THE CORPORATION OF THE TOWNSHIP OF NORTH GLENGARRY

Regular Meeting of Council

Agenda

Monday, January 9, 2023, 6:00 p.m.
Council Chamber
3720 County Road 34
Alexandria, On. K0C 1A0

THE MEETING WILL OPEN WITH THE CANADIAN NATIONAL ANTHEM

1. CALL TO ORDER

2. DECLARATIONS OF PECUNIARY INTEREST

3. ACCEPT THE AGENDA (Additions/Deletions)

4. ADOPTION OF PREVIOUS MINUTES

   a. Regular Meeting of Council - December 12, 2022

5. DELEGATION(S)

6. STAFF REPORTS

   a. Community Services Department

      1. Meet Me on Main Street and Summer Experience Funding

      2. Confirmation of North Glengarry member for the SDG Accessibility Committee

   b. Treasury Department

      1. Temporary Borrowing By-law 01-2023

      2. Borrowing Bylaw for 2 tandem trucks

      3. Revision of Reserve and Reserve Funds Policy

   c. Planning/Building & By-law Enforcement Department

      1. BY-LAW No. 03-2023 Exemption from Part Lot Control

   d. Public Works Department

      1. Responsible Road Infrastructure for information purposes

7. UNFINISHED BUSINESS

8. CONSENT AGENDA

9. NEW BUSINESS

10. NOTICE OF MOTION

Next Regular Public Meeting of Council

Monday January 30th, 2023 at 6:00 p.m. in the Council Chamber at 3720 County Rd 34 Alexandria, Ontario.

Note: Meeting are subject to change or cancellation.

11. QUESTION PERIOD

(limit of one question per person and subsequent question will be at the discretion of the Mayor/Chair).

12. CLOSED SESSION BUSINESS

Identifiable individual (as this matter deals with personal matters about an identifiable individual, including municipal or local board employees they may be discussed in closed session under sections 239 (2)(b) of the Ontario Municipal Act);

And adopt the minutes of the Municipal Council Closed Session meeting of November 28, 2022.

13. CONFIRMING BY-LAW

a. By-law 04-2023

14. ADJOURN

THE CORPORATION OF THE TOWNSHIP OF NORTH GLENGARRY

Regular Meeting of Council

Monday, December 12, 2022, 7:00 p.m.
Council Chamber
3720 County Road 34
Alexandria, On. K0C 1A0

PRESENT: Mayor: Jamie MacDonald
Deputy Mayor: Carma Williams
Councillor: Jacques Massie
Councillor: Jeff Manley
Councillor: Michael Madden
Councillor: Brian Caddell
Councillor: Gary Martin

ALSO PRESENT: CAO/Clerk: Sarah Huskinson
Deputy Clerk: Jena Doonan
Director of Community Services: Anne Leduc
Treasurer & Director of Finance: Kimberley Goyette
Director of Public Works: Timothy Wright
Administrative Assistant -Planning: Chantal Lapierre

1. CALL TO ORDER

2. DECLARATIONS OF PECUNIARY INTEREST

3. ACCEPT THE AGENDA (Additions/Deletions)

Resolution No. 1

Moved by: Carma Williams
Seconded by: Jacques Massie

That the Council of the Township of North Glengarry accepts the agenda of the Regular Meeting of Council on Monday December 12, 2022.

Carried

4. ADOPTION OF PREVIOUS MINUTES

Resolution No. 2

Moved by: Jacques Massie
Seconded by: Brian Caddell

That the minutes of the following meeting be adopted as circulated.

Regular Meeting of Council - November 28, 2022

Carried

5. DELEGATION(S)

a. Regional Waste Management- Roadmap to Collaboration - Ben De-Haan

Ben De-Haan from Stormont-Dundas-Glengarry Counties presented the Regional Waste Management: Roadmap to Collaboration Executive Summary and Action Plan to Council.

6. STAFF REPORTS

a. Administrative Department

1. 2022 Election Report

Resolution No. 3

Moved by: Michael Madden
Seconded by: Jacques Massie

THAT Council for the Township of North Glengarry receives Staff Report No. AD-2022-20 re: 2022 Election for information purposes.

Carried

2. Amendment to the Procedural By-law

Resolution No. 4

Moved by: Brian Caddell
Seconded by: Michael Madden

THAT the Council of the Township of North Glengarry receives Staff Report No. AD-2022-21;

And THAT Council adopt by-law 45-2022, being a by-law to govern and regulate the proceedings of the Municipal Council, the conduct of its members, and the calling of meetings for the Township of North Glengarry;

AND THAT by-law 45-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

b. Community Services Department

1. 2023 Community Grants

Resolution No. 5

Moved by: Jeff Manley
Seconded by: Carma Williams

THAT Council receives the Staff Report No. CS-2022-25; and

THAT Council approves the following grants conditional to the approval of the Community Grant Program funding in the 2023 municipal budget.

Name of Organization 2023	Amount Approved	In Kind Approved	Total
Ameteor	3,500.00		3,500.00
Centre Lochiel Centre	3,500.00		3,500.00
Dalkeith Historical Society	1,500.00	1,940.00	3,440.00
Glengarry Artists Collective	3,360.00		3,360.00
Kenyon Agricultural Society	3,500.00		3,500.00
Maxville Chamber	2,500.00		2,500.00
TOTAL	**$17,860.00**	**$1,940.00**	**$19,800.00**

Carried

2. CIP Application for 34 Centre Street in Alexandria ON

Resolution No. 6

Moved by: Michael Madden
Seconded by: Gary Martin

THAT Council approves the following for the Community Improvement Plan Project at 34 Centre Street, Alexandria, Ontario, as submitted by the property owners Milo Smith and Yvonne Callaway.

- Program B – Building Improvement Grant representing a matching grant of 50% up to a maximum of $7,500.00 for two facades visible from the street;
- Program C – Civic Address Grant representing one civic sign provided by the municipality as part of its civic sign program;
- Program D – Landscaping Grant Program – representing a grant of 50% up to a maximum of $2,000.00 to assist in improving the landscaping between the private property and the municipal infrastructure;
- Program E – Building Permit Grant representing a grant equal to 100% of the eligible building permit fees to a maximum of $200.00;
- Program G – Municipal Loan Program of $10,000.00.

Total Grants: $9,700.00

Total Loan: $10,000.00

Carried

c. Treasury Department

1. Tile Drainage Loan Application

Resolution No. 7

Moved by: Jeff Manley
Seconded by: Michael Madden

THAT Council of the Township of North Glengarry approves the application for a tile drainage loan for roll number 0111 011 01352000.0000 in the estimated amount of $50,000.

Carried

2. 2022 Transfers to and from Reserves

Resolution No. 8

Moved by: Carma Williams
Seconded by: Jacques Massie

THAT Council of the Township of North Glengarry approve the following transfers to and from reserves:

Transfer from North Glengarry General Fund $ 55,000

Transfer from RARE Reserve$ 12,000

Transfer from Elections Reserve$ 32,500

Transfer from Economic Development Reserve$ 5,000

Transfer from Fire Department Reserve$ 47,000

Transfer from Modernization and Efficiency Fund$ 232,500

Transfer from Infrastructure Reserve$ 300,000

Transfer from GSP Slab Reserve$ 250,000

Transfer from Social Services Relief Fund$ 20,400

Transfer from Safe Restart Reserve$ 22,000

Transfer to Planning Reserve (OP)$ 5,000

Transfer to Canada Community Building Fund $ 210,000

Transfer to Major Capital Reserve (New)$1,000,000

Transfer to Waste Disposal Site Reserve$ 38,000

Transfer to Cash in Lieu of Parkland Reserve$ 14,000

Transfer to North Glengarry Water Reserve$ 250,000

Transfer to North Glengarry Wastewater Reserve$ 100,000

Carried

d. Planning/Building & By-law Enforcement Department

1. Zoning By-law Amendment No. Z-17-2022

Resolution No. 9

Moved by: Jacques Massie
Seconded by: Brian Caddell

THAT the Council of the Township of North Glengarry adopt Zoning By-Law No. Z-17-2022; and

THAT by-law Z-17-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

2. Zoning By-law Amendment No. Z-18-2022

Resolution No. 10

Moved by: Brian Caddell
Seconded by: Jeff Manley

THAT the Council of the Township of North Glengarry adopt Zoning By-Law No. Z-18-2022; and

THAT by-law Z-18-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

3. Zoning By-law Amendment No. Z-19-2022

Resolution No. 11

Moved by: Jeff Manley
Seconded by: Michael Madden

THAT the Council of the Township of North Glengarry adopt Zoning By-Law No. Z-19-2022; and

THAT by-law Z-19-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

4. Zoning By-law Amendment No. Z-20-2022

Resolution No. 12

Moved by: Michael Madden
Seconded by: Gary Martin

THAT the Council of the Township of North Glengarry adopt Zoning By-Law No. Z-20-2022; and

THAT by-law Z-20-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

e. Public Works Department

1. Annual Quality Management System (QMS) Summary

Resolution No. 13

Moved by: Gary Martin
Seconded by: Carma Williams

THAT Council of the Township of North Glengarry receives Staff Report No. PW 2022-27;

AND THAT Council receives By-law 44-2022 being a by-law to endorse the updated operational plan under the Township's drinking water quality management system;

AND THAT By-law 44-2022 be read a first, second and third time and enacted in Open Council this 12th day of December 2022.

Carried

7. UNFINISHED BUSINESS

8. CONSENT AGENDA

9. NEW BUSINESS

10. NOTICE OF MOTION

11. QUESTION PERIOD

12. CLOSED SESSION BUSINESS

13. CONFIRMING BY-LAW

a. By- law 46-2022

Resolution No. 14

Moved by: Jeff Manley
Seconded by: Michael Madden

That the Township of North Glengarry receive By-law 46-2022; and

That Council adopt by-law 46-2022 being a by-law to adopt, confirm and ratify matters dealt with by Resolution and that by-law 46-2022 be read a first, second, third time and enacted in Open Council this 12th day of December 2022.

Carried

14. ADJOURN

Resolution No. 15

Moved by: Jacques Massie
Seconded by: Brian Caddell

There being no further business to discuss, the meeting was adjourned at 8:13 pm.

Carried

CAO/Clerk/Deputy Clerk

Mayor/Deputy Mayor

STAFF REPORT TO COUNCIL **Report No: CS-2023-01**

January 9, 2023

From: Anne Leduc

RE: Meet Me on Main Street and Summer Experience Funding

Recommended Motion:

THAT Council receives Staff Report CS-2023-01; and

THAT Council receives information regarding the proposed Meet Me on Main Street Program; and

THAT Council directs staff to apply for funding to staff one student position through the Government of Ontario's Summer Experience Program.

Background / Analysis:

For several years now the Township has celebrated businesses and community leaders through the Business & Community Awards Gala. This has been a very successful program celebrating over 110 businesses, community organizations and leaders in North Glengarry since 2008. Council usually allocates $12,500 to GL 1-4-1900-8004 – Special Events to support the Gala.

Over the last few years, it has become increasingly difficult to obtain nominations for the awards and attendance at the event was declining, even prior to COVID-19. Over the last 5 iterations of the Gala, numbers have reduced from 180 to 120.

As part of the upcoming 2023 Budget deliberations, staff will be requesting that these funds be used for a new project named Meet Me on Main Street. Staff expects that this type of project would have a greater reach across the selected villages/hamlets but also the neighbouring communities/Townships (possibly attracting individuals from the Quebec side).

Ms. Natalie Charette, the Township's Economic Development and Communications Officer, spoke with staff at the North Dundas Township which has been hosting this event for 5 years. A document containing the description of the event, as well as some financial numbers is attached to this report. One of the important points to note is that set-up at each event is for 300 people and at some events it was standing room only with the overflow of people sitting in a park or green space.

Using North Dundas as inspiration, staff would suggest starting with three locations in 2023 and, if successful, expand the events to additional locations over the following years.

Based on a quick calculation, the three events could potentially reach 900 people and bring individuals from outside North Glengarry to our Main Streets.

In order to support this activity, staff proposes to hire a student through the Government of Ontario's Summer Experience Program.

The Summer Experience Program funds a maximum or $3,812 for each student hired under certain criteria:

- All students must be currently enrolled in a secondary, or post-secondary institution or within six months of graduation and have reached the age of 15 upon commencement of employment.
- Students must be employed full time for a minimum employment contract length of 232 hours or 32 days at 7.25 hours per day.

This following table breaks down the wage calculation:

Wage calculation for a Summer Employment Program Student:

Hourly Rate		Hours per day		Salary		Vac/Stat Holiday/ Benefits @ 6%		Total (Salary + Vac/Stat Holiday/ Benefits)		Number of Days Worked		Total Salary (Rounded)
$15.50	x	**7.25**	=	**$112.38**	+	**$6.74**	=	**$119.12**	x	**32**	=	**$3,812.00**

As mentioned, staff suggests organizing three events the first year, probably hosting one every two weeks on July 19th August 2nd and 16th (or thereabouts). The student could start work as of Wednesday, July 5th and complete their work as of August 17th, giving the student some time off prior to returning to school.

This position would be fully funded through the program with minimal expenses incurred by the Township.

In order to qualify for funding, the project must fall under one of three categories: Tourism, Culture or Sports & Recreation. Meet Me on Main Street would qualify under Tourism - Supports and facilitates the development of new experiences and destinations.

Applications must be submitted online through Transfer Payment Ontario (TPON) no later than 5:00 PM EST on Wednesday, January 18th, 2023.

Given the short turnaround time to apply for the funding, staff requires direction from Council regarding the Meet Me on Main Street Program. If Council wishes to move forward with this program, staff will bring a more detailed report at a future meeting.

Alternatives:

Option 1 – Recommended – That Council approves this resolution

Or

Option 2 – Not recommended – That Council does not approve this resolution

Financial Implications:

If Council elects to move forward with the My Main Street Program, funding in the amount of $12,500.00 in GL 1-4-1900-8004 would be used for this project in 2023 instead of the Business and Community Awards Gala.

The Summer Experience Program funds a maximum of $3,812 per position which should cover the totality of the salary for the proposed hire period.

Attachments & Relevant Legislation:

Attached - Meet Me on Main Street in North Dundas

Others Consulted:

Kimberley Goyette – Director of Finance
Natalie Charette – Economic Development & Communications Coordinator

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Reviewed and approved by:
Sarah Huskinson, CAO/Clerk

Meet Me on Main Street in North Dundas

This information pertains to the Meet Me on Main Street program that is organized by the Township of North Dundas.

Meet Me on Main Street is hosted in different North Dundas hamlets on their main streets between 5 pm and 8 pm during the summer. Attendees can purchase local foods and purchase tokens for a selection of beverages, accompanied by a variety of live music and entertainment shows.

Initially the project started with 4 locations but in 2022 was expanded to 6 locations: Winchester, Chesterville, Moorewood, Marionville, Hallville and South Mountain.

The program in North Dundas is structured as follows:

- Committee led – the Recreation Program Coordinator sits on it with the CAO, Mayor, and Director of Recreation.
- Rain or shine event
    - Rain locations are the arenas and community centres in each community.
- Collaboration with the counties for the road closures.
- The event starts at 5 pm ends at 8pm and with the road reopened between 9 pm and 9:30 pm.
- Liquor licensing
    - Two breweries, one distillery and one winery at each event.
    - Tokens are available to purchase at the entrance and at the end of the night the North Dundas Recreation Program Coordinator would retrieve the tokens from each vendor and calculate the payout for each vendor
    - Staff and council help sell tokens for alcoholic beverages.

    - 3,000 tokens ordered which have the North Dundas Township logo on them (one-time cost to purchase and will be reused in the future). The Township used “raffle-type tickets” before, but it created an issue with people using their own.
- Perimeters are set up with barricades and proper signage, including proper detour signage and a student is located at the barricade to direct drivers to the bypass.
    - Road is closed at 2 pm to start set up.
    - Set up is for 300 people (overflow uses park and/or green space).
    - Requires 6-8 recreation staff.
- Food vendors are charged $50 each to sell their food on site and the locations are offered to the local restaurants first, then offered to those outside of the community.
    - Live bands play from 5 pm to 8 pm and a flatbed is used as a stage.
- North Dundas chose to keep the event simple so only food and beverage venders were invited. Attendees are encouraged to talk to neighbours, members of council and staff.
- Tear down is done by one full-time staff and two students plus the Recreation Program Coordinator who is required to stay on site for the entirety of the event due to the liquor license.
- Recommendations from North Dundas staff include setting up at an arena parking lot or park for the first event to gage intake and interest prior to moving to road closures.
- Budget for this years’ event was $18,000 (rough calculation of $3,000 per event).

STAFF REPORT TO COUNCIL **Report No: CS-2023-02**

January 9, 2023

From: Anne Leduc – Director of Community Services

RE: Confirmation of North Glengarry member for the SDG Accessibility Committee

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Recommended Motion:

THAT Council of the Township of North Glengarry receives Staff Report No. CS-2023-02; and

THAT Council of the Township of North Glengarry authorizes staff to advise the United Counties of Stormont, Dundas and Glengarry that Mr. R. Tyo from Apple Hill will serve as the Township of North Glengarry's representative on the SDG Accessibility Committee.

Background / Analysis:

The purpose of the *Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, c. 11* (ODA) is to improve opportunities for people with disabilities and to provide for their involvement in the identification, removal, and prevention of barriers to allow their full participation in life.

To this end, the ODA mandates that each municipality prepares an accessibility plan. The plan and updates outline the history of initiatives to:

- identify, remove, and prevent barriers;
- operational and decision making reviews;
- completed initiatives and the targets; and
- actions to be taken by the municipality.

The municipality must report its progress bi-annually with the next reporting date no later than December 31, 2023.

The SDG Accessibility Advisory Committee consists of one representative from each of the lower tier municipalities within Stormont, Dundas and Glengarry, with the majority of the Committee experiencing some form of disability. Renewal of the Committee members occurs after each municipal election.

Mr. Tyo has been the Township of North Glengarry's representative for many years and has familiarity with both the Township and the SDG's overarching Accessibility Plans.

Alternatives:

Option 1 – Recommended – That Council authorizes staff to advise the United Counties of Stormont, Dundas and Glengarry that Mr. R. Tyo from Apple Hill will serve as the Township of North Glengarry's representative on the SDG Accessibility Committee.

Or

Option 2 – Not recommended – That Council directs staff to propose another individual as North Glengarry's representative on the SDG Accessibility Committee.

Financial Implications:

Accessibility improvements are funded through the Township's Operating Budget GL 1-4-1200-6450. This year the proposed 2023 Operating Budget contains $20,000 for targeted repairs or renovations that improve accessibility in its facilities.

Notwithstanding the $20,000 in targeted accessibility funding, the Township's staff uses every opportunity available to incorporate improvements for accessibility whenever they undertake renovations, repairs, or construction projects. Accessibility improvements far surpass $20,000 in value as the costs for these additional improvements are absorbed under each project's budget.

Attachments & Relevant Legislation:

Relevant Legislation - *Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, c. 11* - https://www.ontario.ca/laws/statute/05a11

Others Consulted:

Kimberley Goyette – Director of Finance

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Reviewed and approved by:
Sarah Huskinson, CAO/Clerk

STAFF REPORT TO COUNCIL **Report No: TR-2023-01**

December 20, 2022

From: Kimberley Goyette – Director of Finance/Treasurer

RE: Temporary Borrowing By-law 01-2023

Recommended Motion:

THAT By-law 01-2023 being a by-law to authorize temporary borrowing from time to time during the fiscal year ending December 31, 2023, be read a first, second and third time and adopted in open Council this 9th day of January, 2023.

Background / Analysis:

Section 407 of the *Municipal Act* provides authority for a Council to authorize temporary borrowing until such time that taxes are collect, and other revenues are received, to meet the current expenditures of the Municipality.

Alternatives:

Recommended: Council adopts Bylaw 01-2023.
Not Recommended: Council does not adopt Bylaw 01-2023.

Financial Implications:

This Bylaw provides for temporary borrowing by the Municipality, if required during the 2023 fiscal year up to the amount of $2,000,000.

Attachments & Relevant Legislation:

The *Municipal Act, 2001, S.O. 2001,* c. 25, section 407
Ontario Municipal Corporations Temporary Borrowing Bylaw

Others Consulted: N/A

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Reviewed and approved by:
Sarah Huskinson, CAO/Clerk

E-FORM 348 (04/2009)

ONTARIO
MUNICIPAL CORPORATIONS
TEMPORARY BORROWING BY-LAW 01-2023

(FOR BANK USE ONLY)
S.R.F. No.: 603-609-538

The **Corporation of the Township of Glengarry** (the "Municipality") By-law No. \ being a by-law to authorize temporary borrowing from time to time to meet current expenditures during the fiscal year ending December 31, 2023.

