



The Corporation of the Township of Malahide

A G E N D A

June 2, 2022 – 7:30 p.m.

**Springfield & Area Community Services Building
51221 Ron McNeil Line, Springfield**

**** Note: Due to COVID-19 restrictions, this meeting will have limited seating capacity for Council and Municipal Staff only. The meeting will also be streamed live on YouTube.****

- (A) Call Meeting to Order
- (B) Disclosure of Pecuniary Interest
- (C) Approval of Previous Minutes **RES 1 (Pages 8-18)**
- (D) Presentations/Delegations/Petitions
 - Meeting to Consider – Glinski Drain relating to property at Parts Lots 23, Concession 3, in the Township of Malahide **RES 2-4 (Pages 19-20)**
 - Public Meeting – Zoning By-law Amendment – Applicants Daniel and Michael Bogart, J Grant Burks Farm LTD. and John Burks relating to property Part of Lot 9, Concession 10 and Part 1 of RP 11R-8266, 50260 & 50264 Lyons Line **RES 5-8 (Pages 21-40)**
 - Public Hearing – Minor Variance Application – Applicant, Wendy D'Angelo (Authorized Agent: Zelinka Priamo Ltd. c/o Matt Campbell), relating to property at Lots 105 through 110 on Registered Plan 78, Village of Springfield, Township of Malahide, 11789 Superior Street **RES 9-11 (Pages 41-57)**
 - Presentation – Derek Richmond – Expanding Services and Protecting Public Post Offices **RES 12 (Page 58)**

(E) Reports of Departments

(i) Director of Fire & Emergency Services

(ii) Director of Public Works

- 2021 Road Needs Study **RES 13 (Pages 59-249)**
- Request for Improvement – Maginnis Drain **RES 14 (Pages 250-253)**
- Ontario Police College Memorandum of Understanding for Kitchen Use **RES 15 (Pages 254-255)**
- Springfield Veteran Banner Request **RES 16 (Pages 256-258)**
- RFP Results – Carter Road Bridge Rehabilitation Request for Proposal **RES 17 (Pages 259-261)**

(iii) Director of Finance/Treasurer

(iv) Clerk

-2022 Municipal Election – Establishment of Joint Compliance Audit Committee **RES 18 (Pages 262-271)**

(v) Building/Planning/By-law

(vi) CAO

- Bill 27, Working for Workers Act, 2021 (Disconnecting from Work) **RES 19 (Pages 272-278)**

(F) Reports of Committees/Outside Boards

(G) Correspondence **RES 20**

1. Association of Municipalities of Ontario - Watch File – dated May 19, 2022 and May 26, 2022. **(Pages C2-7)**
2. The Corporation of the City of Cambridge – Resolution request be sent to the Region of Waterloo on behalf of Cambridge Council for free public transportation on Election Days. **(Pages C8-9)**
3. Corporation of the City of Brantford – Resolution requesting the immediate release to the Survivors' Secretariat, of all documents in the possession of the Government of Canada or the Government of Ontario and the Anglican Church related to the former Mohawk Institute Residential School now located on Six Nations of the Grand River Territory, within the geographic boundaries of the City of Brantford. **(Pages C10-12)**
4. Municipality of Shuniah – Resolution requesting the province increase funding for the Rural and Northern Education Fund, a review of the education funding formula be undertaken and that consultation from school

boards and community groups occur prior to the pupil accommodation review guide being developed. **(Pages C13-16)**

5. Southwestern Public Health – Notice of changes coming to COVID-19 vaccination clinics in Elgin, Oxford, and St. Thomas. **(Page C17)**
6. Ontario Region Delivering Community Power Coordinator Canadian Union of Postal Workers – Request for Malahide Township to support service expansion at Canada Post. **(Pages C18-19)**
7. Town of Aylmer – Notice of Fundraising Challenge – Aylmer-Malahide Museum & Archives Capital Campaign. **(Pages C20-24)**

(H) Other Business

- (i) Springfield Family Fun Day Committee – Request for Event Support **RES 21 (Page 279)**
- (ii) Southwestern Public Health – Request use of Malahide Community Place for vaccination clinic **RES 22 (Page 280)**

(I) By-laws

(J) Closed Session

(K) Confirmatory By-law **RES 23 (Page 281)**

(L) Adjournment **RES 24**

*****VIDEOCONFERENCE MEETING***

Note for Members of the Public: IMPORTANT ---

Please note that the Regular Council Meeting scheduled to be held on June 2, 2022 will be via videoconference only for presenters, the press and the public.

Please note that, at this time, there is not an option for the public to call in to this meeting. However, we will be livestreaming the Council Meeting via YouTube. [Please click here to watch the Council Meeting.](#)

Written comments regarding the Council Agenda items are welcome – please forward such to the Clerk at aadams@malahide.ca.

PLEASE NOTE that the draft resolutions provided below DO NOT represent decisions already made by the Council. They are simply intended for the convenience of the Council to expedite the transaction of Council business. Members of Council will choose whether or not to move the proposed draft motions and the Council may also choose to amend or defeat them during the course of the Council meeting.

1. THAT the minutes of the regular meeting of the Council held on May 19, 2022, be adopted as printed and circulated.
2. THAT the Engineer's Report for the Glinski Drain, as prepared by Spriet Associates London Limited and dated April 26, 2022, be accepted;

AND THAT By-law No. 22-45 being a by-law to provide for the Glinski Drain drainage works be read a first and second time and provisionally adopted.
3. THAT the Court of Revision for the Glinski Drain be scheduled to be held on July 7, 2022, at 7:30 p.m.
4. THAT the tenders for the construction of the Glinski Drain be requested for June 9, 2022 at 11:00 a.m.
5. THAT the Public Meeting concerning the Zoning By-law Amendment Application of Application of Daniel and Michael Bogart, and J. Grant Burks Farms LTD and John Benjamin Burks, relating two properties located at Part of Lot 9, Concession 10 in the former Township of South Dorchester, and being 50260 and 50264 Lyons Line; be called to order at 7: __p.m
6. THAT the Public Meeting concerning the Zoning By-law Amendment Application of Application of Daniel and Michael Bogart, and J. Grant Burks Farms LTD and John Benjamin Burks, relating two properties located at Part of Lot 9, Concession 10 in the former Township of South Dorchester, and being 50260 and 50264 Lyons Line; be adjourned and the Council reconvene at 7: __p.m
7. THAT Report No. DS-22-25 entitled "Housekeeping Zoning By-law Amendment Application of Daniel and Michael Bogart, and J. Grant Burks Farms LTD and John Benjamin Burks" be received;

AND THAT the Housekeeping Zoning By-law Amendment Application No. D14-Z05-22 of relating to the two properties located at Part of Lot 9, Concession 10 in the former Township of South Dorchester, and being 50260 and 50264 Lyons Line, BE APPROVED for the reasons set out in this Report.
8. THAT By-law No. 22-35 being a By-law to amend Zoning By-law No. 18-22 insofar as it relates to the properties owned by Daniel and Michael Bogart, and J. Grant Burks Farms LTD and John Benjamin Burks, located at Part of Lot 9,

Concession 10 in the former Township of South Dorchester, be given first, second and third readings, and properly signed and sealed.

9. THAT the Committee of Adjustment for the Township of Malahide be called to order at 7:___ p.m. and that Mayor Dave Mennill be appointed Chairperson for the "Committee of Adjustment".

10. THAT Report No. DS-22-26 entitled "Application for Minor Variance – Joe & Wendy D'Angelo" be received;

AND THAT the Application for Minor Variance – Joe & Wendy D'Angelo, relating to the property located in Plan 78, Lots 108 to 110 and being part 2 on 11R-1568, be approved for the reasons set out herein.

11. THAT the Committee of Adjustment for the Township of Malahide be adjourned and the Council meeting reconvene at 7:___p.m.

12. THAT the presentation from Derek Richmond, Ontario Region Coordinator for the Canadian Union of Postal Workers, regarding expanding services and protecting public post offices, be received.

13. THAT Report No. PW-22-34 entitled "2021 Road Needs Study" be received;

AND THAT Council adopt the "2021 State of the Infrastructure and Asset Management Plan for Roads" report prepared by 4 Roads Management Services;

AND THAT Staff be directed to utilize the above-noted report to inform long-term asset management recommendations on the Township's road network.

14. THAT Report No. PW-22-41 entitled "Request for Improvement – Maginnis Drain" be received;

AND THAT Mike Devos, P. Eng., of Spriet Associates, be appointed to prepare an Engineer's Report for this petition.

15. THAT Report No. PW-22-37 entitled "Ontario Police College Memorandum of Understanding for Kitchen Use" be received;

AND THAT Township of Malahide Council directs the Facilities Manager to enter into a Memorandum of Understanding with the Ontario Police College for contingent use of the Malahide Community Place Kitchen Facilities.

16. THAT Report No. PW-22-31 entitled "Springfield Banner Request" be received;

AND THAT the Council accept the recommendations from staff to proceed with this project based on the installation of the brackets and banners on the Hydro poles on Ron McNeil Line;

AND THAT the Municipal Staff be directed to work with the “Honour Our Veterans Committee” on the installation of the brackets and banners.

17. THAT Report No. PW-22-40 entitled “RFP Results – Carter Road Bridge Rehabilitation Request for Proposal” be received;

AND THAT the proposal for the Carter Road Bridge Rehabilitation be awarded to Vallee Consulting Engineers, Architects and Planners of Simcoe, Ontario in the amount of \$24,955.70 (plus HST);

AND THAT the Mayor and Clerk be authorized to enter into an agreement with Vallee Consulting Engineers, Architects and Planners for the purpose of completing the Carter Road Bridge Rehabilitation.

18. THAT Report CLERK-22-07 entitled “2022 Municipal Election – Establishment of Joint Compliance Audit Committee” be received for information; and,

THAT Council considers giving three readings to the By-Law establishing an Election Joint Compliance Audit Committee for the 2022 Municipal Election in accordance with the Municipal elections Act, 1996, as amended.

19. THAT Report No. HR-22-04 entitled “Bill 27, Working for Workers Act, 2021 (Disconnecting from Work)” be received.

AND THAT HR Policy B-3.5 Disconnecting from Work is approved.

20. THAT the following correspondence be noted and filed:

1. Association of Municipalities of Ontario - Watch File – dated May 19, 2022 and May 26, 2022. **(Pages C2-7)**
2. The Corporation of the City of Cambridge – Resolution request be sent to the Region of Waterloo on behalf of Cambridge Council for free public transportation on Election Days. **(Pages C8-9)**
3. Corporation of the City of Brantford – Resolution requesting the immediate release to the Survivors’ Secretariat, of all documents in the possession of the Government of Canada or the Government of Ontario and the Anglican Church related to the former Mohawk Institute Residential School now located on Six Nations of the Grand River Territory, within the geographic boundaries of the City of Brantford. **(Pages C10-12)**

4. Municipality of Shuniah – Resolution requesting the province increase funding for the Rural and Northern Education Fund, a review of the education funding formula be undertaken and that consultation from school boards and community groups occur prior to the pupil accommodation review guide being developed. **(Pages C13-16)**
5. Southwestern Public Health – Notice of changes coming to COVID-19 vaccination clinics in Elgin, Oxford, and St. Thomas. **(Page C17)**
6. Ontario Region Delivering Community Power Coordinator Canadian Union of Postal Workers – Request for Malahide Township to support service expansion at Canada Post. **(Pages C18-19)**
7. Town of Aylmer – Notice of Fundraising Challenge – Aylmer-Malahide Museum & Archives Capital Campaign. **(Pages C20-24)**
21. THAT the 2022 Springfield Family Fun Day event being held on June 18, 2022 in Springfield be supported;

AND THAT, in recognition of the community benefit, the Municipal Staff be authorized and directed to confirm 'Affiliated Municipal Groups Liability' insurance coverage for the Springfield Family Fun Day event and its Organizing Committee.
22. THAT the request of Southwestern Public Health Unit for use of Malahide Community Place for a vaccination clinic be received;
23. THAT By-law No. 22-38, being a Confirmatory By-law, be given first, second and third readings, and be properly signed and sealed.
24. THAT the Council adjourn its meeting at _____ p.m. to meet again on June 16, 2022, at 7:30 p.m.

The Corporation of the Township of Malahide**May 19, 2022 – 7:30 p.m.****Virtual Meeting - <https://youtu.be/F3Qkdwf3gNM>**

Due to COVID 19 and Public Health concerns, the Malahide Township Council met at the Springfield & Area Community Services Building, at 51221 Ron McNeil Line, Springfield, at 7:30 p.m. in order to allow for physical distancing. No public attendance was permitted. The following were present:

Council: Mayor D. Mennill, Deputy Mayor D. Giguère, Councillor M. Widner, Councillor M. Moore, Councillor R. Cerna, Councillor S. Lewis, and Councillor C. Glinski.

Staff: Clerk A. Adams, Director of Public Works M. Sweetland, Director of Finance A. Boylan and Director of Fire and Emergency Services J. Spoor.

Council via Zoom: N/A

Staff via Zoom: Chief Administrative Officer A. Betteridge

Absent:

CALL TO ORDER:

Mayor Mennill took the Chair and called the meeting to order at 7:30 p.m.

DISCLOSURE OF PECUNIARY INTEREST and the General Nature thereof:

Councillor Widner disclosed a pecuniary interest with respect to Council Agenda item D – Meeting to Consider Tate Drain and Council Agenda items E (ii) Petition for Drainage – Dykxhoorn Petition and Hacienda Road and Vienna Line Culvert Rehabilitation Consideration. The nature of the conflict being that a Junior Partner at Spriet Associates is an immediate relative of his.

Councillor Glinski disclosed a pecuniary interest with respect to Council Agenda item D – Meeting to Consider Tate Drain. The nature of the conflict being that the drain affects his property.

MINUTES:**No. 22–197****Moved By: Max Moore****Seconded By: Scott Lewis**

THAT the minutes of the regular meeting of the Council held on May 5, 2022, be adopted as printed and circulated.

Carried**PRESENTATIONS/DELEGATIONS/PETITIONS:**

- Meeting to Consider – Tate Drain Branch “E” 2021 relating to property at Lots 24 to 26, Concession 2, Geographic Township of Malahide

Councillor Widner and Councillor Glinski declared a conflict of interest with respect to Council Agenda item D – Meeting to Consider Tate Drain. They retired from the meeting and abstained from all discussions and voting on the matter.

Drainage Engineer, Mike DeVos, of Spriet Associates, appeared before the Council to present the Drainage Engineer’s Report, dated April 23, 2021, regarding the Tate Drain Branch “E” 2021 and outlined the nature of the proposed work.

Mayor Mennill inquired if any persons, including Members of Council, would like to withdraw or add their names to the Petition and there were none.

Mayor Mennill inquired if any persons were in attendance that wished to comment or ask questions concerning the Drainage Report. Deputy Mayor Giguère inquired how errors are mitigated in this type of profession and if fellow colleagues in the industry or landowners of the effected properties are consulted. Mr. DeVos indicated it is a combination of those things as they rely on landowner knowledge, complete field investigations and internal engineers’ complete reports under the Drainage Act.

Leon Passmore noted that he had Mr. Dohner on the phone as Mr. Dohner’s internet connection wasn’t allowing him to connect and make comment. Mr. Dohner inquired how it’s possible that the field is systematically tiled and before it wasn’t a part of the Tate Drain and now it is. Mr. DeVos responded to this by stating that the 10inch tile that was installed would have tiles connected to it and that is the reason for the installation of the tile there was no mention made of tiles heading off to southwest the surface water in the field will flow southwest and leave the property and all the tilling and water that gets into that pipe would come into the Tate Drain. As a result, he noted that Mr. Dohner has to be assessed on the Tate Drain as some surface water will be addressed southwest but not all will be. Having some water going one way and some another does not alleviate the necessity for having the drain. Mr. Devos indicated that Mr. Dohner could remove the tile and have all the water go to the southwest if he wished but he chose to do that tile in that direction and is accessed for the water using that tile.

Mayor Mennill noted that the Township was going to receive the report tonight and that Mr. DeVos had outlined the options if Mr. Dohner wasn't satisfied with the report indicating there is a forty-day appeal period and a final decision would be made at the Drainage Tribunal. If he chose to appeal, he could submit his appeal to the Township office.

No. 22-198

Moved By: Rick Cerna

Seconded By: Scott Lewis

THAT the Engineer's Report for the Tate Drain Branch "E" 2021, as prepared by Spriet Associates London Limited and dated April 23, 2021, be accepted;

AND THAT By-law No. 22-39 being a by-law to provide for the Tate Drain Branch "E" 2021 drainage works be read a first and second time and provisionally adopted.

Carried

No. 22- 199

Moved By: Max Moore

Seconded By: Rick Cerna

THAT the Court of Revision for the Tate Drain Branch "E" 2021 be scheduled to be held on June 16, 2022, at 7:30 p.m.

Carried

No. 22-200

Moved By: Dominique Giguère

Seconded By: Scott Lewis

THAT the tenders for the construction of the Tate Drain Branch "E" 2021 be requested for June 9, 2022 at 11:00 a.m.

Carried

Councillor Widner and Councillor Glinski returned to their seats at the Council table.

REPORTS:

Director of Fire & Emergency Services

- Emergency Services Activity Report – April

No. 22–201

Moved By: Dominique Giguère

Seconded By: Scott Lewis

THAT Report No. F-22-08 entitled “Emergency Services Activity Report – April” be received.

Carried

Director of Public Works

- Petition for Drainage – Dykxhoorn Petition

Councillor Widner declared a conflict of interest with respect to Council Agenda item E (ii) Petition for Drainage – Dykxhoorn Petition. He retired from the meeting and abstained from all discussions and voting on the matter.

No. 22–202

Moved By: Max Moore

Seconded By: Rick Cerna

THAT Report No. PW-22-30 entitled “Petition for Drainage – Dykxhoorn Petition” be received;

AND THAT George Vereyken, P. Eng., of Spriet Associates Ltd., be appointed to prepare an Engineer’s Report for the Dykxhoorn petition, it being noted that the Petitioner is requesting this petition to be incorporated into the Engineers report currently being prepared for the construction of a new branch of the Burks Drain.

Carried

Councillor Widner returned to his seat at the Council table.

- Road Safety Audit Phase 2 Implementation

Councillor Widner inquired about the speed reduction being on one side and not the other at College Line and Springwater Road at Kingsville Corners as it was requested to be included. Director of Public Works Sweetland indicated that this section was included in the Phase 2 Audit and it wasn’t recommended at that time but can be looked

at in the Phase 3 Audit that has recently commenced.

No. 22–203

Moved By: Scott Lewis

Seconded By: Chester Glinski

THAT Report No. PW-22-35 entitled “Road Safety Audit Phase 2 Implementation” be received;

AND THAT the Municipal Staff be authorized and directed to take the necessary steps to ensure that appropriate speed reductions are implemented on all Township roads;

AND THAT the Municipal Staff be authorized and directed to proceed with the installation of guiderail at the identified locations as budget limitations allow.

Carried

- Hacienda Road and Vienna Line Culvert Rehabilitation Consideration

Councillor Widner declared a conflict of interest with respect to Council Agenda item E (ii) Hacienda Road and Vienna Line Culvert Rehabilitation Consideration. He retired from the meeting and abstained from all discussions and voting on the matter.

Mr. Vereyken of Spriet Associates provided an overview of the report and noted both culverts are due for replacement in the near future. Both sites were examined and both are significantly deep which present significant construction challenges and load capacities. Rehabilitation methods and replacement methods were both analyzed for these projects and after review it's being recommended that both sites are replaced.

Mayor Mennill noted the new concept that was used when originally installed and how this type has been problematic since.

Director of Public Works Sweetland noted the implementation plan for these replacement projects are included in the 2022 Capital budget. These culverts are both candidates for grant programs and because they are both Schedule A Class EA's and the pre-approval won't expire.

The Mayor thanked Mr. Vereyken and he retired from the meeting.

No. 22–204

Moved By: Scott Lewis

Seconded By: Chester Glinski

THAT Report No. PW-22-36 entitled “Hacienda Road and Vienna Line Culvert Rehabilitation Consideration” be received;

AND THAT Staff proceed with issuance of request for proposals for the design of concrete box culverts for the replacement of the C-15 Hacienda Road Culvert and C-17 Vienna Line Culvert in accordance with the 2022 Capital budget.

Carried

Councillor Widner returned to his seat at the Council table.

CAO

- Shared Development Approvals Service Business Plan and Electronic Processing

CAO Betteridge noted that a preliminary review has been conducted and will be presented to Council tonight. He noted that the Municipality of Bayham held a special Council meeting the night prior and passed a similar recommendation as being presented to Council tonight.

Todd MacDonald and Tony Quirk of Performance Concepts Inc. presented a shared development services presentation summarizing the findings of their review. The consultants believe there is a workable model to consider that being that the Township of Malahide sell Building Service to Municipality of Bayham, Municipality of Bayham would sell By-law Enforcement Services to the Township of Malahide and that a Shared Services Board be established for Land-Use Planning Services between both municipalities. This recommendation, if approved, would enact phase two.

The Mayor noted the sharing services with other lower tier municipalities and the County of Elgin has provided efficiencies over the years. He noted that at first look the recommendation being presented makes sense.

Councillor Glinski inquired that if Malahide's CBO is completely booked already where would the three days come from to assist Bayham with this service. CAO Betteridge noted that the CBO is booked and utilizing RSM (building consultants) and the shared agreement with Elgin County CBO's for covering vacation. The benefits of this shared service would be that there would be one CBO and one inspector not two separate CBO's.

Councillor Glinski inquired how many new staff would be required in this new model. Mr. MacDonald stated that one new staff would be required for the By-law Enforcement services and this cost would be split between each municipality. This scenario would relieve current staff from their double duty of this job and would reduce billable hours from the By-law Enforcement contractor. In the second stage of the work the net financial impact will be reviewed in detail.

Councillor Glinski inquired which company the Municipality of Bayham uses for By-law Enforcement. CAO Betteridge stated that Municipality of Bayham, like Malahide uses MEU Consulting.

Deputy Mayor Giguère inquired what is the ultimate benefit to Malahide residents and what if any, tangible impact would they see from this arrangement. Mr. MacDonald noted that the primary benefit is that the necessary resources and capacity to consistently deliver services that meet the expectations of the residents. The independent contractor is being deployed but not necessarily closing cases to the satisfaction of residents. Having a trained dedicated By-law Enforcement officer will provide consistency of service and will generate results. The joint service makes economic sense in a constrained labour market.

The Mayor thanked Todd MacDonald and Tony Quirk for their presentation and they retired from the meeting.

No. 22–205

Moved By: Mark Widner

Seconded By: Scott Lewis

THAT Report No. CAO-22-07 entitled “Presentation #1 Re: Shared Development Approvals Service Business Plan and Electronic Processing” be received;

AND THAT Council support and give direction to Performance Concepts Inc. and Staff to proceed with a detailed build-out of a preferred model, subject to the Council for the Municipality of Bayham agreeing, whereby: the Township of Malahide sells Building Services to the Municipality of Bayham; the Municipality of Bayham sells By-Law Enforcement Services to Malahide; and, a Shared Services Board is established for Land-Use Planning Services between both municipalities.

Carried

REPORTS OF COMMITTEES/OUTSIDE BOARDS:

No. 22–206

Moved By: Max Moore

Seconded By: Rick Cerna

THAT the following Reports of Committees/Outside Boards be noted and filed:

- (i) Long Point Region Conservation Authority Board of Directors–
Minutes of May 4, 2022**

Carried

CORRESPONDENCE:

Councillor Widner inquired about correspondence item two and asked Director of Fire Services if he could elaborate on this. Director of Fire Services Spoor noted that in July the Province is enforcing certification for all firefighters and if Tay Township is pushing back they may not be in compliance with the training requirements. Malahide firefighters are up to date and the training gap is smaller than most services our size. Director of Fire Services noted that he supports the certification being presented by the province.

No. 22–207

Moved By: Mark Widner

Seconded By: Rick Cerna

THAT the following correspondence be noted and filed:

- 1. Association of Municipalities of Ontario - Watch File – dated May 5, 2022 and May 12, 2022. (Pages C2-7)**
- 2. Tay Valley Township – Resolution supporting the Association of Municipalities of Ontario’s letter to the Solicitor General of Ontario outlining their concerns with the draft regulations regarding firefighter certification. (Pages C8-11)**
- 3. Mohawk Nation of the Grand River Country- Further expansion of the Mohawk nation. (Pages C12-18)**
- 4. Ministry of Northern Development, Mines, Natural Resources and Forestry – Decision Notice of Proposed Regulation Changes under the Aggregate Resources Act. (Pages C19-20)**
- 5. Ministry of the Solicitor General – Malahide Compliance in 2021 of the Emergency Management and Civil Protection Act (EMCPA). (Page C21)**
- 6. Municipality of Central Elgin – Notice of Study Commencement – Municipal Class Environmental Assessment. (Pages C22-23)**
- 7. Municipality of Central Elgin – Notice of Passing Zoning By-law Amendment relating to the following: (Page C24)**
 - 43315 Roberts Line**
- 8. Ministry of the Solicitor General – Conclusion of COVID-19 Enforcement Support Line. (Page C25)**
- 9. Town of Aylmer – Notice of Public Information Centre – Replacement of the existing water storage facility. (Page C26)**

Carried

OTHER BUSINESS:

- Malahide Firefighters Association – Fireworks Display at Pier in Port Bruce

No. 22–208

Moved By: Rick Cerna

Seconded By: Chester Glinski

THAT Malahide Volunteer Firefighter Association be granted permission to utilize a portion of the pier in Port Bruce for the purpose of a fireworks display on May 22 or May 23; SUBJECT to providing the Township with proof of Event Liability Insurance naming the Township of Malahide as an additional insured.

Carried

- Appointment of Court of Revision Member Barons Drain Branch A & E

No. 22–209

Moved By: Rick Cerna

Seconded By: Max Moore

THAT Deputy Mayor Giguère be appointed as the Township of Malahide's Court of Revision Member for the Barons Drain Branch A & E (Municipality of Central Elgin).

Carried

Councillor Lewis shared news that the Talbot Trail ATV Club had its first group activity in two years and they did a garbage cleanup along the roadway on their trail tour and filled a dumpster full. They did this as a thank you to Malahide Township for allowing the club to access its roadways. Mayor Mennill noted this contribution and directed Staff to send a letter of appreciation for that contribution to the ATV Club.

Deputy Mayor Giguère would like to see speed and traffic counts implemented on Ron McNeil Line at the west village limit to support the need for extending the 50km/h speed limit further out of the village boundaries.

No. 22–210

Moved By: Dominique Giguère

Seconded By: Max Moore

That Township of Malahide Council requests that Elgin County Council conduct speed and traffic counts on Ron McNeil Line at the west village limit in support of extending the 50km/hr speed limit westerly beyond the built-up residential area.

Carried

Deputy Mayor Giguère would like Staff to review sight distances and a no parking consideration on Imperial Road at the northbound curve west of the Port Bruce Provincial Park beach as a result of blind spots around the curve coming into the beach area. Pedestrians are also walking along the road and are being pushed onto the roadway creating unsafe conditions.

No. 22-211

Moved By: Scott Lewis

Seconded By: Dominique Giguère

That Township Council direct staff to review sight distances and no parking consideration on Imperial Road at the northbound curve west of the Port Bruce Provincial Park beach

Carried

BY-LAWS:

CLOSED SESSION:

CONFIRMATORY:

No. 22- 212

Moved By: Rick Cerna

Seconded By: Scott Lewis

THAT By-law No. 22-37, being a Confirmatory By-law, be given first, second and third readings, and be properly signed and sealed.

Carried

ADJOURNMENT:

No. 22–213

Moved By: Chester Glinski

Seconded By: Mark Widner

**THAT the Council adjourn its meeting at 8:52 p.m. to meet again on June 2, 2022,
at 7:30p.m.**

Carried

Mayor – D. Mennill

Clerk – A. Adams



TOWNSHIP OF MALAHIDE

DRAINAGE BY-LAW NO. 22-44

Drainage Act, R. S.O. 1990, c. D17
Reg. 300/81, s.1, Form 6

Being a By-law to provide for a drainage works
on the Glinski Drain
in the Township of Malahide,
in the County of Elgin

WHEREAS the requisite number of owners have petitioned the Council of the Township of Malahide in the County of Elgin in accordance with the provisions of the Drainage Act, requesting that the following lands and roads may be drained by a drainage works.

Parts Lot 23
Concession 3
In the Township of Malahide

AND WHEREAS the Council for the Township of Malahide has procured a report made by Spriet Associates and the report is attached hereto and forms part of this by-law.

AND WHEREAS the estimated total cost of constructing the drainage works is \$35,600.00.

AND WHEREAS \$35,600.00 is the amount to be contributed by the municipality for construction of the drainage works.

AND WHEREAS \$35,600.00 is being assessed in the Township of Malahide in the County of Elgin.

AND WHEREAS the council is of the opinion that the drainage of the area is desirable.

NOW THEREFORE, THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF MALAHIDE UNDER THE DRAINAGE ACT ENACTS AS FOLLOWS:

1. The report dated April 26, 2022, and attached hereto is hereby adopted and the drainage works as therein indicated and set forth is hereby authorized, and shall be completed in accordance therewith.
2.
 - (a) The Corporation of the Township of Malahide may borrow on the credit of the Corporation the amount of \$35,600.00 being the amount necessary for construction of the drainage works.

- (b) The Corporation may issue debentures for the amount borrowed less the total amount of,
 - i. Grants received under section 85 of the Act;
 - ii. Commuted payments made in respect of lands and roads assessed within the municipality;
 - iii. Moneys paid under subsection 61(3) of the Act; and
 - iv. Moneys assessed in and payable by another municipality,
 - (c) And such debentures shall be made payable within five years from the date of the debenture and shall bear interest at a rate not higher than the rate charged by The Ontario Municipal Improvement Corporation on the date of sale of such debentures.
3. A special equal amount rate sufficient to redeem the principal and interest on the debentures shall be levied upon the lands and roads as set forth in the Schedule to be collected in the same manner and at the same time as other taxes are collected in each year for five years after the passing of this by-law.
 4. All assessments of \$500.00 or less are payable in the first year in which the assessment is imposed.
 5. This By-law comes into force on the passing thereof and may be cited as the "Glinski Drain".

READ A FIRST AND SECOND TIME THIS 2nd day of June, 2022.

Mayor

Clerk

READ A THIRD TIME AND FINALLY PASSED THIS 4th day of August, 2022.

Mayor

Clerk



Report to Council

REPORT NO.: DS-22-25
DATE: June 2, 2022
ATTACHMENT: Report Photo, Application, By-law
SUBJECT: “HOUSEKEEPING” ZONING BY-LAW AMENDMENT
APPLICATION OF DANIEL AND MICHAEL BOGART, AND J.
GRANT BURKS FARMS LTD AND JOHN BENJAMIN BURKS
LOCATION: Part of Lot 9, Concession 10, in the former Township of South
Dorchester (50260 and 50264 Lyons Line)

Recommendation:

THAT Report No. DS-22-25 entitled “Housekeeping Zoning By-law Amendment Application of Daniel and Michael Bogart, and J. Grant Burks Farms LTD and John Benjamin Burks” be received;

AND THAT the Housekeeping Zoning By-law Amendment Application No. D14-Z05-22 of relating to the two properties located at Part of Lot 9, Concession 10 in the former Township of South Dorchester, and being 50260 and 50264 Lyons Line, BE APPROVED for the reasons set out in this Report.

Background:

The subject Housekeeping Zoning By-law Amendment (the “Amendment”) is being processed on behalf of the property owners by the Township in order to correct the zoning as it relates to the two subject properties.

Notice of the Application has been circulated to agencies and registered property owners as prescribed and regulated by the Planning Act, RSO 1990, and the Malahide Official Plan, including posting notice in two recent issues of the Aylmer Express.

Comments/Analysis:

50260 Lyons Line is approximately 0.36 hectare/s (0.88 acre) in area, and has approximately 62 metres (204 feet) of frontage along Lyons Line. There is an existing

single-detached dwelling as well as some accessory buildings. This property is shown in green on the attached report photo.

50264 Lyons Line is approximately 39.9 hectares (98.7 acres) in area, and has approximately 247 metres (812 feet) of frontage along Lyons Line and approximately 304 metres (997 feet) of frontage along Crossley-Hunter Line. It is shown in yellow on the attached report photo. There are farm-related buildings at the southerly-end of the property. The single-detached dwelling was demolished this Spring with the intent of building a new dwelling on the property.

The subject properties are bounded by agricultural land to the north, south, east, and west.

The need for this “housekeeping” amendment arose when it was identified by Staff that the existing zoning for the subject properties is both misaligned (area in green should be zoned in the manner in which the area in red as been applied) and doesn’t factor in that there was a legally-established house (recently demolished) on the farm property (area in yellow). The “A2” zone is applied to a retained farm following the severance of a dwelling deemed surplus as a result of a farm consolidation. The “A2” zone prevents the replacement of the demolished dwelling, which is desired.

A housekeeping amendment can be processed for various reasons, including bringing certain regulations and provisions up-to-date, a ‘fix’ for components of the By-law that are no longer working, or in this case, correcting an error.

Given the obvious nature of this zoning error, it is the opinion of Staff that a full evaluation of the applicable policies (Provincial, County, and Township) can be spared.

The amendment will place both properties into their respective “correct” zones so that they can both be used in their rightful manner.

Public/Agency Comments Received

There have been no comments received from the general public as of the date of writing this report.

Financial Implications to Budget:

Given that the existing zoning appears to have been the result of a minor mapping error, the amendment is being processed by the Township so that the subject property owners do not incur any costs (i.e. application fees).

Submitted by:	Approved by:
Christine Strupat, HBA, CPT Development Services Technician/Assistant Planner	Adam Betteridge, MCIP, RPP Chief Administrative Officer

APPLICATION FOR A "HOUSEKEEPING" ZONING BY-LAW AMENDMENT

Daniel Bogart And Michael Bogart (50260 Lyons Line) and
J Grant Burks Farms Ltd And John Benjamin Burks (50264 Lyons Line)

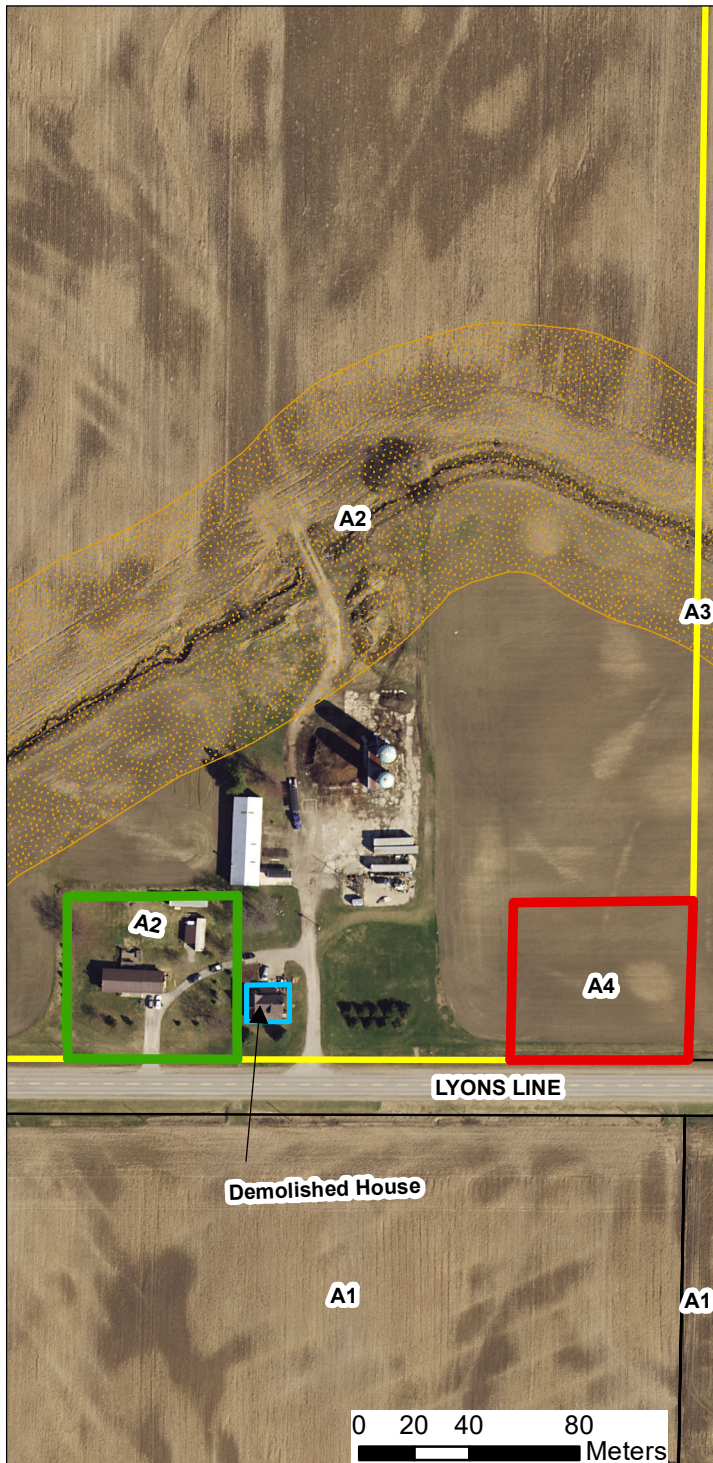
50260 & 50264 Lyons Line

Part of Lot 9, Concession 10 and Part 1 of RP 11R-8266 (50260 Lyons Line)

Part of Lot 9, Concession 10 (50264 Lyons Line)

Former Geographic Township of South Dorchester,
Township of Malahide

Township
of Malahide
Figure 1



OFFICIAL PLAN DESIGNATION
Agriculture

ZONING

A2 Special Agricultural Zone

A4 Small Lot Agricultural

50260 Lyons Line: Lands to be rezoned from SPECIAL AGRICULTURAL (A2) ZONE to SMALL LOT AGRICULTURAL (A4) ZONE

50264 Lyons Line: Lands to be rezoned from SMALL LOT AGRICULTURAL (A4) ZONE to GENERAL AGRICULTURAL (A1) ZONE

50264 Lyons Line: Lands to be rezoned from SPECIAL AGRICULTURAL (A2) ZONE to GENERAL AGRICULTURAL (A1) ZONE

Regulation Limits



1. Registered Owner's Name:

J Grant Burks Farm LTD and John Benjamin Burks

Address: 49900 LYONS LINE SPRINGFIELD ON ,N0L 2J0.

51272 Clinton Street, Springfield, ON, N0L 2J0

Phone No.

Business:

(Home):

226-971-2279

Fax:

Email: jburks@amtelecom.net

Burks401@live.com

Lot and Concession (if applicable):

Lot 9, Concession 10 Southern Division

Are there any other holders of mortgages, charges or other encumbrances of the Subject Lands? If so provide the names and addresses of such persons.

2. Applicant / Authorized Agent:

N/A

Address:

Telephone No.:

Fax:

Please specify to whom all communications should be sent:

Registered Owner () Applicant / Authorized Agent ()

3. Legal Description of the land for which the amendment is requested:

Concession: 10 Southern Division Lot: 9

Reference Plan No: _____ Part Lot: _____

Street and Municipal Address No.: 50264 Lyons Line

What is the size of property which is subject to this Application?

Area: 399,586.603 m² Frontage: 247.80 m Depth: 1402.60 m

When were the subject lands acquired by the current owner?

4. Existing Official Plan Designation:

County OP: Agriculture

Malahide OP: Agriculture

1. Registered Owner's**Name:**Bogart Daniel Eric and Bogart Michael AndrewAddress: 50260 Lyons LinePhone No.
(Home):

Business:

Fax:

Email:

Lot and Concession (if
applicable):Lot 9, Concession 10 Southern Division**Are there any other holders of mortgages, charges or other encumbrances of the Subject Lands? If so provide the names and addresses of such persons.****2. Applicant / Authorized****Agent:**N/A

Address:

Telephone No.:

Fax:

Please specify to whom all communications should be sent:

Registered Owner () Applicant / Authorized Agent ()

3. Legal Description of the land for which the amendment is requested:Concession: 10 Southern Division Lot: 9Reference Plan No: 11R-8266 Part Lot: 1Street and Municipal Address No.: 50260 Lyons Line**What is the size of property which is subject to this Application?**Area: 3662.73 m² Frontage: 62.10 m Depth: 59.42 m**When were the subject lands acquired by the current owner?****4. Existing Official Plan****Designation:**County OP: AgricultureMalahide OP: Agriculture

How does the application conform to the Official Plan?

**5. Existing Zoning By-law
Classification:**

A2 and A4 (key map 14)

What are the current uses of the subject lands?

50260 Lyons Line: Dwelling and accessory building

50264 Lyons Line: agricultural buildings. home has been demolished.

If known, provide the length of time these uses have continued on this property.

If there are any existing buildings or structures on the subject lands provide the following information:

Type	Front Lot Line Setback	Side Lot Line Setbacks	Rear Lot Line Setback	Height	Dimension s
<u>Residential Dwelling</u>	<u>18.06m</u>	<u>13.4m, 25.8m</u>	<u>26.56m</u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>
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If known, provide the dates in which each of these buildings were constructed.

6. What is the Nature and Extent of the Rezoning?

Seek to correct the zones to permit a dwelling on 50264 Lyons Line and relocated incorrectly located A4 Zone on to 50260 Lyons Line

7. Why is the rezoning being requested?

A2 zone does not permit a dwelling.

A4 zone is incorrectly located.

8. **Does the proposed Zoning By-law amendment implement a growth boundary adjustment of a settlement area?**

No.

If so, attach separately justification or information for the request based on the current Official Plan policies or associated Official Plan amendment.

9. **Does the proposed amendment remove land from an area of employment?**

No.

If so, attach separately justification or information for the request based on the current Official Plan policies or associated Official Plan amendment.

10. **Description of proposed development for which this amendment is requested (i.e. permitted uses, buildings or structures to be erected. (Be Specific)**

A new dwelling will be constructed on 50264 Lyons Line.

For any proposed buildings or structures on the subject lands provide the following information:

Type	Front Lot Line Setback	Side Lot Line Setbacks	Rear Lot Line Setback	Height	Dimensions
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11. **Services existing or proposed for the subject lands: Please indicate with a ✓**

Water Supply

Existing

Proposed

Municipal Piped Water Supply	()	()
Private Drilled Well	()	()
Private Dug Well	()	()
Communal Well	()	()
Lake or other Surface Water Body	()	()
Other	()	()

Sewage Disposal	Existing	Proposed
Municipal Sanitary Sewers	()	()
Individual Septic System	()	()
Communal System	()	()
Privy	()	()
Other	()	()

Note: If the proposed development is on a private or communal system and generate more than 4500 litres of effluent per day, the applicant must include a servicing options report and a hydrogeological report.

Are these reports
attached?

If not, where can they be
found?

Storm Drainage

Provisions:

Proposed Outlet:

12. How will the property be accessed?

Provincial Highway () County Road (✓) Municipal Road – maintained all year ()

Municipal Road – seasonally maintained () Right-of-way () Water ()

If access is by water, do the parking and docking facilities exist, and what is the nearest public road?

13. Has the subject land ever been the subject of an application under the Planning Act for:

Plan of Subdivision () Consent ()

Zoning By-law Amendment () Ministers Zoning Order ()

If yes to any of the above, indicate the file number and status of the application.

14. How is the proposed amendment consistent with the Provincial Policy Statement 2005?

15. Are the subject lands within area designated under any Provincial Plan(s)? If the answer is yes, does the proposed amendment conform to the Provincial Plan(s)?

No.

17. The Owner is required to attach the following information with the application and it will form part of the application. Applications will not be accepted without the following.

(a) A sketch based on an Ontario Land Surveyor description of the subject lands showing

- the boundaries and dimension of the subject lands;
 - the location, size and type of all existing and proposed buildings and structures, indicating their setbacks from all lot lines, the location of driveways, parking or loading spaces, landscaping areas, planting strips, and other uses;
-

- the approximate location of all natural and artificial features (buildings, railways, roads, watercourses, drainage ditches, banks of rivers or streams, wetlands, wooded areas, wells and septic tanks) that are on the subject lands, adjacent to the subject lands, or in the opinion of the applicant may affect the application;
 - the current uses of the land that is adjacent to the subject land;
 - the location, width, and name of any roads within or abutting the subject land, indicating where it is an unopened road allowance, a public traveled road, a private road, or a right-of-way;
 - the location of the parking and docking facilities to be used (if access will be by water only);
 - the location and nature of any easement affecting the subject land.
- (b) Written comments from the Elgin St. Thomas Health Unit, Long Point Region Conservation Authority and Ministry of Transportation (if applicable).
- (c) If a private sewage system is necessary, pre-consultation with the Chief Building Official is required about the approval process

18. If this application is signed by an agent or solicitor on behalf of an applicant(s), the owner's written authorization must accompany the application. If the applicant is a corporation acting without an agent or solicitor the application must be signed by an officer of the corporation and the seal if any must be affixed.

19. Additional Information as required by Council

20. If this application is to accommodate the consent of a surplus farm dwelling, please provide the following information:

Date surplus farm dwelling was erected: _____

Please provide the assessment roll number, location, and zoning of the farm parcel with which the subject lands is being consolidated.

1. Registered Owner's Name:

J Grant Burks Farm LTD and John Benjamin Burks

Address: 49900 LYONS LINE SPRINGFIELD ON ,N0L 2J0.

51272 Clinton Street, Springfield, ON, N0L 2J0

Phone No.

Business:

(Home):

226-971-2279

Fax:

Email: jburks@amtelecom.net

Burks401@live.com

Lot and Concession (if applicable):

Lot 9, Concession 10 Southern Division

Are there any other holders of mortgages, charges or other encumbrances of the Subject Lands? If so provide the names and addresses of such persons.

2. Applicant / Authorized Agent:

N/A

Address:

Telephone No.:

Fax:

Please specify to whom all communications should be sent:

Registered Owner ()

Applicant / Authorized Agent ()

3. Legal Description of the land for which the amendment is requested:

Concession: 10 Southern Division Lot: 9

Reference Plan No: _____ Part Lot: _____

Street and Municipal Address No.: 50264 Lyons Line

What is the size of property which is subject to this Application?

Area: 399,586.603 m² Frontage: 247.80 m Depth: 1402.60 m

When were the subject lands acquired by the current owner?

4. Existing Official Plan Designation:

County OP: Agriculture

Malahide OP: Agriculture

1. Registered Owner's**Name:**Bogart Daniel Eric and Bogart Michael AndrewAddress: 50260 Lyons LinePhone No.
(Home):

Business:

Fax:

Email:

Lot and Concession (if
applicable):Lot 9, Concession 10 Southern Division**Are there any other holders of mortgages, charges or other encumbrances of the Subject Lands? If so provide the names and addresses of such persons.****2. Applicant / Authorized****Agent:**N/A

Address:

Telephone No.:

Fax:

Please specify to whom all communications should be sent:

Registered Owner () Applicant / Authorized Agent ()

3. Legal Description of the land for which the amendment is requested:Concession: 10 Southern Division Lot: 9Reference Plan No: 11R-8266 Part Lot: 1Street and Municipal Address No.: 50260 Lyons Line**What is the size of property which is subject to this Application?**Area: 3662.73 m² Frontage: 62.10 m Depth: 59.42 m**When were the subject lands acquired by the current owner?****4. Existing Official Plan****Designation:**County OP: AgricultureMalahide OP: Agriculture

How does the application conform to the Official Plan?

**5. Existing Zoning By-law
Classification:**

A2 and A4 (key map 14)

What are the current uses of the subject lands?

50260 Lyons Line: Dwelling and accessory building

50264 Lyons Line: agricultural buildings. home has been demolished.

If known, provide the length of time these uses have continued on this property.

If there are any existing buildings or structures on the subject lands provide the following information:

Type	Front Lot Line Setback	Side Lot Line Setbacks	Rear Lot Line Setback	Height	Dimension s
Residential Dwelling	18.06m	13.4m, 25.8m	26.56m		

If known, provide the dates in which each of these buildings were constructed.

6. What is the Nature and Extent of the Rezoning?

Seek to correct the zones to permit a dwelling on 50264 Lyons Line and relocated incorrectly located A4 Zone on to 50260 Lyons Line

7. Why is the rezoning being requested?

A2 zone does not permit a dwelling.

A4 zone is incorrectly located.

8. **Does the proposed Zoning By-law amendment implement a growth boundary adjustment of a settlement area?**

No.

If so, attach separately justification or information for the request based on the current Official Plan policies or associated Official Plan amendment.

9. **Does the proposed amendment remove land from an area of employment?**

No.

If so, attach separately justification or information for the request based on the current Official Plan policies or associated Official Plan amendment.

10. **Description of proposed development for which this amendment is requested (i.e. permitted uses, buildings or structures to be erected. (Be Specific)**

A new dwelling will be constructed on 50264 Lyons Line.

For any proposed buildings or structures on the subject lands provide the following information:

Type	Front Lot Line Setback	Side Lot Line Setbacks	Rear Lot Line Setback	Height	Dimensions
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11. **Services existing or proposed for the subject lands: Please indicate with a ✓**

Water Supply

Existing

Proposed

Municipal Piped Water Supply	()	()
Private Drilled Well	()	()
Private Dug Well	()	()
Communal Well	()	()
Lake or other Surface Water Body	()	()
Other	()	()

Sewage Disposal	Existing	Proposed
Municipal Sanitary Sewers	()	()
Individual Septic System	()	()
Communal System	()	()
Privy	()	()
Other	()	()

Note: If the proposed development is on a private or communal system and generate more than 4500 litres of effluent per day, the applicant must include a servicing options report and a hydrogeological report.

Are these reports
attached?

If not, where can they be
found?

Storm Drainage

Provisions:

Proposed Outlet:

12. How will the property be accessed?

Provincial Highway () County Road (✓) Municipal Road – maintained all year ()

Municipal Road – seasonally maintained () Right-of-way () Water ()

If access is by water, do the parking and docking facilities exist, and what is the nearest public road?

13. Has the subject land ever been the subject of an application under the Planning Act for:

Plan of Subdivision () Consent ()

Zoning By-law Amendment () Ministers Zoning Order ()

If yes to any of the above, indicate the file number and status of the application.

14. How is the proposed amendment consistent with the Provincial Policy Statement 2005?

15. Are the subject lands within area designated under any Provincial Plan(s)? If the answer is yes, does the proposed amendment conform to the Provincial Plan(s)?

No.

17. The Owner is required to attach the following information with the application and it will form part of the application. Applications will not be accepted without the following.

(a) A sketch based on an Ontario Land Surveyor description of the subject lands showing

- the boundaries and dimension of the subject lands;
 - the location, size and type of all existing and proposed buildings and structures, indicating their setbacks from all lot lines, the location of driveways, parking or loading spaces, landscaping areas, planting strips, and other uses;
-

- the approximate location of all natural and artificial features (buildings, railways, roads, watercourses, drainage ditches, banks of rivers or streams, wetlands, wooded areas, wells and septic tanks) that are on the subject lands, adjacent to the subject lands, or in the opinion of the applicant may affect the application;
 - the current uses of the land that is adjacent to the subject land;
 - the location, width, and name of any roads within or abutting the subject land, indicating where it is an unopened road allowance, a public traveled road, a private road, or a right-of-way;
 - the location of the parking and docking facilities to be used (if access will be by water only);
 - the location and nature of any easement affecting the subject land.
- (b) Written comments from the Elgin St. Thomas Health Unit, Long Point Region Conservation Authority and Ministry of Transportation (if applicable).
- (c) If a private sewage system is necessary, pre-consultation with the Chief Building Official is required about the approval process

18. If this application is signed by an agent or solicitor on behalf of an applicant(s), the owner's written authorization must accompany the application. If the applicant is a corporation acting without an agent or solicitor the application must be signed by an officer of the corporation and the seal if any must be affixed.

19. Additional Information as required by Council

20. If this application is to accommodate the consent of a surplus farm dwelling, please provide the following information:

Date surplus farm dwelling was erected:

Please provide the assessment roll number, location, and zoning of the farm parcel with which the subject lands is being consolidated.

**THE CORPORATION OF THE
TOWNSHIP OF MALAHIDE
BY-LAW NO. 22-36**

Being a By-law to amend By-law No. 18-22

**Daniel and Michael Bogart, J Grant Burks Farms LTD and John Benjamin Burks/
50260 and 50264 Lyons Line**

WHEREAS the Council of The Corporation of the Township of Malahide deems it necessary to pass a "Housekeeping" By-law to amend By-law No. 18-22, as amended;

AND WHEREAS authority is granted under Section 34 of the Planning Act, as amended, to pass a By-law;

AND WHEREAS this By-law conforms with the Official Plan of the Township of Malahide, as amended;

NOW THEREFORE the Council of The Corporation of the Township of Malahide **HEREBY ENACTS AS FOLLOWS:**

1. **THAT** the area shown in bold on the attached map, Schedule "A", and described as Part of Lot 9, Concession 10, former Geographic Township of South Dorchester, in the Township of Malahide, shall be removed from the "A2" of By-law No. 18-22 and placed within the "General Agricultural (A1) Zone" of By-law No. 18-22 as set forth in this By-law. The zoning of this land shall be shown as "A1" on Key Map 14 of Schedule "A" to By-law No. 18-22, as amended.
2. **THAT** the area shown in hatching on the attached map, Schedule "A", and described as Part of Lot 9, Concession 10, former Geographic Township of South Dorchester, in the Township of Malahide, shall be removed from the "A4" of By-law No. 18-22 and placed within the "General Agricultural (A1) Zone" of By-law No. 18-22 as set forth in this By-law. The zoning of this land shall be shown as "A1" on Key Map 14 of Schedule "A" to By-law No. 18-22, as amended.
3. **THAT** the area shown in cross hatching on the attached map, Schedule "A", and described as Part of Lot 9, Concession 10, Part 1 of RP-11R8266, former Geographic Township of South Dorchester, in the Township of Malahide, shall be removed from the "A2" of By-law No. 18-22 and placed within the "Small Lot Agricultural (A4) Zone" of By-law No. 18-22 as set forth in this By-law. The zoning of this land shall be shown as "A4" on Key Map 14 of Schedule "A" to By-law No. 18-22, as amended.
4. **THAT** this By-law shall come into force:
 - a) Where no notice of objection has been filed with the Township's Clerk within the time prescribed by the Planning Act and regulations pursuant thereto, upon the expiration of the prescribed time; or,

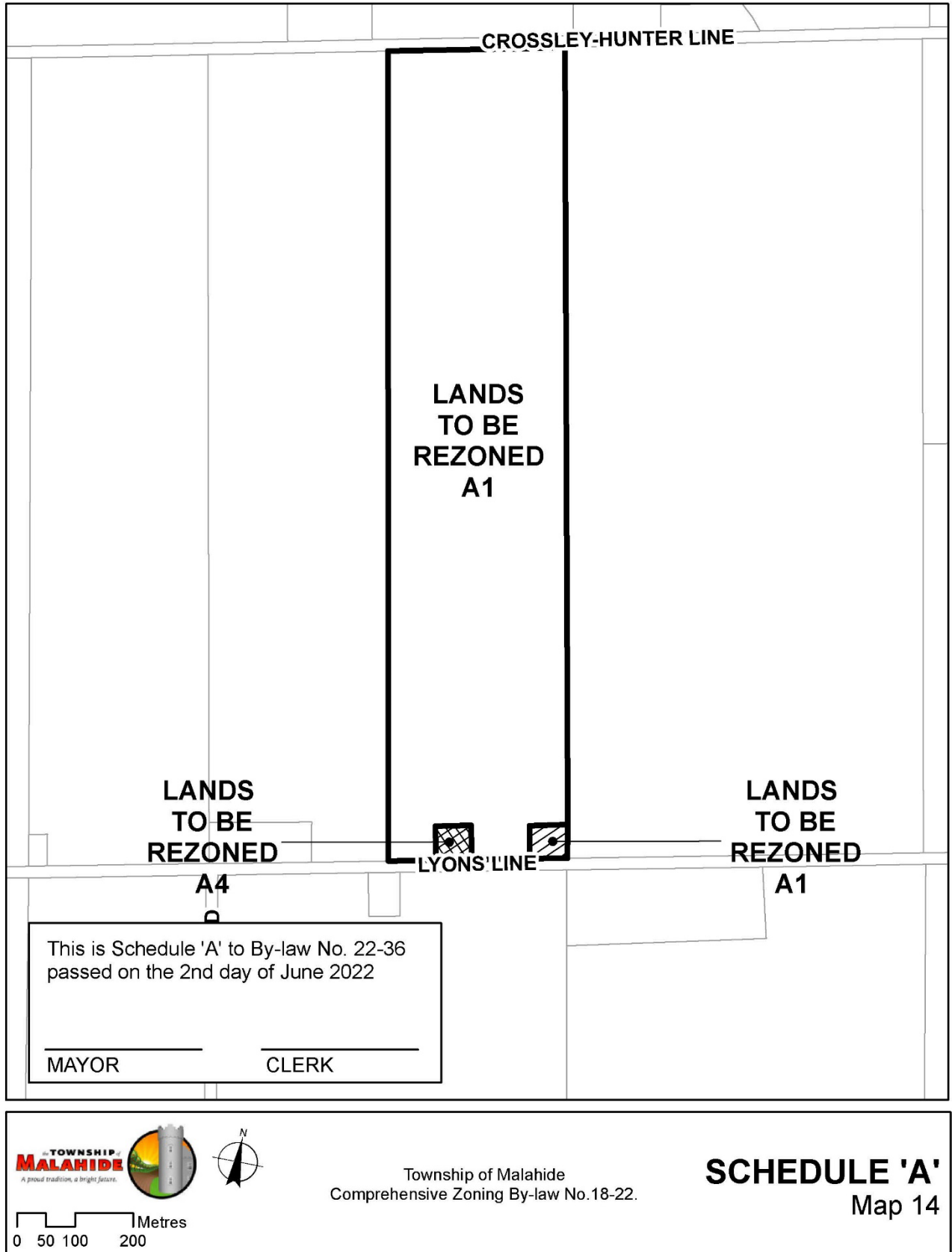
- b) Where notice of objection has been filed with the Township's Clerk within the time prescribed by the Planning Act and regulations pursuant thereto, upon the approval of the Ontario Land Tribunal.

READ a **FIRST** and **SECOND** time this 2nd day of June, 2022.

READ a **THIRD** time and **FINALLY PASSED** this 2nd day of June, 2022.

Mayor – D. Mennill

Clerk – A. Adams



SCHEDULE A



Report to Committee of Adjustment

REPORT NO.: DS-22-26

DATE: June 2, 2022

ATTACHMENT: Report Photo, Application, Letter, Site Plan

SUBJECT: **APPLICATION FOR MINOR VARIANCE – JOE & WENDY D'ANGELO**

LOCATION: Plan 78, Lots 108 to 110 and being part 2 on 11R-1568

Recommendation:

THAT Report No. DS-22-26 entitled “Application for Minor Variance – Joe & Wendy D’Angelo’ be received;

AND THAT the Application for Minor Variance – Joe & Wendy D’Angelo, relating to the property located in Plan 78, Lots 108 to 110 and being part 2 on 11R-1568, be approved for the reasons set out herein.

Background:

The subject application (D13-MV-05-22) for Minor Variance (“the Application”) has been submitted by Zelinka Priamo Limited on behalf of the owners, Joe & Wendy D’Angelo, in order to construct a new dwelling on the subject lands which would not meet the required front and rear yard setbacks of the ‘Village Residential (VR1)’ zone.

The Application relates to the property located in Plan 78, Lots 108 to 110 and being part 2 on 11R-1568. More particularly, the Application relates to the new lot being created through County Consent Application No. E01-22.

The Township of Malahide Committee of Adjustment has scheduled a Public Hearing for this application to be considered on June 2, 2022.

Comments/Analysis:

The subject lands comprise a rectangular-shaped parcel that is situated within the Village of Springfield on the west side of Superior Street. The lot has an approximate

area of 1,458 square metres (0.36 ac.) with a depth of approximately 24.1 metres and a frontage of approximately 60.3 metres on Superior Street.

As noted earlier, the property is subject to a recent consent application, which was given conditional approval, to sever the subject lands from the parcel to the north. Existing buildings and structures on the lands are described in the application as an existing detached garage. The owners propose to construct a new dwelling on the property that has a floor area of approximately 313.5 square metres in size.

The subject lands are situated in an area that predominantly consists of low density residential uses. Residential lots in the area are of generally similar size; however, lots along the west side of Superior Street are shallower in depth compared to other lots in the surrounding area.

County of Elgin Official Plan

The subject property is designated as 'Tier 2 Settlement Area' on Schedule 'A' of the Land Use Plan. A range of uses are permitted under this designation (Section B2.5 d). The character of residential areas is to be maintained and it is to be ensured that land uses are compatible (Section C1.1.1).

Malahide Official Plan

The subject property is designated as 'Residential' on Schedule 'B' of the Township of Malahide Official Plan. This designation permits residential uses, including single detached, two unit, and multiple unit dwellings (Section 4.4.2.1). The Official Plan generally requires that development be compatible with existing uses and conforms to the Zoning By-law unless amended or a variance is granted (Section 4.4.2.6).

Malahide Zoning By-law No. 18-22

The subject property is zoned Village Residential (VR1) on Schedule 'D', Map No. D3 of the Township 's Zoning By-law No. 18-22. The VR1 zone permits low density residential uses including single detached dwellings.

The table below identifies the development standards within the Zoning By-law for lands zoned Village Residential 1 (VR1) as they relate to the proposed development. It is noted that, notwithstanding that Section 6.2.1 requires a six (6.0) metre front yard setback, Section 4.9 of the By-law allows for building closer to a road where there is an already established building. The established building line is defined as the average distance between the street and more than half of the existing buildings on one side of a block. In this instance, the standards below are applicable:

Table 1. Village Residential (VR1) Zone Requirements

Zoning Provision	Required	Proposed	Complies?
Min Lot Area	800 m ²	1458 m ²	Yes
Min Lot Frontage	20 m	60.3 m	Yes
Min Front Yard	2.2 m*	1.6 m	No
Min Interior Side Yard	2 m	16.1 m	Yes
Min Exterior Side Yard	6 m	N/A	Yes
Min Rear Yard	7.5 m	7.3 m	No
Max Lot Coverage	30%	29.7%	Yes
Max Height	10.5 m	< 10.5 m (one storey)	Yes
Min Floor Area – Dwelling	90 m ²	313.57 m	Yes
Max Floor Area – Accessory	120 m ²	119.89 m ²	Yes
Min Landscaped Open Space	30%	59.47%	Yes
Max. Number Dwellings	1	1	Yes

*As permitted under Section 4.9 of the Zoning By-law.

The minor variance application is requesting a reduced minimum front yard setback of **1.6 metres**, where the By-law requires a minimum **2.2 metres**, and a reduced minimum rear yard setback of **7.3 metres** where the Zoning By-law requires a minimum **7.5 metres**.

General Comments

The Township's Development Services Staff has received comments provided by other internal departments and external commenting agencies, notably:

- Roads Department has no concerns with the minor variance application.

As of the date of writing this report, there have been no comments received from members of the public.

The Township's Consulting Planner has also reviewed and provides the following comments:

As noted above, the applicant is seeking reductions to the minimum front and rear yard setbacks. The intent of the front yard setback is to establish a uniform streetscape, provide adequate building separation from the road and to ensure that the functionality of the roadway is maintained. The Roads Department has commented that there are no concerns with the proposed variance. As noted in the application, while the proposed front yard setback would be less than what is required in the Zoning By-law, the proposed setback would be consistent with the other properties along Superior Street and would remain greater than the front yard setback of the adjacent property to the south, which is approximately 1.3 metres.

The intent of the rear yard setback is to ensure the adequate provision of amenity space is provided on a lot. Given that the subject property is shallower in depth and greater in width than other typical lots located in the surrounding area, the side yard of the subject property can be considered to function as the rear yard and would provide sufficient

amenity space with a setback of approximately 18 metres between the proposed dwelling and the southern property boundary.

The proposed single detached dwelling is a permitted use under the Official Plan and Zoning By-law. The requested variances would allow for the construction of a dwelling on a severed lot that differs in depth and would be consistent and compatible with existing dwellings on Superior Street. It is not anticipated that there would be any negative impacts on surrounding properties or impact the function of the roadway.

Based on the above analysis, the proposed minor variance to permit the construction of a new dwelling with a reduced front yard and rear yard setback would maintain the general intent and purpose of the Official Plans, maintains the general intent and purpose of the Zoning By-law, is desirable for the appropriate use of the subject lands, and is minor in nature.

Financial Implications to Budget:

The full cost of the minor variance process is at the expense of the Applicant and has no implications to the Township's Operating Budget.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

The proposed minor variance addresses a deviation from a standard of the Township of Malahide Zoning By-law and would have no direct relationship or bearing upon the document.

Submitted by:	Reviewed by:
Eric Steele, BES Monteith Brown Planning Consultants, <u>Consulting Planner for the Township</u>	Jay McGuffin, MCIP, RPP Monteith Brown Planning Consultants

Approved by:
Adam Betteridge, Chief Administrative Officer

APPLICATION FOR A MINOR VARIANCE

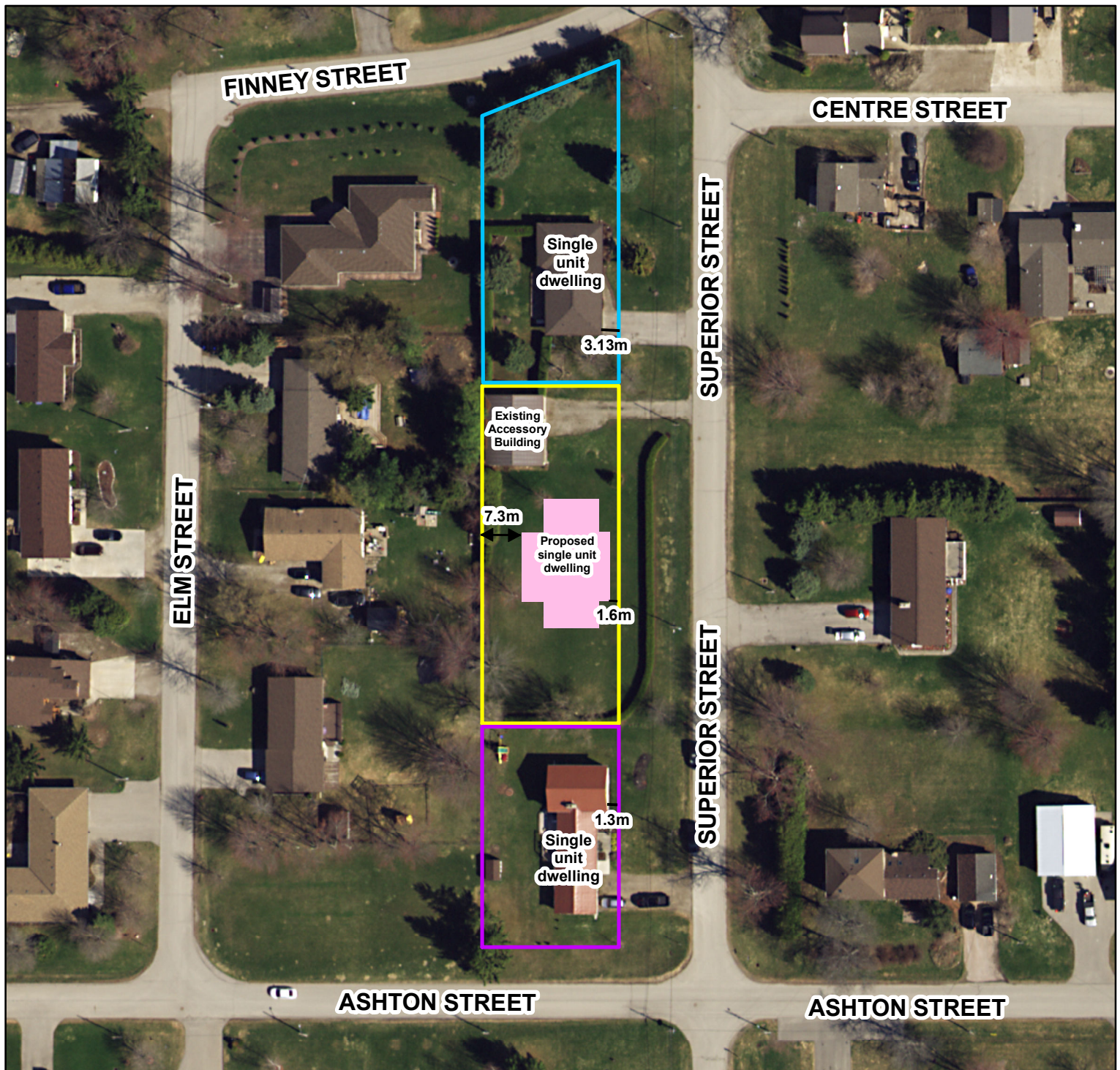
Wendy D'Angelo (Authorized Agent: Matt Campbell, BA,CPT
c/o Zelinka Priamo Ltd.)

11789 SUPERIOR STREET

Lots 105 through 110 on Registered Plan 78

Township of Malahide

Township
of Malahide
Figure 1



OFFICIAL PLAN DESIGNATION
Residential

ZONING
VR1 Village Residential Zone



11789 Superior Street



conditionally severed new residential lot



11747 Superior Street



APPLICATION FOR MINOR VARIANCE OR FOR PERMISSION

Planning Act, R.S.O. 1990, O.Reg 200/96 as amended

The undersigned hereby applies to the Committee of Adjustment for the

TOWNSHIP OF MALAHIDE

under Section 45 of the Planning Act, R.S.O. 1990 for relief, as described in this application, from By-Law No. 05-27 Township of Malahide.

1. OWNER(S)

a)	Name	Wendy D'Angelo
b)	Mailing Address	11789 Superior Street, Springfield, ON, N0L2J0
c)	Telephone No.	5194951084
d)	Fax No.	

2. SOLICITOR / AUTHORIZED AGENT

a)	Name	Zelinka Priamo Ltd. C/o Matt Campbell
b)	Mailing Address	318 Wellington Road, London,
		Ontario, N6C4P4
c)	Telephone No.	5194747137
d)	Fax No.	

3. LOCATION OF LAND

a)	Lot and Plan or Concession No.	108-110, Plan No.-78
b)	Street No. and Name	Superior Street

4. Names and address of any mortgages, holders and charges or other encumbrances:

Name:

Address:

5. Nature and extent of relief applied for:

Reduced Front yard setback to 1.6 m

Reduced Rear Yard Setback to 7.0 m

6. Why is it not possible to comply with the provisions of the Bylaw?

See the Cover letter

7. Dimensions of the land affected:

a) Frontage (m) 60.39 m

b) Depth (m) 24.14

c) Area (sq.m / ha) 1458.0 sq.m.

8. Particulars of all buildings and structures on or proposed for the subject land (specify ground floor area, gross floor area, number of storeys, width, length, height, etc.)

a) Existing Vacant

b) Proposed Single detached dwelling - 1 storey, Gross Floor Area- 313.57 sq.m.

9. Date of acquisition of subject land: N/A

10. Date of construction of all buildings and structures on subject lands: N/A

11. Existing uses of the subject property:

Residential

12. Length of time and existing uses to the subject property have continued: N/A

13. Existing uses of abutting properties:

a) North Residential

b) East Park

c) South Residential

d) West Residential

14. Services available (check appropriate space(s))

a) Method of Water Supply (if applicable)

Public Water Supply System ☐ Private Individual Well ☒

Private Communal Well ☐ Other (*please specify*)

b) Method of Sanitary Waste Disposal (if applicable)

Private Septic Tank and ☐ Private Communal System ☐

Tile Field System ☐ Other (*please specify*)

Municipal sewers

15. Applicable Official Plan designation(s): Residential

16. Applicable Zoning By-law zone(s): Village Residential(VR1)

17. Has the owner previously applied for a minor variance in respect to the subject property?

a) Yes ☐ No ☒

If Yes, describe briefly:

18. Is the subject property the subject of a current application of consent / severance?

Yes ☒ No ☐

STATUTORY DECLARATION

I, Matt Campbell of the City of St. Thomas
 (Name of Applicant) (City, Municipality, Town, Township)
 in the County of Elgin
 (County / District / Region)

SOLEMNLY DECLARE THAT the information provided in this application as required under Section 45 of the Planning Act R.S.O. 1990 and Ontario Regulation 200 / 96 as amended is true.

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and affect as if made under oath.

DECLARED before me

City of London)
 (City, Municipality, Town, Township))

in the County of Middlesex)
 (County / District / Region))

this 26 day of April, 2022)



A Commissioner, etc.)

RICHARD HENRY ZELINKA, a Commissioner, etc.,
 County of Middlesex, for Zelinka Priamo Ltd.
 Expires March 28, 2024


 Signature of Applicant or

Authorized Agent *

* If authorized agent, a letter from the owner of the property must accompany this application.

APPLICATION FEE to accompany \$2,000.00, payable to the Township of Malahide.





May 4, 2022

sent via email

Mr. Adam Betteridge, MCIP, RPP
Chief Administrative Officer
Township of Malahide
87 John Street South
Aylmer, ON
N5H 2C3
abetteridge@malahide.ca

Dear Mr. Betteridge

RE: Application for Minor Variance
 11789 Superior Street
 Township of Malahide
Our File: DNG/MAL/21-01

Zelinka Priamo Ltd., on behalf of Joe D'Angelo and Wendy D'Angelo, is pleased to submit a Minor Variance application regarding the above noted lands (the 'subject lands') seeking relief from Township of Malahide Comprehensive Zoning By-Law. No. 18-22 to permit a reduced front yard setback and rear yard setback for a proposed single detached dwelling on the subject lands.

The subject land consists of the mostly vacant, southerly portion of a larger parcel of land, being 11789 Superior Street located at southwest corner of Superior Street and Finney Street. Only a detached garage, driveway, and landscaped areas are present on the lands.

The subject lands have a lot frontage along Superior Street of approximately 60.3m; a lot depth of approximately 24.1m; and, an area of approximately 0.145ha. The subject lands have received provisional severance approval to be severed from the larger parcel, and a new, single-detached dwelling is proposed to be constructed on the resultant lot

Land uses surrounding the subject lands consist of single detached dwellings in all directions and a park across the street to the east. The subject lands are within the "*Tier 2 Settlement Area*" land use designations according to the Elgin County Official Plan; are within the "*Residential*" land use designation in the Township of Malahide Official Plan along a "*Local Road*"; and are zoned "*Village Residential One (VR1)*" zone in the Township of Malahide Comprehensive Zoning By-Law No. 18-22.

The subject lands are to be developed for a new, single detached dwelling. Due to the shallow lot depth of the subject lands of approximately 24m (whereas most contemporary subdivision lots are 30-35m in depth), the dwelling is located close to the street and the rear lot line. Notably, the position of the dwelling is largely consistent with other dwellings in the area, including the abutting dwelling to the north on the lands to be retained. Based on a site plan provided by CJDLE Engineering showing a proposed single detached dwelling, variances to the VR1 zone are required as follows:

- Relief from Section 6.2.1(4) and Section 2.67 to permit a front yard setback of 1.6m whereas 2.2m is required*;
- Relief from Section 6.2.1(4) to permit a rear yard setback of 7.0m whereas 7.5 m is required

*The established building line has been calculated to be 2.2m based on front yard setbacks of abutting properties of 3.13m (north) and 1.3m (south).

It is noted that the requested variances are slightly larger in magnitude than the dimensions shown on the site plan. The intent of these requests is to provide a minor degree of flexibility for the final layout and positioning of the dwelling.

To assess the merit of an application for Minor Variance, the four tests under Section 45(1) of the Planning Act are applied. An analysis of the four tests is presented below:

Does the proposed variance maintain the intent and purpose of the Official Plan?

The intent of the “*Residential*” land use designation in the Township of Malahide Official Plan is to permit single detached buildings, two-unit dwellings, multiple unit dwellings as primary uses and small-scale professional offices, public and private institutional uses such as schools, churches and government offices as non-residential uses. Generally, the Official Plan requires appropriate setbacks and development layouts.

The proposed lot layout is generally consistent with the built form and building positioning of the neighbourhood and is consistent with the intent and purpose of the Official Plan.

Does the proposed variance maintain the intent and purpose of the Zoning By-Law?

The subject lands zoned “*Village Residential One (VR1)*” zone in the Township of Malahide Comprehensive Zoning By-Law No. 18-22. The intent of the required front and rear yard setbacks is to ensure an appropriate lot layout on any given property.

In most cases, the front yard accommodates a street-facing garage and driveway, and the rear yard functions as the primary outdoor amenity area. In the case of the subject lands, the attached garage faces north and the driveway is an expansion of the existing driveway. Therefore, no parking area is required between the dwelling and the street, negating the need for a dwelling to be located 6.0m back (as this space typically accommodates a vehicular parking space). Additionally, the proposed front yard setback is generally consistent with the established front yard setbacks of dwellings to the north and south, being 3.13m (north) and 1.3m (south) both of which are significantly closer to the street than 6.0m.

While Section 2.67 allows the building to be located at a 2.2m setback, being the average of the two abutting front yard setbacks, the proposed building is slightly closer to the street, requiring the proposed variance. As noted above, the proposed 1.6m setback is in keeping with the established front yard setback on the street and therefore maintains the purpose and intent of the by-law.

With the shallow depth of the subject lands, the primary outdoor amenity area will be to the south of the dwelling, otherwise defined as the interior side yard, which provides a setback of approximately 18m. The proposed 7.0m rear yard is adequate to accommodate any buffering features that may be desirable, such as fencing and/or landscaping.

For the reasons above, the proposed variances are consistent with the purpose and intent of the Township of Malahide Comprehensive Zoning By-Law No. 18-22.

Is the proposed variance minor in nature?

The requested variances are both numerically and contextually minor in nature and will assist in providing a well-functioning residential property that is generally consistent with built form and layout of other lots in the neighbourhood.

Is the proposed variance desirable for the appropriate use of subject lands?

The subject lands are to be severed from original land parcel for the purpose of a single detached dwelling. Given that the subject lands are vacant; the development is in keeping with the built form and character of the neighbourhood; and, that the variances are not anticipated to result in any negative impacts to abutting properties, the proposed variances are desirable for the appropriate use of the subject lands.

As demonstrated above, it is our view that the proposed variances to permit reduced front yard and rear yard setbacks on the subject lands meet the four tests for Minor Variances as they maintain the intent and purpose of the Official Plan and the Zoning By-Law, are minor in nature, and are desirable for the appropriate use of the subject lands.

Please find the following digital materials submitted to support the application:

- The completed Minor Variance application form and declarations;
- Letter of authorization from the land owner; and,
- Site Plan;

The required \$2,000.00 application deposit has already been provided to the Township.

We trust that the enclosed information is complete and satisfactory and look forward to a timely approval process. Should you have any questions or require additional information, please feel free to contact our office.

Yours very truly,

ZELINKA PRIAMO LTD.



Mathew Campbell, BA, CPT
Senior Planner

cc. Joe D'Angelo



Zelinka Priamo Ltd.

LAND USE PLANNERS

May 4, 2022

sent via email

Mr. Adam Betteridge, MCIP, RPP
Chief Administrative Officer
Township of Malahide
87 John Street South
Aylmer, ON
N5H 2C3
abetteridge@malahide.ca

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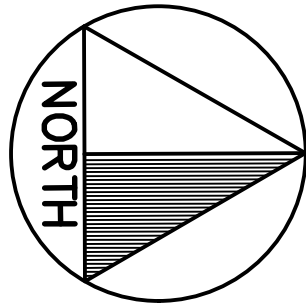
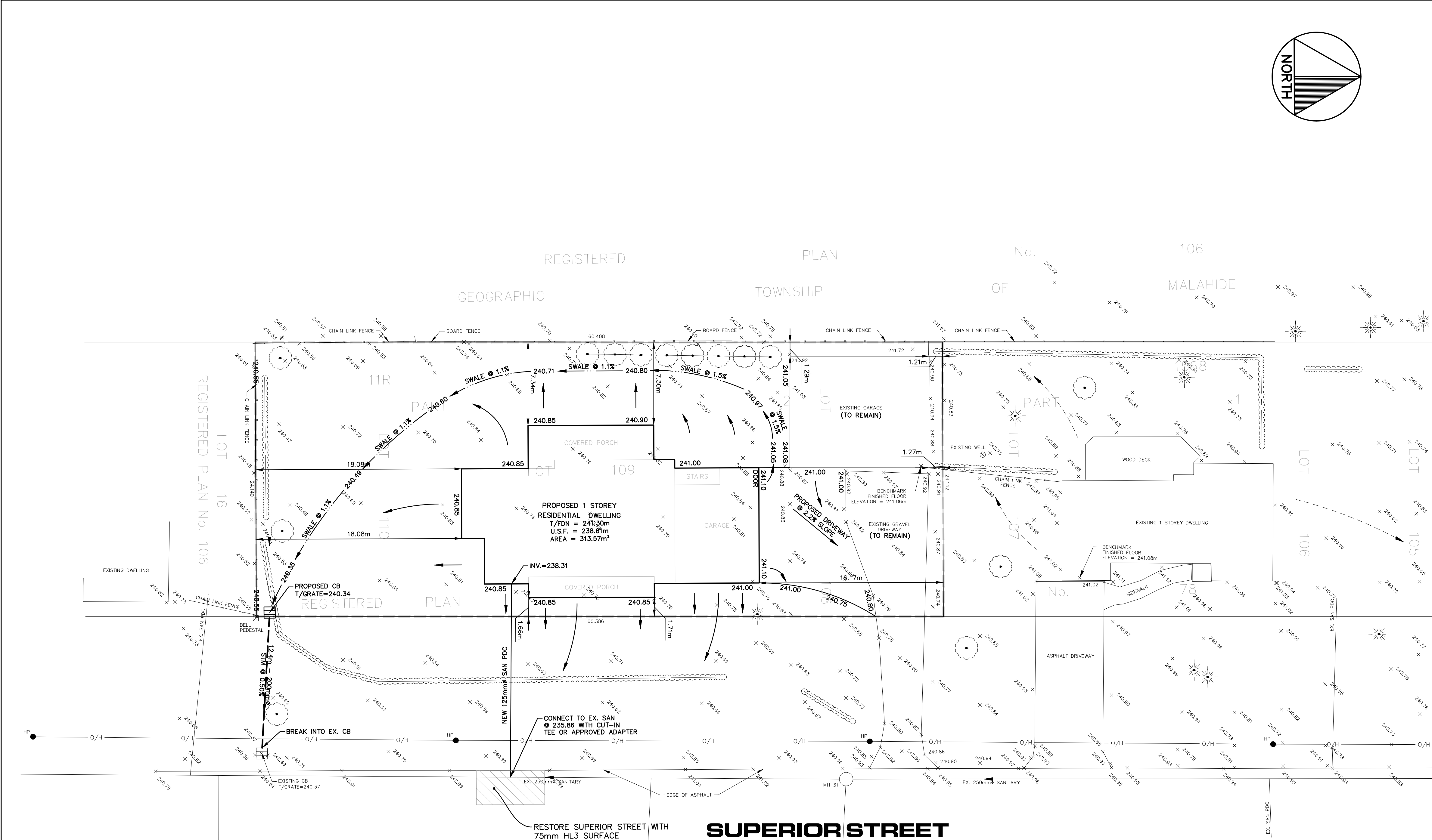
Yours very truly,

ZELINKA PRIAMO LTD.



