



## **Staff Report for Committee of the Whole Meeting**

**Date of Meeting:** December 11, 2018

**Report Number:** SREIS.18.002

**Department:** Environment and Infrastructure Services

**Division:** Design and Construction Services

**Subject:** Proposed Interim Road Reconstruction Priority Rating System (SREIS.18.002)

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### **Purpose:**

To seek authorization to update the Town's 1997 Road Reconstruction Priority Rating System model, specific to roads identified for conversion from rural to urban standards.

### **Recommendation(s):**

- a) That Council adopts the "2019 Interim Road Reconstruction Priority Rating System (RRPRS)" 2019 to 2023 contained herein; and,
- b) That Council direct staff to include the 5 year rural to urban road reconstruction program into the 2019 Ten year Capital Forecast.

### **Contact Person:**

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### **Report Approval:**

**Submitted by:** Italo Brutto, Commissioner of Environment and Infrastructure Services

**Approved by:** Neil Garbe, Chief Administrative Officer

### **Background:**

The Town of Richmond Hill has actively improved its road network since the late 1980's. This was accomplished, in part, through the implementation of the Road Reconstruction and Pavement Resurfacing Program. At the inception of the Program, a list of roads to be converted from rural to urban standards was created and prioritized based primarily on visual condition, which was used to develop a conversion program that incorporated timing and available financing. The program identified approximately 112 km of rural road and was called the "Ten Year Road Reconstruction Program". In 1997, Council amended and enhanced the program by approving a Priority Rating System to guide the prioritization of road conversions from rural to urban.

Although significant progress has been made (86 km of roads converted) since that time, capital funding remains a significant constraint in completing the remaining roads in the program. These constraints result from increasing construction costs, road maintenance program costs, and competing priorities for capital spending allocation.

This report, SREIS.18.002, provides an update to the 1997 Priority Rating System, as an interim measure, to better account for considerations such as risk and liability, the need to accommodate development pressures within mature neighbourhoods, and other technical considerations. The scope of this interim update is limited to prioritizing roads identified for conversion from rural to urban standards.

Moving forward, new asset management regulations (O.Reg. 588/17) will require municipalities to plan for and prioritize for the entire road inventory in reconstruction programs. Furthermore, roads reconstructed in the 80's, 90's and early 2000's are now 20 to 40 years old. By adding existing urban roads to the Road Reconstruction Program, the Town will be able to better prioritize investments in the entire road network by making decisions on the basis of service levels, risk, opportunities, and technical targets. For this reason, staff will report back with a subsequent update to the road reconstruction prioritization strategy that will account for the entire road inventory.

## **Historical Analysis of Road Reconstruction Program**

Historically, the Road Reconstruction Program has evolved to reflect the changing circumstances within the Town. Roads in the program identified for conversion from rural to urban standards are ranked and prioritized based on the Road Reconstruction Priority Rating System (RRPRS) which has undergone several updates over the years. Below is a summary of the evolution of the prioritization model.

### **Road Reconstruction Priority Rating System for Conversion from Rural to Urban Standards: Up to 1992**

During the 1980's, the Road Reconstruction Program had many outside influences which affected the schedule of implementation. The most significant of these was capital funding to deliver the program. The roads program at that time was based on the MTO's Road Needs Study which identified two categories of roads – roads deficient “now” prioritized at the top, and those that would have been deficient in “1-5 years” listed at the bottom of the list. The list was adjusted by staff on the basis of visual surface inspections. The engineering criteria used to prioritize the list of roads which formed the program was limited and lacked rigor. A more sophisticated prioritization method was needed that could take into account risk-based technical analysis as well as evolving best practices.

### **Road Reconstruction Priority Rating System for Conversion from Rural to Urban Standards: 1992 – 1997**

To address these limitations, staff developed a new road prioritization model based on technical criteria which was subsequently approved by Council in 1992. The technical

criteria used in that program were based on MTO's Priority Rating Factor system. The MTO system comprised the following criteria - structural adequacy, surface width, shoulder width, surface condition, drainage, maintenance demand, level of service (LOS) and the average annual daily traffic (AADT). Based on this system each road was tagged and ranked in order of priority. Other criteria were also considered including drainage outlets, bus routing, etc.

This approach was adequate and served the Town well as it provided a consistent prioritization method for the ongoing program. In addition, it provided the necessary due diligence and rationale for selecting priorities in an environment of constrained financial resources and competing priorities for infrastructure projects across the Town.

Also, it met the MTO's requirements for subsidy allocation which was a source of funding at that time. However, this system was resource-intensive to maintain as it required continuous road evaluations to assess road conditions. Also, the model did not consider concurrent capital work on underground infrastructure (e.g. watermains, storm and sanitary sewers), nor did it factor the need for (and costs for) pedestrian facilities, and associated road and pedestrian safety requirements.