WHEREAS Section 407 of the *Municipal Act, 2001*, as amended, provides authority for a council by by-law to authorize the head of council or the treasurer or both of them to borrow from time to time, such sums as the council considers necessary to meet, until taxes are collected and other revenues are received, the current expenditures of the Municipality for the year; and

WHEREAS the total amount which may be borrowed from all sources at any one time to meet the current expenditures of the Municipality, except with the approval of the Municipal Board, is limited by Section 407 of the *Municipal Act, 2001*;

NOW THEREFORE THE COUNCIL OF **The Corporation of the Township of North Glengarry** ENACTS AS FOLLOWS:

1. The head of council or the treasurer or both of them are hereby authorized to borrow from time to time during the fiscal year (hereinafter referred to as the current year) such sums as may be necessary to meet, until taxes are collected and other revenues are received, the current expenditures of the Municipality for the current year.

2. The lender(s) from whom amounts may be borrowed under authority of this by-law shall be **Royal Bank of Canada** and such other lender(s) as may be determined from time to time by by-law of council.

3. The total amount which may be borrowed at any one time under this by-law plus any outstanding amounts of principal borrowed and accrued interest under Section 407 together with the total of any similar borrowings that have not been repaid, shall not exceed from January 1st to September 30th of the current year, 50 percent of the total estimated revenues of the Municipality as set out in the budget adopted for the current year, and from October 1st to December 31st of the current year, 25 percent of the total of the estimated revenues of the Municipality as set out in the budget adopted for the current year or $ 2,000,000.00 whichever is less.

4. The treasurer shall, at the time when any amount is borrowed under this by-law, ensure that the lender is or has beenfurnished with a certified copy of this by-law, (a certified copy of the resolution mentioned in section 2 determining the lender,) if applicable, and a statement showing the nature and amount of the estimated revenues for the current year and also showing the total of any other amounts borrowed from any and all sources under authority of section 407 of the *Municipal Act* that have not been repaid.

5. a) If the budget for the current year has not been adopted at the time an amount is borrowed under this by-law, the statement furnished under section 4 shall show the nature and amount of the estimated revenues of the Municipality as set forth in the budget adopted for the previous year and the nature and amount of the revenues received for and on account of the current year.

   b) If the budget for the current year has not been adopted at the time an amount is borrowed under this by-law, the limitation on borrowing set out in section 3 shall be calculated for the time being upon the estimated revenues of the Municipality as set forth in the budget adopted for the previous year less all revenues received for and on account of the current year.

6. For purposes of this by-law the estimated revenues referred to in section 3, 4, and 5 do not include revenues derivable or derived from, a) any borrowing, including through any issue of debentures; b) a surplus, including arrears of taxes, fees or charges; or c) a transfer from the capital fund, reserve funds or reserves.

7. The treasurer be and is hereby authorized and directed to apply in payment of all or, any sums borrowed under this by- law, together with interest thereon, all or any of the moneys hereafter collected or'received, either on account of or realized in respect of the taxes levied for,the current year and previous years or from any other source, that may be lawfully applied for such purpose.

8. Evidences of indebtedness in respect of borrowings made under section 1 shall be signed by the head of the council or conform to the treasurer or both of them.

9. The Bank shall not be responsible for establishing the necessity of temporary borrowing under this by-law or the manner in which the borrowing is used.

10. This by-law shall take effect on the final day of passing.

Enacted and passed this **9th** day of **January, 2023.**

Head of Council _____ Clerk _____

STAFF REPORT TO COUNCIL **Report No: TR2023-02**

December 21, 2022

From: Kimberley Goyette – Director of Finance/Treasurer

RE: Borrowing Bylaw for 2 tandem trucks

Recommended Motion:

THAT Bylaw 02-2023, being a bylaw to authorize the borrowing of funds for financing capital (two tandem trucks), be read a first, second and third time and adopted in open Council.

Background / Analysis:

During the 2022 budget, Council approved the purchase of two tandem trucks for the North Glengarry Public Works Department in the upset amount of $680,000, financed by long term debt.

The successful bidder of the tender came in with a bid of $639,208.75 plus HST. The Township needs to borrow $638,000 to finance these capital items. The remaining small balance will be absorbed in the operating budget.

The Royal Bank of Canada was contacted rather than Infrastructure Ontario to arrange financing as they could accommodate cash flow as soon as the truck came in with no administrative and legal costs associated.

The loan is amortized over a 15 year period with an interest term of 5 years at an interest rate not to exceed 5%. The short term is recommended in the hopes that interest rates will be much lower upon renewal. Currently the interest rate is 4.92% but is subject to change prior to the reading of the bylaw. Council will be provided the actual rate at the time of passing the bylaw.

The attached Bylaw 02-2023 authorizes such borrowing.

Alternatives:

N/A

Financial Implications:

At an interest rate of 4.92%, annual loan payments will be $60,224. This amount has been included in the 2023 budget.

Attachments & Relevant Legislation:

Section 401(1) of the *Municipal Act, 2001, c.25* provides authority for a municipal to incur debt for the purposes of the municipality, whether through borrowing or in any other manner.

Bylaw 02-2023 is attached.

Others Consulted:
Royal Bank of Canada

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Reviewed and approved by:
Sarah Huskinson, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF NORTH GLENGARRY

BYLAW NO. 02-2023

BEING A Bylaw of the Corporation of the Township of North Glengarry to authorize the financing of capital (two tandem trucks).

WHEREAS the *Municipal Act, 2001, c. 25,* Section 401(1) authorizes that a municipality may incur debt for the purposes of the municipality, whether by borrowing money or in any other way;

AND WHEREAS the Council of the Township of North Glengarry authorized the purchase of two tandem trucks in their 2022 capital budget;

AND WHEREAS the Council of the Township of North Glengarry has authorized that financing be obtained to purchase the tandem trucks for the North Glengarry Public Works Department;

THEREFORE the Council of the Corporation of the Township of North Glengarry enacts as follows:

1) That the financing of the capital project be financed for two A2023 Western Star 4700SF tandem trucks with the Royal Bank of Canada. The interest rate for this loan is estimated at 4.92% for a five (5) year interest term amortized over fifteen (15) years.
2) That the Mayor and Director of finance/Treasurer be authorized to sign all documentation to complete this transaction.

READ a first, second and third time and passed in Open Council this 9th day of January, 2023.

_____ _____

CAO/Clerk, Sarah Huskinson Mayor, Jamie MacDonald

I hereby certify that the foregoing is a true copy of By-Law No. 02-2023, duly adopted by the Council of the Township of North Glengarry, on the 9th day of January, 2023.

_____ _____

Deputy Clerk Date Certified

STAFF REPORT TO COUNCIL **Report No: TR-2023-03**

December 21, 2022

From: Kimberley Goyette - Director of Finance/Treasurer

RE: Revision of Reserve and Reserve Funds Policy

Recommended Motion:

THAT Council of the Township of North Glengarry approves the Reserve and Reserve Funds Policy revised December 19, 2022.

Background / Analysis:

On a regular basis, policies need to be reviewed and updated accordingly. Some new capital and specific purpose reserves have been added and therefore need to be updated in the policy. The creation of some of these reserves are from unspent capital which have been finance by taxes and simply not used in that year. By placing them in reserves, they can be transferred the following year to finance the capital without additional tax dollars being required.

The format of the reserve list has also been changed to provide clarity on which ones are Working /Fiscal Reserves, which are discretionary reserves and which ones are obligatory reserves. Attached to the policy is this listing.

This is basically a housekeeping item.

Alternatives:

N/A

Financial Implications:

The changes to the policy now matches the actual reserves that the Township has.

Attachments & Relevant Legislation:

Reserve and Reserve Fund Balances

Others Consulted:

N/A

_____

Reviewed and Approved by:
Sarah Huskinson, CAO/Clerk

Township of North Glengarry
Reserve and Reserve Fund Balance
Proposed 2023

Reserve Name	2021 Ending Balance	2022 Ending Balance	2023 Transfers In	2023 Transfers Out	2023 Tentative Ending
Working or Fiscal Reserves					
CEMC Contingency Fund	(43,500.00)	(43,500.00)			(43,500.00)
Elections Reserve	(62,500.00)	(30,000.00)	(7,500.00)		(37,500.00)
North Glengarry General Fund	(652,254.63)	(597,254.63)			(597,254.63)
Planning Reserve (OP)	(55,000.00)	(60,000.00)	(5,000.00)		(65,000.00)
Recreation Working Fund	(77,661.00)	(77,661.00)			(77,661.00)
WSIB Insurance	(54,442.57)	(54,442.57)			(54,442.57)
Total Working/Fiscal Reserves	**(945,358.20)**	**(862,858.20)**	**(12,500.00)**	**-**	**(875,358.20)**
DISCRETIONARY RESERVES					
Capital Reserves					
Economic Development	(23,000.00)	(18,000.00)			(18,000.00)
Facilities Reserve	(163,851.21)	(163,851.21)		60,000.00	(103,851.21)
Fleet	(160,000.00)	(160,000.00)		119,800.00	(40,200.00)
Fire Department	(86,560.47)	(39,560.47)			(39,560.47)
Major Capital - NEW	-	(1,000,000.00)			(1,000,000.00)
General Capital	(103,316.33)	(103,316.33)			(103,316.33)
Infrastructure Reserve	(656,010.26)	(356,010.26)		300,000.00	(56,010.26)
Maxville Sports Complex	(54,950.00)	(54,950.00)			(54,950.00)
RARE	(387,531.47)	(375,531.47)		30,000.00	(345,531.47)
Soccer Dome	(5,345.00)	(5,345.00)			(5,345.00)
Waste disposal site	(1,018,394.15)	(1,056,394.15)	(50,000.00)	100,000.00	(1,006,394.15)
Total Capital Funds	**(2,658,958.89)**	**(3,332,958.89)**	**(50,000.00)**	**609,800.00**	**(2,773,158.89)**
Specific Purpose					
Dalkeith Library	(5,633.00)	(5,633.00)			(5,633.00)
GSP Slab Reserve	(250,000.00)	-			-
Maxville Soccer Lights Reserves	(20,000.00)	(20,000.00)		20,000.00	-
Social Services Relief Fund	(20,400.00)	-			-
Safe Restart Reserve	(22,000.00)	-			-
Skateboard Park	(25,000.00)	(25,000.00)			(25,000.00)
Total Specific Purpose	**(343,033.00)**	**(50,633.00)**	**-**	**20,000.00**	**(30,633.00)**
Water/Wastewater					
Water Meters	(44,360.01)	(44,360.01)			(44,360.01)
North Glengarry Water	(691,795.92)	(941,795.92)	(89,730.00)		(1,031,525.92)
North Glengarry Sewer	(1,622,331.35)	(1,722,331.35)		5,803.00	(1,716,528.35)
Total Water/Wastewater	**(2,358,487.28)**	**(2,708,487.28)**	**(89,730.00)**	**5,803.00**	**(2,792,414.28)**
OBLIGATORY RESERVES					
Cash in Lieu of Parkland	(60,819.04)	(74,819.04)			(74,819.04)
Canada Community Building Fund Reserve (formerly Federal Gas Tax)	(131,013.33)	(341,013.33)		320,000.00	(21,013.33)
Total Obligatory Reserves	**(191,832.37)**	**(415,832.37)**	**-**	**320,000.00**	**(95,832.37)**
Total Reserve and Reserve Funds	**(6,497,669.74)**	**(7,370,769.74)**	**(152,230.00)**	**955,603.00**	**(6,567,396.74)**

NORTH GLENGARRY NORD

Ontario's Celtic Heartland
Le centre celtique de l'Ontario

RESERVES AND RESERVE FUNDS POLICY

BACKGROUND

The Township maintains reserves and reserve funds for planned future capital expenditures, unexpected or unpredicted events, or extraordinary expenditures which would otherwise cause fluctuations in the operating or capital budgets. This policy is required to provide direction to manage reserves, reserve funds, and deferred revenue in a responsible manner and to use reserves, reserve funds, and deferred revenue solely for the specific purpose determined.

1. **PURPOSE**

The purpose of the Reserve and Reserve Funds Policy is to establish long term funding strategies for the Township and to ensure good financial and cash management for ongoing financial stability. This policy will support decisions relating to long-range financial planning for operations and capital projects to maximize both debt servicing costs and significant annual budget impacts by allocating costs over many years through the prudent use of reserves and reserve funds.

2. **DEFINITIONS**

"Deferred Revenue" means revenue that is considered a liability on the Municipality's financial statements, until such time it becomes relevant to current operations. Deferred revenue is set aside as an obligatory reserve fund for specific purpose by legislation, regulation, or agreement. Federal gas tax is an example of a deferred revenue.

"Discretionary Reserve Fund" means a reserve fund under the Municipal Act when Council wishes to earmark revenue to finance a future expenditure for which it has the authority to spend money, and to set aside a certain portion of any year's revenues so that the funds are available as required.

"Obligatory Reserve Fund" means a reserve fund when a provincial or federal statute requires that the revenue received for specific purposes be segregated from the general revenues of the municipality. Obligatory reserve funds are to be used solely for the purpose prescribed for them by the statute.

"Reserve" is an allocation of accumulated net revenue with no reference to any specific asset and does not require segregation as in the case of a reserve fund.

"Reserve Fund" means a fund with assets which are segregated and restricted to meet the purpose of the reserve fund. It is based on a statutory requirement, defined liability, or planned capital expenditure. There are two types of reserve funds: obligatory reserve funds and discretionary reserve funds.

"Township" means the Corporation of the Township of North Glengarry.

3. PROCEDURE

The use of reserves is one way of maintaining a sound financial position. However, cash flow changes, risk management, or other considerations may affect reserve requirements. Reserves must be supported by financial evidence indicating the extent of the reserves required. Reserves and discretionary reserve funds help to stabilize the general municipal tax levy and reduce the need for debt. The assets of the reserve funds can be invested to earn income, thus helping to reduce the amount of money to be set aside. Investments are subject to the Municipal Act and the Investment Policy adopted by Council.

All reserve and reserve funds must be established, maintained and used for a specified purpose mandated by this policy, or by-law. Reserves and reserve funds are created by specific motions of Council or as part of other motions, such as annual budgets or gas tax. The annual budget shall set out the estimated portion of revenues considered necessary to be paid into the reserve and reserve funds. The annual operating surpluses are to be transferred to the Working Fund Reserve up to a maximum of 75% the Taxes Receivable with any excess being transferred to the Contingency Reserve. Money in a reserve or reserve fund shall be spent only for the predetermined purpose(s) of the reserve or reserve fund.

Forecasts will be developed for each reserve and reserve fund and will be updated at least annually as part of the budget process. The adequacy of the reserve and reserve fund shall be determined on a case-by-case basis using an estimate of inflows and outflows.

Debt repayment is not normally funded through a reserve. Instead, debt shall be incurred and repaid through the operating fund with corresponding transfers to and from reserves. Any funding of debt costs shall be identified in the Township's annual operating budgets.

Reserve and reserve fund balances, projected contributions, and planned expenditure withdrawals shall be presented with the annual budget. Balances of reserves, discretionary reserve funds, and deferred revenue with comparative figures shall be disclosed by way of note to the financial statements, with specific reference made on the financial statements to the note, in conformity with the requirements of the Public Sector Accounting Standards.

Temporary inter-fund borrowing to cover a reserve fund shortfall is permitted and encouraged to avoid external debt charges. However, borrowing from a reserve or reserve fund may occur only when an analysis of the reserve has determined that excess funds are available and that the use of these funds will not adversely affect the intended purpose of the reserve. Any inter-fund borrowing would require Council approval.

4. WORKING OR FISCAL RESERVES

The Fiscal reserves were established to maintain the financial health and fund future fiscal obligations, known and unknown, of the municipality. They are often referred to as “rainy day funds”. Any remaining operating surpluses shall be transferred at year end to the specific department working funds (i.e. Recreation, R.A.R.E, CEMC, etc.) and any deficits incurred by these departments shall be funded from their specific working fund. All other operating surpluses/deficits from other departments shall be transferred to/from the Working Fund North Glengarry.

Currently, the Township has established the following fiscal reserves:

CEMC Contingency – This reserve was established to provide funding for any unplanned emergency management expenses that should occur. It is funded as required through contributions from the tax levy on an as needed basis.

Elections – This reserve was established to stabilize the impacts of operating cost increases that occur every four years due to election expenses. There is an annual contribution of $12,500 through the approved budget process to provide funding for election year expenses. Transfers from this reserve occur through the budget process in election years.

North Glengarry Working – This reserve fund was established to ensure the Township meets cash flow requirements and provide contingencies for unpredictable revenue sources. This reserve is funded through the annual surpluses of the Township with the target balance of 10% of the annual operations; however, it also funds any year end deficits that the Township may have.

Planning – This reserve was established to provide funding for planning related items, specifically the costs associated with the Official Plan of the Township.

Recreation: – This reserve was established to stabilize the impacts of downturns and operating cost increases that are largely temporary and not within the Township’s ability to adjust in the short term for recreation. Transfers to and from this reserve are based on annual approved budgets.

WSIB Insurance – This reserve was established to cover any insurance claims that may occur for certain classes of employees while the Township was a Schedule 2 employer.

5. DISCRETIONARY RESERVES

Capital:

The Capital Reserve Funds are established to create a funding source for infrastructure, equipment, and facilities and landfill closure sites. Any remaining surpluses on approved expenditures funded through one of these capital reserves, shall be returned to the specific reserve at year end. The Township has established Capital Reserve Funds for the following purposes:

Economic Development – This reserve is to fund minor capital covered under the Economic Development budget. Transfers to and from these reserves are based on annual approved budgets or unspent project specific funds.

Facilities – This reserve was established to cover the cost of capital items due to the aging of the various facilities within the Township o f North Glengarry. This can cover such items as roof repairs, HVAC systems, etc.

Fleet – This reserve was created to help assist in funding replacement vehicles for the Township and reduce the need to finance fleet through long term debt. Transfers to and from this reserve usually take place during budget deliberations.

Fire – This reserve is to fund the replacement and purchase of fire equipment and vehicles. Transfers to and from these reserves are based on annual approved budgets.

Major Capital – This reserve was established to fund major capital items in the future. These funds originated through the sale of properties within the Township.

General Capital - This reserve was established to provide a source of revenue for unexpected increased costs to capital items. This can include infrastructure, legal affairs, natural disasters, etc. Transfers to and from this reserve are based on annual approved budgets.

Infrastructure – This reserve was established to provide funds to refurbish, replace and maintain Township infrastructure such as roads, sidewalks and bridges. Transfers to and from this reserve are based on annual approved budgets.

Maxville Sports Complex – This reserve was created based on funds not spent in previous years but earmarked for use on the Complex.

RARE – This reserve was created specifically for use at the RARE facility. The facility is aging and requires capital dollars in order to meet health and safety requirements and to keep the facility running. Transfers to and from this reserve are usually handled during the budget process.

Soccer Dome – This reserve was established to provide a source of funds to properly maintain the Soccer Dome. This reserve is funded by unspent capital approved for the Glengarry Indoor Soccer Complex.

Waste Disposal Sites – This reserve was established to cover closure and post closure costs associated with the waste disposal sites located in the Township. Transfers to and from this reserve are based on annual approved budgets.

Specific Purpose Reserves:

The specific purpose reserves are discretionary reserve funds created by Council to allocate money to specific projects or purposes.

Dalkeith Library – This reserve was established to stabilize the impacts of cyclical revenue downturns and operating cost increases that are largely temporary and not within the Township's ability to adjust in the short term for the library.

Maxville Soccer Lights Reserve – This reserve has been established for capital requirements and minor infrastructure repairs dedicated to the Maxville Soccer Lights.

Skateboard Park – This reserve was created to hold funds for the future skateboard park expansion. Currently sitting in this reserve are Leaf grant funds received from Commonwell.

Water/Wastewater:

These reserves are very specific for their intended purpose and are different as they are user based and not tax based. The general tax levy is not considered as a funding source. Since the users pay for these services, and surplus or deficits must be taken from these reserves.

North Glengarry Wastewater – This reserve has been established for waste water infrastructure expansions and repairs. This reserve is funded or used as a funding source based on the approved budget from the sewer rates.

North Glengarry Water – This reserve has been established for water infrastructure expansions and repairs. This reserve is funded or used as a funding source based on the approved budget from the water rates.

Water Meters – This reserve was established to fund the replacement of water meters. Interest is earned on an annual basis as the only contribution; however, contributions can be adjusted based on the approved budget process and is funded only through the water rates.

6. OBLIGATORY RESERVES

Obligatory reserves are established whenever legislation requires revenue received for special purposes to be separated from the general revenues of the municipality.