Mathew Campbell, BA, CPT
Senior Planner

cc. Joe D'Angelo



GENERAL NOTES

- DATUM IS GEODETIC RELATED TO OTHER AREA BENCHMARKS. INTERNAL BENCHMARKS SHOWN ON THE DRAWINGS ARE NOT GUARANTEED BY THE MUNICIPALITY OR BY CYRIL J. DEMEYERE LIMITED.
- REAR YARD SWALES SHALL NORMALLY BE 1.0% MINIMUM GRADE EXCEPT AS NOTED
 - SWALE SLOPES SHALL BE 3:1 MAXIMUM (V-BOTTOM ACCEPTABLE).
 - ALL YARDS SHALL BE GRADED AT 2% MINIMUM TO SWALES AND/OR CURB.
 - FOUNDATION WEeping TILES ARE TO BE CONNECTED TO STORM P.D.C. VIA SUMP PUMP ONLY (i.e. NO GRAVITY CONNECTIONS)
 - A MINOR VARIANCE OR ZONE CHANGE MAY BE REQUIRED; CONSULTATION WITH A PLANNER AND THE MUNICIPALITY TO CONFIRM REQUIREMENTS.

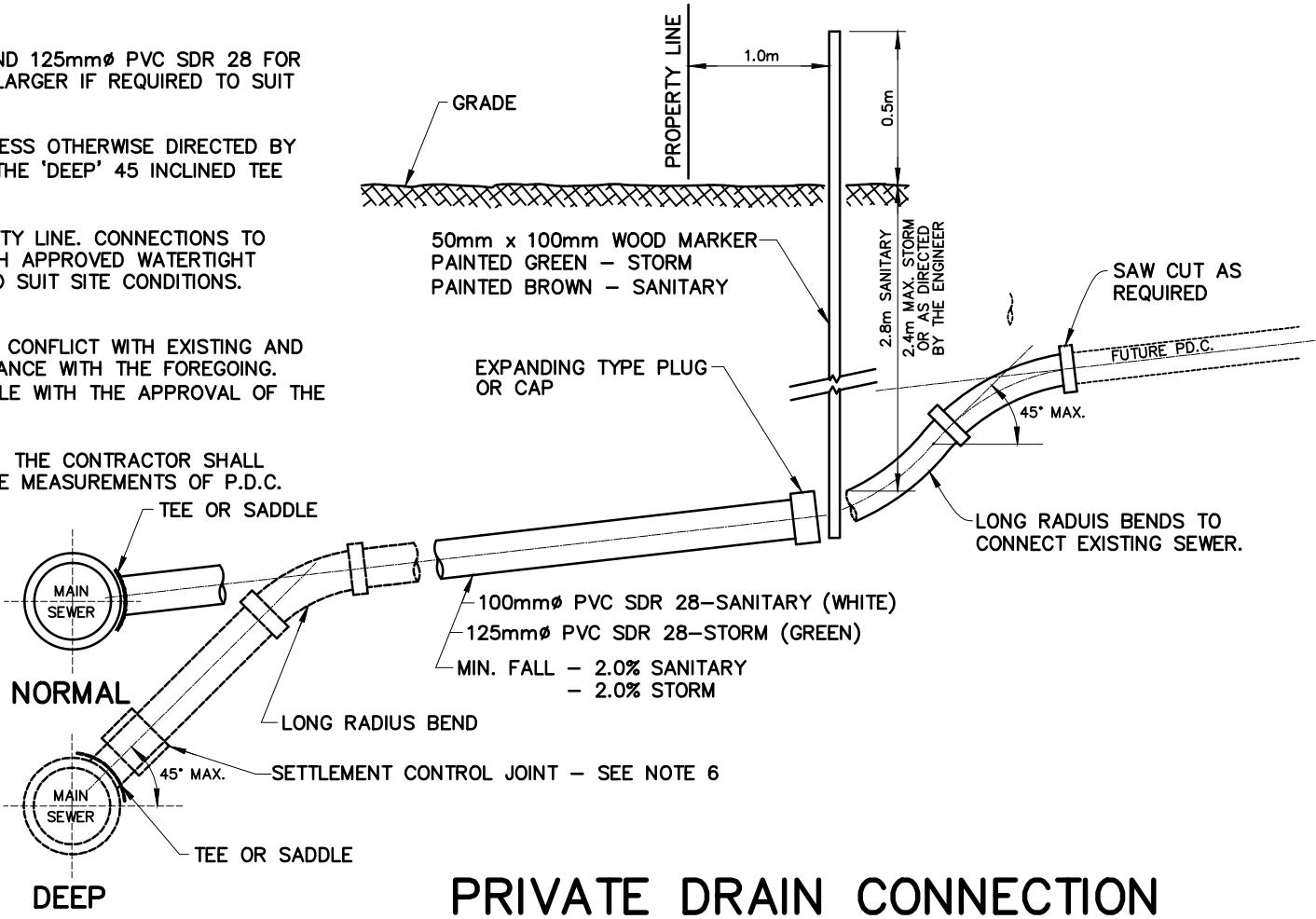
SEDIMENT CONTROL MEASURES

- SILT MIGRATION – THE CONTRACTOR SHALL INSTALL LIGHT-DUTY SILT FENCES (OPSD 219.110) AND PLACE STRAW BALES AS NECESSARY TO ADDRESS SILT MIGRATION TO THE SATISFACTION OF THE MINISTRY OF NATURAL RESOURCES, LONG POINT REGION, CONSERVATION AUTHORITY, MINISTRY OF THE ENVIRONMENT OR ANY OTHER REGULATORY AGENCY OR MINISTRY. AND, IN PARTICULAR, TO THE GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES (MNR). THE CONTRACTOR SHALL ASSUME THE DEFENCE OF AND INDEMNIFY AND SAVE HARMLESS THE TOWN OF DELHI, COUNTY OF NORFOLK, AND CYRIL J. DEMEYERE LIMITED FROM ALL FINES, CHARGES AND CLAIMS RELATING TO THE PROJECT FROM ANY REGULATORY AGENCY OR MINISTRY.
- PROTECT ALL EXPOSED SURFACES AND CONTROL ALL RUNOFF DURING CONSTRUCTION.
- ALL EROSION CONTROL MEASURES TO BE IN PLACE BEFORE STARTING CONSTRUCTION AND REMAIN IN PLACE UNTIL RESTORATION IS COMPLETED.
- MAINTAIN AREA DISTURBED DURING CONSTRUCTION.
- PROTECT ALL CATCH BASINS, MANHOLES AND PIPE ENDS FROM SEDIMENT INTRUSION WITH GEOTEXILE (TERRAFIX 270 R).
- KEEP ALL SUMPS CLEAN DURING CONSTRUCTION.

MALAHIDE ZONING REQUIREMENTS		
	REQUIRED	PROVIDED
ZONING	VILLAGE RESIDENTIAL ONE (VR1)	
LOT AREA (MIN.):	800m²	1458.0m²
LOT FRONTAGE (MIN.):	20.0m	60.39m
FRONT YARD (MIN.):	1.3m*	1.66m
EXTERIOR SIDE YARD (MIN.):	6.0m	NA
INTERIOR SIDE YARD (MIN.):	1.2m	1.21m
REAR YARD (MIN.):	7.5m	1.29m*
* MINOR VARIANCE REQUIRED		
* PER SECTION 4.9		
LOT COVERAGE (MAX.)	30%	29.73%
HEIGHT OF BUILDING (MAX.)	10.5m	< 10.5m
FLOOR AREA (MIN.):	90m²	313.57m²
ACCESSORY BUILDING FLOOR AREA (MAX.):	120m²	119.89m²
LANDSCAPED OPEN SPACE (MIN.):	30%	59.47%
PARKING SINGLE UNIT DWELLING = 2		
TOTAL PARKING	2	2

PRIVATE DRAIN CONNECTION NOTES

- P.D.C.'s SHALL BE 100mm \varnothing PVC SDR 28 FOR SANITARY AND 125mm \varnothing PVC SDR 28 FOR STORM UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR LARGER IF REQUIRED TO SUIT EXISTING SERVICES.
- DEPTH AND LOCATION OF P.D.C. SHALL BE AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE 'NORMAL' FLAT TEE IS PREFERRED. THE 'DEEP' 45 INCLINED TEE MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
- P.D.C.'s SHALL BE LAID AT DESIGN GRADE TO THE PROPERTY LINE. CONNECTIONS TO EXISTING SEWERS SHALL BE MADE BEYOND THIS POINT WITH APPROVED WATERTIGHT FITTINGS USING LONG RADIUS BENDS, CUT AS REQUIRED TO SUIT SITE CONDITIONS. CEMENT MORTAR JOINTS WILL NOT BE ACCEPTABLE.
- THE CONTRACTOR MUST SELECT A P.D.C. GRADE TO AVOID CONFLICT WITH EXISTING AND PROPOSED STORM SEWERS, WATERMANS ETC. IN CONFORMANCE WITH THE FOREGOING. SANITARY P.D.C.'S MAY ONLY BE CONNECTED TO A MANHOLE WITH THE APPROVAL OF THE ENGINEER.
- PLUG AND END MARKER REQUIRED ON NEW P.D.C.'S ONLY. THE CONTRACTOR SHALL ALLOW TIME FOR THE ENGINEER TO PHOTOGRAPH AND TAKE MEASUREMENTS OF P.D.C. BEFORE BACKFILLING.
- FOR SANITARY LATERALS AT EQUAL TO OR GREATER THAN 45° TO THE MAIN SEWER, SETTLEMENT CONTROL JOINTS MUST BE USED AT THE TEE AS PER OXFORD COUNTY SPECIFICATIONS AND OPSD 1006.010.



PRIVATE DRAIN CONNECTION
N.T.S.

LEGEND

- EXISTING OVERHEAD HYDRO
- EXISTING UNDERGROUND HYDRO
- EXISTING FLOW, PROPOSED, FUTURE
- PROPOSED FLOW
- FUTURE FLOW
- CURB CUT
- EXISTING TREE, TO BE REMOVED
- EX. HYDRO POLE AND ANCHOR

- EXISTING SIGN
- PROPOSED SIGN
- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
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METRIC SCALE 1:200			
1	REVISED PER MUNICIPAL COMMENTS	11 MAY 22	AG
No.	REVISION	DATE	BY

TOWNSHIP OF MALAHIDE			
Cyril J. Demeyere Limited P.O. Box 460, 261 Broadway Tillsonburg, Ontario, N4G 4H8 Tel: 519-688-1000 866-302-9886 Fax: 519-842-3235 cjd@cjdeng.com			
DESIGN BY: AG	DRAWN BY: CC	CHECKED BY: AG	
PROJECT NO. 22022	SURVEY BY: AG	DATE: 09 MAY 2022	

11789 SUPERIOR STREET LOTS 105-110 REGISTERED PLAN 78 GEOGRAPHIC TOWNSHIP OF MALAHIDE SPRINGFIELD ELGIN COUNTY	
GRADING/SERVICING PLAN	
DRAWING No.	1

Good day your Worship and Members of Council My name is Derek Richmond, I'm the Ontario Region Coordinator for the Canadian Union of Postal Workers. Thank You for the opportunity to speak to Council on expanding services and protecting public post offices.

Our Delivering Community Power Campaign reimagines our post offices to be the hub for rural communities. Using our post office as a community hub that would provide much needed services that are lacking in rural Canada. The Community Hub model is currently being done in 2 Indigenous Communities. These hubs have provided space for non-profit organizations, an Office Depot kiosk with broadband internet, printer/scanner, photocopier so the community like youth, seniors can utilize resources. These hubs could also provide much needed financial services. Currently there is a pilot project to provide small loans through Canada Post and it must be extended to meet the need of rural residences that don't have easy access to financial services. Other services Canada Post could provide at a community hub is hunting/fishing licenses, space for service Ontario, tourist information, library vending machines, space for farmer markets and local art. Canada Post's 7000 locations could be retro fit with solar panels and create a secure coast to coast network of charging stations. This public charging network would lead to additional tourism to rural Ontario for those who own electric vehicles.

Canada Post can also become a leader in providing service to seniors through an Elder Check-ins program. Covid lockdowns has taught us that seniors were the most vulnerable to the lockdowns and a letter carrier check in program can assist seniors that are shut in and provide additional security for seniors to live independently. Canada Post can provide delivery of grocery and medication to seniors that have a difficult time navigating through Covid.

Canada Post must lead the way in a carbon free post office. Currently Canada Post has approx 20000 vehicles on the road daily and converting the fleet to Canadian manufactured Electric vehicle needs to be a priority now to meet the 2050 emission targets. Canada Post must become a leader for a carbon free delivery.

To this date, close to 1000 municipalities supported resolutions that have been submitted to the federal government on service expansion and postal banking.

There are many innovative and forward-thinking ideas for a post covid recovery to improve service at Canada Post for rural communities and protect good paying jobs. This will enhance our national infrastructure, social communities and strengthen economic viability of rural communities across Canada. But we still need municipalities like _____ to continue to put pressure on the federal government to ensure rural municipalities receive the service they deserve from their public post office.

On behalf of the Canadian Union of Postal Workers, we ask that _____ endorse the Delivering Community Power Resolution to support to retain, enhance and expand rural postal services.

Thank you for your time and support. I'm willing to answer any questions and address any concerns council might have.



Report to Council

REPORT NO.: PW-22-34
DATE: June 2, 2022
ATTACHMENT: 2021 State of the Infrastructure and Asset Management Plan for Roads
SUBJECT: 2021 ROAD NEEDS STUDY

Recommendation:

THAT Report No. PW-22-34 entitled “2021 Road Needs Study” be received;

AND THAT Council adopt the “2021 State of the Infrastructure and Asset Management Plan for Roads” report prepared by 4 Roads Management Services;

AND THAT Staff be directed to utilize the above-noted report to inform long-term asset management recommendations on the Township’s road network.

Background:

As the Council is aware, the Township is required under Ontario Regulation 588/17 to have an asset management plan for core assets by July 1, 2022 containing conditional data not more than 2 years old. The Township’s last road needs study was undertaken in 2015, and a conditional update was completed in 2018. Accordingly, the Township retained the services of 4 Roads Management Services in 2021 through a competitive RFP process to prepare a current State of Infrastructure report complete with conditional ratings on all road assets with the Township road network, and develop replacement costs for each road asset, among other deliverables. 80% of this undertaking was funded through a grant received from the Federation of Canadian Municipalities Municipal Asset Management Program.

Comments/Analysis:

On March 17, 2022, Dave Anderson, President, 4 Road Management Services (the Consultant) appeared before Council by delegation to present the report data collection methodology, and identify the Malahide Specific Issues found during the analysis.

The enclosed detailed report includes an Executive Summary (*pages i-viii*) which details the project scope, asset management and report methodology, field observations, road needs and funding recommendations based on, as well as the detailed findings of the data collection and analyzing program.

Staff worked closely with the Consultant to ensure accuracy of information and adequacy of recommendations. In summary, staff concur with the report methodology, findings, and inventory management recommendations (*page viii*), and further recommend that the report be adopted and be utilized to inform on long term asset management in accordance with O.Reg. 588/17 and the Township long term capital budget to be presented to the 2023 Budget Committee.

Financial Implications to Budget:

The findings and recommendations of the report will inform on the Township's Asset Management Plan, which is to include a degradation and funding strategy for the Municipality's core infrastructure assets by July 1, 2022. These funding strategies will inform on the Township's long term operating and capital budgets, to be presented to the 2023 Budget Committee.

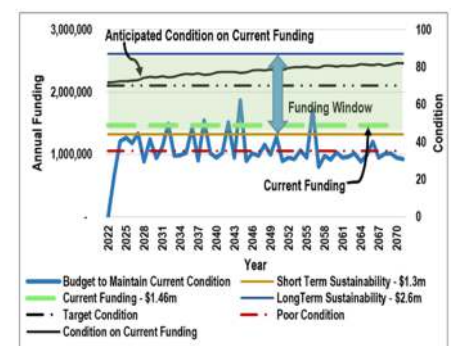
Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that support the "Embody Financial Efficiency throughout Decision-Making" Strategic Pillar is ensuring that the cost of maintaining municipal infrastructure is equitably borne by current and future ratepayers.

One of the goals that support this project is the "Continued exploration of partnerships that will result in the efficient and effective delivery of services". By supporting this and facilitating this proposal, the Council is achieving this goal.

Submitted by:	Approved for Council
Matt Sweetland, P.Eng., Director of Public Works	Adam Betteridge, Chief Administrative Officer



February 2, 2022

Township of Malahide
87 John Street S
Aylmer, Ontario N5H 2C3

Attention: Mr. Matt Sweetland, P.Eng, Director of Public Works

2021 State of the Infrastructure and Asset Management Plan for Roads,

Dear Mr. Sweetland;

4 Roads Management Services Inc. (4 Roads) is pleased to provide this report to the Township of Malahide. The 2021 project updated the condition data on the roads, and updated costing and analysis on the entire road system.

The 2021 field review included the entire Township road system. Updated estimates for recommended improvements and replacement costs have been developed based on current unit pricing provided by the Township. Calculations for Time of Need, Improvement and Replacement Costs and Performance modeling were developed generally in accordance with the Ministry of Transportation's Inventory Manual for Municipal Roads, 1991.

Regulation 588/17, Asset Management Planning for Municipal Infrastructure, requires that all lifecycle activities are to be considered in the development of a 10 year plan that will maintain or improve the average condition of the asset group. The methodology used to develop the work plan is in conformity with the requirements of Regulation 588/17.

We trust that the information provided in this report will be beneficial to the Township of Malahide in the continuing evolution of their Asset Management Plans. Please do not hesitate to call or email if you require any further information or discussion on any aspect of the report. Thank you for the opportunity to prepare this report. If 4 Roads Management Services Inc. may be of any further service, please do not hesitate to contact the undersigned.

Yours truly,

David Anderson, CET, President,
4 Roads Management Services Inc.
Dave.anderson@4roads.ca
519 505 5065



Township of Malahide 2021 State of the Infrastructure and Asset Management Plan for Roads



4 ROADS MANAGEMENT SERVICES

Kitchener, Ontario
www.4roads.ca

Township of Malahide, 2021 SotI and AMP for Roads
February 2, 2022

Executive Summary

Project Scope

The scope of this report is to prepare a State of the Infrastructure (SOTI) report that includes:

- Field review and condition rating on all of the road assets within the Township of Malahide road system.
- Updated Dimensional information, where improvements have occurred
- Add or change road sections to better reflect the constitution of the road system, as required.
- Develop replacement costs for each road asset, based on current unit costs and standard formulae from the Inventory Manual for Municipal Roads, 1991.
- Develop/review recommendations for improvement and associated costing on deficient assets
- Develop recommendations for annual budgets based on current costs for Long Term Sustainability and major program areas based on updated unit costs.
- Develop analysis on the effect of current and recommended budgets on overall system performance.
- Develop a 10 year work plan
- Provide Asset Management Strategy recommendations
- Provide the answers to the basic asset management questions;
 - What you have?
 - Where it's located?
 - What condition is it in?
 - What is it worth?
 - What will it cost to replace it?
 - Useful remaining life?
 - What service level will be required over the service life?
- A report on the foregoing.
- An updated geodatabase

The 2021 State of the Infrastructure Report summarizes the road system survey conducted during the late spring of 2021. The report includes projects that will be completed subsequent to the field work, including rehabilitations, resurfacing, and reconstruction and capital works in progress. The survey identifies the condition of each road asset by its time of need and recommended maintenance, rehabilitation or reconstruction treatment.

Further, the report provides an overview of the physical and financial needs of the road system in its entirety as well as by road section. Both information sources are used to develop programming and budgets. However, once a road section reaches the project design stage, further detailed review, investigation, and design will be required to address the specific requirements of the specific project.

This report should not be confused with a road safety audit. A road safety audit is the formal safety performance examination of an existing or future road or intersection, which qualitatively estimates and reports on potential road safety issues, and identifies opportunities for improvements for all road users. Typically, and more predominantly in a lower tier, rural municipality on lower volume road sections, the road system has some deficiencies with the existing horizontal and vertical alignment.

Township of Malahide staff provided information with respect to their database/network, and updated unit costs from current tenders.

Township of Malahide, 2021 Sotl and AMP for Roads
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Asset Management Planning – Historical and Current Context

Road Needs Studies (RNS) were implemented by the Ministry of Transportation Ontario (MTO) in the 1960's, and evolved into the current methodology by the late 1970's. The most current version of the Inventory Manual for Municipal Roads is dated 1991, and is the methodology used for this report.

The process was originally created by the MTO as a means to equitably distribute conditional grant funding between municipalities. The practice was discontinued by a number of municipalities, when conditional funding for roads was eliminated in the mid 1990's. The RNS process is a sound, consistent asset management practice that still works well today, and in view of the increasing demands on efficiency and asset management, represents a sound business practice that is beneficial to continue.

To put the Road Needs Study in a more current context, the State of the Infrastructure (SotI) is essentially a Road Needs Study. This project enhances the basic requirements of a condition report by providing detailed analysis of the data and development of a work plan based on the data, the current budget, incorporating modern asset management principles.

In August 2012, the Province of Ontario, introduced a requirement for an Asset Management Plan (AMP) as a prerequisite for municipalities seeking funding assistance for capital projects from the province; effectively creating a conditional grant. To qualify for future infrastructure grants, an AMP had to be developed and approved by a municipal council by December 2013. On April 26, 2013 the province announced that it had created a \$100 million Infrastructure Fund for small, rural and northern municipalities.

Subsequently, the province has introduced further initiatives for infrastructure funding: Ontario Community Infrastructure Fund (OCIF) and the Small Communities Fund (SCF). An Asset Management Plan (AMP) approved by Council is required as part of the submission for OCIF Applications. Asset Management Plans were to be reviewed for comprehensiveness.

On December 27, 2017, the Province filed Regulation 588/17, Asset Management Planning for Municipal Infrastructure. The regulation identifies provincial requirements and timelines for development and implementation of asset management plans. Initially, AMP's will have to include the 'core' assets; water and waste water linear and treatment, roads, bridge and culvert structures, and storm water linear and treatment.

Regulation 588/17 requires an Asset Management Plan (AMP) for core assets by July 1, 2022 that is based on condition data that is no more than two years old. This project positions the Township well for compliance with the Regulation from a road asset perspective. Conditional Grants are not new to Ontario. Until the mid-1990's, Road Needs Studies (RNS) were completed by municipalities and submitted to the Ministry of Transportation (MTO) on an annual basis in order to receive provincial funding for their road programs.

Township of Malahide (ToM or the Township) is currently evolving the AMP for the various asset groups, roads being one of them. A key component of the AMP is a 'State of the Infrastructure' (SotI) review of the asset or asset group. This report provides the SotI review of the Township of Malahide road system and also provides recommendations for budgets and road asset programming; effectively an Asset Management Plan for Roads.

Report Methodology Overview

Regulation 588/17 Asset Management Planning for Municipal Infrastructure requires;

'v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.'

Township of Malahide, 2021 Sotl and AMP for Roads February 2, 2022

Data collection and road ratings were completed generally in accordance with the Ministry of Transportation Ontario (MTO) *Inventory Manual for Municipal Roads* from 1991. (*Inventory Manual or IM*). The ratings are either a standalone value or incorporated into calculations performed by the software. The ratings or calculations then classify the road section as a 'NOW', '1 to 5', or '6 to 10' year need for maintenance, rehabilitation or reconstruction in six critical areas.

The *Inventory Manual* offers a holistic review of each road section, developing a Time of Need (TON) or an Adequate rating in six areas that are critical to municipal decision making:

- Geometrics
- Surface Type
- Surface Width
- Capacity
- Structural Adequacy
- Drainage

The Time of Need is a prediction of the time until the road requires reconstruction, **not the time frame until action is required**. Generally, the closer the timeline to reconstruction, the greater the deterioration of the road is. For example, a road may be categorized as a '6 to 10' year need with a resurfacing recommendation. This road should be resurfaced as soon as possible to further defer the need to reconstruct.

Reporting and analysis is on an individual road asset (or road section) basis. Road sections should be reasonably consistent throughout their length, according to roadside environment, surface type, condition, cross section, speed limit, traffic count or a combination of these factors. For example, new sections should be created as surface type, surface condition, cross-section, or speed limit changes as appropriate or practical.

Accurate and current traffic counts are critical in managing a road system and their importance cannot be emphasized enough, particularly truck traffic. Traffic counts establish road maintenance classifications for Minimum Maintenance Standards purposes, as per Ontario Regulation 239/02 (*Minimum Maintenance Standards for Municipal Roads, revised May 3, 2019*), functional classifications as per Regulation 588/17 classification (*Asset Management Planning for Municipal Infrastructure*), as well as determining appropriate geometry, structure, and cross-section when the road is rehabilitated or reconstructed. Traffic counts, including truck counts, should continue to be updated on a regular cycle, as a risk management exercise. The changes in traffic patterns resultant from the pandemic may skew the traffic counts downward, causing an inaccurate determination of the O.Reg 239/02 classification, which would pose a potential liability for the Township.

Road conditions are evaluated during a field inspection. The ratings are either as a standalone value or incorporated into calculations performed by the software in accordance with the *Inventory Manual*, that then classify the road section as a 'Now', '1 to 5', or '6 to 10' year need for maintenance, rehabilitation or reconstruction into the six critical areas noted above.

Recommendations are made based on the defects observed and other information available in the database at the time of preparation of the report. Once a road asset reaches the project level, the municipality may have selected another alternative based on additional information, asset management strategy, development considerations or available funding.

'NOW' needs represent road sections that require reconstruction or major rehabilitation. 'NOW' needs are the backlog of work required on the road system; however, 'NOW' needs may not necessarily be the priority, from an asset management perspective. Preservation and resurfacing treatments typically offer a better Return on Investment (ROI) than major rehabilitation or reconstruction. Construction improvements identified within this time period are representative of roads that have little or no service life left and are in poor condition, or have a significant drainage or capacity need. Resurfacing treatments are never a 'NOW' need, with the following exceptions;

Township of Malahide, 2021 Sotl and AMP for Roads
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- RW (Resurface and Widen) as this is driven by the road asset's capacity.
- PR1 or PR2 (Pulverize and resurface 1 or 2 lifts of asphalt)
- When the surface type is inadequate for the traffic volume (i.e. gravel road over 400AADT)
- When the surface is gravel and the roadside environment is Urban or Semi-Urban

'1 to 5' identifies road sections where reconstruction is anticipated within the next five years, based upon a review of their current condition. These roads can be good candidates for resurfacing treatments that would extend the life of the road (depending on any other deficiencies), deferring the need to reconstruct. These roads would be considered to be in fair condition.

'6 to 10' identifies road sections where reconstruction improvements are anticipated within six to ten years, based upon a review of their current condition. These roads can be good candidates for resurfacing treatments that would extend the life of the road (depending on any other deficiencies), thus deferring the need to reconstruct. These roads would be considered to be in good condition.

'ADEQ' identifies road sections that do not have reconstruction or resurfacing needs, although minor maintenance such as crack sealing, other preservation treatments or spot drainage may be required. These roads would be considered to be in good to excellent condition.

This report summarizes the identified needs through a number of tabular appendices.

When the *Inventory Manual* was originally developed, the Province provided funding for municipal road systems; the road systems were measured by their system adequacy. The system adequacy is the percentage of the road system that is not a "NOW" need. This would be a Level of Service (LOS) measure.

The *Inventory Manual* provides direction that roads with a traffic volume of less than 50 vehicles per day are *deemed to be adequate*, even if they have structural, geometric, or drainage deficiencies that would otherwise be identified as being in a Time of Need. This factor does have an effect of the System Adequacy measure.

Originally, the intention was that the low volume roads were to be corrected within the maintenance allocation (as opposed to the capital allocation). Conditional grant funding no longer exists as it did until the mid 1990's.

To gain a more accurate reflection of the condition of the road network, the roads with an AADT of less than 50 have been analyzed and report as follows;

- 10.15% (27.8 km) of the roads system has an actual or estimated count of less than 50 vehicles per day.
- 4.4% (12.04 km) would be "NOW" Needs if the '50' rule was not applied. .
- If the roads with an AADT of less than 50 roads were considered in the System Adequacy measure, then the system adequacy would be reduced by a further 4.4%.

Asset Management Plan Development Requirements

Regulation 588/17 required an asset management plan for core assets by July 1, 2021.(Since revised to July 1, 2022). Core assets for the Township of Malahide would include roads, structures greater than 3m span, and storm water linear and treatment assets.

Regulation 588/17 provides significant guidance in the development of the asset management plan and states in part

"4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:

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- I. The full lifecycle of the assets.*
- ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.*
- iii. The risks associated with the options referred to in subparagraph ii.*
- iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.”*

With respect to the requirement to maintain the current levels of service, the current funding level for the road assets appears to be sufficient to sustain the system over the long term. This is discussed further in Sections 8, 9, and 10 of the report.

Observations from Field Review and Data Analysis

During the field review, and in reviewing the data and the needs for the road network, there were several unique aspects of the network that came to light:

- With respect to system and Level of Service measures (all assume completion of 2021 proposed work);
 - System Adequacy measure for the Township of Malahide road system is 92.9% by Centreline kilometres (Cl-km). Graph 5 illustrates the system condition measures over time
 - The System Adequacy is above the target established by the Ministry of Transportation when condition road funding was provided to municipalities. The target for system adequacy for a lower tier system was 60%. Malahide's System Adequacy and has been relatively static for the last three reviews.
 - The System Adequacy measure is affected by the length of roads with less than 50 AADT and gravel road review was not conducted during spring break-up.
 - Weighted Average Pavement Condition is 70.71 (14.14 Structural Adequacy) 4 Roads recommends a minimum of 70 (14 Structural Adequacy). Graph 5 illustrates the condition changes over time. The current condition is slightly above 4 Roads recommended level and has been relatively static 2015.
 - Good to Very Good roads for the entire system is 67.9 % when measured by the Structural Adequacy metric (distress).
 - Percentage of the system with potential Capacity issue is 0%.
- With respect to asset management programming and practices;
 - The directive of O.Reg 588/17 to develop a program to sustain the assets over a 10 year period is more easily achieved managing a single asset. This is significantly more difficult and expensive when managing multiple assets. For example, when road sections, are reconstructed due to the demands of the water and waste water systems, it detracts from road project selection from a pure asset management perspective; however, it is necessary to cross integrate assets in the development of a 'holistic' work plan.
 - The system metrics are in a relatively static system condition. System Adequacy is above target, and given the directive of 588/17 to sustain the system condition over time, the system performance appears to comply with that directive.
 - O.Reg 588/17 requires work plan development based on condition data that is no more than two years old. The Township inspection regimen has not been to that standard. The current project

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- produces condition data within two years of the AMP due date. As such, the current report is regulatory compliant with respect to condition data currency.
 - Gravel road conversions are a good asset management practice and should be continued. Appendix D of this report provides further information on gravel road management.
 - It is 4 Roads understanding that historically, the roads and structures funding has been drawn from the same funding source and is currently at approximately \$1.4m annually. This amount is inadequate to sustain both asset groups, given the funding recommendations for the road assets in this report. Roads and structures should have separate funding sources/reserves.
 - The current annual funding for the road system is just above the Short Term Sustainability funding recommendation.
- With respect to observed defects and needs;
 - Surface Treated roads appear to be performing very well structurally, even though some of the sections have a higher traffic count than would be typically expected for a surface treated road in Ontario.
 - The roads are performing well structurally, however, it appears that the interval for re-application of surface treatment has extended too far. The edges are beginning to fail resulting in hot mix padding the edges, then, re-treating.
 - The gravel roads were not inspected during the spring breakup period. To some extent the ratings were reliant upon anecdotal information provided by staff.
 - Platform and surface widths can vary within a section.
 - Overall drainage in the Springfield area should be reviewed.
 - Most of Springfield will be at the condition threshold for resurfacing within the next 5 years.
- A Resurfacing or Rehabilitation treatment is required on 88.71 CL km of hard top roads (Asphalt and Surface Treated). Of that amount, 7.555 CL km are NOW needs, or are in poor condition.

Needs and Funding Recommendations

Based on the current review of the road system, the current system adequacy measure is 92.9% by Centre Line Kilometres meaning that, 7.1% of the road system, is deficient in the 'NOW' time period and in poor condition. The gravel roads were not inspected during the spring review and 4.4% of the system would be classified as NOW needs, except they have less than 50 AADT.

Based on the current unit costs being experienced, the estimated total cost of recommended improvements is **\$28,238,488**. The improvement costs include **\$3,812,479** for those roads identified as NOW needs and **\$24,426,009** is for road work required in the '1 to 10' year time period or for maintenance. Included in those amounts is **\$12,010,072** is for work on road sections that are adequate due to low traffic volume or are maintenance or preservation activities.

Based on the composition of the road system, budget recommendations have been developed for annual capital and maintenance programs as follows:

- **\$2,613,700** for the annualized Long Term Sustainability based on current replacement cost. This would be considered the long term sustainable funding level. (This would be similar to the PSAB 3150 amortization value except using current replacement cost.). The estimated *replacement cost* of the road system is \$130,684,700. The *current value* of the roads system is estimated to be \$104,903,500.

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The design life for a road structure has typically been considered to be 50 years before reconstruction / replacement. However, in an urban setting in particular, with the underground utilities typically having an expected life in the 75 year range, it would seem more pragmatic to match the lifecycles of the road and utility assets. Road assets can be designed to last 75 years with only resurfacing required. Rural cross sections should be treated similarly.

- **\$83,000** on average annually for hot mix resurfacing, based upon a 19 (18.85) year cycle. This would approximate an average of 0.608 CI km per year.
- **\$816,800** on average annually, for single surface treatment of existing surface-treated roads, based on a seven-year cycle (this does not include additional padding or geometric correction).
- **\$420,100** on average annually for gravel road resurfacing. This estimate is based on resurfacing gravel roads with 75mm every 3 years and utilizing the unit cost for maintenance gravel.
- **\$3,300** on average annually for crack sealing on a 5 year cycle.

For modeling purposes, 4 Roads has created a funding level described as 'Short Term Sustainability'. This funding level should theoretically preserve the condition of the road system for up to a 10 year period. The Short Term Sustainability- funding level, is the total of the recommended funding levels for hot mix resurfacing, single surface treatment gravel road resurfacing and crack sealing: **\$1,323,200**. The premise being that if the pavement maintenance, preservation and resurfacing programs are adequately funded, then the system should be sustained over the short term. To sustain the road system over the entire life cycle, the Long Term Sustainability funding level is required as ultimately, replacement will be required.

To clarify, the Short Term Sustainability funding level is the required funding level to sustain or improve the road system over the short term; it is not the total of all of the above recommendations. Sustainable funding over the long term or life cycle has to be at the Long Term Sustainability level. The Short Term budget and performance model thereof, are computer derived. Intangible values and decisions and the effects of other external forces cannot be incorporated into the model. As such, the preservation model is the minimum required to maintain the system- in theory. Theoretically, the 'Short Term Sustainability' funding level would work. Practically, that would rely on every assumption and rating to be absolutely correct, and the program adhered to explicitly. From a more pragmatic perspective and to deal with the real life realities of maintaining a road system, it should be greater.

Municipal pavement management strategies are critical to managing the performance of the road system, more so, if funding is limited. Funding constraints should push the strategy toward those programs that extend the life cycle of the road by providing the correct treatment at the optimum time. Resurfacing, rehabilitation, and preservation projects should be a higher priority than reconstruction projects. The objective is to "keep the good roads good".

As the municipality advances the development of their Asset Management Plan (AMP), a paradigm shift will be required in the way that we approach management of assets. Traditionally, municipalities have spent a fixed amount on capital and maintenance each year. As evidenced by Table ES 16, programs are not at a consistent funding level on an annual basis. The annual budget overall is met, however, the distribution of costs between traditional capital and maintenance activities varies. That variance is being driven by the demands of the road system based on condition and project selection is based on condition and best Return on Investment. This concept should be applied to all assets.

Re-stated, instead of the traditional capital and maintenance line items, consider the gross budget as the annual reinvestment level, with program funding levels fluctuating within the gross amounts, but driven by asset condition.

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The prime goal of any pavement management strategy should be to maintain overall system adequacy. The funding level for road-related programming should be set at a sufficient level so as to ensure that overall system adequacy does not decrease over time.

In addition to the budgetary recommendations, the following recommendations are provided for the management of the road inventory.

1. The information and budget recommendations included in this report be used to further develop the corporate Asset Management Planning.
2. The funding level should be increased to the Long Term Sustainability limit over a ten year period.
3. A separate funding source should be created for structures, with an annual contribution developed using a similar process to develop the roads funding recommendations.
4. Funding levels to be adjusted annually to accommodate growth / system expansion.
5. Funding should be adjusted annually to accommodate inflation.
6. The work plan should
 - Ensure that the preservation and resurfacing programs are optimized. This is particularly critical for those sections that are not going to be affected by upgrade due to development demands.
 - The work plan should cross integrate assets.
 - The work plan should be followed to optimize investments and performance of the road system.
7. The inspection interval should be no greater than 2 years.
8. Gravel road conversions to hard top surface should be continued as part of a long term asset management strategy.
9. Township of Malahide traffic counts should continue to be updated and repeated on a regular basis. The counting should include the percentage of truck traffic.
10. A Roadside Safety Audit should be undertaken to assess the potential safety requirements on rural road sections with potentially substandard alignment.
11. Narrow roads should be signed accordingly.
12. The status of the Boundary Road Agreements should be reviewed.
13. The Level of Service for System Adequacy should be a Minimum of 60% (Currently 92.9).
14. The Level of Service for Average Condition should be a minimum of 70. (Currently 70.71)
15. The Level of Service for Good to Very Good Roads should be a minimum of 60%. (Currently 67.9)
16. The Quality Assurance Program should be reviewed and refined by developing a minimum testing criteria for number and type of tests to be undertaken to confirm quality construction for development and Township projects.
17. Consideration should be given to the development of a maintenance paving program for those roads sections that are in poor condition that will not be addressed in the shorter term programming.
18. Develop a corporate asset management system throughout the organization with the development of a Standard Operating Procedure (SOP) for asset management.
19. Consideration should be given to development of the storm sewer system as a rate supported utility..

Summary Information

All tabular data has been adjusted for boundary roads unless otherwise noted

Table ES 1: Boundary Roads Summary

Adjacent Agency	Malahide Share	Rural	Roadside Environment Semi Urban	Urban	TOTAL km
Municipality of South-West Oxford	50	8.4	0	0	8.4
Town of Aylmer	50	0	0.16	0	0.16
Municipality of Bayham	50	9.18	0	0	9.18
Municipality of Central Elgin	50	2.71	0	0	2.71
TOTAL		20.29	0.16	0	20.45
				Adjustment	10.225

Table ES 2: Classification by Roadside Environment and Surface Type

Material Description	Rural		Roadside Environment Semi Urban		Urban		TOTAL		% OF TOTAL	
	CL-km	Lane-km	CL-km	Lane-km	CL-km	Lane-km	CL-km	Lane-km	CL-km	Lane-km
Gravel, Stone, Other Loosetop	52.135	104.27	0.09	0.18	0	0	52.225	104.45	19.91%	19.91%
High Class Bit.-asphalt	0.495	0.99	8.77	17.54	1.531	3.062	10.796	21.592	4.12%	4.12%
Low Class Bit.-surface treated	194.205	388.41	5.13	10.26	0	0	199.335	398.67	75.98%	75.98%
TOTAL	246.835	493.67	13.99	27.98	1.531	3.062	262.356	524.712		
% OF TOTAL	94.08%	94.08%	5.33%	5.33%	0.58%	0.58%				

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Table ES 3: Classification by Roadside Environment and Functional Class (Inventory Manual)

Functional Classification	Lanes	Roadside Environment						TOTAL		% OF TOTAL	
		Rural		Semi Urban		Urban		CI km	Ln km	CI km	Ln km
		CI km	Ln km	CI km	Ln km	CI km	Ln km				
100	2	26.345	52.69	0	0	0	0	26.345	52.69	10.04%	10.04%
200	2	84.265	168.53	0	0	0	0	84.265	168.53	32.12%	32.12%
300	2	74.1	148.2	0	0	0	0	74.1	148.2	28.24%	28.24%
400	2	42.635	85.27	0	0	0	0	42.635	85.27	16.25%	16.25%
500	2	19.49	38.98	0	0	0	0	19.49	38.98	7.43%	7.43%
C/R	2	0	0	0.17	0.34	0	0	0.17	0.34	0.06%	0.06%
CCI	2	0	0	0.12	0.24	0	0	0.12	0.24	0.05%	0.05%
L/R	2	0	0	13.7	27.4	1.531	3.062	15.231	30.462	5.81%	5.81%
TOTAL		246.835	493.67	13.99	27.98	1.531	3.062	262.356	524.712		
% OF TOTAL		94.08%	94.08%	5.33%	5.33%	0.58%	0.58%				

Table ES 4: Replacement Cost by Functional Classification (Inventory Manual)

Functional Classification	Lanes	Roadside Environment						TOTAL		% OF TOTAL		Cost /km (\$)
		Rural		Semi Urban		Urban		Repl. Cost	CI-km	Repl. Cost	CI-km	
		Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km					
100	2	10,583,589	27.39	0	0	0	0	10,583,589	27.39	8.10%	10.05%	386,403
200	2	35,650,090	87.42	0	0	0	0	35,650,090	87.42	27.28%	32.07%	407,802
300	2	34,600,297	75.02	0	0	0	0	34,600,297	75.02	26.48%	27.52%	461,214
400	2	28,379,114	46.76	0	0	0	0	28,379,114	46.76	21.72%	17.15%	606,910
500	2	12777546	20.39	0	0	0	0	12,777,546	20.39	9.78%	7.48%	626,657
C/R	2	0	0	102,272	0.17	0	0	102,272	0.17	0.08%	0.06%	601,600
CCI	2	0	0	108,752	0.12	0	0	108,752	0.12	0.08%	0.04%	906,267
L/R	2	0	0	6,295,003	13.78	2,188,046	1.531	8,483,049	15.311	6.49%	5.62%	554,049
TOTAL		121,990,636	256.98	6,506,027	14.07	2,188,046	1.531	130,684,709	272.581			
% OF TOTAL		93.35%	94.28%	4.98%	5.16%	1.67%	0.56%					

Not adjusted for Boundary Roads

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Table ES 5: Average Replacement Costs by Asset Class

Asset Class for Performance Modelling	Roadside Environment						TOTAL		% OF TOTAL		Cost / km (\$)
	Rural		Semi Urban		Urban						
	Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km	
GST1-R	21,624,025	55.71	0	0	0	0	21,624,025	55.71	16.55%	20.44%	388,153
GST1-S	0	0	38,920	0.09	0	0	38,920	0.09	0.03%	0.03%	432,444
HCB3-S	0	0	251,716	0.42	0	0	251,716	0.42	0.19%	0.15%	599,324
HCB4-R	666,262	1.15	0	0	0	0	666,262	1.15	0.51%	0.42%	579,358
HCB4-S	0	0	3,763,010	8.35	0	0	3,763,010	8.35	2.88%	3.06%	450,660
HCB4-U	0	0	0	0	2,188,046	1.531	2,188,046	1.531	1.67%	0.56%	1,429,161
LCB1-R	99,700,349	200.12	0	0	0	0	99,700,349	200.12	76.29%	73.42%	498,203
LCB1-S	0	0	2,452,381	5.21	0	0	2,452,381	5.21	1.88%	1.91%	470,707
TOTAL	121,990,636	256.98	6,506,027	14.07	2,188,046	1.531	130,684,709	272.581			
% OF TOTAL	93.35%	94.28%	4.98%	5.16%	1.67%	0.56%					

*Note: Not adjusted for Boundary Roads

Table ES 6: Traffic Count History

Year	AADT Counted	AADT Estimated	TOTAL	% OF TOTAL
2008	71.2	43.58	114.78	42.11%
2009	2.81	0	2.81	1.03%
2013	131.88	0	131.88	48.38%
2014	3.57	0	3.57	1.31%
2015	0	6.89	6.89	2.53%
2018	11.98	0	11.98	4.40%
2021	0	0.671	0.671	0.25%
TOTAL	221.44	51.141	272.581	

*Note: Not adjusted for Boundary Roads

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Table ES 7: Classification by Ontario Regulation 239/02 Classification by Lanes and Roadside Environment

Lanes	Roadside	Regulation 239/02 Classification, Minimum Maintenance Standards for Municipal Roads								TOTAL		% OF TOTAL	
		3		4		5		6					
		CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km
2	Rural	16.62	33.24	181.2	362.4	27.45	54.9	31.71	63.42	256.98	513.96	94.28%	94.28%
2	Semi Urban			2.06	4.12	6.51	13.02	5.5	11	14.07	28.14	5.16%	5.16%
2	Urban					1.044	2.088	0.487	0.974	1.531	3.062	0.56%	0.56%
TOTAL		16.62	33.24	183.26	366.52	35.004	70.008	37.697	75.394	272.581	545.162		
% OF TOTAL		6.10%	6.10%	67.23%	67.23%	12.84%	12.84%	13.83%	13.83%				

*Note: Not adjusted for Boundary Roads

Table ES 8: Classification by O.Reg 588/17 Road Classification by Lanes and Roadside Environment (Dec 27, 2017)

Lanes	Roadside	Regulation 588/17 Classification, Asset Management Planning for Municipal Infrastructure						TOTAL		% OF TOTAL	
		Arterial		Collector		Local					
		CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km
2	R	0	0	197.82	395.64	59.16	118.32	256.98	513.96	94.28%	94.28%
2	S	0	0	2.06	4.12	12.01	24.02	14.07	28.14	5.16%	5.16%
2	U	0	0	0	0	1.531	3.062	1.531	3.062	0.56%	0.56%
TOTAL		0	0	199.88	399.76	72.701	145.402	272.581	545.162		
% OF TOTAL		0	0	73.33%	73.33%	26.67%	26.67%				

*Note: Not adjusted for Boundary Roads

Table ES 9: O.Reg 588/17 Level of Service Measures for Roads

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)	Level of Services Measure for Roads
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality. 395.05 sq. km	Arterial Roads = 0% Collector Roads = 101.2% Local Roads = 36.8%
	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	Weighted Average Overall road condition is 70.7 Weighted average paved road condition is 74.5 Weighted average gravel road condition is 56.0

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Table ES 10: Time of Need by Length and MMS Class –All Needs

Time of Need	O.Reg 239/02 Classification								TOTAL		% OF TOTAL	
	3		4		5		6					
	CI km	Ln km	CI km	Ln km	CI km	Ln km	CI km	Ln km	CI km	Ln km	CI km	Ln km
1 to 5	2.19	4.38	31.95	63.9	6.55	13.1	2.26	4.52	42.95	85.9	15.76%	15.76%
6 to 10	2.06	4.12	54.33	108.66	9.14	18.28	3.26	6.52	68.79	137.58	25.24%	25.24%
ADEQ	11.16	22.32	84.2	168.4	17.124	34.248	28.907	57.814	141.391	282.782	51.87%	51.87%
NOW	1.21	2.42	12.78	25.56	2.19	4.38	3.27	6.54	19.45	38.9	7.14%	7.14%
TOTAL	16.62	33.24	183.26	366.52	35.004	70.008	37.697	75.394	272.581	545.162		
% OF TOTAL	6.10%	6.10%	67.23%	67.23%	12.84%	12.84%	13.83%	13.83%				
System Adequacy	92.7%	92.7%	93.0%	93.0%	93.7%	93.7%	91.3%	91.3%	92.9%	92.9%		
Good to Very Good	79.5%	79.5%	75.6%	75.6%	75.0%	75.0%	85.3%	85.3%	77.1%	77.1%		

Note:

*Includes all potential Time of Needs elements including Capacity, Drainage, Surface Width, Surface Type, Geometry and Structural Adequacy

*Roads with AADT<50 are deemed ADEQ; % of the system has <50 AADT

Includes work proposed for 2021

Not adjusted for Boundary Roads

Gravel roads were not reviewed during spring break-up

Table ES 11: Drainage by Time of Need

Roadside Environment	Time of Need				TOTAL	% OF TOTAL
	1 to 5	6 to 10	ADEQ	NOW		
Rural	0.100	79.660	165.655	1.420	246.835	94.08%
Semi Urban	0.080	8.740	5.170	0.000	13.990	5.33%
Urban	0.000	0.000	1.531	0.000	1.531	0.58%
TOTAL	0.180	88.400	172.356	1.420	262.356	
% OF TOTAL	0.00	33.69%	65.70%	0.54%		

Table ES 12: Drainage by Roadside Environment and Drainage Type

Drainage Type	Roadside Environment			TOTAL	% OF TOTAL
	Rural	Semi Urban	Urban		
AS - Adjacent Road, storm sew	0	0.29	0	0.29	0.11%
DS - Ditch and Storm Sewer	5.62	10.14	0	15.76	6.01%
N - None	2.79	1.64	0	4.43	1.69%
OD - Open Ditch	238.425	1.92	0	240.345	91.61%
SS - Storm Sewer	0	0	1.531	1.531	0.58%
TOTAL	246.835	13.99	1.531	262.356	
% OF TOTAL	94.08%	5.33%	0.58%		

Table ES 13: Improvement Costs by Improvement Type and Roadside Environment per Centre Line Kilometre

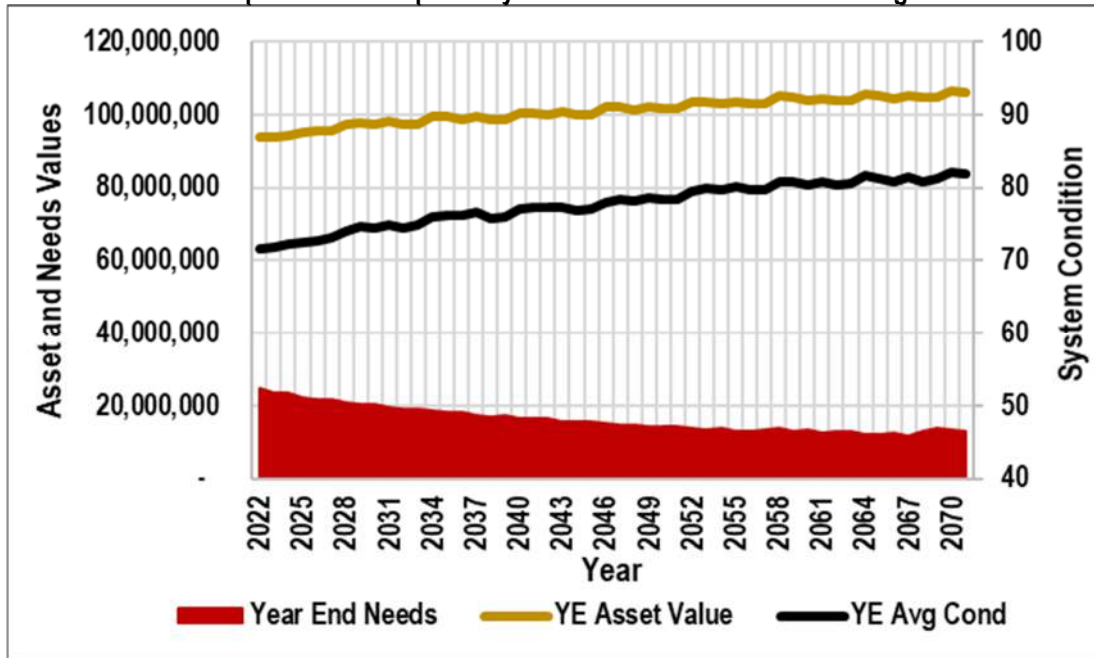
Improvement Class	Improvement ID / Description		Roadside Environment				TOTAL		% OF TOTAL		Cost /km \$		
			Rural		Semi Urban		Urban						
			Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km		Imp. Cost	CI-km
Const	BS	Base and Surface	14,111,237	31.36	747,039	2.35	0	0	14,858,276	33.71	52.62%	12.85%	440,768
Const	NONE	No Improvement Required	0	89.27	0	2.94	0	1.211	0	93.421		35.61%	
Const	REC	Reconstruction - Rural	3169520	8.01	194598	0.45	0	0	3364118	8.46	0.1191	3.22%	397,650
Const	RNS	Reconstruction Nominal Storm Sewer	0	0	40,962	0.08	0	0	40,962	0.08	0.15%	0.03%	512,025
Const	RSS	Reconstruction with Storm Sewers	0	0	2,017,938	1.46	0	0	2,017,938	1.46	7.15%	0.56%	1,382,149
Maint	CRK	Crack Sealing	1436	0.495	1,131	0.78	0	0	2,567	1.275	0.01%	0.49%	2,013
Maint	CRKsd	Crack sealing and Spot Drainage	0	0	1,720	0.4	0	0	1,720	0.4	0.01%	0.15%	4,300
Maint	GRR2sd	150mm of Granular A and Spot Drainage	130,006	2.78	0	0	0	0	130,006	2.78	0.46%	1.06%	46,765
Maint	GRR	75mm of Granular A	196,613	8.17	0	0	0	0	196,613	8.17	0.70%	3.11%	24,065
Maint	GRRsd	75mm of Granular A and Spot Drainage	69,322	2.82	0	0	0	0	69,322	2.82	0.25%	1.07%	24,582
Maint	RSpL	Reduce Speed Limit	1,000	2.77	0	0	0	0	1,000	2.77	0.00%	1.06%	361
Maint	SD	Spot Drainage	44,460	15.6	7695	2.7	0	0	52,155	18.3	0.18%	6.98%	2,850
Rehab	DSTrehab2	DST w 150mm Gran A	1,624,198	11.905	18,290	0.22	0	0	1,642,488	12.125	5.82%	4.62%	135,463
Rehab	DSTrehab	DST w 75mm Gran A	2,991,302	38.525	0	0	0	0	2,991,302	38.525	10.59%	14.68%	77,646
Rehab	PR2	Pulverize and Resurface 2 - 100mm	481,433	1.29	0	0	0	0	481,433	1.29	1.70%	0.49%	373,204
Rehab	R1	Basic Resurfacing 1 - 50mm	139,546	1.03	115,729	0.97	0	0	255,275	2	0.90%	0.76%	127,638
Rehab	R2	Basic Resurfacing 2 - 100mm	0	0	274,445	1.22	109781	0.32	384,226	1.54	1.36%	0.59%	249,497
Rehab	SST	Single Surface Treatment	476,407	15.22	0	0	0	0	476,407	15.22	1.69%	5.80%	31,301
Rehab	SSTedge	Single Surface Treatment with Edge padding	313,094	10.12	12,890	0.42	0	0	325,984	10.54	1.15%	4.02%	30,928
Rehab	SSTrehab	Surface Treatment, Base repair, Ditching, berm removal	946,696	7.47	0	0	0	0	946,696	7.47	3.35%	2.85%	126,733
TOTAL			24,696,269	246.835	3,432,438	13.99	109,781	1.531	28,238,488	262.356			
% OF TOTAL			87.46%	94.08%	12.16%	5.33%	0.39%	0.58%					

Table ES 14: Improvement Costs by Improvement Type and Time of Need

Improvement Class	Improvement ID / Description		Time of Need												% OF TOTAL	
			1 to 5		6 to 10		ADEQ		NOW		TOTAL					
			Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km				
Const	BS	Base and Surface	1,607,025	5.1	3,130,136	16.86	9,329,482	12.02	791,633	4.19	14,858,276	38.17	52.62%	14.00%		
Const	NONE	No Improvement Required	0	0	0	2.04	0	91.381	0	0	0	93.421		34.27%		
Const	REC	Reconstruction - Rural	82164	0.19	866871	2.07	1349934	3.59	1065149	2.81	3364118	8.66	0.1191	3.18%		
Const	RNS	Reconstruction Nominal Storm Sewer	0	0	0	0	40,962	0.08	0	0	40,962	0.08	0.15%	0.03%		
Const	RSS	Reconstruction with Storm Sewers	0	0	870754	0.63	0	0	1,147,184	0.83	2,017,938	1.46	7.15%	0.54%		
Maint	CRK	Crack Sealing	0	0	0	0	2567	1.77	0	0	2,567	1.77	0.01%	0.65%		
Maint	CRKsd	Crack sealing and Spot Drainage	0	0	1204	0.28	516	0.12	0	0	1,720	0.4	0.01%	0.15%		
Maint	GRR2sd	150mm of Granular A and Spot Drainage	0	0	0	0	130,006	2.78	0	0	130,006	2.78	0.46%	1.02%		
Maint	GRR	75mm of Granular A	0	0	0	0	196,613	8.17	0	0	196,613	8.17	0.70%	3.00%		
Maint	GRRsd	75mm of Granular A and Spot Drainage	0	0	69322	2.82	0	0	0	0	69,322	2.82	0.25%	1.03%		
Maint	RSpL	Reduce Speed Limit	0	0	0	0	0	0	1000	2.77	1,000	2.77	0.00%	1.02%		
Maint	SD	Spot Drainage	0	0	36,993	12.98	15,162	5.32	0	0	52,155	18.3	0.18%	6.71%		
Rehab	DSTrehab2	DST w 150mm Gran A	1159595	9.4	0	0	0	0	482893	4.02	1,642,488	13.42	5.82%	4.92%		
Rehab	DSTrehab	DST w 75mm Gran A	1,669,845	22.51	624257	7.7	389485	4.83	307,715	4.11	2,991,302	39.15	10.59%	14.36%		
Rehab	PR2	Pulverize and Resurface 2 - 100mm	481,433	2.19	0	0	0	0	0	0	481,433	2.19	1.70%	0.80%		
Rehab	R1	Basic Resurfacing 1 - 50mm	0	0	242464	1.89	12,811	0.11	0	0	255,275	2	0.90%	0.73%		
Rehab	R2	Basic Resurfacing 2 - 100mm	384,226	1.54	0	0	0	0	0	0	384,226	1.54	1.36%	0.56%		
Rehab	SST	Single Surface Treatment	0	0	0	0	476407	17.47	0	0	476,407	17.47	1.69%	6.41%		
Rehab	SSTedge	Single Surface Treatment with Edge padding	0	0	242,951	7.77	66,128	2.05	16905	0.72	325,984	10.54	1.15%	3.87%		
Rehab	SSTrehab	Surface Treatment, Base repair, Ditching, berm removal	0	0	946,696	7.47	0	0	0	0	946,696	7.47	3.35%	2.74%		
TOTAL			5,384,288	40.93	7,031,648	62.51	12,010,072	149.691	3,812,479	19.45	28,238,488	272.581				
% OF TOTAL			19.07%	15.02%	24.90%	22.93%	42.53%	54.92%	13.50%	7.14%						

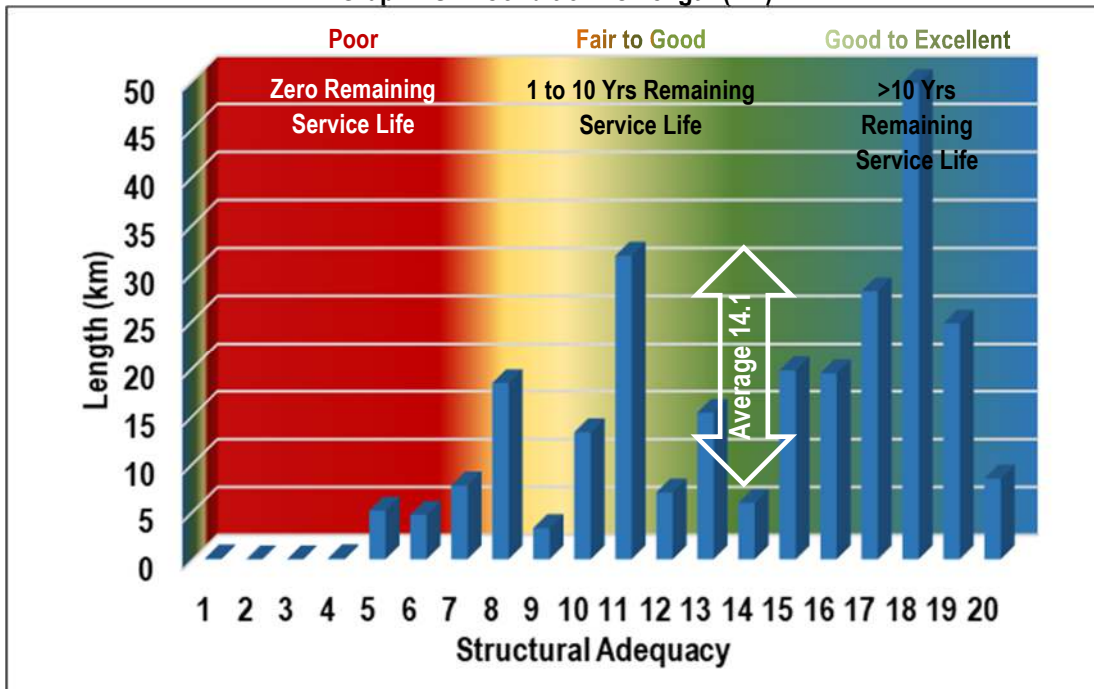
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Graph ES 1: Anticipated System Statistics at Current Funding



**Assumes perpetual pavement performance, Does not anticipate WWW or expansion influences*

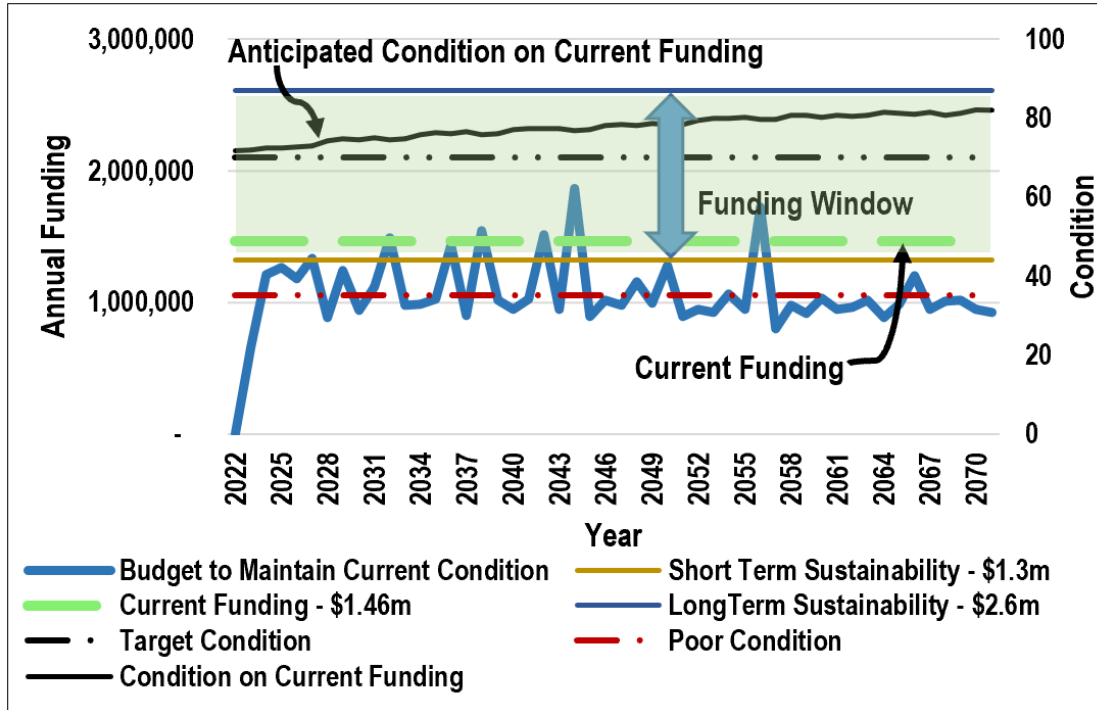
Graph ES 2: Condition vs Length (km)



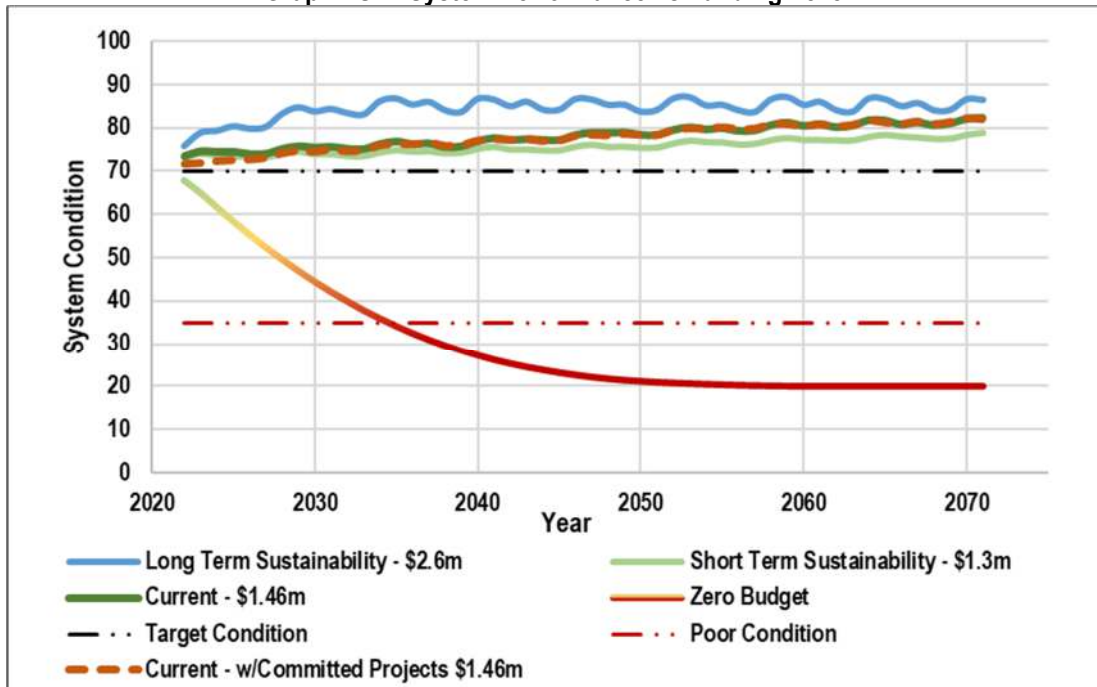
Note: Physical Condition is Structural Adequacy multiplied by 5; Average is 70.71 recommended 70 or greater

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Graph ES 3: The Funding Window

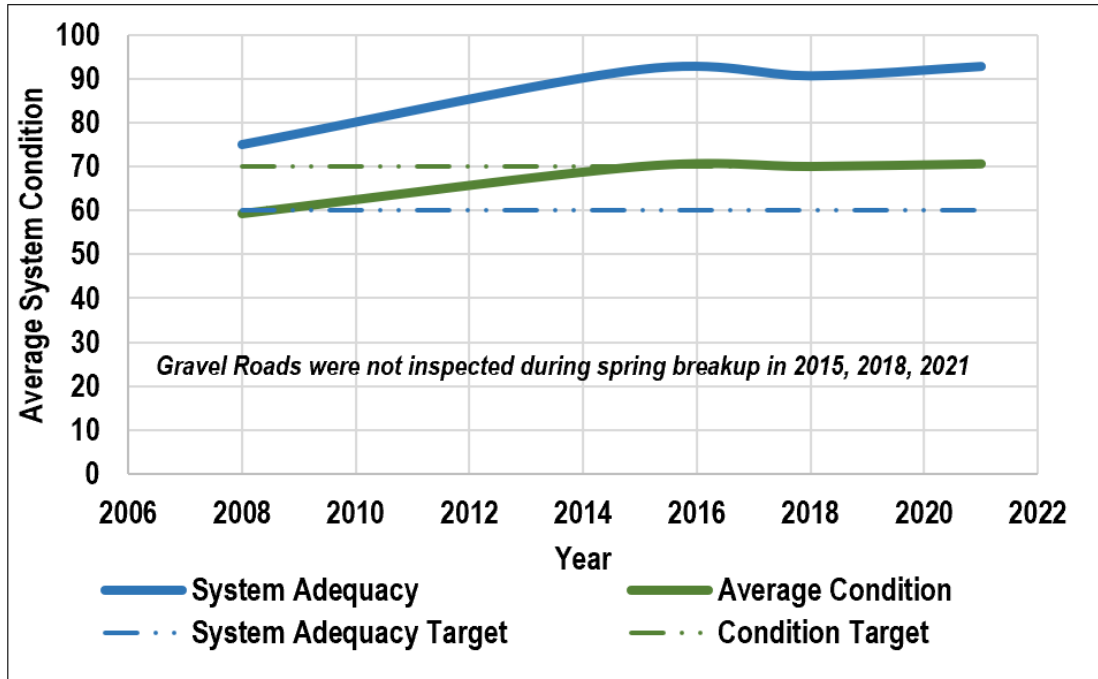


Graph ES 4: System Performance vs Funding Level



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Graph ES 5: System Condition Measures vs Time



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Table ES 15: Good to Very Good Roads by Structural Adequacy

Structural Adequacy	Roadside						Description	TOTAL		% OF TOTAL	
	Rural		Semi Urban		Urban			CL-Km	Lane-Km	CL-Km	Lane-Km
	CL-Km	Lane-Km	CL-Km	Lane-Km	CL-Km	Lane-Km					
1	0.1	0.2	0	0	0	0	Poor	0.1	0.2	0.04%	0.04%
2	0	0	0	0	0	0	Poor	0	0	0.00%	0.00%
3	0	0	0	0	0	0	Poor	0	0	0.00%	0.00%
4	0	0	0.12	0.24	0	0	Poor	0.12	0.24	0.31%	0.31%
5	4.485	8.97	0.6	1.2	0	0	Poor	5.085	10.17	12.95%	12.95%
6	3.645	7.29	0.98	1.96	0	0	Poor	4.625	9.25	11.78%	11.78%
7	7.7	15.4	0	0	0	0	Poor	7.7	15.4	19.62%	19.62%
8	18.175	36.35	0	0	0.19	0.38	Fair	18.365	36.73	46.78%	46.78%
9	2.98	5.96	0.28	0.56	0	0	Fair	3.26	6.52	8.30%	8.30%
10	12.905	25.81	0.35	0.7	0	0	Fair	13.255	26.51	2.71%	2.71%
11	29.82	59.64	1.79	3.58	0.13	0.26	Fair	31.74	63.48	6.49%	6.49%
12	6.67	13.34	0.29	0.58	0	0	Good	6.96	13.92	1.42%	1.42%
13	15.21	30.42	0.08	0.16	0	0	Good	15.29	30.58	3.13%	3.13%
14	4.43	8.86	1.45	2.9	0	0	Good	5.88	11.76	1.20%	1.20%
15	17.34	34.68	2.38	4.76	0	0	Good to Very Good	19.72	39.44	4.04%	4.04%
16	17.29	34.58	2.11	4.22	0	0	Good to Very Good	19.4	38.8	3.97%	3.97%
17	27.925	55.85	0.12	0.24	0	0	Good to Very Good	28.045	56.09	5.74%	5.74%
18	46.55	93.1	3.14	6.28	0	0	Good to Very Good	49.69	99.38	10.17%	10.17%
19	24.15	48.3	0	0	0.54	1.08	Good to Very Good	24.69	49.38	5.05%	5.05%
20	7.46	14.92	0.3	0.6	0.671	1.342	Good to Very Good	8.431	16.862	1.73%	1.73%
TOTAL	246.835	493.67	13.99	27.98	1.531	3.062		262.356	524.712		
% OF TOTAL	94.08%	94.08%	5.33%	5.33%	0.58%	0.58%					
% Poor	67.7%	67.7%	70.6%	70.6%	79.1%	79.1%		67.9%	67.9%		
% Fair	25.9%	25.9%	17.3%	17.3%	20.9%	20.9%		25.4%	25.4%		
% Good to Very Good	6.5%	6.5%	12.2%	12.2%	0.0%	0.0%		6.7%	6.7%		

Note: Based on Structural Adequacy Rating only

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Table ES 16: 10 Year Program from Performance Model at Current Funding Level with Committed Projects (20220107)

Improvement Type	Year										Grand Total
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
BS					12,029						12,029
BSgrav									248,079		248,079
CRK	2,321	247	1,016	508	262	1,408	1,190	552		784	8,288
CRKsd	1,032	688									1,720
DSTrehab	237,950	342,562	1,028,970	122,700	735,166	336,304		151,928			2,955,580
DSTrehab2	18,290	93,324	237,933	508,477	267,401			374,739			1,500,164
GRR2						52,099	18,954	180,883	254,774	286,747	793,457
GRR2sd					55,918			74,088			130,006
MICRO						14,546	10,878	2,604		2,940	30,968
PR2								83,414	398,020		481,434
R1			12,811	15,573		46,118	44,255		22,237		140,994
R2					96,660					62,173	158,833
REC	950,000										950,000
RSS		600,000									600,000
SD	15,903	36,254									52,157
SST	239,589	236,819	142,078	817,334	168,237	1,013,038	1,390,513	595,602	540,533	1,112,958	6,256,701
SSTedge		154,666	41,936		129,381						325,983
Grand Total	1,465,085	1,464,560	1,464,744	1,464,592	1,465,054	1,463,513	1,465,790	1,463,810	1,463,643	1,465,602	14,646,393

Note: Performance Model is based on the current funding level and includes committed projects. It does not account for expansion projects.

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Table ES 17: Improvement Type Abbreviation Summary

Inventory Manual Improvements	
Code	Description
R1	Basic Resurfacing, Basic Resurfacing
R2	Basic Resurfacing – Double Lift,
RM	Major Resurfacing – removes existing asphalt and replace with existing plus and additional lift.
PR1	Pulverizing and Resurfacing
PR2	Pulverizing and Resurfacing – Double Lift
BS	Tolerable standard for lower volume roads: – Rural and Semi-Urban Cross sections only. Improves drainage and adds structure (granular base) and a surface but not to a reconstruct standard. Typically specified where width is to an acceptable standard.
RW	Resurface and Widen- adds additional lanes and resurfaces the entire road
REC	Reconstruction
RNS,	Reconstruction with Nominal Sewers
RSS,	Reconstruction with Storm Sewers
NC	Proposed Road Construction
SRR	Storm Sewer Installation and Road Reinstatement
SD	Spot Drainage
CO	Carry Over project
Additional Treatments	
CRK	Crack sealing
CRKsd	Crack Sealing and Spot Drainage
DSTrehab	Pulverize and existing surface treated road, add 75mm of gravel, double surface treat, and spot drainage improvements. Typically specified where the road appears to be structurally sound but the surface treatment is deteriorated beyond the point where it should not be re surface treated.
DSTrehab2	As DSTrehab, substituting 150mm of gravel,
GRR	Gravel road resurfacing 75mm
GRRsd	Gravel road resurfacing 75mm and spot drainage
GRR2	Gravel road resurfacing 150mm
GRRsd	Gravel road resurfacing 150mm and Spot Drainage
MICRO	Microsurfacing
SST	Single Surface Treatment
SSTedge	Single Surface Treatment and edge padding

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1 Introduction and Background

Road Needs Studies (RNS) were implemented by the Ministry of Transportation Ontario (MTO) in the 1960's, and evolved into the current methodology by the late 1970's. The most current version of the Inventory Manual for Municipal Roads is dated 1991, and is the methodology used for this report.

The process was originally created by the MTO as a means to distribute conditional funding, on an equitable basis, between municipalities. The practice was discontinued by a number of municipalities, when conditional funding for roads was eliminated in the mid 1990's. The RNS process is a sound, consistent asset management practice that still works well today, and in view of the increasing demands on efficiency and asset management, represents a sound business practice that is beneficial to continue.

To put the Road Needs Study in a more current context, the State of the Infrastructure (SotI) is essentially a Road Needs Study.

In August 2012, the Province of Ontario, introduced a requirement for an Asset Management Plan (AMP) as a prerequisite for municipalities seeking funding assistance for capital projects from the province; effectively creating a conditional grant. To qualify for future infrastructure grants, an AMP had to be developed and approved by a municipal council by December 2013. On April 26, 2013 the province announced that it had created a \$100 million Infrastructure Fund for small, rural and northern municipalities.

Subsequently, the province has introduced further initiatives for infrastructure funding: Ontario Community Infrastructure Fund (OCIF) and the Small Communities Fund (SCF). An Asset Management Plan (AMP) approved by Council is required as part of the submission for OCIF Applications. Asset Management Plans were to be reviewed for comprehensiveness.

On December 27, 2017, the Province filed Regulation 588/17, Asset Management Planning for Municipal Infrastructure. The regulation identifies provincial requirements and timelines for development and implementation of asset management plans. Initially, AMP's will have to include the 'core' assets; water and waste water linear and treatment, roads, bridge and culvert structures, and storm water linear and treatment.

Regulation 588/17 requires an Asset Management Plan (AMP) for core assets by July 1, 2022 that is based on condition data that is no more than two years old. This project positions the Township well for compliance with the Regulation.

Conditional Grants are not new to Ontario. Until the mid-1990's, Road Needs Studies (RNS) were completed by municipalities and submitted to the Ministry of Transportation (MTO) on an annual basis in order to receive provincial funding for their road programs.

Township of Malahide is currently evolving the AMP for the various asset groups, roads being one of them. A key component of the AMP is a 'State of the Infrastructure' (SotI) review of the asset or asset group. This report provides the SotI review of the Township of Malahide road system and also provides recommendations for budgets and road asset programming, effectively an Asset Management Plan for Roads.

The scope of this report is to prepare a State of the Infrastructure (SOTI) report that includes:

- Field review and condition rating on all of the road assets within the Township of Malahide road system.
- Updated Dimensional information, where improvements have occurred
- Add or change road sections to better reflect the constitution of the road system, as required.
- Develop replacement costs for each road asset, based on current unit costs and standard formulae from the Inventory Manual for Municipal Roads, 1991.

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- Develop/review recommendations for improvement and associated costing on deficient assets
- Develop recommendations for annual budgets based on current costs for Long Term Sustainability and major program areas based on updated unit costs.
- Develop analysis on the effect of current and recommended budgets on overall system performance.
- Develop a 10 year work plan
- Provide Asset Management Strategy recommendations
- Provide the answers to the basic asset management questions;
 - What you have?
 - Where it's located?
 - What condition is it in?
 - What is it worth?
 - What will it cost to replace it?
 - Useful remaining life?
 - What service level will be required over the service life?
- A report on the foregoing.
- An updated geodatabase

The 2021 Sotl summarizes the condition data survey conducted during the late spring of 2021. The database identifies the condition of each road asset by its time of need and recommended maintenance, rehabilitation or reconstruction treatment.

Recommendations are made based on the defects observed and other information available in the database at the time of preparation of the report. Once a road asset reaches the project level, the municipality may have selected another alternative based on additional information, asset management strategy, development considerations or available funding.

Further, the report provides an overview of the physical and financial needs of the road system in its entirety, as well as by road section. Both information sources are used to develop programming and budgets. However, once a road section reaches the project design stage, further detailed review, investigation, and design will be required to address the specific requirements of each project.

This report should not be confused with a road safety audit. A road safety audit is the formal safety performance examination of an existing or future road or intersection, which qualitatively estimates and reports on potential road safety issue and identifies opportunities for improvements for all road users. Typically, and more predominantly in a lower tier, rural municipality on lower volume road sections, the road system has some deficiencies with the existing horizontal and vertical alignment.

The Township provided updated information with respect to their database/network, which included sections that had been added or removed from the system, and other segment data.

The Inventory Manual methodology is discussed further in Section 2 of this report and Appendix A.

2 Asset Condition Rating Methodology

2.1 Asset Management Planning for Municipal Assets - Regulation 588/17 Requirements

Regulation 588/17, Asset Management Planning for Municipal, Infrastructure requires;

'v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.'

2.2 Asset Condition Rating Methodology

As an asset management practice Township of Malahide is updating the condition and attribute information for the road system. This ensures that pavement management decision making is based upon current data from field survey information and is completed in accordance with standard engineering practice. The road section reviews follow the methodology of the Ministry of Transportation Inventory Manual for Municipal Roads, 1991.

