



The Corporation of the Town of Tecumseh

Public Works & Environmental Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Environmental Services

Date to Council: April 28, 2020

Report Number: PWES-2020-21

Subject: Town of Tecumseh Road Needs Study 2019
Study Completion and Adoption

Recommendations

It is recommended:

That the Town of Tecumseh Road Needs Study 2019 as prepared by Dillon Consulting Limited **be adopted;**

And that Administration **be authorized** to utilize the recommendations contained within the Road Needs Study 2019 when completing the annual Public Works & Environmental Services Capital Works Plan.

Executive Summary

The Road Needs Study summarizes the findings of the evaluation of the Town's road system (excluding bridges and culverts, which are the subject of another study), and identifies needed improvements for roads which are deficient or are expected to become deficient within the next five-year period.

Existing road conditions were documented using vehicle-mounted sensing equipment, carried out by StreetScan Canada ULC in June 2019. The use of automated pavement condition measurement was intended to provide a more objective and repeatable determination of the overall Pavement Condition Index (PCI) for each roadway segment.

The total length of all roads under the jurisdiction of the Town is approximately 180 kilometers. The average kilometer weighted PCI rating of the Town's roads is currently 77.0. Based on the results of the evaluation, approximately 6.3% of the total road system would require some

manner of rehabilitation/maintenance within a five-year timeframe (PCI below 60) and an additional 23.4% would require monitoring/maintenance (PCI between 60 and 70).

A five-year maintenance/rehabilitation program is proposed and is based on undertaking the following:

- Reconstruction works for pavements with a PCI rating less than 45;
- Rehabilitation works such as resurfacing for pavements with PCI ratings from 45 to 55; and
- Maintenance such as crack sealing for pavements with a PCI rating from 55 to 70.

Background

The Town of Tecumseh maintains an extensive network of urban, semi-urban and rural roads of all classes, with the exception of Class 1 roads such as County Road 22. The roads network is approximately 180 centerline-kilometers of roadway (varying from two to four lanes), consisting of varying materials such as asphalt, concrete, and tar and chip.

In accordance with the Town's Transportation Master Plan, the Town maintains seven road classes:

1. Commercial Main Street;
2. Minor Arterial (Urban);
3. Collector (Urban);
4. Local (Urban);
5. Minor Arterial (Rural);
6. Collector (Rural); and
7. Local (Rural).

The maps appended to this report illustrate the road hierarchy system for the Town.

The key to managing the Town's roads is to apply the correct rehabilitation strategy at the correct time. This includes applying preventative maintenance strategies to roads in the early stages of deterioration (i.e. crack sealing), then applying rehabilitation strategies at later dates and ultimately reconstructing the road when the useful life has expired. Road reconstruction is closely coordinated with other infrastructure replacements such as sewer and water in order to achieve a level of efficiencies and cost savings.

The purpose of a Road Needs Study is to assess the existing condition of the Town's road system, and to prepare a comprehensive plan for improving and maintaining the road network for the next 5-year period.

At the December 11, 2018 regular meeting of Council, Council approved the 2019-2023 Public Works & Environmental Services Five Year Capital Works Plan under Report Number PWES-2018-08 (Motion: RCM-361/18) that authorized Administration to proceed with the 2019 Road Needs Study. Dillon Consulting Limited (Dillon) was retained to provide the engineering services for this project based on their experience with Town roads and past completion of the 2003, 2008 and 2014 Road Needs Studies. As part of this study, Dillon engaged StreetScan Canada ULC to assist in obtaining a more detailed assessment and inventory of the Town's road system by means of utilizing new automated road scanning technology.

Comments

The 2019 Road Needs Study (herein Study) was completed for the Town as an update to the Town's previous study completed in 2014, which aligns with the 5-year interval outlined within the Town of Tecumseh Asset Management Plan Version 2.0 (2018). Existing road conditions were documented using vehicle-mounted sensing equipment, which was carried out by StreetScan Canada ULC in June 2019. The use of automated pavement condition measurement was intended to provide a more objective and repeatable determination of the overall Pavement Condition Index (PCI) for each roadway segment.

Pavement Condition Index

The PCI is a numerical index between 0 and 100, which is used to indicate the general condition of the pavement. The PCI considers two main factors: (1) ride quality and (2) surface defects in the pavement (i.e. deformations and pavement cracking).

The existing condition of the Town's road network is shown in Table 1 below:

PCI Range	Condition	Length of Road (km)	Percentage of Total Road Network
90-100	Excellent	32.09	17.9%
75-90	Good	67.51	37.6%
65-75	Fairly Good	47.86	26.7%
50-65	Fair	29.04	16.2%
Below 50	Poor	2.95	1.6%
Total	-	179.44	100%

The 2019 assessment determined the Town's overall PCI rating is 77.0. Approximately 32% (57.51 km) of the Town's roadways have a PCI of less than 70 with approximately 1.6% (2.95 km) requiring improvements within the next two years.