Cash-in-lieu of Parkland – This reserve was established to receive and hold cash payments received in lieu of the conveyance of parklands otherwise required in respect of the development or redevelopment of lands as set out in the Planning Act. This reserve shall only be used for the following: acquisition of land for public park purposes; capital projects for the development of new public parks; capital projects to increase capacity of existing public parks; and capital projects for repair, renewal or replacement of fixed recreation and park assets. Reallocation to other purposes or reserve funds from this account is not permissible.

Canada Community Building Fund (CBBF) formerly Federal Gas Tax – This reserve was established as a permanent source of funding from Infrastructure Canada for local roads, bridges, wastewater infrastructure, and drinking water. The Township primarily uses this fund for bridges and roads. This reserve is funded twice a year through a set allocation from Infrastructure Canada.

Revision Date: December 19, 2022

STAFF REPORT TO COUNCIL

Report No: BP-2023-01

January 9, 2023

From: Chantal Lapierre – Planning Department

RE: **BY-LAW No. 03-2023 Exemption from Part Lot Control**

Owner: DTR Holdings Corp. **Agent:** Nickolas Semanyk (Urban Keios Design Inc.)

Location: 12 Elgin Street, West, Alexandria, ON, K0C 1A0
LT 5 W OF MAIN ST AND S OF ELGIN ST AND N OF RIVER GARRY PL 5; NORTH GLENGARRY

Recommended Motion:

THAT the Council of the Township of North Glengarry adopt By-Law No. 03-2023.

AND THAT by-law 03-2023 be read a first, second and third time and enacted in Open Council this 9th day of January 2023.

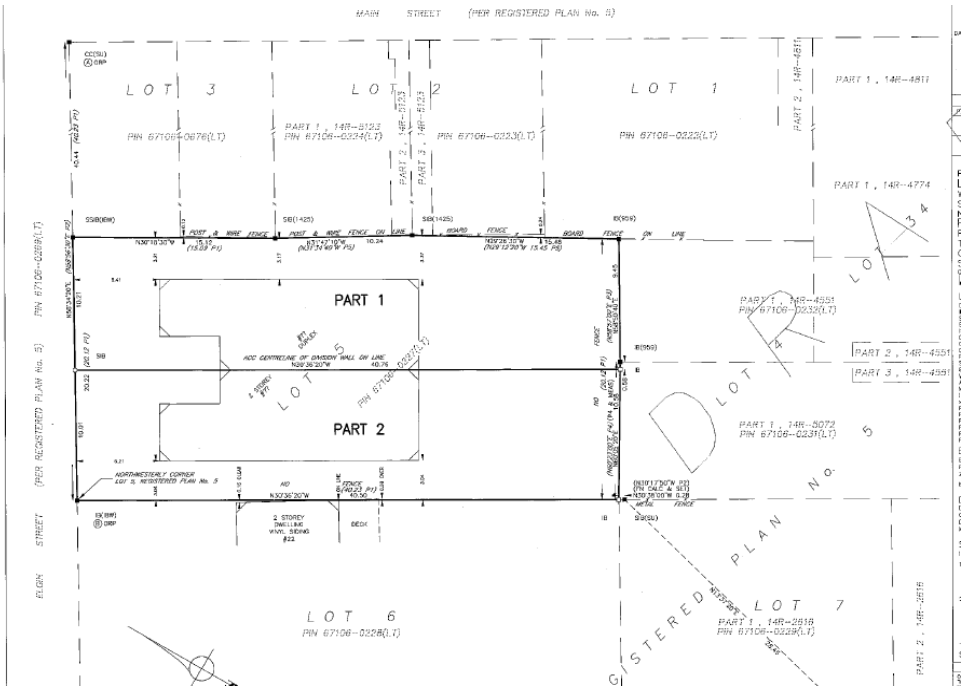
Background / Analysis:

A request to lift Part Lot Control for Lot 5, West of Main St., and South of Elgin St. and North of River Garry on Registered Plan No 5, in the former town of Alexandria, in the Township of North Glengarry, has been made by Nickolas Semanyk who is the agent on file representing the property owner.

The application facilitates the separation of an existing semi-detached dwelling into two properties without having to go through a severance application with land division. This process is not only cost effective for the property owner but can be done quicker and enables each dwelling for individual ownership.

Under Section 50 of the Planning Act, municipalities are granted the authority to pass by-laws to permit whole blocks and lots within a registered plan of subdivision to be further divided. The semi-detached dwelling conforms to the United Counties of Stormont, Dundas and Glengarry Official Plan, and is consistent with the Provincial Policy Statement.

The application is being presented this evening to the Council of The Township of North Glengarry for further discussion and adoption.



Options & Discussion:

Option #1 That Council adopt the by-law as presented- recommended. Once approved, the by-law will be sent to the Untied Counties for stamping.

OR

Option #2 Council does not adopt the by-law – not recommended.

Financial Implications:

No financial implications to the Township

Attachments & Relevant Legislation:

- By-Law 03-2023
- Reference Plan 14R-_____

Others Consulted:

n/a

_____

Reviewed and Approved by:
Sarah Huskinson, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF NORTH GLENGARRY
BY-LAW NO. 03-2023

A By-law to exempt lands legally described as Lot 5, West of Main St., and South of Elgin St. and North of River Garry on Registered Plan No 5 in the former town of Alexandria, in the Township of North Glengarry, from Part Lot Control.

WHEREAS the *Municipal Act, 2001,* as amended, provides that the powers of every Council are to be exercised by By-law;

WHEREAS the *Planning Act, R.S.O. 1990*, as amended states that all lands located within a registered plan of subdivision are subject to part lot control;

AND WHEREAS the *Planning Act, R.S.O. 1990*, as amended, authorises the Council of a local Municipality to enact by-laws to exempt lands located within a registered plan of subdivision from part lot control;

AND WHEREAS the Council of the Township of North Glengarry deem it expedient to exempt from part lot control the lands legally described as Lot 5, West of Main St., and South of Elgin St. and North of River Garry on Registered Plan No 5 in the former town of Alexandria, in the Township of North Glengarry, in the United Counties of Stormont, Dundas and Glengarry.

NOW THEREFORE the Council of the Corporation of the Township of North Glengarry enacts as follows:

1. That Lot 5, West of Main St., and South of Elgin St. and North of River Garry on Registered Plan No 5, in the former town of Alexandria, in the Township of North Glengarry, in the United Counties of Stormont, Dundas and Glengarry is hereby exempt from Part Lot Control pursuant to Subsection 50 (7) of the *Planning Act*;

2. The lands may only be conveyed as a maximum of two parcels which shall be described as:

    - Parcel 1: LT 5, W OF MAIN ST AND S OF ELGIN ST AND N OF RIVER GARRY PL 5; NORTH GLENGARRY, designated as part 1 on Reference Plan 14R- _____ (part of PIN 67106-0227)
    - Parcel 2: LT 5, W OF MAIN ST AND S OF ELGIN ST AND N OF RIVER GARRY PL 5; NORTH GLENGARRY, designated as part 2 on Reference Plan 14R- _____ (part of PIN 67106-0227)

3. That the Part Lot Control exemption pursuant to Subsection 50 (7) of the Planning Act, R.S.O. 1990, as amended, described in Section 1 shall expire January 9th, 2025.

4. That this By-law comes into force upon approval thereof by the United Counties of Stormont, Dundas and Glengarry, in accordance with the requirements of the Planning Act.

READ and passed, signed and sealed in open Council this 9th day of January, 2023.

_____ _____
CAO/Clerk/Deputy Clerk **Mayor/Deputy Mayor**

I, hereby certify that the forgoing is a true copy of By-Law No. 2023-03, duly adopted by the Council of the Township of North Glengarry, on the 9th day of January, 2023.

_____ _____
Date Certified **Clerk/Deputy Clerk**

STAFF REPORT TO COUNCIL **Report No: PW 2022-28**

January 9, 2023

From: Timothy Wright Director of Public Works

RE: Public Works Strategy for Responsible Road Infrastructure for information purposes

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Recommended Motion:
THAT Council of the Township of North Glengarry receives Staff Report No. PW 2023-01, Responsible Road Infrastructure for information purposes; and

THAT Council considers these recommended public works strategy contained in this report during the 2023 budget exercise.

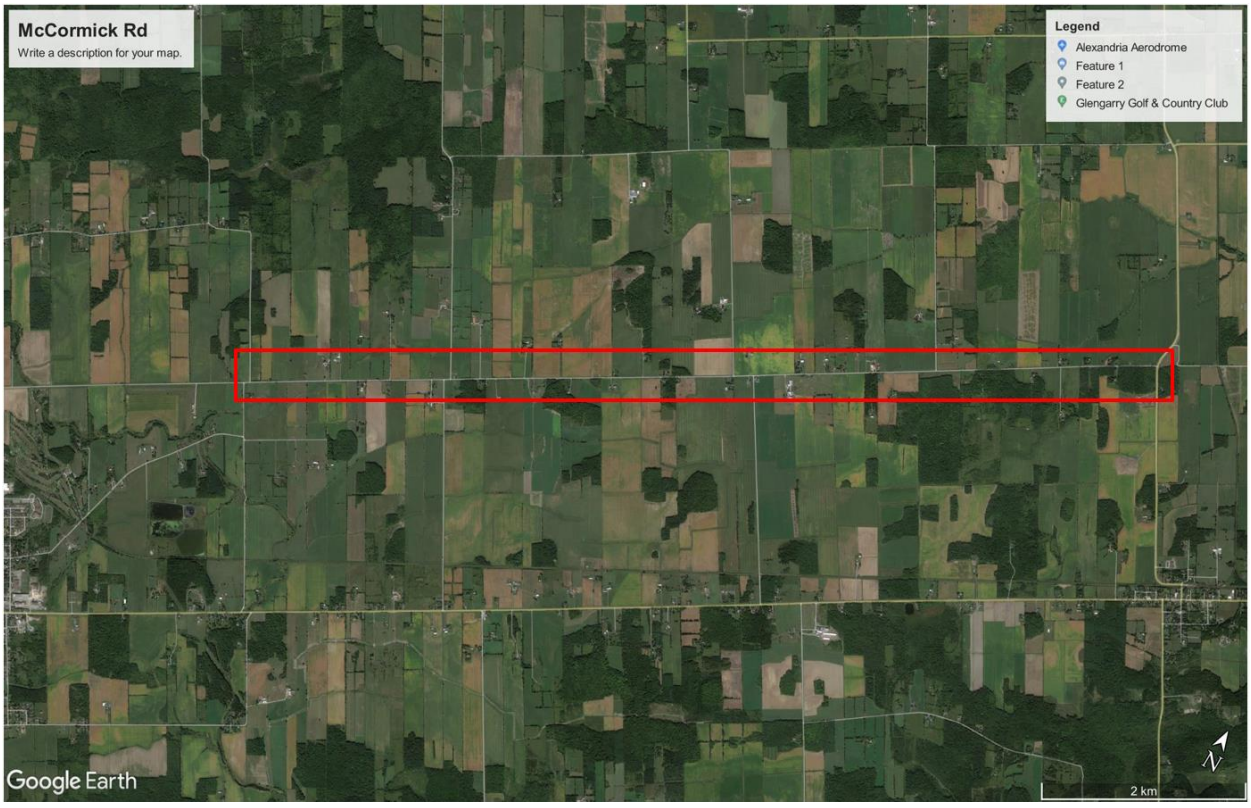
Public Works Strategy:

- Petition to have the United Counties of Stormont, Dundas and Glengarry (County) take over McCormick Road. $465,300.00 of the 2023 budget would be set aside to assist the County in taking over that road. This exchange may include taking over a county road with a low traffic count.
- Follow the optimization portion as presented in the 2021 Road Needs Study
- Include modifications resulting from input from councillors and staff (as shown in appendix A)
- Safety assessment of traffic speeds relative to available clear zones, a traffic survey and if warranted a geotechnical investigation are to be performed prior to future asphalting of gravel roads over 99m.
- The revised work plan would have summer crews concentrate on tasks instead of regions to remove “between jobs time”. The plan includes the hiring of summer students and efficiency equipment such as a trailer to haul noxious weeds from the harvesting operation and roadside disc mowers.
- Purchase a crack sealing machine to enable the timely sealing of cracks and adequate sealing of water maintenance cuts.
- Alternative options for brushing and ditching on hard-top roads which could include purchasing and/or renting of equipment.

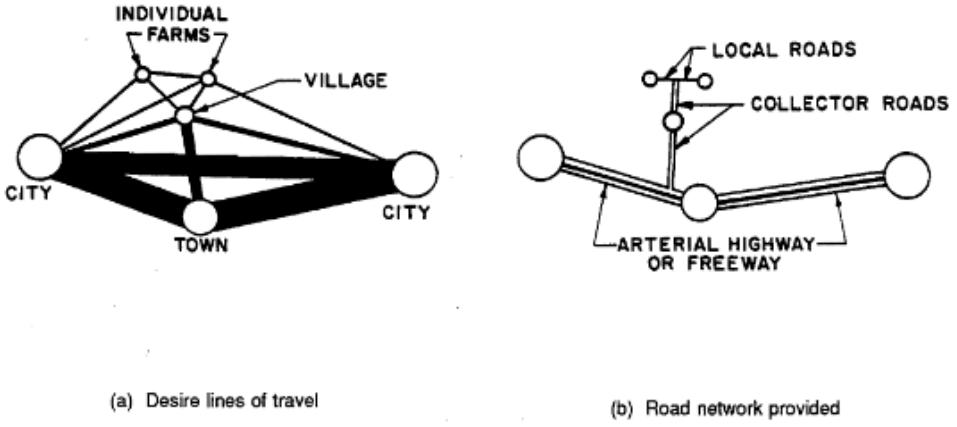
Background / Analysis:

Capital decisions

For 2023, the Township's Roads Needs Study (McIntosh Perry Consulting Engineers Ltd, 2021) recommends pulverizing and double surface treatment of 8km of McCormick Road for roughly 1.5 million dollars. Further geotechnical investigations performed by the same consulting engineer (McIntosh Perry Consulting Engineers Ltd, 2022) have revealed deficiencies in the sub-base requiring a further expenditure of $150,000.00 per km, bringing the project to 2.7 million. Public Works performed a two-month traffic count study on this road (The Township of North Glengarry, 2022) and the average daily traffic count (ADT) suggests that the road is being used as an arterial route and so would ideally be taken over by the Counties of Stormont Dundas and Glengarry. The Director of Transportation for the Counties has been approached on this idea and is open to investigating the possibility further. In 2023, the County, with support and input from its local municipalities, will be completing a system wide road rationalization study. The suggestion from the Counties is to place the rehabilitation amounts we have earmarked for the road into a reserve to assist in facilitating the standard upgrade upon handover.

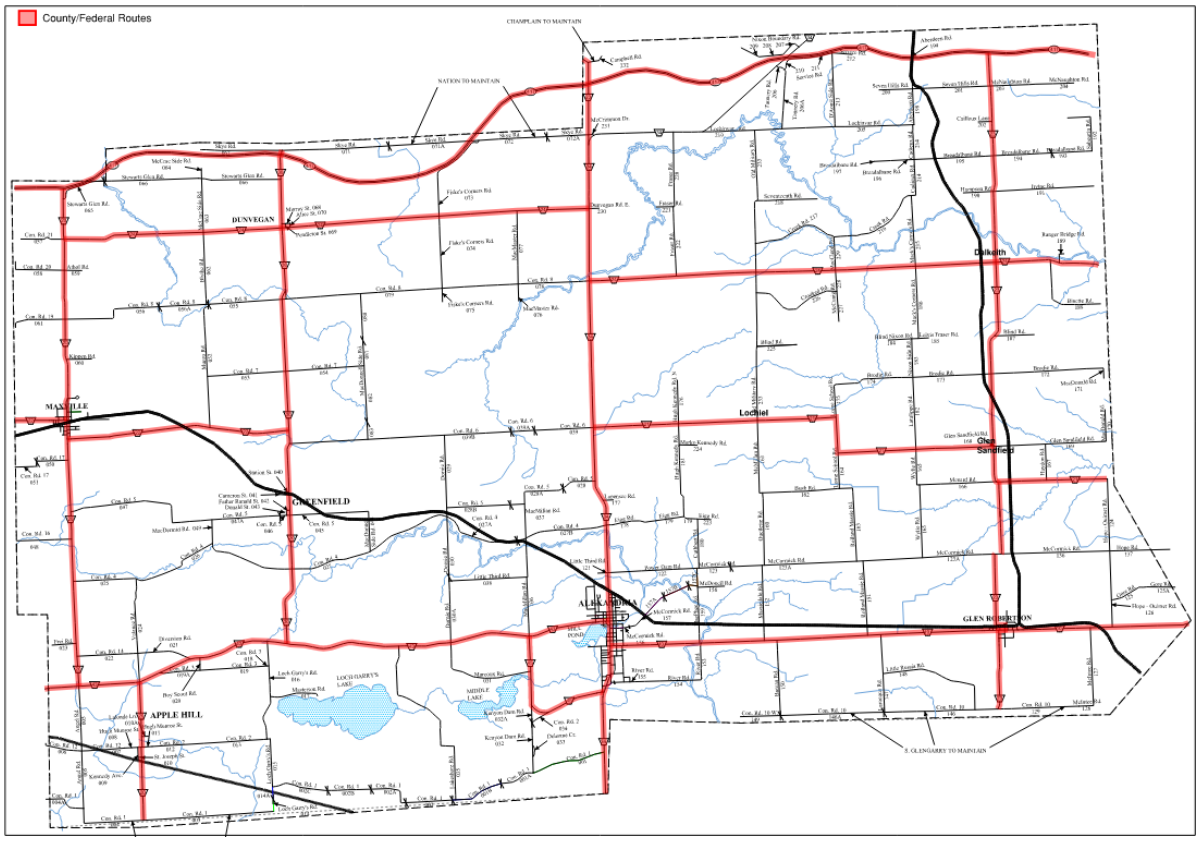


Ontario, like most of the world, uses a hierarchical road system based on the desired lines of travel (Ministry of Transportation, 1985). In Ontario, the responsibility for these different levels of hierarchy falls on different levels of government. North Glengarry is responsible for the local roads, the County is responsible for the arterial and collector roads and the Provincial Government is responsible for the Large Highways.



(Ministry of Transportation, 1985) – Hierarchy of travel – trip channelization

A thicker line represents more people wanting to travel a route.



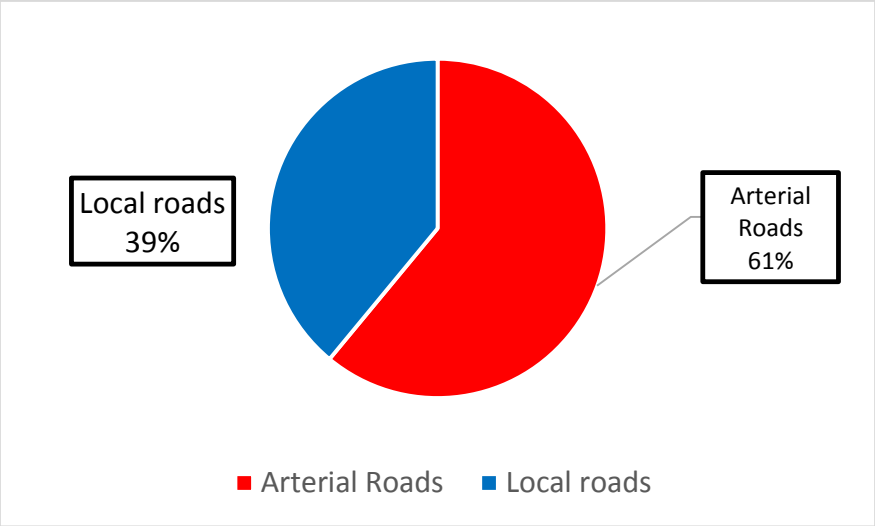
Arterial routed in North Glengarry

In 2022, if we consider the property tax amounts paid towards road infrastructure, all North Glengarry residents paid 61% towards arterial roads (Glengarry, The Counties of Stormont Dundas and, 2022)and 39% towards local roads (Township of North Glengarry, 2022) despite only ~200km of arterial roads residing in North Glengarry vs ~300km of local roads. This is because arterial roads are meant to resist much heavier and faster traffic than local roads. This increases the design requirements of all elements of the road. As a local municipality, it is important that North Glengarry does not build arterial routes as these are the responsibility of the County and doing so imposes an unfair burden upon the North Glengarry taxpayer.