2.2.1 Inventory Manual History

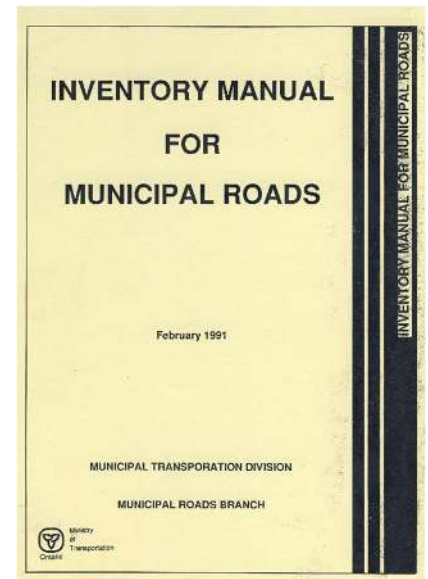
From the 1960's until the mid 1990's, the Ministry of Transportation (MTO) required municipalities to regularly update the condition ratings of their road systems in a number of key areas. The process was originally created by the MTO, as a means to distribute conditional funding, on an equitable basis, between municipalities. The reports were referred to as a 'Road Needs Study' (RNS) and were required in order to receive a conditional grant to subsidize the municipal road programs. After the introduction in the 1960's by the MTO, the methodology evolved into the current format by the late 1970's. The most current version of the Inventory Manual is dated 1991, and is the methodology used for this report. The practice was discontinued by a number of municipalities, when conditional funding for roads was eliminated in the mid 1990's.

2.2.2 Inventory Manual Overview

The Inventory Manual Methodology is a sound, consistent, asset management practice that still works well today, and in view of the increasing demands on efficiency and asset management, represents a sound asset management practice that should be repeated on a cyclical basis. The road section review identifies the condition of each road asset by its time of need and recommended rehabilitation strategy.

Township of Malahide Sotl & AMP Report summarizes the road system survey conducted during the late spring of 2021. The Sotl Report provides an overview of the overall condition of the road system by road section, including such factors as structural adequacy, drainage, and surface condition. The study also provides an indication of potential deficiencies in the horizontal and vertical alignment elements, as per the Ministry of Transportation's manual, "Geometric Design Standards for Ontario Highways".

The report provides an overview of the physical and financial needs of the road system, which may be used for programming and budgeting. However, once a road section reaches the project design stage, further detailed review, investigation, and design will be required to address the specific requirements of the project.



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Asset Management, by its' very nature, is holistic. Managing a road network based solely on pavement condition would be critically deficient in scope in terms of the information required to make an informed decision as to the improvements required on a road section.

The *Inventory Manual* offers a holistic review of each road section, developing a Time of Need (TON) or an Adequate rating in six areas that are critical to municipal decision making:

- Geometrics
- Surface Type
- Surface Width
- Capacity
- Structural Adequacy
- Drainage

Evaluations of each road section were completed generally in accordance with the MTO's *Inventory Manual for Municipal Roads* (1991). Data collected was entered directly into WorkTech's Asset Foundation software. Condition ratings, Time of Need, Priority Ratings, and associated costs were then calculated by the software, in accordance with the *Inventory Manual*. Unit costs for construction were provided by Township of Malahide staff.

Road sections should be reasonably consistent throughout their length, according to roadside environment, surface type, condition, cross section, speed limit, or a combination of these factors. As an example, section changes should occur as surface type, surface condition, cross-section, or speed limit changes.

The Condition Ratings, developed through the scoring in the *Inventory Manual*, classify roads as 'NOW', '1 to 5', or '6 to 10' year needs for reconstruction. The Time of Need is a prediction of the time until the road requires reconstruction, not the time frame until action is required. For example, a road may be categorized as a '6 to 10' year need with a resurfacing recommendation. This road should be resurfaced as soon as possible, to further defer the need to reconstruct.

Field data is obtained through a visual examination of the road system and includes: structural adequacy, level of service, maintenance demand, horizontal and vertical alignment, surface and shoulder width, surface condition, and drainage. The Condition Rating is calculated based upon a combination of other calculations and data.

To best utilize the database information and modern asset management concepts, it has to be understood that the Time of Need (TON) ratings are the estimated time before the road would require reconstruction. NOW needs are still roads that require reconstruction; however, it is not intended that '1 to 5' and '6 to 10' year needs are to be acted on in that timeframe. The '1 to 5' and '6 to 10' year needs are current candidates for resurfacing treatments that will elevate their structural status to 'ADEQ', and offer the greatest return on investment for a road authority (notwithstanding a drainage or capacity need, etc.).

The Time of Need ratings from the Structural Adequacy perspective are described more fully in Appendix A.

2.2.3 Inventory Manual Overview -Gravel Road Inspections

Item 87 – Structural Adequacy provides the following direction on the evaluation of gravel roads;

"Loose Top Sections

Appraise each section on the basis of two conditions during the spring

- (a) *SOFT SPOTS, as indicated by rutting and Frost Boils*
- (b) *FROST BOILS only.*

Table 2.1: Inventory Manual Table 87

Point Rating	Proportion of Section Length Exhibiting Soft Spots (Include the length of Frost Boils)	Proportion of Section Length Exhibiting Frost Boils (Exclude the Length of Soft Spots which do not Boil)
20	Less than 5%	No Boils
19 to 15	5%-15%	Less than 5%
14 to 12	16%-20%	6%-10%
11 to 8	21%-25%	11%-15%
7 to 1	More than 25%	More than 15%

The gravel roads inspections were not undertaken during the spring breakup.

2.3 Improvement Recommendations

Improvement recommendations are predicated upon the field observations and ratings, dimensional data collected, and traffic information. As a project advances, further design, traffic and geotechnical studies should be undertaken to confirm the nature and extent of the improvement required.

Improvement recommendations are provided to correct the observed deficiencies. The road agency may elect to utilize a holding strategy as an interim measure due to budget constraints or other programming that has been prioritized.

During the course of the preparation of the work plan, some recommendations were changed to align with the Township's improvements that are in part being driven by other assets or master plans.

All BS - Base and Surface Improvement types include costing for conversion to a hardtop road on gravel sections

2.3.1 Defects and Quality Assurance

As with the production of any product, the goal is to minimize defects to the greatest extent possible.

Quality Control is the system or process that the supplier undertakes to ensure that the product is provided as specified.

Quality Assurance is the system or process that the receiver of the product employs to assure itself that the product that it is receiving is in fact what was specified.

During the course of the field reviews a number of defects were noted, as follows;

- Surface Treated roads appear to be performing very well structurally, even though some of the sections have a higher traffic count than would be typically expected for a surface treated road in Ontario.
- The roads are performing well structurally, however, it appears that the re-application of surface treatment has extended too far. The edges are beginning to fail resulting in a hot mix padding, then, re-treating.
- The gravel roads were not inspected during the spring breakup period. To some extent the ratings were reliant upon anecdotal information provided by staff to some extent.
- Platform and surface widths can vary within a section.

- Overall drainage in the Springfield area should be reviewed.
- Most of Springfield will be at the condition threshold for resurfacing within the next 5 years.

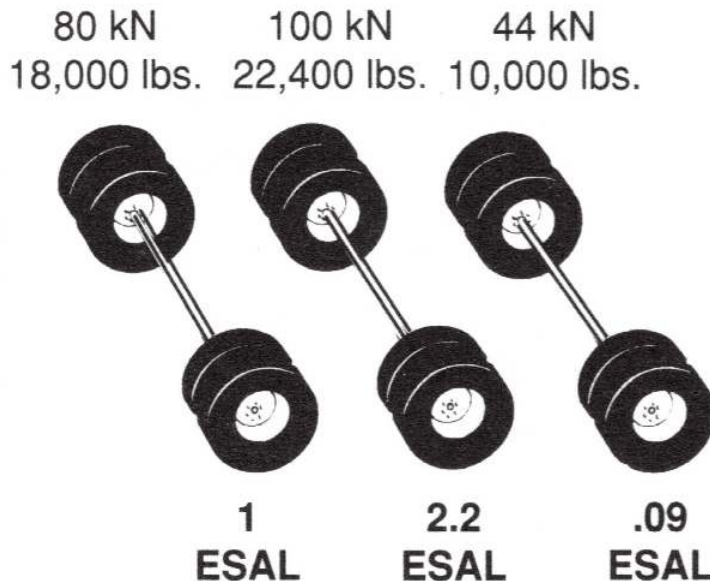
There is an associated cost with quality assurance, but that far outweighs the life cycle cost of receiving product that does not meet standard. *'You get what you inspect – not what you expect.'*

Defects are discussed in greater detail in Appendix B

2.3.2 Traffic Impact on Improvement Recommendations

Improvement recommendations are heavily predicated on traffic, and particularly heavy commercial traffic and buses. The number and type of heavy vehicles is critical to pavement design and ultimately, its' performance. Under-designed pavement will not perform as expected.

Figure 2-1: ESAL Comparison from Asphalt Institute Thickness Design Manual



When designing a road, the traffic loading from different vehicles has to be converted to, and expressed in, common terms. In Ontario (and across North America) Equivalent Single Axle Loads (ESAL's) are used to design pavement structure and to determine the required consensus properties of materials.

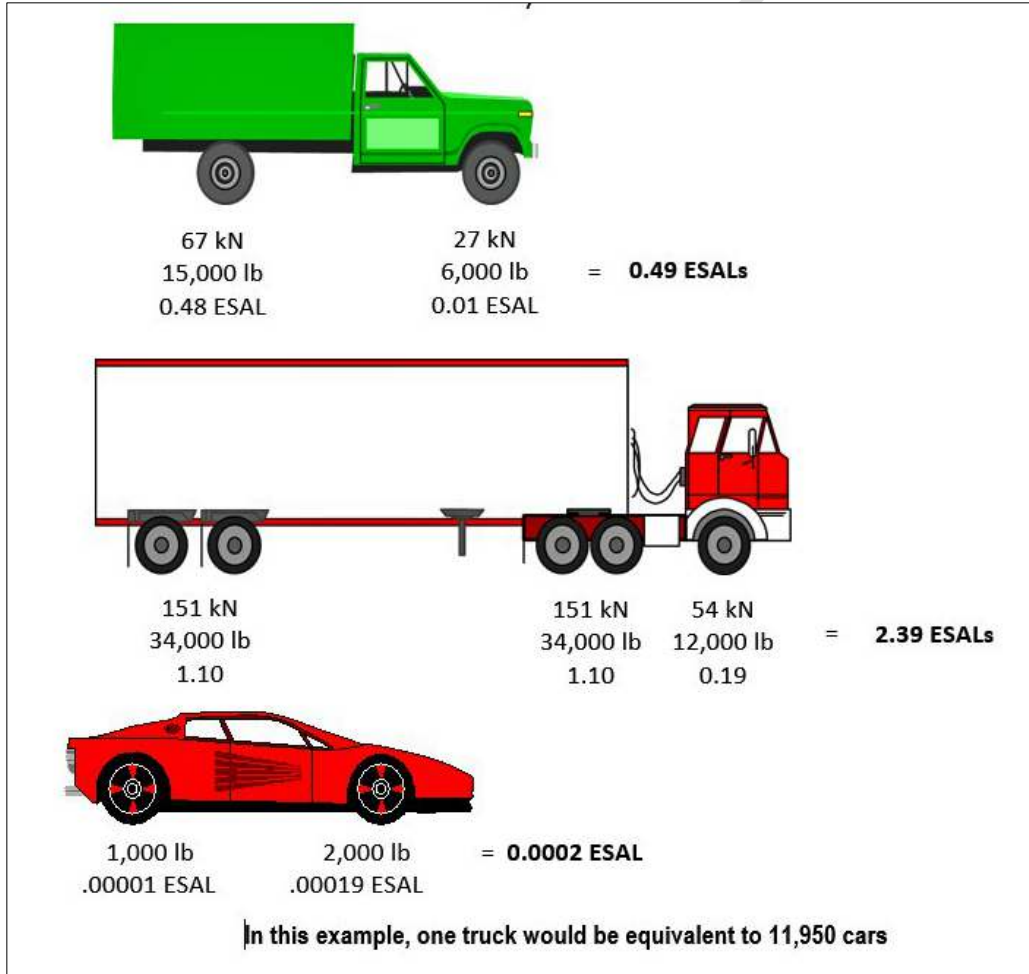
The ESAL measurement has been in use for a significant length of time and has its roots in the older Imperial or Standard measures. The metric system was adopted in Canada in 1977. One ESAL is 18,000 lbs, 18kips or 80 Kilonewtons. In Ontario the maximum load for a single axle is 10 tonnes, which equals 100 Kilonewtons, or 2.2 ESAL's.

The American Association of State Highway and Transportation Officials (AASHTO) and the Asphalt Institute (AI) are often cited references for pavement design. The formula to determine load equivalencies is very complex, however, at a high level, a simplified formula may be used to approximate the load equivalency factor. This formula is sometimes referred to as the Fourth Power Law or the Generalized Fourth Power Law. The Load Equivalency Factor may be used to illustrate the relative difference in damage between particular loadings.

Equation 2-1: Load Equivalency Factor

$$\text{Load Equivalency Factor} = \left[\frac{\text{Specific Axle Load}}{18,000 \text{ lbs}} \right]^4$$

Figure 2-2: ESAL Comparison (Adapted from Asphalt Institute for Highway and Street Rehabilitation Manual)



2.3.3 Traffic Counts

Section 2.3.2 identifies the impact of traffic, particularly trucks, on the performance of the roads and the inherently greater pavement structure that is required to carry said traffic. This reinforces the need to have current traffic information that would include the type and number of vehicles that are using the road in order that an appropriate pavement structure may be determined.

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The Township has a regular traffic counting program that should be continued and include the percentage of trucks, count Year, and the type of count - actual or estimated. The importance of traffic counts is also discussed in Section 3.2.2.

The changes in traffic patterns resultant from the pandemic may skew the traffic counts downward causing an inaccurate determination of the O.Reg 239/02 classification, which would pose a potential liability for the Township.

2.3.4 Seasonal Half Load Restrictions

The discussion in the Section 2.3.2 identifies the effect the heavy vehicles have on a pavement structure. During the spring break-up season- typically March 1 to April 30- frost is coming out of the ground which reduces the ability of the road structure to carry loads.

The Township of Malahide has a policy and process to permit an exemption to spring load restrictions on a site specific basis. The policy/process was approved by Council in January 2021. This section of the report should be considered as a technical discussion supporting that process, and why spring half load restrictions are necessary.

From the paper entitled 'Proposed System for Co-ordinating Spring Load Restrictions in Ontario' presented at the 2013 Transportation Association of Canada Conference, the following provides an easily understood explanation for the need for half load restrictions ;

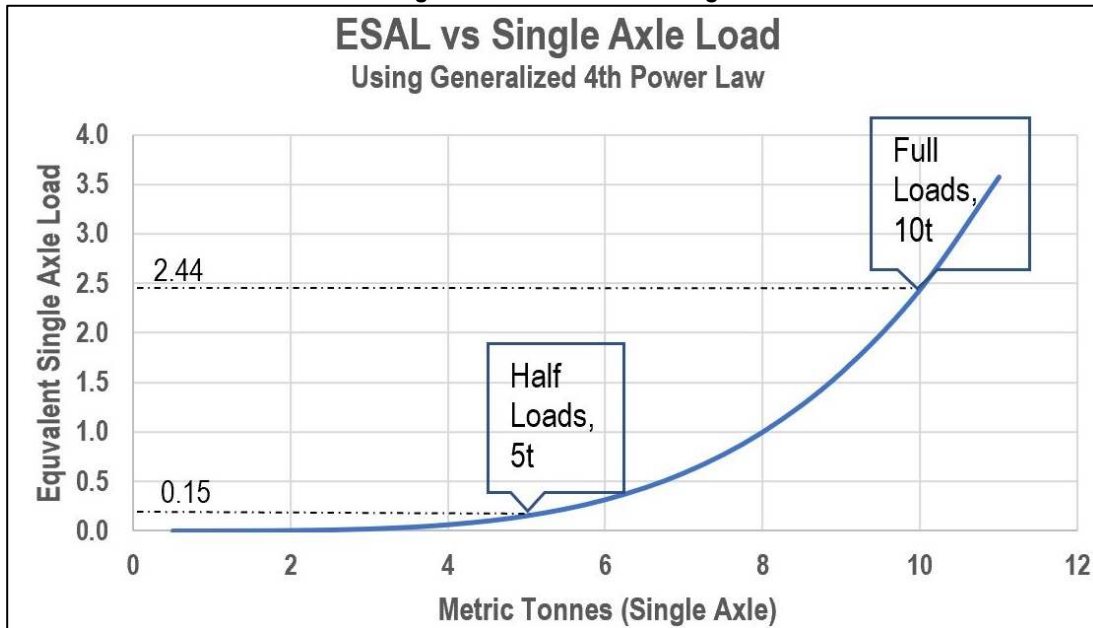
Roads and highways in northern climates are affected by seasonal growth and melting of ice beneath the surface, especially on roads with a non-engineered base beneath the driving surface. Ice growth can be advantageous by increasing the bearing strength of road materials, or disruptive where moisture accumulates locally in frost heaves or boils. Melting of ice can lead to weakening of road materials where melt near the surface is more rapid than at depth, and excess moisture is trapped above a non-permeable subsurface layer, leading to rutting and pavement cracking.

The effects of freezing and thawing of low volume roads in Ontario is mitigated through temporary Winter Weight Premiums (WWP) during the frozen season and Half Load Restrictions or Spring Load Restrictions (SLR) during the thaw season on designated road sections (Ontario, 2013). They are intended to provide a balance between the access needed by the trucking and resource industry and the added road repair and maintenance costs borne by the Ministry of Transportation or local municipalities.

The Highway Traffic Act Section 122 provides authority to a municipality to impose load restrictions. The timing of the imposition of spring load restrictions should be based on the conditions, not just the date. Climate change has introduced significant variability into the commencement the spring thaw, and as such, there should be delegated authority to staff to impose the restrictions as conditions occur.

Half Load Restrictions should commence as determined by the conditions and/or the date. Exemptions should be as per the Township's policy.

Figure 2-3: Effect of Loading



2.3.5 Traffic Impact on other Improvement Recommendations

O.Reg 239/02, Minimum Maintenance Standards for Municipal Highways, provides for inspection frequency and response time for various road defects. O.Reg 239/02 creates a Class 6 road which are low traffic, low speed roads, which the regulation does not apply to. (O.Reg 239/02 is further discussed in section 3.2.2 of this report)

Based on the foregoing, there is a common misconception that there are no standards for Class 6 roads. To be clear, the inspection and response standards do not apply to Class 6 roads, however, there are still minimum geometric requirements.

Minimum tolerable standards for surface and platform width are predicated by traffic count. The Inventory Manual provides guidance for both minimum tolerable standards and desirable standards. This report identifies a number of road sections with substandard surface width.

When the roads are reconstructed or rehabilitated, they should be improved to meet the minimum tolerable standards. Improvements on all the sections may take years to occur. As an interim measure, these sections should have advisory signage placed for 'Narrow Road'.

2.4 Types of Improvements

This report identifies ratings that are resultant from identification of deficiencies on each road section that equate to a TON in one or more of the six critical areas: Geometry, Surface Type, Surface Width, Capacity, Structural Adequacy, or Drainage. Based on the ratings and the deficiencies noted an improvement type recommendation is also provided.

The key factor in providing an improvement type recommendation is the visual survey. During the visual survey, a determination is made as to whether the appearance and performance of a road relates to an underlying structural problem, or simply to aged surface materials. A road's structural or drainage problem would tend to result in a reconstruction/ replacement treatment recommendation, whereas aged surface materials would result in a

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resurfacing/rehabilitation treatment recommendation. A determination of the root cause of the problem or the condition is critical; reconstructing a road that should have had some type of resurfacing treatment would be an ineffective use of available resources.

For the purposes of this report, the standard improvement types and associated costing formulae identified in the Inventory Manual have been used where applicable. Other improvement types have been developed to more fully evolve the development of a more holistic work plan that includes capital and major maintenance activities

The following table provides a list of road improvements used for the development of this report.

Appendix B of this report includes a discussion of pavement structure and defects.

Table 2.2: Average Improvement Costs per Kilometre by Improvement Type

Improvement Class	Improvement ID / Description		TOTAL		% OF TOTAL		Cost / km (\$)
			Imp. Cost	CI-km	Imp. Cost	CI-km	
Const	BS	Base and Surface	14,858,276	33.71	52.62%	12.85%	440,768
Const	NONE	No Improvement Required	0	93.421		35.61%	-
Const	REC	Reconstruction - Rural	3,364,118	8.46	11.91%	3.22%	397,650
Const	RNS	Reconstruction Nominal Storm Sewer	40,962	0.08	0.15%	0.03%	512,025
Const	RSS	Reconstruction with Storm Sewers	2,017,938	1.46	7.15%	0.56%	1,382,149
Maint	CRK	Crack Sealing	2,567	1.275	0.01%	0.49%	2,013
Maint	CRKsd	Crack sealing and Spot Drainage	1,720	0.4	0.01%	0.15%	4,300
Maint	GRR2sd	150mm of Granular A and Spot Drainage	130,006	2.78	0.46%	1.06%	46,765
Maint	GRR	75mm of Granular A	196,613	8.17	0.70%	3.11%	24,065
Maint	GRRsd	75mm of Granular A and Spot Drainage	69,322	2.82	0.25%	1.07%	24,582
Maint	RSpL	Reduce Speed Limit	1,000	2.77	0.00%	1.06%	361
Maint	SD	Spot Drainage	52,155	18.3	0.18%	6.98%	2,850
Rehab	DSTrehab2	DST w 150mm Gran A	1,642,488	12.125	5.82%	4.62%	135,463
Rehab	DSTrehab	DST w 75mm Gran A	2,991,302	38.525	10.59%	14.68%	77,646
Rehab	PR2	Pulverize and Resurface 2 - 100mm	481,433	1.29	1.70%	0.49%	373,204
Rehab	R1	Basic Resurfacing 1 - 50mm	255,275	2	0.90%	0.76%	127,638
Rehab	R2	Basic Resurfacing 2 - 100mm	384,226	1.54	1.36%	0.59%	249,497
Rehab	SST	Single Surface Treatment	476,407	15.22	1.69%	5.80%	31,301
Rehab	SSTedge	Single Surface Treatment with Edge padding	325,984	10.54	1.15%	4.02%	30,928
Rehab	SSTrehab	Surface Treatment, Base repair, Ditching, berm removal	946,696	7.47	3.35%	2.85%	126,733

Table 2.3: Road Improvement Types

Inventory Manual Improvements	
Code	Description
R1	Basic Resurfacing, Basic Resurfacing
R2	Basic Resurfacing – Double Lift,
RM	Major Resurfacing – removes existing asphalt and replace with existing plus and additional lift.
PR1	Pulverizing and Resurfacing
PR2	Pulverizing and Resurfacing – Double Lift
BS	Tolerable standard for lower volume roads: – Rural and Semi-Urban Cross sections only. Improves drainage and adds structure (granular base) and a surface but not to a reconstruct standard. Typically specified where width is to an acceptable standard.
RW	Resurface and Widen- adds additional lanes and resurfaces the entire road
REC	Reconstruction
RNS,	Reconstruction with Nominal Sewers
RSS,	Reconstruction with Storm Sewers
NC	Proposed Road Construction
SRR	Storm Sewer Installation and Road Reinstatement
SD	Spot Drainage
CO	Carry Over project
Additional Treatments	
CRK	Crack sealing
CRKsd	Crack Sealing and Spot Drainage
DSTrehab	Pulverize and existing surface treated road, add 75mm of gravel, double surface treat, and spot drainage improvements. Typically specified where the road appears to be structurally sound but the surface treatment is deteriorated beyond the point where it should not be re surface treated.
DSTrehab2	As DSTrehab, substituting 150mm of gravel,
GRR	Gravel road resurfacing 75mm
GRRsd	Gravel road resurfacing 75mm and spot drainage
GRR2	Gravel road resurfacing 150mm
GRRsd	Gravel road resurfacing 150mm and Spot Drainage
MICRO	Microsurfacing
SST	Single Surface Treatment
SSTedge	Single Surface Treatment and edge padding

2.4.1 Township of Malahide Recommendations and Costing

The bench mark improvements from the Inventory Manual represent a sound methodology for developing a project cost. In the absence of any municipality specific formulae, the bench mark costs work well to produce a representative cost to undertake a specified improvement.

In the bench mark costing, there are four cost factors that are added to the material and placement costs of a project;

- Basic Construction Factor
- Engineering Factor
- Contingency Factor and,
- Terrain and Soil Type Factor

Over the years, additional treatments have been developed that are specific to Township of Malahide and have been identified in Table 2.2 under the heading additional treatments. Where an additional treatment has been created, consideration has been given to the usage of the above mentioned factors, as deemed appropriate.

Appendix A includes fuller descriptions of each of the above noted improvements.

Appendix B of this report includes a discussion of Pavement Structure and defects.

3 State of the Infrastructure

3.1 Scope / Asset Type(s)

This report addresses road assets only. The content will provide review and analysis of the road system from a number of perspectives including condition rating, functional classification, roadside environment, replacement cost, Regulation 239/02 classification and Regulation 588/17 Classification.

The cost of storm sewers is included in the replacement / improvement recommendation RSS - Reconstruct with storm sewers.

3.2 Road Asset Inventory and Classification

Assets are classified by different measures dependent upon regulation and end usage of the information. The following sections of the report define the road assets by a number of parameters including road surface type, roadside environment, and Regulations 239/02 and 588/17.

For performance modeling purposes, 4 Roads has created asset classes that are defined by surface type, roadside environment and traffic. Appendix C of this report provides further discussion on asset classes for performance modeling.

3.2.1 Surface Types and Roadside Environment

Roadside environment and surface type criteria of a road section are useful in characterization of the road section, and in determining costs for replacement, reconstruction and rehabilitation treatments.

The *Inventory Manual* classifies the roadside environment as Rural, Semi-Urban or Urban. The classification is determined by length, servicing, and adjacent land use.

- **Rural Roads** – within areas of sparse development, or where development is less than 50% of the frontage, including developed areas extending less than 300 m on one side or 200 m on both sides, with no curbs and gutters.
- **Semi-Urban Roads** – within areas where development exceeds 50% of the frontage for a minimum of 300 m on one side, or 200 m on both sides, with no curbs and gutters, with or without storm/combination sewers, or for subdivisions where the lot frontages are 30 m or greater.
- **Urban Roads** – within areas where there are curbs and gutters on both sides, served with storm or combination sewers, or curb and gutter on one side, served with storm or combination sewers, or reversed paved shoulders with, or served by, storm or combination sewers, or for subdivisions with frontages less than 30 m.

Table 3.1: Surface Type and Roadside Environment Distribution

Material Description	Roadside Environment						TOTAL		% OF TOTAL	
	Rural		Semi Urban		Urban		CL-km	Lane-km	CL-km	Lane-km
	CL-km	Lane-km	CL-km	Lane-km	CL-km	Lane-km				
Gravel, Stone, Other Loosetop	52.135	104.27	0.09	0.18	0	0	52.225	104.45	19.91%	19.91%
High Class Bit.-asphalt	0.495	0.99	8.77	17.54	1.531	3.062	10.796	21.592	4.12%	4.12%
Low Class Bit.-surface treated	194.205	388.41	5.13	10.26	0	0	199.335	398.67	75.98%	75.98%
TOTAL	246.835	493.67	13.99	27.98	1.531	3.062	262.356	524.712		
% OF TOTAL	94.08%	94.08%	5.33%	5.33%	0.58%	0.58%				

3.2.2 Ontario Regulation 239/02 Classification- Minimum Maintenance Standards for Municipal Highways

In the 1990's, municipalities experienced an escalation of claims and resultant awards for damages which in turn increased the cost of municipal insurance. Increased insurance costs typically resulted in a reduction of available funding for the provision of services as municipalities strove to keep annual tax increases to a minimum.

A draft regulation was created and circulated to municipal stakeholders and agencies for comment over a period of years, starting in the late 1990's. The premise being that, this would represent a standard for maintenance for municipalities that – if met - and documented- would provide the municipalities with a level of defense in claim. (Reference the Ontario Municipal Act) The consultative process occurred over a lengthy period of time.

In November 2002, Ontario Regulation 239/02 (O.Reg 239/02), Minimum Maintenance Standards for Municipal Highways (MMS) came into effect. Essentially, if a municipality met the standard and documented it, they would not be negligent per Section 44(3)c of the Municipal Act noted above.

O.Reg 239/02 created 6 classifications for roads based on AADT (traffic count) and speed limit. Table 3.2 shows O.Reg 239/02 traffic/speed/ classification matrix as amended by O.Reg 366/18.

Regulation 239/02 provided for a review five years after its original implementation. A process to revise Regulation 239/02, chaired by the Ontario Good Roads Association (OGRA), culminated in a revised regulation, Regulation 23/10, coming into effect in February 2010.

In the late fall of 2011, a court decision (Giuliani) was rendered that effectively created case law that negated the protection that the MMS afforded, and in particular, Tables 4 and 5 of the regulation (Tables 4 and 5 addressed Snow Accumulation and Icy Roads in that revision of the MMS). Essentially, the decision created a new standard that went beyond the original MMS. The effect on a municipality is that a higher standard of weather monitoring, documentation and proactive response (as opposed to reactive) to monitoring would be required, particularly in the case of ice formation prevention (anti icing).

OGRA re-called the MMS committee to further amend the regulation, to address the outcome of the Giuliani decision. As a result of the committee meetings and discussions with the province, Regulation 47/13 came into effect, amending Regulations 239/02 and 23/10, on January 25 2013.

As noted, Regulation 239/02 provides for review at 5 year intervals. Effective May 3, 2018, the next revision of the regulation came into effect (O.Reg 366/18). There are a number of revisions in the updated regulation that affected

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the MMS classifications and also modified and added a number of service delivery standards for bike lanes and sidewalks.

Table 3.2: O.Reg 239/02, as amended by O.Reg 366/18, Minimum Maintenance Standard Road Classification

Column 1 Average Daily Traffic (number of motor vehicles)	Column 2 91 - 100 km/h speed limit	Column 3 81 - 90 km/h speed limit	Column 4 71 - 80 km/h speed limit	Column 5 61 - 70 km/h speed limit	Column 6 51 - 60 km/h speed limit	Column 7 41 - 50 km/h speed limit	Column 8 1 - 40 km/h speed limit
53,000 or more	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

The Minimum Maintenance Standards do not have to be adopted by a municipal council per se. The regulation is provincial, applies to all municipalities, and is available for municipalities to use as a defense if they have met the standard and documented it. The more important issue would be to ensure that a municipality has the appropriate Standard Operating Procedures (SOP's) in place, and that they are followed and documented, rather than trying to reword or parallel the language of the regulation into a document that is agency specific. SOP's are a (management) staff created document that identifies service delivery processes to staff, and do not require Council approval. Policy is the purview of Council; SOP's are how staff deliver on the direction of the policy.

Traffic counts are important for a number of decision making purposes, with respect to the road system. Accurate, defensible traffic counts, in conjunction with the posted speed limits, are used in determining the MMS class of the respective road sections. Roads are divided into six service classes by posted speed and traffic count, with Class 1 being the highest service level and Class 6 being the lowest. There are no service standards for Class 6 roads which are low traffic volume and low speed as identified in Table 2.1

The caveat is that, whereas there are no service standards for Class 6 roads, there are geometric design standards for low volume roads that are still applicable for width, curves and other geometry. Road structure will be dependent on traffic type.

The regulation defines response time by MMS class and defect type. Response time is defined as the time from when the municipality becomes aware that a condition exists, until the time that the condition is corrected or brought within the limits specified in the regulation. For example, the response time that is required to remove snow accumulation is 12 hours for a Class 3 road, and 16 hours for a Class 4 road.

This may have a significant impact with respect to the equipment and staffing that may be required to meet the standard, particularly in the case of winter control. The implications are that this increased service level may require the municipality to increase the inspection frequency, staff, and machinery to deliver the service beyond the service delivery hours that may currently exist.

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Traffic Counts are critical to the accurate classification of road sections and decision making for capital and operational programs. The Township of Malahide records indicate the history of the traffic counting program as shown in Table 3.3 .

Table 3.3: Traffic Count History

Year	AADT Counted	AADT Estimated	TOTAL	% OF TOTAL
2008	71.2	43.58	114.78	42.11%
2009	2.81	0	2.81	1.03%
2013	131.88	0	131.88	48.38%
2014	3.57	0	3.57	1.31%
2015	0	6.89	6.89	2.53%
2018	11.98	0	11.98	4.40%
2021	0	0.671	0.671	0.25%
TOTAL	221.44	51.141	272.581	
% OF TOTAL	81.24%	18.76%		

**Not adjusted for Boundary Roads*

Township of Malahide currently does not collect traffic data on the percentage and type of vehicles. As noted earlier in the report, truck and other heavy traffic is the primary driver in the pavement structure design. The type of traffic should be included in the traffic count information.

The distribution of the MMS Classes across the Township of Malahide road system is detailed in Table 3.4.

Table 3.4: Minimum Maintenance Standards Class Distribution

Lanes	Roadside	Regulation 239/02 Classification, Minimum Maintenance Standards for Municipal Roads								TOTAL		% OF TOTAL	
		3	4	5	6								
		CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km
2	R	16.62	33.24	181.2	362.4	27.45	54.9	31.71	63.42	256.98	513.96	94.28%	94.28%
2	S			2.06	4.12	6.51	13.02	5.5	11	14.07	28.14	5.16%	5.16%
2	U					1.044	2.088	0.487	0.974	1.531	3.062	0.56%	0.56%
TOTAL		16.62	33.24	183.26	366.52	35.004	70.008	37.697	75.394	272.581	545.162		
% of Total		6.10%	6.10%	67.23%	67.23%	12.84%	12.84%	13.83%	13.83%	100.00%	100.00%		

*Traffic information for this report was provided by Township of Malahide and/or estimated by 4 Roads in accordance with the Inventory Manual *Not adjusted for Boundary Roads*

3.2.3 Functional / Existing / Design Classifications per the Inventory Manual for Municipal Roads

Roads are further classified within the database by classes such as Local, Collector, or Arterial and Residential or Industrial. Items 33 and 105 in the *Inventory Manual* provide further direction on determination of the Existing or Design Classes of road. Generally, the classifications are predicated on the existing use, roadside environment, and anticipated growth over either the ten- or twenty-year planning horizon.

The road sections are classified by the rater, at the time of the field review. Table 3.5 identifies the Functional Road Class Distribution.

Table 3.5: Functional Road Class Distribution (Inventory Manual)

Functional Classification	Lanes	Roadside Environment						TOTAL		% OF TOTAL	
		Rural		Semi Urban		Urban		CI km	Ln km	CI km	Ln km
		CI km	Ln km	CI km	Ln km	CI km	Ln km				
100	2	26.345	52.69	0	0	0	0	26.345	52.69	10.04%	10.04%
200	2	84.265	168.53	0	0	0	0	84.265	168.53	32.12%	32.12%
300	2	74.1	148.2	0	0	0	0	74.1	148.2	28.24%	28.24%
400	2	42.635	85.27	0	0	0	0	42.635	85.27	16.25%	16.25%
500	2	19.49	38.98	0	0	0	0	19.49	38.98	7.43%	7.43%
C/R	2	0	0	0.17	0.34	0	0	0.17	0.34	0.06%	0.06%
CCI	2	0	0	0.12	0.24	0	0	0.12	0.24	0.05%	0.05%
L/R	2	0	0	13.7	27.4	1.531	3.062	15.231	30.462	5.81%	5.81%
TOTAL		246.835	493.67	13.99	27.98	1.531	3.062	262.356	524.712		
% OF TOTAL		94.08%	94.08%	5.33%	5.33%	0.58%	0.58%				

3.2.4 O. Reg 588/17 Classification – Asset Management Planning for Municipal Infrastructure

Regulation 588/17, Asset Management Planning for Municipal Infrastructure was enacted on December 27, 2017. In part the regulation provides for another functional classification of road sections within a system. The classification takes a broader brush than the Inventory Manual, classifying road sections as Arterial, Collector, or Local, based directly on the Regulation 239/02 road classification.

Class 1 and 2 are Arterial; Class 3 and 4 are Collector; Class 5 and 6 are Local.

Table 3.6 identifies Regulation 588/17 Classification. For the purposes of this report, 4 Roads has aligned the urban and semi urban functional classifications with O.Reg 588/17. Urban and Semi-urban road sections have been classified in accordance with this table.

Table 3.6: Ontario Regulation 588/17 Functional Road Classification

Lanes	Roadside	Regulation 588/17 Classification, Asset Management Planning for Municipal Infrastructure						TOTAL		% OF TOTAL	
		Arterial		Collector		Local		CI-km	Lane-km	CI-km	Lane-km
		CI-km	Lane-km	CI-km	Lane-km	CI-km	Lane-km				
2	R	0	0	197.82	395.64	59.16	118.32	256.98	513.96	94.28%	94.28%
2	S	0	0	2.06	4.12	12.01	24.02	14.07	28.14	5.16%	5.16%
2	U	0	0	0	0	1.531	3.062	1.531	3.062	0.56%	0.56%
TOTAL		0	0	199.88	399.76	72.701	145.402	272.581	545.162		
% OF TOTAL		0	0	73.33%	73.33%	26.67%	26.67%				

**Not adjusted for Boundary Roads.*

3.3 Horizontal and Vertical Alignment

The changes in direction and elevation of the road are referred to as the horizontal and vertical alignment. The changes in direction should be designed and constructed such that the posted speed limit of the road section may be safely maintained throughout the section. If maintaining the posted speed in safety cannot be achieved, then the horizontal or vertical curve would be identified as substandard.

Lower volume roads that have not been reconstructed, tend to closely follow (or avoid) the existing contours of the land. In southern Ontario, which is relatively flat, there was a greater tendency to follow the alignments of the original Township surveys. However, where these roads were adjacent to larger streams and rivers, there was still a tendency to follow the topography. The result was/is a road alignment that tends to change vertical and horizontal direction frequently; at times without much notice.



When a new road is designed, one of the considerations is the Safe Stopping Distance (SSD). The calculation of the distance to stop safely from any given speed is based upon several factors, such as posted speed limit, reaction times, and friction. When road sections are evaluated for a State of the Infrastructure report, the number of vertical and horizontal curves that appear to be deficient are identified. The identification is based on whether there is sufficient SSD for the posted speed limit. The following table is an excerpt from the Geometric Design Standards for Ontario Highways, and indicates the SSD's required for various design speeds.

Figure 3-1: Safe Stopping Distance

Speed <i>v</i>		Perception and Brake Reaction		Coefficient of friction wet pav't	Braking distance on level	S-Min. Stopping sight distance	
Design	Assumed condition	Time	Distance			calculated	rounded
km/h	km/h	s	m	<i>f</i>	m	m	m
40	40	2.5	28	0.380	17	45	45
50	50	2.5	35	0.358	27	62	65
60	60	2.5	42	0.337	42	84	85
70	70	2.5	49	0.323	60	109	110
80	79	2.5	55	0.312	79	134	135
90	87	2.5	60	0.304	98	158	160
100	95	2.5	66	0.296	120	186	185
110	102	2.5	71	0.290	141	212	215
120	109	2.5	76	0.283	165	241	245
130*	116	2.5	81	0.279	190	271	275
140*	122	2.5	85	0.277	211	296	300
150*	127	2.5	88	0.273	232	320	320
160*	131	2.5	91	0.269	251	342	345

**Design Speeds above 120 km/h are beyond the normal range of application*

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On rural roads, one of the effects of substandard alignments is a decrease in the Average Operating Speed through the road section. An Average Operating Speed that is significantly lower than the posted speed will result in a Geometric Need for the road section. The following table from the *Inventory Manual* identifies the limits that will trigger a geometric need for typical posted speed limits.

Table 3.7: Posted Speed vs. Minimum Tolerable Operating Speed

Item	Speed					
Legal Speed Limit	40	50	60	70	80	90
Minimum Tolerable Operating Speed	35	45	50	60	65	75

The following pictures were not taken in Township of Malahide, but provide examples of potentially substandard alignments.

Figure 3-2: Potentially Substandard Vertical and Horizontal Alignment



Photos not from Township of Malahide

Appendix H of this report includes a listing of potentially substandard vertical and horizontal alignment. These sections should be reviewed to ensure signage is compliant with the Ontario Traffic Manual(s)

3.4 Drainage

Adequate drainage is critical to the performance of a road to maximize the life expectancy. Roads are designed, constructed, and maintained in order to minimize the amount of water that may enter, or flow over, the road structure.

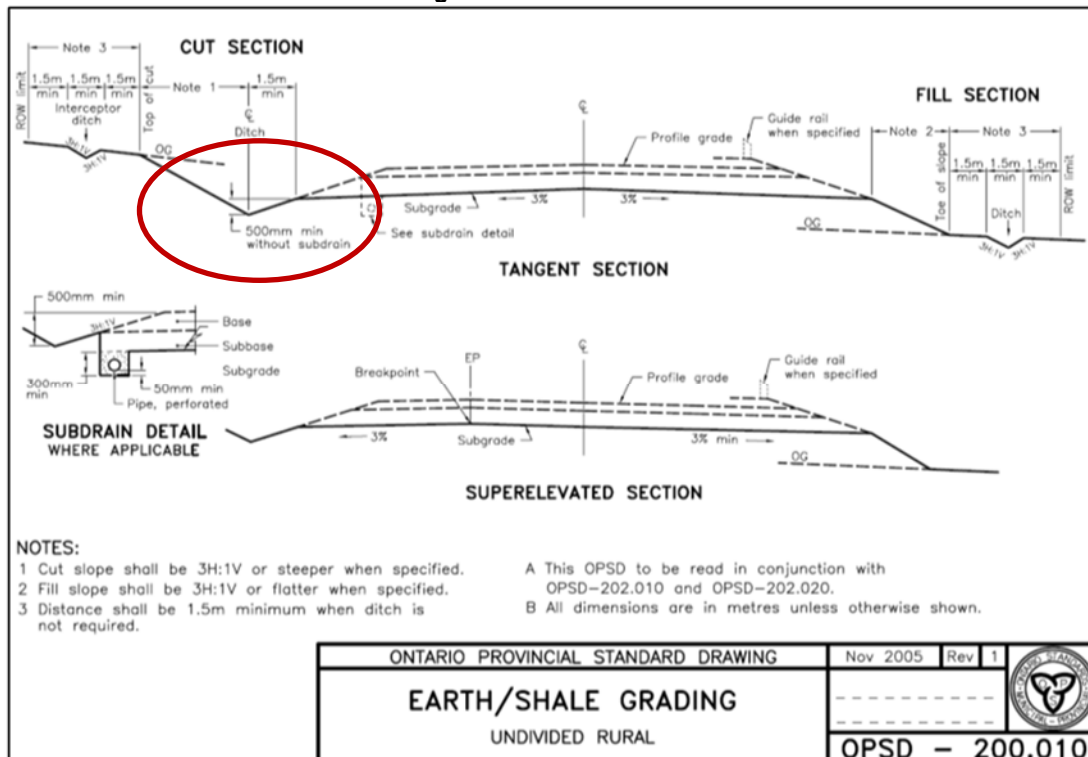
In the case of water flowing over the road, assessment must be made of the circumstances on a site-specific basis. Factors that should be considered include the traffic volumes of the road section, economic impacts to the loss of the use of the road, upgrade costs, and risks. In certain circumstances, water ponds or flows on the road by design, as part of the storm water management plan.

Water in a road base can cause different reactions at different times of the year. In non-freezing conditions, the granular road base can become saturated. Too much water displaces the granular material; it removes the material's ability to support the loads for which it was designed. Too much water in the granular material actually acts like a lubricant and facilitates the displacement of the material under load.

In freezing conditions, water in the road structure can cause frost heave, potholes, and pavement break-up as the water freezes and expands. Generally, a saturated granular road base results in structural failure of the road.

Figure 3-3 provides an example of a rural road, illustrating what the relationship between the gravel road base and the drainage should be. The relationship is the same in an urban system, although not as obvious. Rural road drainage is typically achieved through roadside ditches. Rural road ditches should be a minimum of 500 mm below the granular road base, to ensure that the road base remains free from moisture and maintains its ability to support loads.

Figure 3-3: OPSS 200.10



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Urban roads typically have a storm sewer pipe network that carries the minor storm event. The roadway itself is often part of the overland flow route for the major event. The drainage of the granular road base is accomplished through sub-drains installed below the curb and gutter, lower than the lowest elevation of the granular base. This satisfies the same purpose as the ditch in a rural cross-section, by providing an outlet to ensure that the granular base remains dry.

Evaluations of the drainage scores were in part predicated upon the structural score. For example, where a road section had virtually no ditch, or very minimal ditching but the road structure did not show any signs of failure typically observed when there is inadequate drainage, then generally a rating was between 12 and 14 and an 'SD- (Spot drainage) improvement noted. Where it was obvious that the inadequate ditch was exacerbating the distress on the road or there was occasional flooding, the score would be further reduced and the improvement type would be some type of major rehabilitation or reconstruction dependent upon the traffic volumes. Table 3.8 provides an overview of the drainage needs of the road system by Time of Need.

Table 3.8: Drainage by Time of Need

Roadside Environment	Time of Need				TOTAL	% OF TOTAL
	1 to 5	6 to 10	ADEQ	NOW		
Rural	0.100	79.660	165.655	1.420	246.835	94.08%
Semi Urban	0.080	8.740	5.170	0.000	13.990	5.33%
Urban	0.000	0.000	1.531	0.000	1.531	0.58%
TOTAL	0.180	88.400	172.356	1.420	262.356	
% OF TOTAL	0.00	33.69%	65.70%	0.54%		

Table 3.9: Drainage by Roadside Environment and Drainage Type

Drainage Type	Roadside Environment			TOTAL	% OF TOTAL
	Rural	Semi Urban	Urban		
AS - Adjacent Road, storm sewer	0	0.29	0	0.29	0.11%
DS - Ditch and Storm Sewer	5.62	10.14	0	15.76	6.01%
N - None	2.79	1.64	0	4.43	1.69%
OD - Open Ditch	238.425	1.92	0	240.345	91.61%
SS - Storm Sewer	0	0	1.531	1.531	0.58%
TOTAL	246.835	13.99	1.531	262.356	
% OF TOTAL	94.08%	5.33%	0.58%		

Maintenance of the drainage system(s) is critical to the long-term performance of a road system. Low volume rural roads tend to have a winter maintenance program that includes the application of sand to improve traction. Over time, that sand builds up on the edge of the pavement, to a point where it effectively blocks runoff from getting to the ditch. The runoff is trapped at the edge of pavement, where it saturates that area of the road bed, contributing to the early failure of the edge of the pavement. This element of the road cross-section is not scored as part of the overall evaluation.

Presence or absence of roadside berms is not evaluated during a road review. This is a maintenance issue, however, if roadside berms are not removed, the effect on the overall pavement is similar to not having a ditch. Water cannot drain from the road and it enters into the granular base potentially saturating it. The saturated base cannot support load.

Figure 3-4: Shoulder Berm



3.4.1 Drainage Outlet and Master Planning

Correcting drainage issues is not quite as simple as digging a ditch or installing a storm sewer. In Ontario, Common law for drainage is such that water cannot simply be collected and directed. It has to be directed to a legal, adequate outlet. There are two primary methodologies to achieve the legal outlet; a Class Environmental Assessment Process or a petition for a Municipal Drain under the Drainage Act. The 'adequate' component is an engineering function/assessment.

Drainage in the Springfield area is a mix of ditching, and storm sewers, with varying degrees of both throughout the community. Given that storm sewers are one of the core assets required to be included in the Asset Management Plan, and a number of the roads in Springfield will need to be resurfaced in the near future, it would be prudent to undertake a Master Drainage Plan for the area.

3.5 Boundary Roads

Boundary roads, are roads that a municipality would have in common with the abutting municipality. In order to manage the joint responsibilities, a Boundary Road Agreement that identifies the responsibilities of both agencies is created. The agreements are usually in writing; however, some are informal.

The Boundary Road Agreement should identify costs sharing and responsibility arrangements for maintenance or capital works on the road section. From a risk management perspective, the agreement reduces the risk for one of the parties in the event of a claim, depending upon the content of the agreement.

Boundary road reporting can be dealt with in one of two ways: the length can be split to provide a more accurate depiction of the road system that is actually maintained by the agency, or they may not be adjusted. When MTO was providing subsidy, the roads were adjusted for reporting and accounting purposes. For the purposes of this report adjustment has been made to the road system sizes to account for the 50% sharing of the length of the boundary roads.

When a boundary is reconstructed on a day labour basis by the adjacent municipalities, the project should be treated no differently than if the work were being tendered. The exposure to risk for the municipality is no different. Defining

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who is the 'contractor' is critical. The assignment of the various aspects of the work should be clear and the timing for completion of the tasks clearly identified and adhered to.

The Township of Malahide has 20.45 kilometres of boundary roads per Table 3.10.

Table 3.10: Boundary Roads

Adjacent Agency	Asset ID	Street Name	Roadside Environment			TOTAL
			Rural	Semi Urban	Urban	
Municipality of South-West Oxford	RPIG0005	PIGRAM LINE	0.18	0	0	0.18
Municipality of South-West Oxford	RPIG0010	PIGRAM LINE	0.81	0	0	0.81
Municipality of South-West Oxford	RPIG0020	PIGRAM LINE	1.44	0	0	1.44
Municipality of South-West Oxford	RPIG0030	PIGRAM LINE	0.95	0	0	0.95
Municipality of South-West Oxford	RPIG0035	PIGRAM LINE	0.55	0	0	0.55
Municipality of South-West Oxford	RPIG0040	PIGRAM LINE	1.31	0	0	1.31
Municipality of South-West Oxford	RPIG0050	PIGRAM LINE	1.36	0	0	1.36
Municipality of South-West Oxford	RPRE0030	PRESSEY LINE	1.8	0	0	1.8
Town of Aylmer	RBRO0020	BROOK LINE	0	0.16	0	0.16
Municipality of Bayham	RRIC0010	RICHMOND ROAD	1.69	0	0	1.69
Municipality of Bayham	RSPH0010	SPRINGER HILL ROAD	0.4	0	0	0.4
Municipality of Bayham	RSPH0020	SPRINGER HILL ROAD	0.75	0	0	0.75
Municipality of Bayham	RSPH0030	SPRINGER HILL ROAD	1.84	0	0	1.84
Municipality of Bayham	RSPH0040	SPRINGER HILL ROAD	2.06	0	0	2.06
Municipality of Bayham	RSPH0050	SPRINGER HILL ROAD	2.44	0	0	2.44
Municipality of Central Elgin	RRUS0010	RUSH CREEK LINE	0.7	0	0	0.7
Municipality of Central Elgin	RSPW0010	SPRINGWATER ROAD	2.01	0	0	2.01
TOTAL			20.29	0.16	0	20.45
						10.225

The status of the boundary road agreements should be reviewed.

4 Road System Condition

Regulation 588/17 requires that;

- '3. For each asset category,
 - i. a summary of the assets in the category,
 - ii. the replacement cost of the assets in the category,
 - iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets,
 - iv. the information available on the condition of the assets in the category, and
 - v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.

Regulation 588/17 also requires that;

- '2. The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.'

The Township of Malahide is updating condition and attribute information for the road system in preparation for the 2022 Asset Management Plan required by O.Reg 588/17. The road system was updated in 2008, 2015, 2018 (10% of the system), and in 2021 with this project. The review interval is less frequent that would be required to consistently meet the requirements of O.Reg 588/17.

The road section reviews follow the methodology of the Ministry of Transportation Inventory Manual for Municipal Roads, 1991. This ensures that pavement management decision making is based upon current data from field survey information and is completed in accordance with standard engineering practice. The Inventory Manual specifies that gravel roads be evaluated during the spring break-up period. The gravel road reviews were not conducted during the spring break up period

An Asset Management Plan for Core Assets is required by July 1, 2022, based on dated collected no more than 2 years prior to the development of the plan. The 2021 project satisfies the regulation's requirements.

4.1 Road System Condition by Time of Need

The Inventory Manual methodology results in overall rating of road sections by Time of Need (TON); NOW, 1 to 5, 6 to 10, or Adeq (Adequate). Table 4.1 provides a breakdown of the road system by time of Need and MMS Class.

Table 4.1: Roads System by Time of Need and MMS Class

Time of Need	O.Reg 239/02 Classification								TOTAL	
	3		4		5		6			
	CI km	Ln km	CI km	Ln km	CI km	Ln km	CI km	Ln km	CI km	Ln km
1 to 5	2.19	4.38	31.95	63.9	6.55	13.1	2.26	4.52	42.95	85.9
6 to 10	2.06	4.12	54.33	108.66	9.14	18.28	3.26	6.52	68.79	137.58
ADEQ	11.16	22.32	84.2	168.4	17.124	34.248	28.907	57.814	141.391	282.782
NOW	1.21	2.42	12.78	25.56	2.19	4.38	3.27	6.54	19.45	38.9
TOTAL	16.62	33.24	183.26	366.52	35.004	70.008	37.697	75.394	272.581	545.162
% OF TOTAL	6.10%	6.10%	67.23%	67.23%	12.84%	12.84%	13.83%	13.83%		
System Adequacy	92.7%	92.7%	93.0%	93.0%	93.7%	93.7%	91.3%	91.3%	92.9%	92.9%
Good to Very Good	79.5%	79.5%	75.6%	75.6%	75.0%	75.0%	85.3%	85.3%	77.1%	77.1%

Note: Includes all potential Time of Needs elements including Capacity, Drainage, Surface Width, Surface Type, Geometry and Structural Adequacy

4.2 Road System Adequacy

The system adequacy is a measure of the ratio of the 'NOW' needs to the total system, and includes needs from the six critical areas described earlier in the report. The overall TON is the most severe or earliest identified need. For example, a road section may appear to be in good condition, but is identified as a NOW need for capacity, indicating that it requires additional lanes. Similarly, it may be classified as a NOW need for drainage resultant from periodic flooding. Appendix A includes a more detailed description of the Inventory Manual methodology.

Equation 4-1: System Adequacy Calculation

$$\text{System Adequacy} = \frac{\text{Total System (km)} - \text{NOW Deficiencies (km)}}{\text{Total System (km)}} \times 100$$

Based on the current review of the road system, the current system adequacy measure is 92.9% meaning that, 92.9% of the road system is in fair to good to very good condition. The inverse would be that 7.1% of the system is in poor condition. The road system currently measures 273.851 CL-km (unadjusted for boundary roads), with 19.45 CL-km rated as deficient in the 'NOW' time period.

The *Inventory Manual* provides direction that roads with a traffic volume of less than 50 vehicles per day are deemed to be adequate, even if they have structural, geometric, or drainage deficiencies that would otherwise be identified as being in a Time of Need. This factor does have an effect of the System Adequacy measure. As such, the System Adequacy, as measured following the Inventory Manual methodology, may not be the public's perception of the system condition.

Originally, the intention was that the low volume roads were to be corrected within the maintenance allocation (as opposed to the capital allocation). Conditional grant funding no longer exists as it did until the mid 1990's.

To gain a more accurate reflection of the condition of the road network, the roads with an AADT of less than 50 have been analyzed and report as follows;

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- 10.15% (27.8 km) of the roads system has an actual or estimated count of less than 50 vehicles per day.
- 4.4% (12.04 km) would be "NOW" Needs if the '50' rule was not applied. .
- If the roads with an AADT of less than 50 roads were considered in the System Adequacy measure, then the system adequacy would be reduced by a further 4.4%.

One further caveat is that the gravel roads were not reviewed during the spring break-up period as specified by the Inventory Manual. Once spring grading and gravelling have been completed, soft spots and frost boils cannot be assessed.

The traditional target adequacy for upper-tier road systems (Regions and Counties) was 75%, while a lower-tier's target adequacy was 60%; a lower tier urban municipality was 70%. Based on these former MTO targets, which were in effect when the municipal grant system was in place, and the merge of the aforementioned system types, 4 Roads recommendation is that the target adequacy for Township of Malahide should be 60%, as a minimum. The minimum target adequacies were established by MTO, to reflect the nature and purpose of the road system.

The estimates provided in this report for standard improvements are in accordance with the formulae in the *Inventory Manual*, and utilize the unit costs as identified in Table 4.2. These costs include adjustment factors as per the *Inventory Manual*, such as Basic Construction, Terrain, Contingency Roadside Environment, and Engineering.

Table 4.2: Current Unit Costs

Item	Unit	2021 (BMC) Cost (\$)	Item	Unit	2021 (BMC) Cost (\$)
Excavation	m ³	9.50	Manholes	ea	3,800.00
Hot Mix Asphalt	t	100.00	Manhole removed	ea	200.00
Single Surface Treatment	m ²	2.85	Manholes-Adjust	ea	225.00
Granular A	t	18.00	Catch Basins	ea	1,650.00
Granular B	t	14.00	Catch-Basins- Removed	ea	120.00
Granular M (Maintenance Gravelling)	t	NA	Catch Basin Leads	linear m	210.00
Conc Base	m ³	NA	Catch Basins – Adjust	ea	140.00
Conc- Curb and Gutter-place	linear m	42.00	Asphalt Planing	m ²	0.90
Conc- Curb and Gutter-removal	linear m	15.00	Asphalt Pulverizing	m ²	0.501.45
Subdrains	linear m	21.50	Crack Sealing	lm	1.45
Storm Sewer-525mm	linear m	255.00	Slurry		3.50
Microsurfacing	m ²	3.50			

Based on the current unit costs being experienced, the estimated total cost of recommended improvements is **\$28,238,488**. The improvement costs include **\$3,812,479** for those roads identified as NOW needs and **\$24,426,009** is for road work required in the '1 to 10' year time period or for maintenance. Included in those amounts is **\$12,010,072** is for work on road sections that are adequate due to low traffic volume or are maintenance or preservation activities.

Tables 4.3 and 4.4 provide further detail on the needs.

4.3 Record of Assumptions –TON, Improvement and Replacement Costs

The methodology of this report is such that the Inventory Manual itself forms the basis of a large number of assumptions in terms of;

- Dimensional requirements for the development of improvement and replacement costs
- Structural requirements based on road classification
- Time of needs based on the ratings and subsequent calculations

Deterioration assumptions effect of treatments on the asset are included in Appendix C.

With respect to the urban or semi urban cross sections, where there were sewers it was generally assumed that the storm sewers were adequate. The resultant improvement type of those sections would then be RNS – Reconstruction Nominal Sewers. With respect to some semi urban sections the recommendations were also RNS as it appeared that the short length of a section could be adequately drained via curb and gutter to a storm sewer on an adjacent sewer.

Table 4.3: Improvement Costs by Improvement Type and Time of Need

Improvement Class	Improvement ID / Description		Time of Need											
			1 to 5		6 to 10		ADEQ		NOW		TOTAL		% OF TOTAL	
			Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km
Const	BS	Base and Surface	1,607,025	4.015	2,601,805	11.48	6,255,870	8.63	539,906	2.73	11,004,606	26.855	43.84%	10.24%
Const	BSgrav	Base and Surface Gravel	0	0	449,813	2.85	532,171	2.645	214,316	1.46	1,196,300	6.955	4.77%	2.65%
Const	NONE	No Improvement Required	0	0	0	2.04	0	91.381	0	0	0	93.421		35.61%
Const	REC	Reconstruction - Rural	82,164	0.19	727,189	2.07	1,105,834	3.29	969,329	2.81	2,884,516	8.36	11.49%	3.19%
Const	RNS	Reconstruction Nominal Storm Sewer	0	0	0	0	40,962	0.08	0	0	40,962	0.08	0.16%	0.03%
Const	RSS	Reconstruction with Storm Sewers	0	0	870,754	0.63	0	0	1,147,184	0.83	2,017,938	1.46	8.04%	0.56%
Maint	CRK	Crack Sealing	0	0	0	0	2,567	1.275	0	0	2,567	1.275	0.01%	0.49%
Maint	CRKsd	Crack sealing and Spot Drainage	0	0	1,204	0.28	516	0.12	0	0	1,720	0.4	0.01%	0.15%
Maint	GRR2sd	150mm of Granular A and Spot Drainage	0	0	0	0	130,006	2.78	0	0	130,006	2.78	0.52%	1.06%
Maint	GRR	75mm of Granular A	0	0	0	0	196,613	8.17	0	0	196,613	8.17	0.78%	3.11%
Maint	GRRsd	75mm of Granular A and Spot Drainage	0	0	69,322	2.82	0	0	0	0	69,322	2.82	0.28%	1.07%
Maint	RSpL	Reduce Speed Limit	0	0	0	0	0	0	1,000	2.77	1,000	2.77	0.00%	1.06%
Maint	SD	Spot Drainage	0	0	36,993	12.98	15,162	5.32	0	0	52,155	18.3	0.21%	6.98%
Rehab	DSTrehab2	DST w 150mm Gran A	1,159,595	9.4	0	0	0	0	482,893	2.725	1,642,488	12.125	6.54%	4.62%
Rehab	DSTrehab	DST w 75mm Gran A	1,850,922	23.935	624,257	7.7	208,408	2.78	307,715	4.11	2,991,302	38.525	11.92%	14.68%
Rehab	PR2	Pulverize and Resurface 2 - 100mm	481,433	1.29	0	0	0	0	0	0	481,433	1.29	1.92%	0.49%
Rehab	R1	Basic Resurfacing 1 - 50mm	0	0	242,464	1.89	12,811	0.11	0	0	255,275	2	1.02%	0.76%
Rehab	R2	Basic Resurfacing 2 - 100mm	384,226	1.54	0	0	0	0	0	0	384,226	1.54	1.53%	0.59%
Rehab	SST	Single Surface Treatment	0	0	0	0	476,407	15.22	0	0	476,407	15.22	1.90%	5.80%
Rehab	SSTedge	Single Surface Treatment with Edge padding	0	0	242,951	7.77	66,128	2.05	16,905	0.72	325,984	10.54	1.30%	4.02%
Rehab	SSTrehab	Surface Treatment, Base repair, Ditching, berm removal	0	0	946,696	7.47	0	0	0	0	946,696	7.47	3.77%	2.85%
TOTAL			5,565,365	40.37	6,813,448	59.98	9,043,455	143.851	3,679,248	18.155	25,101,516	262.356		
% OF TOTAL			22.17%	15.39%	27.14%	22.86%	36.03%	54.83%	14.66%	6.92%				

Table 4.4: Improvement Needs by Roadside Environment

Improvement Class	Improvement ID / Description		Roadside Environment						TOTAL		% OF TOTAL		Cost /km \$	
			Rural		Semi Urban		Urban		Imp. Cost	CI-km	Imp. Cost	CI-km		
			Imp. Cost	CI-km	Imp. Cost	CI-km	Imp. Cost	CI-km						
Const	BS	Base and Surface	10,257,566	24.505	747,039	2.35	0	0	11,004,606	26.855	43.84%	10.24%	409,779	
Const	BSgrav	Base and Surface Gravel	1,196,300	6.955	0	0	0	0	1,196,300	6.955	4.77%	2.65%	172,006	
Const	NONE	No Improvement Required	0	89.27	0	2.94	0	1.21	0	93.421		35.61%	-	
Const	REC	Reconstruction - Rural	2,689,918	7.91	194,598	0.45	0	0	2,884,516	8.36	11.49%	3.19%	345,038	
Const	RNS	Reconstruction Nominal Storm Sewer	0	0	40,962	0.08	0	0	40,962	0.08	0.16%	0.03%	512,025	
Const	RSS	Reconstruction with Storm Sewers	0	0	2,017,938	1.46	0	0	2,017,938	1.46	8.04%	0.56%	1,382,149	
Maint	CRK	Crack Sealing	1,436	0.495	1,131	0.78	0	0	2,567	1.275	0.01%	0.49%	2,013	
Maint	CRKsd	Crack sealing and Spot Drainage	0	0	1,720	0.4	0	0	1,720	0.4	0.01%	0.15%	4,300	
Maint	GRR2sd	150mm of Granular A and Spot Drainage	130,006	2.78	0	0	0	0	130,006	2.78	0.52%	1.06%	46,765	
Maint	GRR	75mm of Granular A	196,613	8.17	0	0	0	0	196,613	8.17	0.78%	3.11%	24,065	
Maint	GRRsd	75mm of Granular A and Spot Drainage	69,322	2.82	0	0	0	0	69,322	2.82	0.28%	1.07%	24,582	
Maint	RSpL	Reduce Speed Limit	1,000	2.77	0	0	0	0	1,000	2.77	0.00%	1.06%	361	
Maint	SD	Spot Drainage	44,460	15.6	7,695	2.7	0	0	52,155	18.3	0.21%	6.98%	2,850	
Rehab	DSTrehab2	DST w 150mm Gran A	1,624,198	11.905	18,290	0.22	0	0	1,642,488	12.125	6.54%	4.62%	135,463	
Rehab	DSTrehab	DST w 75mm Gran A	2,991,302	38.525	0	0	0	0	2,991,302	38.525	11.92%	14.68%	77,646	
Rehab	PR2	Pulverize and Resurface 2 - 100mm	481,433	1.29	0	0	0	0	481,433	1.29	1.92%	0.49%	373,204	
Rehab	R1	Basic Resurfacing 1 - 50mm	139,546	1.03	115,729	0.97	0	0	255,275	2	1.02%	0.76%	127,638	
Rehab	R2	Basic Resurfacing 2 - 100mm	0	0	274,445	1.22	109,781	0.32	384,226	1.54	1.53%	0.59%	249,497	
Rehab	SST	Single Surface Treatment	476,407	15.22	0	0	0	0	476,407	15.22	1.90%	5.80%	31,301	
Rehab	SSTedge	Single Surface Treatment with Edge padding	313,094	10.12	12,890	0.42	0	0	325,984	10.54	1.30%	4.02%	30,928	
Rehab	SSTrehab	Surface Treatment, Base repair, Ditching, berm removal	946,696	7.47	0	0	0	0	946,696	7.47	3.77%	2.85%	126,733	
TOTAL			21,559,297	246.835	3,432,438	13.99	109,781	1.53	25,101,516	262.356				
% OF TOTAL			85.89%	94.08%	13.67%	5.33%	0.44%	0.58%						

4.4 System Needs – Surface Widths

As noted in section 2.3.5, there is a common misconception that there are no standards for Class 6 roads. To be clear, the inspection and response standards do not apply to Class 6 roads, however, there are still minimum geometric requirements.

Minimum tolerable standards for surface and platform width are predicated by traffic count. The Inventory Manual provides guidance for both minimum tolerable standards and desirable standards. Figure 4-1 is excerpted from the Inventory Manual, and identifies Minimum Tolerable Standards for all classes of roads. For rural and semi urban sections, there is an additional 1m of platform required in addition to the surface width to accommodate the Minimum Tolerable Shoulder Width of 0.5m, which applies to all classes.

Figure 4-1: Inventory Manual Item 93 - Surface Width

#* ITEM 93 SURFACE WIDTH

RURAL

Under Existing Conditions the Surface Width (Item 37) is transcribed by the computer. The Minimum Tolerable Standard for the existing Road Class (Item 33) is then derived using Table 93R.

TABLE 93R - MINIMUM TOLERABLE SURFACE WIDTH - RURAL (metres)

	EXISTING CLASS									
	100	200	300	400	500	600	700	800	4LN	EXP
ROADWAY WIDTH	5.0	5.5	5.5	6.0	6.0	6.0	6.5	6.5	13.0	3.5/lane

SEMI-URBAN and URBAN

Under Existing Conditions the Surface Width (Item 37) is transcribed by the computer. The Minimum Tolerable Standard for the existing Road Class (Item 33), the Number of Lanes (Item 34) and the Traffic Operation (Item 53) is then derived using Table 93SU.

TABLE 93SU - MINIMUM TOLERABLE SURFACE WIDTH - SEMI-URBAN and URBAN (metres)

FUNCTIONAL CLASSIFICATION	SEMI-URBAN		URBAN	
	2 Way (2W,2M)	1 Way (1W,1M)	2 Way (2W,2M)	1 Way (1W,1M)
2-lane Local Comm. & Ind.	5.5	5.5	6.0	6.0
2-lane Collector Residential	5.5	5.5	6.0	6.0
2-lane Collector Comm. & Ind.	6.0	6.0	6.5	6.5
2-lane Arterial	6.0	6.0	6.5	6.5
3-lane Local Comm. & Ind.	9.0	8.7	9.0	8.7
3-lane Collector Residential	9.0	8.7	9.0	8.7
3-lane Collector Comm. & Ind.	9.0	8.7	9.0	8.7
3-lane Arterial	9.0	9.0	9.5	9.5
4-lane Collector Residential	11.0	11.0	11.5	11.5
4-lane Collector Comm. & Ind.	12.0	12.0	12.5	12.5
4-lane Arterial	12.0	12.0	12.5	12.5
5-lane Arterial	15.0	15.0	15.5	15.5
6-lane Arterial	18.0	18.0	18.5	18.5
7-lane Arterial	21.5	21.5	22.0	22.0
8-lane Arterial	24.5	24.5	25.0	25.0
9-lane Arterial	27.5	27.5	28.0	28.0
Expressway	—	—	3.5/ln	3.5/ln

This report identifies a number of road sections with substandard surface width summarized in Table 4.5.

Table 4.5: Narrow Road Summary

Time of Need	Roadside Environment			TOTAL	% OF TOTAL
	Rural	Semi Urban	Urban		
ADEQ	237.265	13.29	1.531	252.086	237.265
NOW	9.57	0.7		10.27	9.57
TOTAL	246.835	13.99	1.531	262.356	246.835
% OF TOTAL	237.265	13.29	1.531	252.086	237.265

A detailed listing of the narrow roads is included in Appendix I.

When the roads are reconstructed or rehabilitated, they should be improved to meet the minimum tolerable standards. Improvements on all the sections may take years to occur. As an interim measure, these sections should have advisory signage placed for 'Narrow Road'.

5 Replacement Cost Valuation

Program funding recommendations are a function of the dimensional information, surface type, roadside environment, and functional class of the individual assets. Recommended funding for the road system should include sufficient capital expenditures that would allow for the replacement of infrastructure as the end of design life is approached, in addition to sufficient funding for maintenance, to ensure that that full life expectancy may be realized.

Budgetary recommendations in this report do not include items related to development and growth or roads under another road authority's jurisdiction. The Township should consider those items as additional to the recommendations in this report. Generally, that type of improvement or expansion to the system would be funded from a different source, such as Development Charges.

The budget recommendations bear a direct relationship to the value of the road system. 4 Roads estimates the cost to replace the road system, to the current standard, at **\$130,684,700**. This estimate is based on the municipality's unit costs using the standardized formulae in the Inventory Manual. The current estimated value of the road system is \$104,903,500.

Unit costs should be reviewed and adjusted annually. Unit cost changes impact funding requirements directly.

Table 5.1: Replacement Cost by Functional Classification (Inventory Manual)

Functional Classification	Lanes	Roadside Environment						TOTAL		% OF TOTAL		Cost /km (\$)
		Rural		Semi Urban		Urban		Repl. Cost	CI-km	Repl. Cost	CI-km	
		Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km					
100	2	10,583,589	27.39	0	0	0	0	10,583,589	27.39	8.10%	10.05%	386,403
200	2	35,650,090	87.42	0	0	0	0	35,650,090	87.42	27.28%	32.07%	407,802
300	2	34,600,297	75.02	0	0	0	0	34,600,297	75.02	26.48%	27.52%	461,214
400	2	28,379,114	46.76	0	0	0	0	28,379,114	46.76	21.72%	17.15%	606,910
500	2	12777546	20.39	0	0	0	0	12,777,546	20.39	9.78%	7.48%	626,657
C/R	2	0	0	102,272	0.17	0	0	102,272	0.17	0.08%	0.06%	601,600
CCI	2	0	0	108,752	0.12	0	0	108,752	0.12	0.08%	0.04%	906,267
L/R	2	0	0	6,295,003	13.78	2,188,046	1.531	8,483,049	15.311	6.49%	5.62%	554,049
TOTAL		121,990,636	256.98	6,506,027	14.07	2,188,046	1.531	130,684,709	272.581			
% OF TOTAL		93.35%	94.28%	4.98%	5.16%	1.67%	0.56%					

Table 5.2: Replacement Cost by Performance Model Asset Class

Asset Class for Performance Modelling	Roadside Environment						TOTAL		% OF TOTAL		Cost / km (\$)
	Rural		Semi Urban		Urban		Repl. Cost	CI-km	Repl. Cost	CI-km	
	Repl. Cost	CI-km	Repl. Cost	CI-km	Repl. Cost	CI-km					
GST1-R	21,624,025	55.71	0	0	0	0	21,624,025	55.71	16.55%	20.44%	388,153
GST1-S	0	0	38,920	0.09	0	0	38,920	0.09	0.03%	0.03%	432,444
HCB3-S	0	0	251,716	0.42	0	0	251,716	0.42	0.19%	0.15%	599,324
HCB4-R	666,262	1.15	0	0	0	0	666,262	1.15	0.51%	0.42%	579,358
HCB4-S	0	0	3,763,010	8.35	0	0	3,763,010	8.35	2.88%	3.06%	450,660
HCB4-U	0	0	0	0	2,188,046	1.531	2,188,046	1.531	1.67%	0.56%	1,429,161
LCB1-R	99,700,349	200.12	0	0	0	0	99,700,349	200.12	76.29%	73.42%	498,203
LCB1-S	0	0	2,452,381	5.21	0	0	2,452,381	5.21	1.88%	1.91%	470,707
TOTAL	121,990,636	256.98	6,506,027	14.07	2,188,046	1.531	130,684,709	272.581			
% OF TOTAL	93.35%	94.28%	4.98%	5.16%	1.67%	0.56%					



6 Asset Condition Assessment and Plan Updates

6.1 Condition Assessment Cycle Recommendation

Regulation 588/17 requires that condition information be current within 2 years of the preparation of the Asset Management Plan for core assets required for July 1, 2022.

This project would make the municipality compliant for the condition of the road system with respect to the preparation of an Asset Management Plan for 2022.

The Township's road system review interval should be reviewed to remain compliant with O.Reg 588/17. A two year interval is recommended.

The current condition rating for the asset meets the requirements of O.Reg 588/17; the program development is based upon data that is *'based on data from at most the two calendar years prior to the year.'*

7 Level of Service (LOS)

As noted in Section 4 of this report, road system condition and Level of Service (LOS) measures are inextricably linked, and for that reason, some of the measures are shown in both areas of this report. For roads, as with most assets, a single measure for condition or level of service may not provide a complete or accurate view of the performance of an asset group.

Level of Service has a different meaning for different interests. For instance, the cost per unit may not have an impact to a ratepayer whose chief concern may be actual service delivery itself. Similarly, cost or expenditure per unit may not illustrate the condition of the asset to the end user.

Regulatory compliance with Regulation 239/02 may also be considered a level of service. The regulation provides for correction/resolution to identified defects with specified time periods dependent upon posted speed limit and traffic count.

4 Roads believes that multiple service measures may be required to adequately relate the condition of an asset to the various user groups; condition, operating costs, and end user. The following sections identify various measurements of service of the road system.

Regulation 588/17, Asset Management Planning for Municipal Infrastructure, requires that hard topped surfaces be rated using a Pavement Condition Index (PCI). The regulation is non-specific as to the PCI methodology. Table 4 from the regulation is shown below.

Table 7.1: Regulation 588/17, Table 4

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.
Quality	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).

From **ASTM 6433**, Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys;

2.1.4 pavement condition index (PCI)—a numerical rating of the pavement condition that ranges from 0 to 100 with 0 being the worst possible condition and 100 being the best possible condition.

4.1 The PCI is a numerical indicator that rates the surface condition of the pavement. The PCI provides a measure of the present condition of the pavement based on the distress observed on the surface of the pavement, which also indicates the structural integrity and surface operational condition (localized roughness and safety). The PCI cannot measure structural capacity nor does it provide direct measurement of skid resistance or roughness. It provides an objective and rational basis for determining maintenance and repair needs and priorities. Continuous monitoring of the PCI is used to establish the rate of pavement deterioration, which permits early identification of major rehabilitation needs. The PCI provides feedback on pavement performance for validation or improvement of current pavement design and maintenance procedures.

There is also a significant difference in the weighting of ride in the PCI measure. In some of the MTO methodologies it is significantly weighted whereas, for example, in ASTM 6433, ride is rated indirectly on four of nineteen distresses. In the Inventory Manual methodology, 'ride' (Surface Condition) is not a trigger for any improvement or time of need. Further, there is not necessarily a relationship between ride and distress.

In WorkTech, Physical Condition is the Structural Adequacy multiplied by 5 to produce a score from 5 to 100; effectively a PCI by definition.

There a number of PCI methodologies in use in Ontario.

The different methodologies can produce a different 'PCI' for the same section of road. As such, it is critical for an agency to understand the methodology used, and trigger points for treatments. There is further explanation of this concept in Appendix C of this report.

A PCI is one type of measure for level of service.

7.1 Current Level of Service Measurement

7.1.1 System Adequacy

System Adequacy was discussed earlier in the report as a measure of the condition of the road system. It also represents a level of service measure. The current system adequacy is 92.9% indicating that 92.9% of the system is in fair to good to excellent condition. The inverse is that 7.1% of the road system is in poor condition.

As noted earlier in the report, using the Inventory Manual methodology, roads with an AADT of less than 50 are deemed adequate. If this factor were disregarded then the System Adequacy would be 88.3%.

- The System Adequacy is above the target established by the Ministry of Transportation when condition road funding was provided to municipalities. The Township is a lower tier rural and small urban municipality. 4 Roads is recommending a target system adequacy of 60.
- Gravel roads were not reviewed during the spring break-up period.

All Level of Service / Condition measures consider that the 2021 program was completed.

The above comments would be applicable to all Level of Service condition measures.

7.1.2 Physical Condition

The Physical Condition is an alternate method of describing the condition of a road section or the average condition of the road system. By the ASTM definition, it is a Pavement Condition Index (PCI). The value is the structural adequacy converted to be expressed as a value out of 100, instead of 20. This methodology lends itself to modeling and comparators that may be more easily understood. There isn't a 1:1 relationship between the weighted average physical condition and the system adequacy.

The Weighted Average Physical Condition of the road system is currently 70.71.

4 Roads' recommendation is that the weighted average Physical Condition be at 70 or above.

7.1.3 Good to Very Good Roads

It has been assumed that the 6-10 and adequate roads are good to very good and this has been expressed as a percentage of the system. Good to Very Good roads represent 67.9% of the road system based on CL-km and the Structural Adequacy measure.

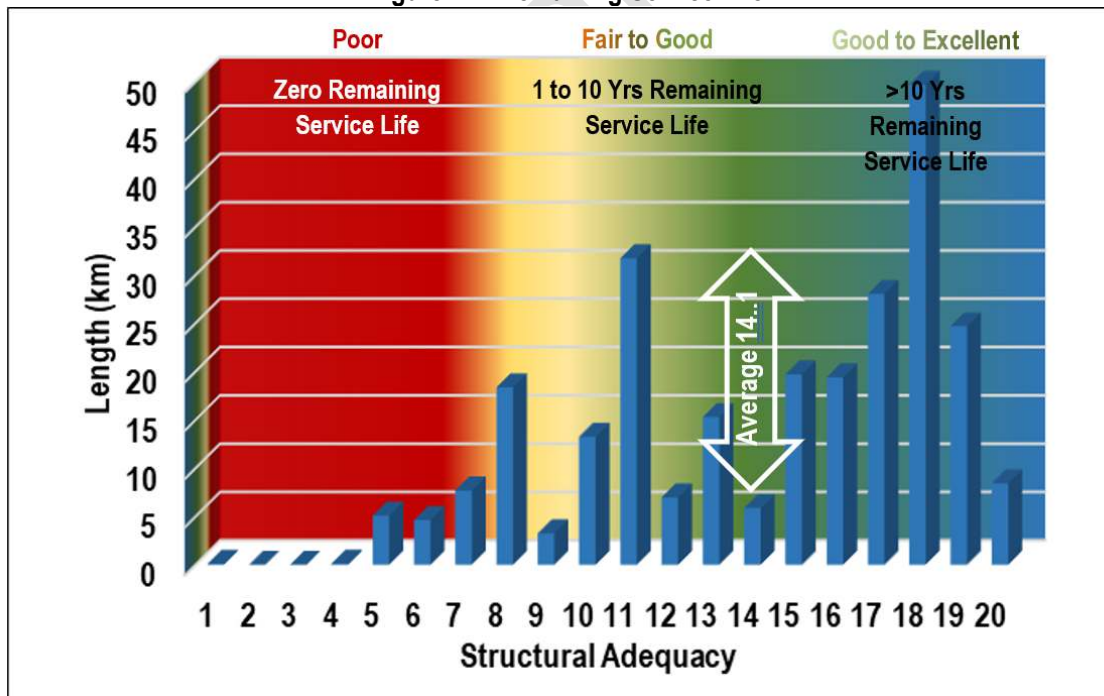
4 Roads recommendation is that Good to Very Good roads be at 60% or higher.

7.1.4 Estimated Remaining Service Life

As indicated previously, the Time of Need is really a prediction model in terms of an estimate based on current condition to the time for reconstruction. The TON then also provides an estimate of the remaining life in the road system/section. The following figure summarizes the structural adequacy ratings of the road system and illustrates the estimated remaining service life of the road system.