### **Road Reconstruction Priority Rating System for Conversion from Rural to Urban Standards: 1997 to 2018**

This version of the rating system was categorized into three core areas – Road Works, Water and Sewer, and Road Usage.

#### **Road Works Category**

The Road Works section deals with items specific to the status of repair of the road and the associated maintenance required. The analysis for each item in this section is directly related to the asset inventory data and rating criteria previously established through the Town's Road Needs Studies. This data and rating has the ability to be updated periodically if specific road conditions change.(for example an asphalt overlay) which would change the status of a road within the program.

#### **Water and Sanitary Sewer Category**

This new category was included in the 1997 model and included the age, material, condition and/or break rate of watermains. The importance of this category is to:

- Allow for major maintenance/repairs/replacement of surface and below ground infrastructure to be coordinated.
- Reduce the potential for uncoordinated actions by Divisions on the same street within close time frames.
- Reduce overall replacement and/or maintenance costs if projects are completed simultaneously.

This category allows for the continuing assessment and updating of underground infrastructure.

## **Road Usage Category**

This category takes into account other outside influences affecting a road not directly related to the condition of the existing infrastructure.

Bus routing can have an effect on the longevity of a pavement surface, and will result in a draw of pedestrians to a road with bus stops. Schools, community centres, parks and sidewalks also have heightened use and safety considerations related to pedestrians (and for this reason have special status in the road program). The Road Class (local, collector, arterial) is also considered in this section with respect to road width and traffic volumes, particularly in circumstances where roads are operating at or beyond their capacity.

## **Current Prioritization Model**

The 1997 RRPRS model consisted of the three (3) key rating categories listed above and covered eleven (11) different specific rating criteria for a total of 100 points. This model serves as the basis for the existing road reconstruction program. However, advancements in best practices have occurred over the last 20 years, in combination with emerging regulations, which call for an update to the prioritization model. Concurrently, the Town's inventory of infrastructure has grown significantly along with funding constraints which has led to a need for more sophisticated risk-based decision-making models.

## **Proposed (2019) Road Reconstruction Program**

The proposed interim model includes the three core areas used in the current model, and further expands on them to consider the evolving conditions as the Town matures.

Past models were developed based solely on core technical principles which will continue to serve as a foundation for a robust prioritization framework; however, the 2019 update contained in this report reflects changing conditions given that the Town has grown and become more urban and complex over the past 20 years. For example, the update takes into account emerging complexities and challenges related to aging infrastructure, the need to mitigate associated risk and liabilities, and the need to accommodate and coordinate the capital program with development within existing communities. In addition, some technical criteria have been adjusted to reflect evolved considerations. These updates are grouped under three categories; Infrastructure Risks, Technical Considerations and Changing Conditions. To reiterate, the scope of this interim update is limited to roads being considered for conversion from rural to urban standards.

### **Criteria 1 - Infrastructure Risks**

#### **Conditions posing Adverse Risk**

These refer to asset conditions which pose risk to people or property exposing the Town to potential liability. For example, reverse driveways (when the road grade is higher than the home entry point) can result in property flooding during high rainfall or storm events.

Complaints and claims from residents regarding this issue are not uncommon. Similarly, when aging underground infrastructure fails (e.g. watermains) where reverse driveways exist, flooding to properties will also occur. Roads having these conditions would be ranked higher within the program.

## **Criteria 2 - Technical Considerations**

### **Road Classification**

The Road Class criteria will be revised to consider lane widths, road cross section, and the number of cars the road was designed to accommodate. It will not account for volume of traffic currently on the road. Road Class will be assigned on the basis of designations in the Official Plan or other Town documents. Considerations for actual traffic volumes are factored into the RRPRS model as explained below under “Traffic Volume Coverage”.

### **Traffic Volume Coverage**

In the development of the 1997 RRPRS model traffic volume data was only available for selected areas. Over the last number of years the Traffic Division has expanded the Traffic Count Program across the Town and more comprehensive data is being collected annually.

### **Technological Innovations**

In 2002, Council established a Pavement Quality Index (PQI) system to assess the condition of all road pavements. This data is collected for the Town on a rotating three-year cycle i.e. the Town is divided into three parts where one third (1/3) is assessed every year. Although similar data has been used in the 1997 road model before, the automated derivation and analysis of this data now allows the road quality to be assessed and results updated with ease.

### **Technical Criteria Interactions**

One of the limitations of the 1997 RRPRS model is that it did not consider how one criteria may be affected by relational characteristics of the asset, e.g. road length, and as a result its effect on the placement of a particular road within the prioritization list. For example, the Pavement Quality Index (PQI) establishes the condition of the pavement, and assumes that roads having a lower PQI should be reconstructed first, everything else being equal. However, if the road length is factored into the analysis the longer road would be ranked first given that a longer road in poor condition would pose greater risk and generate more intense public complaints than a shorter one. A similar analysis can be made for traffic volume and road lengths.