The proportion of taxes towards local vs County roads

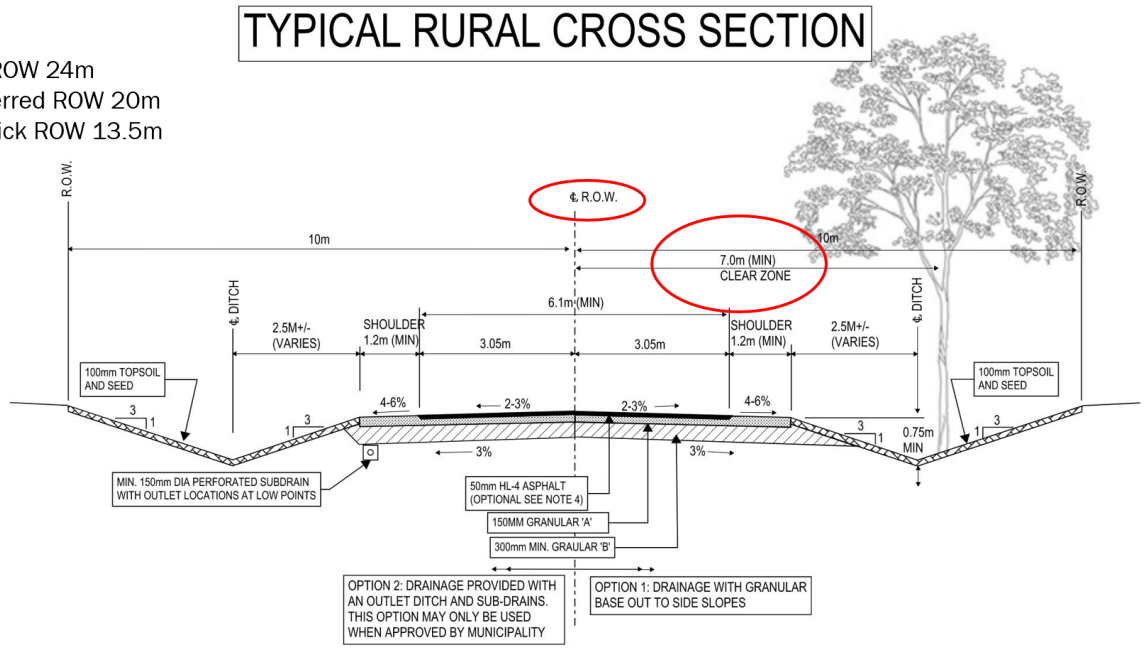
Average assessment		$	244,915.00
Upper-tier tax rate	0.0059	$	1,445.00
Arterial roads portion	0.5000	$	722.50
Lower-tier tax rate	0.0053	$	1,298.05
Local roads portion	0.3560	$	462.11
School levy	0.0015	$	367.37

Local vs.. County Road Funding



One of the important, yet frequently misunderstood factors of creating arterial roads out of local roads, is the inadequacy of the clear zone. The clear zone is the distance from the centre of the road to an obstacle on the side of the road and needs to be at least 7 meters for a local road and larger for a County or arterial road. Clear zones are related to speed and are the result of studies of reaction times if a driver is to lose control of their vehicle. Local roads are often underserved for their right of way (ROW) (distance allowed for the road between property lines) and corresponding clear zone. For example, McCormick Road averages a ROW of less than 13m. Upgrading this road to a smooth asphalted travel surface without extending the clear zone will likely result in higher speeds travelled and an increase in high-speed traffic accidents.

County ROW 24m
NG preferred ROW 20m
McCormick ROW 13.5m



"Paving a road tempts drivers to drive faster. As speed increases, the road must be straighter, wider, and as free as possible from obstructions for it to be safe. Paving low-volume roads before correcting safety and design inadequacies, encourages speeds which are unsafe, especially when the inadequacies "surprise" the driver. Because of the vast mileage of low volume roads, it is difficult to reduce speeds by enforcement." Appendix D pg. 4 (Federal Highway Administration, 2000)

These roads need to be either redesigned so they cannot be used as an arterial route or transferred to the County so they can become an arterial route with the proper arterial design considerations. Such designs include that, the road could be made a no-through road or the surface can be brought back to a gravel road to slow down traffic.

Maintenance Recommendations

While making responsible capital decisions is very important, the other part of the equation is maintenance. The Low-Class Bituminous (LCB) road investigations report found that there has been insufficient ditching and brushing work on the LCB roads (McIntosh Perry Consulting Engineers Ltd, 2022). This is because:

1. The Township does not own the proper equipment to perform the work. The excavator Public Works currently possesses can only perform ditching and brushing on gravel roads as it will damage an LCB surface.
2. As with most tasks in public works there is an overallocation of resources (people and/or equipment). There is vastly more work to be performed than worker hours available. This is demonstrated in Appendix B - 2022 roads task analysis. Each Red Figure in the column represents a point where someone has been asked to be in two places at once.

Many of these inefficiencies deserve a full report of their own such as the manpower spent on watering flowers and picking up garbage from individual locations however the

recommendations below will remove the over-allocations in the workplan. The Township will not see decreases in the budget as a result of these changes but will instead experience a lowered risk of failure in our road infrastructure and less expense over the life of its road assets. The immediate 2023 changes and corresponding benefits are:

- Reorganizing the roads teams during the summer to job-specific tasks and removing complaint response duties from two out of three foremen (rotated) allowing them to concentrate on production – this will reduce time spent switching between tasks but has the potential to result in a longer response time to unique resident issues as only one team will be assigned to deal with such issues across the township (instead of three)
- The hiring of summer students to supplement the summer workforce – adding more manpower hours will ease overallocation
- The purchase of a weed harvesting trailer will remove a loader and tandem from the weed harvesting operation allowing students to perform the task and for the task to run continuously (weather permitting) during the permitted time by the ministry of environment
- The purchase of a crack-sealing trailer and router to seal the cracks in HCB asphalt preventing the formation of potholes
- The purchasing of disc mowing attachments for the roadside tractors enabling faster cutting and decreased usage of roadside spray

Alternatives:

A) Recommended – consider these recommendations during the 2023 budget exercise
B) Not Recommended – decline these recommendations

Financial Implications:

No change to the overall proposed amount in the 2023 budget for Public Works Department

References:

Federal Highway Administration. (2000). *Gravel Roads Maintenance and Design Manual.* U.S. Department of Transportation. University of Kentucky at Lexinton, KY: Fereal Highway Administration.

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The Township of North Glengarry. (2022). *McCormick Road Traffic Study.*

Township of North Glengarry. (2022). *2022 Operating and Capital Budgets.*

Others Consulted:
Michel Currier, Manager of Transportation – North Glengarry
Benjamin de Haan, Director of Transportation – The Counties of Stormont, Dundas and Glengarry
Philip Almond, P.Eng, Manager, Pavement Engineering – McIntosh Perry
Scott Keely, P.Eng, Geotechnical Engineer – McIntosh Perry
Ted Phillips, B. Sc. (Agr.), LEL, C.E.T. – McIntosh Perry

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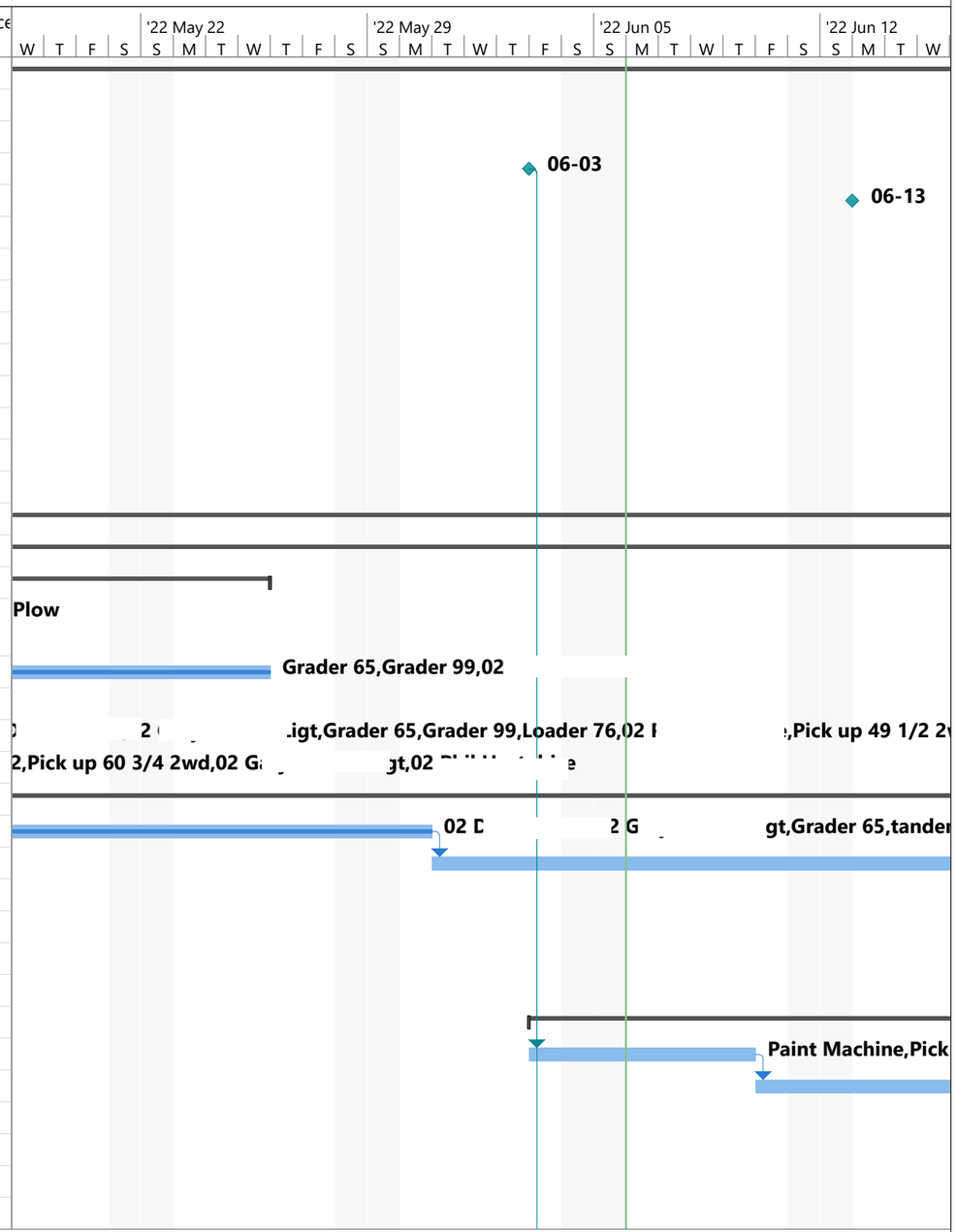
Reviewed and approved by:
Sarah Huskinson, CAO/Clerk

Work Plan Roads

ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
1		**Enviromental Factors**		**148 days**	**Fri 22-04-01**	**Tue 22-11-01**	
2		Snow has melted	All Township	1 day	Wed 22-04-13	Wed 22-04-13	
3		Half loads	All Township	32 days	Fri 22-04-01	Mon 22-05-16	
4		Warm weather	All Township	0 days	Fri 22-06-03	Fri 22-06-03	
5		permit for weed harvesting	All Township	0 days	Mon 22-06-13	Mon 22-06-13	
6		After spring growth	All Township	0 days	Mon 22-08-01	Mon 22-08-01	
7		Winter season start	All Township	0 days	Tue 22-11-01	Tue 22-11-01	
8		**Township Events**		**91 days**	**Fri 22-07-01**	**Fri 22-11-11**	
9		Dunvegan living history day	Dunvegan	0 days	Fri 22-09-23	Fri 22-09-23	
10		rememberence day	All Township	0 days	Fri 22-11-11	Fri 22-11-11	
11		community living run	All Township	0 days	Sat 22-09-17	Sat 22-09-17	
12		Highland games	Maxville	2 days	Thu 22-07-28	Fri 22-07-29	
13		New building move in	Alexandria	0 days	Wed 22-07-13	Wed 22-07-13	
14		Canada Day	All Township	0 days	Fri 22-07-01	Fri 22-07-01	
15		**Lochiel**	**All Township**	**246 days**	**Tue 22-01-04**	**Mon 22-12-19**	
16		**Operations**		**246 days**	**Tue 22-01-04**	**Mon 22-12-19**	
17	✓	**Type 1 activities after snow has melted**		**30 days**	**Wed 22-04-13**	**Wed 22-05-25**	
18	✓	Spring inspections, culverts, condition of roads, ditches etc	All Township	5 days	Thu 22-04-14	Wed 22-04-20	2
19	✓	Grading	All Township	30 days	Thu 22-04-14	Wed 22-05-25	2
20	✓	Lochiel wash and sweep sidewalks and bridges	Lochiel	5 days	Wed 22-04-13	Wed 22-04-20	2
21	✓	post winter equipment maintenance	All Township	5 days	Thu 22-04-21	Wed 22-04-27	20
22	✓	Lochiel cold patch	Lochiel	10 days	Thu 22-04-28	Wed 22-05-11	21
23		**Type 2 activities after half loads**		**56 days**	**Tue 22-05-17**	**Wed 22-08-03**	
24	✓	Spring Gravel	Lochiel	10 days	Tue 22-05-17	Mon 22-05-30	3
25		Dust treatment	Lochiel	21 days	Tue 22-05-31	Mon 22-07-18	24
26	✓	Snow plough damage repair	Lochiel	8 days	Fri 22-06-17	Tue 22-06-28	25
27		Put up speed control signs	All Township	1 day	Tue 22-06-28	Wed 22-06-29	26
28		Replacing sidewalk panels	Lochiel	13 days	Thu 22-06-30	Tue 22-07-19	27
29		culvert repairs per culvert	Lochiel	10 days	Wed 22-07-20	Wed 22-08-03	28
30		**Type 3 activities need warm weather**		**137 days**	**Fri 22-06-03**	**Fri 22-12-16**	
31		line painting Lochiel	Lochiel	5 days	Fri 22-06-03	Thu 22-06-09	4
32		trim brush around bridges and guardrails	Lochiel	8 days	Fri 22-06-10	Fri 22-07-01	31
33		washing bridges Lochiel	Lochiel	6 days	Mon 22-07-04	Mon 22-07-11	32
34		Warm weather patching	Lochiel	10 days	Tue 22-07-12	Mon 22-07-25	33
35		roadside grass cutting	Lochiel	100 days	Tue 22-07-26	Fri 22-12-16	34
36		**Type 4 activities after spring growth**		**42 days**	**Tue 22-08-02**	**Thu 22-09-29**	

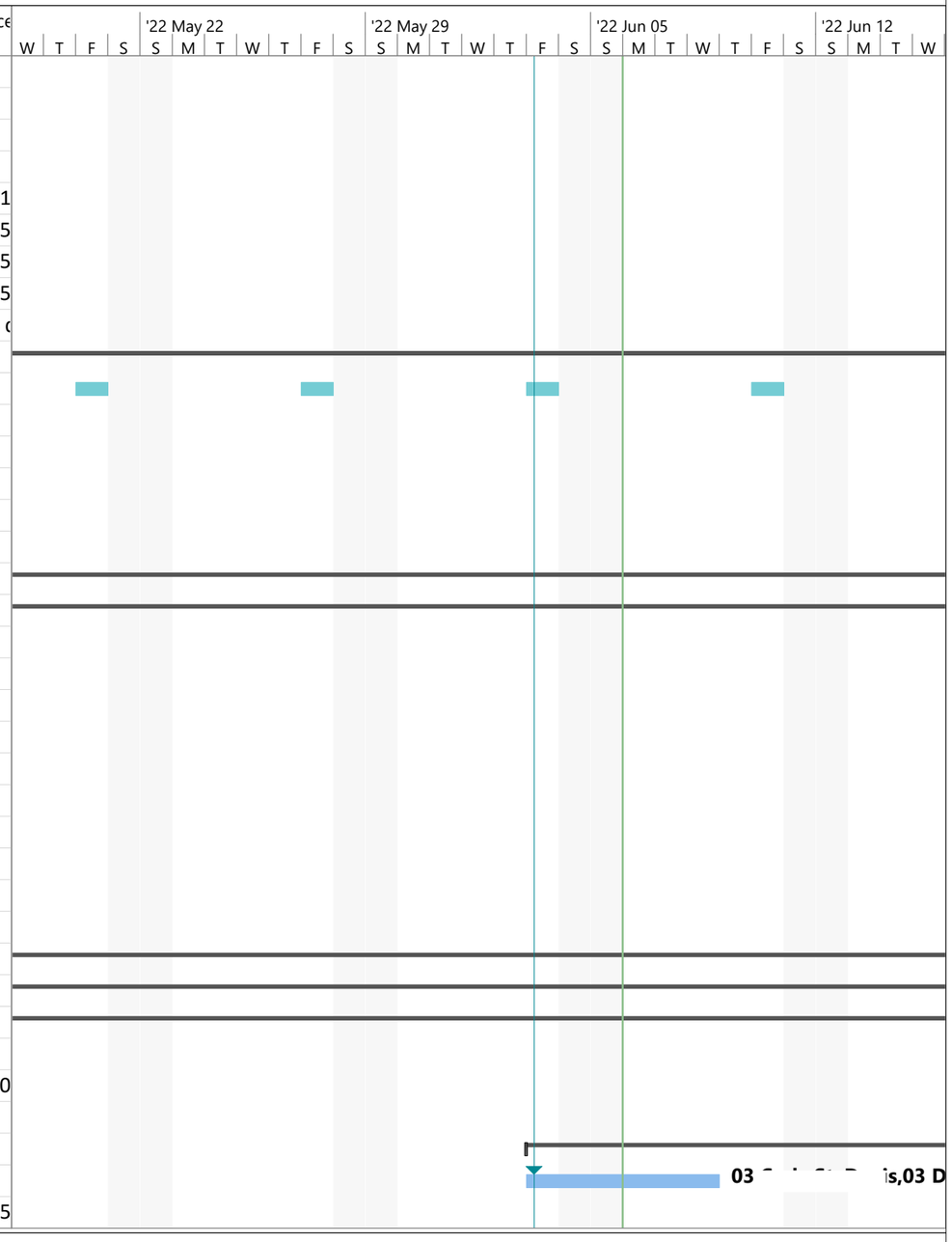


Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

Work Plan Roads

ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
37		Autumn Brushing	Lochiel	30 days	Tue 22-08-02	Tue 22-09-13	6
38		Catch basin cleaning	Lochiel	10 days	Wed 22-09-14	Tue 22-09-27	37
39		Landscape accessory maintenance	Lochiel	2 days	Wed 22-09-28	Thu 22-09-29	38
40		**Type 5 activities before winter**		**56 days**	**Thu 22-09-29**	**Mon 22-12-19**	
41		loading up winter storage	Lochiel	2 days	Thu 22-09-29	Mon 22-12-19	42SS-1
42		Clean catch basins with sewer sucker truck	Lochiel	5 days	Mon 22-10-03	Fri 22-10-07	43SS-5
43		Preperation for winter sidewalks	Lochiel	5 days	Tue 22-10-11	Mon 22-10-17	44SS-5
44		Tandem winter conversion	Lochiel	5 days	Tue 22-10-18	Mon 22-10-24	45SS-5
45		Winter Dry Run	Lochiel	5 days	Tue 22-10-25	Mon 22-10-31	7SS-5 d
46		**Recurring Activities**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
47		**Empty garbage cans**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
75		**Public Relations Work**		**3.3 days**	**Tue 22-01-04**	**Fri 22-01-07**	
76		Clean out molding building		2 days	Tue 22-01-04	Wed 22-01-05	
77		Alexandria Garbage x2 per week		0.3 days	Fri 22-01-07	Fri 22-01-07	
78		moving boxes for the archives		3 days	Tue 22-01-04	Thu 22-01-06	
79		move speed signs to requested location		1 day	Thu 22-01-06	Thu 22-01-06	
80		**Vacations**		**107 days**	**Fri 22-05-06**	**Thu 22-10-06**	
81		**(n**		**65 days**	**Fri 22-05-06**	**Fri 22-08-05**	
82		1		1 day	Fri 22-05-06	Fri 22-05-06	
83		2		5 days	Mon 22-06-20	Fri 22-06-24	
84		3		2 days	Wed 22-06-29	Thu 22-06-30	
85		4		1 day	Fri 22-08-05	Fri 22-08-05	
86				**10 days**	**Thu 22-09-22**	**Thu 22-10-06**	
87		1		10 days	Thu 22-09-22	Thu 22-10-06	
88		(igt					
89		I		**44 days**	**Mon 22-06-20**	**Fri 22-08-19**	
90		1		5 days	Mon 22-06-20	Fri 22-06-24	
91		2		5 days	Mon 22-08-15	Fri 22-08-19	
92		**Kenyon**	**All Township**	**246 days?**	**Sat 22-01-01**	**Mon 22-12-19**	
93		**Operations**		**246 days**	**Sat 22-01-01**	**Mon 22-12-19**	
94		**Event Preperation**		**246 days**	**Sat 22-01-01**	**Mon 22-12-19**	
95		**Dunvegan living history day**	**Dunvegan**	**2 days**	**Fri 22-09-09**	**Mon 22-09-12**	
96		Put 1812 banners up	Dunvegan	1 day	Fri 22-09-09	Fri 22-09-09	9SS-10
97		Take 1812 banners down	Dunvegan	1 day	Mon 22-09-12	Mon 22-09-12	96
98		**Highland games**	**Maxville**	**138 days**	**Fri 22-06-03**	**Mon 22-12-19**	
99		hang flower baskets, highland game banners and b	Maxville	4 days	Fri 22-06-03	Wed 22-06-08	4
100		Maxville clean up for highland games	Maxville	5 days	Thu 22-07-21	Wed 22-07-27	12SS-5