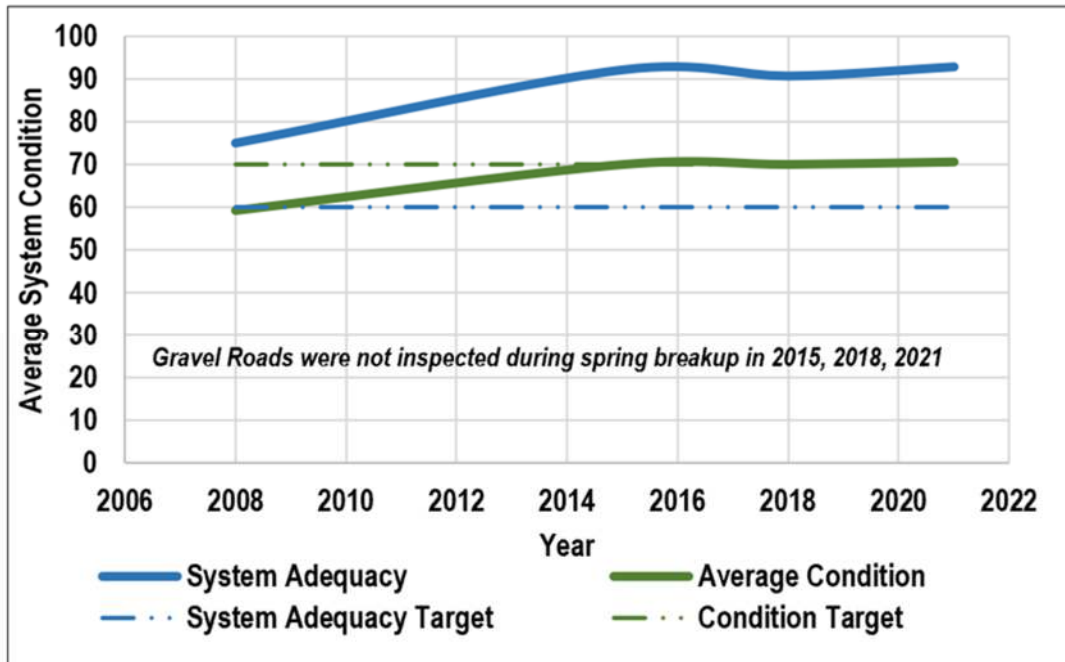
Based on the current weighted average physical condition, the entire system would have approximately 14 years until it reached the poor designation, if no further expenditures were made.

Figure 7-1: Remaining Service Life



Note: Physical Condition is Structural Adequacy multiplied by 5; Average is 70.7; recommended 70 or greater

Figure 7-2: Level of Service Measures over Time



7.1.5 Capacity

The *Inventory Manual* methodology includes a calculation to determine if there is potential for a capacity problem on road assets. The calculation is based on a number of data fields in the database including but not limited to AADT, pavement width, shoulder width, terrain, and the number of entrances.

The Township of Malahide Township does not appear to have any potential capacity issues.

Item 94 in the *Inventory Manual* addresses the capacity calculation and guidance for developing an appropriate recommendation.

7.1.6 Regulation 588/17 Level of Service Measures

Regulation 588/17 came into effect December 27, 2017, and provides different service measures dependent upon asset type.

Table 7.2: Regulation 588/17 Level of Service Measures for Roads

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)	Level of Services Measure for Roads	
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality. 395.05 sq. km	Arterial Roads = Collector Roads = Local Roads =	0% 101.2% 36.8%
	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).	Weighted Average Overall road condition is Weighted average paved road condition is Weighted average gravel road condition is	70.7 74.5 56.0

8 Asset Management Strategy

8.1 Asset Management Definition

Asset management has almost as many definitions as there are agencies that manage assets.

In 1999, the Transportation Association of Canada adopted a definition prepared by the U.S. Department of Transportation

‘Asset Management is a framework for making cost effective resource allocation, programming and management decisions. It combines engineering principles with sound business practices and economic theory, and provides tools to facilitate a more organized, logical and comprehensive approach to decision making.’

This definition may be applied to any asset.

Regardless of the source of the definition, the key themes that keep being repeated are;

- Managing
- Strategic
- Effective
- Efficient
- \$\$\$\$!!
- Service
- Optimizing asset life cycle
- Risk Management

8.1.1 Asset Management and PSAB

Asset Management and PSAB both address tangible capital assets – but from completely different perspectives.

From a very simplistic perspective, PSAB 3150 establishes standards on how to account for and report tangible capital assets in government financial statements. It deals with the historic costs and amortization. Financial reporting is a requirement of the Municipal Act, 2001

Asset management deals with the same assets but from a current and future planning perspective. Asset management is a requirement of O.Reg 588/17 Asset Management Planning for Municipal Infrastructure, made under the Infrastructure for Jobs and Prosperity Act, 2015.

8.2 Asset Management Systems

Asset Management software alone is not an asset management system.

ISO is the International Organization for Standardization. The following excerpt is from ISO 55001;

‘An asset management system is a set of interrelated and interacting elements of an organization, whose function is to establish the asset management policy and asset management objectives, and the processes, needed to achieve those objectives. In this context, the elements of the asset management system should be viewed as a set of tools, including policies, plans, business processes and information systems which are integrated to give assurance that the asset management activities will be delivered.’

An agency managing assets has to have 'rules of engagement' to ensure the asset management system functions as intended and there is a reproducibility of results.

The level of granularity of the rules begins with issues as simple as what constitutes a valid entry code for a data field, how assets are created and defined or how the unit costs are developed. Is it defensible and repeatable?

ISO 55000, 55001, and 55002 are all asset management related and speak in detail to asset management and asset management systems.

8.3 Asset Management Goal

As an absolute minimum, the objective of any asset management plan, or strategy, should be to ensure that the overall condition of an asset group does not diminish over time. This objective is also a requirement of Regulation 588/17 for the asset management plans that are due July 1, 2022.

The asset management strategy of an agency is heavily predicated, and inextricably linked to the available funding. Funding has to be adequate to sustain the asset group. For most municipalities this is a significant challenge.

8.3.1 Asset Management Plan (AMP) and O.Reg 588/17

On December 27, 2017, the Province of Ontario filed Regulation 588/17, Asset Management Planning for Municipal Infrastructure. The regulation provides the province's requirements for scope and content for a municipal asset management plan. Regulatory Compliance is required for a successful application for a conditional grant for municipal infrastructure projects.

Table 8.1: Municipal Asset Management Plan Implementation Schedule (from MOI later dated May 31, 2019)

Date	Milestone
July 1, 2019	Date for municipalities to have a finalized strategic asset management policy that promotes best practices and links asset management planning with budgeting, operations, maintenance and other municipal planning activities.
July 1, 2021	Date for municipalities to have an approved asset management plan for core assets (roads, bridges and culverts, water, wastewater and stormwater management systems) that identifies current levels of service and the cost of maintaining those levels of service.
July 1, 2023	Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that identifies current levels of service and the cost of maintaining those levels of service.
July 1, 2024	Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that builds upon the requirements set out in 2023. This includes an identification of proposed levels of service, what activities will be required to meet proposed levels of service, and a strategy to fund these activities.

The Milestone date for the Asset Management Plan for Core Assets was subsequently revised to be July 1, 2022

The regulation is a complex document and should be reviewed in detail by municipalities as soon as possible.

Although the timelines appear to be reasonable, once the requirements for content of the Strategic Asset Management Policy are reviewed, it will be obvious that there should be significant understanding of the asset groups at the time of preparation of the policy as there are potentially significant budget implications, particularly if the asset groups are not at a reasonable average condition currently and/or are underfunded.

Section 11.8.1 includes further discussion on the Regulatory requirements with respect to work plan development.

8.3.2 AMP Funding Level Development

The development of an appropriate asset management plan, may be a daunting task for municipalities. An AMP for the primary assets is a requirement of O.Reg 588/17.

The AMP development will be particularly daunting.

To be clear, the current budget does not define or limit the AMP. The funding level is driven by the assets, their condition and lifecycle costs and required lifecycle activities – not the current budget. The budget should be determined by the requirements of the lifecycle activities of the assets.

AMP's that are developed to match current budgets- if underfunded- will result in failure and non compliance with O.Reg 588/17.

Section 11 of this report provides recommendations for funding levels for long term sustainability and programs.

Most agencies are not fully funded, and a large number are not even funded sufficiently as to maintain the current condition of their system. In those circumstances, the strategy should be twofold

- Focus should be on a pavement management strategy that utilizes available funding on preservation and resurfacing programs as a priority. Reconstruction and replacement candidates will remain reconstruction and replacement candidates and cost increases will be incremental with inflation. Preservation and resurfacing opportunities that are missed will escalate in cost by several hundred percent depending on site specifics.
- Develop the financial plan in order that there is sufficient funding to maintain the condition of the road system through prioritizing preservation and rehabilitation treatments.

The current funding level for Township of Malahide appears to be sufficient to sustain the system over the short term.

The caveat being that the model assumes the that the recommended program will be adhered to and deterioration will be as predicted. Further, there will be some road sections in poor condition that will not be addressed in the program.

8.4 Priority Rating vs. Condition Rating

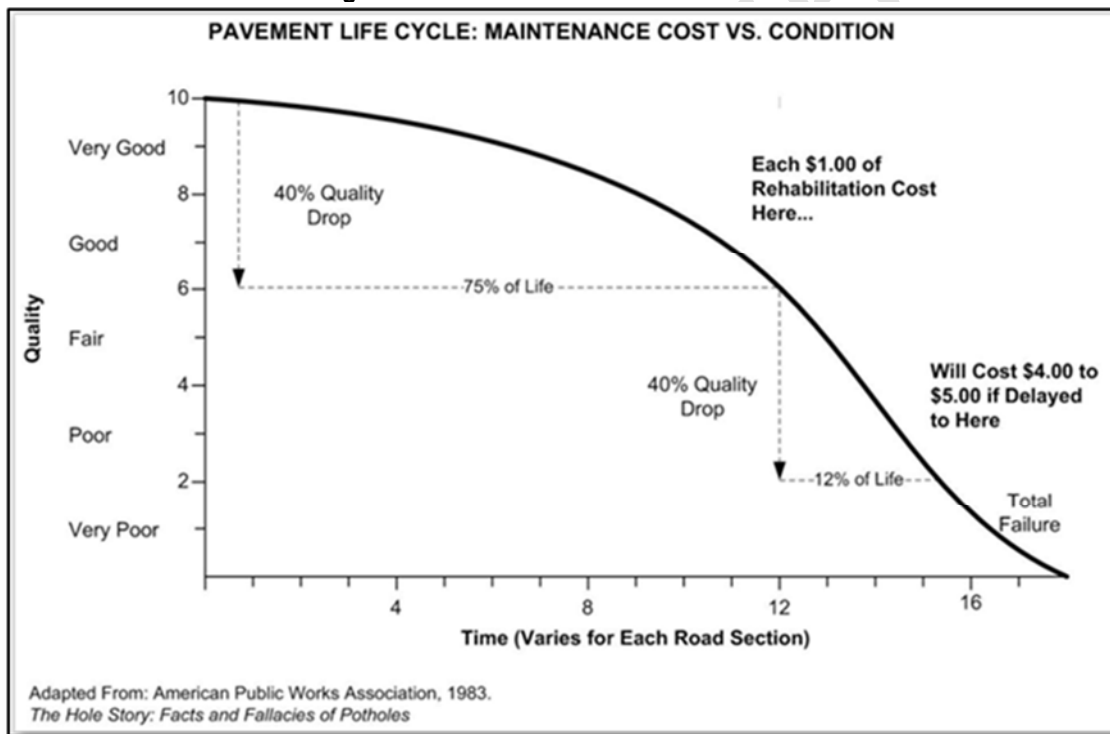
Information in a database may be sorted and analyzed in numerous ways. Understanding what the information in a data field represents, is key to the analysis. The Inventory Manual has many rated and calculated data fields and thus provides for many ways to sort data. Some commonly used representations, or sorting of information, from the database include:

- Priority Rating
- Priority Guide Number
- Structural Adequacy (Condition)

Priority Rating is a calculated field in the Inventory Manual, and is a function of the traffic count and the overall condition rating of the road section. This approach adds weight to the traffic count of the section; a higher volume road in poorer condition will have a higher priority number. Although the word 'priority' is included in the field name, a road section that has a higher calculated 'Priority Rating' is not necessarily a higher priority in the broader sense of asset management.

Similarly, a municipality may choose to sort the road sections based on condition and cost per vehicle. The Priority Guide Number data field would assist in providing that analysis, as sorting on that parameter would prioritize road sections that have higher traffic and thus a lower cost per vehicle.

Figure 8-1: Treatment Cost vs. Deterioration



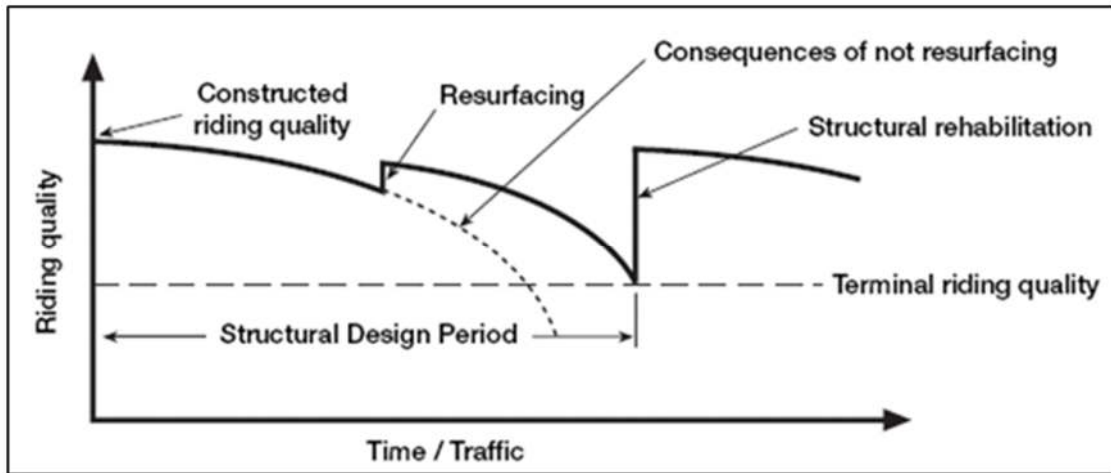
Developing a road capital program around the Priority Rating or Priority Guide Number fields will result in programming that would lead to a less efficient expenditure of funds and reduced system performance per budget dollar, as road sections with high traffic and in poor condition would be selected first, as opposed to selecting the best rehabilitation candidates at the appropriate time in their life cycles. The exception to this statement would be cases where rehabilitation funding is at a high enough level to ensure that the preservation program requirements can be met.

To paraphrase Regulation 588/17, program development is to be based on selecting the lowest cost lifecycle activities that will maintain the condition of the system over a 10 year period.

From a more current asset management perspective, project selection should be predicated by condition (Structural Adequacy, PCI or PQI) depending on agency. Figure 8-2 clearly illustrates the financial advantages of managing the road system by performing the right treatment at the right time of the asset life cycle. If appropriate strategies are not undertaken at the correct time, available funding usage is less effective.

Ideally, if a road is constructed and maintained with timely appropriate maintenance and resurfacing, the road system will reach a point where the majority of the activities will be preservation and resurfacing. Figure 8-2 clearly illustrates the effect the life span of a pavement by applying the correct treatment at the correction time in the life cycle.

Figure 8-2: Pavement Management- The Right Treatment at the Right Time



Source: Wirtgen Cold Recycling Manual

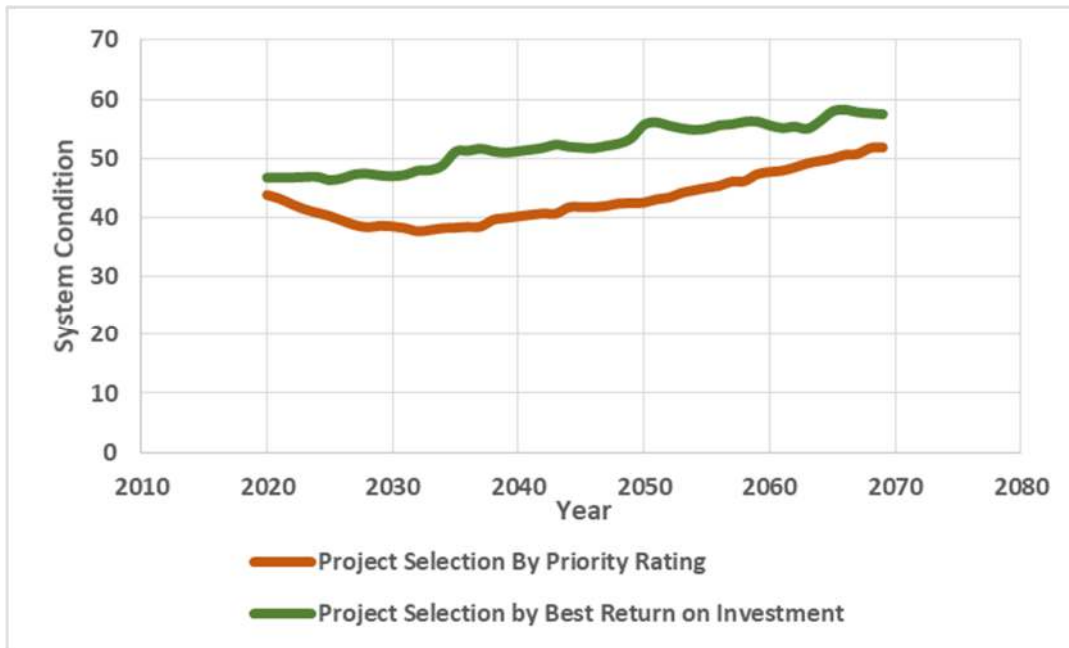
If an agency's budget is fully funded, the programming will include reconstruction, resurfacing, and preservation programs. Prioritization within the different programs will vary as demands are different. However, within the resurfacing and preservation programs, the pavement condition should drive the decision making.

Figure 8-3 illustrates the difference in system performance over time where best Return on Investment drives the project selection rather than worst first. The model is not for the Township of Malahide system; however, it illustrates the point. When available funding is limited, treatment / project selection is critical. Prioritizing worst first projects will result in a considerably poorer performance of the road system over time.

The green line is system performance based on a best return on investment project selection and the orange line is the system performance based on the priority number. (The priority number is a function of condition and traffic – a poor condition road with high traffic would generate a higher priority number.) The differences in performance are more dramatic when annual budgets are minimal.

Where funding is limited, resurfacing and preservation programs should be prioritized over the construction program. The effect of this approach will be that 'NOW' need roads will remain 'NOW' needs. However, by virtue of their 'NOW' need condition, 'NOW' need roads will require increased maintenance and likely generate increased complaints from the driving public. To deal with this eventuality, a municipality should create a **'maintenance paving budget'**, over and above the resurfacing budget. The purpose of this budget is to defer the reconstruction needs and reduce maintenance efforts and complaints until the road can be reconstructed.

Figure 8-3: System Performance –Worst First (Priority #) vs Best ROI



Note: Example not from the Township of Malahide road system data

8.5 Optimal Programming and Network Condition

Section 7.1.2 of this report provides information on the current weighted average physical condition of the road system. Figure 8-4 from the Transportation Association of Canada's Pavement Asset Design and Management Guide provides a visual representation of various measures of road network and individual section performance.

4 Roads has recommended that the weighted average Physical Condition of the Network be a minimum of 70. Figure 8-4 supports that recommendation based on the following analysis. Using the Inventory Manual methodology, the trigger for pavement rehabilitation is a Structural Adequacy of 14, which is a Physical Condition of 70. From the graph, the average network condition should be higher than the trigger value for network rehabilitation; supporting 4 Roads recommendation that the weighted average Physical Condition be greater than 70.

Figure 8-4: Service Levels and Triggers for Pavement Improvements

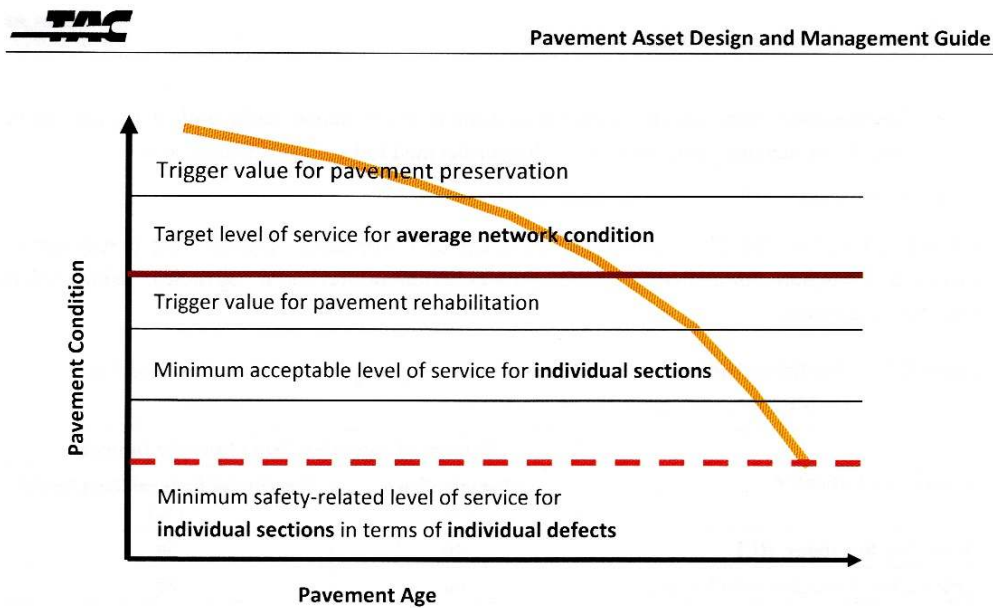


Figure 5.3 – Types of Service Levels and Trigger Levels for Pavements
[Adapted from FCM 2003]

8.6 Cross Asset Integration and Project Prioritization

Prioritizing projects from a purely asset management perspective is a relatively straightforward exercise, regardless of funding level. Complications arise when the specific needs, commitments of the agency, and priorities of other utilities factor into the decision making process.

The road system is, in reality, a utility corridor. Multiple utilities in both urban and rural roadside environments will present conflicting demands and priorities in advancing projects. The State of the Infrastructure provides ratings that deal strictly with the condition of various factors as they relate to the road section. Those factors have to be considered in conjunction with needs and priorities that may exist for other utilities or pending development. In fact, the condition of other infrastructure within the road allowance may be the key element in the prioritization. For example, a road rated as a reconstruction project may have a relatively low priority rating, but a trunk storm sewer servicing a greater area may require immediate installation. The priority of the road is then dictated by the other utility, and should be integrated into the capital plan, to best serve all interests.

Less tangible priorities may also be project prioritization tools for some agencies. For example, an agency may want to advance projects that also include bus routes or bike lanes.

As a municipal road program is developed, opportunities to complete work on smaller sections adjacent to the main project, at a lesser cost than if completed as a stand-alone project, should be considered to realize economies of scale, and complete improvements that may otherwise be passed over.

The caveat to this discussion is the requirement of Regulation 588/17 that the overall system condition be maintained.

8.7 Gravel Roads Management Strategy

Township of Malahide has a gravel road system of 52.225 centre line kilometres (19.81% of the system). The budget recommendation is approximately \$420,100 annually, for the materials only (Placed on the site) and includes maintenance gravel and road base upgrades. This would place 75mm (3 inches) every 3 years.

Proper maintenance of a gravel road surface is deceptively expensive. Costs include gravel, dust control, and grading. Frequently, budget analysis proves that the per-kilometre cost of gravel road maintenance is greater than the per-kilometre cost for hard top maintenance. For this reason, conversion of gravel surface roads to hard top roads generally proves to make economic sense and improves user satisfaction.

Road agencies in both Canada and the United States, have conducted studies that have generally indicated that, dependent upon local unit costs, gravel road conversion to hardtop, can be a cost-effective strategy. One source indicates that this may be effective management for roads with traffic volumes as low as 100 AADT.

Appendix D of this report includes additional information on gravel road conversions including a flow chart to illustrate the decision matrix for conversion. Benefits to converting a gravel road include:

- Customer satisfaction
- Reduced maintenance costs for routine maintenance
- Reduced maintenance costs for winter maintenance

Appendix D of this reports identifies a criteria for selection of potential gravel road conversion candidates. Gravel roads were reviewed during the spring break-up.

Gravel road conversion to hard top over time is the recommended strategy.

8.7.1 Gravel Resurfacing Program Analysis

Gravel roads can be deceptively expensive to manage and maintain.

Gravel roads tend to be the 'forgotten' asset. Gravel roads form an integral component of the road asset group for a large number of municipalities and should be managed as any other asset.

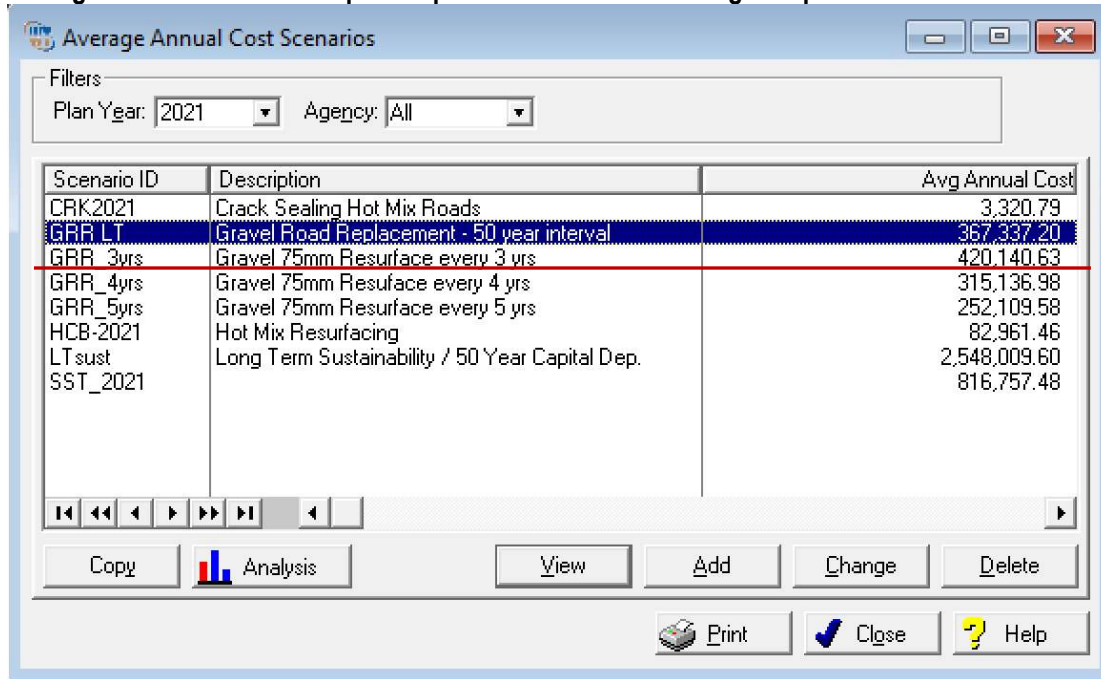
Most aspects of municipal service delivery are in fact an asset management decision. The decision whether to surface treat a road, or have the road remain as a gravel surface, is very much an asset management decision.

This report provides a recommended annual cost for gravel road maintenance of 75mm additional gravel to be added every three years, and does not included regular grading or dust control costs. The additional 75mm of gravel was a typical standard that was used in the past by many municipalities. Due to the natural life cycle wear and tear, maintenance, and winter control activities, gravel roads require additional gravel on a regular basis to ensure continuing performance.

One of the difficulties in determining the deterioration of a gravel road is that the wearing surface and the granular layers are one and the same, so the extent of deterioration may not be as obvious until the deterioration is significant. Appropriate gravel road maintenance can be deceptively expensive. Frequently, high level budget analysis proves that the per-kilometre cost of adequate gravel road maintenance is greater than the per-kilometre cost for hard top maintenance. This is further exacerbated as traffic volume on a gravel road increases.

The following screen capture from the software utilized illustrates the point with respect to the cost of gravel road maintenance by showing the calculated annualized replacement costs versus the annualized gravel road resurfacing requirements at intervals of 3,4,and 5 years.

Figure 8-5: Annualized Capital Depreciation and Resurfacing Comparison – Gravel Roads



Scenario ID	Description	Avg Annual Cost
CRK2021	Crack Sealing Hot Mix Roads	3,320.79
GRR_LT	Gravel Road Replacement - 50 year interval	367,337.20
GRR_3yrs	Gravel 75mm Resurface every 3 yrs	420,140.63
GRR_4yrs	Gravel 75mm Resurface every 4 yrs	315,136.98
GRR_5yrs	Gravel 75mm Resurface every 5 yrs	252,109.58
HCB-2021	Hot Mix Resurfacing	82,961.46
LTsust	Long Term Sustainability / 50 Year Capital Dep.	2,548,009.60
SST_2021		816,757.48

8.7.2 Gravel Road Conversion to Hard Top

Aggregate specifications include many requirements to ensure performance, including gradation. The gradation of aggregates was designed in order that the granular base can support load and drain. Gravel roads become contaminated very quickly after placement of new material due to adjacent business operations tracking material on to the road surface and in some instances even the municipal grading operation may contaminate the material.

The contamination interferes with the granular material's ability to support load and drain. As such, given the cost to maintain a gravel road, it would appear logical that once a gravel road is structurally sound and has clean material placed on the surface, placing a hard top – typically surface treatment- to preserve the investment.

Appendix D of this report provides further information on conversion selection criteria.

A high level review of the data filtered for AADT>100, Platform =>7m, good structural adequacy and only minor drainage issues produced potential conversion candidates shown in Table

Table 8.2: Potential Conversion Candidates

Asset ID	Street Name	From Desc	To Desc	Length (km)	Width (m)	Platform (m)	Time of Need					
							Capacity	Drainage	Geometric	Structural Adequacy	Surface Type	Surface Width
RCHA0015	CHALET LINE	0.12km E of HACIENDA ROAD	SPRINGFIELD ROAD	1.94	6	7.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RCHA0020	CHALET LINE	SPRINGFIELD ROAD	WALKER ROAD	2.06	6	7.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RCHA0030	CHALET LINE	WALKER ROAD	ANGER ROAD	0.83	6	8.3	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RCHA0040	CHALET LINE	ANGER ROAD	CARTER ROAD	1.3	6	7.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RHAC0020	HACIENDA ROAD	VIENNA LINE	CALTON LINE	2.07	6	8	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RNEW0010	NEWELL ROAD	RON MCNEIL LINE	CENTURY LINE	1.44	6	7.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RPIG0020	PIGRAM LINE	LYONS LINE	CROSSLEY HUNTER LINE	1.44	6	9.6	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RPIG0030	PIGRAM LINE	CROSSLEY HUNTER LINE	0.1km S of OSTRANDER ROAD	0.95	6	9.6	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RPIG0040	PIGRAM LINE	0.1km N of WILSON LINE	YORKE LINE	1.31	6	8.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RPIG0050	PIGRAM LINE	AVON DRIVE	YORKE LINE	1.36	6	8.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RSAW0020	SAWMILL ROAD	0.1km N OF VIENNA LINE	CALTON LINE	1.97	6	7.3	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ
RSAW0030	SAWMILL ROAD	CALTON LINE	JOHN WISE LINE	2.06	6	7	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ
RVAN0010	VAN PATTEN LINE	IMPERIAL ROAD	HACIENDA ROAD	2.05	6	7	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RWAL0030	WALKER ROAD	GLENCOLIN LINE	COLLEGE LINE	2.08	6	7.9	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ
RWAL0040	WALKER ROAD	COLLEGE LINE	PRESSEY LINE	2.06	6	7.5	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ
RYOR0060	YORKE LINE	PUTNAM ROAD	CORLESS ROAD	1.86	6	7.6	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
RYOR0070	YORKE LINE	CORLESS ROAD	PIGRAM LINE	0.98	6	7.5	ADEQ	6 to 10	ADEQ	ADEQ	ADEQ	ADEQ
Total Length				27.76								

9 Program Funding Recommendations

9.1 Overview

Program funding recommendations are a function of the dimensional information, surface type, roadside environment, functional class of the individual assets and current unit costing. Recommended funding for the road system should include sufficient capital expenditures that would allow the replacement of infrastructure as the end of design life is approached, in addition to sufficient funding for maintenance, to ensure that that full life expectancy may be realized.

Budgetary recommendations in this report do not include items related to development and growth; those should be considered as additional. Generally, that type of improvement or expansion to the system would be funded from a different source, such as Development Charges.

The budget recommendations bear a direct relationship to the value of the road system. 4 Roads estimates the cost to replace the road system, to its current standard, at **\$130,684,700** based on current unit costs and the standardized calculations in the Inventory Manual. The budget recommendations provided in this report are based on the constitution of the road system. This represents an opportunity to develop a financial plan in concert with the asset management plan, for a phased implementation.

9.2 Program Funding Recommendations

9.2.1 Current Replacement Costs and Long Term Sustainability

The estimated replacement value of the Township road system to the current standard is **\$130,684,700**. This equates to an annualized capital replacement of **\$2,613,700** based on a 50 year period. This would represent the Long Term Sustainable funding level. (This would be similar to the PSAB 3150 amortization value using current replacement cost instead of historic cost.) The current value of the road system is estimated to be \$104,903,500.

The Long Term Sustainability funding level is strictly a function of the replacement cost and the life cycle period and would best be described as an 'Accountaneering' number. This estimate does not include bridges, culverts, cross culverts less than 3 m, sidewalks, or street lighting. The typical design life for a road structure has typically been considered to be 50 years before reconstruction/replacement.

However, in an urban setting in particular, with the underground utilities typically having an expected life in the 75 year range, it would seem more pragmatic to match the lifecycles of the road and utility assets. Road assets can be designed to last 75 years with only resurfacing required. Rural cross sections should be treated similarly.

The estimated replacement/depreciation is based upon the replacement value of the road system over a 50-year life cycle. However, the 50-year life cycle can only be a reality if maintenance and preservation treatments such as crack sealing and hot mix asphalt overlays are delivered at the appropriate time. Inadequate maintenance and preservation will result in premature failure and increased life cycle costs.

Analogies to houses and cars sometimes make road maintenance easier to understand. If a house does not have the roof renewed within the correct time frame, there will be damage to the structure, below the roof, and if this is not dealt with, it will result in a rapid deterioration of the house. Similarly, roads require crack sealing and resurfacing at the appropriate time, during the life cycle, in order to maximize the life expectancy of the asset. Preservation and maintenance extend the useful life of the pavement, reducing life cycle costs.

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It is 4 Roads understanding that historically, the roads and structures funding has been drawn from the same funding source and is currently at approximately \$1.4m annually. This amount is inadequate to sustain both asset groups, given the funding recommendations for the road assets in this report. Roads and structures should have separate funding sources/reserves.

9.2.2 Hot Mix Resurfacing

Roads require major maintenance throughout the life cycle, in order to optimize and maximize the asset life span. Roads require resurfacing at the appropriate interval, for the respective class of road. Different agencies categorize the expense differently, usually dependent upon the dollar value; however, resurfacing is essentially a maintenance activity.

Resurfacing schedules are dependent upon traffic loading and the percentage of commercial traffic. Higher traffic volumes and percentages of commercial traffic shorten the interval between resurfacings. Optimal resurfacing intervals will vary from ten to twenty years (or more), depending upon the road function, classification, and quality of design and construction.

The Hot Mix Asphalt Resurfacing recommendation in this report is based upon the distribution of the Township's hot mix asphalt inventory. As such, the optimal budget calculation will focus on the 19 (18.85)-year interval, for hot mix roads. This would represent an average of 12 CL-km of resurfacing annually.

Table 9.1: Hot Mix Asphalt Roads by Asset Class and Life Cycle (unadjusted length)

Asset Class	Life Cycle Yrs	Asset Qty. (CL-km)	Weighted Average (Yrs)
A/C-R	19	0	0
A/C-S	19	0	0
A/C-U	19	0	0
HCB1-R	9	0	0
HCB1-S	9	0	0
HCB1-U	9	0	0
HCB2-R	12		
HCB2-S	12		
HCB2-U	12		
HCB3-R	15		
HCB3-S	15	0.42	0.54973822
HCB3-U	15	0	0
HCB4-R	19	1.15	1.906631763
HCB4-S	19	8.35	13.84380454
HCB4-U	19	1.54	2.553228621
Totals		11.46	18.85

Given the aforementioned, and the information with respect to surface type contained in Table 3.1 the funding for the annual resurfacing program should be **\$83,000** per year on average, in order to maintain the system at its current adequacy level. This estimate is for the major resurfacing work only and does not include any estimated costs for

other pavement preservation activities or programs. Table 9.1 identifies the distribution of hot asphalt roads by asset class and the basis for the recommendation for the annual program budget recommendation.

9.2.3 Crack Sealing

Crack sealing is a preservation activity that extends the life of a hot mix asphalt surface. A program estimate is provided based on crack sealing one metre per two lane metre of pavement every 5 years at the unit cost provided by 4 Roads, that we believe to be representative. Based on that premise, the recommended budget for crack sealing is **\$3,300**.

9.2.4 Surface Treatment Resurfacing

Most agencies report that the average life of surface treated road is seven years. Similar to the concept applied to the development of the hot mix resurfacing recommendations, the surface-treated road network should be completely resurfaced every seven years, or approximately 14% (28 km) of the surface treated inventory in each calendar year.

At a unit cost of \$2.85 per square metre, the annual program size should be **\$83,000** on average, exclusive of any other preparatory work.

9.2.5 Gravel Road Resurfacing

When MTO was providing maintenance subsidy, the standard practice for gravel road maintenance was to place approximately 75 mm of gravel on each gravel road section, every three years.

Since the conditional grant system was discontinued, a large number of municipalities have reduced the amount of gravel that has been placed on gravel roads, to the point where the gravel roads in the system are a major maintenance problem, particularly in the latter part of the winter and early spring. If the granular base is not replenished, the road structure will disappear through normal usage, and the remaining gravel typically becomes contaminated by other materials, such as the native soil and winter sand.

Township of Malahide Township has 52.225 km of gravel surfaced roads, as per Table 3.1 of this report. Using the Township's benchmark costing, the annual gravel resurfacing program size should be **\$420,100** per year, based on adding 75 mm of gravel every three years. (This is 75mm across the entire platform.) This estimate does not include costs for re-grading, dust control, or gravel road conversion.

9.3 Short and Long Term Sustainability and the Funding Window Concept

Typically, municipalities, and more particularly public works departments, prepare annual budgets that have a specific line items for capital, operational and maintenance expenditures. The definitions for capital and operational costs can vary between municipalities and road authorities.

From a pure asset management perspective, project selection and annual programming should be driven by asset condition, rather than a fixed line item amount. Section 8 of this report, provided a review of this asset management philosophy.

Rather than have a fixed line item for certain activities, 4 Road recommends that all of the major maintenance and rehabilitation and construction activities be considered as the annual re-investment amount. Annual expenditures will meet the overall bottom line, however, when projects and programs are driven by condition, the annual line items will vary.

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The funding window is the zone between the short and long term sustainability funding recommendations.

The 'funding window' is the range between the Short Term Sustainability and the Long Term Sustainability funding levels. Re-stated, instead of the traditional capital and maintenance line items, consider the gross budget as **the annual reinvestment level**, with program funding levels fluctuating within the gross amounts, but driven by asset condition.

As an example, if the 'capital' and 'operations' line item limitation were imposed on a municipality that has experienced significant growth, then opportunities to optimize funding will be missed. In municipalities experiencing significant growth, there will be a need for treatments within that development at a similar timeframe. For example, the roads will need to be resurfaced within a year or two of each other. If they are not resurfaced at the appropriate condition, then the condition will deteriorate and improvement will be more expensive. This concept is illustrated in Figure 8-1 and Figure 8-2.

For modeling purposes, 4 Roads has created a funding level described as the Short Term Sustainability or 'Preservation Funding level which should provide maintain the condition of the system over a short time frame and provide that Short Term Sustainability of the road system.

The Short Term Sustainability is the total of the recommended funding levels for hot mix resurfacing, single surface treatment, gravel road resurfacing and crack sealing: **\$1,323,200**. The premise being that if the pavement maintenance, preservation and resurfacing programs are adequately funded, then the system should be sustained over the short term; five to 10 year maximum. The caveat is that the program that is developed through a performance model at this funding level must be adhered to strictly, or the system will deteriorate.

The Short Term Sustainability funding and performance model thereof, are computer derived. Intangible values and decisions and the effects of other external forces cannot be incorporated into the model. As such the model is the minimum required to maintain the system- in theory. **Theoretically, the 'Short Term Sustainability' funding level would work. Practically, that would rely on every assumption and rating to absolutely correct, and the program adhered to explicitly.** From a more pragmatic perspective and to deal with the real life realities of maintaining a road system, it should be greater.

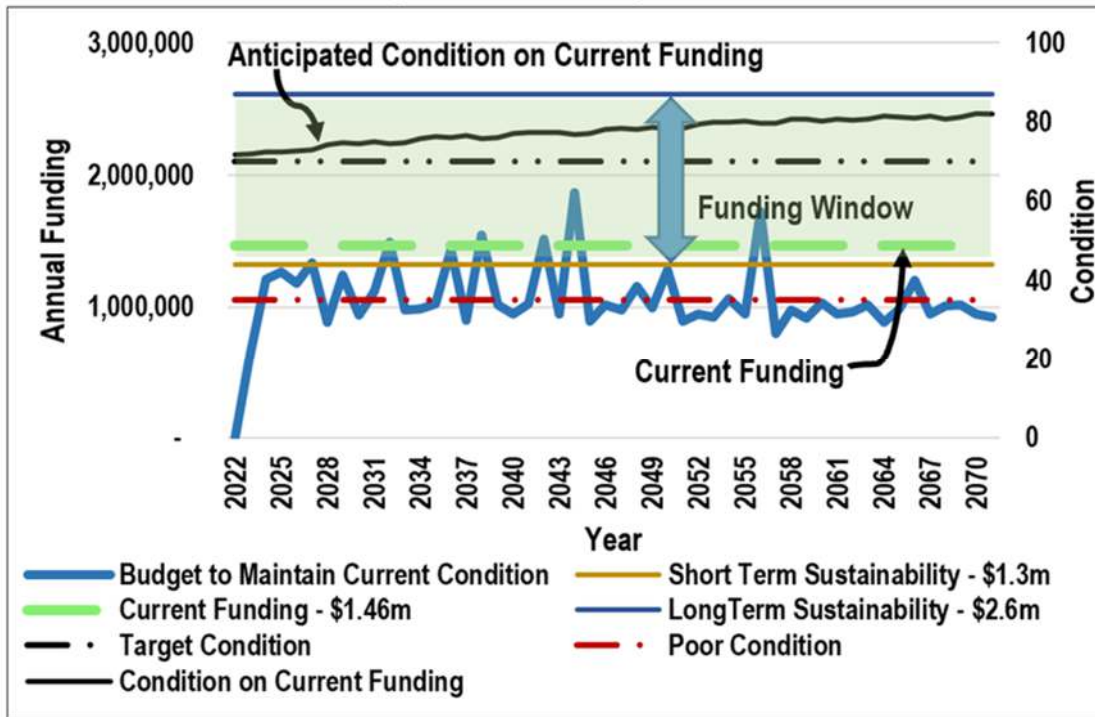
To sustain the road system over the entire life cycle the Long Term Sustainability funding level is required. Performance modeling is discussed in Section 9 of this report. 4 Roads has calculated that the annualized replacement cost -Long Term Sustainability- at **\$2,547,800**.

Figure 9-1 depicts the necessity to fund at the long Term Sustainability replacement . The entire amount does not have to be expended each year, but should be placed in a reserve until the demands on the system exist.

Municipal pavement and asset management strategies are critical to managing the performance of the road system, more so, if funding is limited. Funding constraints should push the strategy toward those programs that extend the life cycle of the road by providing the correct treatment at the optimum time as a priority. Resurfacing, rehabilitation, and preservation projects should be a higher priority than reconstruction projects. The objective is to "keep the good roads good".

As the municipality advances the development of their Asset Management Plan (AMP), a paradigm shift will be required in the way that we approach management of assets. Traditionally, municipalities have spent a fixed amount on capital and maintenance each year. As evidenced by Table 10.3, programs are not at a consistent funding level on an annual basis. The annual budget overall is met, however, the distribution of costs between traditional capital and maintenance activities varies. That variance is being driven by the demands of the road system based on condition. Project selection is based on condition and best Return on Investment. This concept can and should be applied to all assets.

Figure 9-1: The Funding Window



In Malahide's circumstances, the current funding level is satisfactory in the short term. The graph illustrates that – theoretically – the current budget will hold the condition of the system. However, that would only be true if:

- If the anticipated performance of the road assets followed the deterioration curve exactly
- If the work plan developed by the model were adhered to explicitly

For this reason, we typically recommend the funding window with a minimum funding level of the Short Term Sustainability budget as a target for the short term and the Long Term Sustainability funding level over the life cycle. It is recommended that the annual funding level be increased to the Long Term Sustainability Level over the next 10 years, as a minimum.

9.4 Annual Budget Adjustments

9.4.1 Inflation

The typical approach to annual budget adjustments is to adjust with some reference or consideration to the Consumer Price Index (CPI). Public Works Departments have not fared well with this approach, as a large portion of the Public Works Budget is expended on commodities and services that typically vary/increase at a rate significantly higher than the CPI. Public Works Departments' annual increases based solely on CPI, will generally result in a continual downward spiral in overall condition of the road system and service levels. Decreasing service levels increase risk. Ontario is becoming much more litigious; therefore, the reduction in service levels increases the risk for a municipality, and the cost of service provision versus the cost of litigation should be considered.

In recent years, increases and decreases in fuel, asphalt, and salt have been disproportionate to the CPI. As such, consideration should be given to annual adjustments in road funding, which are more reflective of the actual experience. Some municipalities provide for such disproportionate changes in their budget process, in order that the specific impacts of a commodity price increase and service delivery are considered.

9.4.2 Plant Adjustment (System Changes)

Most municipalities experience development-related growth. Growth comes at a cost, both in the longer-term, with additional resurfacing and replacement requirements, and in the shorter-term, with Operational budgets. Operational budgets should be adjusted on a pro-rata basis to account for the additional length of road that has to be maintained.

Capital budgets and forecasts should also be adjusted annually, to reflect the changes in the system, and integrated into the longer-term financial plan.

10 Performance Modeling- Budget Effect on System Performance

10.1.1 Asset Management Plan Analysis

The asset management plan is a function of the assets, the required life cycle activities and funding. Required funding is driven by the plan and the life cycle activities – not necessarily the current funding level. The development process for all elements is dynamic, iterative, and holistic on a number of levels. It is complex.

From Regulation 588/17;

“4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:

- i. The full lifecycle of the assets.*
- ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.*
- iii. The risks associated with the options referred to in subparagraph ii.*
- iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.”*

A work plan and lifecycle activities – a Performance Model – were developed using WorkTech Asset Management Foundation software, which 4 Roads is a licensed user of.

Performance models may be developed with as many variables for weighting of attributes that may be included in the database. Models that develop work plans based on a Return on Investment (ROI) scenario produce results in terms of project selection that are consistent with the concepts of asset management and selection of the right treatment at the right time. From available funding, the treatments offering the best ROI are selected as a priority. Those treatments are typically crack sealing, micro paving and resurfacing.

The provincial guidelines for the preparation of an AMP indicate that the following must be considered;

- Options must be compared on Lifecycle cost- the total cost of constructing, maintaining, renewing and operating an infrastructure asset throughout its service life. Future costs must be discounted and inflation must be incorporated.
- Assessment of all other relevant direct and indirect costs and benefits associated with each option.
 - Direct benefits and Costs
 - Efficiencies and network effects
 - Investment scheduling to appropriately time expansion in asset lifecycles
 - Safety
 - Environmental

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- Vulnerability to climate change
- Indirect Benefits and Costs
 - Municipal wellbeing and costs
 - Amenity values
 - Value of culturally or historically significant sites
 - Municipal image
- Assessment of Risks associated with all potential options. Each option must be evaluated based on its potential risk, using an approach that allows for comparative analysis. Risks associated with each option can be scored based on quantitative measures when reasonable estimates can be made of the probability of the risk event happening and the cost associated with the risk event. Qualitative measures can be used when reasonable estimates of probability and cost associated with the risk event cannot be made.

Significant effort (and expense) will be required to meet all of these requirements.

10.1.2 Performance Model Overview

A properly developed performance model will satisfy the majority of the requirements identified in the foregoing. Key elements of a Performance Model will include;

- Deterioration Curves identifying anticipated deterioration of an appropriately constructed asset over the life cycle of the asset
- 'Trigger' points throughout the deterioration curve identifying appropriate treatments at condition ranges
- Current costing for all treatments identified

To capture the essence of the provincial requirements, development and use of a Performance Model is recommended. Through modeling and the resultant output, the following may be addressed;

- Review of options and lifecycle effects based on a Return on Investment Analysis
- Efficiencies and network effects
- Budget requirements to achieve LOS goals

As noted in section 10.1.1, Regulation 588/17 requires a work program that considers the lifecycle activities of each asset over a 10 year period and results in a program that maintains the average condition of the asset group. The most effective means to achieve this goal is through a performance model. WorkTech Asset Manager Foundation includes a performance modeling capability, which has been used to develop the work plan for this project.

Through performance modeling, appropriate budget levels, programming and associated costs can be determined, delivering key elements of any plan that can be refined or revisited as circumstances change. Once a model is developed, then the effect of any alternatives may also be measured.

4 Roads is of the opinion a number of other requirements that the province has identified should not be addressed until they reach the project stage. Further, a number of those requirements would be addressed through a Class Environmental Assessment process.

This particular series of Performance Models is based on the road system in the condition that it exists today in terms of the current pavement distress information and the current dimensional information. Section 10.4 of this report discusses a 10 year performance model.

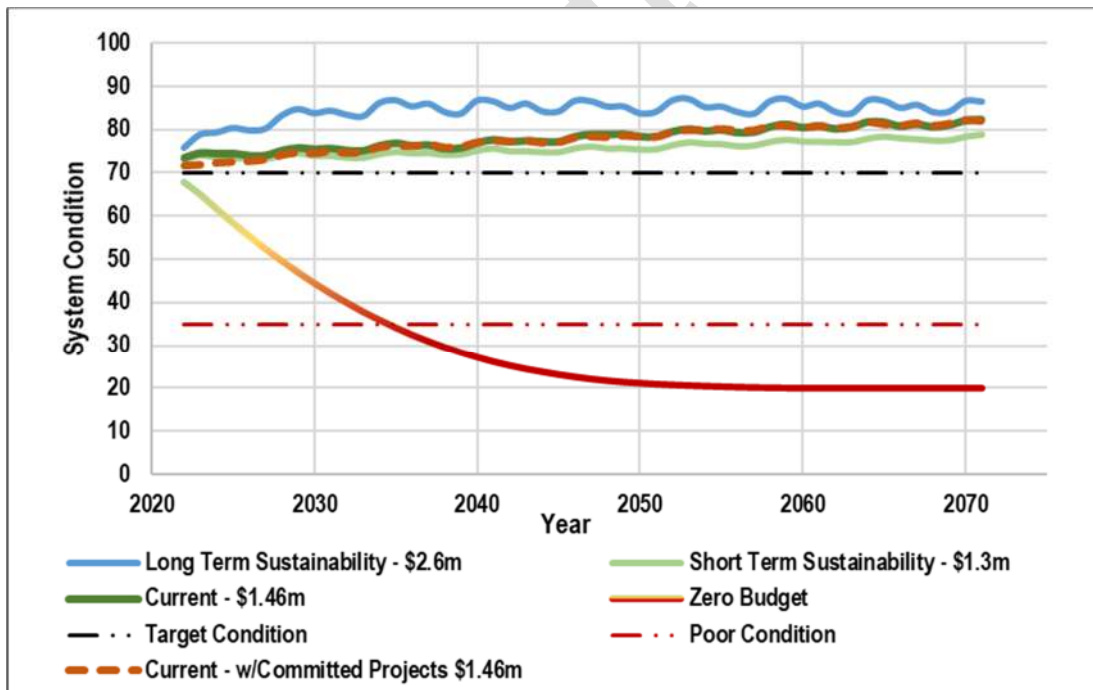
10.2 System Performance at Various Budget Levels

This report includes budget recommendations for various aspects of the programming that are typical to road departments. The budget recommendations do not include the expansion program related to growth and development. System performance can be predicted based on the level of funding.

4 Roads has prepared four different 50-year performance models for the road system. The models have been prepared with the following parameters:

- Zero budget – demonstrates the effect of no work being performed on the road system and how quickly it will deteriorate
- Short Term Sustainability /Preservation budget – \$1.3m-This includes the total dollar value of the budget recommendations for Hot Mix Asphalt resurfacing, surface treatment, gravel road resurfacing and crack sealing.
- Current Budget - increases over time to \$1.46m
- Current Budget with Committed Projects – increases over time to \$1.46m
- Long Term Sustainability budget- \$2.6m full replacement cost of the road system annualized.

Figure 10-1: Performance Modeling at Various Budget Levels



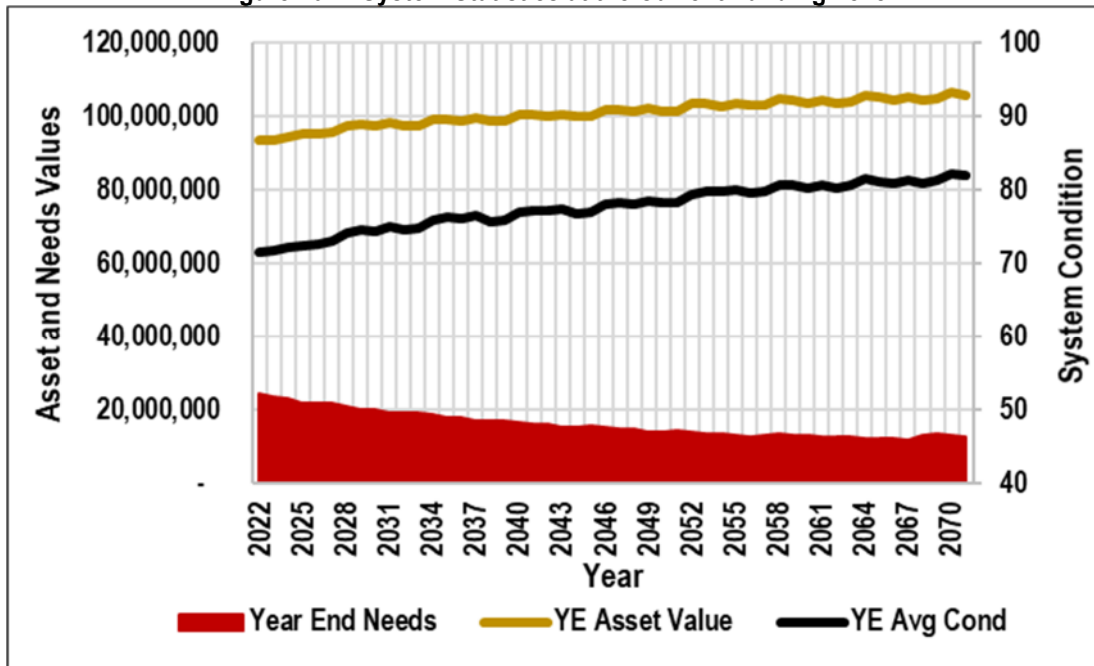
Notes: Short Term Sustainability assumes perpetual performance of the road after initial rehabilitation and is not influenced by other asset demands

The Average Physical Condition of the road system is currently 69.01. The performance model calculations all begin with the current Physical Condition and for purposes of the graphing, the year-end Physical Condition is displayed, based on the effects that the improvements have had on the overall condition of the road system.

From Figure 10-1, the performance at the current funding level, including committed projects, increases the average system condition over time. The model is reliant on anticipated deterioration. If road sections deteriorate more quickly, then the current funding and committed programming is not sufficient to sustain the system.

Further, there will be some road sections in poor condition that will not be addressed in the program.

Figure 10-2: System Statistics at the Current Funding Level



Notes: The mode assumes perpetual performance of the road after initial rehabilitation and is not influenced by other asset demands

In reviewing the results of the performance models, it should be understood that, with the methodology being used, the trigger for a resurfacing activity is a Physical Condition of 70 for hot mix roads. At appropriate funding levels the system condition improves over time.

The effect of a funding level has many measures, not just the performance of the condition of the system. Figure 10-2 illustrates the effect of the current funding level on the average system condition, the value of the road system and the cumulative needs.

The deterioration curves that have been used consider an average/typical performance for the various road classes. When used in the model at a reasonable funding level the overall average system condition will remain at a similar level as the model will treat the pavements as perpetual. This concept is illustrated in Table 10.1 using Township Section RJON0010, .

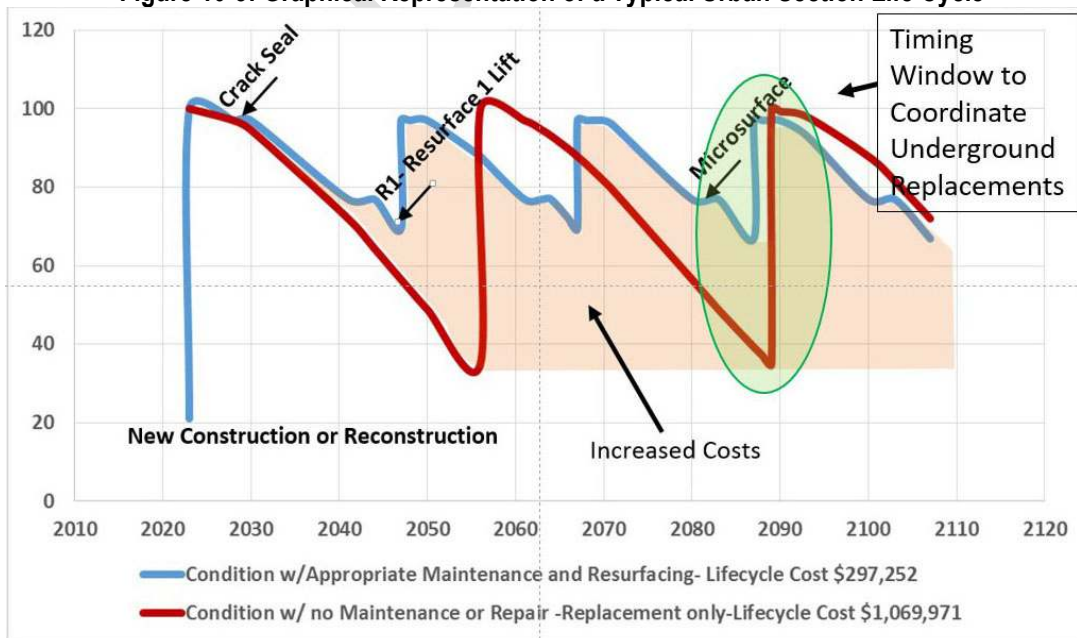
Table 10.1: Sample Section Life Cycle (from 2021 Study)

Asset RJON0010, Jones Road, Nova Scotia Line to South End								
Year	Improvement Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	ROI
2029	REC	358,050	23.96	100		85,789	358,050	0.77
2036	SST	14,170	77.27	95.27		276,665	341,114	5.56
2042	SST	14,170	77.27	95.27		276,665	341,114	5.56
2048	SST	14,170	77.27	95.27		276,665	341,114	5.56
2054	SST	14,170	77.27	95.27		276,665	341,114	5.56
2060	SST	14,170	77.27	95.27		276,665	341,114	5.56
2066	SST	14,170	77.27	95.27		276,665	341,114	5.56

For the purposes of a short to mid-term plan considering the pavement as performing as a perpetual pavement does not pose a problem. The aggregate road base will deteriorate over time however, the time frame where that may be contributory to the road decline would be beyond 50 years. Condition data is collected regularly and monitoring and analysis would alert the municipality to changes that are occurring.

Figure 10-3 provides a graphical representation of the two distinctly different approaches to asset management. The blue line represents a treatment selection based on treatment selection by condition and the best ROI. The Red line represents a road management by reconstructing and then deteriorating to failure and then reconstructing or major rehabilitation. The cost difference is approximately 3 times.

Figure 10-3: Graphical Representation of a Typical Urban Section Life Cycle



Note: Life cycle with appropriate maintenance includes crack sealing, microsurfacing, resurfacing and reconstruction.

The orange shaded area represents the difference in life cycle costs between the strategies

Figure 10-4 illustrates the typical effect on budget requirements by holding the condition of the system at a specified level. If the orange line represented the average annual expense, the budget years above that line would require debt

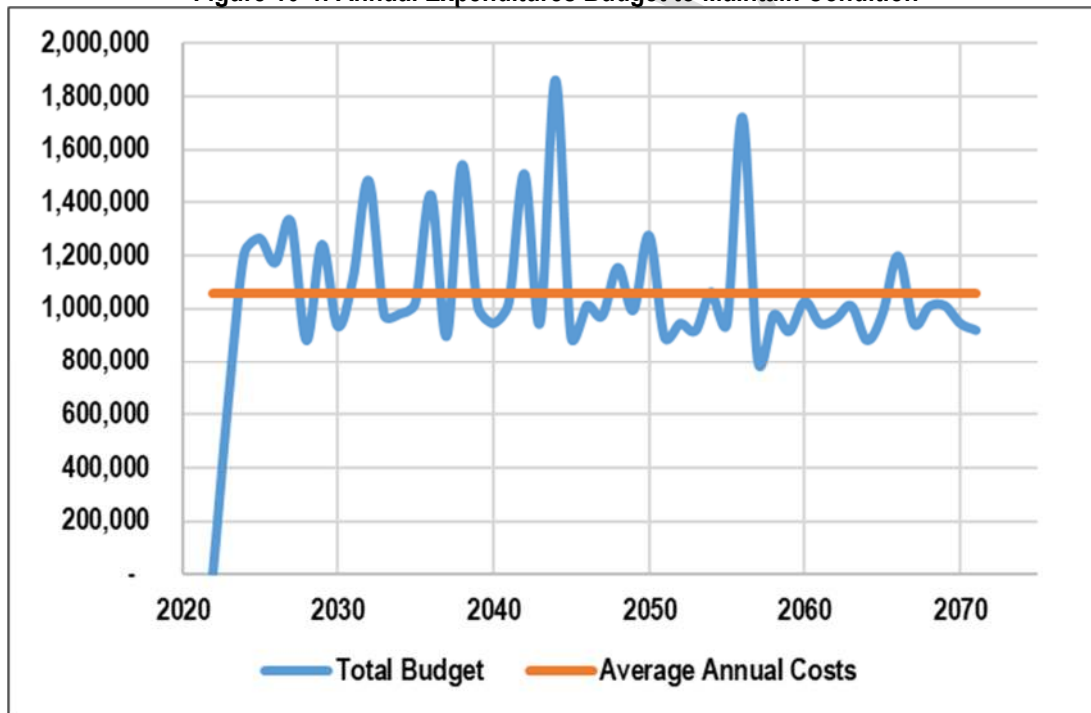
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financing or funding from reserves. Conversely, in those years where the funding requirement is less than the annual average then the unspent funds would accumulate in a reserve.

Deterioration curves developed by 4 Roads have been utilized for development of funding and prediction models and based on our experience with a large cross-section of municipalities and resultant feedback, we believe that those deterioration profiles are representative. The models indicate that the overall condition of the road system will continue to increase over time to a point where the average physical condition will be in the mid 70's range. A physical condition beyond that level may be indicating an over-expenditure/inefficiency in the programming. An average physical condition above 70 would indicate that the average road only requires maintenance.

In a number of the models created for this project, all of the funding will not be spent each year once the average rises above 70. The deterioration curves that have been used consider an average/typical performance for the various road classes.

Figure 10-4: Annual Expenditures Budget to Maintain Condition



10.3 Record of Assumptions -Performance Modeling

10.3.1 Pavement Classification for Modeling

In order to develop budget recommendations, 4 Roads adds an additional classification of roads differentiated by surface type, roadside environment and traffic volume. It is anticipated that each road classification will deteriorate at a different rate. Differentiation by roadside environment within a classification permits calculation of the different replacement costs to reflect the servicing and feature differences.

Table 10.2: Road Asset Classes

Asset Class	Subtype	Material	Roadside Env't	AADT Low	AADT High
A/C	All	A/C	R	1	100,000
CM1	All	C/M	R	1	3,000
CON	All	CON	R	1	100,000
GST1	All	G/S	R	1	10,000
HCB1	All	HCB	R	20,000	100,000
HCB2	All	HCB	R	10,000	19,999
HCB3	All	HCB	R	1,000	9,999
HCB4	All	HCB	R	1	999
ICB	All	ICB	S	1	3,000
LCB1	All	LCB	R	1	2,000

Figure 10-5: Typical Treatment Selection vs. Condition for Hot Mix Asphalt Roads

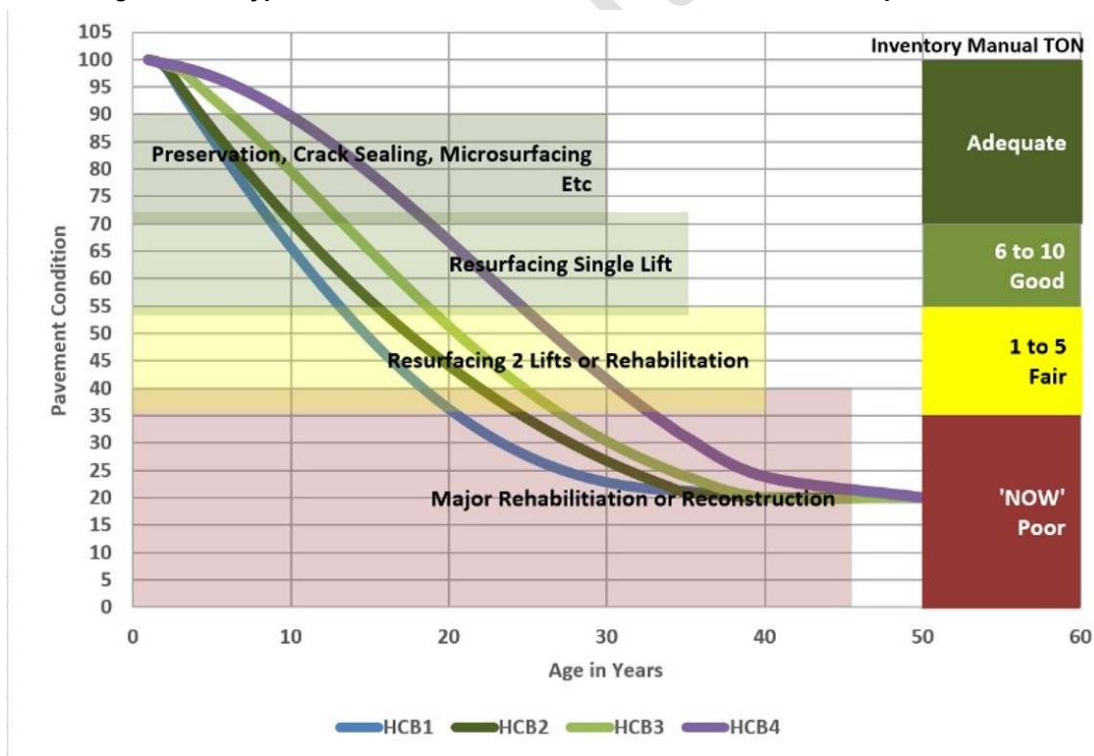


Figure 10-5 illustrates treatment selection by time and asset classes for hot mix roads. Typical treatments and/or improvements have been superimposed over the deterioration curves, to illustrate the general timelines for implementing the treatments. Other road asset classes have been treated similarly. An important concept to remember is that as a road deteriorates the cost of rehabilitation increases. The deterioration curves, improvement types, current unit costs and current condition ratings are essentially the assumptions used to develop budget and programming recommendations in this report. Appendix C provides detail on the deterioration curves for all road asset classes.

10.4 10 Year Program Performance Model

Appendix G includes the results of a 10 Year program based on the ROI Performance model. The funding is at the Preservation level. This performance models will select treatments by condition and best Return on Investment (ROI).

The resultant project selection from the model may vary from the current operational programs and forecast as the model will select projects based on best ROI initially and then expend remaining funds on other projects. The model can be a starting point for program development but has to be metered with decisions than cannot be easily introduced into a model.

The model does not include any new/additional road sections; only work on existing road sections

Draft V5

Table 10.3: Performance Model Summary - 10 Year Program- Current Funding Level with Committed Projects 20220107

Improvement Type	Year										Grand Total
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
BS					12,029						12,029
BSgrav									248,079		248,079
CRK	2,321	247	1,016	508	262	1,408	1,190	552		784	8,288
CRKsd	1,032	688									1,720
DSTrehab	237,950	342,562	1,028,970	122,700	735,166	336,304		151,928			2,955,580
DSTrehab2	18,290	93,324	237,933	508,477	267,401			374,739			1,500,164
GRR2						52,099	18,954	180,883	254,774	286,747	793,457
GRR2sd					55,918			74,088			130,006
MICRO						14,546	10,878	2,604		2,940	30,968
PR2								83,414	398,020		481,434
R1			12,811	15,573		46,118	44,255		22,237		140,994
R2					96,660					62,173	158,833
REC	950,000										950,000
RSS		600,000									600,000
SD	15,903	36,254									52,157
SST	239,589	236,819	142,078	817,334	168,237	1,013,038	1,390,513	595,602	540,533	1,112,958	6,256,701
SSTedge		154,666	41,936		129,381						325,983
Grand Total	1,465,085	1,464,560	1,464,744	1,464,592	1,465,054	1,463,513	1,465,790	1,463,810	1,463,643	1,465,602	14,646,393

Note: Does not include any new/additional road sections; only work on existing road sections

11 Recommendations

In addition to the budgetary recommendations, the following recommendations are provided for the management of the road inventory.

1. The information and budget recommendations included in this report be used to further develop the corporate Asset Management Planning.
2. The funding level should be increased to the Long Term Sustainability limit over a ten year period.
3. A separate funding source should be created for structures, with an annual contribution developed using a similar process to develop the roads funding recommendations.
4. Funding levels to be adjusted annually to accommodate growth / system expansion.
5. Funding should be adjusted annually to accommodate inflation.
6. The work plan should
 - Ensure that the preservation and resurfacing programs are optimized. This is particularly critical for those sections that are not going to be affected by upgrade due to development demands.
 - The work plan should cross integrate assets.
 - The work plan should be followed to optimize investments and performance of the road system.
7. The inspection interval should be no greater than 2 years.
8. Gravel road conversions to hard top surface should be continued as part of a long term asset management strategy.
9. Township of Malahide traffic counts should continue to be updated and repeated on a regular basis. The counting should include the percentage of truck traffic.
10. A Roadside Safety Audit should be undertaken to assess the potential safety requirements on rural road sections with potentially substandard alignment.
11. Narrow roads should be signed accordingly.
12. The status of the Boundary Road Agreements should be reviewed.
13. The Level of Service for System Adequacy should be a Minimum of 60% (Currently 92.9).
14. The Level of Service for Average Condition should be a minimum of 70. (Currently 70.71)
15. The Level of Service for Good to Very Good Roads should be a minimum of 60%. (Currently 67.9)
16. The Quality Assurance Program should be reviewed and refined by developing a minimum testing criteria for number and type of tests to be undertaken to confirm quality construction for development and Township projects.
17. Consideration should be given to the development of a maintenance paving program for those roads sections that are in poor condition that will not be addressed in the shorter term programming.
18. Develop a corporate asset management system throughout the organization with the development of a Standard Operating Procedure (SOP) for asset management.
19. Consideration should be given to development of the storm sewer system as a rate supported utility.

Appendix A: Inventory Manual Methodology Overview

Regulatory Requirements in Ontario

Regulation 588/17 Asset Management Planning for Municipal Infrastructure requires;

'v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.'

Data collection and road ratings were completed generally in accordance with the Ministry of Transportation Ontario (MTO) *Inventory Manual for Municipal Roads* from 1991. (*Inventory Manual or IM*). The ratings are either a standalone value or incorporated into calculations performed by the software. The ratings or calculations then classify the road section as a 'NOW', '1 to 5', or '6 to 10' year need for maintenance, rehabilitation or reconstruction in six critical areas.

Inventory Manual History

From the 1960's until the mid-1990's, the Ministry of Transportation (MTO) required municipalities to regularly update the condition ratings of their road systems in a number of key areas. The process was originally created by the MTO as a means to distribute conditional funding between municipalities, on an equitable basis. The reports were referred to as a 'Road Need Study' (RNS) and were required in order to receive a conditional grant to subsidize municipal road programs. After the introduction in the 1960's by the MTO, the methodology evolved into the current format by the late 1970's. The most current version of the Inventory Manual is dated 1991, and is the methodology used for this report and supported by WorkTech Asset Manager Foundation Software. The practice was discontinued by a number of municipalities when conditional funding for roads was eliminated in the mid 1990's.

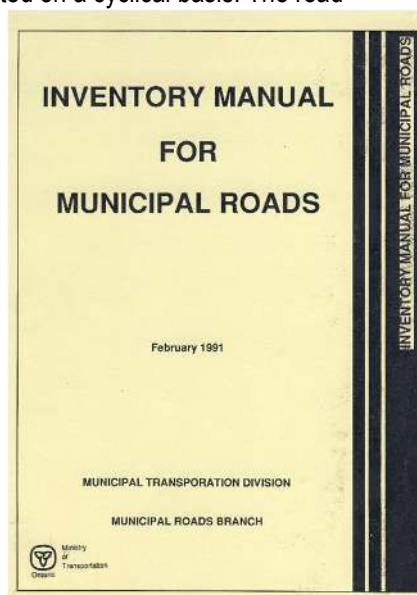
Inventory Manual Overview

The Inventory Manual Methodology is a sound, consistent, asset management practice that still works well today, and in view of the increasing demands on efficiency and asset management, represents a sound road asset inventorying and management system. Road system reviews should be repeated on a cyclical basis. The road section review identifies the condition of each road asset by its time of need and recommended rehabilitation treatment.

In addition to condition ratings, the Inventory Manual also provides guidance in terms of data fields that should be included in a road system database in order to make comprehensive decisions with respect to improvements. There is more to an improvement recommendation than just condition.

To put terminology in a more current context, the past Road Needs Study is now *'The State of the Infrastructure Report (SotI)'*. The SotI analyzes and summarizes the road system survey data collected (or provided) and provides an overview of the overall condition of the road system by road section, including such factors as structural adequacy, drainage, and surface condition. The study also provides an indication of apparent deficiencies in horizontal, and vertical alignment elements, as per the Ministry of Transportation's manual, "Geometric Design Standards for Ontario Highways".

The report provides an overview of the physical and financial needs of the road system, which may be used for programming and budgeting. However, once a road section reaches the project design stage, further detailed review, investigation, and design will be required to address the specific requirements of the project.



Asset Condition Rating Methodology

The Inventory Manual for Municipal Roads

Asset Management by its' very nature is holistic. Managing a road network based solely on pavement condition would be critically deficient in scope in terms of the information required to make an informed decision as to the improvements required on a road section.

The *Inventory Manual* offers a holistic review of each road section, developing a Time of Need (TON) or an Adequate rating in six areas that are critical to municipal decision making:

- Geometrics
- Surface Type
- Surface Width
- Capacity
- Structural Adequacy
- Drainage

Evaluations of each road section were completed generally in accordance with the MTO's *Inventory Manual for Municipal Roads* (1991). Data collected was entered directly into WorkTech's Asset Manager Foundation software. Condition ratings, Time of Need, Priority Ratings, and associated costs were then calculated by the software, in accordance with the *Inventory Manual*. Unit costs for construction are typically provided by municipal staff.

Road sections should be reasonably consistent throughout their length, according to roadside environment, surface type, condition, cross section, speed limit, or a combination of these factors. As an example, section changes should occur as surface type, surface condition, cross-section, or speed limit changes.

Field data is obtained through a visual examination of the road system and includes: structural adequacy, level of service, maintenance demand, horizontal and vertical alignment, surface and shoulder width, surface condition, and drainage. The Condition Rating is calculated based upon a combination of other calculations and data.

The Condition Ratings, developed through the scoring in the *Inventory Manual*, classify roads as 'NOW', '1 to 5', or '6 to 10' year needs for reconstruction. **The Time of Need is a prediction of the time until the road requires reconstruction, not the time frame until action is required.** It is in essence, a prediction model. For example, a road may be categorized as a '6 to 10' year need with a resurfacing recommendation. This road should be resurfaced as soon as possible, to raise the condition, and to further defer the need to reconstruct. Graph 1 provides a graphical explanation.

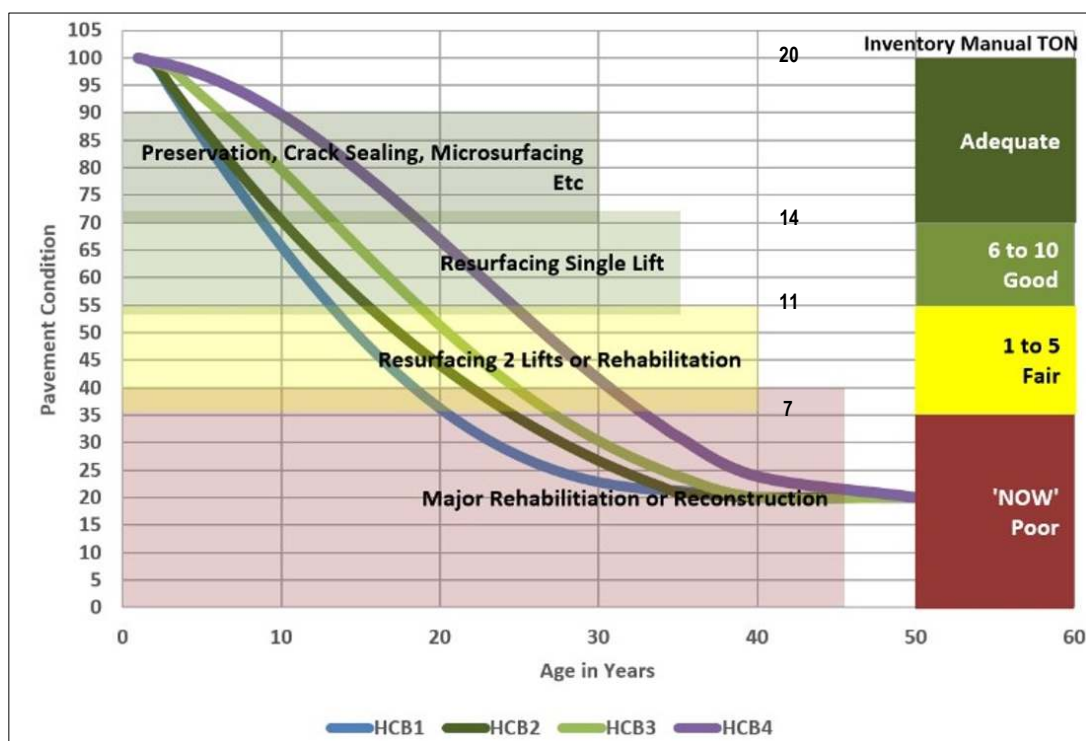
To best utilize the database information and modern asset management concepts, it has to be understood that the Time of Need (TON) ratings are the estimated time before the road would require reconstruction. NOW needs are still roads that require reconstruction; however, it is not intended that '1 to 5' and '6 to 10' year needs are to be acted on in that timeframe for resurfacing recommendations. The '1 to 5' and '6 to 10' year needs are current candidates for resurfacing treatments that will elevate their structural status to 'ADEQ', and offer the greatest return on investment for a road authority (notwithstanding a drainage or capacity need, etc.).

O.Reg 588/17 also requires Level of Service measures for hard topped roads by Pavement Condition Index (PCI). By definition, a PCI is a rating of the road condition between 1 and 100. (ASTM 6433). O.Reg 588/17 is non specific as to the PCI methodology. This is discussed in further detail in Appendix C.

The structural or distress rating in the Inventory Manual has a maximum score of 20, which can be a bit more difficult to relate to than a 1 to 10 or 1 to 100 rating. For the purposes of Graph 1, the Structural Adequacy rating (distress) has been multiplied by 5 to produce a rating on a 1 to 100 scale which may be more readily understood.

When the Structural Adequacy rating is depicted as a 1 to 100 rating, and shown graphically, it is obvious that even given the vintage of the origins of the Inventory Manual (late 1970's), the pavement management concepts of the Ministry of Transportation were well evolved even at that time. Graph 1 is very much in keeping with what are considered to be modern pavement management concepts.

Graph 1: Time of Need vs. Typical Improvement For Hot Mix Asphalt Surface



'NOW' Needs

'NOW' needs represent the backlog of work required on the road system. A **'NOW'** need is not necessarily the highest priority from asset management or return on investment perspectives. Construction improvements identified within this time period are representative of roads that have little or no service life left and are in poor condition. Theoretically a resurfacing strategy is never a **'NOW'** need, with the exceptions of a PR1 or PR2 treatment recommendation (Pulverize and resurface one or two lifts of asphalt) and where the surface type is inadequate for the traffic volume.

If a road with an improvement recommendation of "resurface" deteriorates too far, it becomes a **'NOW'** construction need. A **'NOW'** need rating may be triggered by substandard ratings in any of the Structural Adequacy, Surface Type, Surface Width, Capacity, Drainage, or Geometrics data fields.

These roads would be described as being on **'Poor'** condition and exhibit distress over greater than 20% of the surface area of the section.



Asset Condition Rating Methodology

The Inventory Manual for Municipal Roads

'1 to 5' Year Needs

'1 to 5' Identifies road sections where reconstruction is anticipated within the next five years, based upon a review of their current condition. These roads can be good candidates for resurfacing treatments that would extend the life of the road (depending on any other deficiencies), thus deferring the need to reconstruct.

