failed pavement and subsurface needs must be addressed, capital planning exercises balance investment in preservation with full reconstruction. Investment in preservation may seem like a luxury, however it is critical to reduce longer term pavement investment needs, to allow capital funding to fully replace aging, deteriorated infrastructure that has reached the end of its life.

Appendix A - Road Condition Map

City of Barrie 2020 Pavement Condition Map



Appendix B

2021-2025 Road Resurfacing Candidate List

A

Adam – Puget St to Johnson St
Alexander Ave – Johnson St to Oliver St
Anne St N – Cundles Road to Austen Lane
Anne St N – Valley Dr to Shelley Lane
Anne St N – Castle Dr to Edgehill Dr
Anne St S – Tiffin St to Essa Road
Ardagh Road – Essa Road to Ferndale Dr S
Ardagh Road – Wright Road to Hwy 27
Armstrong Blvd – Springhome Road to Leacock Dr
Austen Lane – Anne St N to Leacock Dr

B

Bayfield St – Simcoe St to Wellington St E
Bayfield St – Dalton St to Grove St E
Bayview Dr – Little Ave to Springhome Road
Bayview Dr – Lockhart Road to Churchill Dr
Berczy St – Dunlop St E to Collier St
Big Bay Point Dr – Huronia Road to Grand Forest Dr
Big Bay Point Dr – Hurst Dr to Britannic Lane
Blake St – Collier St to Cook St
Blake St – Nelson Sq E to Puget St
Bradford St – Tiffin St to Dunlop St
Broadfoot Road – Leacock Dr to Fox Run
Burton Ave – Essa Road to Milburn St

C

Caplan Ave – Bryne Dr to Hunter Road
Cedar Pointe Dr – Dunlop St to Edgehill Dr
Clapperton St – Dunlop St W to Collier St
Collier St – Bayfield St to Blake St
Cundles St E – Lion's Gate Blvd to Duckworth St
Cundles St W – Coulter St to Bayfield St

D

Donald St – Wellington St W to Anne St N
Doris Dr – Ridgeway Ave to Highcroft Road
Downsview Dr – Blake St to Steel St
Dunlop St E – Poyntz St to Sampson St
Dunlop St E – Berczy St to Collier St
Dunlop St W – Miller Dr to Sarjeant Dr

E

Eccles St S – Dunlop St to Innisfil St
Eden Dr – Leacock Dr to Fox Run
Essa Road – Gowan St to Bradford St
Essa Road – Anne St S to 100m N of Anne St S

F

Ferndale Dr N – Ferndale Industrial Dr to Edgehill Dr
Ferndale Dr S – Greenwich St to Hawthorne Cres (south)
Farris Lane – Collete Cres to Cundles St E
Fox Run – Edgehill Dr to Leacock Dr

G

Georgian Dr – Duckworth St to Gallie Court
Glen Court – Springhome Road to Glen Court



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Grand Forest Dr – Big Bay Point Road to Golden Meadow Road
Grove St E – Fletcher Dr to Penetanguishine Road

H

Hanmer St E – Bayfield St to St. Vincent
Hart Drive – Dunlop St W to Tiffin St
Hemingway Cres – Fox Run to Fox Run
High St – Bradford St to Dunlop St W
Highcroft Road – Broadmoor Ave to Little Ave
Hooper Road – Saunders Road to Welham Road
Hunter Road – Caplan Ave to End
Huron Road – Big Bay Point Road to Maplevue Drive E

I

Innisfil St – Perry St to Vespra St

L

Lakeshore Drive – Victoria St to Lakeshore Drive/Tiffin
Little Ave – Carol Road to Broadmoor Ave
Livingstone St W – Ferndale Drive N to Bayfield St
Lorena St – John St to Brock St

M

Maple Ave – Simcoe St to Dunlop St W
Maplevue Drive W – County Road 27 to Essa Road
Meadowland Ave – Broadmoor Ave to Springhome Road
Miller Drive – 255m NW of Dunlop St W to Sproule Drive
Minet's Point Road – Yonge St to Hurst Drive

N

Napier St – Puget St to Johnson St

O

Oliver St – Alexander Ave to Steel St

P

Paterson Road – Ardagh Road to Tiffin St
Penetanguishene Road – Steel St to End
Perry St – End to Dunlop St W
Puget St – Blake St to Steel St

R

Rawson Ave – Lockhart Road to Saunders Road
Robin Court – St Vincent St to End
Rose St – St. Vincent St to Duckworth St
Ross St – Toronto St to Bayfield St

S

Sampson St – Dunlop St E to Berczy St
Shanty Bay Road – Blake St to End
Simcoe St – Bradford St to Dunlop St E
Sperling Dr – St Vincent St to Cundles Road E
Springhome Road – Joanne Court to Armstrong Blvd
St Vincent St – Hanmer St E to End

T

Tiffin St – Essa Road to Anne St S
Tiffin St – Boulton Court to Ferndale Dr N
Tollendal Mill Road – Hurst to Tollendal Village Entrance
Tollendal Mill Road – Royal Oak Dr to Cox Mill Road
Toronto St – Lakeshore Dr to Simcoe St
Truman Road – Huron Road to Hamilton Road

V

Varden Ave – Napier St to Steel St
Varden Cres – End to Napier St



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Veteran's Dr – Mapleton Ave to Essa Road
Veteran's Lane – Veteran's Dr to 25m S of Montserrand St
Vine St – Shirley Ave to Letitia St

W

Weldon Cres – Weldon St to Weldon St
Wellington St E – Berczy St to St Vincent St
Wellington St W – Donald St to Bayfield St

Y

Yonge St – Ashford Dr to Big Bay Point Road

2021-2024 End of Life Pavement Replacement Program Candidate List

Agnes St – Lount St to Peel St
Ferndale Industrial Dr – End to Ferndale Dr N
Fairview Road – Little Ave to Big Bay Point Road
Lockhart Road – Saunders Road to Huronia Road
Shannon St – St Vincent St to Marion Cres
Saunders Road – Welham Road to Huronia Road
Welham Road – Saunders Road to Hooper Road
Vancouver – Codrington to Napier