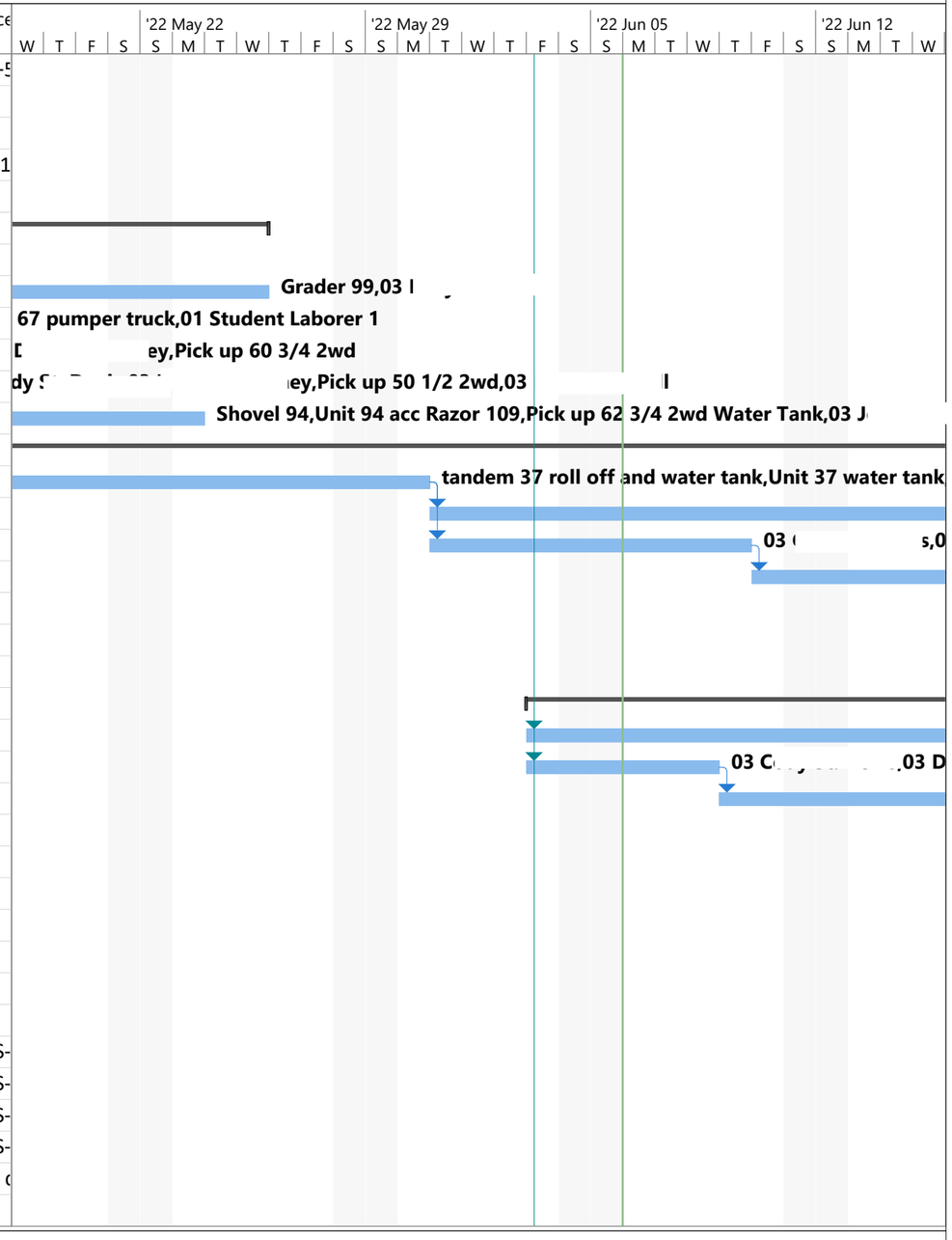


Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

Work Plan Roads

ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
101		remove maxville decorations	Maxville	1 day	Mon 22-12-19	Mon 22-12-19	12FS+5
102		Canada Day	All Township	0 days	Sat 22-01-01	Sat 22-01-01	
103		**Rememberence Day**	**All Township**	**2 days**	**Fri 22-10-28**	**Mon 22-10-31**	
104		Putting up banners for rememberance day	All Township	1 day	Fri 22-10-28	Fri 22-10-28	10SS-1
105		taking down banners for rememberance day	All Township	1 day	Mon 22-10-31	Mon 22-10-31	104
106		**Type 1 activities after snow has melted**		**30 days**	**Wed 22-04-13**	**Wed 22-05-25**	
107		Spring inspections, culverts, condition of roads, ditche	Kenyon	5 days	Thu 22-04-14	Wed 22-04-20	2
108		Grading	Kenyon	30 days	Thu 22-04-14	Wed 22-05-25	2
109		Wash and sweep sidewalks and bridges	Kenyon	10 days	Wed 22-04-13	Wed 22-04-27	2
110		Initial cold patch	Kenyon	5 days	Thu 22-04-28	Wed 22-05-04	109
111		post winter equipment maintenance	Kenyon	5 days	Wed 22-05-04	Wed 22-05-11	110
112		Spring brushing	All Township	8 days	Thu 22-05-12	Mon 22-05-23	111
113		**Type 2 activities after half loads**		**34 days**	**Tue 22-05-17**	**Fri 22-07-01**	
114		Spring Gravel	Kenyon	10 days	Tue 22-05-17	Mon 22-05-30	3
115		Dust treatment	Kenyon	24 days	Tue 22-05-31	Fri 22-07-01	114
116		Snow plough damage repair	Kenyon	8 days	Tue 22-05-31	Thu 22-06-09	114
117		Replacing sidewalk panels	Kenyon	5 days	Fri 22-06-10	Thu 22-06-16	116
118		culvert repairs per culvert	Kenyon	5 days	Fri 22-06-17	Thu 22-06-23	117
119		Put up speed control signs	Kenyon	1 day	Thu 22-06-23	Fri 22-06-24	118
120		put the flags up at cenotaph	Kenyon	2 days	Fri 22-06-24	Tue 22-06-28	119
121		**Type 3 activities need warm weather**		**80 days**	**Fri 22-06-03**	**Mon 22-09-26**	
122		roadside grass cutting	Kenyon	80 days	Fri 22-06-03	Mon 22-09-26	4
123		washing bridges Kenyon	Kenyon	4 days	Fri 22-06-03	Wed 22-06-08	4
124		line painting Kenyon	Kenyon	10 days	Thu 22-06-09	Wed 22-06-22	123
125		Warm weather patching	Kenyon	8 days	Fri 22-08-05	Tue 22-08-16	273
126		trim brush around bridges and guardrails	Kenyon	16 days	Wed 22-08-17	Thu 22-09-08	125
127		**Type 4 activities after spring growth**		**30 days**	**Tue 22-08-02**	**Tue 22-09-13**	
128		Autumn Brushing	All Township	30 days	Tue 22-08-02	Tue 22-09-13	6
129		Catch basin cleaning	All Township	10 days	Tue 22-08-02	Mon 22-08-15	6
130		Landscape accessory maintenance	All Township	13 days	Tue 22-08-02	Thu 22-08-18	6
131		**Type 5 activities before winter**		**26 days**	**Thu 22-09-22**	**Mon 22-10-31**	
132		loading up winter storage	Kenyon	1 day	Thu 22-09-22	Thu 22-09-22	133SS-
133		Clean catch basins with sewer sucker truck		10 days	Fri 22-09-23	Fri 22-10-07	134SS-
134		Preperation for winter sidewalks		5 days	Tue 22-10-11	Mon 22-10-17	135SS-
135		Tandem winter conversion		5 days	Tue 22-10-18	Mon 22-10-24	136SS-
136		Winter Dry Run		5 days	Tue 22-10-25	Mon 22-10-31	7SS-5 d
137		**Public Relations Work**		**3 days**	**Tue 22-01-04**	**Thu 22-01-06**	



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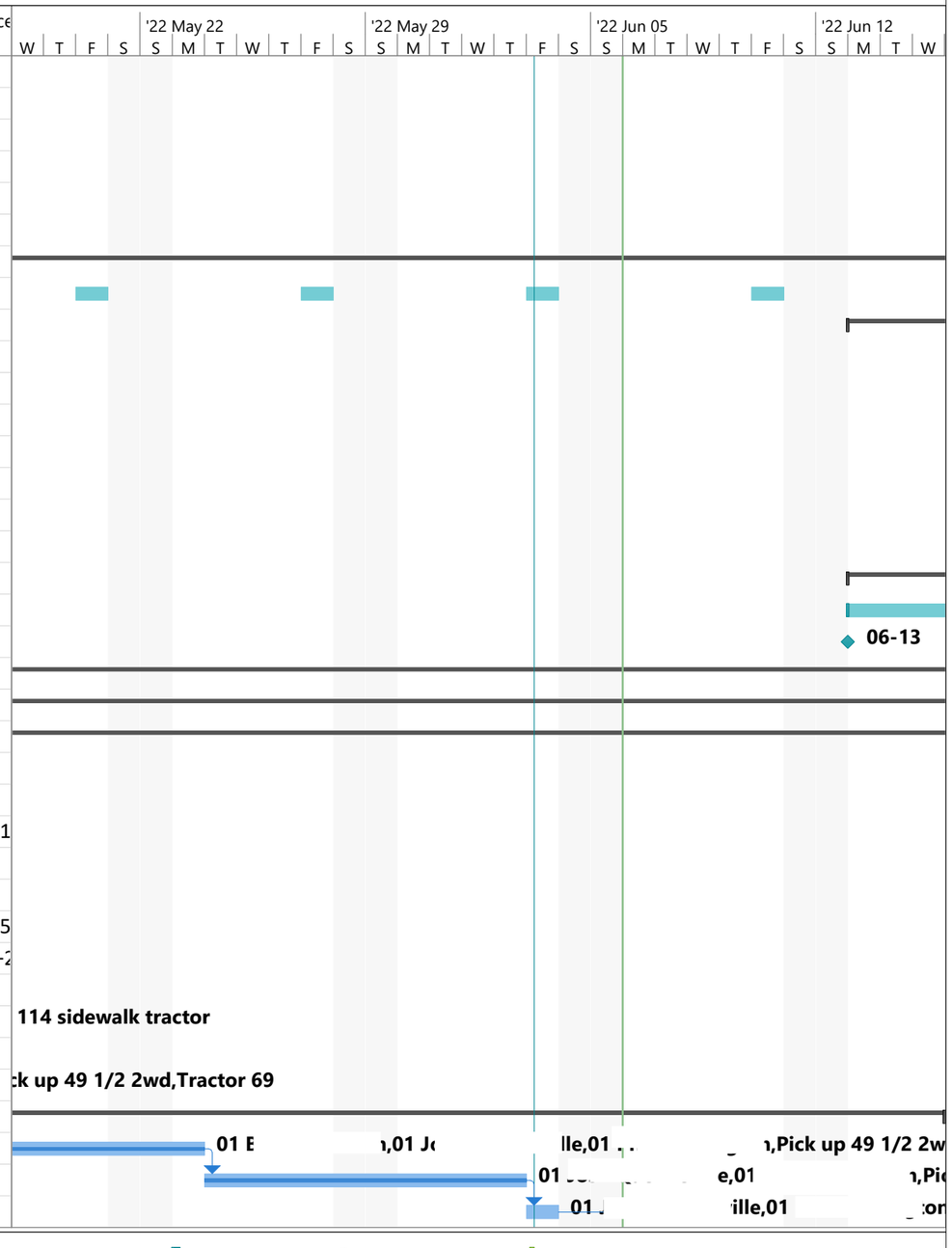
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

Work Plan Roads

ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
138		Clean out molding building		2 days	Tue 22-01-04	Wed 22-01-05	
139		Alexandria Garbage x2 per week		0.3 days	Tue 22-01-04	Tue 22-01-04	
140		moving boxes for the archives		3 days	Tue 22-01-04	Thu 22-01-06	
141		move speed signs to requested location		1 day	Tue 22-01-04	Tue 22-01-04	
142		**Emergency Activities**		**10 days**	**Tue 22-01-04**	**Mon 22-01-17**	
143		Storm damage		10 days	Tue 22-01-04	Mon 22-01-17	
144		**Recurring Activities**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
145		**Empty garbage cans**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
173		**Vacations**		**111 days?**	**Mon 22-06-13**	**Fri 22-11-18**	
174		**Robbie Smeall**		**9 days**	**Mon 22-08-29**	**Fri 22-09-09**	
175		1		9 days	Mon 22-08-29	Fri 22-09-09	
176		**Josh Decoste**		**30 days**	**Fri 22-10-07**	**Fri 22-11-18**	
177		1		6 days	Fri 22-10-07	Mon 22-10-17	
178		2		5 days	Mon 22-11-14	Fri 22-11-18	
179		**Kelly McIntee**		**10 days**	**Mon 22-11-07**	**Fri 22-11-18**	
180		1		10 days	Mon 22-11-07	Fri 22-11-18	
181		**Donald Dashney**		**5 days**	**Mon 22-06-13**	**Fri 22-06-17**	
182		1		5 days	Mon 22-06-13	Fri 22-06-17	
183		Cody St. Denis		0 days?	Mon 22-06-13	Mon 22-06-13	
184		**Alexandria**	**All Township**	**211 days**	**Sat 22-01-01**	**Mon 22-10-31**	
185		**Operations**		**211 days**	**Sat 22-01-01**	**Mon 22-10-31**	
186		**Event Preperation**		**211 days**	**Sat 22-01-01**	**Mon 22-10-31**	
187		Canada Day	All Township	0 days	Sat 22-01-01	Sat 22-01-01	
188		**Rememberence Day**	**All Township**	**2 days**	**Fri 22-10-28**	**Mon 22-10-31**	
189		Putting up banners for rememberance day	Alexandria	1 day	Fri 22-10-28	Fri 22-10-28	10SS-1
190		taking down banners for rememberance day	Alexandria	1 day	Mon 22-10-31	Mon 22-10-31	189
191		**Community Living**	**All Township**	**8 days**	**Mon 22-09-12**	**Wed 22-09-21**	
192		putting up banners for the community living run	All Township	1 day	Mon 22-09-12	Mon 22-09-12	11SS-5
193		taking down banners for the community living run	All Township	1 day	Wed 22-09-21	Wed 22-09-21	11FS+2
194		**Type 1 activities after snow has melted**		**15 days**	**Thu 22-04-14**	**Wed 22-05-04**	
195		Alexandria wash and sweep sidewalks and islands	Alexandria	10 days	Thu 22-04-14	Wed 22-04-27	2
196		Spring inspections, culverts, condition of roads, ditche	All Township	5 days	Thu 22-04-14	Wed 22-04-20	2
197		post winter equipment maintenance	Alexandria	5 days	Thu 22-04-28	Wed 22-05-04	195
198		**Type 2 activities after half loads**		**22 days**	**Tue 22-05-17**	**Wed 22-06-15**	
199		Initial cold patch	Alexandria	5 days	Tue 22-05-17	Mon 22-05-23	3
200		Snow plough damage repair	Alexandria	8 days	Tue 22-05-24	Thu 22-06-02	199
201		Alexandria washing of three bridges	Alexandria	1 day	Fri 22-06-03	Fri 22-06-03	200

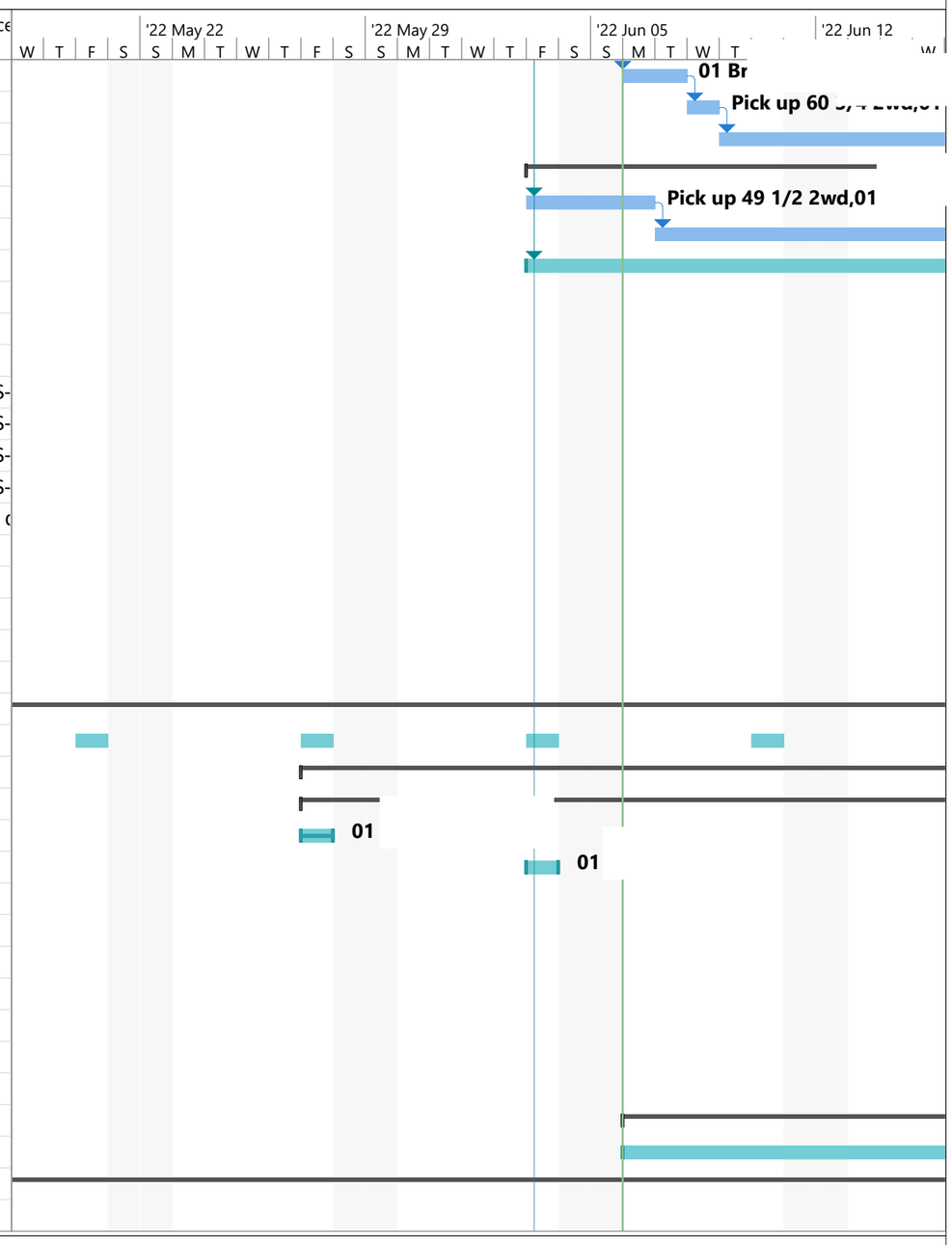


Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
202		Alexandria setting out mill square	Alexandria	2 days	Mon 22-06-06	Tue 22-06-07	201
203		Put up speed control signs	Alexandria	1 day	Wed 22-06-08	Wed 22-06-08	202
204		Alexandria sidewalk repairs and maintenance	Alexandria	5 days	Thu 22-06-09	Wed 22-06-15	203
205		**Type 3 activities need warm weather**		**32 days**	**Fri 22-06-03**	**Mon 22-07-18**	
206		put the flags up at cenotaph	Alexandria	2 days	Fri 22-06-03	Mon 22-06-06	4
207		line painting Alexandria	Alexandria	30 days	Tue 22-06-07	Mon 22-07-18	206
208		Weed harvesting for Canada Day	Alexandria	10 days	Fri 22-06-03	Thu 22-06-16	4
209		Remaining weed harvesting	Alexandria	15 days	Fri 22-06-17	Thu 22-07-07	208
210		cold patching	Alexandria	2 days	Fri 22-07-08	Mon 22-07-11	209
211		**Type 5 activities before winter**		**26 days**	**Thu 22-09-22**	**Mon 22-10-31**	
212		loading up winter storage	Alexandria	1 day	Thu 22-09-22	Thu 22-09-22	213SS-
213		Clean catch basins with sewer sucker truck		10 days	Fri 22-09-23	Fri 22-10-07	214SS-
214		Preperation for winter sidewalks		5 days	Tue 22-10-11	Mon 22-10-17	215SS-
215		Tandem winter conversion		5 days	Tue 22-10-18	Mon 22-10-24	216SS-
216		Winter Dry Run		5 days	Tue 22-10-25	Mon 22-10-31	7SS-5 d
217		**Public Relations Work**		**3 days**	**Tue 22-01-04**	**Thu 22-01-06**	
218		Clean out molding building		2 days	Tue 22-01-04	Wed 22-01-05	
219		Alexandria Garbage x2 per week		0.3 days	Tue 22-01-04	Tue 22-01-04	
220		moving boxes for the archives		3 days	Tue 22-01-04	Thu 22-01-06	
221		move speed signs to requested location		1 day	Tue 22-01-04	Tue 22-01-04	
222		**Recurring Activities**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
223		**Empty garbage cans**		**127 days**	**Fri 22-04-29**	**Fri 22-10-28**	
251		**Vacations**		**65 days**	**Fri 22-05-27**	**Fri 22-08-26**	
252				**60 days**	**Fri 22-05-27**	**Fri 22-08-19**	
253		1		1 day	Fri 22-05-27	Fri 22-05-27	
254		2		1 day	Fri 22-06-03	Fri 22-06-03	
255		3		1 day	Thu 22-06-30	Thu 22-06-30	
256		4		5 days	Mon 22-07-25	Fri 22-07-29	
257		5		4 days	Tue 22-08-02	Fri 22-08-05	
258		[illegible]		5 days	Mon 22-08-15	Fri 22-08-19	
259				**39 days**	**Mon 22-07-04**	**Fri 22-08-26**	
260		1		10 days	Mon 22-07-04	Fri 22-07-15	
261		[illegible]		5 days	Mon 22-08-22	Fri 22-08-26	
262				**10 days**	**Mon 22-06-06**	**Fri 22-06-17**	
263		1		10 days	Mon 22-06-06	Fri 22-06-17	
264		**Joint Operations**	**All Township**	**191 days**	**Tue 22-01-04**	**Fri 22-09-30**	
265		**Equipment maintenance**		**5 days**	**Tue 22-01-04**	**Mon 22-01-10**	