These roads would be described as being in 'Fair' condition and exhibit distress over 15% to 20% of the surface area of the section.



'6 to 10' Year Needs

'6 to 10' Identifies road sections where reconstruction improvements are anticipated within six to ten years, based upon a review of their current condition. These roads can be good candidates for resurfacing treatments that would extend the life of the road (depending on any other deficiencies), thus deferring the need to reconstruct.

These roads would be described as being in 'Good' condition and exhibit distress over 10% to 15% of the surface area of the section.



Needs with a 1 to 5, or 6 to 10 year, 'Time of Need' rating are prime candidates for resurfacing or rehabilitation treatments and should be acted on in the very near future.

The 1 to 5 and 6 to 10 year 'Time of Need' ratings may be misleading without adding some context to the discussion. This is a prediction of the time to when reconstruction would be anticipated, if no action is taken, not the time to act on the current recommendation.

ADEQ'

An '**ADEQ**' rating encompasses a wide range of conditions that include the following:

- Roads with a traffic volume of less than 50 vehicles per day will be deemed adequate, and deficiencies on those roads are to be corrected with the maintenance budgets
- Gravel Roads with a structural adequacy rating that is not a 'NOW' need (more than 25% distress) is adequate; there is no further differentiation by time period
- Roads that do not require improvement other than maintenance and exhibit distress over 0% to 10% of the surface area of the section.



These roads would be described as being in good to excellent condition, with the potential exception the ADEQ rating of roads with less than 50 AADT. Roads with less than 50 AADT may be ADEQ but be in poor condition

INVENTORY MANUAL TREATMENTS

Table A.1: Road Improvement Types

Inventory Manual Improvements	
Code	Description
R1	Basic Resurfacing
R2	Basic Resurfacing – Double Lift
RM	Major Resurfacing – removes existing asphalt and replace with existing plus and additional lift.
PR1	Pulverizing and Resurfacing – Single Lift
PR2	Pulverizing and Resurfacing – Double Lift
BS	Tolerable standard for lower volume roads: – Rural and Semi-Urban Cross sections only. Improves drainage and adds structure (granular base) and a surface but not to a reconstruct standard. Typically specified where width is to an acceptable standard.
RW	Resurface and Widen- adds additional lanes and resurfaces the entire road
REC	Reconstruction
RNS	Reconstruction Nominal Storm Sewers (Urban: no new sewer, adjust manholes, catch basins, add sub-drain, remove and replace curb and gutter, granular, and hot mix)
RSS	Reconstruction including Installation of Storm Sewers (New storm sewers, and manholes in addition to the above)
NC	Proposed Road Construction
SRR	Storm Sewer Installation and Road Reinstatement
SD	Spot Drainage
SR	Spot Road
SI	Spot Intersection

Inventory Manual Improvements	
Code	Description
CO	Carry Over project
Additional Treatments*	
CRK	Crack sealing
CRKsd	Crack Sealing and Spot Drainage
DST	Double Surface Treatment. Typically specified where it appears that the gravel road surface is adequate and may be a converted to a hard top surface.
DSTrehab	Pulverize and existing surface treated road, add 75mm of gravel, double surface treat, and spot drainage improvements. Typically specified where the road appears to be structurally sound but the surface treatment is deteriorated beyond the point where it should not be re surface treated.
DSTrehab2	In addition to DSTrehab components, base stabilization with magnesium chloride and fog seal over the DST
Fog Seal	Thin spray of bituminous material over surface treated roads to reduce aggregate loss
GRR	Gravel road resurfacing 75mm
GRRsd	Gravel road resurfacing 75mm and spot drainage
GRR2	Gravel road resurfacing 150mm
GRRsd	Gravel road resurfacing 150mm and Spot Drainage
MICRO	Microsurfacing
Slurry	Slurry Seal
SST	Single Surface Treatment
SSTsd	Single Surface Treatment and spot drainage
R2Urehab	Urban resurfacing with 2 lifts, CB and MH adjustments (Very similar to R2 in an urban environment.)

**Additional Improvement Types developed by 4 Roads not included in the Inventory Manual*

Inventory Manual Improvement Types

For each Type of Improvement (**Item 104**), there are a number of specific road improvements that are included in the total cost relative to the Roadside Environment (**Item 32**) and the Design Class (**Item 105**). The computer will check a number of Items on the appraisal sheet in order to select the appropriate factors and cross section standards and then calculate the Bench Mark Cost. For example, a Resurfacing and Widening improvement coded under Item 104 is a significantly different road cross section and cost when applied to a rural road vs. an urban arterial. The computer will make all of the necessary checks to arrive at the recommended improvement cost.

Described in the following pages are the road improvements and associated construction activities costed for each Type of Improvement listed under Item 104. Please note, that the Codes (**CO**) – Carry Over, (**SR**) – Spot Road, (**SI**) – Spot Intersection and (**SD**) – Spot Drainage are direct cost inputs and **are not** included in the Bench Mark Cost system.

(R1) - BASIC RESURFACING

(Single Lift of Hot Mix – 50 mm)

Rural and Semi-Urban Roads (Cross Section A)

- (a) Hot mix padding for 20% of area to be resurfaced
- (b) Single lift of hot mix (50 mm)
- (c) Granular material to raise shoulders to new surface grade

Urban Roads – Granular Base (Cross Section B-1)

– Concrete Base (Cross Section C-1)

- (a) Minor base repairs for 10% of area to be resurfaced
- (b) Hot mix padding for 20% of area to be resurfaced
- (c) Curb removal and replacement on both sides for 50% of section length
- (d) Planning 1.0m of existing pavement along both curbs
- (e) Adjust manholes and catch basins to new surface grade
- (f) Single lift of hot mix (50 mm)

(R2) - BASIC RESURFACING

(Double Lift of Hot Mix – 100 mm)

Rural and Semi-Urban Roads (Cross Section A)

- (a) Hot mix padding for 20% of area to be resurfaced
- (b) Double lift of hot mix (100 mm)
- (c) Granular materials to raise shoulder to new surface grade

Urban Roads – Granular Base (Cross Section B-1)

– Concrete Base (Cross Section C-1)

- (a) Minor base repairs for 10% of area to be resurfaced
- (b) Hot mix padding for 20% of area to be resurfaced
- (c) Curb removal and replacement on both sides for 50% of section length
- (d) Planning 1.0 m of existing pavement along both curbs
- (e) Adjust manholes and catch basins to new surface grade
- (f) Double lift of hot mix (100 mm)

(RM) - MAJOR RESURFACING

(Double Lift of Hot Mix – 100 mm)

Urban Roads (Arterials and Collectors) – Granular Base (Cross Section B-1)

– Concrete Base (Cross Section C-1)

- (a) Base repairs for 50% of area to be resurfaced
- (b) Planning for 50% of area to be resurfaced
- (c) Curb removal and replacement on both sides for 50% of section length
- (d) Adjust manholes and catch basins to new surface grade
- (e) Double lift of hot mix (100 mm)

Asset Condition Rating Methodology

The Inventory Manual for Municipal Roads

(PR1) - PULVERIZING AND RESURFACING

(Single lift of Hot Mix – 50 mm)

Rural Roads (Cross Section A)

- (a) Pulverize existing hard top surface
- (b) Single lift of hot mix (50 mm)
- (c) Granular material to raise shoulders to new surface grade

(PR2) - PULVERIZING AND RESURFACING (Double Lift of Hot Mix – 100 mm)

Rural Roads (Cross Section A)

- (a) Pulverize existing hard top surface
- (b) Double lift of hot mix (100 mm)
- (c) Granular material to raise shoulders to new surface grade

(BS) - BASE AND SURFACE

Rural Roads – Tolerable Standard (50 to 100 AADT) (Cross Section D)

- (a) Granular material for base
- (b) Granular material for loose top surface
- (c) Minimal shoulder widening
- (d) Minor Ditching

Rural Roads – Design Standard (200 to 399 AADT) (Cross Section D)

- (a) Placing granular material
- (b) Minimal shoulder widening
- (c) Double surface treatment
- (d) Minor ditching

Rural Roads – Design Standard (400 plus AADT) (Cross Section D) and Semi-Urban Roads – Design Standard (Cross Section D)

- (a) Placing granular material
- (b) Minimal shoulder widening
- (c) Hot mix (50/100 mm, see table F-1)
- (d) Minor ditching

(RW) - RESURFACE AND WIDEN

Rural Roads – Tolerable Standard (50 to 199 AADT) (Cross Section E)

- (a) Excavating for widening
- (b) Ditching and side culvert replacement
- (c) Granular material for widening base
- (d) Granular material for loose top surface

Rural Roads – Design Standard (200 to 399 AADT) (Cross Section E)

- (a) Excavating for widening
- (b) Ditching and side culvert replacement
- (c) Granular material for widening base
- (d) Double surface treatment

Rural Road – Design Standard (400 plus AADT) (Cross Section E) and Semi-Urban Roads – Design Standard (Cross Section E)

- (a) Excavating for widening
- (b) Ditching and side culvert replacement
- (c) Granular material for widening base
- (d) Base Course of hot mix for widening
- (e) Hot mix Padding for 20% of existing surface area
- (f) Single lift of hot mix (50 mm)

Urban Roads – Design Standard – Granular Base (Cross Section F)

- (a) Excavating for widening
- (b) Curb and Gutter removal
- (c) Catch Basin removal
- (d) Base repair 10% of existing surface area
- (e) Granular material for widening
- (f) Place catch basins and leads
- (g) New curb and gutter
- (h) New sub-drains
- (i) Base course of hot mix for widening
- (j) Hot mix padding for 20% of existing surface area
- (k) Adjust manholes to new surface grade
- (l) Single lift of hot mix (50 mm) curb to curb

Urban Roads – Design Standard – Concrete Base (Cross section G)

- (a) Excavating for widening
- (b) Curb and gutter removal
- (c) Catch basin removal
- (d) Base repair for 10% of existing surface area
- (e) Place new catch basins and leads
- (f) Granular material for widening
- (g) Concrete base for widening
- (h) New curb and gutter
- (i) New subdrains
- (j) Base course of hot mix for widening
- (k) Hot mix padding for 20% of existing surface area
- (l) Adjust manholes to new surface grade
- (m) Single lift of hot mix (50 mm) curb to curb

(REC) - RECONSTRUCTION (RURAL and SEMI-URBAN)

Rural Roads – Design Standard (200 to 399 AADT) (Cross Section H)

- (a) Excavate base material
- (b) Ditching and side culvert replacement
- (c) Grading
- (d) Granular material
- (e) Double surface treatment

*Rural Roads – Design Standard (400 plus AADT) Cross Section H
and*

Semi-Urban Roads – Design Standard (Cross Section H)

- (a) Excavate base material
- (b) Ditching and side culvert replacement
- (c) Grading
- (d) Granular material
- (e) Hot mix (50/100 mm, see Table F-1)

*Rural and Semi-Urban Roads – Design Standard (Concrete Surface)
(Cross Section P)*

- (a) Excavate base material
- (b) Ditching and side culvert replacement
- (c) Grading
- (d) Granular Material
- (e) Concrete base and surface

(RNS) - RECONSTRUCTION NOMINAL STORM SEWERS (URBAN)

Urban Roads – Design Standard – Granular Base (Cross Section I)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Granular base
- (d) New curb and gutter
- (e) New sub-drains
- (f) Adjust manholes and catch basins
- (g) Hot mix (50/100 mm, see Table F-1)

Urban Roads – Design Standard – Concrete Base (Cross Section J)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Granular base
- (d) Concrete base
- (e) New curb and gutter
- (f) New sub-drains
- (g) Adjust manholes and catch basins
- (h) Hot mix (50/100 mm, see Table H-5)

Urban Roads – Design Standard – Concrete Surface (Cross Section O)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Granular base
- (d) Concrete base and surface
- (e) New curb and gutter
- (f) New sub-drains
- (g) Adjust manholes and catch basins

(RSS) - RECONSTRUCTION INCLUDING INSTALLATION OF STORM SEWERS

Urban Roads – Design Standard – Granular Base (Cross Section K)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Storm sewer removal
- (d) Manhole and Catch Basin removal including leads
- (e) New storm sewers
- (f) New manhole and catch basins including leads
- (g) New curb and gutter
- (h) New sub-drains
- (i) Granular base
- (j) Hot mix (100/150 mm, see Table F-1)

Urban Roads – Design Standard – Concrete Base (Cross Section L)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Storm sewer removal
- (d) Manhole and Catch Basin removal including leads
- (e) New storm sewers
- (f) New manhole and catch basins including leads
- (g) New curb and gutter
- (h) New sub-drains
- (i) Granular base
- (j) Concrete base
- (k) Hot mix (50/100 mm, see Table F-1)

Urban Roads – Design Standard – Concrete Surface (Cross Section Q)

- (a) Excavate base material
- (b) Curb and gutter removal
- (c) Storm sewer removal
- (d) Manhole and Catch Basin removal including leads
- (e) New storm sewers
- (f) New manhole and catch basins including leads
- (g) New curb and gutter
- (h) New sub-drains
- (i) Granular base
- (j) Concrete base and surface

(NC) - PROPOSED ROAD CONSTRUCTION

Rural Roads – Design Standard (200 – 399 AADT) (Cross Section H)

- (a) Grading
- (b) Ditching and cross culverts
- (c) Granular base
- (d) Double surface treatment

Rural Roads – Design Standard (400 plus AADT) (Cross Section H)

- (a) Grading
- (b) Ditching and cross culverts
- (c) Granular base
- (d) Hot mix (50.100 mm, see Table F-1)

Semi-Urban Roads

New Construction does not apply to semi-urban roads as there is no existing frontage development.

Urban Roads – Design Standard – Granular Base (Cross Section K)

- (a) Grading
- (b) Storm Sewers
- (c) Manholes and catch basins including leads
- (d) Curb and gutter
- (e) Sub-drains
- (f) Granular base
- (g) Hot mix (100 mm/150 mm, see Table F-1)

Urban Roads – Design Standard – Concrete Base (Cross Section L)

- (a) Grading
- (b) Storm Sewers
- (c) Manholes and catch basins including leads
- (d) Curb and gutter
- (e) Sub-drains
- (f) Granular base
- (g) Concrete base
- (h) Hot mix (50 mm/100 mm , see Table F-1)

Asset Condition Rating Methodology

The Inventory Manual for Municipal Roads

(SRR) - STORM SEWER INSTALLATION AND ROAD REINSTATEMENT (URBAN AND SEMI-URBAN)

Urban and Semi-Urban Roads – Granular Base (Cross Section M)

- (a) Trenching and removal of existing storm sewers
- (b) New manholes and adjust catch basin leads
- (c) New storm sewer including bedding
- (d) Granular materials in trench
- (e) Hot mix to restore surface grade (100/150 mm, see Table F-1)

Urban and Semi-Urban Roads – Concrete Base (Cross Section N)

- (a) Trenching and removal of existing storm sewers
- (b) New manholes and adjust catch basin leads
- (c) New storm sewers including bedding
- (d) Granular material in trench
- (e) Concrete base for trenched area
- (f) Hot mix to restore surface grade (50/100 mm, See Table F-1)

Urban and Semi-Urban Roads – Concrete Surface (Cross Section R)

- (a) Trenching and removal of existing storm sewers
- (b) New manholes and adjust catch basin leads
- (c) New storm sewers including bedding
- (d) Granular material in trench
- (e) Concrete base and surface for trenched area

(MICRO) SINGLE LIFT OF MICROSURFACING

Urban, Semi-Urban and Rural Roads with a HCB (High Class Bituminous) surface type

- (a) Unit cost per square metre of Microsurfacing

(SST) SINGLE LIFT OF SURFACE TREATMENT

Urban, Semi-Urban and Rural Roads with a LCB (Low Class Bituminous) surface type

- (a) Unit cost per square metre of Single Surface Treatment

(SSTplus) SINGLE LIFT OF SURFACE TREATMENT, GEOMETRIC CORRECTION DITCHING IMPROVEMENTS

Semi-Urban and Rural Roads with a LCB (Low Class Bituminous) surface type

- (a) Unit cost per square metre of Single Surface Treatment
- (b) 20% Surface area padding to 50mm to correct geometric deficiencies
- (c) Earth Excavation allowance to provide for minor ditch improvements and berm removal

(DST) DOUBLE LIFT OF SURFACE TREATMENT

Urban, Semi-Urban and Rural Roads with a LCB (Low Class Bituminous) surface type

- (a) Unit cost per square metre of Double Surface Treatment

Appendix B: Pavement Structure and Defects



To assist in understanding the content and methodology and recommendations of the report, the following discussion provides an overview of how flexible and rigid pavement structures are designed and function. The majority of municipal roads would be described as having a flexible pavement structure. Hot mix asphalt, surface treatment, and gravel road surfaces are typical flexible pavement road structures. Other pavement structure types include rigid and composite, and are more typically found on 400 series highways, or on arterial roads of larger urban centres.

Flexible Pavement Road Structure

Load is applied to the pavement structure, and ultimately to the native sub-grade, via wheel loads of vehicles. The pavement structure between the native sub-grade and the load application point has to be designed such that the load that is transmitted to the sub-grade is not greater than the sub-grade's ability to support the load. The figure below shows a typical flexible pavement structure and how applied load dissipates.

Figure 1: Load Distribution through Pavement Structure

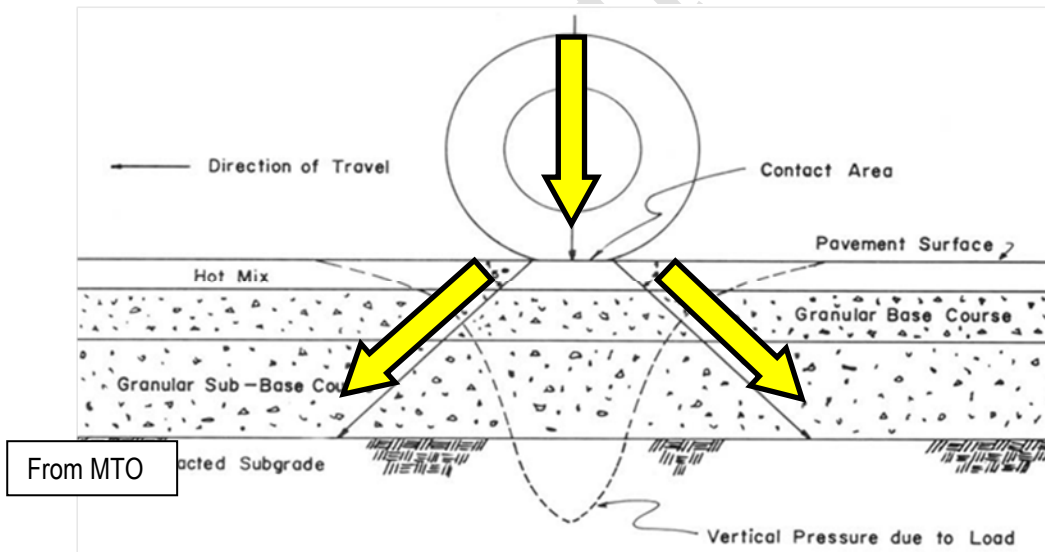


Table 1: Stress vs Depth

Depth Below Surface	Stress (psi)	Stress (Kpa)
At Surface	90	620.50
8" (200 mm) Below	11	75.84
11" (275 mm) Below	7	48.26
16" (400 mm) Below	4	27.58

If the road structure is insufficient to support the imposed load, then dependent on the sufficiency of the native soil, the soil may deform and migrate into the granular base. The granular base is then contaminated -from a geotechnical perspective- and will have reduced capacity to support load.

Surface materials experience the highest loading at the point of contact with the vehicle's tire. Radial truck tires, running from 110 psi to 120 psi (760 kpa to 830 kpa), can have an impact 20 times higher at the surface, than at the

compacted sub-grade, as shown in the above table. The loading actually occurs in three dimensions, in a conical fashion, dissipating both vertically and horizontally as it passes through the pavement structure. Loading decreases exponentially as it passes through the road structure. Therefore, materials of lesser strength, or lesser quality, may be used deeper in the road structure.

As a rule of thumb, the closer the road building materials are placed to the surface of the road, the higher the quality of the material required. Similarly, the poorer the sub-grade, or native material, the deeper/stronger the road structure has to be to carry the same loads.

Traffic counts, particularly the percentage of trucks, are critical to structural design of the pavement. Pavements are designed based on the estimated number of Equivalent Single Axle Loads (ESAL's) over the design period. One ESAL is 8 tonnes, or 80 kN. Depending upon the source, the effect of a single EASL on the pavement structure can be equivalent of up to 12,000 passenger cars. The effect of farm machinery would be very similar to that of heavy trucks. However, the Highway Traffic Act does permit certain types of farm machinery and equipment to use the roads, even during half load season, so this is an additional consideration when designing road structure and particularly low volume rural roads with farm equipment.

Figure 2: Structurally Inadequate Low Volume Road



Pavement evaluation involves a review of each road section and an assessment of the type and extent of the distress(es) observed. Treatment recommendations are predicated by whether the cause of the major distress(es) is structural or non-structural, while also considering other factors such as truck count, drainage, pavement width, etc...

Flexible pavements will have age-related distresses and wearing such as thermal cracking and oxidation. These distresses are non-structural; however, once a crack develops and water enters the pavement structure, deterioration will accelerate. Poor construction practices, quality control, or materials may produce other non-structural surface defects, such as segregation and raveling, which will also result in a reduced life expectancy of the surface asphalt.

Figure 3: Wheelpath Fatigue Cracking



Fatigue cracking indicates structural failure and can manifest itself in many forms, such as wheel path, alligator, and edge cracking. It can be localized or throughout a road section. When roads that have exhibited fatigue cracking are rehabilitated, there should be particular attention paid to the rehabilitation treatment, to ensure that the upgraded facility has sufficient structure.

Flexible Pavement Road Structure Design

There are a number of flexible pavement structural design methodologies and associated software. The simplest way to describe structural design may be the Granular Base Equivalency (GBE) Methodology. This GBE methodology is still used in Ontario by a number of agencies, and is frequently used as a cross-check where more sophisticated analysis has been undertaken.

The measurement is unit-less and relates to the structural value of one millimetre of Granular 'A' material. The relationship of the typical road building materials is expressed in either of the two following ways:

- **1 mm of HMA = 2 mm of Granular A = 3 mm of Granular B**

Or

- **HMA = 2, Granular A = 1, Granular B = 0.67**

To gain some perspective on what this means in terms of typical construction activities, the following table indicates a typical subdivision road construction as expressed in GBE.

Table 2 Granular Base Equivalency

Material	Example 1 Depth	Granular Base Equivalency	Example 2 Depth	Granular Base Equivalency
Hot Mix Asphalt (HMA)	100	200	150	300
Granular A	150	150	300	300
Granular B	300	200	0	0
TOTAL GBE	550	550	600	600

When reconstruction and rehabilitation projects are undertaken, and use of alternate materials and/or road structure is contemplated, the GBE concept is important to bear in mind, as different treatments such as Expanded Asphalt and Cold in Place recycling, also have a structural value. For design purposes, it may be prudent to use a conservative equivalency of 1.5 for these products (although, some sources indicate GBE's of up to 1.8).

As an example, if a 200 mm pavement is replaced with 150 mm of Expanded Asphalt or Cold in Place Recycling, with a 50 mm overlay of Hot Mix asphalt, a pavement structure with a GBE of 400 is replaced by a pavement structure with a GBE of 325; a significant difference. (Using a GBE of 1.5 for the Expanded or Cold in Place.) Premature failure will be the result of an under-designed pavement structure, wasting quality resources and available funding.

The purpose of this example is to illustrate the different structural values that products have. Expanded Asphalt and Cold in Place recycling are both excellent products to rehabilitate pavement structures when used appropriately.

The MTO's *Pavement Design and Rehabilitation Manual Second Edition 2013* is an excellent resource for use in pavement structure design and rehabilitation, and is available from the online MTO Catalog.

Thin Lift Pavements

Hot mix asphalt mixes are designed in Ontario either by the Marshall Method or the Superpave Method. Through time, this has resulted in a number of commonly used mixes that are typically sorted by size. One of the parameters used to describe that sizing is the Nominal Maximum Aggregate Size (NMAS).

In the Marshall Mix Method, typical mix designations are HL1, HL2, HL3, HL4, and HL8. In the Superpave mix design methodology, mixes are designated by the NMAS. The NMAS is one sieve size larger than the first sieve to retain 10% or more.

The following table identifies the NMAS for the more commonly used mixes, and indicates recommended minimum lift thicknesses for them.

Table 3: Recommended Minimum Lift Thicknesses

Mix Type	NMAS (mm)	Lift Thickness Range (mm)
SP 9.5	9.5	30 to 40
SP 12.5	12.5	40 to 50
SP 19	19.0	60 to 80
HL3	13.2	40 to 55
HL4	16.0	50 to 65
HL8	19.0	60 to 80

Figure 4: Thin Lift Pavement



**Thin lift with inappropriate aggregate size*

Rigid Pavement Structure

Rigid Pavements are constructed of concrete, or concrete with an asphalt wearing surface. The fundamental difference between a flexible pavement and a rigid pavement is the method in which the load is transferred. Whereas the flexible pavement distributes load through the pavement structure in a conical fashion, with a higher point load directly beneath the loading point, the rigid pavement structure distributes that load in a beam-like fashion, more evenly across the pavement structure. Rigid pavements may have an exposed concrete wearing surface, or they may be covered with an asphaltic concrete wearing surface.

The resulting rigid pavement structure is usually thinner overall, when compared to a flexible pavement, designed to accommodate the same traffic loading. This does not necessarily translate into a reduced cost of construction. Any comparison of costs between flexible and rigid pavements should be on a life cycle basis, for the most accurate assessment.

Older concrete pavements were prone to failure at joints, as load transfer caused a slight movement in the concrete slab, and with the intrusion of water, a structural failure. Newer concrete pavements are designed with improved load transfer technology.

Figure 5 Flexible vs. Rigid Pavement Structure(s)

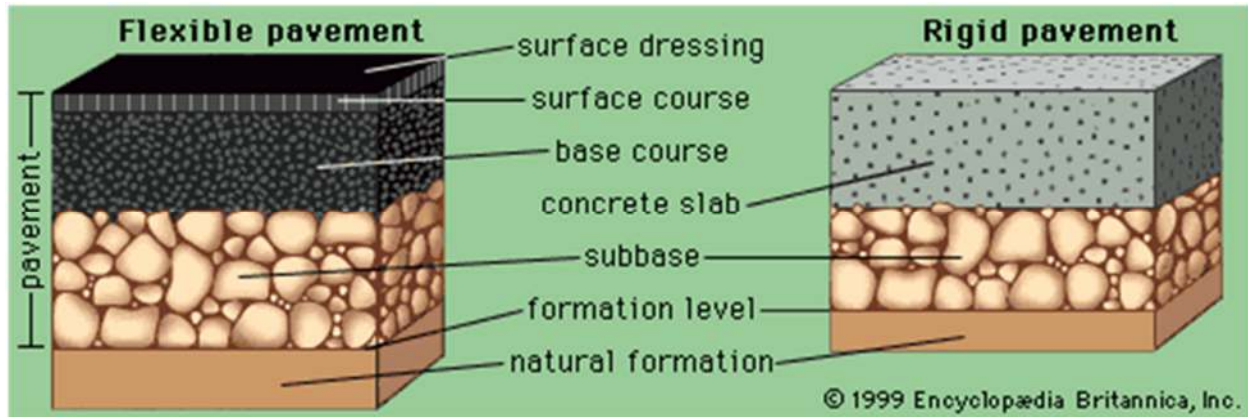
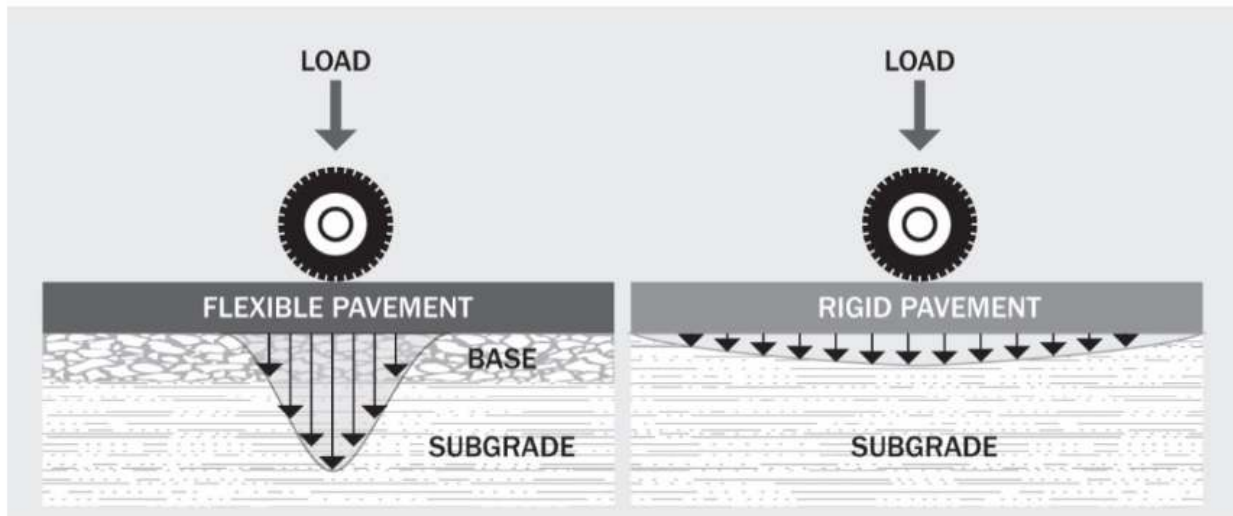


Figure 6: Flexible vs Rigid Pavement Load Distribution (CTAA Hot Mix Asphalt)



Flexible Pavement Distresses and Treatment Selection

Treatment recommendation is dependent upon the condition of the road section at the time of the review.

Treatment Selection – Critical Area Analysis

When using the Inventory Manual methodology all of the 'holistic' needs are considered in the recommendation. For example, a road may appear to require only a resurfacing, however, when the other critical areas are reviewed, there

may be a capacity problem which would then result in a recommendation to resurface and widen (RW) that would address both the pavement condition and the need for additional lanes.

Another example would be where the pavement is exhibiting some type of distress but there is also poor drainage. The recommendation would then be to reconstruct (REC if rural, RSS if urban).

Treatment Selection for Non-Structural Rehabilitation

Resurfacing recommendations are predicated upon the type and extent of distress noted. For example, all pavements will develop thermal/transverse cracking as they age. As the age of the pavement increases, the frequency of the cracking increases. If the spacing of the cracks is still greater than 10m, then the R1 – resurface with one lift of asphalt – treatment will typically be sufficient to restore the road as the treatment provides for overlay and base asphalt repair. However, if the frequency of transverse cracking, which may have become transverse alligator cracking if left unattended too long, then the recommendation will be more extensive, such as a PR2- Pulverize and resurface with 2 lifts of asphalt. The following illustrates transverse cracking.

Figure 7: Transverse /Thermal Cracking (Non Structural)



Reflective Cracking

Paving over an active crack(s) will result in a crack(s) in the same location within 2 to 3 years. As a rule of thumb, the crack will migrate through at approximately 25mm per year. Therefore it would be anticipated that if a 50mm overlay is placed, then the cracking would reappear in approximately 2 years. This is not an efficient usage of available funding.

Figure 8: Reflective Transverse Cracking on Newer Pavement



Treatment Selection for Structural Rehabilitation

Road sections exhibiting structural failure such as fatigue cracking require a more extensive rehabilitation to restore the performance of the road section. In simple terms, placing a single lift of asphalt over structurally failed asphalt will guarantee the same failure in a very short time period. Unless the single lift overlay is placed knowingly as a holding strategy, it should be avoided on structurally deficient pavements. For pavements that have failed structurally or have too frequent transverse cracking, the recommendation is typically PR2 as a minimum provided the drainage is adequate or requires only minor improvement.

Figure 9: Overlay on Failed Pavement and Resultant Reflective Cracking



The above figures illustrate a pavement that has failed both structurally and has very frequent severe transverse cracks. Placement of a 50mm overlay over this type of pavement condition will result in rapid failure and is not recommended, other than if a holding treatment is absolutely necessary. The figure above and to the right illustrates a newer pavement that already has very frequent transverse cracks appearing, likely the result of paving over a failed pavement. Under normal circumstances, the first transverse / thermal cracks generally appear in approximately 4 to 6 years and the cracks are 40m to 50m or more apart. Reflective cracking is dependent on overlay thickness. As a rule of thumb, the cracks will reappear on the surface at approximately 25mm/year. A 50mm overlay over a cracked surface will should the underlying defects in approximately 2 years.

Draft V5

Township of Malahide, 2021 SotI and AMP for Roads
February 2, 2022

Appendix C: Deterioration Curve Detail



Asset Classes

In order to utilize the Best Practice and Performance Modeling modules of the WorkTech Asset Manager Foundation software (WT), assets must be defined by an asset class.

Conventional wisdom has been to define road assets by their functional classes such as Arterial, Collector or Local, and then further differentiate by usage, such as residential or commercial. From a performance modeling perspective, using the functional classification will only work to a point, as the traffic on a functional class can and does vary significantly between agencies. There may also be differences in surface materials, which will have different performance and life cycle events.

Functional classifications also vary dependent on the methodology being utilized. Commonly used classification systems have been developed a number of agencies including the Transportation Association of Canada (TAC) and the Ontario Ministry of Transportation (MTO). Both utilize combinations of roadside environment, functional classifications, and in some cases, speed limit. In both these examples, surface materials are not a consideration in the classification.

In Ontario, Regulation 239/02, Minimum Maintenance Standards for Municipal Highways, and Regulation 588/17, Asset Management Planning for Municipal Infrastructure also provide for road asset classification.

The various classifications all serve a purpose. However, within any given functional classification such as may be found in O.Reg 239/02, O.Reg 588/17 or the Inventory Manual, roadside environment, surface material, traffic count and commercial traffic counts can vary significantly. Those parameters result in varying performance, replacement and treatment costs.

To develop more accurate pavement performance prediction models, parameters that are common to a group of assets have to be accommodated in the road asset classification (and are not accommodated in the aforementioned classification methodologies.) The performance/deterioration of a road section is more predictable based on surface type and traffic volume rather than by functional class.

Based on that philosophy, 4 Roads developed road asset classifications based on by Surface Type, Traffic Volume and Roadside Environment. Roadside Environment has been added to accommodate the differences in replacement and improvement costs between rural, semi urban and urban cross-sections.

Typically, the traffic range for road assets with a gravel (G/S) or surface treated surface (LCB) is quite limited. However, road assets with a hot mix asphalt surface (HCB) may have a significant variance in traffic volume, and a resultant difference in anticipated performance. As such, road assets with more limited traffic ranges have been differentiated by surface type and roadside environment. For HCB road assets the profiles are subdivided by road side environment, and further subdivided into four traffic ranges.

Table 1: Road Asset Surface Materials

Acronym	Description	Acronym	Description
ETH	Earth	C/M	Cold Mix
G/S	Gravel Stone or Other Loose Top	HCB	High Class Bituminous
HFL	High Float, similar to LCB	CON	Concrete
LCB	Low Class Bituminous (Surface Treatment)	A/C	Asphalt over Concrete
ICB	Intermediate Class Bituminous	OTH	Other

Table 2 identifies the road asset classes that have been developed for use in WT by 4 Roads Management Services Inc.

Table 2: Road Asset Classes

Asset Class	Subtype	Material	RDSE Envt	AADT Low	AADT High
A/C-R	All	A/C	R	1	100,000
A/C-S	All	A/C	S	1	100,000
A/C-U	All	A/C	U	1	100,000
CM1-R	All	C/M	R	1	3,000
CM1-S	All	C/M	S	1	3,000
CM1-U	All	C/M	U	1	3,000
CON-R	All	CON	R	1	100,000
CON-S	All	CON	S	1	100,000
CON-U	All	CON	U	1	100,000
GST1-R	All	G/S	R	1	10,000
GST1-S	All	G/S	S	1	10,000
HCB1-R	All	HCB	R	20,000	100,000
HCB1-S	All	HCB	S	20,000	100,000
HCB1-U	All	HCB	U	20,000	100,000
HCB2-R	All	HCB	R	10,000	19,999
HCB2-S	All	HCB	S	10,000	19,999
HCB2-U	All	HCB	U	10,000	19,999
HCB3-R	All	HCB	R	1,000	9,999
HCB3-S	All	HCB	S	1,000	9,999
HCB3-U	All	HCB	U	1,000	9,999
HCB4-R	All	HCB	R	1	999
HCB4-S	All	HCB	S	1	999
HCB4-U	All	HCB	U	1	999
ICB-S	All	ICB	S	1	3,000
ICB-U	All	ICB	U	1	3,000
ICB1-R	All	ICB	R	1	3,000
LCB1-R	All	LCB	R	1	2,000
LCB1-S	All	LCB	S	1	2,000
LCB1-U	All	LCB	U	1	2,000

Asset classes are differentiated by surface material, roadside environment and traffic range.

Deterioration Curves

From **ASTM 6433**, Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys, Pavement Condition Index (PCI) is defined as follows;

'2.1.4 pavement condition index (PCI)—a numerical rating of the pavement condition that ranges from 0 to 100 with 0 being the worst possible condition and 100 being the best possible condition.'

'4.1 The PCI is a numerical indicator that rates the surface condition of the pavement. The PCI provides a measure of the present condition of the pavement based on the distress observed on the surface of the pavement, which also indicates the structural integrity and surface operational condition (localized roughness and safety). The PCI cannot measure structural capacity nor does it provide direct measurement of skid resistance or roughness. It provides an objective and rational basis for determining maintenance and repair needs and priorities. Continuous monitoring of the PCI is used to establish the rate of pavement deterioration, which permits early identification of major rehabilitation needs. The PCI provides feedback on pavement performance for validation or improvement of current pavement design and maintenance procedures.'

In WorkTech, Physical Condition is the Structural Adequacy multiplied by 5 to produce a score from 5 to 100; very much a parallel to the PCI and its' inherent usage as identified above.

When using the Inventory Manual (IM) methodology, Structural Adequacy is a measurement of the percentage of the surface of the road that is exhibiting distress. The rater will consider the type of distress as well as the other critical areas (surface width, capacity, geometry, drainage, and surface type) in order to provide a recommendation for an improvement. In the IM, any, or multiple of the critical areas, may produce a Time of Need (TON). The overall TON of the road section is the worst of all of the TON's. For example, if five of the TON's are ADEQ, and one is NOW, the section is a NOW need.

All deterioration curves relate to the 'Physical Condition' data field in WorkTech. The Physical Condition deterioration curve is specific to the Inventory Manual and therefore the trigger points and definition of the curve will be different than other methodologies. It should be noted that different evaluation methodologies will produce varying deterioration curves and trigger points. Familiarity with the rating system being utilized is essential.

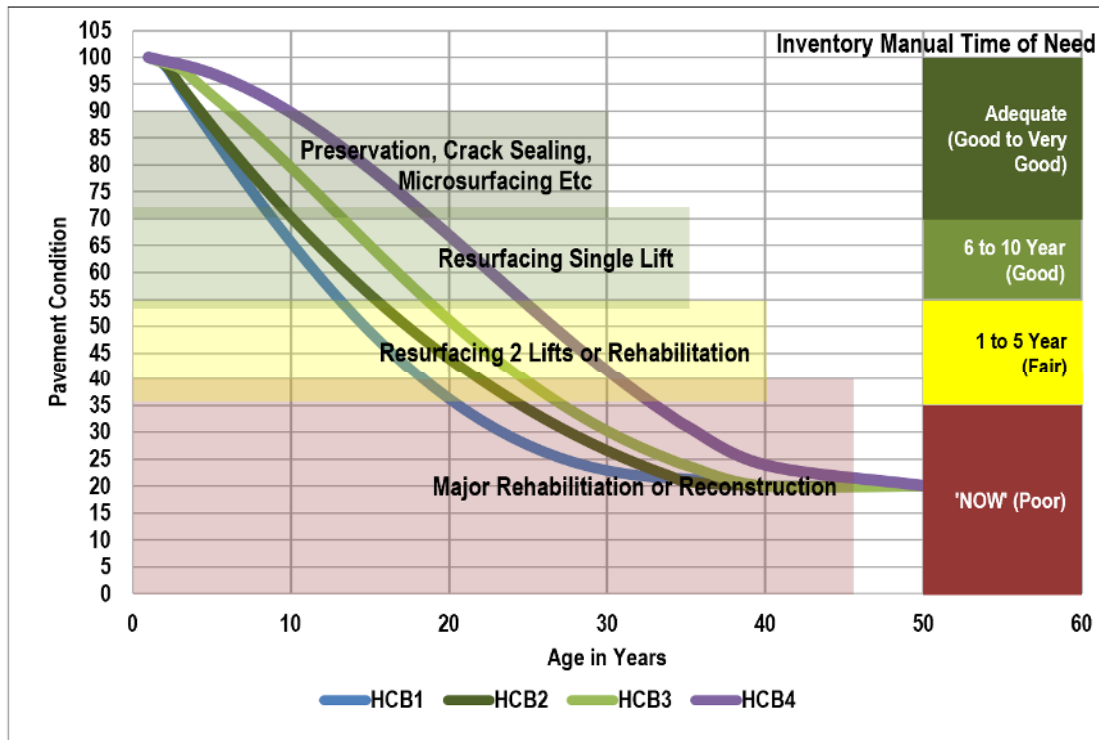
It would be possible, but very difficult, to develop performance models around all of the critical areas. So, for the purposes of the performance modeling, Structural Adequacy (distress) has been selected to be the driver in the decisions with respect to the model. This is typical with most performance modeling software.

Models can be configured to weight factors, such as condition, and traffic in project selection to develop a program. From a pure asset management perspective, weighting project selection for best return on investment (ROI) will produce a work plan that most effectively utilizes available funding.

Models may also be configured to select the improvement recommended from the field review or use the deterioration curve based on just the structural rating. Typically, 4 Roads uses the recommended treatment as that should address all of the defects, not just the pavement defects. In the early years of the model, if a project is selected that has a recommended improvement type resultant from the field review, that improvement will be used for the project in the year that it is selected based on the model configuration and available funding. In the later years, presumably after all current deficiencies have been corrected, the model will revert to the assigned asset class for deterioration and project selection based on estimated condition.

The deterioration curves are the same for each asset class regardless of roadside environment. The difference is the improvement and replacement costs; urban treatments are more expensive. For example, for urban sections, the replacement improvement is RSS- Reconstruction with Storm Sewers, rather than REC- Reconstruction Rural, used for rural and semi urban cross sections.

Figure 1: Physical Condition versus Improvement Selection by Hot Mix Asphalt Asset Class



In 4 Roads WorkTech setup where the MTO PCI / Inventory Manual Hybrid Condition Rating format is being used, the PCI data is entered to produce a PCI score from different formulas that represent the defects and weightings by surface type. The PCI formulae are from the Ministry of Transportation of Ontario Pavement Rehabilitation and Design Manual, Second Edition, 2013.

The PCI score is then used to approximate a Structural Adequacy score (and a Physical Condition). Table 3 identifies the approximations to convert PCI to Structural Adequacy and a Time of Need.

Once a Structural Adequacy Score has been determined, the TON is also calculated. What this achieves is the detail of PCI data collection and the strength of the holistic evaluation of the Inventory Manual.

The PCI comparator in Table 3 is for HCB roads using the rating methodology in the Ministry of Transportation of Ontario Pavement Rehabilitation and Design Manual, Second Edition, 2013. Different PCI methodologies will produce a different PCI score as the number and weighting of defects may change. There is also a significant difference in how ride is integrated into the overall formula. Structural Adequacy ratings do not include a ride component and only include structural defects. PCI ratings typically include rating for all types of defects, structural or not.

PCI rating methodologies typically include a severity and extent of a defect. The Inventory Manual is more of a presence/absence measure.

Given the foregoing discussion, Table 3 indicates approximations rather than an equation to directly convert the ratings.

Table 3: PCI to Structural Adequacy Approximations

PCI Range	SA	Physical Condition (SA * 5)	% Structural Distress - Inventory Manual	Time of Need - Inventory Manual	Descriptor
100	20	100	<5	ADEQ	Good
100	19	95	0-4	ADEQ	Good
95-99	18	90	5-10	ADEQ	Good
89-95	17	85	5-10	ADEQ	Good
85-89	16	80	5-10	ADEQ	Good
86-86	15	75	5-10	ADEQ	Good
81-85	14	70	11	6 to 10	Good
75-81	13	65	11-15	6 to 10	Good
74-76	12	60	11-15	6 to 10	Good
73-75	11	55	15	1 to 5	Fair
67-73	10	50	16-20	1 to 5	Fair
59-67	9	45	16-20	1 to 5	Fair
55-59	8	40	16-20	1 to 5	Fair
52-55	7	35	20	NOW	Poor
44-53	6	30	33	NOW	Poor
36-44	5	25	46	NOW	Poor
28-36	4	20	59	NOW	Poor
21-28	3	15	72	NOW	Poor
18-21	2	10	85	NOW	Poor
10-18	1	5	100	NOW	Poor

Asset Classes and Deterioration Curves for Roads

Figure 2: Inventory Manual / Pavement Condition Comparisons

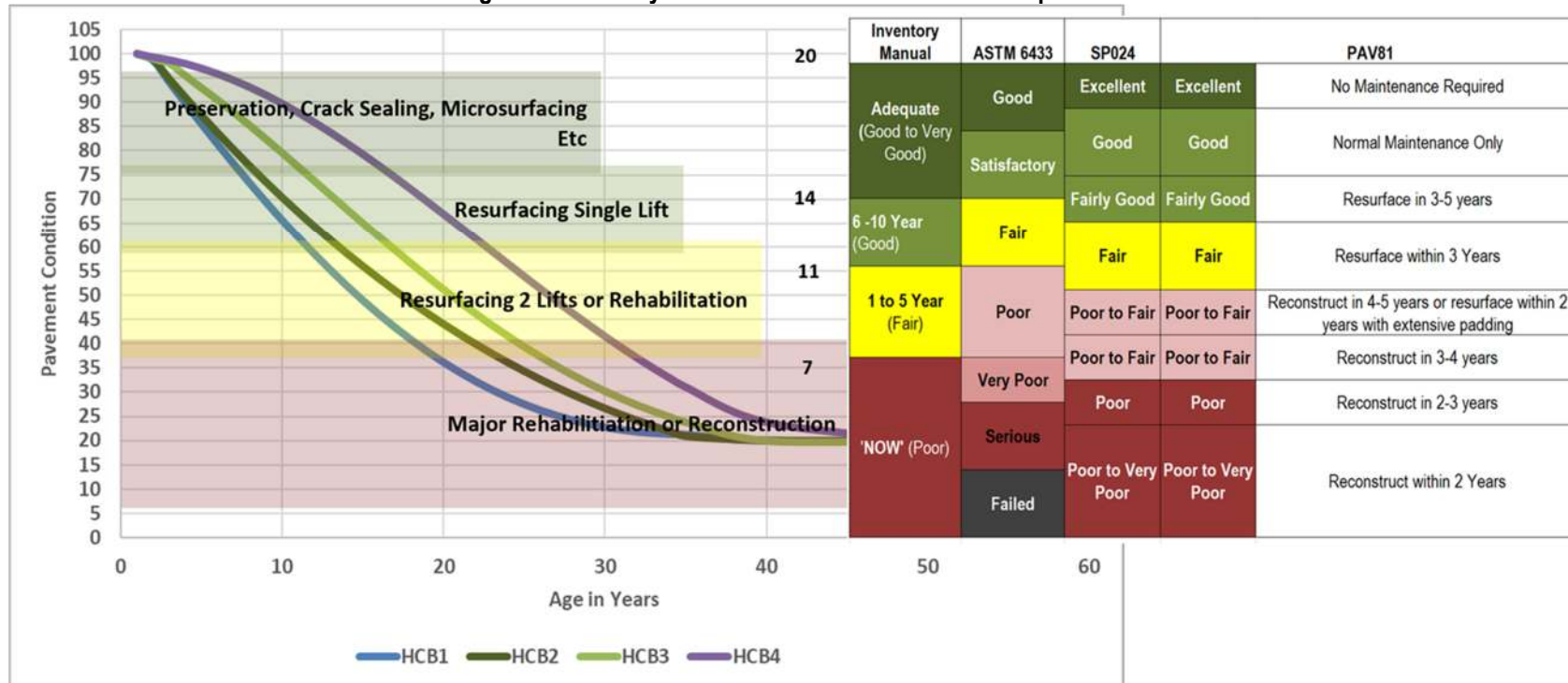


Figure 3: Inventory Manual / Physical Condition Comparison to SP021 (for LCB Roads)

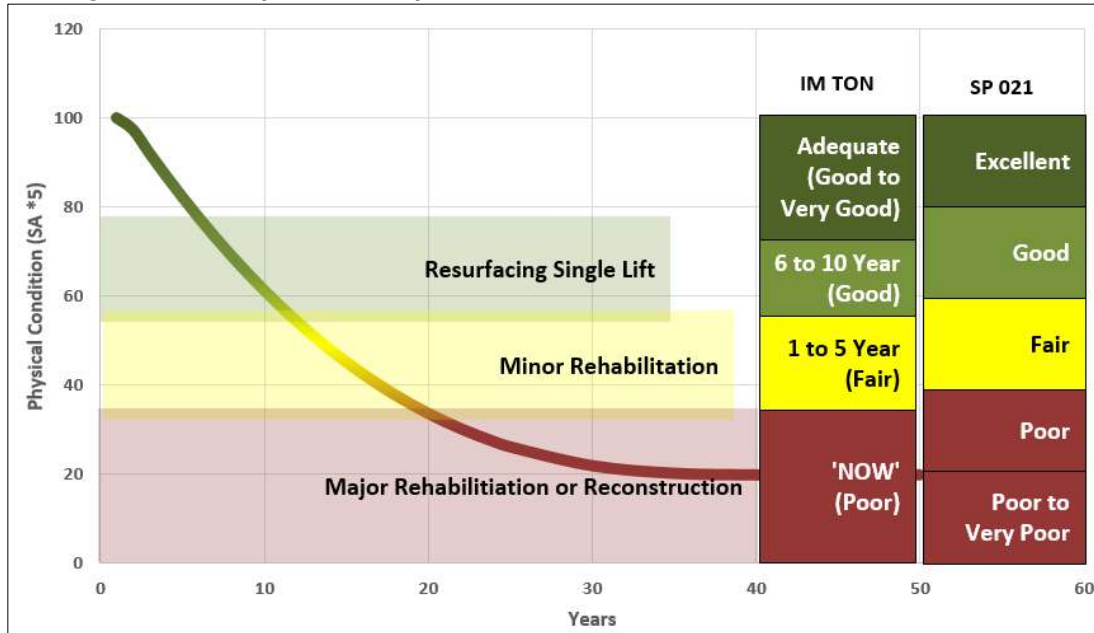
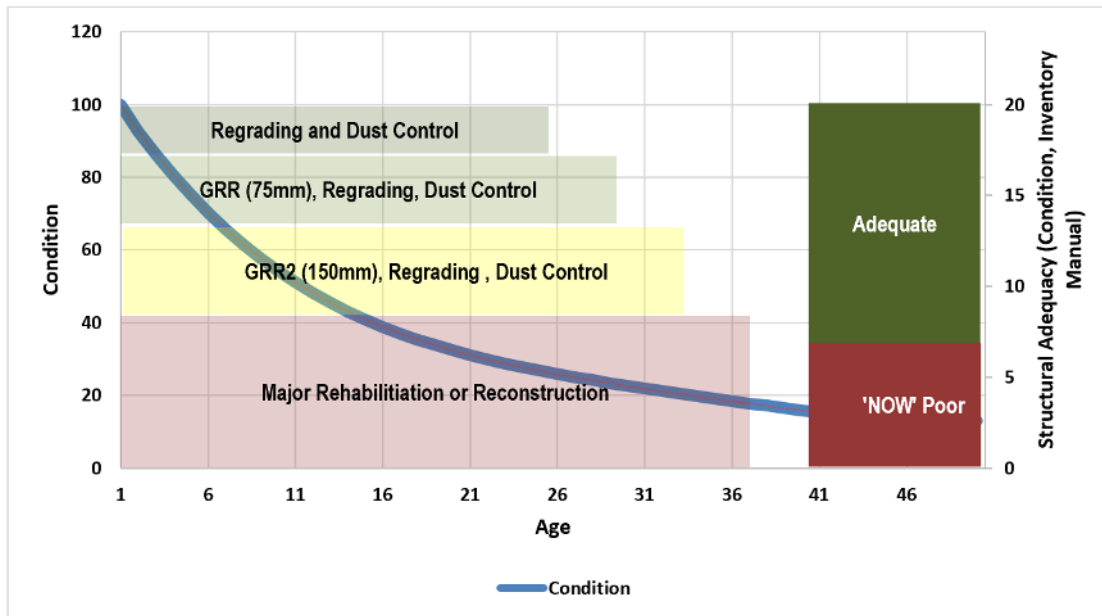


Figure 4: Inventory Manual TON vs Improvement Recommendation for Gravel Roads



Improvement Types- Effect on the Asset

Appendix A of this report includes a summary of the improvement types that are included in the inventory Manual. In WorkTech there is no restriction on what may be developed as an improvement type for a road agency. However, regardless of the improvement types that are used, the effect that the improvement has on the asset has to be understood in order to use performance modeling.

Table 4 identifies a number of improvement types and further identifies the effect that they have on a road asset. A similar approach may be taken with other assets.

The effect that a treatment has on an asset is critical to the analysis. Inaccurate determination of the effect of a treatment on an asset will produce an inaccurate – and indefensible- result. The following chart is a comparison of the deterioration of a road section without any treatment applied versus a road section that has appropriate treatment at the optimal condition, producing a more cost effective life cycle.

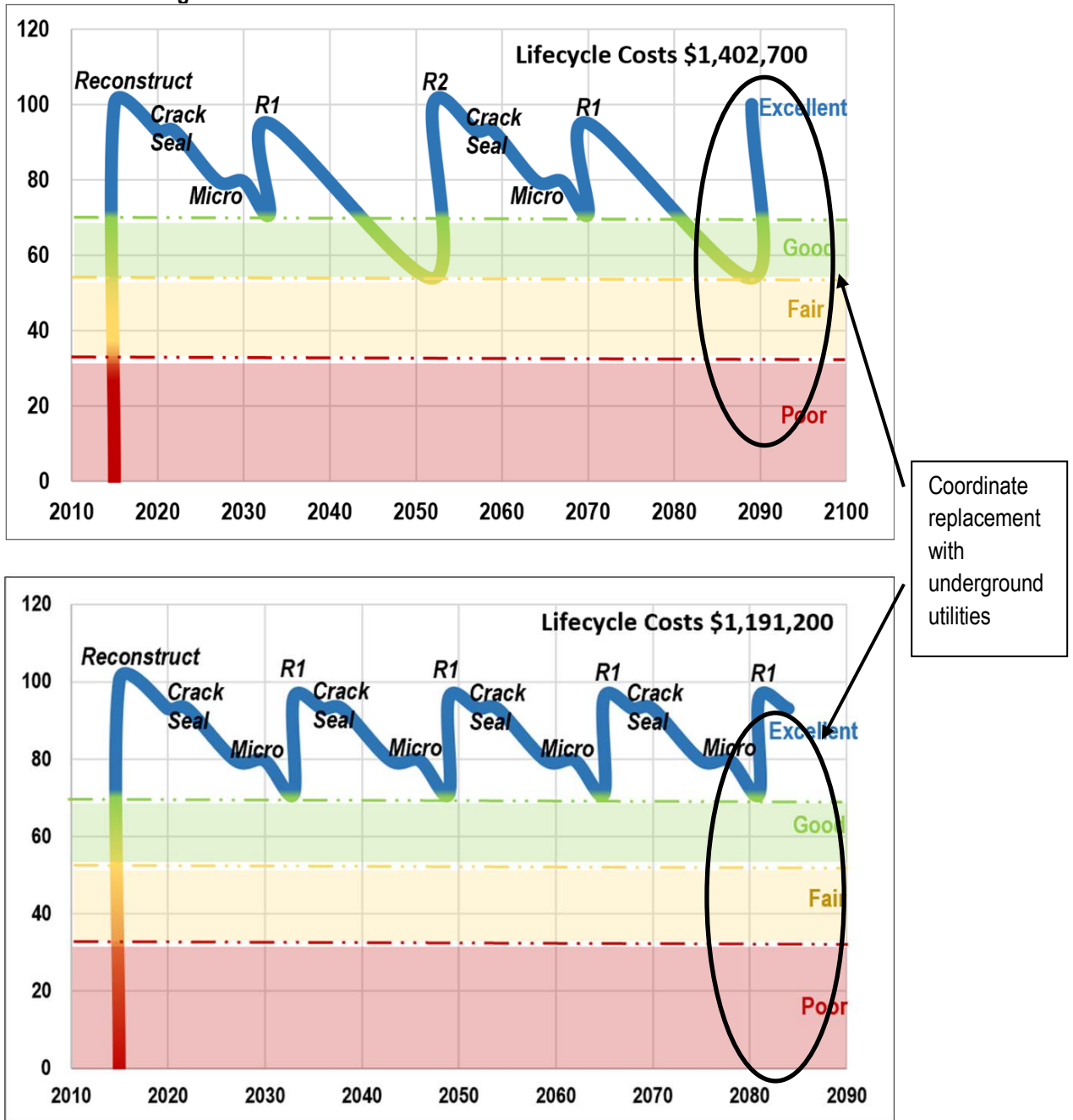
Table 4: Treatment Effect on the Asset

Code	Description	Effect on the Asset
R1	Basic Resurfacing – Single Lift	Increase Physical Condition by 27
R2	Basic Resurfacing – Double Lift	Increase Physical Condition to 100
RM	Major Resurfacing	Increase Physical Condition to 100
PR1	Pulverizing and Resurfacing – Single Lift - Generally not recommended by 4 Roads	Increase Physical Condition to 90
PR2	Pulverizing and Resurfacing – Double Lift –May be substituted with CIR, CIREAM, with appropriate structural investigation	Increase Physical Condition to 100
BS	Base and Surface Tolerable – Tolerable standard for lower volume roads – Rural and Semi-Urban Cross sections only	Increase Physical Condition to 95
RW	Resurface and Widen	Increase Physical Condition to 97
REC	Reconstruction	Increase Physical Condition to 100
RNS	Reconstruction Nominal Storm Sewers (Urban: no new sewer, adjust manholes, catch basins, add sub-drain, remove and replace curb and gutter, granular, and hot mix)	Increase Physical Condition to 100
RSS	Reconstruction including Installation of Storm Sewers (New storm sewers and manholes in addition to the above)	Increase Physical Condition to 100
NC	Proposed Road Construction	Increase Physical Condition to 100
NONE	No Improvement Recommended	No Effect
SRR	Storm Sewer Installation and Road Reinstatement	No Effect
CRK	Crack Sealing	Hold Physical Condition for 2 Years
MICRO	Microsurfacing	Hold Physical Condition for 3 years
GRR	Gravel Road Resurfacing – add 75mm	Hold Physical Condition for 3 years
GRR2	Gravel Road Resurfacing - Add 150mm	Increase Physical Condition by 20
SST	Single Surface Treatment	Increase Physical Condition to 90
DST	Double Surface Treatment	Increase Physical Condition to 95
DSTrehab	Double Surface Treatment Rehabilitation- Pulverize, Add 75mm Aggregate, Double Surface Treat to edge of rounding, Ditching	Increase Physical Condition to 95

Performance Model Project Selection

From a pure asset/pavement management perspective, 4 Roads believes that project selection based on return on investment of the improvement type will produce a work plan that optimizes available funding. Typically, if the return on investment (ROI) scenario is selected, the preservation and resurfacing activities offer the highest ROI and are prioritized within the work plan model.

Figure 5: Performance Model – Effect of Treatment on Asset



Notes: Lifecycle activities will depend on initial design and asphalt thickness
 Top graph may more closely resemble a perpetual pavement life cycle; bottom graph may more closely resemble a lower volume road such as in a subdivision

Figure 5 illustrates several different aspects of performance model output including the effect of a treatment on an asset and the effect of multiple treatments undertaken at the optimal asset condition to produce a cost effective management strategy.

Similar calculations are utilized to determine the scenario ROI and the improvement type ROI. The following is excerpted from the WorkTech Manual.

Scenario Return on Investment

$$ROI = \frac{(\text{End of Scenario Asset Value} - \text{Do Nothing Asset Value})}{\text{Total Budget (all years)}}$$

Improvement Type Return on Investment

$$ROI = \frac{(\text{Value if Funded} - \text{Do Nothing Value})}{\text{Improvement Cost.}}$$

Within any given scenario, weightings may be applied that will affect project selection. Weighting factors may be applied for best condition, worst condition

Calculation Methods (from the WorkTech Manual)

The calculation method choice tells the program whether to determine budget needs or, optimize a given budget. Choices are as follows

- **Calculate Budget to Maintain Current Average Condition.** The program will determine the budget and work plan to keep the average condition for each service class at the current level. For example, if Arterial Roads are at an average condition of 72, the program will determine what is needed to maintain the average condition of 72.
- **Calculate Budget to Produce Desired Average Condition.** The program will determine the budget and work plan required to produce the entered average condition value at the end of the scenario.
- **Calculate Results for Entered Budgets.** You will enter the available budget by year and the program will optimize this based on your spending objective.

Spending Objective (from the WorkTech Manual)

With any of the above Calculation Methods the program needs to make choices on which improvements to fund. The program will do this based on your spending objective. You have the option of selecting one of several pre-defined objectives or, creating a custom spending priority objective. Options for your spending objective are as follows

Return on Investment The program will prioritize work that results in the highest return on investment.

$$ROI = \frac{(\text{Asset Value if Work is Funded} - \text{Do Nothing Asset Value})}{\text{Cost of Required Work}}$$

Needs Savings The program will prioritize work which results in the highest reduction in Needs.

$$\text{Needs Savings Percent} = \frac{(\text{Current Needs} - \text{Next Year Needs if work is Funded})}{\text{Cost of Required Work}}$$

Best Condition The program will prioritize assets based on condition value.

Lowest Condition

The program will prioritize assets based on inverse condition (1 / condition)

Custom

Displays the Custom Priority Setup Group Box. May be defined by one or more weighting formulas.

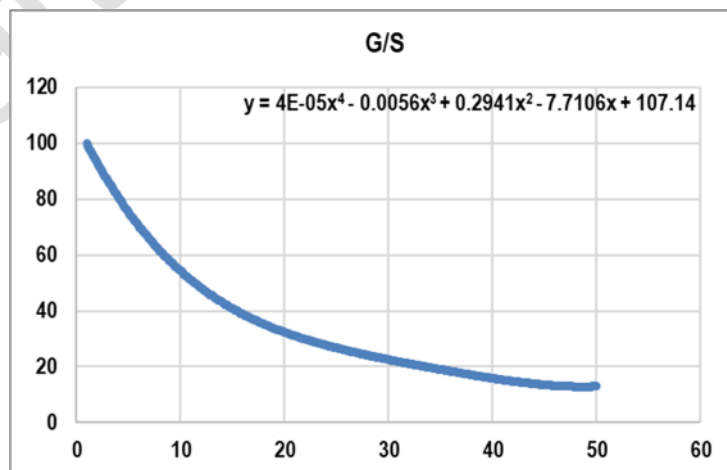
Weighting types may include ROI, Needs Savings, Inverse Condition, Service Class and AADT or combinations thereof.

Deterioration Curves by Surface Type and Traffic Volume

The following pages includes tables and graphs indicating the anticipated performance of an appropriately constructed road asset and the condition triggers for treatments. The deterioration curves by asset class used in concert with the table indicating the treatment effect on the asset, and the agency's unit costs, will produce a performance model that demonstrates the effect on the system at various budget levels and produce a program based on input parameters.

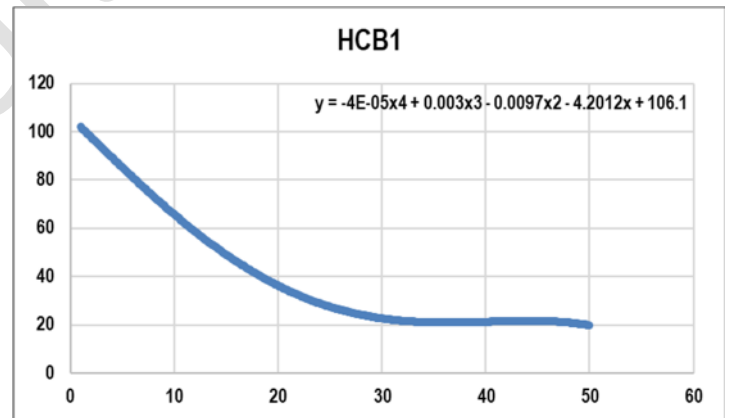
Gravel Roads- All Roadsides, all AADT

Year	Condition	Imp Type	Description
1	100	NONE	No Improvement Required
2	92.45	NONE	No Improvement Required
3	86.21	GRR	75mm of Granular A
4	80.43	GRR	75mm of Granular A
5	75.11	GRR	75mm of Granular A
6	70.21	GRR	75mm of Granular A
7	65.7	GRR2	150mm of additional Gravel
8	61.55	GRR2	150mm of additional Gravel
9	57.75	GRR2	150mm of additional Gravel
10	54.27	GRR2	150mm of additional Gravel
11	51.07	GRR2	150mm of additional Gravel
12	48.15	GRR2	150mm of additional Gravel
13	45.48	GRR2	150mm of additional Gravel
14	43.04	GRR2	150mm of additional Gravel
15	40.81	BS	Base and Surface
16	38.77	BS	Base and Surface
17	36.9	BS	Base and Surface
18	35.2	REC	Reconstruction - Rural
19	33.63	REC	Reconstruction - Rural
20	32.19	REC	Reconstruction - Rural
21	30.86	REC	Reconstruction - Rural
22	29.64	REC	Reconstruction - Rural
23	28.51	REC	Reconstruction - Rural
24	27.45	REC	Reconstruction - Rural
25	26.47	REC	Reconstruction - Rural
30	22.28	REC	Reconstruction - Rural
35	18.88	REC	Reconstruction - Rural
40	20	REC	Reconstruction - Rural
45	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



HCB1 All Roadsides- AADT > 20,000, assumes 10% Commercial

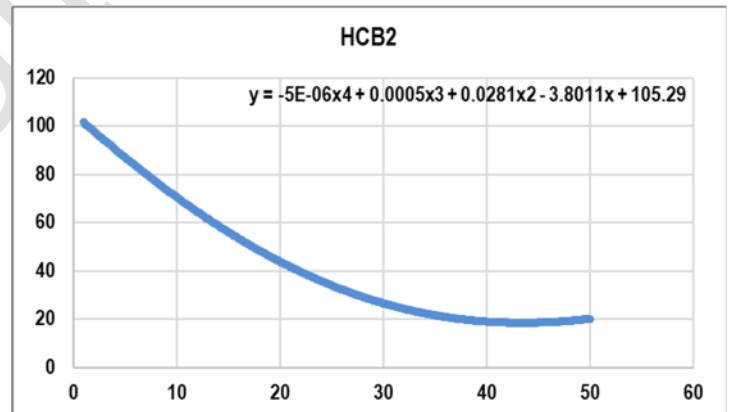
Year	Condition	Imp. Type	Description
1	100	NONE	No Improvement Required
2	98.61	NONE	No Improvement Required
3	94.19	NONE	No Improvement Required
4	89.83	CRK	Crack Sealing
5	85.55	CRK	Crack Sealing
6	81.36	CRK	Crack Sealing
7	77.26	MICRO	Microsurfacing– Pavement Preservation
8	73.28	MICRO	Microsurfacing Pavement Preservation
9	69.4	R1	Basic Resurfacing 1 - 50mm
10	65.65	R1	Basic Resurfacing 1 - 50mm
11	62.02	R1	Basic Resurfacing 1 - 50mm
12	58.54	R1	Basic Resurfacing 1 - 50mm
13	55.19	R2	Basic Resurfacing 2 - 100mm
14	52	R2	Basic Resurfacing 2 - 100mm
15	48.96	R2	Basic Resurfacing 2 - 100mm
16	46.08	R2	Basic Resurfacing 2 - 100mm
17	43.36	R2	Basic Resurfacing 2 - 100mm
18	40.81	R2	Basic Resurfacing 2 - 100mm
19	38.41	R2	Basic Resurfacing 2 - 100mm
20	36.19	REC	Reconstruction - Rural
22	32.24	REC	Reconstruction - Rural
23	30.51	REC	Reconstruction - Rural
24	28.95	REC	Reconstruction - Rural
25	27.55	REC	Reconstruction - Rural
26	26.3	REC	Reconstruction - Rural
27	25.21	REC	Reconstruction - Rural
28	24.27	REC	Reconstruction - Rural
29	23.47	REC	Reconstruction - Rural
30	22.82	REC	Reconstruction - Rural
35	21.31	REC	Reconstruction - Rural
40	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



Where 'REC' is specified, 'RSS' is utilized for an Urban Roadside Environment

HCB 2 All Roadsides- AADT >10,000 <20,000, Assumes 10% Commercial

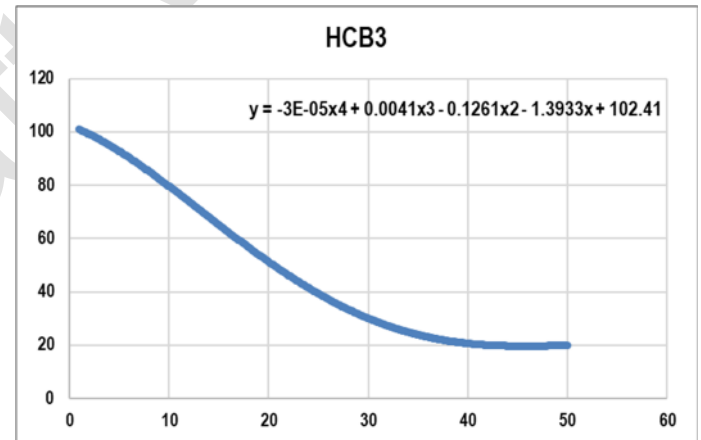
Year	Condition	Imp. Type	Description
1	100	NONE	No Improvement Required
2	98.79	NONE	No Improvement Required
3	94.85	NONE	No Improvement Required
4	91.01	CRK	Crack Sealing
5	87.29	CRK	Crack Sealing
6	83.68	CRK	Crack Sealing
7	80.18	CRK	Crack Sealing
8	76.79	MICRO	Microsurfacing Pavement Preservation
9	73.51	MICRO	Microsurfacing Pavement Preservation
10	70.33	R1	Basic Resurfacing 1 - 50mm
11	67.26	R1	Basic Resurfacing 1 - 50mm
12	64.28	R1	Basic Resurfacing 1 - 50mm
13	61.41	R1	Basic Resurfacing 1 - 50mm
14	58.63	R1	Basic Resurfacing 1 - 50mm
15	55.95	R2	Basic Resurfacing 2 - 100mm
16	53.38	R2	Basic Resurfacing 2 - 100mm
17	50.89	R2	Basic Resurfacing 2 - 100mm
18	48.5	R2	Basic Resurfacing 2 - 100mm
19	46.2	R2	Basic Resurfacing 2 - 100mm
20	43.99	R2	Basic Resurfacing 2 - 100mm
21	41.87	R2	Basic Resurfacing 2 - 100mm
22	39.84	R2	Basic Resurfacing 2 - 100mm
23	37.89	R2	Basic Resurfacing 2 - 100mm
24	36.03	R2	Basic Resurfacing 2 - 100mm
25	34.26	REC	Reconstruction - Rural
26	32.56	REC	Reconstruction - Rural
27	30.95	REC	Reconstruction - Rural
28	29.42	REC	Reconstruction - Rural
29	27.97	REC	Reconstruction - Rural
30	26.59	REC	Reconstruction - Rural
35	20.86	REC	Reconstruction - Rural
40	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



Where 'REC' is specified, 'RSS' is utilized for an Urban Roadside Environment

HCB 3 All Roadsides – AADT 1,000 < 10,000, Assumes 10% Commercial

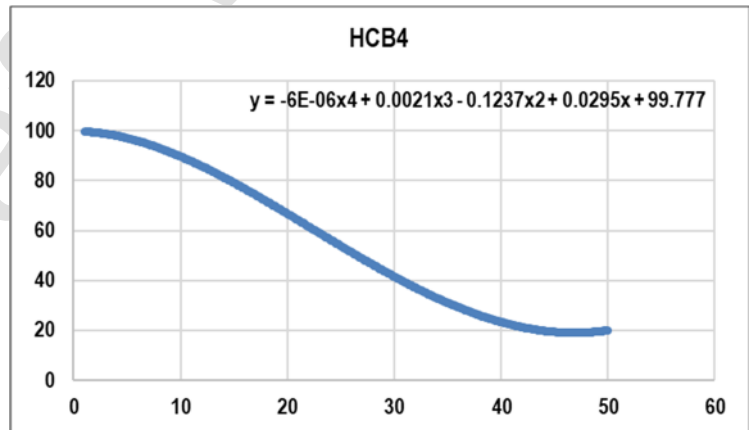
Year	Condition	Imp. ype	Description
1	100	NONE	No Improvement Required
2	99.44	NONE	No Improvement Required
3	97.46	NONE	No Improvement Required
4	95.29	NONE	No Improvement Required
5	92.95	CRK	Crack Sealing
6	90.48	CRK	Crack Sealing
7	87.88	CRK	Crack Sealing
8	85.18	CRK	Crack Sealing
9	82.4	CRK	Crack Sealing
10	79.56	MICRO	Microsurfacing Pavement Preservation
11	76.67	MICRO	Microsurfacing Pavement Preservation
12	73.76	MICRO	Microsurfacing Pavement Preservation
13	70.83	R1	Basic Resurfacing 1 - 50mm
14	67.91	R1	Basic Resurfacing 1 - 50mm
15	65.01	R1	Basic Resurfacing 1 - 50mm
16	62.14	R1	Basic Resurfacing 1 - 50mm
17	59.31	R1	Basic Resurfacing 1 - 50mm
18	56.54	R1	Basic Resurfacing 1 - 50mm
19	53.83	R2	Basic Resurfacing 2 - 100mm
20	51.19	R2	Basic Resurfacing 2 - 100mm
21	48.63	R2	Basic Resurfacing 2 - 100mm
22	46.17	R2	Basic Resurfacing 2 - 100mm
23	43.8	R2	Basic Resurfacing 2 - 100mm
24	41.53	R2	Basic Resurfacing 2 - 100mm
25	39.37	R2	Basic Resurfacing 2 - 100mm
26	37.31	R2	Basic Resurfacing 2 - 100mm
27	35.37	R2	Basic Resurfacing 2 - 100mm
28	33.54	REC	Reconstruction - Rural
29	31.82	REC	Reconstruction - Rural
30	30.22	REC	Reconstruction - Rural
35	23.83	REC	Reconstruction - Rural
40	20	REC	Reconstruction - Rural
45	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



Where 'REC' is specified, 'RSS' is utilized for an Urban Roadside Environment

HCB 4 All Roadsides- AADT <1,000, Assumes 5% Commercial

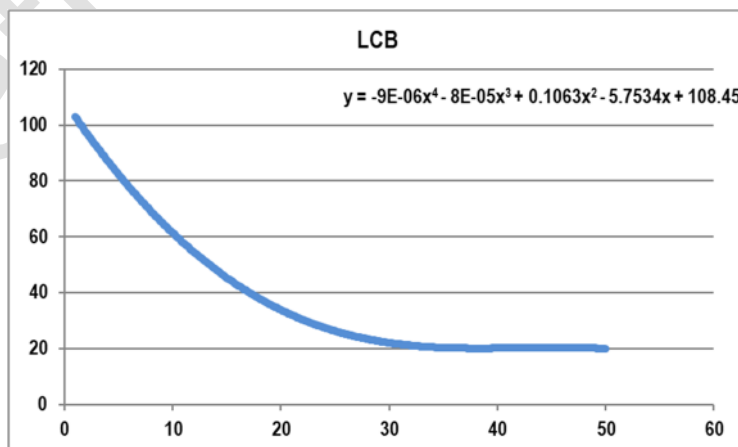
Year	Condition	Imp. Type	Description
1	100	NONE	No Improvement Required
2	99.3	NONE	No Improvement Required
3	98.73	NONE	No Improvement Required
4	97.96	NONE	No Improvement Required
5	97	CRK	Crack Sealing
6	95.86	CRK	Crack Sealing
7	94.55	CRK	Crack Sealing
8	93.09	CRK	Crack Sealing
9	91.48	CRK	Crack Sealing
10	89.73	CRK	Crack Sealing
11	87.85	CRK	Crack Sealing
12	85.85	CRK	Crack Sealing
13	83.76	CRK	Crack Sealing
14	81.56	CRK	Crack Sealing
15	79.27	MICRO	Microsurfacing Pavement Preservation
16	76.91	MICRO	Microsurfacing Pavement Preservation
17	74.48	MICRO	Microsurfacing Pavement Preservation
18	72	MICRO	Microsurfacing Pavement Preservation
19	69.47	R1	Basic Resurfacing 1 - 50mm
20	66.91	R1	Basic Resurfacing 1 - 50mm
21	64.32	R1	Basic Resurfacing 1 - 50mm
22	61.71	R1	Basic Resurfacing 1 - 50mm
23	59.1	R1	Basic Resurfacing 1 - 50mm
24	56.5	R1	Basic Resurfacing 1 - 50mm
25	53.91	R2	Basic Resurfacing 2 - 100mm
26	51.35	R2	Basic Resurfacing 2 - 100mm
27	48.82	R2	Basic Resurfacing 2 - 100mm
28	46.33	R2	Basic Resurfacing 2 - 100mm
29	43.91	R2	Basic Resurfacing 2 - 100mm
30	41.55	R2	Basic Resurfacing 2 - 100mm
35	31.1	REC	Reconstruction - Rural
40	23.85	REC	Reconstruction - Rural
45	21.06	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



Where 'REC' is specified, 'RSS' is utilized for an Urban Roadside Environment

LCB All roadsides – All AADT's

Year	Condition	Imp. Type	Description
1	100	NONE	No Improvement Required
2	98.61	NONE	No Improvement Required
3	94.19	NONE	No Improvement Required
4	89.84	NONE	No Improvement Required
5	85.56	NONE	No Improvement Required
6	81.36	NONE	No Improvement Required
7	77.26	SST	Single Surface Treatment
8	73.28	SST	Single Surface Treatment
9	69.4	SST	Single Surface Treatment
10	65.65	SST	Single Surface Treatment
11	62.02	SST	Single Surface Treatment
12	58.54	SST	Single Surface Treatment
13	55.19	SST	Single Surface Treatment
14	52	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
15	48.96	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
16	46.08	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
17	43.36	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
18	40.81	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
19	38.41	DSTrehab	Double Surface Treat Rehab inc Spot Drainage
20	36.19	REC	Reconstruction - Rural
21	34.13	REC	Reconstruction - Rural
22	32.24	REC	Reconstruction - Rural
23	30.51	REC	Reconstruction - Rural
24	28.95	REC	Reconstruction - Rural
25	27.55	REC	Reconstruction - Rural
30	22.82	REC	Reconstruction - Rural
35	21.31	REC	Reconstruction - Rural
40	21.92	REC	Reconstruction - Rural
45	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural



Where 'REC' is specified, 'RSS' is utilized for an Urban Roadside Environment

Appendix D: Gravel Road Conversions



Gravel Road Conversion Overview

Gravel roads tend to be the 'forgotten' asset. Gravel roads form an integral component of the road asset group for a large number of municipalities and should be managed as any other asset.

Most aspects of municipal service delivery are in fact an asset management decision. The decision whether to surface treat a road, or have the road remain as a gravel surface, is very much an asset management decision.

This report provides a recommended annual cost for gravel road maintenance of 75mm additional gravel to be added every three years, and does not include regular grading or dust control costs. The additional 75mm of gravel was a typical standard that was used in the past by many municipalities. Due to the natural life cycle wear and tear, maintenance, and winter control activities, gravel roads require additional gravel on a regular basis to ensure continuing performance.

One of the difficulties in determining the deterioration of a gravel road is that the wearing surface and the granular layers are one and the same, so the extent of deterioration may not be as obvious until the deterioration is significant. Appropriate gravel road maintenance can be deceptively expensive. Frequently, high level budget analysis proves that the per-kilometre cost of adequate gravel road maintenance is greater than the per-kilometre cost for hard top maintenance. This is further exacerbated as traffic volume on a gravel road increases.

Road agencies in both Canada and the United States have conducted studies that have generally indicated that, dependent upon local unit costs, gravel road conversion to hardtop can be a cost-effective management strategy. One source indicates that this may be effective management for roads with traffic volumes as low as 100 AADT.

A number of factors have to be assessed and analysed to render an appropriate decision such as:

- Traffic volumes
- Material costs
- Anticipated life cycle costs (and unit costs)
- Anticipated performance
- Current condition of the road, drainage, width, etc

With respect to traffic volumes,

- The Ministry of Transportation's Inventory Manual for Municipal Roads, 1991, deemed that a gravel road with over 400 AADT was a 'NOW' need and required a hard top surface
- Applied Research Technology prepared a report in 2002 for the United States Federal Highways Administration (USFHA) and the State of South Dakota, which determined that user costs were lower for roads with some type of hard surface vs roads with gravel or stabilized gravel surfaces
- The USFHA Gravel Roads Maintenance and Design Manual suggests in Appendix D of that document that the average daily volumes used to justify conversion to hard to range for 50 AADT to 400 AADT. Decisions are all reflective of assessed construction, maintenance and user costs.