## **Criteria 3 - Changing Conditions**

### **Site Plans, Infill and Subdivision**

As the Town matures, greenfield developments become less common, and infill developments are emerging adjacent to and within mature communities where lots are severed, combined into subdivisions or site plans. As these developments become

more frequent, it has become increasingly more challenging to plan the delivery of Town infrastructure whilst simultaneously coordinating with developers to avoid uncoordinated events. The Environment and Infrastructure Services Department and the Planning and Regulatory Services Department have developed a protocol to better meet this challenge. The protocol seeks to anticipate when developments and capital projects will coincide and allow staff to plan ahead and potentially negotiate capital funding and delivery options with developers.

## **2019 RRPRS Results**

The 2019 RRPRS model was used to update the Rural to Urban Road Reconstruction program and the results are shown in Table A1.

Table A1 compares roads proposed for reconstruction under the previous RRPRS with roads proposed under the updated RRPRS within the 5 year period. A total of 20 roads would have been reconstructed under the previous model within the proposed 5 year transition period, 9 of which will continue to be part of the new road program (see highlighted roads in Table A1). Each of the remaining 11 road segments were deferred for one or more of the following reasons:

- a) due to the ongoing Transportation Master Plan and its potential impact on active transportation facilities along these routes;
- b) proposed/ongoing subdivision or site plan applications within the adjacent area;
- c) the geographical proximity to other segments proposed for later years;
- d) due to recent resurfacing works which improved the road surface quality index thus pushing the road lower on the priority list; and,
- e) road was pushed to a future year outside the 5 year transition period based on updated model criteria.

The rural to urban road reconstruction program to be delivered in each of the 5 year period from 2019 to 2023 is shown in Table A2.

Staff propose this RRPRS model as an interim measure to allow time to operationalize the asset management function within the Town and expand the road reconstruction program to include all roads.

## **Financial/Staffing/Other Implications:**

There are no financial or staffing implications associated with this report.

The rural to urban road reconstruction program is included within the 2019 ten year Capital Forecast based on the propose year of delivery.

## **Relationship to the Strategic Plan:**

The recommendations in Report SREIS.18.002 is directed at improving and utilizing innovative tools to underpin critical decisions to ensure the *“Wise Management of Resources in Richmond Hill”* as defined in goal four of the Town’s Strategic Plan.

## **Future Considerations:**

Ontario Regulation 588/17 as defined under the “Infrastructure for Jobs and Prosperity Act 2015”, sets out requirements for asset management planning for municipal infrastructure. As such, the Town is actively working towards having a fully operationalized asset management program to meet the Province’s deadline of July 1, 2021 for core infrastructure, and for all other assets by July 1, 2023. The regulation requires that levels of service and technical performance targets be established for each asset category. The existing Road Reconstruction Program is limited in scope to roads scheduled for conversion from rural to urban standards, and furthermore, is not based on a defined level of service or technical performance target. As such, the proposed update to the Prioritization Rating System would serve only as an interim model.

It is important that future prioritization strategies consider both urban and rural roads to assist in balanced decision-making regarding capital funding for road infrastructure. A prioritized program of all Town roads (urban and rural), will provide insights as to whether urbanizing a rural road is to be delayed in favour of reconstructing an already urbanized road that is currently in a state of disrepair; or which roads should be resurfaced versus being reconstructed. The difference in lifecycle cost between various approaches can be significant and is a critical consideration when planning major capital expenses to maintain the road inventory as a whole in a state of good repair.

Staff will return to Council with a subsequent road reconstruction prioritization strategy based on optimized decision-making practices, including all roads, in keeping with the intent of Provincial policy direction.

## **Conclusion:**

Given the infrastructure risks and technical considerations noted, and the need to meet the mandate of Ontario Regulation 588/17 by July 2021, staff developed an Interim 2019 Road Reconstruction Priority Rating System as detailed above, and has proposed a static 5 year rural to urban road reconstruction program derived from the interim model. This 5 year road program will be included in the 2019 ten year Capital Program.

Staff recommend that Council endorses this approach as it will allow for capital programming and budget forecasting clarity during the transition period.

Staff will subsequently develop a road reconstruction prioritization strategy that accounts for both rural to urban and urban to urban road types on the basis of service levels and performance targets to be applied to future budget cycles.