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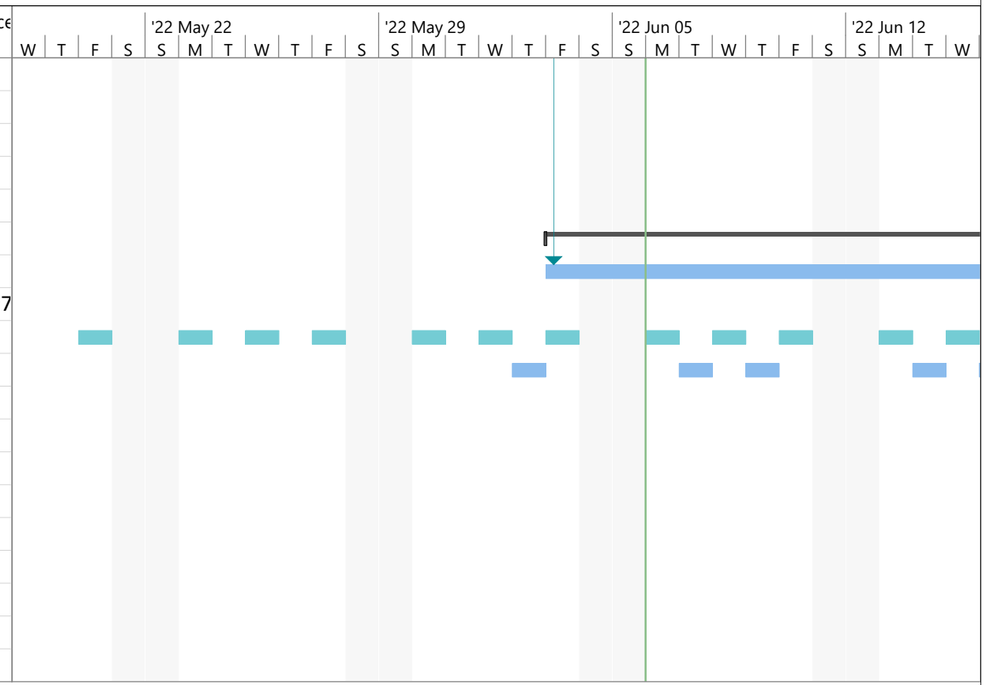
Summary	Inactive Summary	Manual Summary	External Milestone	

Work Plan Roads

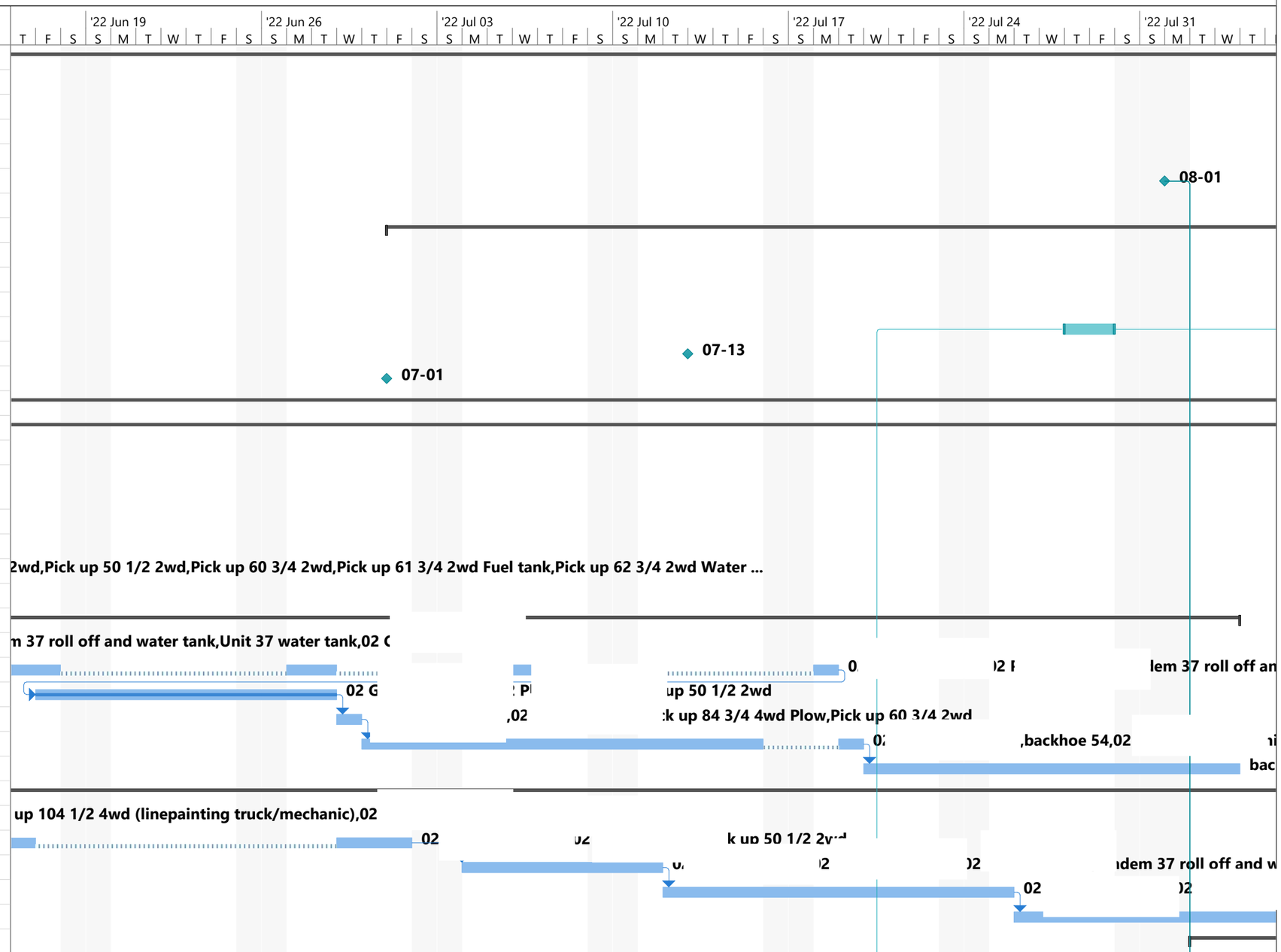
ID	Task Mode	Task Name	Location	Duration	Start	Finish	Predece
266		Loader	All Township	5 days	Tue 22-01-04	Mon 22-01-10	
267		**Emergency Activities**		**10 days**	**Tue 22-01-04**	**Mon 22-01-17**	
268		Storm damage		10 days	Tue 22-01-04	Mon 22-01-17	
269		**Emergency Activities**		**10 days**	**Tue 22-01-04**	**Mon 22-01-17**	
270		Storm damage		10 days	Tue 22-01-04	Mon 22-01-17	
271		**Type 3 Ditch Maintenance**	**All Township**	**44 days**	**Fri 22-06-03**	**Thu 22-08-04**	
272		Summer brushing RAZOR	All Township	10 days	Fri 22-06-03	Thu 22-06-16	4
273		Ditching + edge dozer	All Township	30 days	Wed 22-06-22	Thu 22-08-04	124,27
274		**Watering flowers**		**93 days**	**Fri 22-05-20**	**Fri 22-09-30**	
333		**Whipper Snipping**		**63 days**	**Thu 22-06-02**	**Tue 22-08-30**	
360		**Training**		**5 days**	**Tue 22-01-04**	**Mon 22-01-10**	
361		Mental Health First Aid Training		5 days	Tue 22-01-04	Mon 22-01-10	
362		Roadschool - 2 year basic TJ Mahoney		5 days	Tue 22-01-04	Mon 22-01-10	
363		grader not ground force - Gueph		5 days	Tue 22-01-04	Mon 22-01-10	
364		loader backhoe		5 days	Tue 22-01-04	Mon 22-01-10	
365		Shovel		5 days	Tue 22-01-04	Mon 22-01-10	
366		snowplough refresher		5 days	Tue 22-01-04	Mon 22-01-10	
367		Book 7 training		5 days	Tue 22-01-04	Mon 22-01-10	
368		basics of supervision		5 days	Tue 22-01-04	Mon 22-01-10	



Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

ID	Task Mode	Task Name
1		**Enviromental Factors**
2		Snow has melted
3		Half loads
4		Warm weather
5		permit for weed harvesting
6		After spring growth
7		Winter season start
8		**Township Events**
9		Dunvegan living history day
10		rememberence day
11		community living run
12		Highland games
13		New building move in
14		Canada Day
15		**Lochiel**
16		**Operations**
17		**Type 1 activities after snow has melted**
18		Spring inspections, culverts, condition of roads, ditches etc
19		Grading
20		Lochiel wash and sweep sidewalks and bridges
21		post winter equipment maintenance
22		Lochiel cold patch
23		**Type 2 activities after half loads**
24		Spring Gravel
25		Dust treatment
26		Snow plough damage repair
27		Put up speed control signs
28		Replacing sidewalk panels
29		culvert repairs per culvert
30		**Type 3 activities need warm weather**
31		line painting Lochiel
32		trim brush around bridges and guardrails
33		washing bridges Lochiel
34		Warm weather patching
35		roadside grass cutting
36		**Type 4 activities after spring growth**

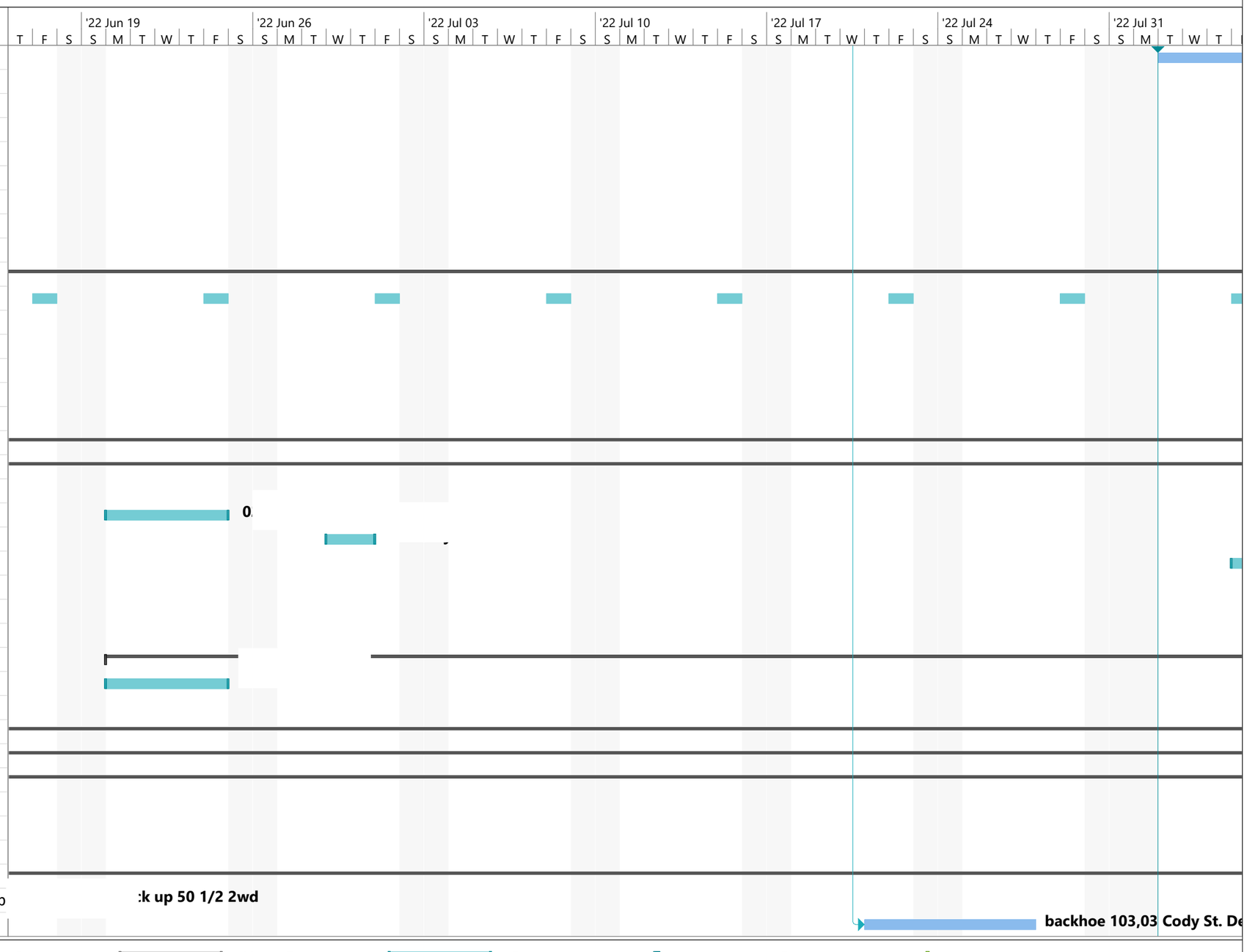


Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
37		Autumn Brushing
38		Catch basin cleaning
39		Landscape accessory maintenance
40		**Type 5 activities before winter**
41		loading up winter storage
42		Clean catch basins with sewer sucker truck
43		Preperation for winter sidewalks
44		Tandem winter conversion
45		Winter Dry Run
46		**Recurring Activities**
47		**Empty garbage cans**
75		**Public Relations Work**
76		Clean out molding building
77		Alexandria Garbage x2 per week
78		moving boxes for the archives
79		move speed signs to requested location
80		**Vacations**
81		
82		1
83		2
84		3
85		
86		
87		1
88		
89		
90		1
91		2
92		**Kenyon**
93		**Operations**
94		**Event Preperation**
95		**Dunvegan living history day**
96		Put 1812 banners up
97		Take 1812 banners down
98		**Highland games**
99		hang flower baskets, highland game banners and b
100		Maxville clean up for highland games



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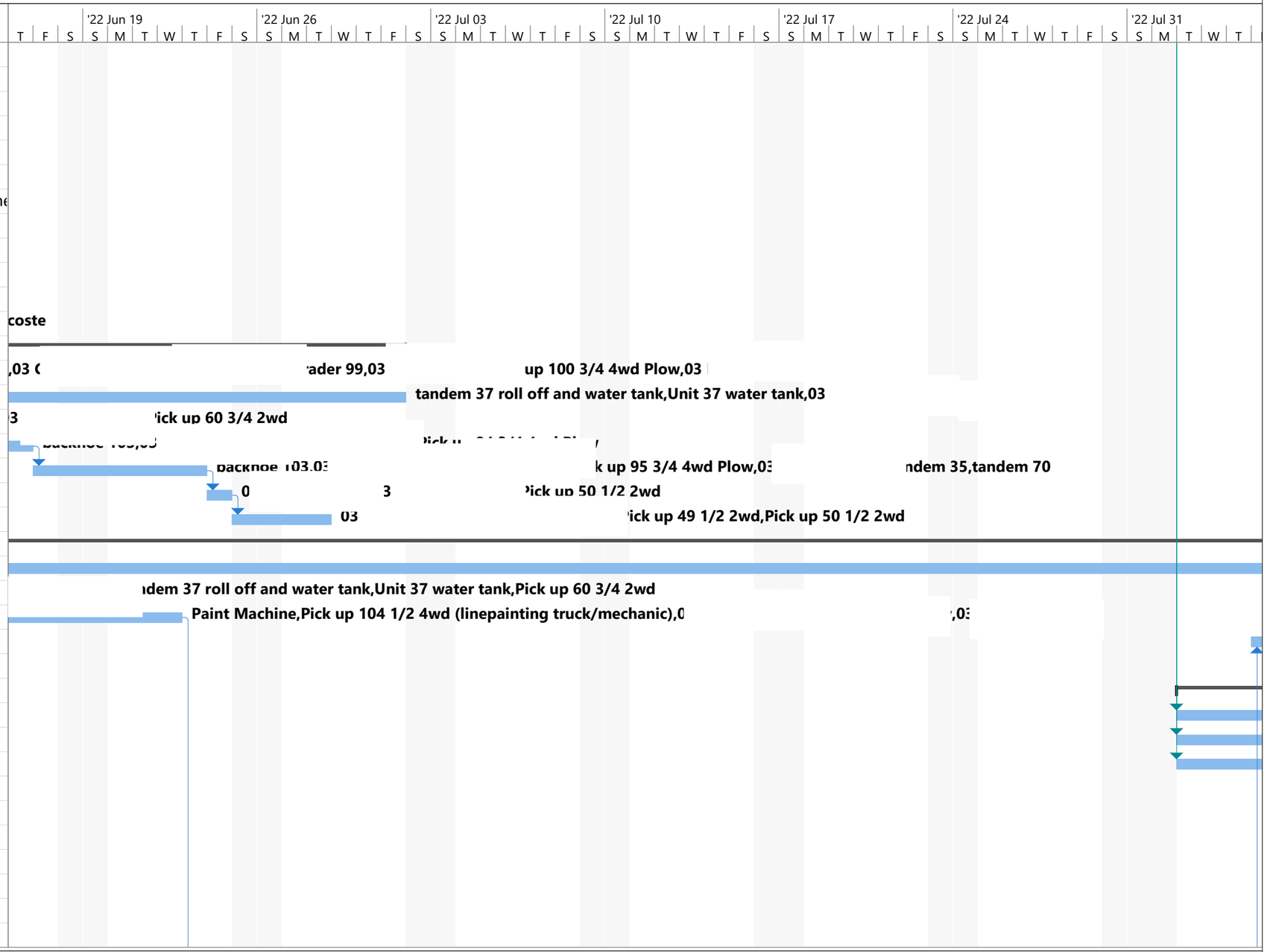
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

ID	Task Mode	Task Name
101		remove maxville decorations
102		Canada Day
103		**Rememberence Day**
104		Putting up banners for rememberance day
105		taking down banners for rememberance day
106		**Type 1 activities after snow has melted**
107		Spring inspections, culverts, condition of roads, ditche
108		Grading
109		Wash and sweep sidewalks and bridges
110		Initial cold patch
111		post winter equipment maintenance
112		Spring brushing
113		**Type 2 activities after half loads**
114		Spring Gravel
115		Dust treatment
116		Snow plough damage repair
117		Replacing sidewalk panels
118		culvert repairs per culvert
119		Put up speed control signs
120		put the flags up at cenotaph
121		**Type 3 activities need warm weather**
122		roadside grass cutting
123		washing bridges Kenyon
124		line painting Kenyon
125		Warm weather patching
126		trim brush around bridges and guardrails
127		**Type 4 activities after spring growth**
128		Autumn Brushing
129		Catch basin cleaning
130		Landscape accessory maintenance
131		**Type 5 activities before winter**
132		loading up winter storage
133		Clean catch basins with sewer sucker truck
134		Preperation for winter sidewalks
135		Tandem winter conversion
136		Winter Dry Run
137		**Public Relations Work**