If the argument for conversion may be made from a financial perspective, then there are additional factors that should be considered from physical and risk perspectives. Other factors for consideration include:

- Platform width
- Drainage
- Structural Adequacy
- Traffic Volume and Type

Conversion candidates should have a width that meets or exceeds the minimum standard width for the traffic volume of the road section plus minimum 0.5 metre shoulder, be **structurally sound**, and have good drainage. Structural soundness may be obtained through geotechnical examination or documented past performance. A decision matrix for gravel road conversion may be found at the end of this document.

Benefits to converting a gravel road include:

- Customer satisfaction
- Reduced maintenance costs for routine maintenance
- Reduced maintenance costs for winter maintenance, dependent upon local practices
- Reduced complaints

Analysis Methods

Like other road assets, gravel roads have lifecycle maintenance and rehabilitation costs that should be addressed as part of any asset management plan. Life cycle costs include regular addition of gravel, dust control, grading and labour. Grading will typically include equipment costs for a motor grader.

There are a number of potential tools that may be used to assist in the analysis and decision to convert a gravel surface to hard. A Net Present Value Analysis (NPV) or a performance model are two methods that may be used to develop a decision.

Net Present Value (NPV) Analysis

Process

Given the above noted, a Net Present Value (NPV) assessment of the gravel road, in comparison with a surface treated road section or other hard top surface, should be undertaken as it may be more cost-effective to convert/upgrade the gravel road to a hard surface; typically surface treatment. The NPV analysis will compare the lifecycle costs for status quo and conversion assuming inflation rates and discounts rates for the analysis period.

It is preferable to address the cost comparisons over a period of time where the life cycles may conclude concurrently. For instance, if the gravel maintenance is on a three year basis and the surface treatment is seven, then the cycles coincide at 21 years. Total life cycle cost over that time period should be considered. Whatever other surface type is being compared with the gravel road surface should include the same factors as for gravel so there is a 1:1 comparison.

Equipment

As part of a holistic review of service delivery, consideration should be given to the equipment hourly rates and replacement. Accurate hourly rates are required to provide a true assessment. Equipment rates should include capital depreciation/replacement and operating costs.

One of the factors driving the overall cost is the equipment that is required to properly maintain a gravel road system - particularly graders. Part of the gravel road conversion analysis should include:

- Has the hourly rate for the equipment been calculated properly to include capital depreciation and maintenance costs?

- A new grader will typically cost close to \$500,000. At a 20-year life span, there is a minimum of \$25,000 in annual capital depreciation alone on the grader. If the grader were replaced on a 10 year cycle, the annual capital depreciation would be \$50,000.
- What is the current rate for the grader? If there is not full cost recovery on the grader hourly rate, then the cost for gravel road maintenance is not accurate either.
- Is the grader used for any other purpose/activities?
- What is the length of the gravel road system? A commonly used measure to justify a grader is 75 kilometres of gravel for each grader.
- How many hours per year is the grader operated?
- Are there other pieces of equipment that could be used or rented to maintain the gravel roads?

As a rule of thumb, one grader is required for approximately 75 kilometres of gravel roads, dependent upon the distribution of the gravel roads across the system. The current replacement cost of a grader is in the \$500,000 range and yearly usage may not be that high, which translates into a higher hourly rate for the equipment.

Performance Model -Gravel vs Surface Treatment

The following is a high level analysis using a performance model. Unit costs for this analysis are not specific to an individual agency but are representative of user costs experienced in 2020. Unit costs used for the evaluations are as follows.

Table 1: Unit Costs

Item ID	Description	Unit Price	Units
UPExcavate	Excavation	15	m3
UPGranA	Granular A	20	tonne
UPGranB	Granular B	15	tonne
UPDSurfTr	Double Surface Treatment	7	m2
UPSurfTr	Single Surface Treatment	3.5	m2

Assumptions

- Both road sections are the same length
- Both were in the same initial condition
- Both were rehabilitated to the same standard, ditching, a total of 300mm of Granular material. In addition, one section received a double surface treated surface (the other remained as gravel)
- All calculations are in current dollars; no adjustments for inflation or discounts rates
- Gravel roads would receive a 75mm layer of gravel every 3 years.
 - At a lesser condition the gravel section would receive a 150mm lift.
- Surface treated roads would theoretically receive a re-treatment every 7 years
- Surface Treatment does not have a structural value
- Cost for gravel road regrading and dust control are not included

The discussion focuses on modelling 2 sections as described above.

The model is set to make decisions based on anticipated deterioration of the assets and an analysis of the best Return on Investment for the model and for the treatment selection. Formulae for the ROI analysis are as follows;

From the WorkTech Manual;

Scenario Return on Investment

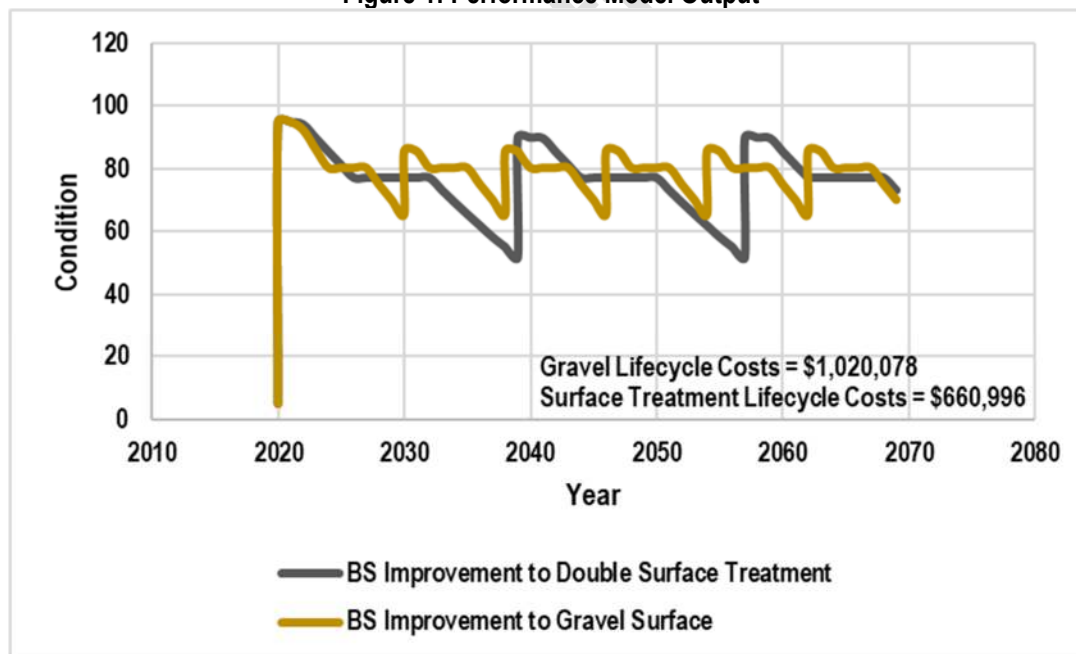
$$ROI = \frac{(End\ of\ Scenario\ Asset\ Value - Do\ Nothing\ Asset\ Value)}{Total\ Budget\ (all\ years)}$$

Improvement Type Return on Investment

$$ROI = \frac{(Value\ if\ Funded - Do\ Nothing\ Value)}{Improvement\ Cost.}$$

Deterioration curves are shown at the end of the document

Figure 1: Performance Model Output



The model shows a significant cost differential between the sections over the 50 year period

The payback period is approximately 12 years; the costs for both service delivery models are similar at this juncture. Going forward, the gravel costs contribute to a much higher life cycle cost.

For the gravel roads, the model initially selects a 75mm layer of material and then lets the condition deteriorate to the condition where 150mm of material is required. This sequence of events repeats throughout the remainder of the model.

For the surface treated road, the model treatment selection is similar. Initially it selects a single surface treatment, then allows the condition to reduce to the point where a surface treatment with some padding is required and the analysis shows it offered a better ROI.

This is a simple analysis. Analyses conducted by other sources have included vehicle costs, the aforementioned maintenance costs etc. Maintenance cost assessment should be conducted using appropriate equipment rates.

Asset Management Perspective

Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure, provides significant guidance in the development of the asset management plan and states in part

“4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:

- i. The full lifecycle of the assets.*
- ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.*
- iii. The risks associated with the options referred to in subparagraph ii.*
- iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.”*

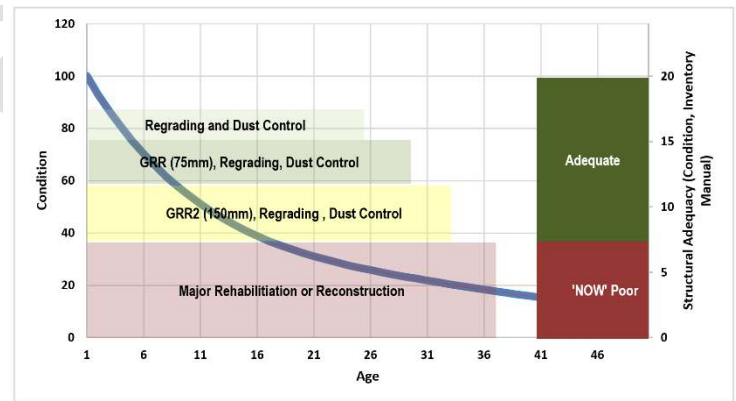
Figure 1 provides a graphic representation of the cost benefit of gravel road conversion to hard top on a life cycle basis. Given the directive of the regulation, gravel road conversion to hard top surface appears to be consistent with the regulation.

Gravel Road Conversion

Gravel Roads- All Roadsides, all AADT

Year	Condition	Imp Type	Description
1	100	NONE	No Improvement Required
2	92.45	NONE	No Improvement Required
3	86.21	GRR	75mm of Granular A
4	80.43	GRR	75mm of Granular A
5	75.11	GRR	75mm of Granular A
6	70.21	GRR	75mm of Granular A
7	65.7	GRR2	150mm of additional Gravel
8	61.55	GRR2	150mm of additional Gravel
9	57.75	GRR2	150mm of additional Gravel
10	54.27	GRR2	150mm of additional Gravel
11	51.07	GRR2	150mm of additional Gravel
12	48.15	GRR2	150mm of additional Gravel
13	45.48	GRR2	150mm of additional Gravel
14	43.04	GRR2	150mm of additional Gravel
15	40.81	GRR2	150mm of additional Gravel
16	38.77	GRR2	150mm of additional Gravel
17	36.9	GRR2	150mm of additional Gravel
18	35.2	GRR2	150mm of additional Gravel
19	33.63	REC	Reconstruction - Rural
20	32.19	REC	Reconstruction - Rural
21	30.86	REC	Reconstruction - Rural
22	29.64	REC	Reconstruction - Rural
23	28.51	REC	Reconstruction - Rural
24	27.45	REC	Reconstruction - Rural
25	26.47	REC	Reconstruction - Rural
30	22.28	REC	Reconstruction - Rural
35	18.88	REC	Reconstruction - Rural
40	20	REC	Reconstruction - Rural
45	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural

Every treatment will not be undertaken every year. The model will select the correct treatment based on the condition

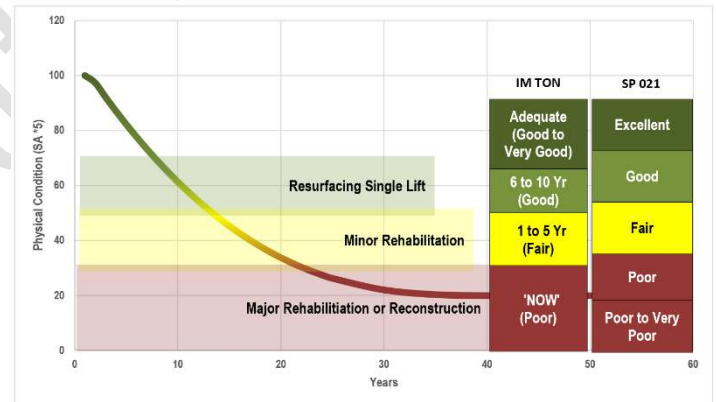


Gravel Road Conversion

LCB Roads- All Roadsides, all AADT

Year	Condition	Imp. Type	Description
1	100	NONE	No Improvement Required
2	98.61	NONE	No Improvement Required
3	94.19	NONE	No Improvement Required
4	89.84	NONE	No Improvement Required
5	85.56	NONE	No Improvement Required
6	81.36	NONE	No Improvement Required
7	77.26	SST	Single Surface Treatment
8	73.28	SST	Single Surface Treatment
9	69.4	SST	Single Surface Treatment
10	65.65	SST	Single Surface Treatment
11	62.02	SST	Single Surface Treatment
12	58.54	SST	Single Surface Treatment
13	55.19	SST	Single Surface Treatment
14	52	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
15	48.96	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
16	46.08	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
17	43.36	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
18	40.81	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
19	38.41	SSTplus	Single Surface Treatment plus 10% padding to correct geometry
20	36.19	REC	Reconstruction - Rural
21	34.13	REC	Reconstruction - Rural
22	32.24	REC	Reconstruction - Rural
23	30.51	REC	Reconstruction - Rural
24	28.95	REC	Reconstruction - Rural
25	27.55	REC	Reconstruction - Rural
30	22.82	REC	Reconstruction - Rural
35	21.31	REC	Reconstruction - Rural
40	21.92	REC	Reconstruction - Rural
45	20	REC	Reconstruction - Rural
50	20	REC	Reconstruction - Rural

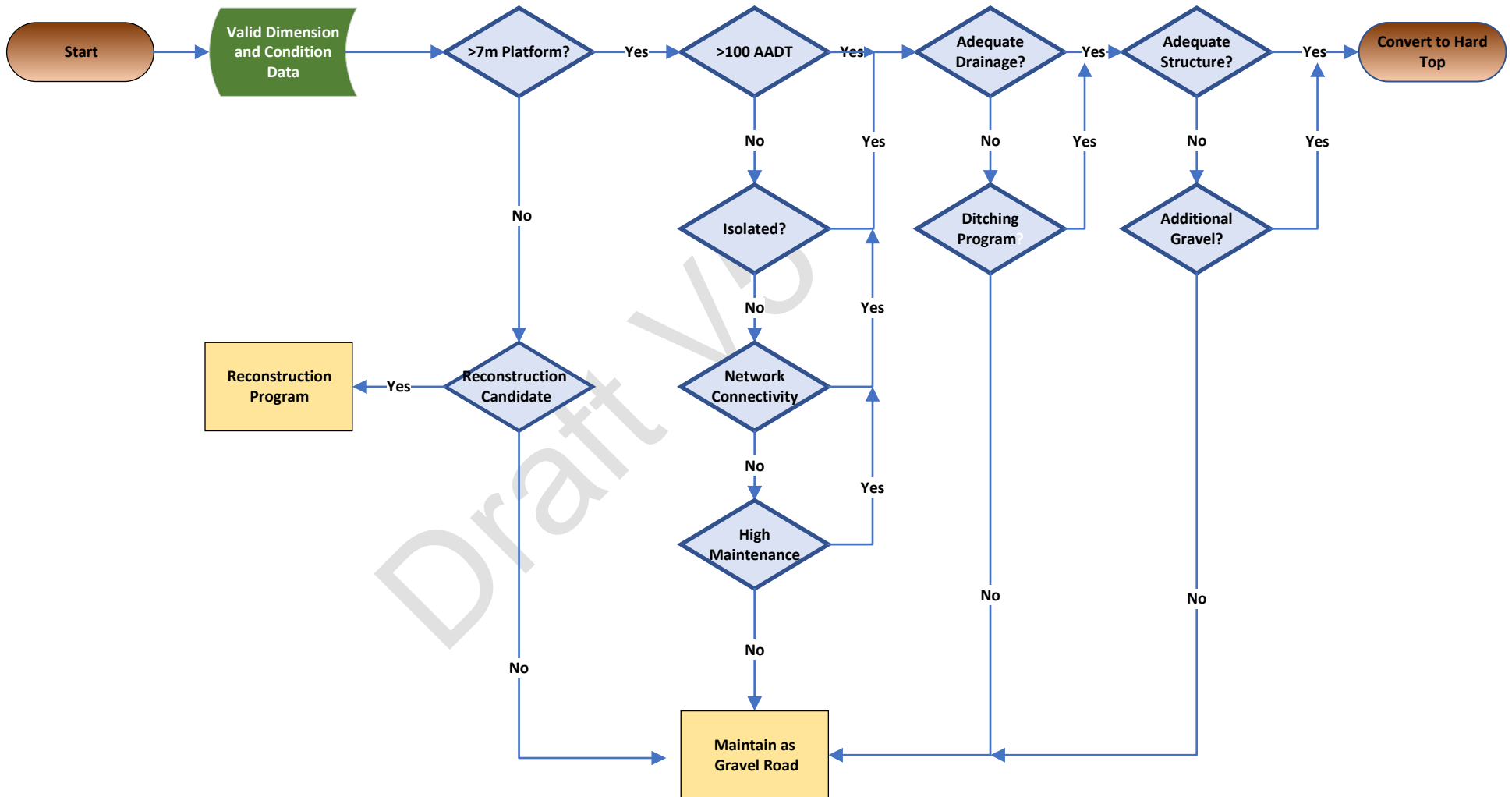
Every treatment will not be undertaken every year. The model will select the correct treatment based on the condition



Well Constructed Gravel Road



Gravel Road Conversion Decision Matrix



Appendix E: Regulation 588/17 – Asset Management Planning for Municipal Infrastructure



Français

ONTARIO REGULATION 588/17

made under the

INFRASTRUCTURE FOR JOBS AND PROSPERITY ACT, 2015

Made: December 13, 2017

Filed: December 27, 2017

Published on e-Laws: December 27, 2017

Printed in *The Ontario Gazette*: January 13, 2018**ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE****CONTENTS**INTERPRETATION AND APPLICATION

1. Definitions
2. Application

STRATEGIC ASSET MANAGEMENT POLICIES

3. Strategic asset management policy
4. Update of asset management policy

ASSET MANAGEMENT PLANS

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6. Asset management plans, proposed levels of service
7. Update of asset management plans
8. Endorsement and approval required
9. Annual review of asset management planning progress
10. Public availability
Table 1 Water assets
Table 2 Wastewater assets
Table 3 Stormwater management assets
Table 4 Roads
Table 5 Bridges and culverts

COMMENCEMENT

11. Commencement

INTERPRETATION AND APPLICATION**Definitions**

1. (1) In this Regulation,

“asset category” means a category of municipal infrastructure assets that is,

- (a) an aggregate of assets described in each of clauses (a) to (e) of the definition of core municipal infrastructure asset, or
- (b) composed of any other aggregate of municipal infrastructure assets that provide the same type of service; (“catégorie de biens”)

“core municipal infrastructure asset” means any municipal infrastructure asset that is a,

- (a) water asset that relates to the collection, production, treatment, storage, supply or distribution of water,
- (b) wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater,
- (c) stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater,
- (d) road, or
- (e) bridge or culvert; (“bien d’infrastructure municipale essentiel”)

“ecological functions” has the same meaning as in Ontario Regulation 140/02 (Oak Ridges Moraine Conservation Plan) made under the *Oak Ridges Moraine Conservation Act, 2001*; (“fonctions écologiques”)

“green infrastructure asset” means an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands,

stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs; (“bien d’infrastructure verte”)

“hydrological functions” has the same meaning as in Ontario Regulation 140/02; (“fonctions hydrologiques”)

“joint municipal water board” means a joint board established in accordance with a transfer order made under the *Municipal Water and Sewage Transfer Act, 1997*; (“conseil mixte de gestion municipale des eaux”)

“lifecycle activities” means activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities; (“activités relatives au cycle de vie”)

“municipal infrastructure asset” means an infrastructure asset, including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board; (“bien d’infrastructure municipale”)

“municipality” has the same meaning as in the *Municipal Act, 2001*; (“municipalité”)

“operating costs” means the aggregate of costs, including energy costs, of operating a municipal infrastructure asset over its service life; (“frais d’exploitation”)

“service life” means the total period during which a municipal infrastructure asset is in use or is available to be used; (“durée de vie”)

“significant operating costs” means, where the operating costs with respect to all municipal infrastructure assets within an asset category are in excess of a threshold amount set by the municipality, the total amount of those operating costs. (“frais d’exploitation importants”)

(2) In Tables 1 and 2,

“connection-days” means the number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue. (“jours-branchements”)

(3) In Table 4,

“arterial roads” means Class 1 and Class 2 highways as determined under the Table to section 1 of Ontario Regulation 239/02 (Minimum Maintenance Standards for Municipal Highways) made under the *Municipal Act, 2001*; (“artères”)

“collector roads” means Class 3 and Class 4 highways as determined under the Table to section 1 of Ontario Regulation 239/02; (“routes collectrices”)

“lane-kilometre” means a kilometre-long segment of roadway that is a single lane in width; (“kilomètre de voie”)

“local roads” means Class 5 and Class 6 highways as determined under the Table to section 1 of Ontario Regulation 239/02. (“routes locales”)

(4) In Table 5,

“Ontario Structure Inspection Manual” means the Ontario Structure Inspection Manual (OSIM), published by the Ministry of Transportation and dated October 2000 (revised November 2003 and April 2008) and available on a Government of Ontario website; (“manuel d’inspection des structures de l’Ontario”)

“structural culvert” has the meaning set out for “culvert (structural)” in the Ontario Structure Inspection Manual. (“ponceau structurel”)

Application

2. For the purposes of section 6 of the Act, every municipality is prescribed as a broader public sector entity to which that section applies.

STRATEGIC ASSET MANAGEMENT POLICIES

Strategic asset management policy

3. (1) Every municipality shall prepare a strategic asset management policy that includes the following:

1. Any of the municipality’s goals, policies or plans that are supported by its asset management plan.
2. The process by which the asset management plan is to be considered in the development of the municipality’s budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.
3. The municipality’s approach to continuous improvement and adoption of appropriate practices regarding asset management planning.
4. The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the Act.

5. The municipality's commitment to consider, as part of its asset management planning,
 - i. the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality's infrastructure assets, in respect of such matters as,
 - A. operations, such as increased maintenance schedules,
 - B. levels of service, and
 - C. lifecycle management,
 - ii. the anticipated costs that could arise from the vulnerabilities described in subparagraph i,
 - iii. adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph i,
 - iv. mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets, and
 - v. disaster planning and contingency funding.
6. A process to ensure that the municipality's asset management planning is aligned with any of the following financial plans:
 - i. Financial plans related to the municipality's water assets including any financial plans prepared under the *Safe Drinking Water Act, 2002*.
 - ii. Financial plans related to the municipality's wastewater assets.
7. A process to ensure that the municipality's asset management planning is aligned with Ontario's land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the *Planning Act*, any provincial plans as defined in the *Planning Act* and the municipality's official plan.
8. An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality's asset management plan and how the thresholds compare to those in the municipality's tangible capital asset policy, if it has one.
9. The municipality's commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.
10. The persons responsible for the municipality's asset management planning, including the executive lead.
11. An explanation of the municipal council's involvement in the municipality's asset management planning.
12. The municipality's commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality's asset management planning.

(2) For the purposes of this section,

"capitalization threshold" is the value of a municipal infrastructure asset at or above which a municipality will capitalize the value of it and below which it will expense the value of it. ("seuil de capitalisation")

Update of asset management policy

4. Every municipality shall prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five years.

ASSET MANAGEMENT PLANS

Asset management plans, current levels of service

5. (1) Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets by July 1, 2021, and in respect of all of its other municipal infrastructure assets by July 1, 2023.

(2) A municipality's asset management plan must include the following:

1. For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan:
 - i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.
 - ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
2. The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from

at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.

3. For each asset category,
 - i. a summary of the assets in the category,
 - ii. the replacement cost of the assets in the category,
 - iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets,
 - iv. the information available on the condition of the assets in the category, and
 - v. a description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.
4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:
 - i. The full lifecycle of the assets.
 - ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.
 - iii. The risks associated with the options referred to in subparagraph ii.
 - iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.
5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:
 - i. A description of assumptions regarding future changes in population or economic activity.
 - ii. How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:
 - i. With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.
 - ii. With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.
 - iii. With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.
 - iv. With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.
 - v. If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.
 - vi. For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.

(3) Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public.

(4) In this section,

“2017 Growth Plan” means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the *Places to Grow Act, 2005* on May 16, 2017 and came into effect on July 1, 2017; (“Plan de croissance de 2017”)

“Greater Golden Horseshoe growth plan area” means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the *Places to Grow Act, 2005*. (“zone de croissance planifiée de la région élargie du Golden Horseshoe”)

Asset management plans, proposed levels of service

6. (1) Subject to subsection (2), by July 1, 2024, every asset management plan prepared under section 5 must include the following additional information:

1. For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:
 - i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.
 - ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
2. An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:
 - i. The options for the proposed levels of service and the risks associated with those options to the long term sustainability of the municipality.
 - ii. How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).
 - iii. Whether the proposed levels of service are achievable.
 - iv. The municipality’s ability to afford the proposed levels of service.
3. The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.
4. A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1:
 - i. An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:
 - A. The full lifecycle of the assets.
 - B. The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.
 - C. The risks associated with the options referred to in sub-subparagraph B.
 - D. The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.
 - ii. An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.
 - iii. An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.
 - iv. If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,
 - A. an identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and
 - B. if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.
5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,

- i. the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,
- ii. the funding projected to be available, by source, as a result of increased population and economic activity, and
- iii. an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.

7. An explanation of any other key assumptions underlying the plan that have not previously been explained.

(2) With respect to an asset management plan prepared under section 5 on or before July 1, 2021, if the additional information required under this section is not included before July 1, 2023, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years.

Update of asset management plans

7. (1) Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.

(2) The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).

Endorsement and approval required

8. Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,

- (a) endorsed by the executive lead of the municipality; and
- (b) approved by a resolution passed by the municipal council.

Annual review of asset management planning progress

9. (1) Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality's asset management plan is completed under section 6.

(2) The annual review must address,

- (a) the municipality's progress in implementing its asset management plan;
- (b) any factors impeding the municipality's ability to implement its asset management plan; and
- (c) a strategy to address the factors described in clause (b).

Public availability

10. Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public, and shall provide a copy of the policy and plan to any person who requests it.

TABLE 1
WATER ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system. 2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	1. Percentage of properties connected to the municipal water system. 2. Percentage of properties where fire flow is available.
Reliability	Description of boil water advisories and service interruptions.	1. The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system. 2. The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.

TABLE 2
WASTEWATER ASSETS

Column 1	Column 2	Column 3
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Service attribute	Community levels of service (qualitative descriptions)	Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system.
Reliability	<ol style="list-style-type: none"> 1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches. 3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes. 4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3. 5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system. 	<ol style="list-style-type: none"> 1. The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system. 2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system. 3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.

TABLE 3
STORMWATER MANAGEMENT ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	<ol style="list-style-type: none"> 1. Percentage of properties in municipality resilient to a 100-year storm. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.

TABLE 4
ROADS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.
Quality	Description or images that illustrate the different levels of road class pavement condition.	<ol style="list-style-type: none"> 1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).

TABLE 5
BRIDGES AND CULVERTS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.
Quality	<ol style="list-style-type: none"> 1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts. 	<ol style="list-style-type: none"> 1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.

COMMENCEMENT

Commencement

11. This Regulation comes into force on the later of January 1, 2018 and the day it is filed.

Appendix F: Sample Road Section

Draft V5



210 MUNICIPAL ROAD APPRAISAL

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A. IDENTIFICATION

Road Name: ANGER ROAD	Road Section No.: RANG0010
From: JOHN WISE LINE	Length: 1.72 km
To: CHALET LINE	Old Section No.:
Owner: 44612	Road Value: 698,136
<input type="checkbox"/> Shared?	Special Designation: CBL
Shared With:	MunicA
Owner Share: 100.00	Patrol:
Adjacent Road Section No.:	MunicB
	Year Assumed:

B. EXISTING CONDITIONS

Horizontal Alignment		
Substandard Curves:	Roadside Env.: R	Curb/Gutter
Substandard S.S.D.:	Existing Class: 200	Left:
	Number of Lanes: 2.00	Right:
Vertical Alignment	Surface Type: LCB	Sidewalk Width Left: Right:
Substandard Grades:	Platform Width: 9.50 m	Boulevard Width Left: Right:
Substandard S.S.D.:	Surface Width: 6.800 m	Parking:
Right of Way Width	Median Width:	
Existing: 20 m	Shoulder Type: TRD	Existing Surface Depth:
Desirable: 20 m	Shoulder Width: 1.35	Existing Gran "A" Depth:
Terrain: NF - Non R		Existing Gran "B" Depth:
Drainage: OD - Open Ditch		

C. TRAFFIC DATA

Legal Speed Limit: 80	<u>Traffic Count</u>	<u>10 Year Traffic Forecast</u>
Avg. Operating Speed: 80	Year: A-2013-C	Year: 2023
Traffic Operation: 2W	AADT: 104	AADT: 106
Route Designations	DHV Factor: 11.5 %	DHV Factor: 11.5 %
<input type="checkbox"/> Bus <input type="checkbox"/> Truck Route	DHV: 12 vph	DHV: 12 vph
<input type="checkbox"/> School <input type="checkbox"/> Bicycle	Trucks: 3.00 %	Trucks: 3.0 %
Load Restrictions: 5T	Peak Directional Split: %	Capacity: 1,164 vph
	10 Year Growth Factor: 1.02	

D. APPROVALS

Date: 2021-06-29	Inspected By: D. Anderson, CET	Approved By: D. Anderson, CET
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E. ROAD NEEDS

Field	Max Points	Rating	Comments
Drainage	15.0	15	
Horiz. Alignment	10.0	10	
Maint. Demand	10.0	6	
Shoulder Width	10.0	9	
Structural Adequacy	20.0	13	
Surface Condition	10.0	8	
Surface Width	15.0	15	
Vert. Alignment	10.0	10	

F. FUNCTIONAL NEEDS

Field	Existing	Min Tolerable	Time of Need	Comments
Capacity	A	E	ADEQ	
Drainage	15	8	ADEQ	
Geometrics	80	65	ADEQ	
Structural Adequacy	13	8	6-10	
Surface Type	LCB	G/S,PRI	ADEQ	
Surface Width	6.8	5.5	ADEQ	

Impr.Class	Improvement	Description	Override?	Percent	Time of Need	Year	Base/Const Cost
Rehab	DSTrehab	DST w 75mm Gran A	<input type="checkbox"/> Override	100.00	6-10		151,927.60
Rehab Subtotal:							151,927.60

G. ENGINEERING RECOMMENDATIONS

Year (Re)Constructed:

Design Class: 200

Design Width: 6.00 m

Improvement Length: 1.720 km

☐ Set Values Manually?

Time of Need: 6-10

Improvement Type: DSTrehab DST w 75mm Gran A

Ratings

Priority Rating: 8

Guide Number: 1

\$/Vehicle km: 0.23

H. IMPROVEMENT COSTS

Total Base/Construction: **151,927.60**

TOTAL: 151,927.60

Owners Share: 151,927.60

Appendix G: Program from Performance Model (20220107)



Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2022	RPCO0020	1	0	COLIN STREET	(to) IMPERIAL ROAD (PARK LOOP)-to-HALE STREET	CRK	\$ 435	90	90	2	\$ 128,668	\$ 128,668	0.3
2022	RDOR0072	1	0	DORCHESTER ROAD	(to) 0.75km N of YORKE LINE-to-AVON DRIVE	SD	\$ 1,995	85	85	2	\$ 267,757	\$ 267,757	0.7
2022	RPIG0010	1	0	PIGRAM LINE	(to) 0.18km N of PRESSEY LINE-to-RON MCNEIL LINE	CRK	\$ 1,175	85	85	2	\$ 415,448	\$ 415,448	0.81
2022	RSPH0040	1	0	SPRINGER HILL ROAD	(to) GLENCOLIN LINE-to-COLLEGE LINE	SST	\$ 54,248	80	98		\$ 1,064,682	\$ 1,304,235	2.06
2022	RHEL0010	1	0	HELDER ROAD	(to) YORKE LINE-to-0.45km S OF AVON DRIVE	SD	\$ 2,736	90	90	2	\$ 303,522	\$ 303,522	0.96
2022	RSPH0050	1	0	SPRINGER HILL ROAD	(to) COLLEGE LINE-to-PRESSEY LINE	SST	\$ 63,490	80	98		\$ 1,137,443	\$ 1,393,368	2.44
2022	RHAC0050	1	0	HACIENDA ROAD	(to) VAN PATTEN LINE-to-BRADLEY CREEK LINE	SST	\$ 46,555	80	98		\$ 819,112	\$ 1,003,412	1.65
2022	RBRO0010	1	0	BROOK LINE	(to) ROGERS ROAD-to-0.16km W of CAVERLY ROAD	DSTrehab	\$ 64,388	40	97		\$ 198,671	\$ 481,777	0.86
2022	RPCO0010	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-HALE STREET	CRKsd	\$ 516	90	90	2	\$ 97,877	\$ 97,877	0.12
2022	RDIN0010	1	0	DINGLE STREET	(to) AYLMEER TOWN LIMIT-to-HACIENDA ROAD	SD	\$ 3,078	80	80	2	\$ 392,683	\$ 392,683	1.08
2022	RYOR0060	1	0	YORKE LINE	(to) PUTNAM ROAD-to-CORLESS ROAD	SD	\$ 5,301	90	90	2	\$ 530,420	\$ 530,420	1.86
2022	RYOR0070	1	0	YORKE LINE	(to) CORLESS ROAD-to-PIGRAM LINE	SD	\$ 2,793	90	90	2	\$ 279,469	\$ 279,469	0.98
2022	RROM0010	1	0	ROMMEL ROAD	(to) 100m SOUTH OF CALTON LINE-to-CALTON LINE	SST	\$ 2,038	75	93		\$ 31,409	\$ 38,947	0.1
2022	RCOL0020	1	0	COLLEGE LINE	(to) ROGERS ROAD-to-IMPERIAL ROAD	DSTrehab	\$ 153,689	25	97		\$ 209,825	\$ 814,120	2.05
2022	RWHI0020	1	0	WHITTAKER ROAD	(to) CROSSLEY HUNTER LINE-to-WILSON LINE	SST	\$ 35,864	80	98		\$ 514,814	\$ 630,647	1.43
2022	RWHI0010	1	0	WHITTAKER ROAD	(to) LYONS LINE-to-CROSSLEY HUNTER LINE	SST	\$ 37,394	80	98		\$ 511,214	\$ 626,237	1.42
2022	ROWE0010	1	0	WELDON STREET	(to) SPRINGWATER ROAD-to-EAST END	DSTrehab2	\$ 18,290	30	97		\$ 28,541	\$ 92,283	0.22
2022	RCHA0060	1	0	CHALET LINE	(to) 1.2km E of CARTER ROAD-to-EAST CULDESAC	DSTrehab	\$ 19,873	30	97		\$ 30,970	\$ 100,137	0.25
2022	RPDE0010	1	0	DEXTER LINE	(to) IMPERIAL ROAD-to-CTY RD 73 /DEXTER LINE	CRK	\$ 247	80	80	2	\$ 64,810	\$ 64,810	0.17
2022	RPIG0005	1	0	PIGRAM LINE	(to) PRESSEY LINE-to-0.18km N of PRESSEY LINE	CRK	\$ 261	95	95	2	\$ 103,183	\$ 103,183	0.18
2022	RSCA0010	1	0	CATHERINE STREET	(to) PRESSEY LINE-to-RON MCNEIL LINE	CRK	\$ 203	75	75	2	\$ 46,333	\$ 46,333	0.14
2022	RSSP0010	1	0	SPRINGFIELD ROAD	(to) RON MCNEIL LINE-to-12KM NORTH OF RON MCNEIL LINE	CRKsd	\$ 516	85	85	2	\$ 45,008	\$ 45,008	0.12
2022	RPRE0010	1	1	PRESSEY LINE	(to) 0.45km E of CATHERINE STREET-to-WALKER ROAD (NORTH LEG)	REC	\$ 437,349	35	100		\$ 262,799	\$ 750,853	1.21
2022	RSPR0020	1	1	PRESSEY LINE	(to) CATHERINE STREET-to-0.45km E of CATHERINE STREET	REC	\$ 162,651	50	100		\$ 139,622	\$ 279,243	0.45
2022	RWOO0010	1	1	WOOLLEYVILLE LINE	(to) SPRINGFIELD ROAD-to-0.35km E of SPRINGFIELD ROAD	REC	\$ 100,410	50	100		\$ 75,677	\$ 151,354	0.35
2022	RWOO0020	1	1	WOOLLEYVILLE LINE	(to) 0.35km E of SPRINGFIELD ROAD-to-EAST END (BEND)	REC	\$ 249,590	75	100		\$ 206,750	\$ 275,666	0.87
							\$1,465,085						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2023	RCAL0040	1	0	CALTON LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	SD	\$ 5,814	89.8	89.8	2	\$ 1,173,513	\$ 1,173,513	2.04
2023	RJOH0010	1	0	JOHN WISE LINE	(to) SPRINGFIELD ROAD-to-SAWMILL ROAD	SD	\$ 5,871	89.8	89.8	2	\$ 1,148,435	\$ 1,148,435	2.06
2023	RROG0030	1	0	ROGERS ROAD	(to) CONSERVATION LINE-to-TALBOT LINE	SD	\$ 7,353	89.8	89.8	2	\$ 1,438,331	\$ 1,438,331	2.58
2023	RROG0020	1	0	ROGERS ROAD	(to) JOHN WISE LINE-to-CONSERVATION LINE	SD	\$ 5,871	89.8	89.8	2	\$ 1,078,418	\$ 1,078,418	2.06
					(to) HACIENDA ROAD-to-0.42km W of SPRINGFIELD ROAD								
2023	RCAL0050	1	0	CALTON LINE	ROAD	SD	\$ 4,646	89.8	89.8	2	\$ 845,732	\$ 845,732	1.63
2023	RPIM0010	1	0	IMPERIAL ROAD	(to) LEVI STREET-to-COLIN STREET	CRK	\$ 247	89.7	89.7	2	\$ 91,769	\$ 91,769	0.17
					(to) 0.42km W of SPRINGFIELD ROAD-to-SPRINGFIELD ROAD								
2023	RCAL0055	1	0	CALTON LINE -(MOUNT SALEM)	SPRINGFIELD ROAD	SD	\$ 1,197	89.8	89.8	2	\$ 176,486	\$ 176,486	0.42
					(to) IMPERIAL ROAD (WEST)-to-IMPERIAL ROAD (NORTH)								
2023	RHAL0010	1	0	HALF MOON ROAD	(NORTH)	SD	\$ 2,081	89.8	89.8	2	\$ 247,722	\$ 247,722	0.73
2023	RCOL0010	1	0	COLLEGE LINE	(to) SPRINGWATER ROAD-to-ROGERS ROAD	DSTrehab	\$ 154,026	24.1	97		\$ 195,939	\$ 789,946	2.06
					(to) SPRINGWATER ROAD-to-0.05km W of ELM STREET								
2023	RSAS0010	1	0	ASHTON STREET	STREET	SD	\$ 1,482	74.5	74.5	2	\$ 170,922	\$ 170,922	0.52
2023	RSCE0010	1	0	CENTRE STREET	(to) SUPERIOR STREET-to-TRACEY STREET	SD	\$ 399	74.5	74.5	2	\$ 46,018	\$ 46,018	0.14
2023	RSTR0010	1	0	TRACEY STREET	(to) CLINTON STREET-to-FINNEY STREET	SD	\$ 969	74.5	74.5	2	\$ 111,757	\$ 111,757	0.34
2023	RPCO0030	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-DEXTER LINE	SD	\$ 371	74.5	74.5	2	\$ 41,876	\$ 41,876	0.13
2023	RDOR0030	1	0	DORCHESTER ROAD	(to) MAPLETON LINE-to-LYONS LINE	SST	\$ 36,774	77.3	95.3		\$ 479,859	\$ 591,642	1.38
					(to) SPRINGFIELD ROAD (NORTH LEG)-to-WALKER ROAD								
2023	RGLE0050	1	0	GLENCOLIN LINE	ROAD	SST	\$ 67,246	73.3	91.3		\$ 832,551	\$ 1,037,081	1.95
2023	RYOR0020	1	0	YORKE LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 99,756	77.3	95.3		\$ 1,286,579	\$ 1,586,286	3.7
2023	RSPH0020	1	0	SPRINGER HILL ROAD	(to) HERITAGE LINE-to-TALBOT LINE	DSTrehab2	\$ 93,324	24.1	97		\$ 107,017	\$ 431,450	0.75
2023	RGRA0010	1	0	GRANGER ROAD	(to) NOVA SCOTIA LINE-to-SOUTH END CULDESAC	SSTedge	\$ 16,905	69.4	87.4		\$ 188,740	\$ 237,693	0.72
2023	RCAL0030	1	0	CALTON LINE	(to) ROMMEL ROAD-to-IMPERIAL ROAD	SST	\$ 33,043	77.3	95.3		\$ 388,905	\$ 479,501	1.24
2023	RNOV0010	1	0	NOVA SCOTIA LINE	(to) IMPERIAL ROAD-to-CULDESAC	SSTedge	\$ 12,890	73.3	91.3		\$ 143,955	\$ 179,315	0.42
2023	RYOR0050	1	0	YORKE LINE	(to) WHITTAKER ROAD-to-PUTNAM ROAD	SSTedge	\$ 57,083	69.4	87.4		\$ 585,933	\$ 737,904	1.86
2023	RCHA0050	1	0	CHALET LINE	(to) CARTER ROAD-to-1.2km E of CARTER ROAD	SSTedge	\$ 34,947	62	80		\$ 311,672	\$ 402,128	1.2
2023	RVIE0010	1	0	VIENNA LINE	(to) WEST TURNAROUND-to-IMPERIAL ROAD	DSTrehab	\$ 188,536	38.4	97		\$ 367,155	\$ 926,967	2.53
2023	RWIL0060	1	0	WILSON LINE	(to) CORLESS ROAD-to-PIGRAM LINE	SSTedge	\$ 32,841	62	80		\$ 273,515	\$ 352,897	0.98
2023	RSCE0030	1	0	CENTRE STREET	(to) SPRINGFIELD ROAD-to-WEST END	SD	\$ 200	89.7	89.7	2	\$ 27,716	\$ 27,716	0.07
2023	RPBA0010	1	0	BANK STREET	(to) RUSH CREEK LINE-to-IMPERIAL ROAD	CRKsd	\$ 688	79.3	79.3	2	\$ 56,526	\$ 56,526	0.16
2023	RSPR0010	1	1	PRESSEY LINE	(to) SPRINGFIELD ROAD-to-CATHERINE STREET	RSS	\$ 600,000	29.4	100		\$ 53,648	\$ 182,726	0.41
							\$1,464,560						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2024	RWA0010	1	0	WALES CRES	(to) MERVIS DRIVE-to-House 5265	CRK	\$ 595	94.6	94.6	2	\$ 554,021	\$ 554,021	0.41
2024	RME0010	1	0	MERVIS DRIVE	(to) NOVA SCOTIA LINE-to-WALES CRES	CRK	\$ 189	94.6	94.6	2	\$ 175,665	\$ 175,665	0.13
2024	RCEN0024	1	0	CENTURY LINE	(to) 0.08km W of PUTNAM ROAD-to-PUTNAM ROAD	CRK	\$ 116	94.6	94.6	2	\$ 32,566	\$ 32,566	0.08
2024	RCEN0026	1	0	CENTURY LINE	(to) PUTNAM ROAD-to-0.08km E of PUTNAM ROAD	CRK	\$ 116	94.6	94.6	2	\$ 32,566	\$ 32,566	0.08
2024	RGLE0060	1	0	GLENCOLIN LINE	(to) WALKER ROAD-to-CARTER ROAD (SOUTH LEG)	SST	\$ 71,039	77.3	95.3		\$ 1,028,349	\$ 1,267,903	2.06
					(to) HACIENDA ROAD-to-SPRINGFIELD ROAD								
2024	RGLE0040	1	0	GLENCOLIN LINE	(NORTH LEG)	SST	\$ 71,039	77.3	95.3		\$ 987,751	\$ 1,217,847	2.06
2024	RCOL0030	1	0	COLLEGE LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	DSTrehab2	\$ 237,933	36.2	97		\$ 436,525	\$ 1,170,017	2.07
2024	RWIL0020	1	0	WILSON LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	DSTrehab	\$ 266,726	49	97		\$ 793,988	\$ 1,573,056	3.7
2024	RDIN0020	1	0	DINGLE LINE	(to) HACIENDA ROAD-to-SPRINGFIELD ROAD	DSTrehab	\$ 158,704	46.1	97		\$ 421,211	\$ 886,663	2.42
2024	RWIL0010	1	0	WILSON LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	DSTrehab	\$ 270,763	49	97		\$ 796,134	\$ 1,577,307	3.71
2024	RWIL0030	1	0	WILSON LINE	(to) IMPERIAL ROAD-to-WHITTAKER ROAD	DSTrehab	\$ 277,204	49	97		\$ 815,205	\$ 1,615,092	3.7
2024	RRUS0010	1	0	RUSH CREEK LINE	(to) 1.7km W of IMPERIAL ROAD-to-JAMESTOWN LINE	DSTrehab	\$ 55,573	46.1	97		\$ 145,156	\$ 305,558	0.7
2024	RDOR0020	1	0	DORCHESTER ROAD	(to) RON MCNEIL LINE-to-MAPLETON LINE	SSTedge	\$ 41,936	58.4	76.4		\$ 341,164	\$ 446,372	1.44
2024	RSMI0010	1	0	MILL STREET	(to) RON MCNEIL LINE-to-BROADWAY STREET	R1	\$ 12,811	66.9	93.9		\$ 32,477	\$ 45,583	0.11
							\$1,464,744						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2025	RPCO0010	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-HALE STREET (to) RON MCNEIL LINE-to-.12KM NORTH OF RON	CRK	\$ 174	87.9	87.9	2	\$ 95,571	\$ 95,571	0.12
2025	RSSP0010	1	0	SPRINGFIELD ROAD	MCNEIL LINE	CRK	\$ 174	83.8	83.8	2	\$ 44,352	\$ 44,352	0.12
2025	RWAL0010	1	0	WALKER ROAD	(to) CHALET LINE-to-TALBOT LINE	SST	\$ 53,561	77.3	95.3		\$ 1,003,389	\$ 1,237,128	2.01
2025	RYOR0010	1	0	YORKE LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	SST	\$ 99,756	77.3	95.3		\$ 1,847,034	\$ 2,277,300	3.7
2025	RHAC0040	1	0	HACIENDA ROAD	(to) JOHN WISE LINE-to-VAN PATTER LINE	SST	\$ 31,977	77.3	95.3		\$ 542,241	\$ 668,556	1.02
2025	RCRO0020	1	0	CROSSLEY HUNTER LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 111,089	77.3	95.3		\$ 1,862,011	\$ 2,295,765	3.73
2025	RCRO0010	1	0	CROSSLEY HUNTER LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	SST	\$ 116,309	77.3	95.3		\$ 1,852,027	\$ 2,283,455	3.71
2025	RDIN0010	1	0	DINGLE STREET	(to) AYLMEER TOWN LIMIT-to-HACIENDA ROAD	SST	\$ 28,779	77.3	95.3		\$ 379,234	\$ 467,588	1.08
2025	RCHA0050	1	0	CHALET LINE	(to) CARTER ROAD-to-1.2km E of CARTER ROAD	SST	\$ 30,096	77.3	95.3		\$ 388,308	\$ 478,764	1.2
2025	RDOR0050	1	0	DORCHESTER ROAD	(to) CROSSLEY HUNTER LINE-to-WILSON LINE	SST	\$ 38,285	77.3	95.3		\$ 493,768	\$ 608,792	1.42
2025	RDOR0040	1	0	DORCHESTER ROAD	(to) LYONS LINE-to-CROSSLEY HUNTER LINE	SST	\$ 39,003	77.3	95.3		\$ 497,246	\$ 613,079	1.43
2025	RCHA0010	1	0	CHALET LINE	(to) HACIENDA ROAD-to-0.12km E of HACIENDA	SST	\$ 3,198	77.3	95.3		\$ 38,289	\$ 47,208	0.12
2025	RDOR0020	1	0	DORCHESTER ROAD	(to) RON MCNEIL LINE-to-MAPLETON LINE	SST	\$ 36,115	76.4	94.4		\$ 446,372	\$ 551,579	1.44
2025	RWIL0060	1	0	WILSON LINE	(to) CORLESS ROAD-to-PIGRAM LINE	SST	\$ 28,880	77.3	95.3		\$ 340,769	\$ 420,151	0.98
2025	RDOR0070	1	0	DORCHESTER ROAD	(to) YORKE LINE-to-0.75km N of YORKE LINE	SST	\$ 22,572	77.3	95.3		\$ 260,793	\$ 321,545	0.75
2025	RVIE0040	1	0	VIENNA LINE	(to) SPRINGFIELD ROAD-to-SAWMILL ROAD (to) 1.7km W of IMPERIAL ROAD-to-0.5km W of	SST	\$ 56,004	77.3	95.3		\$ 636,676	\$ 784,990	2.03
2025	RRUS0012	1	0	RUSH CREEK LINE	IMPERIAL ROAD	DSTrehab	\$ 84,060	46.1	97		\$ 231,568	\$ 487,458	1.2
2025	RCAR0070	1	0	CARTER ROAD	(to) GLENCOLIN LINE-to-COLLEGE LINE	SST	\$ 60,060	77.3	95.3		\$ 646,085	\$ 796,590	2.06
2025	RCOL0040	1	0	COLLEGE LINE	(to) HACIENDA ROAD-to-SPRINGFIELD ROAD	DSTrehab2	\$ 251,130	34.1	97		\$ 401,733	\$ 1,141,756	2.02
2025	RCOL0050	1	0	COLLEGE LINE	(to) SPRINGFIELD ROAD-to-WALKER ROAD	DSTrehab2	\$ 257,347	34.1	97		\$ 411,677	\$ 1,170,017	2.07
2025	RCAR0080	1	0	CARTER ROAD	(to) COLLEGE LINE-to-PRESSEY LINE	SST	\$ 61,650	77.3	95.3		\$ 649,221	\$ 800,457	2.07
2025	RWAL0050	1	0	WALKER ROAD	(to) PRESSEY LINE-to-RON MCNEIL LINE	DSTrehab	\$ 38,640	46.1	97		\$ 94,560	\$ 199,053	0.51
2025	RSMI0010	1	0	MILL STREET	(to) RON MCNEIL LINE-to-BROADWAY STREET	CRK	\$ 160	93.9	93.9	2	\$ 45,583	\$ 45,583	0.11
2025	ROCH0010	1	0	CHURCH STREET	(to) SPRINGWATER ROAD-to-NORTON STREET	R1	\$ 15,573	64.3	91.3		\$ 35,589	\$ 50,528	0.11
							\$1,464,592						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2026	RSCE0030	1	0	CENTRE STREET	(to) SPRINGFIELD ROAD-to-WEST END	CRK	\$ 102	87.9	87.9	2	\$ 27,135	\$ 27,135	0.07
2026	ROCH0010	1	0	CHURCH STREET	(to) SPRINGWATER ROAD-to-NORTON STREET	CRK	\$ 160	91.3	91.3	2	\$ 50,528	\$ 50,528	0.11
2026	RSPA0010	1	0	SPARTA LINE	(to) CENTRAL ELGIN BOUNDARY-to-MELON ROAD	SST	\$ 65,998	77.3	95.3		\$ 896,344	\$ 1,105,147	2.77
2026	RDOR0072	1	0	DORCHESTER ROAD	(to) 0.75km N of YORKE LINE-to-AVON DRIVE	SST	\$ 18,873	77.3	95.3		\$ 243,407	\$ 300,108	0.7
2026	RWIL0040	1	0	WILSON LINE	(to) WHITTAKER ROAD-to-PUTNAM ROAD	DSTrehab	\$ 136,026	49	97		\$ 409,806	\$ 811,911	1.86
2026	RJAM0010	1	0	JAMESTOWN LINE	(to) RUSH CREEK LINE-to-IMPERIAL ROAD	DSTrehab	\$ 374,398	40.8	97		\$ 793,530	\$ 1,886,579	4.71
2026	RCAR0060	1	0	CARTER ROAD	(to) TALBOT LINE-to-GLENCOLIN LINE	SST	\$ 83,366	73.3	91.3		\$ 823,791	\$ 1,026,170	2.77
					(to) 0.1km S of OSTRANDER ROAD-to-0.1km N of								
2026	RPIG0035	1	0	PIGRAM LINE	WILSON LINE	DSTrehab	\$ 43,665	43.4	97		\$ 96,797	\$ 216,544	0.55
					(to) CARTER ROAD (SOUTH LEG)-to-SPRINGER HILL								
2026	RCOL0070	1	0	COLLEGE LINE	ROAD	DSTrehab2	\$ 267,401	40.8	97		\$ 527,172	\$ 1,253,326	2
2026	RWIL0050	1	0	WILSON LINE	(to) PUTNAM ROAD-to-CORLESS ROAD	SSTedge	\$ 63,253	52	70		\$ 437,591	\$ 589,065	1.87
2026	RCAR0010	1	0	CARTER ROAD	(to) NOVA SCOTIA LINE-to-VIENNA LINE	SSTedge	\$ 66,128	62	80		\$ 516,057	\$ 665,831	2.05
2026	RBRA0010	1	0	BRADLEY CREEK LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	DSTrehab	\$ 181,077	43.4	97		\$ 360,790	\$ 807,119	2.05
					(to) HACIENDA ROAD (TERPSTA SUB)-to-0.04km W of								
2026	RTCA0010	1	0	CATHERINE STREET	LOUISA STREET	R2	\$ 45,206	46.3	100		\$ 86,077	\$ 185,791	0.13
2026	RNEW0020	1	0	NEWELL ROAD	(to) CENTURY LINE-to-LYONS LINE	GRR2sd	\$ 55,918	45.5	65.5		\$ 214,093	\$ 308,241	1.34
2026	RSWH0010	1	0	WHITTAKER ROAD	(to) RON MCNEIL LINE-to-SOUTH END	R2	\$ 51,454	46.3	100		\$ 49,065	\$ 105,903	0.24
2026	RPLE0005	1	0	LEVI STREET	(to) IMPERIAL ROAD-to-SOUTH END	BS	\$ 12,029	26.5	95		\$ 4,579	\$ 16,433	0.04
							\$1,465,054						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2027	RWA0020	1	0	WALES CRES	(to) HOUSE 5265-to-MERVIS DRIVE	CRK	\$ 242	97	97	2	\$ 231,510	\$ 231,510	0.167
2027	RME0030	1	0	MERVIS DRIVE	(to) WALES CRES, NORTHERLY INTERSECTION-to-JAMESTOWN LINE	CRK	\$ 355	97	97	2	\$ 339,640	\$ 339,640	0.245
2027	RME0020	1	0	MERVIS DRIVE	(to) WALES CRES , SOUTHERLY INTERSECTION-to-WALES CRES, NORTHERLY INTERSECTION	CRK	\$ 376	97	97	2	\$ 359,048	\$ 359,048	0.259
2027	RROM0010	1	0	ROMMEL ROAD	(to) 100m SOUTH OF CALTON LINE-to-CALTON LINE	SST	\$ 2,038	77.3	95.3		\$ 32,359	\$ 39,897	0.1
2027	RJOH0020	1	0	JOHN WISE LINE	(to) SAWMILL ROAD-to-CARTER ROAD	SST	\$ 62,982	77.3	95.3		\$ 982,956	\$ 1,211,935	2.05
2027	RJOH0030	1	0	JOHN WISE LINE	(to) CARTER ROAD-to-RICHMOND ROAD	SST	\$ 62,841	77.3	95.3		\$ 950,043	\$ 1,171,355	2.11
2027	RROG0040	1	0	ROGERS ROAD	(to) TALBOT LINE-to-GLENCOLIN LINE	SST	\$ 61,948	77.3	95.3		\$ 936,536	\$ 1,154,701	2.08
2027	RGRA0010	1	0	GRANGER ROAD	(to) NOVA SCOTIA LINE-to-SOUTH END CULDESAC	SST	\$ 13,995	77.3	95.3		\$ 210,143	\$ 259,096	0.72
2027	RGLE0070	1	0	GLENCOLIN LINE	(to) CARTER ROAD (SOUTH LEG)-to-SPRINGER HILL ROAD	SST	\$ 68,970	77.3	95.3		\$ 998,397	\$ 1,230,973	2
2027	RHIL0010	1	0	HILLTOP LANE	(to) SPRINGFIELD ROAD-to-WEST END	CRK	\$ 435	97	97	2	\$ 145,093	\$ 145,093	0.3
2027	RHAC0030	1	0	HACIENDA ROAD	(to) CALTON LINE-to-JOHN WISE LINE	SST	\$ 60,060	77.3	95.3		\$ 797,165	\$ 982,888	2.06
2027	RYOR0050	1	0	YORKE LINE	(to) WHITTAKER ROAD-to-PUTNAM ROAD	SST	\$ 49,564	77.3	95.3		\$ 652,378	\$ 804,349	1.86
2027	RDOR0060	1	0	DORCHESTER ROAD	(to) WILSON LINE-to-YORKE LINE	SST	\$ 37,206	77.3	95.3		\$ 479,859	\$ 591,642	1.38
2027	RROG0010	1	0	ROGERS ROAD	(to) SOUTH END-to-JOHN WISE LINE	SST	\$ 24,864	77.3	95.3		\$ 320,240	\$ 394,840	1.03
2027	RVIE0050	1	0	VIENNA LINE	(to) SAWMILL ROAD-to-CARTER ROAD SOUTH LEG	SST	\$ 56,458	77.3	95.3		\$ 649,221	\$ 800,457	2.07
2027	RVIE0060	1	0	VIENNA LINE	(to) CARTER ROAD SOUTH LEG-to-RICHMOND ROAD	SST	\$ 56,458	77.3	95.3		\$ 649,221	\$ 800,457	2.07
2027	RROG0050	1	0	ROGERS ROAD	(to) GLENCOLIN LINE-to-COLLEGE LINE	SST	\$ 60,277	77.3	95.3		\$ 693,130	\$ 854,594	2.21
2027	RROG0060	1	0	ROGERS ROAD	(to) COLLEGE LINE-to-RON MCNEIL LINE	SST	\$ 20,183	77.3	95.3		\$ 232,089	\$ 286,154	0.74
2027	RMAP0010	1	0	MAPLETON LINE	(to) CENTRAL ELGIN TOWNLINE-to-SPRINGWATER ROAD	SST	\$ 96,163	77.3	95.3		\$ 1,088,377	\$ 1,341,913	3.13
2027	RWAL0020	1	0	WALKER ROAD	(to) TALBOT LINE-to-GLENCOLIN LINE	SST	\$ 100,320	77.3	95.3		\$ 1,112,717	\$ 1,371,924	3.2
2027	RMAP0020	1	0	MAPLETON LINE	(to) SPRINGWATER ROAD-to-DORCHESTER ROAD	SST	\$ 18,058	77.3	95.3		\$ 200,725	\$ 247,484	0.64
2027	RMAP0030	1	0	MAPLETON LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 104,960	77.3	95.3		\$ 1,166,717	\$ 1,438,503	3.72
2027	RWIL0050	1	0	WILSON LINE	(to) PUTNAM ROAD-to-CORLESS ROAD	SST	\$ 55,693	70	88		\$ 589,065	\$ 740,539	1.87
2027	RCAR0030	1	0	CARTER ROAD	(to) CALTON LINE-to-JOHN WISE LINE	DSTrehab	\$ 166,415	46.1	97		\$ 383,423	\$ 807,119	2.05
2027	RCAR0020	1	0	CARTER ROAD	(to) VIENNA LINE-to-CALTON LINE	DSTrehab	\$ 169,889	49	97		\$ 411,361	\$ 814,992	2.07
2027	RNEW0020	1	0	NEWELL ROAD	(to) CENTURY LINE-to-LYONS LINE	GRR2	\$ 52,099	65.5	85.5		\$ 308,241	\$ 402,389	1.34
2027	RPCO0030	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-DEXTER LINE	R1	\$ 13,508	69.5	96.5		\$ 39,054	\$ 54,233	0.13
2027	RPIG0010	1	0	PIGRAM LINE	(to) 0.18km N of PRESSEY LINE-to-RON MCNEIL LINE	MICRO	\$ 10,206	79.3	79.3	4	\$ 387,442	\$ 387,442	0.81
2027	RSCA0010	1	0	CATHERINE STREET	(to) PRESSEY LINE-to-RON MCNEIL LINE	R1	\$ 16,305	69.5	96.5		\$ 42,916	\$ 59,596	0.14
2027	RSCE0010	1	0	CENTRE STREET	(to) SUPERIOR STREET-to-TRACEY STREET	R1	\$ 16,305	69.5	96.5		\$ 42,916	\$ 59,596	0.14
2027	RSBU0010	1	0	BURGESS STREET	(to) RON MCNEIL LINE-to-NELSON STREET	MICRO	\$ 2,170	72	72	4	\$ 31,771	\$ 31,771	0.1
2027	RSOM0010	1	0	OMEMEE STREET	(to) BROADWAY STREET-to-RON MCNEIL LINE	MICRO	\$ 2,170	72	72	4	\$ 31,771	\$ 31,771	0.1
							\$1,463,513						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2028	RCAL0040	1	0	CALTON LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	SST	\$ 51,163	77.3	95.3		\$ 1,009,320	\$ 1,244,441	2.04
2028	RSPH0040	1	0	SPRINGER HILL ROAD	(to) GLENCOLIN LINE-to-COLLEGE LINE	SST	\$ 54,248	77.3	95.3		\$ 1,028,349	\$ 1,267,903	2.06
2028	RBRO0010	1	0	BROOK LINE	(to) ROGERS ROAD-to-0.16km W of CAVERLY ROAD	SST	\$ 21,569	77.3	95.3		\$ 383,782	\$ 473,184	0.86
2028	ROWE0010	1	0	WELDON STREET	(to) SPRINGWATER ROAD-to-EAST END	SST	\$ 4,138	77.3	95.3		\$ 73,503	\$ 90,628	0.22
2028	RSPH0050	1	0	SPRINGER HILL ROAD	(to) COLLEGE LINE-to-PRESSEY LINE	SST	\$ 63,490	77.3	95.3		\$ 1,098,628	\$ 1,354,553	2.44
2028	RHAC0050	1	0	HACIENDA ROAD	(to) VAN PATTEN LINE-to-BRADLEY CREEK LINE	SST	\$ 46,555	77.3	95.3		\$ 791,160	\$ 975,460	1.65
2028	RHAC0065	1	0	HACIENDA ROAD	(to) TALBOT LINE-to-0.6km N of TALBOT LINE	SST	\$ 16,929	77.3	95.3		\$ 287,695	\$ 354,713	0.6
2028	RHAC0070	1	0	HACIENDA ROAD	(to) 0.6km N OF TALBOT LINE-to-DINGLE STREET	SST	\$ 19,186	77.3	95.3		\$ 326,054	\$ 402,008	0.68
					(to) HACIENDA ROAD-to-0.42km W of SPRINGFIELD ROAD								
2028	RCAL0050	1	0	CALTON LINE	ROAD	SST	\$ 43,435	77.3	95.3		\$ 727,401	\$ 896,849	1.63
2028	RGLE0010	1	0	GLENCOLIN LINE	(to) SPRINGWATER ROAD-to-ROGERS ROAD	SST	\$ 58,405	77.3	95.3		\$ 948,590	\$ 1,169,563	2.07
2028	RGLE0020	1	0	GLENCOLIN LINE	(to) ROGERS ROAD-to-IMPERIAL ROAD	SST	\$ 57,841	77.3	95.3		\$ 939,425	\$ 1,158,263	2.05
2028	RROG0020	1	0	ROGERS ROAD	(to) JOHN WISE LINE-to-CONSERVATION LINE	SST	\$ 58,123	77.3	95.3		\$ 927,531	\$ 1,143,598	2.06
2028	RROG0030	1	0	ROGERS ROAD	(to) CONSERVATION LINE-to-TALBOT LINE	SST	\$ 79,265	77.3	95.3		\$ 1,237,087	\$ 1,525,265	2.58
2028	RHAC0080	1	0	HACIENDA ROAD	(to) DINGLE STREET-to-GLENCOLIN LINE	SST	\$ 59,565	77.3	95.3		\$ 911,033	\$ 1,123,257	1.9
2028	RJOH0010	1	0	JOHN WISE LINE	(to) SPRINGFIELD ROAD-to-SAWMILL ROAD	SST	\$ 64,581	77.3	95.3		\$ 987,751	\$ 1,217,847	2.06
2028	RWHI0020	1	0	WHITTAKER ROAD	(to) CROSSLEY HUNTER LINE-to-WILSON LINE	SST	\$ 35,864	77.3	95.3		\$ 497,246	\$ 613,079	1.43
2028	RNOV0010	1	0	NOVA SCOTIA LINE	(to) IMPERIAL ROAD-to-CULDESAC	SST	\$ 11,192	77.3	95.3		\$ 151,773	\$ 187,134	0.42
					(to) IMPERIAL ROAD (WEST)-to-IMPERIAL ROAD								
2028	RHAL0010	1	0	HALF MOON ROAD	(NORTH)	SST	\$ 16,020	77.3	95.3		\$ 213,062	\$ 262,695	0.73
2028	RWHI0010	1	0	WHITTAKER ROAD	(to) LYONS LINE-to-CROSSLEY HUNTER LINE	SST	\$ 37,394	77.3	95.3		\$ 493,768	\$ 608,792	1.42
2028	RCON0010	1	0	CONSERVATION LINE	(to) SPRINGWATER ROAD-to-ROGERS ROAD	SST	\$ 54,894	77.3	95.3		\$ 716,311	\$ 883,176	2.06
					(to) SPRINGFIELD ROAD (NORTH LEG)-to-WALKER ROAD								
2028	RGLE0050	1	0	GLENCOLIN LINE	ROAD	SST	\$ 67,246	77.3	95.3		\$ 878,002	\$ 1,082,532	1.95
2028	RCOL0020	1	0	COLLEGE LINE	(to) ROGERS ROAD-to-IMPERIAL ROAD	SST	\$ 51,414	77.3	95.3		\$ 648,526	\$ 799,600	2.05
2028	RYOR0030	1	0	YORKE LINE	(to) IMPERIAL ROAD-to-HELDER ROAD	SST	\$ 51,314	77.3	95.3		\$ 646,767	\$ 797,431	1.86
2028	RCEN0010	1	0	CENTURY LINE	(to) NEWELL ROAD-to-WHITTAKER ROAD	SST	\$ 43,968	77.3	95.3		\$ 545,788	\$ 672,929	1.87
2028	RSPR0010	1	0	PRESSEY LINE	(to) SPRINGFIELD ROAD-to-CATHERINE STREET	CRK	\$ 595	97	97	2	\$ 177,244	\$ 177,244	0.41
					(to) 0.42km W of SPRINGFIELD ROAD-to-								
2028	RCAL0055	1	0	CALTON LINE -(MOUNT SALEM)	SPRINGFIELD ROAD	SST	\$ 12,509	77.3	95.3		\$ 151,773	\$ 187,134	0.42
2028	RCEN0030	1	0	CENTURY LINE	(to) 0.08km E of PUTNAM ROAD-to-EMPEY ROAD	SST	\$ 42,968	77.3	95.3		\$ 519,520	\$ 640,542	1.78
2028	RCEN0040	1	0	CENTURY LINE	(to) EMPEY ROAD-to-PIGRAM LINE	SST	\$ 23,898	77.3	95.3		\$ 288,947	\$ 356,256	0.99
2028	RCHA0060	1	0	CHALET LINE	(to) 1.2km E of CARTER ROAD-to-EAST CULDESAC	SST	\$ 6,662	77.3	95.3		\$ 79,769	\$ 98,351	0.25
2028	RCEN0020	1	0	CENTURY LINE	(to) WHITTAKER ROAD-to-0.08km W of PUTNAM	SST	\$ 47,166	77.3	95.3		\$ 555,131	\$ 684,448	1.77
2028	RCAR0010	1	0	CARTER ROAD	(to) NOVA SCOTIA LINE-to-VIENNA LINE	SST	\$ 57,841	77.3	95.3		\$ 642,949	\$ 792,724	2.05
2028	RCAR0040	1	0	CARTER ROAD	(to) JOHN WISE LINE-to-CHALET LINE	SST	\$ 67,716	77.3	95.3		\$ 751,084	\$ 926,048	2.16
2028	RCAR0050	1	0	CARTER ROAD	(to) CHALET LINE-to-TALBOT LINE	SST	\$ 63,954	77.3	95.3		\$ 709,357	\$ 874,601	2.04
2028	RSCA0010	1	0	CATHERINE STREET	(to) PRESSEY LINE-to-ROD MCNEIL LINE	CRK	\$ 203	96.5	96.5	2	\$ 59,596	\$ 59,596	0.14
2028	RSCE0010	1	0	CENTRE STREET	(to) SUPERIOR STREET-to-TRACEY STREET	CRK	\$ 203	96.5	96.5	2	\$ 59,596	\$ 59,596	0.14

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2028	RHEL0020	1	0	HELDER ROAD	(to) 0.45km S OF AVON DRIVE-to-AVON DRIVE	GRR2	\$ 18,954	65.7	85.7		\$ 93,679	\$ 122,196	0.45
2028	RPCO0030	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-DEXTER LINE	CRK	\$ 189	96.5	96.5	2	\$ 54,233	\$ 54,233	0.13
2028	RSEL0010	1	0	ELM STREET	(to) ASHTON STREET-to-FINNEY STREET	R1	\$ 19,798	64.3	91.3		\$ 48,250	\$ 68,504	0.17
2028	RSNE0010	1	0	NELSON STREET	(to) WEST END-to-WHITTAKER ROAD	R1	\$ 24,457	69.5	96.5		\$ 64,374	\$ 89,394	0.21
2028	RPCO0020	1	0	COLIN STREET	(to) IMPERIAL ROAD (PARK LOOP)-to-HALE STREET	MICRO	\$ 7,350	79.6	79.6	4	\$ 113,742	\$ 113,742	0.3
2028	RPBA0010	1	0	BANK STREET	(to) RUSH CREEK LINE-to-IMPERIAL ROAD	MICRO	\$ 3,528	72	72	4	\$ 51,342	\$ 51,342	0.16
							\$1,465,790						

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Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2029	RPRE0010	1	0	PRESSEY LINE	(to) 0.45km E of CATHERINE STREET-to-WALKER ROAD (NORTH LEG)	SST	\$ 32,243	77.3	95.3		\$ 580,184	\$ 715,338	1.21
2029	RSPR0020	1	0	PRESSEY LINE	(to) CATHERINE STREET-to-0.45km E of CATHERINE STREET	SST	\$ 11,991	77.3	95.3		\$ 215,771	\$ 266,035	0.45
2029	RPRE0020	1	0	PRESSEY LINE	(to) WALKER ROAD (NORTH LEG)-to-CARTER ROAD	SST	\$ 55,301	77.3	95.3		\$ 939,802	\$ 1,158,728	1.96
2029	RSEL0010	1	0	ELM STREET	(to) ASHTON STREET-to-FINNEY STREET	CRK	\$ 247	91.3	91.3	2	\$ 68,504	\$ 68,504	0.17
2029	RSPH0020	1	0	SPRINGER HILL ROAD	(to) HERITAGE LINE-to-TALBOT LINE	SST	\$ 21,161	77.3	95.3		\$ 343,692	\$ 423,755	0.75
2029	RWHI0030	1	0	WHITTAKER ROAD	(to) WILSON LINE-to-YORKE LINE	SST	\$ 34,861	77.3	95.3		\$ 483,336	\$ 595,929	1.39
2029	RWOO0010	1	0	WOOLLEYVILLE LINE	(to) SPRINGFIELD ROAD-to-0.35km E of SPRINGFIELD ROAD	SST	\$ 8,778	77.3	95.3		\$ 116,936	\$ 144,180	0.35
2029	RDOR0030	1	0	DORCHESTER ROAD	(to) MAPLETON LINE-to-LYONS LINE	SST	\$ 36,774	77.3	95.3		\$ 479,859	\$ 591,642	1.38
2029	RYOR0020	1	0	YORKE LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 99,756	77.3	95.3		\$ 1,286,579	\$ 1,586,286	3.7
2029	RCOL0010	1	0	COLLEGE LINE	(to) SPRINGWATER ROAD-to-ROGERS ROAD	SST	\$ 51,665	77.3	95.3		\$ 629,269	\$ 775,857	2.06
2029	RWOO0020	1	0	WOOLLEYVILLE LINE	(to) 0.35km E of SPRINGFIELD ROAD-to-EAST END (BEND)	SST	\$ 17,728	77.3	95.3		\$ 213,007	\$ 262,627	0.87
2029	RCAL0030	1	0	CALTON LINE	(to) ROMMEL ROAD-to-IMPERIAL ROAD	SST	\$ 33,043	77.3	95.3		\$ 388,905	\$ 479,501	1.24
2029	RVIE0010	1	0	VIENNA LINE	(to) WEST TURNAROUND-to-IMPERIAL ROAD	SST	\$ 63,452	77.3	95.3		\$ 738,420	\$ 910,434	2.53
2029	RVIE0020	1	0	VIENNA LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	SST	\$ 64,895	77.3	95.3		\$ 719,789	\$ 887,463	2.07
2029	RVIE0030	1	0	VIENNA LINE	(to) HACIENDA ROAD-to-SPRINGFIELD ROAD	SST	\$ 63,954	77.3	95.3		\$ 709,357	\$ 874,601	2.04
2029	RANG0010	1	0	ANGER ROAD	(to) JOHN WISE LINE-to-CHALET LINE	DSTrehab	\$ 151,928	43.4	97		\$ 302,712	\$ 677,192	1.72
2029	RSPH0030	1	0	SPRINGER HILL ROAD	(to) TALBOT LINE-to-GLENCOLIN LINE	DSTrehab2	\$ 228,955	25.7	97		\$ 195,041	\$ 737,008	1.84
2029	RSPA0030	1	0	SPARTA LINE	(to) ROMMEL ROAD-to-IMPERIAL ROAD	DSTrehab2	\$ 145,784	36.2	97		\$ 180,567	\$ 483,973	1.24
2029	RHEL0010	1	0	HELDER ROAD	(to) YORKE LINE-to-0.45km S OF AVON DRIVE	GRR2	\$ 39,813	65.7	85.7		\$ 221,571	\$ 289,021	0.96
2029	RPRE0025	1	0	PRESSEY LINE	(to) CARTER ROAD-to-PIGRAM LINE	PR2	\$ 83,414	36.2	100		\$ 87,583	\$ 242,010	0.39
2029	RSNE0010	1	0	NELSON STREET	(to) WEST END-to-WHITTAKER ROAD	CRK	\$ 305	96.5	96.5	2	\$ 89,394	\$ 89,394	0.21
2029	RSAW0030	1	0	SAWMILL ROAD	(to) CALTON LINE-to-JOHN WISE LINE	GRR2	\$ 93,442	48.2	68.2		\$ 314,289	\$ 444,834	2.06
2029	RYOR0070	1	0	YORKE LINE	(to) CORLESS ROAD-to-PIGRAM LINE	GRR2	\$ 47,628	65.7	85.7		\$ 204,012	\$ 266,117	0.98
2029	RNEW0010	1	0	NEWELL ROAD	(to) RON MCNEIL LINE-to-CENTURY LINE	GRR2sd	\$ 74,088	38.8	58.8		\$ 176,898	\$ 268,153	1.44
2029	RSSP0010	1	0	SPRINGFIELD ROAD	(to) RON MCNEIL LINE-to-.12KM NORTH OF RON MCNEIL LINE	MICRO	\$ 2,604	79.3	79.3	4	\$ 41,974	\$ 41,974	0.12
							\$1,463,810						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2030	RCOL0030	1	0	COLLEGE LINE	(to) IMPERIAL ROAD-to-HACIENDA ROAD	SST	\$ 53,862	77.3	95.3		\$ 932,033	\$ 1,149,150	2.07
2030	RGLE0060	1	0	GLENCOLIN LINE	(to) WALKER ROAD-to-CARTER ROAD (SOUTH LEG)	SST	\$ 71,039	77.3	95.3		\$ 1,028,349	\$ 1,267,903	2.06
2030	RWIL0020	1	0	WILSON LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 89,316	77.3	95.3		\$ 1,253,093	\$ 1,545,000	3.7
					(to) HACIENDA ROAD-to-SPRINGFIELD ROAD								
2030	RGLE0040	1	0	GLENCOLIN LINE	(NORTH LEG)	SST	\$ 71,039	77.3	95.3		\$ 987,751	\$ 1,217,847	2.06
2030	RWIL0030	1	0	WILSON LINE	(to) IMPERIAL ROAD-to-WHITTAKER ROAD	SST	\$ 92,796	77.3	95.3		\$ 1,286,579	\$ 1,586,286	3.7
2030	RWIL0010	1	0	WILSON LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	SST	\$ 90,721	77.3	95.3		\$ 1,256,480	\$ 1,549,176	3.71
2030	RDIN0020	1	0	DINGLE LINE	(to) HACIENDA ROAD-to-SPRINGFIELD ROAD	SST	\$ 53,107	77.3	95.3		\$ 706,314	\$ 870,850	2.42
2030	RRUS0010	1	0	RUSH CREEK LINE	(to) 1.7km W of IMPERIAL ROAD-to-JAMESTOWN LINE	SST	\$ 18,653	77.3	95.3		\$ 243,407	\$ 300,108	0.7
2030	RPRE0030	1	0	PRESSEY LINE	(to) PIGRAM LINE-to-SPRINGER HILL ROAD	PR2	\$ 398,020	29	100		\$ 328,757	\$ 1,135,603	1.8
					(to) NOVA SCOTIA LINE-to-1.69km S of NOVA SCOTIA								
2030	RRIC0010	1	0	RICHMOND ROAD	LINE	BSgrav	\$ 248,079	23.1	95		\$ 123,805	\$ 508,716	1.69
2030	RYOR0060	1	0	YORKE LINE	(to) PUTNAM ROAD-to-CORLESS ROAD	GRR2	\$ 91,601	61.6	81.6		\$ 362,749	\$ 480,620	1.86
2030	RSAW0020	1	0	SAWMILL ROAD	(to) 0.1km N OF VIENNA LINE-to-CALTON LINE	GRR2	\$ 93,189	45.5	65.5		\$ 283,891	\$ 408,733	1.97
2030	RNEW0010	1	0	NEWELL ROAD	(to) RON MCNEIL LINE-to-CENTURY LINE	GRR2	\$ 69,984	58.8	78.8		\$ 268,153	\$ 359,409	1.44
2030	RPDE0010	1	0	DEXTER LINE	(to) IMPERIAL ROAD-to-CTY RD 73 /DEXTER LINE	R1	\$ 22,237	66.9	93.9		\$ 54,206	\$ 76,079	0.17
							\$1,463,643						

