Meeting Date: **April 23, 2025**

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Report No: **PWE 20-2025**

Subject: **Roads Needs Study**

Recommendation:

THAT Report PWE-20-2025, re: Roads Needs Study be received for information.

Purpose:

The purpose of this report is to provide Municipal Council and residents with an updated assessment of the Municipality's Road network. This study builds on the studies previously completed in 2020 and 2022.

Background:

Through the 2024 budget process, Council approved funding for the completion of a Roads Needs Study (RNS). The RNS is a critical document used in assisting staff with the prioritization and asset management of the Municipality's 603 centre line kilometers of roadway.

Analysis:

The 2024 Middlesex Centre RNS, summarizes road system surveys conducted during the summer of 2024. All hard surface roads in Middlesex Centre including boundary roads were included in this study, gravel roads were excluded as there has been no change to the gravel road system. The purpose of the RNS is to provide an overview of the overall condition of the road system. The study provides a rating of the general condition of the road system by road section, and includes variables such as; structural adequacy, drainage, surface condition, horizontal and vertical alignment, and lane width. This information was gathered in accordance with the Ministry of Transportation (MTO) Inventory Manual for Municipal Roads. The study data and information were used to generate priorities for road maintenance activities and capital improvements. This information will be used to help future Transportation budgeting and with the intent

of maintaining the roadway Pavement Condition Index (PCI) of 70 as approved by Council in the current Asset Management Plan (AMP).

The following table provides a break down of the road network between gravel, surface treated (LCB), and asphalt (HCB).

Table ES.1-2: Surface Type Distribution

Surface Type	Roadside Environment			Total CL-KM	% CL-KM
	Rural	Semi-Urban	Urban		
High Class Bituminous	44.4	19.9	50.2	114.5	19.0%
Low Class Bituminous	212.8	3.1	0.3	216.2	35.9%
Gravel	272.0	0.1	-	272.1	45.1%
Total	**529.2**	**23.2**	**50.5**	**602.9**	**100%**

The bulk of the roadside environment is classified as rural with 529.2 centre line kilometers or 88% of the road network, with 50.5 centre line kilometers being urban (8% of the road network), and 23.2 centre line kilometers (4% of road network) being classified as semi urban.

Financial Implications:

As part of the RNS, several budget scenarios for maintenance and rehabilitation were reviewed;

- Do nothing,
- Maintain existing PCI 72.3,
- Maintain asset management plan target PCI of 70,
- Alternative target of PCI 60,
- Unlimited funding,
- 2024 Funding level

The unlimited funding scenario represents an optimized approach that maximize surface life (PCI). This scenario is unencumbered by budgets and uses the right interventions at the right time as per the decision tree contained in the RNS.

The results of the different funding scenarios over 10 years are shown in the chart below, with the corresponding impact to the entire road networks PCI value.

Table ES.1-6: Budget Scenario Cost and Performance Summary

Budget Scenario	Total 10-Year Funding	Overall Score (/100) (2024)	Overall Score (/100) (2034)
Do Nothing	$0	72.3	36.4
Total Maintain PCI = 72.3 (Existing)	$27.6M	72.3	72.4
Total Maintain PCI = 70.0 (Target)	$25.2M	72.3	70.0
Total Maintain PCI = 60.0 (Alternative Target)	$18.7M	72.3	60.0
Unlimited Funding	$30.2M	72.3	75.7
2024 Current Funding Level	$17.3M	72.3	55.5

Under the current funding scenario (based on the 2024 budget) the road network will degrade over a 10-year time frame to an overall network of PCI 55.5. Using the recommendations of the currently approved AMP to maintain a PCI of 70 would require $25.2 million dollars over 10 years or approximately $2.52 million dollars per year for asphalt and tar and chip rehabilitation. This does not account for any costs associated with other improvements such as road conversion (gravel to tar and chip, or tar and chip to asphalt) or improvements to drainage, vertical or horizontal curves. This is only the cost associated with maintaining the existing network to a PCI of 70.

The second component of the RNS provides a cost summary of improvements to the road network to address identified deficiencies such as; surface type, surface width, drainage, geometric, and structural. A summary of the deficiency types and time of need can be found below.

Table 3-8: TON Distribution for Six Critical Areas

Area of Need	Time of Need							
	NOW		1 to 5		6 to 10		ADEQ	
	CL-km	% CL-km	CL-km	% CL-km	CL-km	% CL-km	CL-km	% CL-km
Geometrics	16.3	2.7%	-	-	-	-	586.6	97.3%
Surface Type	42.5	7.0%	11.8	2.0%	7.0	1.2%	541.5	89.8%
Surface Width	34.0	5.6%	3.8	0.6%	0.5	0.1%	564.6	93.6%
Capacity	-	-	-	-	-	-	602.9	100%
Structural Adequacy	19.6	3.3%	51.1	8.5%	96.4	16.0%	435.7	72.3%
Drainage	21.4	3.5%	-	-	147.2	24.2%	434.3	72.0%

The following table provides a summary of costs associated with addressing the noted deficiencies.

Table 3-15: Deficiency Cost Summary

Deficiency	Total Cost ($)
Multiple Deficiencies	$ 2,789,888
Surface Type Deficiencies – Now Need	$ 9,694,538
Surface Type Deficiencies – 1-5 Yr Need	$ 3,157,032
Surface Type Deficiencies – 6-10 Yr Need	$ 1,508,789
Surface Width Deficiencies	$ 6,944,495
Structural Adequacy Deficiencies	$ 2,090,943
Geometric Deficiencies	$ 2,628,400
Drainage Deficiencies	$ 266,684
Total	**$ 29,080,769**

To fix all of the identified deficiencies over a 10-year period would require a capital investment of 2.91 million dollars per year on top of the budget to maintain the desired PCI level of 70 as per the AMP.

The below table summarises the Municipality's current 2025 budgeted investments into the road network compared to the RNS recommendations, and approved AMP targets.

	Currently budgeted (based on 2025 budget)	**Recommended Investment as per RNS to Meet AMP target of PCI 70**	**Difference**
Rehabilitation and Maintenance	$1,740,000.00	$2,520,000.00	$(780,000.00)
Reconstruction/ Deficiency Improvement	$600,876.00*	$2,910,000.00	$(2,309,124.00)
Total	$2,340,876.00	$5,430,000.00	$(3,089,124.00)

*Old River Road excluded as it was not included in the costing of the RNS deficiency review due to the unique and ongoing nature of the project.

It is worth noting that; structural, surface type, and drainage deficiencies typically see higher operating and maintenance costs, and shorter service lives due to the underlying problems not being resolved unless through a capital project.

This financial information will be used to help inform and facilitate budget discussions, asset management, and to prioritize rehabilitation, reconstruction and maintenance needs of the road network.

Based on the above outlined scenarios, staff continue to monitor and take into consideration the Asset Management Plan as we budget accordingly to maintain our infrastructure to the existing PCI standards.

Strategic Plan:

This matter aligns with following strategic priorities:

- Sustainable Infrastructure and Services

The Road Needs study will allow staff and Council to prioritize the rehabilitation, maintenance, and reconstruction of the municipal road network to ensure a sustainable transportation network that meets the goals and targets set out in the Asset Management Plan.

Attachments:

Appendix A – 2024 Road Needs Study Report