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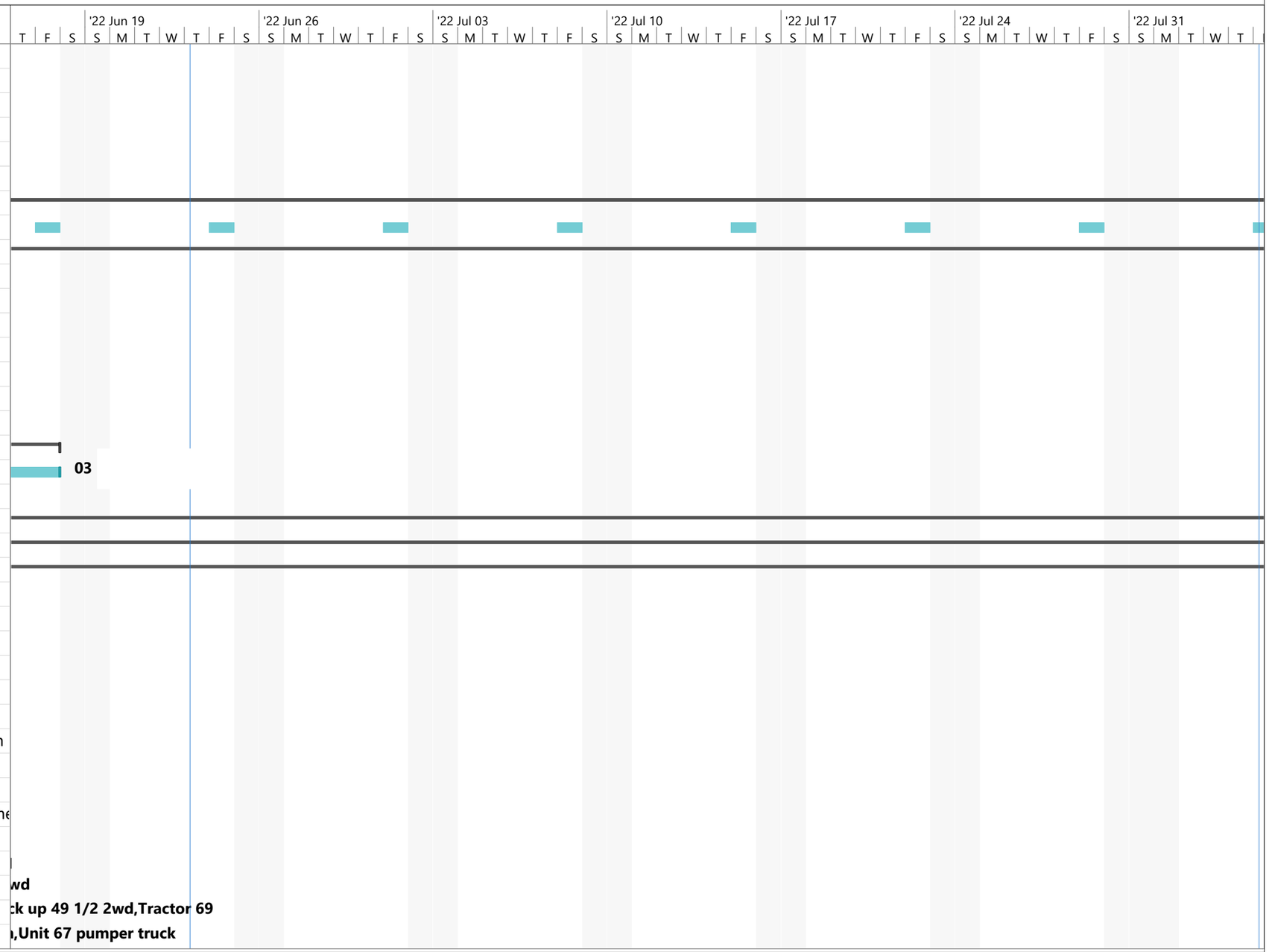
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

Work Plan Roads

ID	Task Mode	Task Name
138		Clean out molding building
139		Alexandria Garbage x2 per week
140		moving boxes for the archives
141		move speed signs to requested location
142		**Emergency Activities**
143		Storm damage
144		**Recurring Activities**
145		**Empty garbage cans**
173		**Vacations**
174		
175		
176		
177		1
178		2
179		
180		
181		
182		
183		
184		**Alexandria**
185		**Operations**
186		**Event Preperation**
187		Canada Day
188		**Rememberence Day**
189		Putting up banners for rememberance day
190		taking down banners for rememberance day
191		**Community Living**
192		putting up banners for the community living run
193		taking down banners for the community living run
194		**Type 1 activities after snow has melted**
195		Alexandria wash and sweep sidewalks and islands
196		Spring inspections, culverts, condition of roads, ditche
197		post winter equipment maintenance
198		**Type 2 activities after half loads**
199		Initial cold patch
200		Snow plough damage repair
201		Alexandria washing of three bridges



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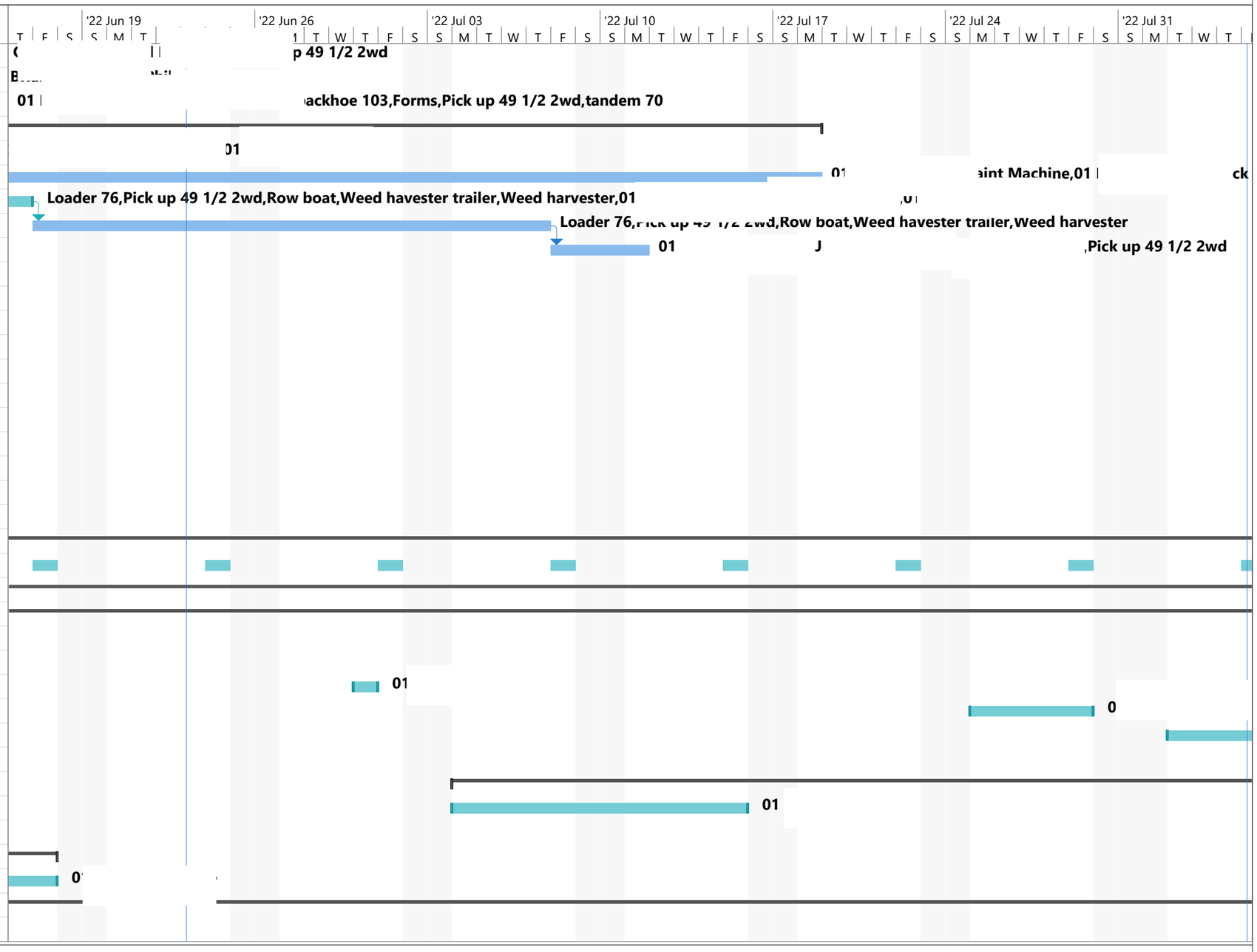
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

ID	Task Mode	Task Name
202		Alexandria setting out mill square
203		Put up speed control signs
204		Alexandria sidewalk repairs and maintenance
205		**Type 3 activities need warm weather**
206		put the flags up at cenotaph
207		line painting Alexandria
208		Weed harvesting for Canada Day
209		Remaining weed harvesting
210		cold patching
211		**Type 5 activities before winter**
212		loading up winter storage
213		Clean catch basins with sewer sucker truck
214		Preperation for winter sidewalks
215		Tandem winter conversion
216		Winter Dry Run
217		**Public Relations Work**
218		Clean out molding building
219		Alexandria Garbage x2 per week
220		moving boxes for the archives
221		move speed signs to requested location
222		**Recurring Activities**
223		**Empty garbage cans**
251		**Vacations**
252		
253		-
254		2
255		3
256		4
257		5
258		6
259		
260		-
261		2
262		
263		-
264		**Joint Operations**
265		**Equipment maintenance**



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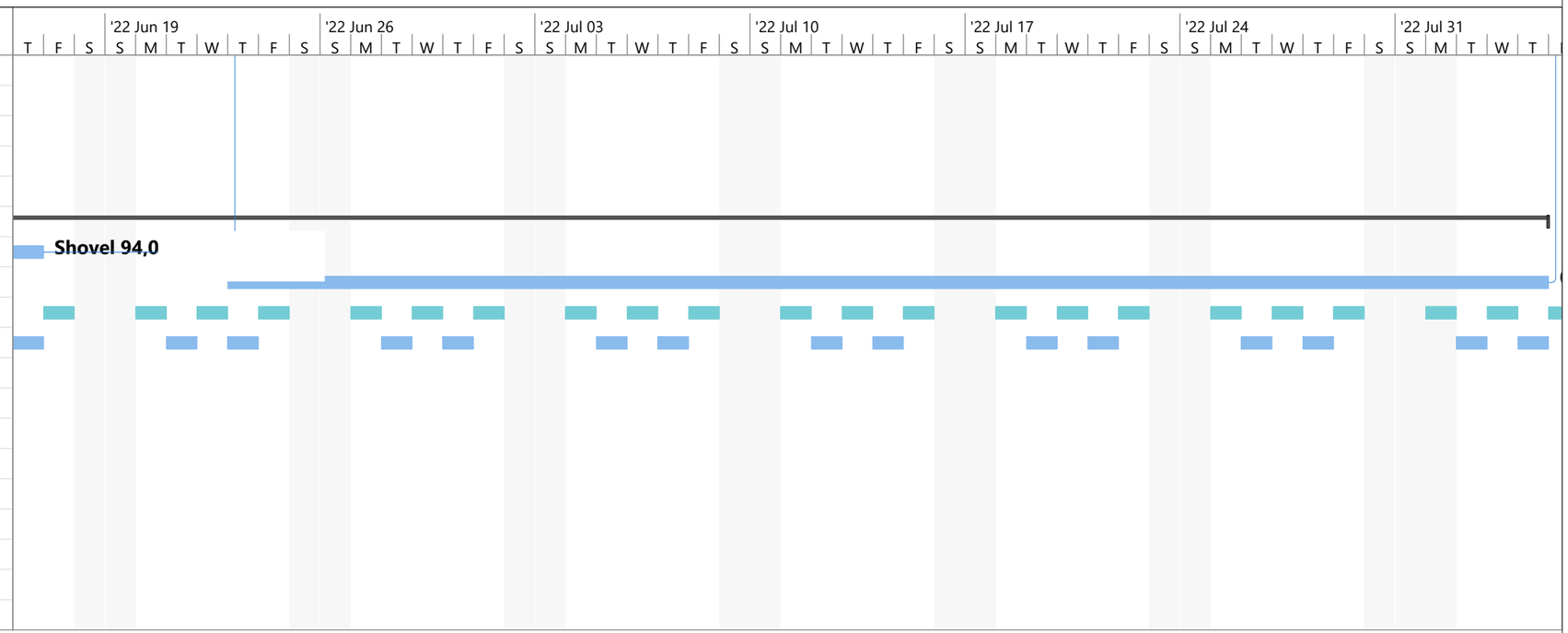
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

Work Plan Roads

ID	Task Mode	Task Name
266		Loader
267		**Emergency Activities**
268		Storm damage
269		**Emergency Activities**
270		Storm damage
271		**Type 3 Ditch Maintenance**
272		Summer brushing RAZOR
273		Ditching + edge dozer
274		**Watering flowers**
333		**Whipper Snipping**
360		**Training**
361		Mental Health First Aid Training
362		Roadschool - 2 year basic TJ Mahoney
363		grader not ground force - Gueph
364		loader backhoe
365		Shovel
366		snowplough refresher
367		Book 7 training
368		basics of supervision



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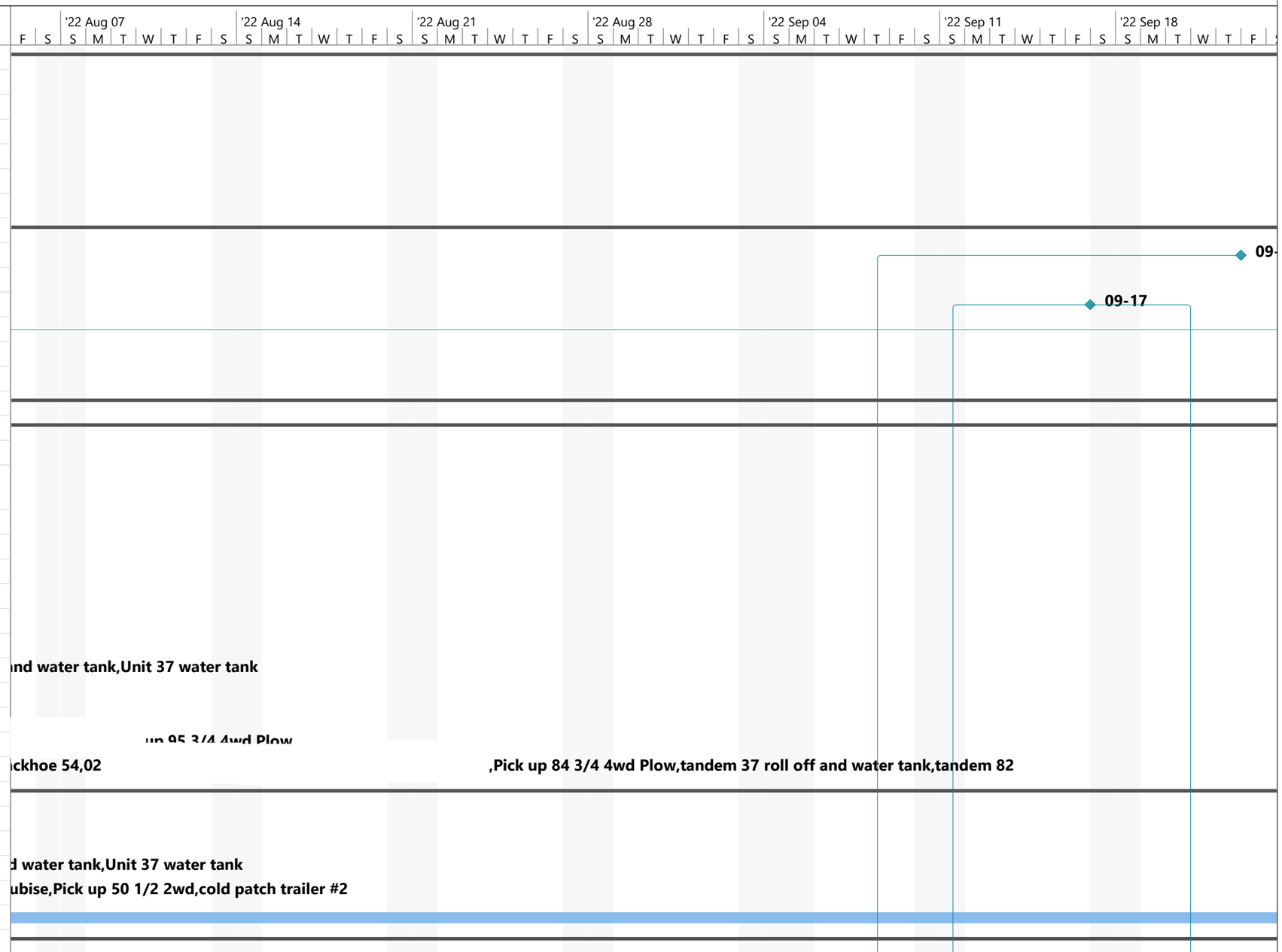
Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
1		**Enviromental Factors**
2		Snow has melted
3		Half loads
4		Warm weather
5		permit for weed harvesting
6		After spring growth
7		Winter season start
8		**Township Events**
9		Dunvegan living history day
10		rememberence day
11		community living run
12		Highland games
13		New building move in
14		Canada Day
15		**Lochiel**
16		**Operations**
17		**Type 1 activities after snow has melted**
18		Spring inspections, culverts, condition of roads, ditches etc
19		Grading
20		Lochiel wash and sweep sidewalks and bridges
21		post winter equipment maintenance
22		Lochiel cold patch
23		**Type 2 activities after half loads**
24		Spring Gravel
25		Dust treatment
26		Snow plough damage repair
27		Put up speed control signs
28		Replacing sidewalk panels
29		culvert repairs per culvert
30		**Type 3 activities need warm weather**
31		line painting Lochiel
32		trim brush around bridges and guardrails
33		washing bridges Lochiel
34		Warm weather patching
35		roadside grass cutting
36		**Type 4 activities after spring growth**