Township of Malahide

10 Year Work Plan from Performance Model 20220107

Year	Asset ID	Fund	Proj	Street Name	Description	Imp. Type	Cost	Start Cond	End Cond	Yrs Hold	Start Value	End Value	Length (km)
2031	RTCA0010	1	0	CATHERINE STREET	(to) HACIENDA ROAD (TERPSTA SUB)-to-0.04km W of LOUISA STREET	CRK	\$ 189	97	97	2	\$ 180,217	\$ 180,217	0.13
2031	RWAL0010	1	0	WALKER ROAD	(to) CHALET LINE-to-TALBOT LINE	SST	\$ 53,561	77.3	95.3		\$ 1,003,389	\$ 1,237,128	2.01
2031	RYOR0010	1	0	YORKE LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	SST	\$ 99,756	77.3	95.3		\$ 1,847,034	\$ 2,277,300	3.7
2031	RHAC0040	1	0	HACIENDA ROAD	(to) JOHN WISE LINE-to-VAN PATTER LINE	SST	\$ 31,977	77.3	95.3		\$ 542,241	\$ 668,556	1.02
2031	RCRO0020	1	0	CROSSLEY HUNTER LINE	(to) DORCHESTER ROAD-to-IMPERIAL ROAD	SST	\$ 111,089	77.3	95.3		\$ 1,862,011	\$ 2,295,765	3.73
2031	RCOL0040	1	0	COLLEGE LINE	(to) HACIENDA ROAD-to-SPRINGFIELD ROAD	SST	\$ 56,994	77.3	95.3		\$ 909,520	\$ 1,121,393	2.02
2031	RCOL0050	1	0	COLLEGE LINE	(to) SPRINGFIELD ROAD-to-WALKER ROAD	SST	\$ 58,405	77.3	95.3		\$ 932,033	\$ 1,149,150	2.07
2031	RCRO0010	1	0	CROSSLEY HUNTER LINE	(to) BELMONT ROAD-to-DORCHESTER ROAD	SST	\$ 116,309	77.3	95.3		\$ 1,852,027	\$ 2,283,455	3.71
2031	RRUS0012	1	0	RUSH CREEK LINE	(to) 1.7km W of IMPERIAL ROAD-to-0.5km W of IMPERIAL ROAD	SST	\$ 28,215	77.3	95.3		\$ 388,308	\$ 478,764	1.2
2031	RDIN0010	1	0	DINGLE STREET	(to) AYLMEER TOWN LIMIT-to-HACIENDA ROAD	SST	\$ 28,779	77.3	95.3		\$ 379,234	\$ 467,588	1.08
2031	RCHA0050	1	0	CHALET LINE	(to) CARTER ROAD-to-1.2km E of CARTER ROAD	SST	\$ 30,096	77.3	95.3		\$ 388,308	\$ 478,764	1.2
2031	RDOR0050	1	0	DORCHESTER ROAD	(to) CROSSLEY HUNTER LINE-to-WILSON LINE	SST	\$ 38,285	77.3	95.3		\$ 493,768	\$ 608,792	1.42
2031	RDOR0040	1	0	DORCHESTER ROAD	(to) LYONS LINE-to-CROSSLEY HUNTER LINE	SST	\$ 39,003	77.3	95.3		\$ 497,246	\$ 613,079	1.43
2031	RDOR0020	1	0	DORCHESTER ROAD	(to) RON MCNEIL LINE-to-MAPLETON LINE	SST	\$ 36,115	77.3	95.3		\$ 451,632	\$ 556,840	1.44
2031	RWAL0050	1	0	WALKER ROAD	(to) PRESSEY LINE-to-RON MCNEIL LINE	SST	\$ 12,951	77.3	95.3		\$ 158,565	\$ 195,503	0.51
2031	RSWH0010	1	0	WHITTAKER ROAD	(to) RON MCNEIL LINE-to-SOUTH END	CRK	\$ 348	97	97	2	\$ 102,726	\$ 102,726	0.24
2031	RCHA0010	1	0	CHALET LINE	(to) HACIENDA ROAD-to-0.12km E of HACIENDA	SST	\$ 3,198	77.3	95.3		\$ 38,289	\$ 47,208	0.12
2031	RWIL0060	1	0	WILSON LINE	(to) CORLESS ROAD-to-PIGRAM LINE	SST	\$ 28,880	77.3	95.3		\$ 340,769	\$ 420,151	0.98
2031	RWIL0050	1	0	WILSON LINE	(to) PUTNAM ROAD-to-CORLESS ROAD	SST	\$ 55,693	77.3	95.3		\$ 650,244	\$ 801,718	1.87
2031	RDOR0070	1	0	DORCHESTER ROAD	(to) YORKE LINE-to-0.75km N of YORKE LINE	SST	\$ 22,572	77.3	95.3		\$ 260,793	\$ 321,545	0.75
2031	RVIE0040	1	0	VIENNA LINE	(to) SPRINGFIELD ROAD-to-SAWMILL ROAD	SST	\$ 56,004	77.3	95.3		\$ 636,676	\$ 784,990	2.03
2031	RCAR0070	1	0	CARTER ROAD	(to) GLENCOLIN LINE-to-COLLEGE LINE	SST	\$ 60,060	77.3	95.3		\$ 646,085	\$ 796,590	2.06
2031	RCAR0080	1	0	CARTER ROAD	(to) COLLEGE LINE-to-PRESSEY LINE	SST	\$ 61,650	77.3	95.3		\$ 649,221	\$ 800,457	2.07
2031	RCAR0060	1	0	CARTER ROAD	(to) TALBOT LINE-to-GLENCOLIN LINE	SST	\$ 83,366	77.3	95.3		\$ 868,764	\$ 1,071,143	2.77
2031	RPDE0010	1	0	DEXTER LINE	(to) IMPERIAL ROAD-to-CTY RD 73 /DEXTER LINE	CRK	\$ 247	93.9	93.9	2	\$ 76,079	\$ 76,079	0.17
2031	RSAW0030	1	0	SAWMILL ROAD	(to) CALTON LINE-to-JOHN WISE LINE	GRR2	\$ 93,442	65.7	85.7		\$ 428,842	\$ 559,388	2.06
2031	RSAW0020	1	0	SAWMILL ROAD	(to) 0.1km N OF VIENNA LINE-to-CALTON LINE	GRR2	\$ 93,189	65.5	85.5		\$ 408,733	\$ 533,575	1.97
2031	RWAL0040	1	0	WALKER ROAD	(to) COLLEGE LINE-to-PRESSEY LINE	GRR2	\$ 100,116	43	63		\$ 280,934	\$ 411,480	2.06
2031	RSSU0010	1	0	SUPERIOR STREET	(to) CLINTON STREET-to-FINNEY STREET	R2	\$ 62,173	39.3	100		\$ 50,252	\$ 127,966	0.29
2031	RPCO0010	1	0	COLIN STREET	(to) IMPERIAL ROAD-to-HALE STREET	MICRO	\$ 2,940	76.7	76.7	4	\$ 83,380	\$ 83,380	0.12
							\$1,465,602						

Appendix H: Potential Substandard Vertical and Horizontal Alignment



Geometric Needs By Asset ID

Current Insp - Rural w/Curve Needs Only

Asset ID	Street Name	From Description	To Description	Length	RDSD	AADT	Limit	Op. Speed	TON	H.Curve	H. SSD	V. Curve	V.SSD
RCAL0010	CALTON LINE	SPRINGWATER ROAD	MELON ROAD	2.080	R	406	80	80	ADEQ	1	0	0	2
RCAL0020	CALTON LINE	MELON ROAD	ROMMEL ROAD	0.830	R	410	80	80	ADEQ	0	0	0	2
RCAL0040	CALTON LINE	IMPERIAL ROAD	HACIENDA ROAD	2.040	R	629	50	50	ADEQ	0	0	0	4
RCAR0040	CARTER ROAD	JOHN WISE LINE	CHALET LINE	2.160	R	327	80	80	ADEQ	0	0	0	2
RCAR0050	CARTER ROAD	CHALET LINE	TALBOT LINE	2.040	R	362	80	80	ADEQ	2	0	0	2
RCAR0060	CARTER ROAD	TALBOT LINE	GLENCOLIN LINE	2.770	R	287	60	80	ADEQ	1	0	0	0
RCAT0010	CATT LINE	SPRINGWATER ROAD	ROGERS ROAD	2.250	R	50	50	50	ADEQ	1	0	0	0
RCHA0015	CHALET LINE	0.12km E of HACIENDA ROAD	SPRINGFIELD ROAD	1.940	R	86	80	80	ADEQ	0	0	0	1
RCHA0020	CHALET LINE	SPRINGFIELD ROAD	WALKER ROAD	2.060	R	66	80	80	ADEQ	0	0	0	1
RCHA0030	CHALET LINE	WALKER ROAD	ANGER ROAD	0.830	R	127	80	80	ADEQ	0	0	0	1
RCHA0040	CHALET LINE	ANGER ROAD	CARTER ROAD	1.300	R	175	80	80	ADEQ	1	0	0	1
RCHA0050	CHALET LINE	CARTER ROAD	1.2km E of CARTER ROAD	1.200	R	72	80	80	ADEQ	1	0	0	0
RCHA0060	CHALET LINE	1.2km E of CARTER ROAD	EAST CULDESAC	0.250	R	25	80	65	ADEQ	1	0	0	0
RCON0010	CONSERVATION LINE	SPRINGWATER ROAD	ROGERS ROAD	2.060	R	314	50	50	ADEQ	0	0	0	1
RCOR0020	CORLESS ROAD	0.1km N of WILSON LINE	YORKE LINE	1.300	R	10	50	50	ADEQ	0	0	0	3
RCRO0040	CROSSLEY HUNTER LINE	WHITTAKER ROAD	PUTNAM ROAD	1.860	R	40	80	80	ADEQ	0	0	0	2
RCRO0050	CROSSLEY HUNTER LINE	PUTNAM ROAD	PIGRAM LINE	2.850	R	103	80	80	ADEQ	0	0	0	3
RDAL0010	DALBY ROAD	LYONS LINE	NORTH END	0.500	R	10	80	80	ADEQ	0	0	0	1
RDIN0020	DINGLE LINE	HACIENDA ROAD	SPRINGFIELD ROAD	2.420	R	100	60	50	ADEQ	5	0	0	0
RHAC0020	HACIENDA ROAD	VIENNA LINE	CALTON LINE	2.070	R	90	80	65	ADEQ	3	0	0	2
RJAM0010	JAMESTOWN LINE	RUSH CREEK LINE	IMPERIAL ROAD	4.710	R	249	80	75	ADEQ	4	0	0	2
RJOH0030	JOHN WISE LINE	CARTER ROAD	RICHMOND ROAD	2.110	R	727	80	70	ADEQ	2	0	0	0
RMAP0010	MAPLETON LINE	CENTRAL ELGIN TOWNLINE	SPRINGWATER ROAD	3.130	R	273	60	60	ADEQ	1	0	0	2
RNEW0020	NEWELL ROAD	CENTURY LINE	LYONS LINE	1.340	R	23	80	80	ADEQ	0	0	0	1
RPIG0020	PIGRAM LINE	LYONS LINE	CROSSLEY HUNTER LINE	1.440	R	189	80	80	ADEQ	0	0	0	2
RPIG0040	PIGRAM LINE	0.1km N of WILSON LINE	YORKE LINE	1.310	R	108	80	80	ADEQ	0	0	0	1
RPIG0050	PIGRAM LINE	AVON DRIVE	YORKE LINE	1.360	R	139	80	80	ADEQ	0	0	0	4
RPRE0025	PRESSEY LINE	CARTER ROAD	PIGRAM LINE	0.390	R	1,150	80	80	ADEQ	1	0	0	0
RROG0010	ROGERS ROAD	SOUTH END	JOHN WISE LINE	1.030	R	83	80	80	ADEQ	0	0	0	1
RROG0020	ROGERS ROAD	JOHN WISE LINE	CONSERVATION LINE	2.060	R	872	80	80	ADEQ	0	0	0	2
RROG0040	ROGERS ROAD	TALBOT LINE	GLENCOLIN LINE	2.080	R	471	80	80	ADEQ	2	0	0	0
RRUS0010	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	JAMESTOWN LINE	0.700	R	70	80	70	ADEQ	1	0	0	0
RRUS0012	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	0.5km W of IMPERIAL ROAD	1.200	R	128	50	50	ADEQ	4	0	1	1
RSPA0010	SPARTA LINE	CENTRAL ELGIN BOUNDARY	MELON ROAD	2.770	R	190	80	55	NOW	5	0	1	0
RSPA0020	SPARTA LINE	MELON ROAD	ROMMEL ROAD	0.820	R	190	80	80	ADEQ	1	0	0	0

Geometric Needs By Asset ID

Current Insp - Rural w/Curve Needs Only

Asset ID	Street Name	From Description	To Description	Length	RDSD	AADT	Limit	Op. Speed	TON	H.Curve	H. SSD	V. Curve	V.SSD
RSPH0040	SPRINGER HILL ROAD	GLENCOLIN LINE	COLLEGE LINE	2.060	R	469	80	80	ADEQ	0	0	0	2
RSPW0010	SPRINGWATER ROAD	CALTON LINE	JOHN WISE LINE	2.010	R	675	80	80	ADEQ	1	0	0	0
RVIE0010	VIENNA LINE	WEST TURNAROUND	IMPERIAL ROAD	2.530	R	30	80	70	ADEQ	2	0	0	0
RVIE0020	VIENNA LINE	IMPERIAL ROAD	HACIENDA ROAD	2.070	R	262	80	80	ADEQ	0	0	0	3
RVIE0050	VIENNA LINE	SAWMILL ROAD	CARTER ROAD SOUTH LEG	2.070	R	312	80	80	ADEQ	0	0	0	1
RWAL0010	WALKER ROAD	CHALET LINE	TALBOT LINE	2.010	R	394	80	80	ADEQ	0	0	0	1
RWHI0010	WHITTAKER ROAD	LYONS LINE	CROSSLEY HUNTER LINE	1.420	R	90	80	80	ADEQ	0	0	0	1
RWHI0030	WHITTAKER ROAD	WILSON LINE	YORKE LINE	1.390	R	41	60	60	ADEQ	0	0	0	2
RWHI0040	WHITTAKER ROAD	YORKE LINE	AVON DRIVE	1.420	R	53	60	60	ADEQ	0	0	0	1
RWIL0010	WILSON LINE	BELMONT ROAD	DORCHESTER ROAD	3.710	R	353	80	80	ADEQ	0	0	0	1
RWIL0020	WILSON LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.700	R	313	80	80	ADEQ	0	0	0	5
RWIL0030	WILSON LINE	IMPERIAL ROAD	WHITTAKER ROAD	3.700	R	180	80	80	ADEQ	0	0	0	3
RWIL0040	WILSON LINE	WHITTAKER ROAD	PUTNAM ROAD	1.860	R	180	80	80	ADEQ	0	0	0	1
RWIL0050	WILSON LINE	PUTNAM ROAD	CORLESS ROAD	1.870	R	218	80	80	ADEQ	0	0	0	1
RWIL0060	WILSON LINE	CORLESS ROAD	PIGRAM LINE	0.980	R	217	80	80	ADEQ	0	0	0	1
RWOO0020	WOOLLEYVILLE LINE	0.35km E of SPRINGFIELD ROAD	EAST END (BEND)	0.870	R	50	50	45	ADEQ	2	0	0	0
RYOR0020	YORKE LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.700	R	396	80	80	ADEQ	0	0	0	1
RYOR0030	YORKE LINE	IMPERIAL ROAD	HELDER ROAD	1.860	R	128	80	80	ADEQ	0	0	0	2
RYOR0040	YORKE LINE	HELDER ROAD	WHITTAKER ROAD	1.830	R	149	80	80	ADEQ	0	0	0	2
				102.320									

Township of Malahide, 2021 SotI and AMP for Roads
February 2, 2022

Appendix I: Narrow Roads

Draft V5



Township of Malahide, 2021 Sotl and AMP for Roads
February 2, 2022

Asset ID	Street Name	From Desc	To Desc	Length	Boundary	Adj Agency	AADT	Surface Width	Width	Platform	Material	Impr ID
RCAT0010	CATT LINE	SPRINGWATER ROAD	ROGERS ROAD	2.25	0		50	NOW	5	6	G/S	BS
REMP0010	EMPEY ROAD	LYONS LINE	CENTURY LINE	1.46	0		60	NOW	5	6	G/S	BS
RGRA0010	GRANGER ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	0.72	0		70	NOW	5.2	6.2	LCB	SSTedge
RJON0010	JONES ROAD	NOVA SCOTIA LINE	SOUTH END TURNAROUND	1.13	0		50	NOW	3	4	G/S	REC
RPAM0010	AMASA STREET	COLIN STREET	WEST END	0.08	0		30	NOW	4.9	5.9	HCB	BS
RPED0010	PEDE ROAD	NOVA SCOTIA LINE	SOUTH END	1.29	0		30	NOW	4	5	G/S	REC
RPED0020	PEDE ROAD	NOVA SCOTIA LINE	NORTH END	0.48	0		20	NOW	4	5	G/S	REC
RPLE0010	LEVI STREET	IMPERIAL ROAD	COLIN STREET	0.36	0		300	NOW	4	5.3	HCB	BS
RROD0010	ROD ROAD	TALBOT LINE	0.1KM NORTH OF TALBOT LINE	0.1	0		10	NOW	2	3	G/S	REC
RSAL0010	ALLEY STREET	RON MCNEIL LINE	PRESSEY LINE	0.08	0		20	NOW	3.5	4.5	HCB	RNS
RSBE0010	BEACH STREET	WHITTAKER ROAD	DETROIT STREET	0.18	0		100	NOW	3.8	4.8	HCB	RSS
RSPA0040	SPARTA LINE	IMPERIAL ROAD	EAST END	0.62	0		25	NOW	3.8	4.8	G/S	BS
RSPF0010	SPRINGFIELD ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	1.32	0		20	NOW	4	5	G/S	REC
RSPH0010	SPRINGER HILL ROAD	SOUTH END	HERITAGE LINE	0.4	1	44609	10	NOW	4	5	G/S	REC
Total Length				10.47								

Appendix J: Critical Deficiencies by Asset ID

Draft V5



Critical Deficiencies

Current Inspection Batch

ID	Street Name	From Description	To Description	Length	AADT	Cap.	Drain	Geo	SA	Width	Type	Imp	Overall TON
RANG0010	ANGER ROAD	JOHN WISE LINE	CHALET LINE	1.720	104	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	DSTrehat	6-10
RBRA0010	BRADLEY CREEK LINE	IMPERIAL ROAD	HACIENDA ROAD	2.050	363	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RBRO0010	BROOK LINE	ROGERS ROAD	0.16km W of CAVERLY ROAD	0.860	587	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RBRO0020	BROOK LINE	0.16km W of CAVERLY ROAD	CAVERLY ROAD	0.160	600	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	BS	1-5
RCAL0010	CALTON LINE	SPRINGWATER ROAD	MELON ROAD	2.080	406	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	BS	1-5
RCAL0020	CALTON LINE	MELON ROAD	ROMMEL ROAD	0.830	410	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RCAL0030	CALTON LINE	ROMMEL ROAD	IMPERIAL ROAD	1.240	327	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RCAL0040	CALTON LINE	IMPERIAL ROAD	HACIENDA ROAD	2.040	629	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RCAL0050	CALTON LINE	HACIENDA ROAD	0.42km W of SPRINGFIELD ROAD	1.630	853	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RCAL0055	CALTON LINE -(MOUNT SALEM)	0.42km W of SPRINGFIELD ROAD	SPRINGFIELD ROAD	0.420	800	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RCAR0010	CARTER ROAD	NOVA SCOTIA LINE	VIENNA LINE	2.050	98	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SSTedge	ADEQ
RCAR0020	CARTER ROAD	VIENNA LINE	CALTON LINE	2.070	255	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	DSTrehat	6-10
RCAR0030	CARTER ROAD	CALTON LINE	JOHN WISE LINE	2.050	320	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	DSTrehat	6-10
RCAR0040	CARTER ROAD	JOHN WISE LINE	CHALET LINE	2.160	327	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RCAR0050	CARTER ROAD	CHALET LINE	TALBOT LINE	2.040	362	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RCAR0060	CARTER ROAD	TALBOT LINE	GLENCOLIN LINE	2.770	287	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCAR0070	CARTER ROAD	GLENCOLIN LINE	COLLEGE LINE	2.060	211	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCAR0080	CARTER ROAD	COLLEGE LINE	PRESSEY LINE	2.070	144	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCAT0010	CATT LINE	SPRINGWATER ROAD	ROGERS ROAD	2.250	50	ADEQ	6-10	ADEQ	ADEQ	NOW	ADEQ	BS	NOW
RCAV0010	CAVERLY ROAD	BROOK LINE	SOUTH END	0.240	100	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	RSS	NOW
RCEN0010	CENTURY LINE	NEWELL ROAD	WHITTAKER ROAD	1.870	24	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RCEN0020	CENTURY LINE	WHITTAKER ROAD	0.08km W of PUTNAM ROAD	1.770	64	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCEN0024	CENTURY LINE	0.08km W of PUTNAM ROAD	PUTNAM ROAD	0.080	70	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCEN0026	CENTURY LINE	PUTNAM ROAD	0.08km E of PUTNAM ROAD	0.080	80	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCEN0030	CENTURY LINE	0.08km E of PUTNAM ROAD	EMPEY ROAD	1.780	81	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RCEN0040	CENTURY LINE	EMPEY ROAD	PIGRAM LINE	0.990	66	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCHA0010	CHALET LINE	HACIENDA ROAD	0.12km E of HACIENDA ROAD	0.120	136	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCHA0015	CHALET LINE	0.12km E of HACIENDA ROAD	SPRINGFIELD ROAD	1.940	86	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RCHA0020	CHALET LINE	SPRINGFIELD ROAD	WALKER ROAD	2.060	66	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RCHA0030	CHALET LINE	WALKER ROAD	ANGER ROAD	0.830	127	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RCHA0040	CHALET LINE	ANGER ROAD	CARTER ROAD	1.300	175	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RCHA0050	CHALET LINE	CARTER ROAD	1.2km E of CARTER ROAD	1.200	72	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RCHA0060	CHALET LINE	1.2km E of CARTER ROAD	EAST CULDESAC	0.250	25	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	DSTrehat	ADEQ
RCOL0010	COLLEGE LINE	SPRINGWATER ROAD	ROGERS ROAD	2.060	216	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	DSTrehat	NOW
RCOL0020	COLLEGE LINE	ROGERS ROAD	IMPERIAL ROAD	2.050	242	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	DSTrehat	NOW
RCOL0030	COLLEGE LINE	IMPERIAL ROAD	HACIENDA ROAD	2.070	398	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCOL0040	COLLEGE LINE	HACIENDA ROAD	SPRINGFIELD ROAD	2.020	657	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCOL0050	COLLEGE LINE	SPRINGFIELD ROAD	WALKER ROAD	2.070	512	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCOL0060	COLLEGE LINE	WALKER ROAD	CARTER ROAD SOUTH LEG	2.040	489	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RCOL0070	COLLEGE LINE	CARTER ROAD (SOUTH LEG)	SPRINGER HILL ROAD	2.000	381	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RCON0010	CONSERVATION LINE	SPRINGWATER ROAD	ROGERS ROAD	2.060	314	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCON0020	CONSERVATION LINE	ROGERS ROAD	IMPERIAL ROAD	2.070	408	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	BS	ADEQ
RCOR0010	CORLESS ROAD	WILSON LINE	0.1km N of WILSON LINE	0.100	10	ADEQ	ADEQ	ADEQ	NOW	ADEQ	ADEQ	BS	ADEQ
RCOR0020	CORLESS ROAD	0.1km N of WILSON LINE	YORKE LINE	1.300	10	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BSgrav	ADEQ
RCRO0010	CROSSLEY HUNTER LINE	BELMONT ROAD	DORCHESTER ROAD	3.710	577	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ

Critical Deficiencies

Current Inspection Batch

ID	Street Name	From Description	To Description	Length	AADT	Cap.	Drain	Geo	SA	Width	Type	Imp	Overall TON
RCRO0020	CROSSLEY HUNTER LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.730	519	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RCRO0030	CROSSLEY HUNTER LINE	IMPERIAL ROAD	WHITTAKER ROAD	3.710	41	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	BS	ADEQ
RCRO0040	CROSSLEY HUNTER LINE	WHITTAKER ROAD	PUTNAM ROAD	1.860	40	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	BS	ADEQ
RCRO0050	CROSSLEY HUNTER LINE	PUTNAM ROAD	PIGRAM LINE	2.850	103	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BSgrav	6-10
RDAL0010	DALBY ROAD	LYONS LINE	NORTH END	0.500	10	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BSgrav	ADEQ
RDIN0010	DINGLE STREET	AYLMER TOWN LIMIT	HACIENDA ROAD	1.080	1,152	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RDIN0020	DINGLE LINE	HACIENDA ROAD	SPRINGFIELD ROAD	2.420	100	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RDOR0010	DORCHESTER ROAD	COLLEGE LINE	RON MCNEIL LINE	0.410	133	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RDOR0020	DORCHESTER ROAD	RON MCNEIL LINE	MAPLETON LINE	1.440	107	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RDOR0030	DORCHESTER ROAD	MAPLETON LINE	LYONS LINE	1.380	217	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RDOR0040	DORCHESTER ROAD	LYONS LINE	CROSSLEY HUNTER LINE	1.430	177	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RDOR0050	DORCHESTER ROAD	CROSSLEY HUNTER LINE	WILSON LINE	1.420	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RDOR0060	DORCHESTER ROAD	WILSON LINE	YORKE LINE	1.380	269	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RDOR0070	DORCHESTER ROAD	YORKE LINE	0.75km N of YORKE LINE	0.750	283	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RDOR0072	DORCHESTER ROAD	0.75km N of YORKE LINE	AVON DRIVE	0.700	100	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
REMP0010	EMPEY ROAD	LYONS LINE	CENTURY LINE	1.460	60	ADEQ	6-10	ADEQ	ADEQ	NOW	ADEQ	BSgrav	NOW
RGLE0010	GLENCOLIN LINE	SPRINGWATER ROAD	ROGERS ROAD	2.070	423	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RGLE0020	GLENCOLIN LINE	ROGERS ROAD	IMPERIAL ROAD	2.050	650	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RGLE0040	GLENCOLIN LINE	HACIENDA ROAD	SPRINGFIELD ROAD (NORTH LEG)	2.060	1,140	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RGLE0050	GLENCOLIN LINE	SPRINGFIELD ROAD (NORTH LEG)	WALKER ROAD	1.950	646	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RGLE0060	GLENCOLIN LINE	WALKER ROAD	CARTER ROAD (SOUTH LEG)	2.060	532	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RGLE0070	GLENCOLIN LINE	CARTER ROAD (SOUTH LEG)	SPRINGER HILL ROAD	2.000	361	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RGRA0010	GRANGER ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	0.720	70	ADEQ	ADEQ	ADEQ	6-10	NOW	ADEQ	SSTedge	NOW
RHAC0020	HACIENDA ROAD	VIENNA LINE	CALTON LINE	2.070	90	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	REC	6-10
RHAC0030	HACIENDA ROAD	CALTON LINE	JOHN WISE LINE	2.060	692	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RHAC0040	HACIENDA ROAD	JOHN WISE LINE	VAN PATTEN LINE	1.020	1,040	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RHAC0050	HACIENDA ROAD	VAN PATTEN LINE	BRADLEY CREEK LINE	1.650	1,106	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RHAC0060	HACIENDA ROAD	BRADLEY CREEK LINE	TALBOT LINE	1.030	1,230	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	R1	6-10
RHAC0065	HACIENDA ROAD	TALBOT LINE	0.6km N of TALBOT LINE	0.600	941	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RHAC0070	HACIENDA ROAD	0.6km N OF TALBOT LINE	DINGLE STREET	0.680	1,300	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RHAC0080	HACIENDA ROAD	DINGLE STREET	GLENCOLIN LINE	1.900	1,280	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RHAL0010	HALF MOON ROAD	IMPERIAL ROAD (WEST)	IMPERIAL ROAD (NORTH)	0.730	40	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	ADEQ
RHEL0010	HELDER ROAD	YORKE LINE	0.45km S OF AVON DRIVE	0.960	29	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	ADEQ
RHEL0020	HELDER ROAD	0.45km S OF AVON DRIVE	AVON DRIVE	0.450	29	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RHIL0010	HILLTOP LANE	SPRINGFIELD ROAD	WEST END	0.300	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RJAM0010	JAMESTOWN LINE	RUSH CREEK LINE	IMPERIAL ROAD	4.710	249	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RJOH0010	JOHN WISE LINE	SPRINGFIELD ROAD	SAWMILL ROAD	2.060	1,326	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RJOH0020	JOHN WISE LINE	SAWMILL ROAD	CARTER ROAD	2.050	1,174	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RJOH0030	JOHN WISE LINE	CARTER ROAD	RICHMOND ROAD	2.110	727	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RJON0010	JONES ROAD	NOVA SCOTIA LINE	SOUTH END TURNAROUND	1.130	50	ADEQ	6-10	ADEQ	NOW	NOW	ADEQ	REC	NOW
RMAP0010	MAPLETON LINE	CENTRAL ELGIN TOWNLINE	SPRINGWATER ROAD	3.130	273	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RMAP0020	MAPLETON LINE	SPRINGWATER ROAD	DORCHESTER ROAD	0.640	194	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RMAP0030	MAPLETON LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.720	159	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RME0010	MERVIS DRIVE	NOVA SCOTIA LINE	WALES CRES	0.130	200	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RME0020	MERVIS DRIVE	WALES CRES , SOUTHERLY INTERSECTION	WALES CRES, NORTHERLY INTERSECTION	0.259	260	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ

Critical Deficiencies

Current Inspection Batch

ID	Street Name	From Description	To Description	Length	AADT	Cap.	Drain	Geo	SA	Width	Type	Imp	Overall TON
RME0030	MERVIS DRIVE	WALES CRES, NORTHERLY INTERSECTION	JAMESTOWN LINE	0.245	400	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RNEW0010	NEWELL ROAD	RON MCNEIL LINE	CENTURY LINE	1.440	31	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	GRR2sd	ADEQ
RNEW0020	NEWELL ROAD	CENTURY LINE	LYONS LINE	1.340	23	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	GRR2sd	ADEQ
RNOV0010	NOVA SCOTIA LINE	IMPERIAL ROAD	CULDESAC	0.420	271	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SSTedge	6-10
ROCH0010	CHURCH STREET	SPRINGWATER ROAD	NORTON STREET	0.110	100	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	R1	6-10
RONO0010	NORTON STREET	TALBOT LINE	NORTH END CULDESAC	0.280	200	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	R2	1-5
ROWE0010	WELDON STREET	SPRINGWATER ROAD	EAST END	0.220	50	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	DSTrehat	NOW
RPAM0010	AMASA STREET	COLIN STREET	WEST END	0.080	30	ADEQ	1-5	ADEQ	6-10	NOW	ADEQ	BS	ADEQ
RPBA0010	BANK STREET	RUSH CREEK LINE	IMPERIAL ROAD	0.160	100	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	CRKsd	6-10
RPCO0010	COLIN STREET	IMPERIAL ROAD	HALE STREET	0.120	1,000	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	CRKsd	6-10
RPCO0020	COLIN STREET	IMPERIAL ROAD (PARK LOOP)	HALE STREET	0.300	1,000	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RPCO0030	COLIN STREET	IMPERIAL ROAD	DEXTER LINE	0.130	500	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RPDE0010	DEXTER LINE	IMPERIAL ROAD	CTY RD 73 /DEXTER LINE	0.170	200	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RPED0010	PEDE ROAD	NOVA SCOTIA LINE	SOUTH END	1.290	30	ADEQ	ADEQ	ADEQ	ADEQ	NOW	ADEQ	REC	ADEQ
RPED0020	PEDE ROAD	NOVA SCOTIA LINE	NORTH END	0.480	20	ADEQ	ADEQ	ADEQ	ADEQ	NOW	ADEQ	REC	ADEQ
RPHA0010	HALE STREET	LEVI STREET	COLIN STREET	0.190	250	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	REC	1-5
RPIG0005	PIGRAM LINE	PRESSEY LINE	0.18km N of PRESSEY LINE	0.180	600	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RPIG0010	PIGRAM LINE	0.18km N of PRESSEY LINE	RON MCNEIL LINE	0.810	519	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RPIG0020	PIGRAM LINE	LYONS LINE	CROSSLEY HUNTER LINE	1.440	189	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RPIG0030	PIGRAM LINE	CROSSLEY HUNTER LINE	0.1km S of OSTRANDER ROAD	0.950	180	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RPIG0035	PIGRAM LINE	0.1km S of OSTRANDER ROAD	0.1km N of WILSON LINE	0.550	180	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RPIG0040	PIGRAM LINE	0.1km N of WILSON LINE	YORKE LINE	1.310	108	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RPIG0050	PIGRAM LINE	AVON DRIVE	YORKE LINE	1.360	139	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RPIM0010	IMPERIAL ROAD	LEVI STREET	COLIN STREET	0.170	800	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RPLE0005	LEVI STREET	IMPERIAL ROAD	SOUTH END	0.040	20	ADEQ	6-10	ADEQ	NOW	ADEQ	NOW	BS	ADEQ
RPLE0010	LEVI STREET	IMPERIAL ROAD	COLIN STREET	0.360	300	ADEQ	6-10	ADEQ	NOW	NOW	ADEQ	BS	NOW
RPLI0005	LINDLEY STREET	IMPERIAL ROAD	SOUTH END	0.050	10	ADEQ	6-10	ADEQ	NOW	ADEQ	NOW	BS	ADEQ
RPLI0010	LINDLEY STREET	IMPERIAL ROAD	HALE STREET	0.120	50	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	BS	NOW
RPRE0010	PRESSEY LINE	0.45km E of CATHERINE STREET	WALKER ROAD (NORTH LEG)	1.210	1,000	ADEQ	ADEQ	ADEQ	NOW	ADEQ	ADEQ	DSTrehat	NOW
RPRE0020	PRESSEY LINE	WALKER ROAD (NORTH LEG)	CARTER ROAD	1.960	1,024	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RPRE0025	PRESSEY LINE	CARTER ROAD	PIGRAM LINE	0.390	1,150	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	PR2	1-5
RPRE0030	PRESSEY LINE	PIGRAM LINE	SPRINGER HILL ROAD	1.800	1,748	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	PR2	1-5
RPRU0010	RUSH CREEK LINE	0.5km W of IMPERIAL ROAD	IMPERIAL ROAD	0.500	100	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	BS	1-5
RPRU0020	RUSH CREEK LINE	IMPERIAL ROAD	BANK STREET	0.260	50	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	REC	NOW
RRIC0010	RICHMOND ROAD	NOVA SCOTIA LINE	1.69km S of NOVA SCOTIA LINE	1.690	10	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	BSgrav	ADEQ
RROD0010	ROD ROAD	TALBOT LINE	0.1KM NORTH OF TALBOT LINE	0.100	10	ADEQ	1-5	ADEQ	NOW	NOW	ADEQ	BS	ADEQ
RROG0010	ROGERS ROAD	SOUTH END	JOHN WISE LINE	1.030	83	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RROG0020	ROGERS ROAD	JOHN WISE LINE	CONSERVATION LINE	2.060	872	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RROG0030	ROGERS ROAD	CONSERVATION LINE	TALBOT LINE	2.580	1,195	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SD	ADEQ
RROG0040	ROGERS ROAD	TALBOT LINE	GLENCOLIN LINE	2.080	471	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RROG0050	ROGERS ROAD	GLENCOLIN LINE	COLLEGE LINE	2.210	123	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RROG0060	ROGERS ROAD	COLLEGE LINE	RON MCNEIL LINE	0.740	130	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RROM0010	ROMMEL ROAD	100m SOUTH OF CALTON LINE	CALTON LINE	0.100	50	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RRUS0010	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	JAMESTOWN LINE	0.700	70	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5
RRUS0012	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	0.5km W of IMPERIAL ROAD	1.200	128	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehat	1-5

Critical Deficiencies

Current Inspection Batch

ID	Street Name	From Description	To Description	Length	AADT	Cap.	Drain	Geo	SA	Width	Type	Imp	Overall TON
RSAL0010	ALLEY STREET	RON MCNEIL LINE	PRESSEY LINE	0.080	20	ADEQ	6-10	ADEQ	1-5	NOW	ADEQ	RNS	ADEQ
RSAS0010	ASHTON STREET	SPRINGWATER ROAD	0.05km W of ELM STREET	0.520	200	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RSAW0010	SAWMILL ROAD	NOVA SCOTIA LINE	0.1km S OF VIENNA LINE	1.950	100	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	GRRsd	6-10
RSAW0013	SAWMILL ROAD	0.1km S OF VIENNA LINE	VIENNA LINE	0.100	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RSAW0018	SAWMILL ROAD	VIENNA LINE	0.1km N OF VIENNA LINE	0.100	100	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RSAW0020	SAWMILL ROAD	0.1km N OF VIENNA LINE	CALTON LINE	1.970	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	GRR	ADEQ
RSAW0030	SAWMILL ROAD	CALTON LINE	JOHN WISE LINE	2.060	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	GRR	ADEQ
RSBE0010	BEACH STREET	WHITTAKER ROAD	DETROIT STREET	0.180	100	ADEQ	6-10	ADEQ	ADEQ	NOW	ADEQ	RSS	NOW
RSBR0010	BROADWAY STREET	OMEMEE STREET	SPRINGFIELD ROAD	0.700	250	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	R2	1-5
RSBU0010	BURGESS STREET	RON MCNEIL LINE	NELSON STREET	0.100	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RSCA0010	CATHERINE STREET	PRESSEY LINE	RON MCNEIL LINE	0.140	50	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRK	ADEQ
RSCE0010	CENTRE STREET	SUPERIOR STREET	TRACEY STREET	0.140	70	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RSCE0030	CENTRE STREET	SPRINGFIELD ROAD	WEST END	0.070	20	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	ADEQ
RSCL0010	CLINTON STREET	SPRINGFIELD ROAD	0.09km W of SUPERIOR STREET	0.460	120	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	R1	6-10
RSCO0010	COURTRIGHT STREET	BROADWAY STREET	WHITTAKER ROAD	0.280	70	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	RSS	6-10
RSDE0010	DETROIT STREET	RON MCNEIL LINE	BROADWAY STREET	0.110	50	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	RSS	6-10
RSEL0010	ELM STREET	ASHTON STREET	FINNEY STREET	0.170	80	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RSFI0010	FINNEY STREET	SPRINGFIELD ROAD	ELM STREET	0.510	200	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	BS	6-10
RSIN0010	INVERNESS STREET	RON MCNEIL LINE	SOUTH END CULDESAC	0.260	50	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	BS	6-10
RSMC0010	MCINTOSH STREET	RON MCNEIL LINE	SOUTH END	0.240	60	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	RSS	6-10
RSMI0010	MILL STREET	RON MCNEIL LINE	BROADWAY STREET	0.110	20	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	R1	ADEQ
RSNE0010	NELSON STREET	WEST END	WHITTAKER ROAD	0.210	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RSOM0010	OMEMEE STREET	BROADWAY STREET	RON MCNEIL LINE	0.100	250	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RSPA0010	SPARTA LINE	CENTRAL ELGIN BOUNDARY	MELON ROAD	2.770	190	ADEQ	ADEQ	NOW	ADEQ	ADEQ	ADEQ	RSpl	NOW
RSPA0020	SPARTA LINE	MELON ROAD	ROMMEL ROAD	0.820	190	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RSPA0030	SPARTA LINE	ROMMEL ROAD	IMPERIAL ROAD	1.240	147	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RSPA0040	SPARTA LINE	IMPERIAL ROAD	EAST END	0.620	25	ADEQ	6-10	ADEQ	ADEQ	NOW	ADEQ	BS	ADEQ
RSPF0010	SPRINGFIELD ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	1.320	20	ADEQ	6-10	ADEQ	NOW	NOW	ADEQ	REC	ADEQ
RSPH0010	SPRINGER HILL ROAD	SOUTH END	HERITAGE LINE	0.400	10	ADEQ	6-10	ADEQ	ADEQ	NOW	ADEQ	REC	ADEQ
RSPH0020	SPRINGER HILL ROAD	HERITAGE LINE	TALBOT LINE	0.750	411	ADEQ	ADEQ	ADEQ	NOW	ADEQ	ADEQ	DSTrehab	NOW
RSPH0030	SPRINGER HILL ROAD	TALBOT LINE	GLENCOLIN LINE	1.840	361	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	DSTrehab	NOW
RSPH0040	SPRINGER HILL ROAD	GLENCOLIN LINE	COLLEGE LINE	2.060	469	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RSPH0050	SPRINGER HILL ROAD	COLLEGE LINE	PRESSEY LINE	2.440	400	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RSPR0010	PRESSEY LINE	SPRINGFIELD ROAD	CATHERINE STREET	0.410	964	ADEQ	6-10	ADEQ	NOW	ADEQ	ADEQ	RSS	NOW
RSPR0020	PRESSEY LINE	CATHERINE STREET	0.45km E of CATHERINE STREET	0.450	946	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RSPW0010	SPRINGWATER ROAD	CALTON LINE	JOHN WISE LINE	2.010	675	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	BS	1-5
RSPW0020	SPRINGWATER ROAD	RON MCNEIL LINE	MAPLETON LINE	1.440	50	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RSSP0010	SPRINGFIELD ROAD	RON MCNEIL LINE	.12KM NORTH OF RON MCNEIL LINE	0.120	400	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	CRKsd	ADEQ
RSSU0010	SUPERIOR STREET	CLINTON STREET	FINNEY STREET	0.290	70	ADEQ	6-10	ADEQ	6-10	ADEQ	ADEQ	R1	6-10
RSTR0010	TRACEY STREET	CLINTON STREET	FINNEY STREET	0.340	150	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RSWH0010	WHITTAKER ROAD	RON MCNEIL LINE	SOUTH END	0.240	100	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	R2	1-5
RTCA0010	CATHERINE STREET	HACIENDA ROAD (TERPSTA SUB)	0.04km W of LOUISA STREET	0.130	100	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	R2	1-5
RTL00010	LOUISA CRESCENT	HACIENDA ROAD (TERPSTA SUB)	CATHERINE STREET	0.190	50	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	R2	1-5
RVAN0010	VAN PATTEN LINE	IMPERIAL ROAD	HACIENDA ROAD	2.050	106	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	BS	6-10
RVIE0010	VIENNA LINE	WEST TURNAROUND	IMPERIAL ROAD	2.530	30	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	ADEQ

Critical Deficiencies

Current Inspection Batch

ID	Street Name	From Description	To Description	Length	AADT	Cap.	Drain	Geo	SA	Width	Type	Imp	Overall TON
RVIE0020	VIENNA LINE	IMPERIAL ROAD	HACIENDA ROAD	2.070	262	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RVIE0030	VIENNA LINE	HACIENDA ROAD	SPRINGFIELD ROAD	2.040	264	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RVIE0040	VIENNA LINE	SPRINGFIELD ROAD	SAWMILL ROAD	2.030	330	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RVIE0050	VIENNA LINE	SAWMILL ROAD	CARTER ROAD SOUTH LEG	2.070	312	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RVIE0060	VIENNA LINE	CARTER ROAD SOUTH LEG	RICHMOND ROAD	2.070	282	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWA0010	WALES CRES	MERVIS DRIVE	House 5265	0.410	250	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWA0020	WALES CRES	HOUSE 5265	MERVIS DRIVE	0.167	167	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWAL0010	WALKER ROAD	CHALET LINE	TALBOT LINE	2.010	394	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWAL0020	WALKER ROAD	TALBOT LINE	GLENCOLIN LINE	3.200	247	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWAL0030	WALKER ROAD	GLENCOLIN LINE	COLLEGE LINE	2.080	40	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	GRR	ADEQ
RWAL0040	WALKER ROAD	COLLEGE LINE	PRESSEY LINE	2.060	100	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	GRR	ADEQ
RWAL0050	WALKER ROAD	PRESSEY LINE	RON MCNEIL LINE	0.510	115	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RWHI0010	WHITTAKER ROAD	LYONS LINE	CROSSLEY HUNTER LINE	1.420	90	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RWHI0020	WHITTAKER ROAD	CROSSLEY HUNTER LINE	WILSON LINE	1.430	87	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RWHI0030	WHITTAKER ROAD	WILSON LINE	YORKE LINE	1.390	41	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RWHI0040	WHITTAKER ROAD	YORKE LINE	AVON DRIVE	1.420	53	ADEQ	NOW	ADEQ	ADEQ	ADEQ	ADEQ	REC	NOW
RWIL0010	WILSON LINE	BELMONT ROAD	DORCHESTER ROAD	3.710	353	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RWIL0020	WILSON LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.700	313	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RWIL0030	WILSON LINE	IMPERIAL ROAD	WHITTAKER ROAD	3.700	180	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RWIL0040	WILSON LINE	WHITTAKER ROAD	PUTNAM ROAD	1.860	180	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	DSTrehab	6-10
RWIL0050	WILSON LINE	PUTNAM ROAD	CORLESS ROAD	1.870	218	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RWIL0060	WILSON LINE	CORLESS ROAD	PIGRAM LINE	0.980	217	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RWOO0010	WOOLLEYVILLE LINE	SPRINGFIELD ROAD	0.35km E of SPRINGFIELD ROAD	0.350	200	ADEQ	6-10	ADEQ	1-5	ADEQ	ADEQ	BS	1-5
RWOO0020	WOOLLEYVILLE LINE	0.35km E of SPRINGFIELD ROAD	EAST END (BEND)	0.870	50	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	GRRsd	6-10
RYOR0010	YORKE LINE	BELMONT ROAD	DORCHESTER ROAD	3.700	375	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	NONE	ADEQ
RYOR0020	YORKE LINE	DORCHESTER ROAD	IMPERIAL ROAD	3.700	396	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	ADEQ	SST	ADEQ
RYOR0030	YORKE LINE	IMPERIAL ROAD	HELDER ROAD	1.860	128	ADEQ	ADEQ	ADEQ	1-5	ADEQ	ADEQ	DSTrehab	1-5
RYOR0040	YORKE LINE	HELDER ROAD	WHITTAKER ROAD	1.830	149	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTrehab	6-10
RYOR0050	YORKE LINE	WHITTAKER ROAD	PUTNAM ROAD	1.860	136	ADEQ	ADEQ	ADEQ	6-10	ADEQ	ADEQ	SSTedge	6-10
RYOR0060	YORKE LINE	PUTNAM ROAD	CORLESS ROAD	1.860	65	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	6-10
RYOR0070	YORKE LINE	CORLESS ROAD	PIGRAM LINE	0.980	41	ADEQ	6-10	ADEQ	ADEQ	ADEQ	ADEQ	SD	ADEQ
				272.581									

Appendix K: Needs Sorted by Time of Need and Improvement Category



Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
SSTreh										
26.00	RCAL0020	CALTON LINE	MELON ROAD	ROMMEL ROAD	410	0.830	6-10	Rehab	SSTrehab	105,386.23
19.00	RSPA0020	SPARTA LINE	MELON ROAD	ROMMEL ROAD	190	0.820	6-10	Rehab	SSTrehab	103,345.30
17.00	RYOR0040	YORKE LINE	HELDER ROAD	WHITTAKER ROAD	149	1.830	6-10	Rehab	SSTrehab	231,783.87
17.00	RCOL0060	COLLEGE LINE	WALKER ROAD	CARTER ROAD SOUTH LEG	489	2.040	6-10	Rehab	SSTrehab	262,219.25
14.00	RSAW0018	SAWMILL ROAD	VIENNA LINE	0.1km N OF VIENNA LINE	100	0.100	6-10	Rehab	SSTrehab	11,243.93
13.00	RDOR0010	DORCHESTER ROAD	COLLEGE LINE	RON MCNEIL LINE	133	0.410	6-10	Rehab	SSTrehab	51,233.16
12.00	RSPW0020	SPRINGWATER ROAD	RON MCNEIL LINE	MAPLETON LINE	50	1.440	6-10	Rehab	SSTrehab	181,484.42
						7.470				946,696.16
SSTedg										
21.00	RGLE0020	GLENCOLIN LINE	ROGERS ROAD	IMPERIAL ROAD	650	2.050	6-10	Rehab	SSTedge	66,127.88
20.00	RGRA0010	GRANGER ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	70	0.720	NOW	Rehab	SSTedge	16,905.24
19.00	RCAR0050	CARTER ROAD	CHALET LINE	TALBOT LINE	362	2.040	6-10	Rehab	SSTedge	72,200.70
18.00	RGLE0010	GLENCOLIN LINE	SPRINGWATER ROAD	ROGERS ROAD	423	2.070	6-10	Rehab	SSTedge	66,773.03
15.00	RNOV0010	NOVA SCOTIA LINE	IMPERIAL ROAD	CULDESAC	271	0.420	6-10	Rehab	SSTedge	12,889.80
14.00	RDOR0020	DORCHESTER ROAD	RON MCNEIL LINE	MAPLETON LINE	107	1.440	6-10	Rehab	SSTedge	41,936.40
14.00	RWIL0060	WILSON LINE	CORLESS ROAD	PIGRAM LINE	217	0.980	6-10	Rehab	SSTedge	32,841.27
13.00	RYOR0050	YORKE LINE	WHITTAKER ROAD	PUTNAM ROAD	136	1.860	6-10	Rehab	SSTedge	57,083.40
13.00	RWIL0050	WILSON LINE	PUTNAM ROAD	CORLESS ROAD	218	1.870	6-10	Rehab	SSTedge	63,252.75
13.00	RCAR0040	CARTER ROAD	JOHN WISE LINE	CHALET LINE	327	2.160	6-10	Rehab	SSTedge	76,447.80
13.00	RCHA0050	CHALET LINE	CARTER ROAD	1.2km E of CARTER ROAD	72	1.200	6-10	Rehab	SSTedge	34,947.00
10.00	RCAR0010	CARTER ROAD	NOVA SCOTIA LINE	VIENNA LINE	98	2.050	ADEQ	Rehab	SSTedge	66,127.88
						18.860				607,533.15
SST										
25.00	RHAC0070	HACIENDA ROAD	0.6km N OF TALBOT LINE	DINGLE STREET	1,300	0.680	ADEQ	Rehab	SST	19,186.20
23.00	RHAC0050	HACIENDA ROAD	VAN PATTEN LINE	BRADLEY CREEK LINE	1,106	1.650	ADEQ	Rehab	SST	46,554.75
22.00	RHAC0080	HACIENDA ROAD	DINGLE STREET	GLENCOLIN LINE	1,280	1.900	ADEQ	Rehab	SST	59,565.00
18.00	RSPH0040	SPRINGER HILL ROAD	GLENCOLIN LINE	COLLEGE LINE	469	2.060	ADEQ	Rehab	SST	54,248.04
17.00	RHAC0065	HACIENDA ROAD	TALBOT LINE	0.6km N of TALBOT LINE	941	0.600	ADEQ	Rehab	SST	16,929.00
17.00	RROM0010	ROMMEL ROAD	100m SOUTH OF CALTON LINE	CALTON LINE	50	0.100	ADEQ	Rehab	SST	2,037.75
15.00	RSPH0050	SPRINGER HILL ROAD	COLLEGE LINE	PRESSEY LINE	400	2.440	ADEQ	Rehab	SST	63,490.02
15.00	RYOR0020	YORKE LINE	DORCHESTER ROAD	IMPERIAL ROAD	396	3.700	ADEQ	Rehab	SST	99,755.70
14.00	RCAL0030	CALTON LINE	ROMMEL ROAD	IMPERIAL ROAD	327	1.240	ADEQ	Rehab	SST	33,042.90
12.00	RDOR0030	DORCHESTER ROAD	MAPLETON LINE	LYONS LINE	217	1.380	ADEQ	Rehab	SST	36,773.55
12.00	RWHI0010	WHITTAKER ROAD	LYONS LINE	CROSSLEY HUNTER LINE	90	1.420	ADEQ	Rehab	SST	37,394.28
12.00	RWHI0020	WHITTAKER ROAD	CROSSLEY HUNTER LINE	WILSON LINE	87	1.430	ADEQ	Rehab	SST	35,864.40
11.00	RGLE0050	GLENCOLIN LINE	SPRINGFIELD ROAD (NORTH LEG)	WALKER ROAD	646	1.950	ADEQ	Rehab	SST	67,245.75
10.00	RCEN0030	CENTURY LINE	0.08km E of PUTNAM ROAD	EMPEY ROAD	81	1.780	ADEQ	Rehab	SST	42,968.31
9.00	RCEN0010	CENTURY LINE	NEWELL ROAD	WHITTAKER ROAD	24	1.870	ADEQ	Rehab	SST	43,968.38
5.00	RSAW0013	SAWMILL ROAD	0.1km S OF VIENNA LINE	VIENNA LINE	100	0.100	ADEQ	Rehab	SST	0.00
						24.300				659,024.03
R2										
19.00	RSBR0010	BROADWAY STREET	OMEMEE STREET	SPRINGFIELD ROAD	250	0.700	1-5	Rehab	R2	150,073.42
19.00	RONO0010	NORTON STREET	TALBOT LINE	NORTH END CULDESAC	200	0.280	1-5	Rehab	R2	72,917.94

Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
16.00	RSWH0010	WHITTAKER ROAD	RON MCNEIL LINE	SOUTH END	100	0.240	1-5	Rehab	R2	51,453.74
12.00	RTLO0010	LOUISA CRESCENT	HACIENDA ROAD (TERPSTA SUB)	CATHERINE STREET	50	0.190	1-5	Rehab	R2	64,574.63
10.00	RTCA0010	CATHERINE STREET	HACIENDA ROAD (TERPSTA SUB)	0.04km W of LOUISA STREET	100	0.130	1-5	Rehab	R2	45,206.29
						1.540				384,226.02
R1										
22.00	RHAC0060	HACIENDA ROAD	BRADLEY CREEK LINE	TALBOT LINE	1,230	1.030	6-10	Rehab	R1	139,545.95
17.00	RSCL0010	CLINTON STREET	SPRINGFIELD ROAD	0.09km W of SUPERIOR STREET	120	0.460	6-10	Rehab	R1	53,572.15
16.00	RSSU0010	SUPERIOR STREET	CLINTON STREET	FINNEY STREET	70	0.290	6-10	Rehab	R1	33,773.75
13.00	ROCH0010	CHURCH STREET	SPRINGWATER ROAD	NORTON STREET	100	0.110	6-10	Rehab	R1	15,572.57
12.00	RSMI0010	MILL STREET	RON MCNEIL LINE	BROADWAY STREET	20	0.110	ADEQ	Rehab	R1	12,810.73
						2.000				255,275.15
PR2										
37.00	RPRE0025	PRESSEY LINE	CARTER ROAD	PIGRAM LINE	1,150	0.390	1-5	Rehab	PR2	83,413.82
28.00	RPRE0030	PRESSEY LINE	PIGRAM LINE	SPRINGER HILL ROAD	1,748	1.800	1-5	Rehab	PR2	398,019.60
						2.190				481,433.42
DSTreh										
36.00	RPRE0010	PRESSEY LINE	0.45km E of CATHERINE STREET	WALKER ROAD (NORTH LEG)	1,000	1.210	NOW	Rehab	DSTrehab	142,323.83
29.00	ROWE0010	WELDON STREET	SPRINGWATER ROAD	EAST END	50	0.220	NOW	Rehab	DSTrehab	18,290.36
26.00	RSPH0020	SPRINGER HILL ROAD	HERITAGE LINE	TALBOT LINE	411	0.750	NOW	Rehab	DSTrehab	93,324.00
25.00	RCOL0030	COLLEGE LINE	IMPERIAL ROAD	HACIENDA ROAD	398	2.070	1-5	Rehab	DSTrehab	237,932.84
25.00	RCOL0040	COLLEGE LINE	HACIENDA ROAD	SPRINGFIELD ROAD	657	2.020	1-5	Rehab	DSTrehab	251,130.44
24.00	RSPH0030	SPRINGER HILL ROAD	TALBOT LINE	GLENCOLIN LINE	361	1.840	NOW	Rehab	DSTrehab	228,954.88
21.00	RCOL0050	COLLEGE LINE	SPRINGFIELD ROAD	WALKER ROAD	512	2.070	1-5	Rehab	DSTrehab	257,346.54
17.00	RCOL0070	COLLEGE LINE	CARTER ROAD (SOUTH LEG)	SPRINGER HILL ROAD	381	2.000	1-5	Rehab	DSTrehab	267,401.20
14.00	RSPA0030	SPARTA LINE	ROMMEL ROAD	IMPERIAL ROAD	147	1.240	1-5	Rehab	DSTrehab	145,784.32
						13.420				1,642,488.41
DSTreh										
28.00	RBRO0010	BROOK LINE	ROGERS ROAD	0.16km W of CAVERLY ROAD	587	0.860	1-5	Rehab	DSTrehab	64,388.20
27.00	RCOL0020	COLLEGE LINE	ROGERS ROAD	IMPERIAL ROAD	242	2.050	NOW	Rehab	DSTrehab	153,688.50
27.00	RRUS0012	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	0.5km W of IMPERIAL ROAD	128	1.200	1-5	Rehab	DSTrehab	84,060.00
25.00	RCOL0010	COLLEGE LINE	SPRINGWATER ROAD	ROGERS ROAD	216	2.060	NOW	Rehab	DSTrehab	154,026.20
24.00	RJAM0010	JAMESTOWN LINE	RUSH CREEK LINE	IMPERIAL ROAD	249	4.710	1-5	Rehab	DSTrehab	374,397.90
24.00	RSPR0020	PRESSEY LINE	CATHERINE STREET	0.45km E of CATHERINE STREET	946	0.450	1-5	Rehab	DSTrehab	35,725.50
23.00	RWIL0010	WILSON LINE	BELMONT ROAD	DORCHESTER ROAD	353	3.710	1-5	Rehab	DSTrehab	270,763.22
23.00	RWIL0020	WILSON LINE	DORCHESTER ROAD	IMPERIAL ROAD	313	3.700	1-5	Rehab	DSTrehab	266,725.60
22.00	RCHA0060	CHALET LINE	1.2km E of CARTER ROAD	EAST CULDESAC	25	0.250	ADEQ	Rehab	DSTrehab	19,872.50
22.00	RDIN0020	DINGLE LINE	HACIENDA ROAD	SPRINGFIELD ROAD	100	2.420	1-5	Rehab	DSTrehab	158,703.60
20.00	RWIL0040	WILSON LINE	WHITTAKER ROAD	PUTNAM ROAD	180	1.860	6-10	Rehab	DSTrehab	136,025.52
20.00	RWIL0030	WILSON LINE	IMPERIAL ROAD	WHITTAKER ROAD	180	3.700	1-5	Rehab	DSTrehab	277,204.00
19.00	RCAR0030	CARTER ROAD	CALTON LINE	JOHN WISE LINE	320	2.050	6-10	Rehab	DSTrehab	166,414.90
17.00	RRUS0010	RUSH CREEK LINE	1.7km W of IMPERIAL ROAD	JAMESTOWN LINE	70	0.700	1-5	Rehab	DSTrehab	55,573.00
16.00	RPIG0035	PIGRAM LINE	0.1km S of OSTRANDER ROAD	0.1km N of WILSON LINE	180	0.550	1-5	Rehab	DSTrehab	43,664.50
15.00	RWAL0050	WALKER ROAD	PRESSEY LINE	RON MCNEIL LINE	115	0.510	1-5	Rehab	DSTrehab	38,639.64

Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
15.00	RYOR0030	YORKE LINE	IMPERIAL ROAD	HELDER ROAD	128	1.860	1-5	Rehab	DSTrehab	152,653.92
14.00	RCAR0020	CARTER ROAD	VIENNA LINE	CALTON LINE	255	2.070	6-10	Rehab	DSTrehab	169,889.04
14.00	RBRA0010	BRADLEY CREEK LINE	IMPERIAL ROAD	HACIENDA ROAD	363	2.050	1-5	Rehab	DSTrehab	181,076.50
13.00	RVIE0010	VIENNA LINE	WEST TURNAROUND	IMPERIAL ROAD	30	2.530	ADEQ	Rehab	DSTrehab	188,535.60
10.00	RCEN0024	CENTURY LINE	0.08km W of PUTNAM ROAD	PUTNAM ROAD	70	0.080	1-5	Rehab	DSTrehab	7,452.00
10.00	RCEN0026	CENTURY LINE	PUTNAM ROAD	0.08km E of PUTNAM ROAD	80	0.080	1-5	Rehab	DSTrehab	7,452.00
9.00	RANG0010	ANGER ROAD	JOHN WISE LINE	CHALET LINE	104	1.720	6-10	Rehab	DSTrehab	151,927.60
						41.170				3,158,859.44
<u>SD</u>										
28.00	RPCO0030	COLIN STREET	IMPERIAL ROAD	DEXTER LINE	500	0.130	6-10	Maint	SD	370.50
21.00	RJOH0010	JOHN WISE LINE	SPRINGFIELD ROAD	SAWMILL ROAD	1,326	2.060	6-10	Maint	SD	5,871.00
18.00	RCAL0040	CALTON LINE	IMPERIAL ROAD	HACIENDA ROAD	629	2.040	6-10	Maint	SD	5,814.00
18.00	RDIN0010	DINGLE STREET	AYLMER TOWN LIMIT	HACIENDA ROAD	1,152	1.080	6-10	Maint	SD	3,078.00
17.00	RROG0030	ROGERS ROAD	CONSERVATION LINE	TALBOT LINE	1,195	2.580	ADEQ	Maint	SD	7,353.00
17.00	RROG0020	ROGERS ROAD	JOHN WISE LINE	CONSERVATION LINE	872	2.060	6-10	Maint	SD	5,871.00
17.00	RSTR0010	TRACEY STREET	CLINTON STREET	FINNEY STREET	150	0.340	6-10	Maint	SD	969.00
16.00	RHEL0010	HELDER ROAD	YORKE LINE	0.45km S OF AVON DRIVE	29	0.960	ADEQ	Maint	SD	2,736.00
15.00	RSAS0010	ASHTON STREET	SPRINGWATER ROAD	0.05km W of ELM STREET	200	0.520	6-10	Maint	SD	1,482.00
14.00	RSCE0010	CENTRE STREET	SUPERIOR STREET	TRACEY STREET	70	0.140	6-10	Maint	SD	399.00
12.00	RHAL0010	HALF MOON ROAD	IMPERIAL ROAD (WEST)	IMPERIAL ROAD (NORTH)	40	0.730	ADEQ	Maint	SD	2,080.50
12.00	RYOR0070	YORKE LINE	CORLESS ROAD	PIGRAM LINE	41	0.980	ADEQ	Maint	SD	2,793.00
10.00	RYOR0060	YORKE LINE	PUTNAM ROAD	CORLESS ROAD	65	1.860	6-10	Maint	SD	5,301.00
10.00	RCAL0050	CALTON LINE	HACIENDA ROAD	0.42km W of SPRINGFIELD ROAD	853	1.630	6-10	Maint	SD	4,645.50
10.00	RCAL0055	CALTON LINE -(MOUNT SALEM)	0.42km W of SPRINGFIELD ROAD	SPRINGFIELD ROAD	800	0.420	6-10	Maint	SD	1,197.00
9.00	RSCE0030	CENTRE STREET	SPRINGFIELD ROAD	WEST END	20	0.070	ADEQ	Maint	SD	199.50
9.00	RDOR0072	DORCHESTER ROAD	0.75km N of YORKE LINE	AVON DRIVE	100	0.700	6-10	Maint	SD	1,995.00
						18.300				52,155.00
<u>RSpL</u>										
14.00	RSPA0010	SPARTA LINE	CENTRAL ELGIN BOUNDARY	MELON ROAD	190	2.770	NOW	Maint	RSpL	1,000.00
						2.770				1,000.00
<u>GRRsd</u>										
24.00	RWOO0020	WOOLLEYVILLE LINE	0.35km E of SPRINGFIELD ROAD	EAST END (BEND)	50	0.870	6-10	Maint	GRRsd	20,801.70
17.00	RS AW0010	SAWMILL ROAD	NOVA SCOTIA LINE	0.1km S OF VIENNA LINE	100	1.950	6-10	Maint	GRRsd	48,519.90
						2.820				69,321.60
<u>GRR2sd</u>										
25.00	RNEW0020	NEWELL ROAD	CENTURY LINE	LYONS LINE	23	1.340	ADEQ	Maint	GRR2sd	55,918.20
15.00	RNEW0010	NEWELL ROAD	RON MCNEIL LINE	CENTURY LINE	31	1.440	ADEQ	Maint	GRR2sd	74,088.00
						2.780				130,006.20
<u>GRR</u>										
15.00	RS AW0030	SAWMILL ROAD	CALTON LINE	JOHN WISE LINE	100	2.060	ADEQ	Maint	GRR	46,720.80
14.00	RS AW0020	SAWMILL ROAD	0.1km N OF VIENNA LINE	CALTON LINE	100	1.970	ADEQ	Maint	GRR	46,594.44
13.00	RWAL0040	WALKER ROAD	COLLEGE LINE	PRESSEY LINE	100	2.060	ADEQ	Maint	GRR	50,058.00

Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
10.00	RWAL0030	WALKER ROAD	GLENCOLIN LINE	COLLEGE LINE	40	2.080	ADEQ	Maint	GRR	53,239.68
						8.170				196,612.92
<u>CRKsd</u>										
28.00	RPCO0010	COLIN STREET	IMPERIAL ROAD	HALE STREET	1,000	0.120	6-10	Maint	CRKsd	516.00
16.00	RSSP0010	SPRINGFIELD ROAD	RON MCNEIL LINE	.12KM NORTH OF RON MCNEIL LINE	400	0.120	ADEQ	Maint	CRKsd	516.00
13.00	RPBA0010	BANK STREET	RUSH CREEK LINE	IMPERIAL ROAD	100	0.160	6-10	Maint	CRKsd	688.00
						0.400				1,720.00
<u>CRK</u>										
14.00	RPDE0010	DEXTER LINE	IMPERIAL ROAD	CTY RD 73 /DEXTER LINE	200	0.170	ADEQ	Maint	CRK	246.50
12.00	RPCO0020	COLIN STREET	IMPERIAL ROAD (PARK LOOP)	HALE STREET	1,000	0.300	ADEQ	Maint	CRK	435.00
12.00	RSCA0010	CATHERINE STREET	PRESSEY LINE	RON MCNEIL LINE	50	0.140	ADEQ	Maint	CRK	203.00
10.00	RPIM0010	IMPERIAL ROAD	LEVI STREET	COLIN STREET	800	0.170	ADEQ	Maint	CRK	246.50
9.00	RPIG0010	PIGRAM LINE	0.18km N of PRESSEY LINE	RON MCNEIL LINE	519	0.810	ADEQ	Maint	CRK	1,174.50
7.00	RPIG0005	PIGRAM LINE	PRESSEY LINE	0.18km N of PRESSEY LINE	600	0.180	ADEQ	Maint	CRK	261.00
						1.770				2,566.50
<u>RSS</u>										
32.00	RSPR0010	PRESSEY LINE	SPRINGFIELD ROAD	CATHERINE STREET	964	0.410	NOW	Const	RSS	566,681.15
24.00	RSBE0010	BEACH STREET	WHITTAKER ROAD	DETROIT STREET	100	0.180	NOW	Const	RSS	248,786.84
24.00	RCAV0010	CAVERLY ROAD	BROOK LINE	SOUTH END	100	0.240	NOW	Const	RSS	331,715.79
14.00	RSCO0010	COURTRIGHT STREET	BROADWAY STREET	WHITTAKER ROAD	70	0.280	6-10	Const	RSS	387,001.76
13.00	RSMC0010	MCINTOSH STREET	RON MCNEIL LINE	SOUTH END	60	0.240	6-10	Const	RSS	331,715.79
12.00	RSDE0010	DETROIT STREET	RON MCNEIL LINE	BROADWAY STREET	50	0.110	6-10	Const	RSS	152,036.41
						1.460				2,017,937.74
<u>RNS</u>										
23.00	RSAL0010	ALLEY STREET	RON MCNEIL LINE	PRESSEY LINE	20	0.080	ADEQ	Const	RNS	40,961.84
						0.080				40,961.84
<u>REC</u>										
31.00	RPHA0010	HALE STREET	LEVI STREET	COLIN STREET	250	0.190	1-5	Const	REC	82,163.71
28.00	RJON0010	JONES ROAD	NOVA SCOTIA LINE	SOUTH END TURNAROUND	50	1.130	NOW	Const	REC	358,049.54
26.00	RSPF0010	SPRINGFIELD ROAD	NOVA SCOTIA LINE	SOUTH END CULDESAC	20	1.320	ADEQ	Const	REC	418,252.57
25.00	RWHI0040	WHITTAKER ROAD	YORKE LINE	AVON DRIVE	53	1.420	NOW	Const	REC	498,844.72
25.00	RPRU0020	RUSH CREEK LINE	IMPERIAL ROAD	BANK STREET	50	0.260	NOW	Const	REC	112,434.55
23.00	RPED0010	PEDE ROAD	NOVA SCOTIA LINE	SOUTH END	30	1.290	ADEQ	Const	REC	408,746.82
23.00	RSPH0010	SPRINGER HILL ROAD	SOUTH END	HERITAGE LINE	10	0.400	ADEQ	Const	REC	126,743.20
22.00	RPED0020	PEDE ROAD	NOVA SCOTIA LINE	NORTH END	20	0.480	ADEQ	Const	REC	152,091.84
21.00	RHAC0020	HACIENDA ROAD	VIENNA LINE	CALTON LINE	90	2.070	6-10	Const	REC	727,189.13
						8.560				2,884,516.08
<u>NONE</u>										
19.00	RHAC0040	HACIENDA ROAD	JOHN WISE LINE	VAN PATTER LINE	1,040	1.020	ADEQ	Const	NONE	0.00
17.00	RJOH0020	JOHN WISE LINE	SAWMILL ROAD	CARTER ROAD	1,174	2.050	ADEQ	Const	NONE	0.00
17.00	RGLE0040	GLENCOLIN LINE	HACIENDA ROAD	SPRINGFIELD ROAD (NORTH LEG)	1,140	2.060	ADEQ	Const	NONE	0.00

Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
16.00	RWAL0010	WALKER ROAD	CHALET LINE	TALBOT LINE	394	2.010	ADEQ	Const	NONE	0.00
15.00	RSOM0010	OMEMEE STREET	BROADWAY STREET	RON MCNEIL LINE	250	0.100	ADEQ	Const	NONE	0.00
14.00	RHEL0020	HELDER ROAD	0.45km S OF AVON DRIVE	AVON DRIVE	29	0.450	ADEQ	Const	NONE	0.00
14.00	RPRE0020	PRESSEY LINE	WALKER ROAD (NORTH LEG)	CARTER ROAD	1,024	1.960	ADEQ	Const	NONE	0.00
13.00	RROG0010	ROGERS ROAD	SOUTH END	JOHN WISE LINE	83	1.030	ADEQ	Const	NONE	0.00
13.00	RJOH0030	JOHN WISE LINE	CARTER ROAD	RICHMOND ROAD	727	2.110	ADEQ	Const	NONE	0.00
13.00	RSEL0010	ELM STREET	ASHTON STREET	FINNEY STREET	80	0.170	ADEQ	Const	NONE	0.00
13.00	RSNE0010	NELSON STREET	WEST END	WHITTAKER ROAD	100	0.210	ADEQ	Const	NONE	0.00
13.00	RYOR0010	YORKE LINE	BELMONT ROAD	DORCHESTER ROAD	375	3.700	ADEQ	Const	NONE	0.00
12.00	RVIE0050	VIENNA LINE	SAWMILL ROAD	CARTER ROAD SOUTH LEG	312	2.070	ADEQ	Const	NONE	0.00
12.00	RSBU0010	BURGESS STREET	RON MCNEIL LINE	NELSON STREET	100	0.100	ADEQ	Const	NONE	0.00
11.00	RDOR0060	DORCHESTER ROAD	WILSON LINE	YORKE LINE	269	1.380	ADEQ	Const	NONE	0.00
11.00	RCHA0010	CHALET LINE	HACIENDA ROAD	0.12km E of HACIENDA ROAD	136	0.120	ADEQ	Const	NONE	0.00
11.00	RVIE0040	VIENNA LINE	SPRINGFIELD ROAD	SAWMILL ROAD	330	2.030	ADEQ	Const	NONE	0.00
10.00	RCAR0060	CARTER ROAD	TALBOT LINE	GLENCOLIN LINE	287	2.770	ADEQ	Const	NONE	0.00
10.00	RCON0010	CONSERVATION LINE	SPRINGWATER ROAD	ROGERS ROAD	314	2.060	ADEQ	Const	NONE	0.00
10.00	RDOR0040	DORCHESTER ROAD	LYONS LINE	CROSSLEY HUNTER LINE	177	1.430	ADEQ	Const	NONE	0.00
10.00	RCRO0020	CROSSLEY HUNTER LINE	DORCHESTER ROAD	IMPERIAL ROAD	519	3.730	ADEQ	Const	NONE	0.00
10.00	RMAP0010	MAPLETON LINE	CENTRAL ELGIN TOWNLINE	SPRINGWATER ROAD	273	3.130	ADEQ	Const	NONE	0.00
9.00	RMAP0020	MAPLETON LINE	SPRINGWATER ROAD	DORCHESTER ROAD	194	0.640	ADEQ	Const	NONE	0.00
9.00	RMAP0030	MAPLETON LINE	DORCHESTER ROAD	IMPERIAL ROAD	159	3.720	ADEQ	Const	NONE	0.00
9.00	RROG0060	ROGERS ROAD	COLLEGE LINE	RON MCNEIL LINE	130	0.740	ADEQ	Const	NONE	0.00
9.00	RROG0040	ROGERS ROAD	TALBOT LINE	GLENCOLIN LINE	471	2.080	ADEQ	Const	NONE	0.00
9.00	RDOR0050	DORCHESTER ROAD	CROSSLEY HUNTER LINE	WILSON LINE	100	1.420	ADEQ	Const	NONE	0.00
9.00	RCRO0010	CROSSLEY HUNTER LINE	BELMONT ROAD	DORCHESTER ROAD	577	3.710	ADEQ	Const	NONE	0.00
9.00	RDOR0070	DORCHESTER ROAD	YORKE LINE	0.75km N of YORKE LINE	283	0.750	ADEQ	Const	NONE	0.00
9.00	RGLE0060	GLENCOLIN LINE	WALKER ROAD	CARTER ROAD (SOUTH LEG)	532	2.060	ADEQ	Const	NONE	0.00
9.00	RHAC0030	HACIENDA ROAD	CALTON LINE	JOHN WISE LINE	692	2.060	ADEQ	Const	NONE	0.00
9.00	RCAR0070	CARTER ROAD	GLENCOLIN LINE	COLLEGE LINE	211	2.060	ADEQ	Const	NONE	0.00
9.00	RCEN0040	CENTURY LINE	EMPEY ROAD	PIGRAM LINE	66	0.990	ADEQ	Const	NONE	0.00
9.00	RCEN0020	CENTURY LINE	WHITTAKER ROAD	0.08km W of PUTNAM ROAD	64	1.770	ADEQ	Const	NONE	0.00
9.00	RWHI0030	WHITTAKER ROAD	WILSON LINE	YORKE LINE	41	1.390	ADEQ	Const	NONE	0.00
9.00	RVIE0060	VIENNA LINE	CARTER ROAD SOUTH LEG	RICHMOND ROAD	282	2.070	ADEQ	Const	NONE	0.00
8.00	RCAR0080	CARTER ROAD	COLLEGE LINE	PRESSEY LINE	144	2.070	ADEQ	Const	NONE	0.00
7.00	RROG0050	ROGERS ROAD	GLENCOLIN LINE	COLLEGE LINE	123	2.210	ADEQ	Const	NONE	0.00
6.00	RWAL0020	WALKER ROAD	TALBOT LINE	GLENCOLIN LINE	247	3.200	ADEQ	Const	NONE	0.00
6.00	RVIE0020	VIENNA LINE	IMPERIAL ROAD	HACIENDA ROAD	262	2.070	ADEQ	Const	NONE	0.00
5.00	RGLE0070	GLENCOLIN LINE	CARTER ROAD (SOUTH LEG)	SPRINGER HILL ROAD	361	2.000	ADEQ	Const	NONE	0.00
3.00	RME0010	MERVIS DRIVE	NOVA SCOTIA LINE	WALES CRES	200	0.130	ADEQ	Const	NONE	0.00
3.00	RHIL0010	HILLTOP LANE	SPRINGFIELD ROAD	WEST END	100	0.300	ADEQ	Const	NONE	0.00
3.00	RVIE0030	VIENNA LINE	HACIENDA ROAD	SPRINGFIELD ROAD	264	2.040	ADEQ	Const	NONE	0.00
3.00	RWA0010	WALES CRES	MERVIS DRIVE	House 5265	250	0.410	ADEQ	Const	NONE	0.00
0.00	RWA0020	WALES CRES	HOUSE 5265	MERVIS DRIVE	167	0.167	ADEQ	Const	NONE	0.00
0.00	RME0020	MERVIS DRIVE	WALES CRES , SOUTHERLY INTERSECTION	WALES CRES, NORTHERLY INTERSECTION	260	0.259	ADEQ	Const	NONE	0.00

Total Needs Summary by Improvement Type

Current Inspection Batch

Priority#	ID	Street Name	From	To	AADT	Length	TON	Imp. Class	Imp	Imp. Cost
0.00	RME0030	MERVIS DRIVE	WALES CRES, NORTHERLY INTERSECTION	JAMESTOWN LINE	400	0.245	ADEQ	Const	NONE	0.00
						76.251				0.00
BSgrav										
27.00	RCOR0020	CORLESS ROAD	0.1km N of WILSON LINE	YORKE LINE	10	1.300	ADEQ	Const	BSgrav	205,177.83
26.00	REMP0010	EMPEY ROAD	LYONS LINE	CENTURY LINE	60	1.460	NOW	Const	BSgrav	214,316.47
26.00	RCRO0050	CROSSLEY HUNTER LINE	PUTNAM ROAD	PIGRAM LINE	103	2.850	6-10	Const	BSgrav	449,812.94
23.00	RRIC0010	RICHMOND ROAD	NOVA SCOTIA LINE	1.69km S of NOVA SCOTIA LINE	10	1.690	ADEQ	Const	BSgrav	248,078.65
22.00	RDAL0010	DALBY ROAD	LYONS LINE	NORTH END	10	0.500	ADEQ	Const	BSgrav	78,914.55
						7.800				1,196,300.44
BS										
40.00	RPLE0010	LEVI STREET	IMPERIAL ROAD	COLIN STREET	300	0.360	NOW	Const	BS	115,883.83
27.00	RPLE0005	LEVI STREET	IMPERIAL ROAD	SOUTH END	20	0.040	ADEQ	Const	BS	12,028.88
27.00	RROD0010	ROD ROAD	TALBOT LINE	0.1KM NORTH OF TALBOT LINE	10	0.100	ADEQ	Const	BS	87,186.29
27.00	RCOR0010	CORLESS ROAD	WILSON LINE	0.1km N of WILSON LINE	10	0.100	ADEQ	Const	BS	87,186.29
26.00	RPLI0005	LINDLEY STREET	IMPERIAL ROAD	SOUTH END	10	0.050	ADEQ	Const	BS	15,036.10
26.00	RBRO0020	BROOK LINE	0.16km W of CAVERLY ROAD	CAVERLY ROAD	600	0.160	1-5	Const	BS	51,762.29
25.00	RCAT0010	CATT LINE	SPRINGWATER ROAD	ROGERS ROAD	50	2.250	NOW	Const	BS	387,935.73
25.00	RCHA0040	CHALET LINE	ANGER ROAD	CARTER ROAD	175	1.300	6-10	Const	BS	240,993.32
25.00	RCAL0010	CALTON LINE	SPRINGWATER ROAD	MELON ROAD	406	2.080	1-5	Const	BS	684,468.93
25.00	RSPW0010	SPRINGWATER ROAD	CALTON LINE	JOHN WISE LINE	675	2.010	1-5	Const	BS	615,179.80
24.00	RPLI0010	LINDLEY STREET	IMPERIAL ROAD	HALE STREET	50	0.120	NOW	Const	BS	36,086.63
23.00	RPAM0010	AMASA STREET	COLIN STREET	WEST END	30	0.080	ADEQ	Const	BS	24,057.75
23.00	RSPA0040	SPARTA LINE	IMPERIAL ROAD	EAST END	25	0.620	ADEQ	Const	BS	540,554.99
21.00	RCRO0040	CROSSLEY HUNTER LINE	WHITTAKER ROAD	PUTNAM ROAD	40	1.860	ADEQ	Const	BS	1,621,664.96
21.00	RCHA0030	CHALET LINE	WALKER ROAD	ANGER ROAD	127	0.830	6-10	Const	BS	143,105.18
21.00	RPIG0050	PIGRAM LINE	AVON DRIVE	YORKE LINE	139	1.360	6-10	Const	BS	252,116.09
20.00	RPIG0020	PIGRAM LINE	LYONS LINE	CROSSLEY HUNTER LINE	189	1.440	6-10	Const	BS	266,946.45
20.00	RCHA0015	CHALET LINE	0.12km E of HACIENDA ROAD	SPRINGFIELD ROAD	86	1.940	6-10	Const	BS	334,486.81
20.00	RWO00010	WOOLLEYVILLE LINE	SPRINGFIELD ROAD	0.35km E of SPRINGFIELD ROAD	200	0.350	1-5	Const	BS	105,252.67
19.00	RCRO0030	CROSSLEY HUNTER LINE	IMPERIAL ROAD	WHITTAKER ROAD	41	3.710	ADEQ	Const	BS	3,234,611.28
19.00	RCHA0020	CHALET LINE	SPRINGFIELD ROAD	WALKER ROAD	66	2.060	6-10	Const	BS	355,176.71
19.00	RVAN0010	VAN PATTEN LINE	IMPERIAL ROAD	HACIENDA ROAD	106	2.050	6-10	Const	BS	353,452.55
18.00	RSFI0010	FINNEY STREET	SPRINGFIELD ROAD	ELM STREET	200	0.510	6-10	Const	BS	156,689.36
16.00	RPIG0030	PIGRAM LINE	CROSSLEY HUNTER LINE	0.1km S of OSTRANDER ROAD	180	0.950	6-10	Const	BS	176,110.51
16.00	RPIG0040	PIGRAM LINE	0.1km N of WILSON LINE	YORKE LINE	108	1.310	6-10	Const	BS	242,847.12
15.00	RPRU0010	RUSH CREEK LINE	0.5km W of IMPERIAL ROAD	IMPERIAL ROAD	100	0.500	1-5	Const	BS	150,360.96
13.00	RSIN0010	INVERNESS STREET	RON MCNEIL LINE	SOUTH END CULDESAC	50	0.260	6-10	Const	BS	79,880.85
10.00	RCON0020	CONSERVATION LINE	ROGERS ROAD	IMPERIAL ROAD	408	2.070	ADEQ	Const	BS	633,543.37
						30.470				11,004,605.70
						272.581				25,733,239.80
						272.581				25,733,239.80

Appendix L: Inventory Manual References



Township of Malahide, 2021 SotI and AMP for Roads
February 2, 2022

TABLE F-1 ROAD DESIGN STANDARDS

RURAL ROAD STANDARDS

		50-199 AADT 200	200-399 AADT 300	400-999 AADT 400	1000-1999 AADT 500	2000-2999 AADT 600	3000-3999 AADT 700	4000+ AADT 800	4 lanes & Exp 4LN, EXP
Shw	Surface Width (m)	6.0	6.0	6.5	6.5	7.0	7.0	7.5	15.0
Shw	Shoulder Width (m)	1.5	1.5	1.5	2.5	2.5	3.0	3.0	3.0
DOP	Hot Mix (mm)	16	16	50	50	100	100	100	100
DA	Granular A (mm)	150	150	150	150	150	150	150	150
DB	Southern Ontario Granular B (mm)								
	BS	150	150	150	150	150	150	150	150
	RW, REC, NC	300	300	450	450	450	450	450	450
DB	Northern Ontario Granular B (mm)								
	BS	250	250	250	250	250	250	250	250
	RW, REC, NC	400	400	550	550	550	550	550	550
DC	Concrete Surface								
DC	Concrete (mm)	150	150	150	225	225	225	225	225
DB	Granular B (mm)	150	150	150	150	150	150	150	150

* Double Surface Treatment (DST) assumed to equal 16 mm of Hot Mix

Note: Class 100 rural roads are eligible for maintenance subsidy only.