The time of improvement is based on the Town's level of service as defined in the Town's AMP relative to the value of the PCI. The Town's Roads Condition Assessment Policy has a greater threshold PCI value for the 'Now' and the '1-5 Years' categories than that of the Ministry of Transportation (MTO) standards. The modified time improvement criteria allow for less expensive repair/rehabilitation (mill and pave, overlay) methods to be used which can extend the useful life of the roadway and delay the need for more costly reconstruction.

The Town of Tecumseh Time of Improvement is outlined in Table 2 below:

Time of Improvement	Pavement Condition Index (Tecumseh)
Now	Less than 50
1-5 Years	50 to 60
6-10 Years	60 to 80
Beyond 10 Years	Greater than 80

The MTO Time of Improvement is outlined in Table 3 below:

Time of Improvement	Pavement Condition Index (MTO)
Now – 3 Years	0-20
3-5 Years	20 to 40
Within 5 Years	40 to 60
Normal Maintenance	60 to 80
No Maintenance	Greater than 80

Recommended Pavement Management Program

The Town's roadway maintenance needs and improvement strategies have been based on meeting the desired level of service, as defined in the Town's AMP outline below:

- Maintaining a PCI of 70 on average throughout the Town.

- Roads having a PCI of less than 50, considered a “Now” improvement, to be slated for some form of work within a two-year timeframe.
- Roads having a PCI between 50 and 60, considered a “1-5 Year” improvement, to be addressed in some manner within a five-year timeframe.

The recommended five-year pavement management program is outlined in Table 4 below and is based on the following approach:

- Address all road sections in the ‘Now’ category within a two-year period;
- Reconstruction of all road sections with a PCI below 45;
- Rehabilitation of all road sections in the ‘Now’ and ‘1 to 5 Year’ category with a PCI value ranging from 45 to 55;
- Incorporate maintenance measures on road sections in the ‘1 to 5 Year’ and ‘6 to 10 Year’ category with a PCI value ranging from 55 to 70; and
- Monitor all road sections with a PCI value ranging from 70 to 100. Preventative measures can be carried out on an as-needed basis.

Years	PCI Rating	Road Length	Total Cost	Cost per Year
1-2 Reconstruction/Rehabilitation	< 50	1.86 km	\$715,222	\$357,611 (over 2 yrs.)
3-5 Rehabilitation	50 to 55	4.20 km	\$2,019,766	\$673,256 (over 3 yrs.)
1-5 Maintenance	55 to 60	5.11 km	\$418,560	\$83,712 (over 5 yrs.)
1-5 Maintenance	60 to 70	42.05 km	\$1,403,579	\$280,716 (over 5 yrs.)
Total	-	53.22 km	\$4,557,127	\$911,426 (over 5 yrs.)

This recommended level of maintenance is projected to result in an average PCI rating of 75 in five years. The resulting level of service exceeds the Town's objective of maintaining an average PCI of 70, as identified in the Town's AMP.

Consultations

Financial Services
Dillon Consulting Limited
StreetScan Canada ULC

Financial Implications

Table 5 (below) outlines the historical expenditures for Roads within the Town since 2003 and compares that with the average PCI from the Roads Needs.

Year	Road Expenditures	Average PCI
2003	\$2,891,074	67.2
2004	\$1,204,171	
2005	\$5,870,764	
2006	\$7,606,645	
2007	\$2,890,261	
2008	\$3,136,064	79.0
2009	\$6,541,317	
2010	\$3,124,088	
2011	\$1,676,774	
2012	\$1,501,375	
2013	\$2,578,696	
2014	\$2,863,064	74.1
2015	\$3,783,712	
2016	\$3,702,263	
2017	\$3,797,577	
2018	\$2,403,786	
2019	\$3,255,044	77.0

The average PCI of 77.0 indicates that the Town has been maintaining the infrastructure in overall good condition.

Administration will utilize the recommendations and estimated costs contained within the Study when completing the annual Public Works & Environmental Services Capital Works Plan and when updating the Town's Asset Management Plan.

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

John Henderson, P.Eng.
Manager Engineering Services

Reviewed by:

Kirby McArdle, P.Eng.
Manager Roads & Fleet

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Environmental Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Town of Tecumseh Road Needs Study 2019
2	Map: Tecumseh Transportation Master Plan Road Classifications
3	Map: Tecumseh Transportation Master Plan Road Classifications – Urban Area