**Table A1: Rural to Urban Roads Reconstruction Program**

<b>Based on RRPRS (1997 to 2018)</b>		<b>Based on 2019 RRPRS</b>	
<b>Road Name</b>	<b>Road Limits</b>	<b>Road Name</b>	<b>Road Limit</b>
<b>Bedford Park Avenue</b>	Yonge Street To Pugsley Avenue	<b>Montiel Road</b>	Laverock Avenue To Driscoll Road
<b>**Olde Bayview Avenue</b>	39m North of North Lake Road To 30m South Of North Limit	<b>Tampico Road</b>	Laverock Avenue To Driscoll Road
<b>Wright Street</b>	Hall Street To Powell Street	<b>Bethesda Sideroad-1</b>	Anchusa Drive To Leslie Street
<b>Arnold Crescent</b>	Elizabeth Street To Major Mackenzie Drive	<b>Coon's Road</b>	Yonge Street To Humberland Drive
<b>Powell Street</b>	Wright Street To Mill Street	<b>Bedford Park Avenue</b>	Yonge Street To Pugsley Avenue
<b>Ohio Road</b>	Elgin Mills Road To East Limit	<b>Ohio Road</b>	Elgin Mills Road To East Limit
<b>Westwood Lane</b>	60m South Of Denham Drive To South Limit	<b>Powell Street</b>	Wright Street To Mill Street
<b>**Elm Grove Avenue</b>	Parker Avenue To Yonge Street	<b>Wright Street</b>	Hall Street To Powell Street
<b>**Harris Avenue</b>	Yonge Street To 400m West	<b>Moray Avenue</b>	North Lake Road To North Limit
<b>Schomberg Road</b>	Maple Grove Avenue To King Road	<b>Arnold Crescent</b>	Elizabeth Crescent To Major Mackenzie Drive
<b>**Sugar Maple Lane</b>	Mill Street To Mill Street	<b>Cynthia Crescent</b>	Coon's Road to Coon's Road
<b>**Beaufort Hills Road</b>	Blackforest Drive To West Limit	<b>Schomberg Road</b>	Maple Grove Avenue To King Road
<b>**Hughes Street</b>	King Road To North Limit	<b>Wildwood Avenue</b>	North Lake Road To South Limit
<b>*Highland Lane</b>	Arnold Crescent To 300m South	<b>Maple Grove Avenue</b>	Yonge Street To Blyth Road
<b>**Shaver Street</b>	King Road To North Limit	<b>Rockport Crescent</b>	Tormore Drive To Bayview Avenue
<b>**Wendy Way</b>	Maple Grove Avenue To South Limit	<b>Blyth Street</b>	King Road To North Limit

**Table A1: Rural to Urban Roads Reconstruction Program**

Based on RRPRS (1997 to 2018)		Based on 2019 RRPRS	
<b>**Rosegarden Crescent</b>	Blackforest Drive To Blackforest Drive	<b>MaCachen Street</b>	King Road to Poplar Drive
<b>Moray Avenue</b>	North Lake Road To North Limit	<b>Westwood Lane</b>	60m South of Denham To South Limit
<b>**Cheval Court</b>	Beaufort Hills To South Limit	<b>Shelley Road</b>	Newkirk Road To 130m East
<b>**Black Willow Court</b>	Coon's Road to East Limit	<b>Fergus Avenue</b>	North Lake Road To North Limit
		<b>Bethesda Sideroad -2</b>	Leslie Street To Highway 404

\*Highland Lane is included with the Arnold Crescent urbanization project

- \*\*a) due to the ongoing Transportation Master Plan and its potential impact on active transportation facilities along these routes;
- b) proposed/ongoing subdivision or site plan applications within the adjacent area;
- c) the geographical proximity to other segments proposed for later years;
- d) due to recent resurfacing works which improved the road surface quality index thus pushing the road lower on the priority list; and,
- e) road was pushed to a future year outside the 5 year transition period based on updated model criteria.

**Table A2: 5 Year Rural to Urban Road Reconstruction Program**

2019	2020	2021	2022	2023
Tampico Road	Powell Street	Cynthia Crescent	Maple Grove Avenue	Ohio Road
Montiel Road	Wright Street	*Bethesda Sideroad-1	MaCachen Street	Moray Avenue
	Coon's Road		Wildwood Avenue	Bedford Park Avenue
			**Blyth Street	

\*Bethesda Sideroad-1: Anchusa Drive to Leslie. \*\* Blyth Street to be reconstructed as part of the Maple Grove Avenue reconstruction project

## Report Approval Details

Document Title:	Proposed Interim Road Reconstruction - Priority Rating System.docx
Attachments:	
Final Approval Date:	Nov 30, 2018

This report and all of its attachments were approved and signed as outlined below:

**Paolo Masaro - Nov 27, 2018 - 10:18 AM**

**Terry Ricketts - Nov 27, 2018 - 1:55 PM**

**Italo Brutto - Nov 27, 2018 - 2:23 PM**

**Neil Garbe - Nov 30, 2018 - 2:14 PM**