SEMI-URBAN ROAD STANDARDS

		Local Roads		Collector Roads		Arterials
		Residential LR	Comm/Ind LCI	Residential CR	Comm/Ind CCI	All Lanes ART
Shw	Lane Width (m)	3.0	3.25	3.25	3.75	3.75
Shw	Shoulder Width (m)	1.5	1.5	2.5	2.5	3.0
DOP	Hot Mix (mm)	50	50	50	100	100
DA	Granular A (mm)	150	150	150	150	150
DB	Southern Ontario Granular B (mm)					
	BS	150	150	150	150	150
	RW, REC	250	300	300	450	450
DB	Northern Ontario Granular B (mm)					
	BS	250	250	250	250	250
	RW, REC	350	400	400	550	550
DC	Concrete Surface					
DC	Concrete (mm)	150	150	225	225	225
DB	Granular B (mm)	150	150	150	150	150

URBAN ROAD STANDARDS

		Local Roads		Collector Roads		Arterials	Expressways
		Residential LR	Comm/Ind LCI	Residential CR	Comm/Ind CCI	All Lanes ART	All Lanes EXP
Through Lane Width (m)		3.0	3.25	3.25	3.75	3.75	3.75
Parking Lane Width (m)		2.5	2.5	2.5	2.5	3.0	3.0
Curb Offset each side (m)		.5	.5	.5	.5	.5	.5
Granular Base							
DOP	Hot Mix (mm)	100	100	100	150	150	150
DA	Granular A (mm)	150	150	150	150	150	150
DB	Granular B (mm)						
	Southern Ontario	300	300	300	300	450	450
	Northern Ontario	400	400	400	400	550	550
Concrete Base							
DOP	Hot Mix (mm)	50	50	50	50	100	100
DC	Concrete (mm)	150	150	200	200	200	200
DB	Granular B (mm)	150	150	150	150	150	200
Concrete Surface							
DC	Concrete (mm)	150	150	250	250	250	250
DB	Granular B (mm)	150	150	150	150	150	150

Note: Bench Mark Costs will not exceed the design standards specified in the above tables

Feb 1, 1991

F - 12

Township of Malahide, 2021 SotI and AMP for Roads
February 2, 2022

TABLE 93R - MINIMUM TOLERABLE SURFACE WIDTH - RURAL (metres)

	EXISTING CLASS									
	100	200	300	400	500	600	700	800	4LN	EXP
ROADWAY WIDTH	5.0	5.5	5.5	6.0	6.0	6.0	6.5	6.5	13.0	3.5/lane

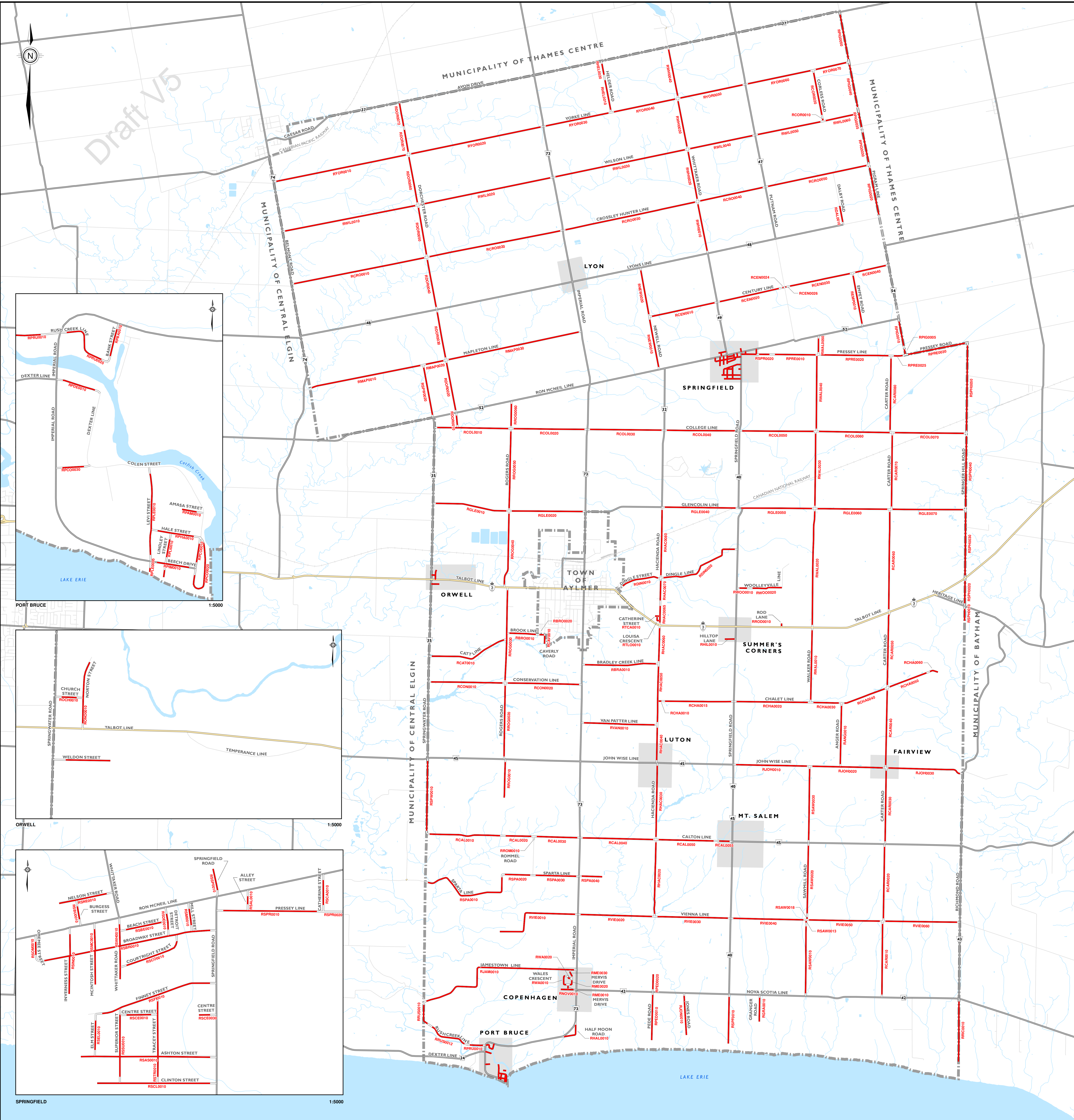
TABLE 93SU - MINIMUM TOLERABLE SURFACE WIDTH - SEMI-URBAN and URBAN (metres)

FUNCTIONAL CLASSIFICATION	SEMI-URBAN		URBAN	
	2-Way (2W,2M)	1 Way (1W,1M)	2 Way (2W,2M)	1 Way (1W,1M)
2-lane Local Residential	5.0	5.0	5.5	5.5
2-lane Local Comm. & Ind.	5.5	5.5	6.0	6.0
2-lane Collector Residential	5.5	5.5	6.0	6.0
2-lane Collector Comm. & Ind.	6.0	6.0	6.5	6.5
2-lane Arterial	6.0	6.0	6.5	6.5
3-lane Local Comm. & Ind.	9.0	8.7	9.0	8.7
3-lane Collector Residential	9.0	8.7	9.0	8.7
3-lane Collector Comm. & Ind.	9.0	8.7	9.0	8.7
3-lane Arterial	9.0	9.0	9.5	9.5
4-lane Collector Residential	11.0	11.0	11.5	11.5
4-lane Collector Comm. & Ind.	12.0	12.0	12.5	12.5
4-lane Arterial	12.0	12.0	12.5	12.5
5-lane Arterial	15.0	15.0	15.5	15.5
6-lane Arterial	18.0	18.0	18.5	18.5
7-lane Arterial	21.5	21.5	22.0	22.0
8-lane Arterial	24.5	24.5	25.0	25.0
9-lane Arterial	27.5	27.5	28.0	28.0
Expressway	—	—	3.5/ln	3.5/ln

Appendix M: Thematic Maps

Draft V5

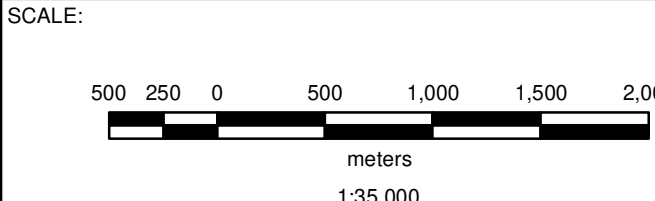




4 ROADS MANAGEMENT SERVICES

the Township of
Malahide

- LEGEND:**
- ROAD SECTION
 - PROVINCIAL HIGHWAY
 - ARTERIAL ROAD
 - LOCAL/COLLECTOR ROAD
 - RAILWAY
 - WATERCOURSE
 - WATERBODY
 - HAULET
 - MUNICIPAL BOUNDARY



PROJECT NAME:
2021 ROAD NEEDS STUDY

SHEET TITLE:
ROAD INVENTORY SECTIONS

PROJECT No:
C14-0447

DRAFTER:
S. ELLIOTT

DESIGNER:

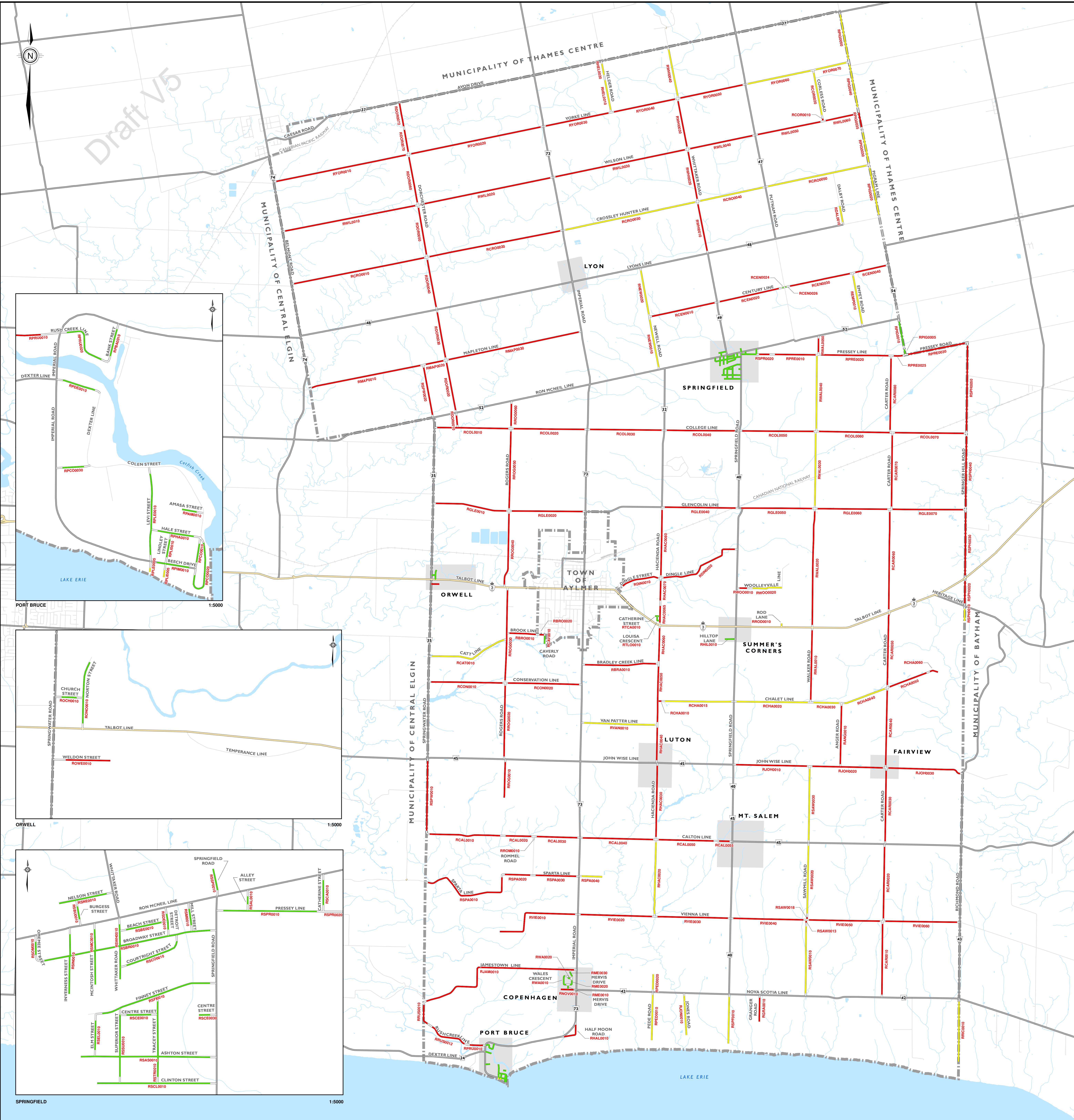
APPROVER:
D. CAMPBELL

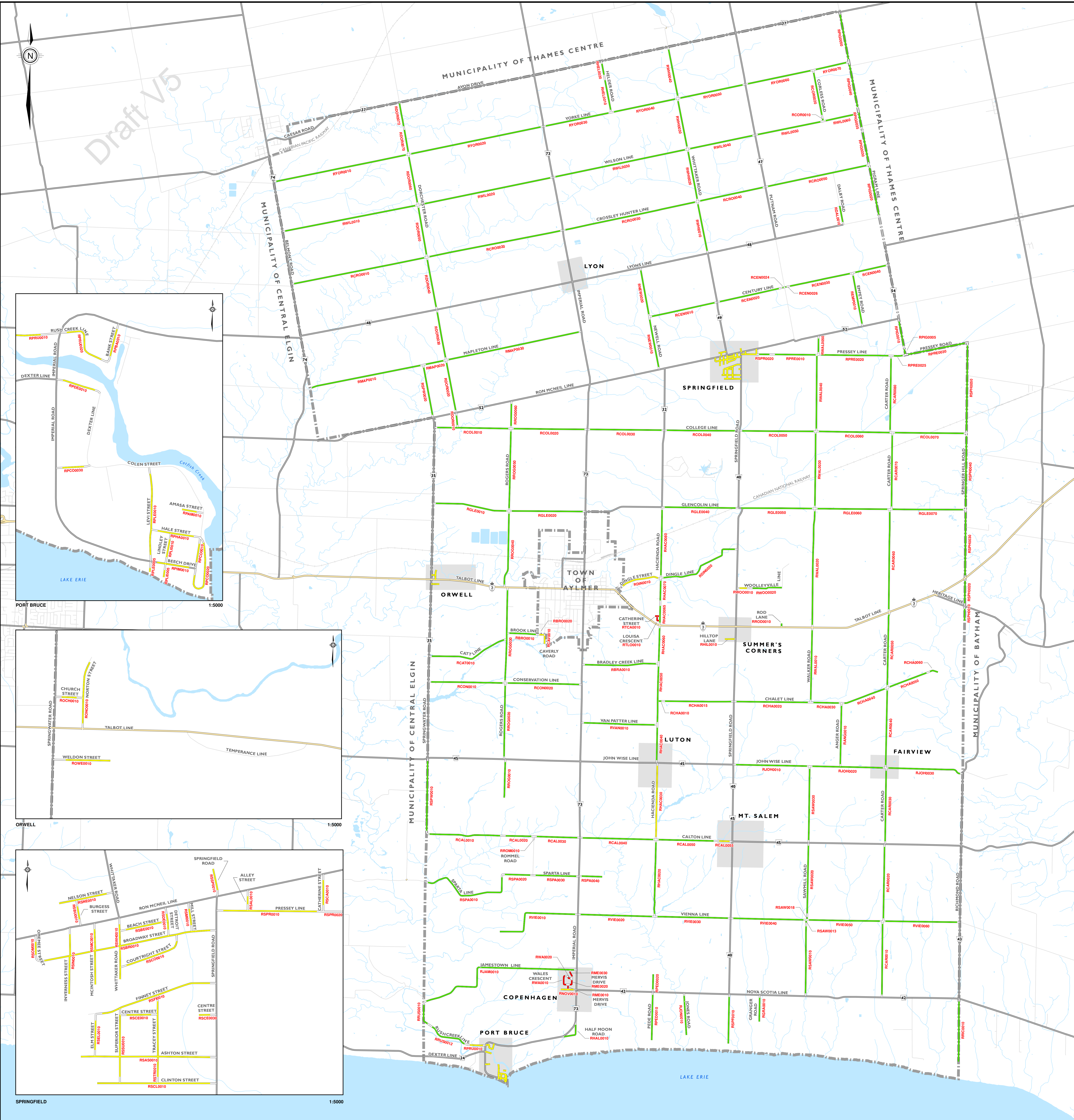
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1/14/2022

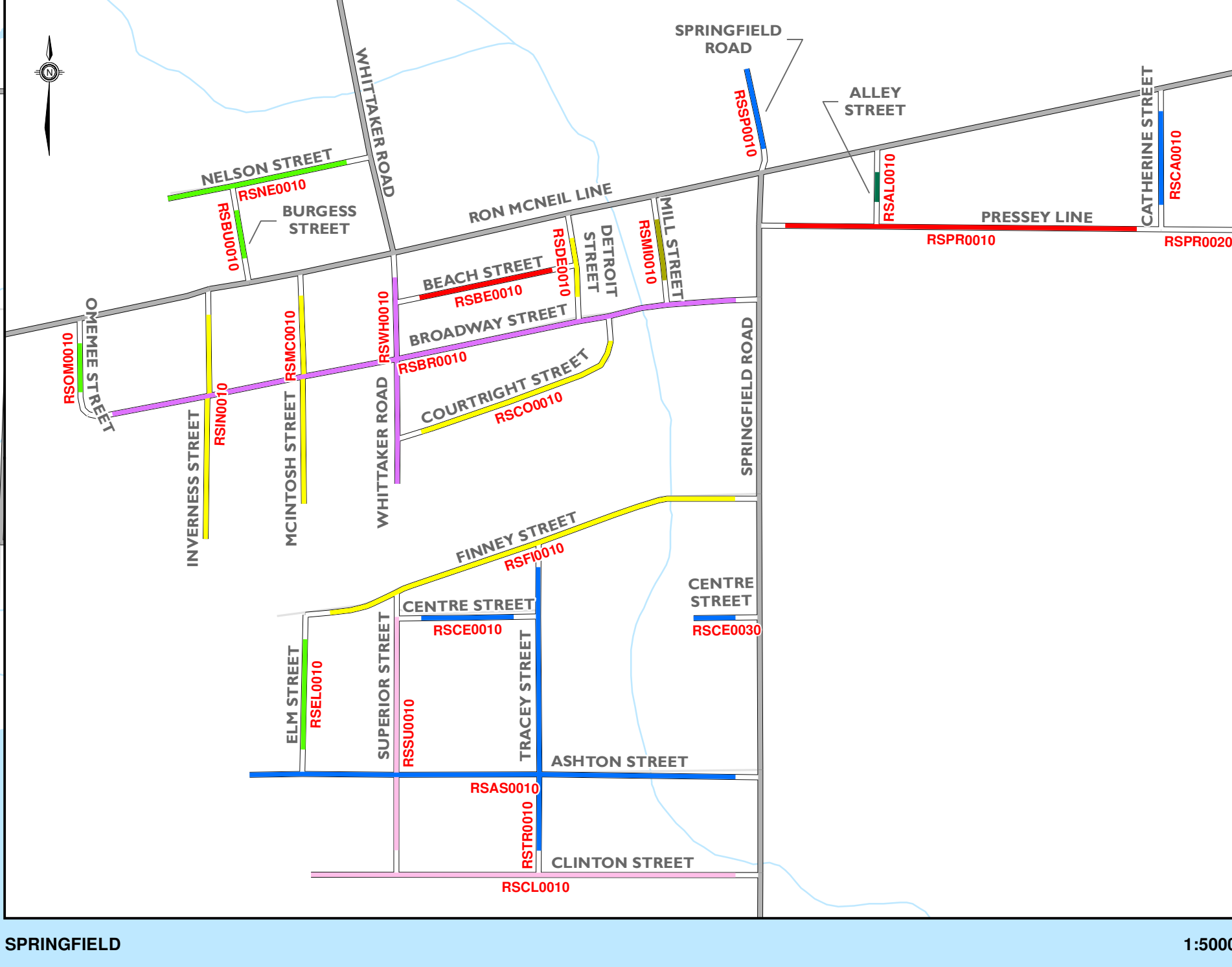
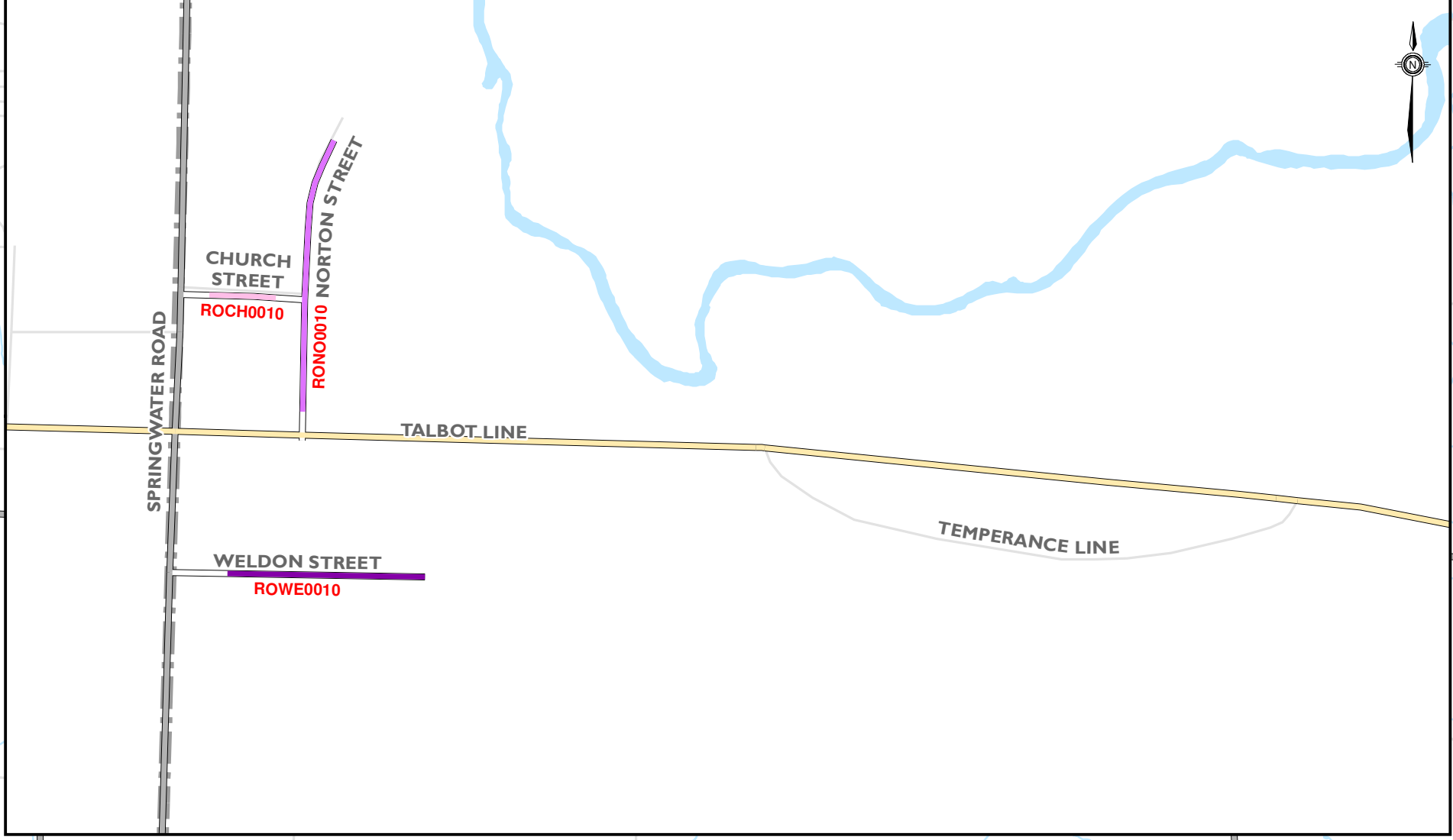
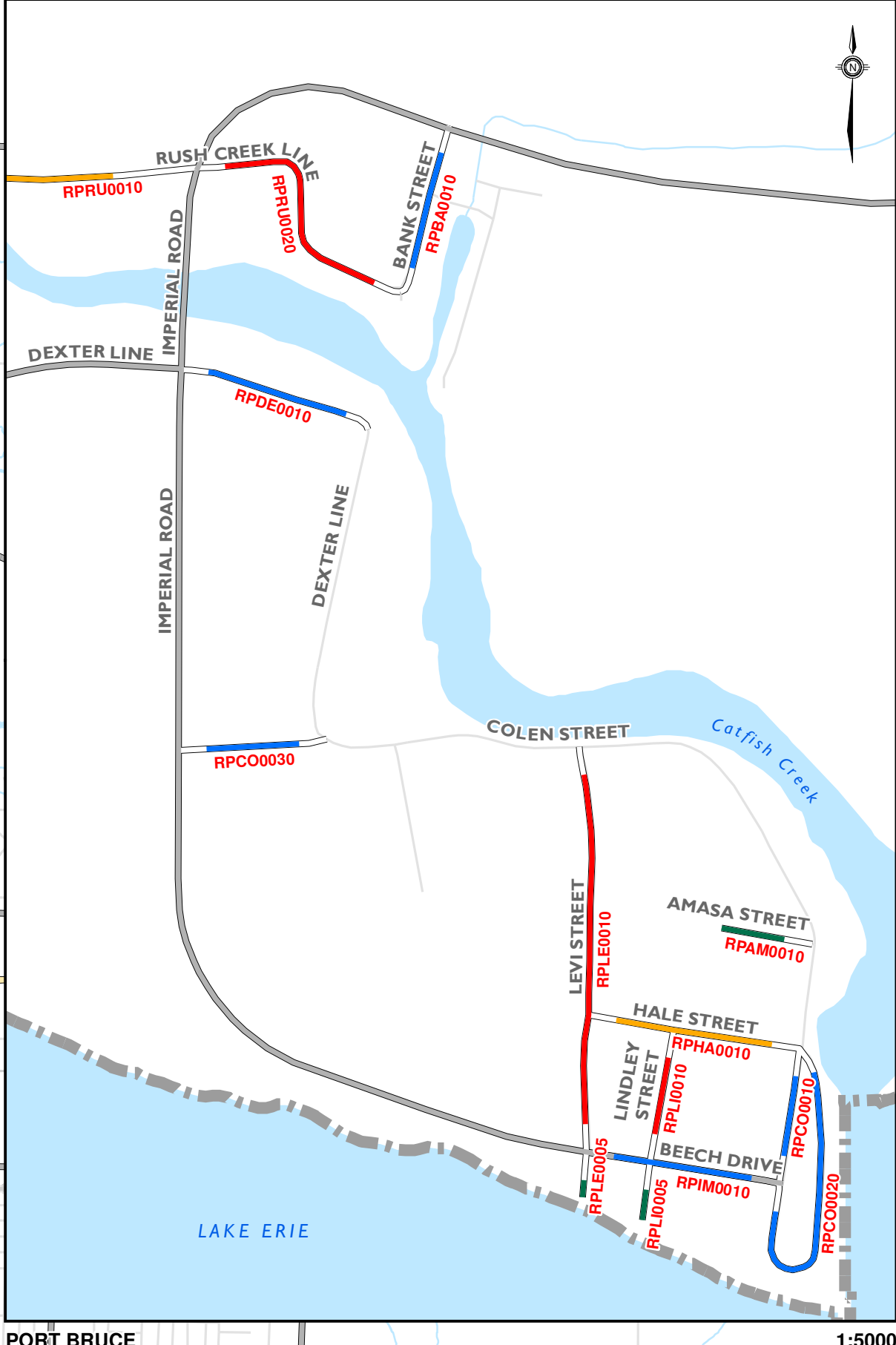
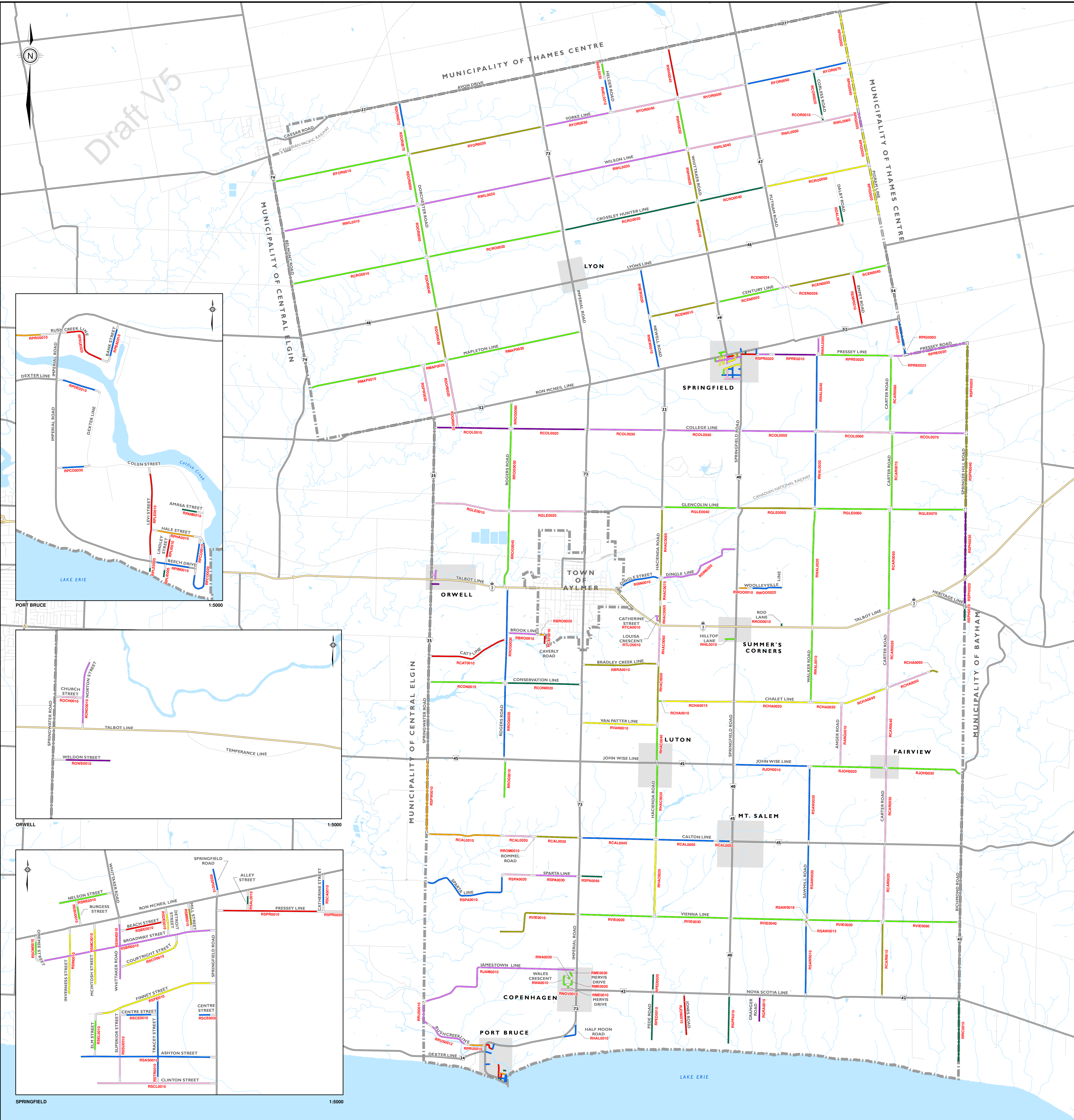
CLIENT FILE No:

DRAWING No:
1

SHEET No:
1 of 4



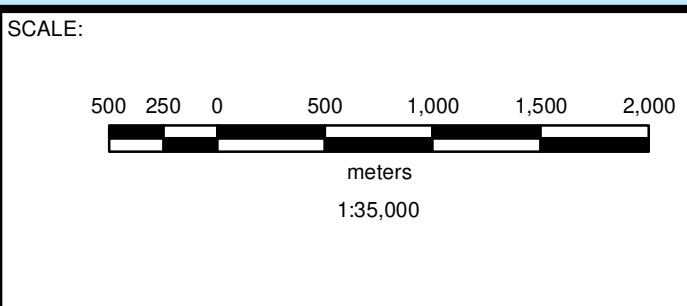




4 ROADS MANAGEMENT SERVICES

the Township of Malahide

LEGEND:		ROAD NETWORK		WATERCOURSE	
—	adequate	—	6 TO 10 YEAR CONSTRUCTION	—	WATERCOURSE
—	LOW RESURFACING	—	MAINTENANCE	—	WATERBODY
—	1 TO 5 YEAR RESURFACING	—	ARTERIAL ROAD	—	HAULET
—	6 TO 10 YEAR CONSTRUCTION	—	LOCAL COLLECTOR ROAD	—	MUNICIPAL BOUNDARY
—		—	OTHER FEATURE	—	RAILWAY



PROJECT NAME: 2021 ROAD NEEDS STUDY
SHEET TITLE: IMPROVEMENT NEEDS

PROJECT No: C14-0447	CLIENT FILE No: —
DRAFTER: S. ELLIOTT	DESIGNER: —
APPROVER: D. CAMPBELL	APPROVER: —
DATE: 1/14/2022	SHEET No: 1 of 4



Report to Council

REPORT NO.: PW-22-41
DATE: June 2, 2022
ATTACHMENT: Map and Request for Improvement
SUBJECT: REQUEST FOR IMPROVEMENT – MAGINNIS DRAIN

Recommendation:

THAT Report No. PW-22-41 entitled “Request for Improvement – Maginnis Drain” be received;

AND THAT Mike Devos, P. Eng., of Spriet Associates, be appointed to prepare an Engineer’s Report for this petition.

Comments/Analysis:

The Township of Malahide has received a request for improvement to incorporate elements of an inline irrigation pond on the Maginnis Drain. The pond is located on the property at 6242 Springfield Road (see map on following page). Due to a recent failure and washout of a privately-owned water control structure and laneway at the south end of the pond, the landowner at 50942 Vienna Line has requested that the inlet and outlet culverts of the pond be incorporated as part of the Maginnis Drain.

This existing portion of the Maginnis Drain was last re-constructed pursuant to a report by Spriet Associates, dated July 18, 1991. This report acknowledged the existence of the inline pond but did not include instructions as to who was responsible for the maintenance of the pond or its culverts.

The Staff is recommending that Spriet Associates be appointed by the Council to prepare a new Engineer’s Report under *Section 78 of the Drainage Act R.S.O. 1990*, to address the pond and culverts with an estimated construction date of Fall 2022.

Financial Implications to Budget:

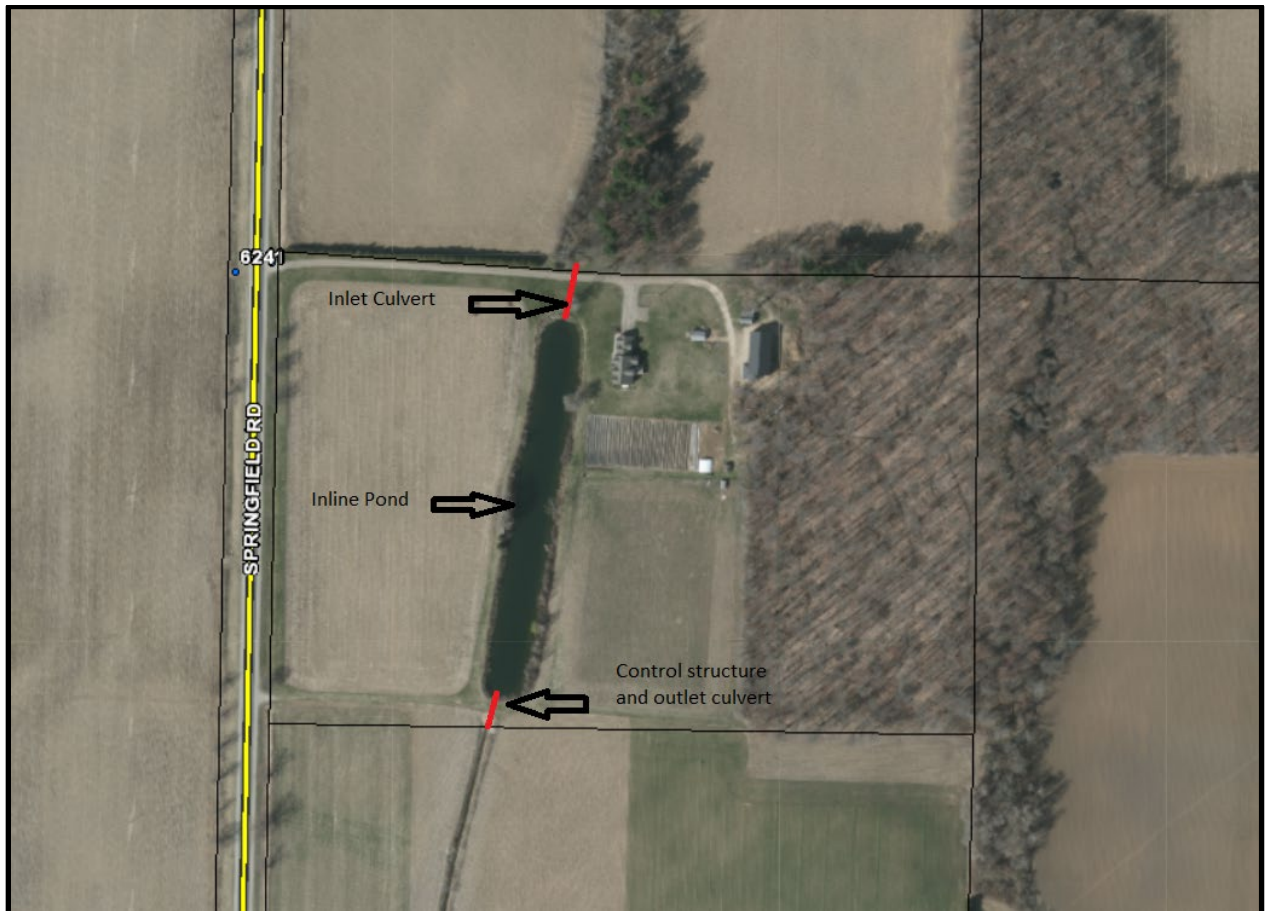
The Township has lands which contribute to the drainage area, and thus, will likely be a party to the Report.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that support the “Our Local Government” Strategic Pillar is “Embody Financial Efficiency throughout Decision-Making”. Ensuring that the cost of maintaining municipal infrastructure is equitably borne by current and future ratepayer’s works to achieve this goal.

Submitted by:	Approved by:	Approved for Council:
Bob Lopez, Engineering Technologist/ Drainage Superintendent	Matt Sweetland, P.Eng., Director of Public Works	Adam Betteridge Chief Administrative Officer



Notice of Request for Drain Improvement*Drainage Act, R.S.O. 1990, c. D.17, subs. 78(1)*

To: The Council of the Corporation of the Township _____ of Malahide _____

Re: Maginnis Drain _____
(Name of Drain)

In accordance with section 78(1) of the *Drainage Act*, take notice that I/we, as owner(s) of land affected, request that the above mentioned drain be improved.

The work being requested is (check all appropriate boxes):

- ☐ Changing the course of the drainage works;
- ☐ Making a new outlet for the whole or any part of the drainage works;
- ☐ Constructing a tile drain under the bed of the whole or any part of the drainage works;
- ☐ Constructing, reconstructing or extending bridges or culverts;
- ☐ Constructing, reconstructing or extending embankments, walls, dykes, dams, reservoirs, pumping stations or other protective works in connection with the drainage works;
- ☒ Otherwise improving, extending to an outlet or altering the drainage works;
- ☐ Covering all or part of the drainage works; and/or
- ☐ Consolidating two or more drainage works.

Provide a more specific description of the proposed drain improvement you are requesting:

Request pond culverts be incorporated as municipal drain.

Property Owners:

- Your municipal property tax bill will provide the property description and parcel roll number.
- In rural areas, the property description should be in the form of (part) lot and concession and civic address.
- In urban areas, the property description should be in the form of street address and lot and plan number, if available.

Property Description

Part of lot 21, Concession 3

Ward or Geographic Township
Township of MalahideParcel Roll Number
340800002005400

If property is owned in partnership, all partners must be listed. If property is owned by a corporation, list the corporation's name and the name and corporate position of the authorized officer. Only the owner(s) of the property may request a drain improvement.

Select Ownership Type

Enter the mailing address and primary contact information of property owner below:

Last Name <u>Barbier</u>		First Name <u>Jeff</u>	Middle Initial <u>C</u>
Mailing Address			
Unit Number	Street/Road Number <u>50423</u>	Street/Road Name <u>Vienna Line</u>	PO Box
City/Town <u>Aylmer</u>	Province <u>ONT</u>		Postal Code <u>N5H2R2</u>
Telephone Number <u>5197739551</u>	Cell Phone Number (Optional) <u>5198720435</u>	Email Address (Optional) <u>jeffbarbier@gmail.com</u>	

To be completed by recipient municipality:

Notice filed this 24th day of May 20 22

Name of Clerk (Last Name, First Name) <u>ADAMS, ALLISON</u>	Signature of Clerk <u>A Adams</u>
--	--------------------------------------



Report to Council

REPORT NO.: PW-22-37
DATE: June 2, 2022
ATTACHMENT: None
SUBJECT: **ONTARIO POLICE COLLEGE MEMORANDUM OF UNDERSTANDING FOR KITCHEN USE**

Recommendation:

THAT Report No. PW-22-37 entitled “Ontario Police College Memorandum of Understanding for Kitchen Use” be received;

AND THAT Township of Malahide Council directs the Facilities Manager to enter into a Memorandum of Understanding with the Ontario Police College for contingent use of the Malahide Community Place Kitchen Facilities.

Background:

In 2018 the Ontario Policy College (OPC) rented the kitchen facilities at the Malahide Community Place (MCP) for one week while renovations were being completed at their facility. As the use of the MCP Kitchen Facilities met the needs of the OPC, a Memorandum of Understanding has been sought by the OPC Staff to meet the needs of their Business Continuity Planning to ensure adequate facilities are in place in the event the OPC temporarily loses the use of their kitchen facility due to some unforeseen circumstance.

Comments/Analysis:

OPC Staff have advised that the contingent needs of the facility would include full time use of the kitchen facility during the time of need, as proposed in the attached Draft

Memorandum of Understanding. Should an instance occur wherein OPC Staff have relocated to the MCP Kitchen and a conflict is realized with a pre-accommodated renter, such renter would get the use of the facility and the Facilities Manager would work with the OPC for alternate arrangements, for example the possible use of the South Dorchester Community Hall kitchen facilities.

A similar MOU exists with the OPC and East Elgin Community Complex for use of that facility as a communication centre in the event of contingent need.

Staff have reviewed the attached DRAFT Memorandum of Understanding and confirm it will not have undue impact on the transient availability of the MCP Kitchen facility.

Financial Implications to Budget:

All use of the kitchen under this Memorandum of Understanding is billed out at approved facility rental rates and does not affect the Township budget.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that support the “Our Local Government” Strategic Pillar relates to “Pursuing New Partnerships”. Working with a Community partner to ensure their business stays in operation meets this strategic pillar.

Submitted by:	Approved by:	Approved for Council:
Chris Cox, Facilities Manager	Matt Sweetland, P Eng. Director of Public Works	Adam Betteridge Chief Administrative Officer



Report to Council

REPORT NO.: PW-22-31
DATE: April 27, 2022
ATTACHMENT: Springfield Banner Cost Comparison
SUBJECT: **SPRINGFIELD VETERAN BANNER REQUEST**

Recommendation:

THAT Report No. PW-22-31 entitled “Springfield Banner Request” be received;

AND THAT the Council accept the recommendations from staff to proceed with this project based on the installation of the brackets and banners on the Hydro poles on Ron McNeil Line;

AND THAT the Municipal Staff be directed to work with the “Honour Our Veterans Committee” on the installation of the brackets and banners.

Background:

At the regular Council Meeting held on January 21, 2021, a request from the “Honour Our Veterans Committee” (the Committee) was received regarding a proposal to install Veterans Memorial Banners on existing hydro poles in the Village of Springfield along Ron McNeil Line. The Council directed Staff to investigate further to determine if such a project would be permitted by Hydro One and if so, to advise the Council and Committee of the requirements and estimated costs to undertake the program.

In follow-up to the January 21, 2021 meeting the Committee presented an alternate proposal at the regular Council Meeting held on November 18, 2021 to consider the installation of poles in the Memorial / Cenotaph park to accommodate the banners.

Staff took into consideration of both proposals and did a cost comparison as per Councils request, as attached with this report.

Comments/Analysis:

In the cost comparison completed for the two proposals (attached) there is ultimately only one cost that needs to be considered by the Township, being the installation and removal of the banners. All other cost considerations for this project in any scenario are covered through donations given to the Committee. Together with the Committee, Staff have reviewed the optimal locations for the banners to ensure cost consideration does not become burdensome.

In the discussions consistent with the Committee, the recommended approach is to utilize the hydro poles for these banners and brackets as authorized in the 2003 service agreement with Hydro One indicating banner attachments are permitted, providing installation of such is completed by a Hydro One approved electrical contractor.

With this consideration, the Township is provided the opportunity to utilize the banner brackets the rest of the year outside of the Remembrance Day banner period thereby providing Economic Development / Community Improvement opportunity. These banners could be seasonal or be historic and also have the ability to promote other annual events in the community.

Financial Implications to Budget:

The initial cost to install the brackets and banners is proposed to be borne by the Committee. The per occurrence cost for installation of banners is \$400.00, and removal of banners is \$400.00. It is proposed that the Committee will be responsible for all banner installation/removal costs.

The brackets being provided on the poles will also be available for Township Promotional/Advertising use if desired, falling within the Economic Development portion of the Township Budget.

Should the Township desire promotional banner use, the Township would share costs associated with Committee banner removal/installation.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that support the “Our Community” Strategic Pillar relates to “Showcase Local Culture & Heritage” Strategic Pillar is to “Strengthen and develop Malahide’s cultural fabric for the benefit of all”. By supporting a program to honour our Veterans, Council is achieving this goal.

Submitted by:	Approved by:	Approved for Council by:
Chris Cox Facilities Manager	Matt Sweetland, P.Eng., Director of Public Works	Adam Betteridge, Chief Administrative Officer

**Springfield Veterans Banner Project
Costing Comparison**

Proposal #1 -Locate Banners on Hydro-One Poles

<u>Item</u>	<u>Quantity</u>	<u>Unit cost</u>	<u>Total Cost</u>	<u>Notes</u>
Materials - Banner Brackets	20 \$	45.00	\$ 900.00	Committee expense
Materials - Banding for banner brackets	40 \$	1.85	\$ 74.00	Committee expense
Materials - Banners	10 \$	155.95	\$ 1,559.50	Committee expense
Installation - Brackets and banners by Hydro-One approved Contractor	1 \$	2,985.00	\$ 2,985.00	Committee expense
			<u>\$ 5,518.50</u>	
Removal of banners per occurrence			\$ 400.00	By Hydro-One approved Contractor
Installation of banners per occurrence			\$ 400.00	By Hydro-One approved Contractor

Proposal #2 - Cenotaph Park Poles

<u>Item</u>	<u>Quantity</u>	<u>Unit cost</u>	<u>Total Cost</u>	
Materials - Poles	1 \$	7,984.50	\$ 7,984.50	Committee expense
Materials - Banner Brackets	30 \$	45.00	\$ 1,350.00	Committee expense
Materials - Banding for banner brackets	60 \$	1.85	\$ 111.00	Committee expense
Materials - Banners	15 \$	155.95	\$ 2,339.25	Committee expense
Installation - Poles	1 \$	5,700.00	\$ 5,700.00	Committee expense
Installation - Brackets and Banners	1 \$	130.00	\$ 130.00	Committee expense
			<u>\$ 17,614.75</u>	
Removal of banners each year			\$ 130.00	
Installation of banners each year			\$ 130.00	



Report to Council

REPORT NO.: PW-22-40
DATE: June 2, 2022
ATTACHMENT: None
SUBJECT: RFP RESULTS – CARTER ROAD BRIDGE REHABILITATION

Recommendation:

THAT Report No. PW-22-40 entitled “RFP Results – Carter Road Bridge Rehabilitation Request for Proposal” be received;

AND THAT the proposal for the Carter Road Bridge Rehabilitation be awarded to Vallee Consulting Engineers, Architects and Planners of Simcoe, Ontario in the amount of \$24,955.70 (plus HST);

AND THAT the Mayor and Clerk be authorized to enter into an agreement with Vallee Consulting Engineers, Architects and Planners for the purpose of completing the Carter Road Bridge Rehabilitation.

Background:

As Council will recall, the 2020 "Ontario Structure Inspection Manual" (OSIM) inspections identified immediate critical work required on the Carter Road Bridge located south of Pressey Line. The Carter Road Bridge was built in 1965 and is experiencing critical cracking and exposed rebar.

Staff conducted a follow-up investigation and confirmed that the structure was not at immediate risk of failure, and rehabilitation works would be possible to extend the life of the structure rather than requiring to replace it at an estimated cost of \$1.6 Million. The Council approved \$25,000.00 to be included in the 2022 Capital Budget to undertake the structural investigation and remedial design work.

Staff issued a Request for Proposals (RFP) for qualified engineering consultants to explore options and construction methodology to rehabilitate the Carter Road Bridge. Consultants will be required to undertake sufficient structural design so as to allow for the full evaluation of different rehabilitation methods complete with drawings and construction specifications.

Comments/Analysis:

The RFP was posted to the Township of Malahide Bids & Tenders page on April 1, 2022 and closed on May 4, 2022. A total of two (2) firms submitted detailed proposals for this project. These firms are listed below:

- Vallee Consulting Engineers, Architects and Planners
- PML Consultants Ltd.

A two-envelope system was used for this RFP; the Bidders were required to submit their price for the project in a separate sealed envelope. The firms were first scored on the following criteria:

1. Qualifications and Relevant Experience of Project Team
2. Understanding of the Objectives
3. Quality of Approach, Methodology, Value Added Services
4. Proposed Work Plan and Schedule

The Staff completed proposal evaluations on May 11, 2022. Firms achieving a minimum score of 70% on the technical merits had their pricing envelopes opened. Two of the submitted proposals scored above the 70% minimum technical requirement, and therefore their financial bid was factored into the overall score with equivalent weighting of technical points (50) and financial points (50).

The firm that achieved the highest overall score was Vallee Consulting Engineers. This firm's team of professionals has extensive experience in many aspects of engineering services including bridge rehabilitation. The Township of Malahide is confident they can complete the work tasked to them in this RFP.

Financial Implications to Budget:

The approved 2022 Budget includes \$25,000 for the Carter Road Bridge Rehabilitation project. The proposal from Vallee Consulting Engineers for \$24,955.70 will exceed the budgeted amount by \$394.92 due to the application of 1.76% non-refundable the HST. Staff recommend this shortfall be financed from reserves.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ICSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that supports the "Our Local Government" strategic pillar is "Embody Financial Efficiency throughout Decision-Making". Ensuring that the cost of maintaining municipal infrastructure is equitably borne by current and future ratepayer's works to achieve this goal.

Submitted by:	Approved by:	Approved for Council:
Bob Lopez, Engineering Technologist Drainage Superintendent	Matt Sweetland, P.Eng., Director of Public Works	Adam Betteridge Chief Administrative Officer



Report to Council

REPORT NO.: CLERK-22-07
DATE: June 2, 2022
ATTACHMENT: Draft By-law - Election Joint Compliance Audit Committee
SUBJECT: **2022 MUNICIPAL ELECTION – ESTABLISHMENT OF JOINT COMPLIANCE AUDIT COMMITTEE**

Recommendation:

THAT Report CLERK-22-07 entitled “2022 Municipal Election – Establishment of Joint Compliance Audit Committee” be received for information; and,

THAT Council considers giving three readings to the By-Law establishing an Election Joint Compliance Audit Committee for the 2022 Municipal Election in accordance with the Municipal elections Act, 1996, as amended.

Background:

Section 88.37 of the Municipal Elections Act, 1996, as amended requires each municipal Council to establish a Compliance Audit Committee before October 1st in an election year to deal with matters regarding election campaign finances and contributions.

Historically, Member Municipalities within Elgin County have established an “Elgin Election Joint Compliance Audit Committee” to deal with matters provided for in Sections 88.33, 88.34, 88.35 and 88.36 of the Municipal Elections Act, 1996.

Comments/Analysis:

Establishment of such joint compliance audit committee offers numerous efficiencies in terms of committee member recruitment, review of the committee terms of reference and notice obligations, while remaining compliant with relevant provisions of the Municipal Elections Act, 1996.

The attached draft Elgin Election Joint Compliance Audit Committee Terms of Reference provides for the committee term, meeting overview, mandate, composition, appointment process, compensation, role of staff, application process, roles and responsibilities and appeal overview.

Once all Elgin County Member Municipalities have established a Joint Compliance Audit Committee and approved a Committee Terms of Reference by By-Law, recruitment for committee members will begin. Advertising for prospective Committee Members will

include the placement of ads in local newspapers, contacting previous members of the Joint Committee from 2018, and by posting ads on each respective municipal website.

More information about the Committee Member Appointment Process is outlined in Section 7 of the attached Terms of Reference.

Financial Implications to Budget:

The municipality is responsible for any costs resulting from the review of applications submitted to the Election Joint Compliance Audit Committee. These costs include:

- Committee members' honorarium, which is being recommended to be \$100.00 per member, per meeting, plus mileage costs;
- auditor's costs to perform an audit;
- costs related to the Committee's operations and activities;
- legal costs related to an appeal to the Ontario Court of Justice with respect to a decision of the Committee; and,
- legal costs to undertake legal action against the candidate for violations of the elections finance provisions of the MEA.

Factors involved in determining Election Joint Compliance Audit Committee costs include the number of compliance audit applications that are received, the number of meetings that are required to be held, and the complexity of the audits that need to be conducted. It is therefore difficult to pre-determine the costs that will result from the establishment of the Election Joint Compliance Audit Committee process, as the number of applications to be submitted are unknown in advance.

It is recommended that Reserves be identified as the source of financing for the operational expenses of the Election Joint Compliance Audit Committee.

Relationship to Cultivating Malahide:

The Cultivating Malahide Integrated Community Sustainability Plan (ACSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

The Cultivating Malahide Integrated Community Sustainability Plan (ACSP) is based upon four pillars of sustainability: Our Land, Our Economy, Our Community, and Our Government.

One of the goals that support the “Our Local Government” Strategic Pillar relates to “Pursue New Partnerships”. Partnering with other County municipalities to establish a joint committee reduces duplication and streamlines the compliance audit process.

Submitted by:	Approved by:
Allison Adams, Manager of Legislative Services/Clerk	Adam Betteridge Chief Administrative Officer

**THE CORPORATION OF THE
TOWNSHIP OF MALAHIDE
BY-LAW NO. 22-45**

Being a By-law to establish an Election Joint Compliance Audit Committee for the 2022 Municipal Election in accordance with the Municipal Elections Act, 1996, as amended.

WHEREAS subsection 5(3) of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, provides that a municipal power shall be exercised by by-law;

AND WHEREAS section 9 of the Municipal Act, 2001 provides that a municipality has the capacity, rights, powers and privileges of a natural person for the purpose of exercising its authority under this or any other Act;

AND WHEREAS section 88.37 of the Municipal Elections Act, 1996, as amended requires the Council to establish a Compliance Audit Committee before October 1st in an election year to deal with matters regarding election campaign finances and contributions;

AND WHEREAS the Council of the Corporation of the Township of Malahide wishes to establish a Compliance Audit Committee to deal with matters regarding election campaign finances and contributions;

NOW THEREFORE the The Corporation of the Township of Malahide **HEREBY ENACTS AS FOLLOWS:**

1. **THAT** a committee, to be known as the Elgin Election Joint Compliance Audit Committee, is hereby established to deal with the matters provided for in Sections 88.33, 88.34, 88.35 and 88.36 of the Municipal Elections Act, 1996, as amended.
2. **THAT** the business of the Elgin Election Joint Compliance Audit Committee for the 2022 Municipal Election be conducted in accordance with the Terms of Reference set out in Appendix "A" attached hereto and forming a part of this By-law.
3. **THAT** this By-law shall come into force and take effect on the final passing thereof.

READ a **FIRST** and **SECOND** time this 2nd day of June, 2022.

READ a **THIRD** time and **FINALLY PASSED** this 2nd day of June, 2022.

MAYOR, D. Mennill

CLERK, A. Adams

**TERMS OF REFERENCE
FOR THE
ELGIN ELECTION JOINT COMPLIANCE AUDIT COMMITTEE**

1. DEFINITIONS

- a. Act - means the Municipal Elections Act, 1996, S.O. 1996, c. 32, as amended from time to time.
- b. Applicant – means an elector as defined under Section 88.33(1) or 88.35(1) of the Act who applies for a compliance audit of a candidate's or third party advertiser's election campaign finances.
- c. Application – means an application for a compliance audit accepted by the Clerk pursuant to Section 88.33(2) of the Act.
- d. Auditor - means a person appointed by the Elgin Election Joint Compliance Audit Committee to conduct a compliance audit of the election campaign finances of candidates and registered third parties pursuant to Section 88.33 of the Act.
- e. Auditor's Report - means a report prepared by an auditor regarding the findings of an audit into the election campaign finances of a candidate or registered third party advertiser.
- f. Candidate - means the candidate whose election campaign finances are the subject of an application for a compliance audit.
- g. Clerk – means the Clerk of a member municipality in Elgin County, or their designate.
- h. Committee - means the Elgin Election Joint Compliance Audit Committee established pursuant to Section 88.37 of the Act.
- i. Compliance Audit - means an audit conducted by an auditor, appointed by the Elgin Election Joint Compliance Audit Committee, of a candidate's election campaign finances; contributions to candidates; registered third parties campaign finances, and contributions to registered third parties.
- j. Council – means the Council of a member municipality in Elgin County, including the Council of the Town of Aylmer, Municipality of Bayham, Municipality of Central Elgin, Municipality of Dutton Dunwich, Township of Malahide, Township of Southwold, and Municipality of West Elgin.
- k. Municipality – means a member municipality in the County of Elgin, including The Corporation of the Town of Aylmer, The Corporation of the Municipality of Bayham, The Corporation of the Municipality of Central Elgin, The Corporation of the Municipality of Dutton Dunwich, The Corporation of the Township of Malahide, The Corporation of the

Township of Southwold, and The Corporation of the Municipality of West Elgin.

- I. Registered Third Party - means the individual, corporation or trade union whose notice of registration has been certified by the Clerk and whose campaign finances are the subject of an application for a compliance audit.

2. **ENABLING LEGISLATION**

Section 88.37 of the Act requires that before October 1st in an election year, Council establish a Compliance Audit Committee for the purposes of Sections 88.33, 88.34, 88.35 and 88.36 of the said Act relative to a possible contravention of the Act's election campaign finance provisions.

3. **TERM**

The term of office of the Committee is the same as the term of office of Council, being November 15, 2022 to November 14, 2026, and shall serve in the instance of any by-election that may take place during that time.

4. **MEETINGS**

The Committee will meet as needed, with meetings to be scheduled by the Clerk of the municipality where a compliance audit application is received, in accordance with the MEA requirements. The Clerk of the host municipality shall ensure and verify the validity of the meeting. The Clerk will contact all members to ensure that a quorum of members is able to attend the said meeting. Meetings will be held at the location determined by the Clerk of the host municipality.

The Committee members will select a Chair from amongst its members at its first meeting.

In accordance with the Act, the meetings of the Committee shall be open to the public, but the Committee may deliberate in private.

5. **MANDATE**

The Committee is required to act in accordance with the powers and obligations set out in the Municipal Elections Act, 1996, as amended (MEA). The Committee will be required to:

- a. consider a compliance audit application received from an elector that a candidate or a registered third party has contravened provisions of the MEA relating to election campaign finances and determine whether it should be granted or rejected;
- b. if the application is granted, the Committee shall appoint an auditor to conduct a compliance audit;
- c. receive the auditor's report;
- d. consider the auditor's report and if the report concludes that the candidate or registered third party appear to have contravened a provision of the MEA relating to election campaign finances, the Committee may commence legal

proceedings against the candidate or registered third party for the apparent contravention; and

- e. consider the report(s) of the Clerk identifying each contributor to a candidate for office on a Council or a registered third party who appears to have contravened any of the contribution limits under section 88.9 or 88.13 of the MEA and decide whether to commence a legal proceeding against a contributor for an apparent contravention.

6. **COMPOSITION**

The Committee will be composed of at least three (3) and no more than seven (7) members of the public.

Members must possess an in-depth knowledge of the campaign financing rules of the MEA and therefore membership drawn from the following stakeholder groups:

- a. accounting and audit – accountants or auditors with experience in preparing or auditing the financial statements of municipal candidates;
- b. academic – college or university professors with expertise in political science or local government administration;
- c. legal profession with experience in municipal law, municipal election law or administrative law;
- d. professionals who in the course of their duties are required to adhere to codes or standards of their profession which may be enforced by disciplinary tribunals; and
- e. other individuals with knowledge of the campaign financing rules of the Municipal Elections Act, 1996, as amended.

Pursuant to subsection 88.37(2) of the Act, the Committee shall not include:

- a. Members of Council or local board;
- b. Employees or officers of the Municipality or local board;
- c. Any persons who are candidates in the election for which the Committee is established; or
- d. Any persons who are registered third parties in the Municipality in the election for which the committee is established.

Further, an individual shall be deemed ineligible to be a member of the Committee if they prepare the financial statements of:

- a. any candidate running for office on Municipal Council or local board during the term for which the Committee has been established; or

- b. any registered third party.

In addition, a Committee Member may not be a contributor or provider of any election-related services to a registered candidate or third party advertiser in the 2022 Municipal Election or any subsequent by-election including but not limited to accounting, legal, auditing, marketing or campaign services.

7. **APPOINTMENT PROCESS**

All applicants will be required to submit a summary outlining their qualifications and experience.

A Nominating Committee consisting of the Clerks from each of the member municipalities in Elgin County will review and consider all applicants/ applications, and will prepare a proposed Joint Committee membership list for consideration by each of the respective Municipal Councils.

Members will be selected on the basis of the following:

- a. demonstrated knowledge and understanding of municipal election campaign financing rules and knowledge of the MEA and related regulations;
- b. proven analytical and decision-making skills;
- c. experience working on a committee, administrative tribunal, task force or similar setting;
- d. demonstrated knowledge of quasi-judicial proceedings;
- e. availability and willingness to attend meetings; and
- f. excellent oral and written communication skills.

The Members will be appointed by each of the respective Municipal Councils.

8. **COMPENSATION**

Members of the Committee shall be paid an honorarium of \$125.00 per meeting, plus mileage at the current mileage rate established by the host municipality. The host municipality shall pay all costs relative to the respective application.

9. **STAFF SUPPORT**

The Clerk or designate of the host municipality shall act as the Secretary to the Committee and provide support where required.

The Clerk shall establish administrative practices and procedures for the Committee and shall carry out any other duties required under this Act to implement the Committee's decisions.

10. **APPLICATION BY ELECTOR**

a. Financial Statements of Candidates

All candidates are required to file provincially prescribed financial statements with the Clerk detailing their election campaign financing activities.

An eligible elector who believes on reasonable grounds that a candidate has contravened a provision of the Act, as amended, relating to election campaign finances, may apply for a compliance audit of the candidate's election campaign finances, even if the candidate has not filed a financial statement.

The application must be made in writing to the Clerk and include the reasons for the elector's belief that the candidate has contravened the Act. The application must be made within 90 days after the latest of the following dates:

- i. The filing date;
- ii. The date the candidate filed a financial statement, if the statement was filed within 30 days after the applicable filing date;
- iii. The candidate's supplementary filing date, if any; or
- iv. The date on which the candidate's extension, if any, expires.

b. Registered Third Parties Financial Statements

All registered third parties are required to file provincially prescribed financial statements with the Clerk reflecting the registered third party's campaign finances in relation to third party advertisements.

An eligible elector who believes on reasonable grounds that a registered third party who is registered in relation to the election in the Municipality has contravened a provision of the Act, relating to campaign finances, may apply for a compliance audit of the campaign finances of the registered third party in relation to third party advertisements, even if the registered third party has not filed a financial statement.

The application must be made in writing to the Clerk and include the reasons for the elector's belief that the registered third party has contravened the Act. The application must be made within 90 days after the latest of the following dates:

- i. The filing date;
- ii. The date the registered third party filed a financial statement, if the statement was filed within thirty (30) days after the applicable filing date;
- iii. The supplementary filing date, if any, for the registered third party; or

- iv. The date on which the registered third party's extension, if any, expires.

11. ROLES AND RESPONSIBILITIES

Sections 88.33, 88.34, 88.35 and 88.36 of the Municipal Elections Act outlines the process for Compliance Audits.

a. Compliance Audit of Candidates' Election Campaign Finances

The Compliance Audit Committee will be required to:

- i. within thirty (30) days after the committee has received a compliance audit application, consider the application submitted by an elector and received by the Clerk and decide whether it should be granted or rejected;
- ii. give notice of its decision to grant or reject the application, and brief written reasons for the decision, to the candidate, the clerk with whom the candidate filed his or her nomination, the secretary of the local board, if applicable, and the applicant;
- iii. Appoint an auditor, if the compliance audit application is granted, to conduct a compliance audit of the candidate's election campaign finances;
- iv. within thirty (30) days after receiving the Auditor's Report, consider the report and, if the report concludes that the candidate appears to have contravened a provision of the Act relating to election campaign finances, the committee shall decide whether to commence a legal proceeding against the candidate for the apparent contravention; and
- v. give notice of the committee's decision, and brief written reasons for the decision, to the candidate, the clerk with whom the candidate filed his or her nomination, the secretary of the local board, if applicable, and the applicant.

b. Compliance Audit of Contributions to Candidates

The Compliance Audit Committee will be required to:

- i. within thirty (30) days after receiving the Clerk's Report that identifies each contributor to a candidate for office on Council who appears to have contravened contribution limits, consider the report and decide whether to commence a legal proceeding against the candidate for the apparent contravention; and
- ii. give notice of the committee's decision, and give brief written reasons for the decision, to the contributor and to the Clerk of the Municipality or secretary of the local board as the case may be.

c. Compliance Audit of Registered Third Parties' Campaign Finances

The Compliance Audit Committee will be required to:

- i. within thirty (30) days after the committee has received a compliance audit application, consider the application submitted by an elector and received by the Clerk and decide whether it should be granted or rejected;
 - iii. give notice of its decision to grant or reject the application, and brief written reasons for the decision, to the registered third party, the clerk with whom the registered third party is registered, the secretary of the local board, if applicable, and the applicant;
 - iv. Appoint an auditor, if the compliance audit application is granted, to conduct a compliance audit of the campaign finances of the registered third party in relation to third party advertisements that appear during an election in the Municipality;
 - v. within thirty (30) days after receiving the Auditor's Report, consider the report and, if the report concludes that the registered third party appears to have contravened a provision of the Act relating to campaign finances of the registered third party in relation to third party advertisements that appear during an election in the municipality, the committee shall decide whether to commence a legal proceeding against the candidate for the apparent contravention; and
 - vi. give notice of the committee's decision, and brief written reasons for the decision, to the candidate, the clerk with whom the candidate filed his or her nomination, the secretary of the local board, if applicable, and the applicant.
- d. Compliance Audit of Contributions to Registered Third Parties
The Compliance Audit Committee will be required to:
- i. within 30 days after receiving the Clerk's Report that identifies each contributor to the registered third party who appears to have contravened contributions limits, consider the report and decide whether to commence a legal proceeding against a contributor for an apparent contravention; and
 - ii. give notice of the committee's decision, and brief written reasons for the decision, to the contributor and to the Clerk of the Municipality.

12. **APPEAL**

The decision of the Compliance Audit Committee may be appealed to the Superior Court of Justice within 15 days after the decision is made and the Court may make any decision the Committee could have made.



Report to Council

REPORT NO.: HR-22-04
DATE: June 2, 2022
ATTACHMENT: HR Policy B-3.5 - Disconnecting from Work
SUBJECT: **BILL 27, WORKING FOR WORKERS ACT, 2021
 (DISCONNECTING FROM WORK)**

Recommendation:

THAT Report No. HR-22-04 entitled “Bill 27, Working for Workers Act, 2021 (Disconnecting from Work)” be received.

AND THAT HR Policy B-3.5 Disconnecting from Work is approved.

Background:

Part VII.0.1 of Bill 27, Working for Workers Act, 2021 which was passed on December 2, 2021 indicates that employers who employ more than 25 people on January 1st of any year, must have a written Policy in place for all employees with respect to “disconnecting from work”.

“Disconnecting from work” is defined as “not engaging in work-related communications, including emails, telephone calls, video calls or the sending or reviewing of other messages, so as to be free from the performance of work”.

To comply with this new legislation, an employer’s written policy must:

- Apply to all employees of the municipality who are covered by the *Employment Standards Act*
- Be “with respect to” disconnecting from work as defined
- Include the date the policy was prepared and the dates that any changes were made to the policy.

Of note as well from the Ministry Guidance

- The amendments do not create a new right to disconnect from work

- The *Employment Standards Act* does not specify that the policy provide a right for the employee to disconnect from work and be free from the obligation to engage in work-related communications beyond what is already set out under the ESA or other terms and conditions of employment.

The Ministry has provided two examples of what a “disconnecting from work” policy MAY address (but is not required to):

- Expectations of employees to read or reply to work-related emails or answer work-related calls after their shift is over
- Expectations on using out-of-office notifications and/or changing voicemail messages when employees are not scheduled to work

Comments/Analysis:

Staff have reviewed the various positions of employees, as well as their employment contracts.

The draft Policy attached, based on templates provided by Municipal Human Resources lawyers, Hicks Morley, meets the expectations of the Legislation and provides direction to employees on expectations surrounding “Disconnecting from Work” keeping in mind that the Legislation is not designed to create a new right to disconnect, only to provide a right for the employee to be free from the obligation to engage in work-related communications.

The draft Policy is largely the same as what was recently adopted by the Elgin County Council.

Financial Implications to Budget:

There are no new financial implications to enacting this Policy.

Submitted by:	Approved for Council by:
Gwen Tracey, CHRL Human Resources Manager & Emergency Services Assistant	Adam Betteridge, Chief Administrative Officer

Section:	Policy Number:
Subsection:	Effective Date: June 2, 2022
Subject:	Revision Date:
	Page 1 of 5

DISCONNECTING FROM WORK

Purpose:

The health and wellbeing of our employees is of the utmost importance to us, and we, the Township of Malahide (the “Township”) encourage and support our employees in prioritizing their own wellbeing.

Disconnecting from work is important for an individual’s wellbeing, and helps employees achieve a healthy and sustainable work-life balance.

To encourage and support our employees in balancing their working and personal lives, whether working traditional hours in the workplace, remotely or flexibly, we have implemented this Disconnecting from Work Policy (the “Policy”) to encourage employees to disconnect from work outside of their normal working hours in accordance with and subject to this Policy.

This Policy should be read alongside the Township’s associated policies, such as:

- B-3.3 Safety
- B-4.2 Respect in the Workplace
- B-4.3 Accommodating Special Needs
- C-1.1 Hours of Work
- C-1.4 Telework
- D-2.6 Vacations

and any relevant and applicable legislation, and any other policy that may become applicable and/or relevant.

Definitions:

Disconnecting from Work: to not engage in work-related communications, including emails, telephone calls, video calls or the sending or reviewing of other messages, so as to be free from the performance of work.

Normal Working Hours: are set out in each individual employee’s terms and conditions of employment. A normal work day varies by employee, position and/or department.

Due to the nature of their position, some employees are afforded flexibility in working hours and location, which may occasionally affect their normal work hours in a day. For example, an employee attends a personal appointment during their regular workday, but subsequently works past their normal end time to account for time spent

at the personal appointment. For the purposes of this policy, the employee's normal work day would be considered extended accordingly.

Scope:

This Policy applies to all employees, as defined by the *Ontario Employment Standard Act, 2000* ("ESA"), whether they are working remotely, in the workplace, flexibly or are mobile. For clarity, "employee" under this Policy means only those employees of the Township which are considered employees under the ESA.

Policy:

- 1.1 In the ordinary course of business there will be situations where it is necessary to contact colleagues outside of an employee's normal working hours, including but not limited to:
 - a) checking availability for scheduling;
 - b) to fill in on short notice for a colleague who is unavailable for work;
 - c) where unforeseeable circumstances may arise;
 - d) where an emergency may arise;
 - e) where employees voluntarily wish to communicate with one another for work-related purposes outside of their normal working hours; or
 - f) other business or operational reasons that require contact outside of an employee's normal working hours.

Employer Obligations:

- 1.2 The Township will take steps to ensure that all employees, regardless of their place of work are:
 - a) informed of what their normal working hours are reasonably expected to be and are informed of the circumstances in which they will be expected to engage in work-related communications outside their normal working hours;
 - b) able to take applicable meal, rest periods and hours free from work as required by law, contract and/or applicable collective agreement language;
 - c) able to take vacation or other leave entitlement as required by law, contract and/or applicable collective agreement language; and,
 - d) not contacted unnecessarily outside of normal working hours, including on Township provided devices.

Employee Obligations:

- 1.3 The Township expects all employees to comply with the following in the course of their work. Employees must:
 - a) Ensure that they manage their own working time and consider their obligation as an employee to meeting the Township's operations needs, while working, to take reasonable care to protect their health and safety and that of their colleagues;

- b) Co-operate fully with any appropriate and/or reasonable mechanism utilized by the Township to record working time or update their working status (i.e. out-of-office notifications, electronic calendars) including when working remotely, flexibly or when mobile;
- c) Be mindful of colleagues' working hours (ie. by not routinely emailing or calling outside of normal working hours or expecting answers or responses outside of normal working hours);
- d) Comply with the Township's overtime policy, including any requirements to obtain prior approval before performing overtime work; and,
- e) Notify their supervisor or manager, in writing, of any right or entitlement they were unable to exercise and the reasons why.

Ability to Disconnect from Work:

- 1.4 An employee's ability to disconnect from work depends on the Township's operation needs and the duties and obligations of the employee's position, subject to an employee's employment contract, applicable collective agreement and/or their minimum statutory entitlements under the ESA.
- 1.5 Nothing in the Policy precludes the Township or other employees of the Township from contacting colleagues outside of what may be considered normal working hours or standard business hours. Subject to any rights or entitlements of receiving colleague or employee may have under their employment contract, applicable collective agreement and/or their minimum statutory entitlements under the ESA.
- 1.6 This Policy does not afford employees a "right to disconnect" beyond what is within their individual employment contract, applicable collective agreement and/or their minimum statutory entitlements under the ESA, which may include rights or entitlements speaking to: normal hours of work and hours free from work, overtime pay, meal and/or rest periods, public holidays and public holiday pay, and vacation.
- 1.7 Nothing in this Policy is not intended to amend or supersede any grievance procedure or other aspect of any applicable collective agreement.

Communications:

- 1.8 Where possible, work-related communications should be checked or sent during normal working hours. Due to differing/non-standard work schedules within the Township, some employees may send communications at times which are inopportune for other employees, such as evenings or weekends. The sender should consider the timing of their communication for potential for disturbance and the recipient should understand expectations for response outside of their regular working hours.
- 1.9 If a director/manager/supervisor send email communications outside applicable normal working hours and it requires immediate or prompt response, the response expectations should be set out in the communication and the

employee should be contacted by telephone to be advised that there is email communications with an expectation for a response.

- 1.10 If an employee is not online or available during their normal working hours, it is expected that they will update their working status (i.e. out-of-office notifications, voice mailbox).

Meetings:

- 1.11 Where possible, meetings should be scheduled during the Township's standard hours of operation, or normal working hours if the attendees' have work schedules outside of the Township's standard hours of operation.
- 1.12 Those organizing meetings should be mindful of the time of those whom they are inviting to attend, and ensure that those invited will play an active role and have something to contribute to the matters being discussed.

Vacation:

- 1.13 All employees are expected to take their allotted vacation entitlements as set out in Township Policy D-2.6 Vacations, their applicable collective agreement or employment contract.
- 1.14 Employees taking vacation are expected to use all applicable tools to update their status and to ensure that impacted colleagues and ratepayers are informed of their status as off on vacation, including but not limited Out of Office notification for email and voicemail.

Exceptions:

- 1.15 Some employees, including Directors and Managers, are required to be on-call or participate in standby rotation in accordance with their terms of employment or their Collective Agreement. For the purposes of this policy an employee on-call or standby do not have the right to disconnect from work related to the reasons for being on-call.

Reporting Concerns:

- 1.16 All employees are expected and required to report any concerns or issues they may have which they feel is impacting their ability to disconnect from work.
- 1.17 Employees should report such concerns or issues, in writing, to their immediate supervisor. If that is not appropriate or the matter cannot be resolved by doing so, employees should direct their concerns or issues to the Human Resources Manager.

Posting, Notice and Retention:

- 1.18 The Township shall provide a copy of this Policy to each employee within 30 calendar days of implementation. Should any changes be made to the Policy

after its implementation, the Township shall provide each employee a copy of the revised Policy within 30 days of the changes being made.

- 1.19 The Township shall provide a copy of this Policy to all new employees upon onboarding and within 30 calendar days of the employee commencing employment with the Township.
- 1.20 The Township shall retain a copy of this and any revised versions of this Policy for three years after it ceases to be in effect.

SPRINGFIELD FAMILY FUN DAY 2022

17th May 2022

TO: Malahide Council

From: Springfield Family Fun Day Committee

Our annual Fun Day has been set for Saturday, June 18th, 2022 at the Springfield Community Hall and baseball grounds. We will be having a breakfast, hosted by the South Dorchester Optimist. There will be other various children's events along with displays from various vendors and service clubs and a market around the walking path.

The Committee members this year are:

Kelly Pearson; Max Moore; Janice McCallum; Mary Robinson; Tammy Ross; Louise Myers; Chris Cox; Angela Rochus, Michelle Newton, Ashley Fentie and Rosemary Kennedy

We trust this is the information you require. Should you have any questions or concerns, please do not hesitate to give us a call. Also, any participation in our Fun Day events would be greatly appreciated.

Thanks

Rosey

Rosemary Kennedy



May 27, 2022

Dear Township of Malahide Council,

The COVID19 pandemic and the impacts of illness from COVID19 has been devastating across the world. Continued vaccination efforts, especially in communities that face barriers such as transportation to mass immunization sites, are increasingly important to ensure cases of COVID19 are minimized.

Southwestern Public Health (SWPH) and The Ministry of Health's Govaxx team are prepared to bring a team of vaccination professionals to The Malahide Community Place on Friday, June 10th, as well as potential dates into the summer and fall months of 2022 as needed and only if the space is available – to service the residents of Springfield and surrounding communities. A large, accessible, and familiar location for local residents is preferred when planning and preparing for vaccination clinics.

SWPH is requesting a waiver of fees for the rental of the Malahide Community Place to operate COVID-19 vaccination clinics. SWPH staff will work with Township staff to ensure that all other details of the rental requirements are met.

SWPH appreciates the Township of Malahide Council's time and consideration of this request. We will look forward to your response as we continue to plan this outreach.
Sincerely,

Susan MacIsaac
Director, Vaccine Branch
Southwestern Public Health

THE CORPORATION OF THE TOWNSHIP OF MALAHIDE**BY-LAW NO. 22-38**

Being a By-law to adopt, confirm and ratify matters dealt with by resolution of the Township of Malahide.

WHEREAS Section 5(3) of the Municipal Act, 2001, c. 25, as amended, provides that the powers of every council are to be exercised by by-law;

AND WHEREAS in many cases, action which is taken or authorized to be taken by the Township of Malahide does not lend itself to the passage of an individual by-law;

AND WHEREAS it is deemed expedient that the proceedings of the Council of the Township of Malahide at this meeting be confirmed and adopted by by-law;

NOW THEREFORE the Council of The Corporation of the Township of Malahide **HEREBY ENACTS AS FOLLOWS:**

1. THAT the actions of the Council of the Township of Malahide, at its regular meeting held on June 2, 2022, in respect of each motion, resolution and other action taken by the Council of the Township of Malahide at such meeting is, except where the prior approval of the Ontario Municipal Board or other authority is required by law, is hereby adopted, ratified and confirmed as if all such proceedings were expressly embodied in this By-law.
2. THAT the Mayor and the appropriate officials of the Township of Malahide are hereby authorized and directed to do all things necessary to give effect to the action of the Council of the Township of Malahide referred to in the proceeding section.
3. THAT the Mayor and the Clerk are hereby authorized and directed to execute all documents necessary in that behalf and to affix thereto the corporate seal of the Township of Malahide.
4. THAT this By-law shall come into force and take effect upon the final passing thereof.

READ a **FIRST** and **SECOND** time this 2nd day of June, 2022.

READ a **THIRD** time and **FINALLY PASSED** this 2nd day of June, 2022.

Mayor, D. Mennill

Clerk, A. Adams