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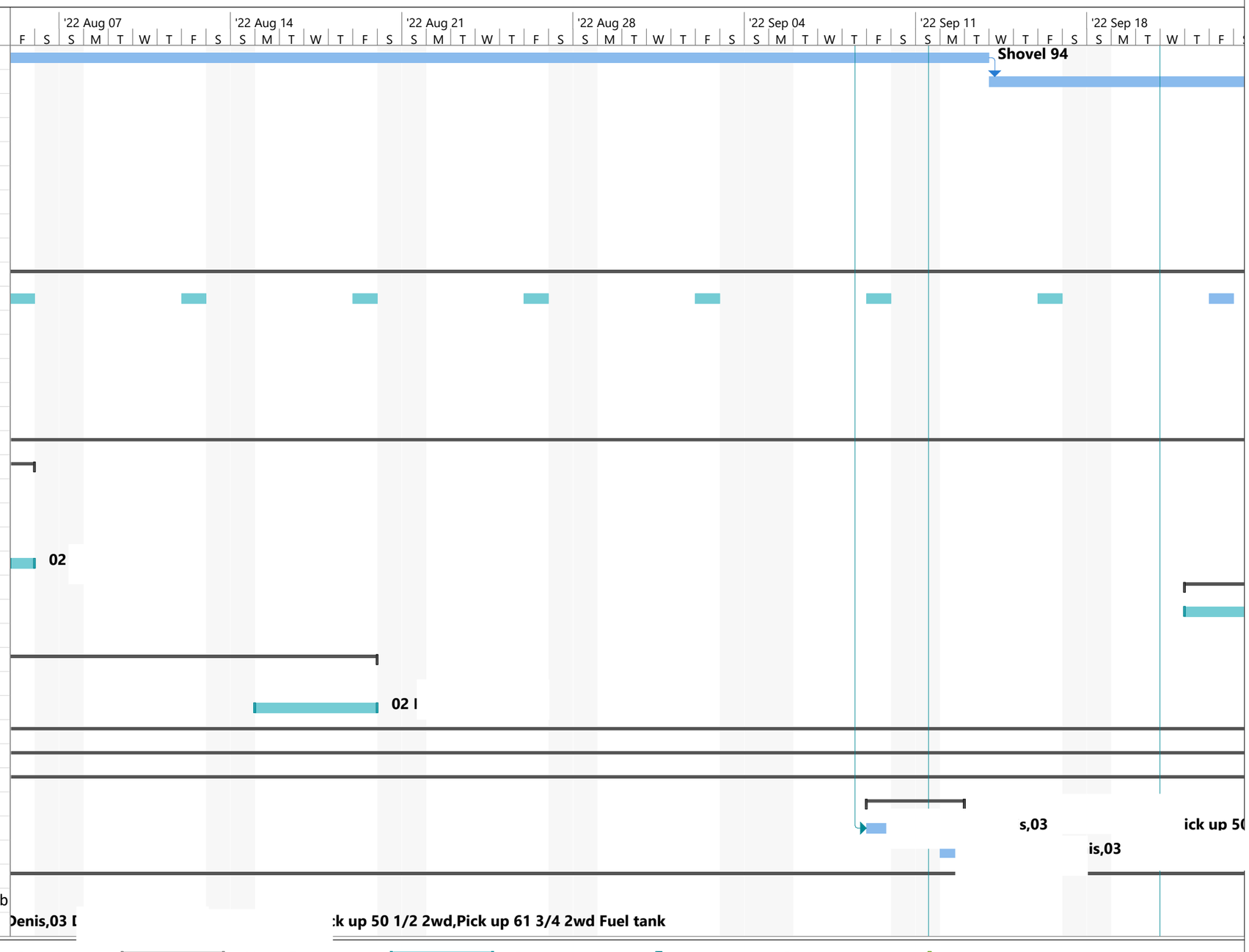
Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
37		Autumn Brushing
38		Catch basin cleaning
39		Landscape accessory maintenance
40		**Type 5 activities before winter**
41		loading up winter storage
42		Clean catch basins with sewer sucker truck
43		Preperation for winter sidewalks
44		Tandem winter conversion
45		Winter Dry Run
46		**Recurring Activities**
47		**Empty garbage cans**
75		**Public Relations Work**
76		Clean out molding building
77		Alexandria Garbage x2 per week
78		moving boxes for the archives
79		move speed signs to requested location
80		**Vacations**
81		
82		1
83		2
84		3
85		4
86		
87		1
88		
89		
90		1
91		2
92		**Kenyon**
93		**Operations**
94		**Event Preperation**
95		**Dunvegan living history day**
96		Put 1812 banners up
97		Take 1812 banners down
98		**Highland games**
99		hang flower baskets, highland game banners and b
100		Maxville clean up for highland games



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Task	Project Summary	Manual Task	Start-only	Deadline
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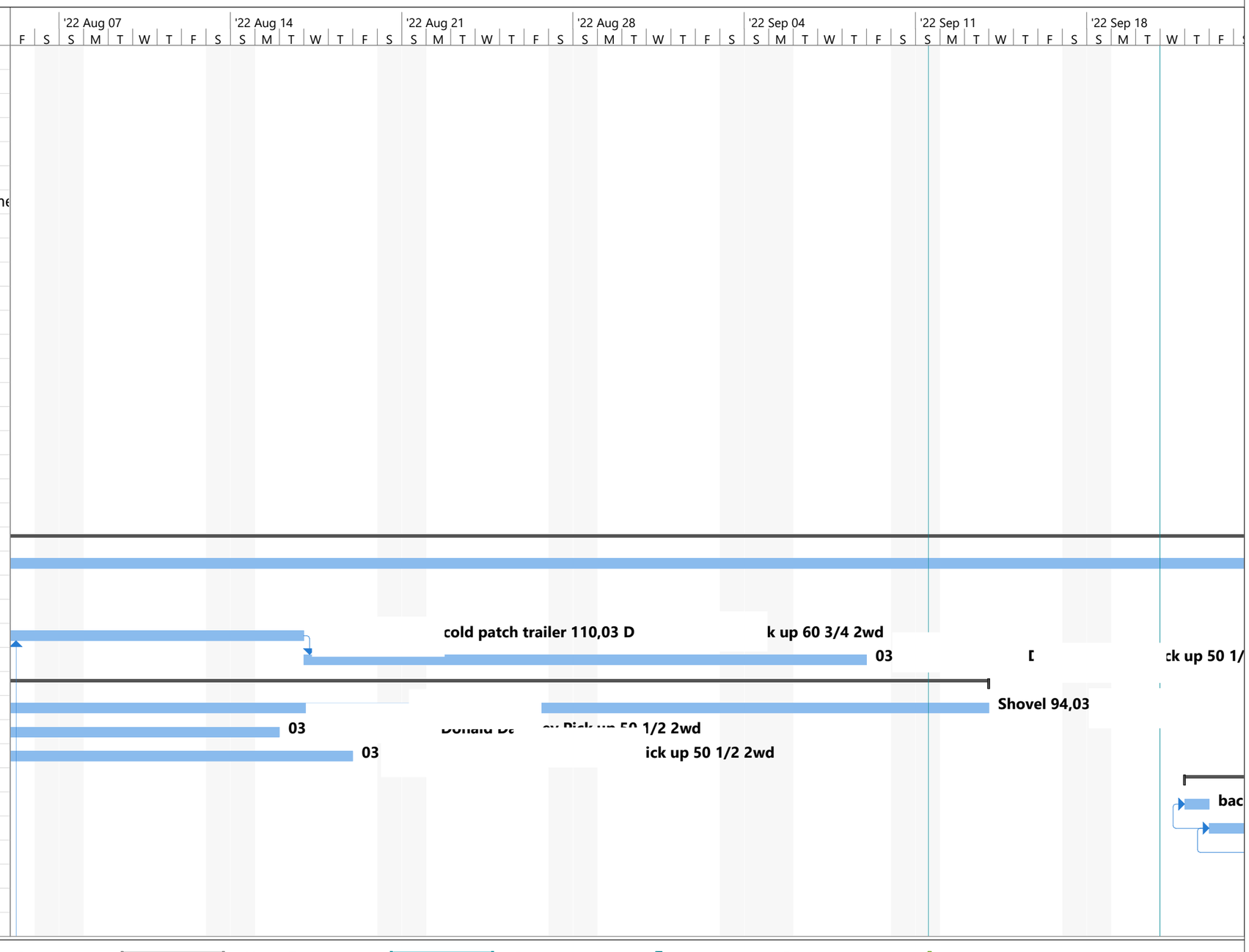
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

Work Plan Roads

ID	Task Mode	Task Name
101		remove maxville decorations
102		Canada Day
103		**Rememberence Day**
104		Putting up banners for rememberance day
105		taking down banners for rememberance day
106		**Type 1 activities after snow has melted**
107		Spring inspections, culverts, condition of roads, ditche
108		Grading
109		Wash and sweep sidewalks and bridges
110		Initial cold patch
111		post winter equipment maintenance
112		Spring brushing
113		**Type 2 activities after half loads**
114		Spring Gravel
115		Dust treatment
116		Snow plough damage repair
117		Replacing sidewalk panels
118		culvert repairs per culvert
119		Put up speed control signs
120		put the flags up at cenotaph
121		**Type 3 activities need warm weather**
122		roadside grass cutting
123		washing bridges Kenyon
124		line painting Kenyon
125		Warm weather patching
126		trim brush around bridges and guardrails
127		**Type 4 activities after spring growth**
128		Autumn Brushing
129		Catch basin cleaning
130		Landscape accessory maintenance
131		**Type 5 activities before winter**
132		loading up winter storage
133		Clean catch basins with sewer sucker truck
134		Preperation for winter sidewalks
135		Tandem winter conversion
136		Winter Dry Run
137		**Public Relations Work**



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Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
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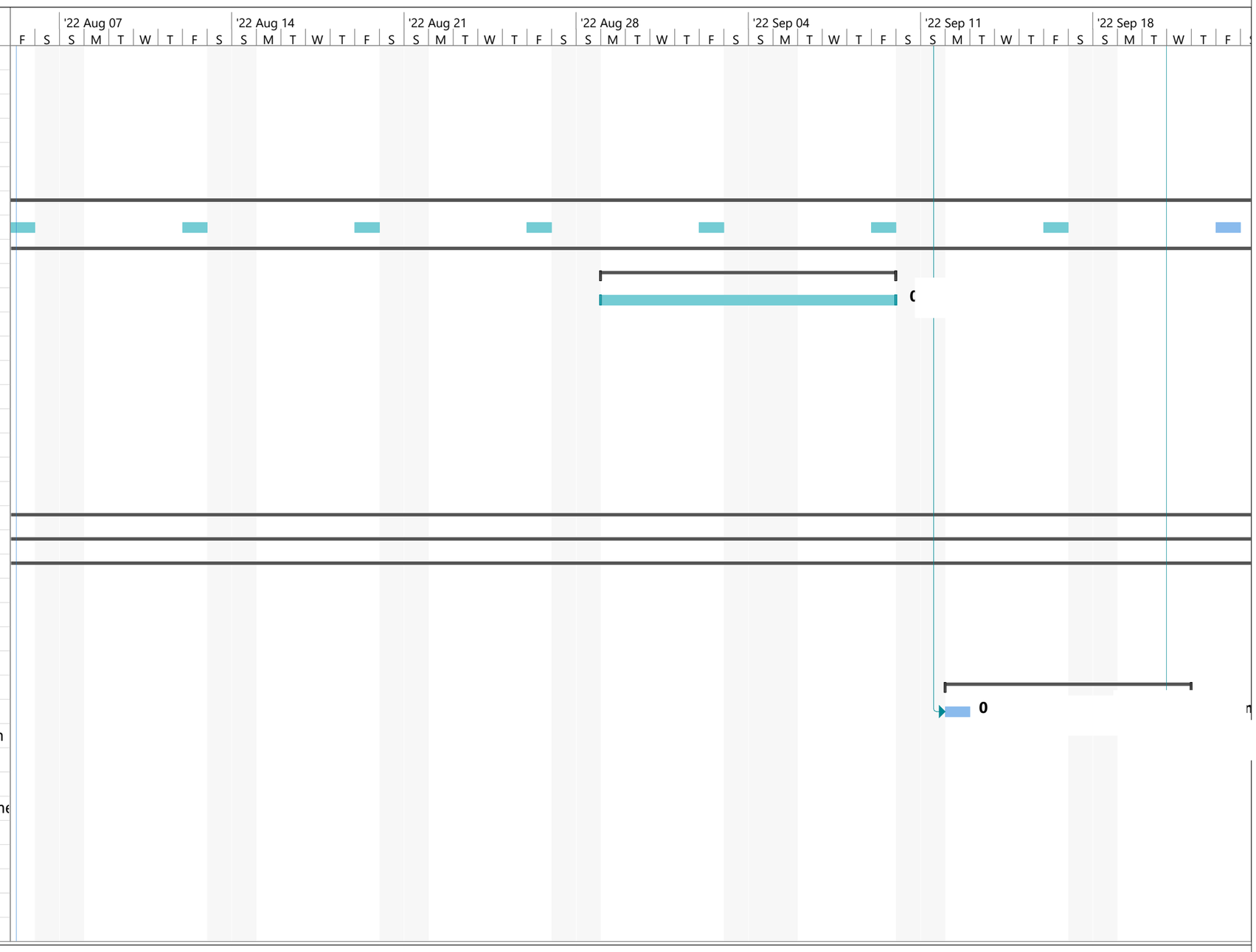
Work Plan Roads

ID	Task Mode	Task Name
138		Clean out molding building
139		Alexandria Garbage x2 per week
140		moving boxes for the archives
141		move speed signs to requested location
142		**Emergency Activities**
143		Storm damage
144		**Recurring Activities**
145		**Empty garbage cans**
173		**Vacations**
174		
175		
176		
177		1
178		
179		
180		1
181		
182		
183		
184		**Alexandria**
185		**Operations**
186		**Event Preperation**
187		Canada Day
188		**Rememberence Day**
189		Putting up banners for rememberance day
190		taking down banners for rememberance day
191		**Community Living**
192		putting up banners for the community living run
193		taking down banners for the community living run
194		**Type 1 activities after snow has melted**
195		Alexandria wash and sweep sidewalks and islands
196		Spring inspections, culverts, condition of roads, ditche
197		post winter equipment maintenance
198		**Type 2 activities after half loads**
199		Initial cold patch
200		Snow plough damage repair
201		Alexandria washing of three bridges



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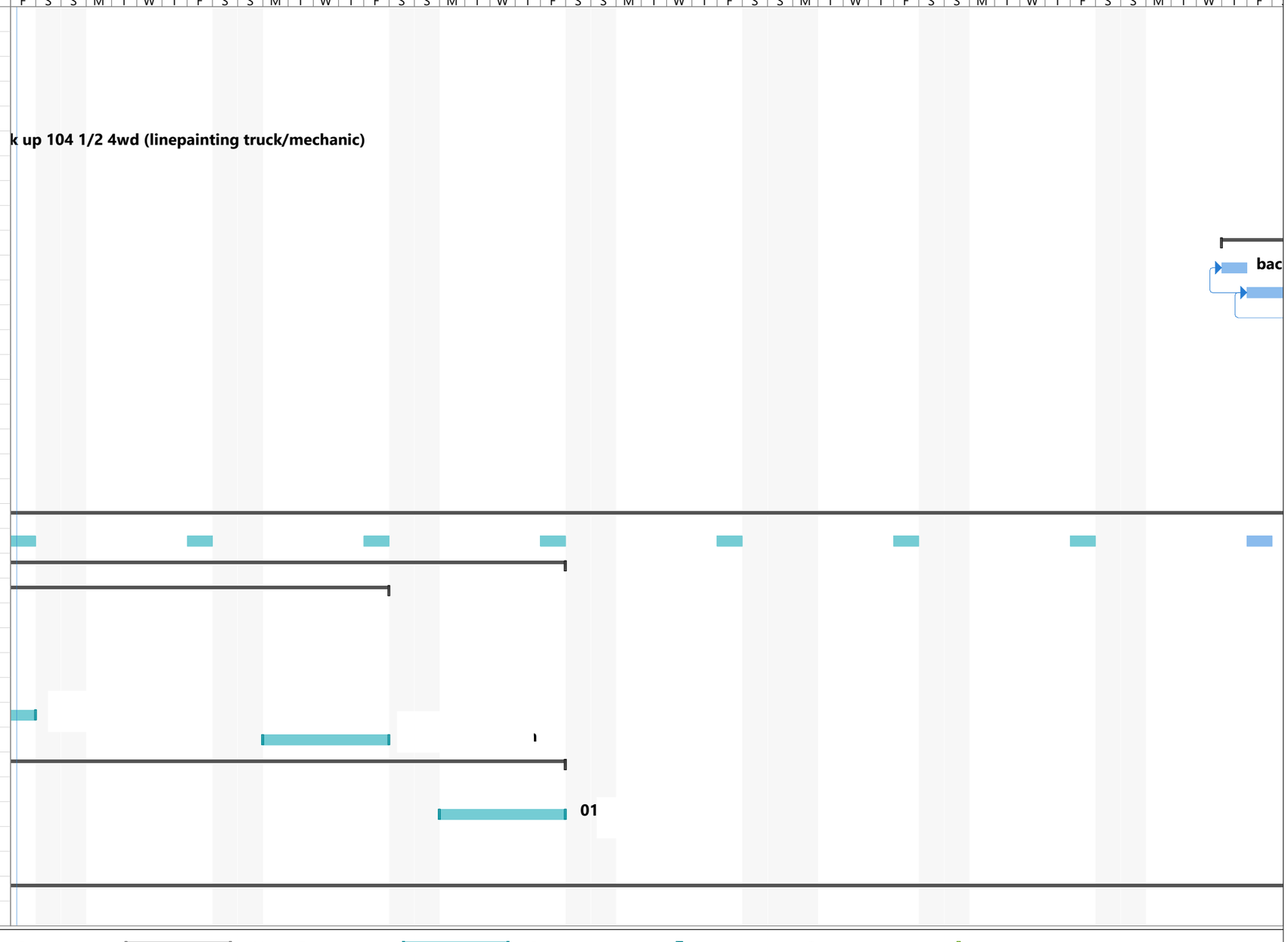
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

ID	Task Mode	Task Name
202		Alexandria setting out mill square
203		Put up speed control signs
204		Alexandria sidewalk repairs and maintenance
205		**Type 3 activities need warm weather**
206		put the flags up at cenotaph
207		line painting Alexandria
208		Weed harvesting for Canada Day
209		Remaining weed harvesting
210		cold patching
211		**Type 5 activities before winter**
212		loading up winter storage
213		Clean catch basins with sewer sucker truck
214		Preperation for winter sidewalks
215		Tandem winter conversion
216		Winter Dry Run
217		**Public Relations Work**
218		Clean out molding building
219		Alexandria Garbage x2 per week
220		moving boxes for the archives
221		move speed signs to requested location
222		**Recurring Activities**
223		**Empty garbage cans**
251		**Vacations**
252		
253		
254		2
255		3
256		4
257		5
258		6
259		
260		
261		2
262		
263		
264		**Joint Operations**
265		**Equipment maintenance**



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Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
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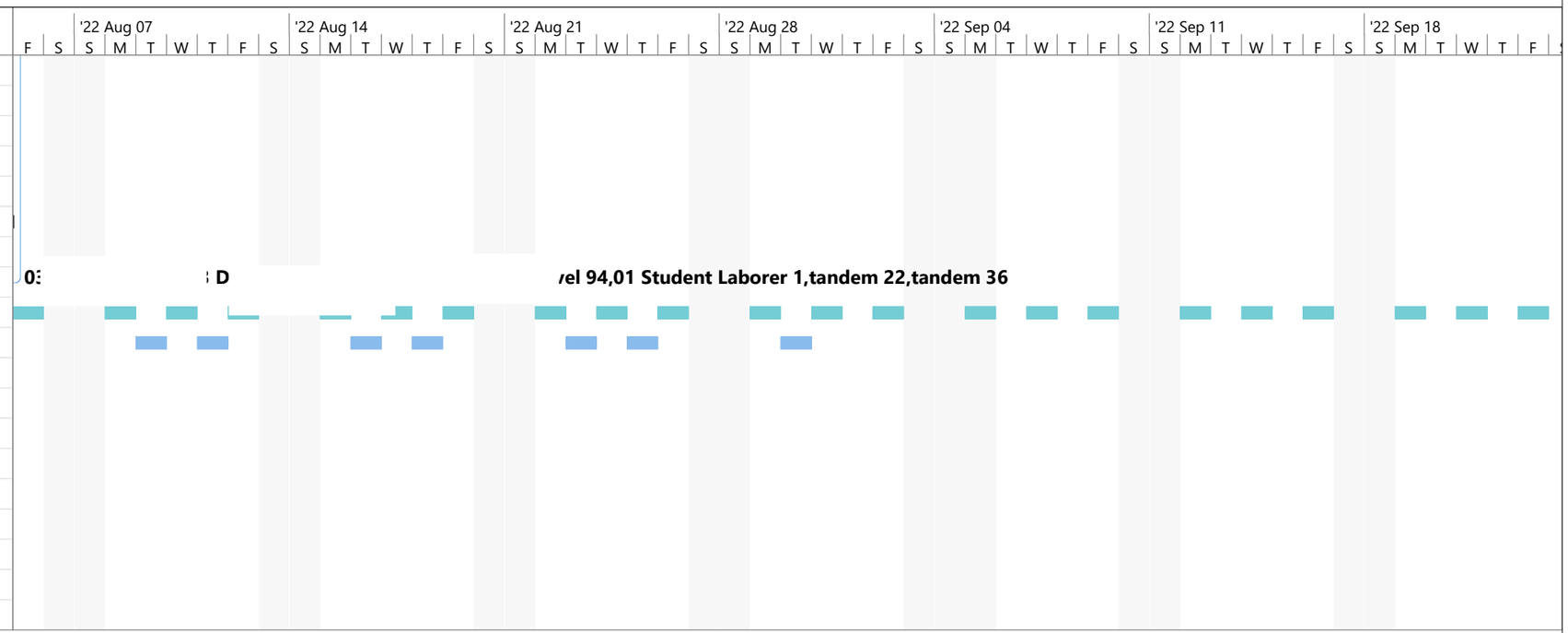
Work Plan Roads

ID	Task Mode	Task Name
266		Loader
267		**Emergency Activities**
268		Storm damage
269		**Emergency Activities**
270		Storm damage
271		**Type 3 Ditch Maintenance**
272		Summer brushing RAZOR
273		Ditching + edge dozer
274		**Watering flowers**
333		**Whipper Snipping**
360		**Training**
361		Mental Health First Aid Training
362		Roadschool - 2 year basic TJ Mahoney
363		grader not ground force - Gueph
364		loader backhoe
365		Shovel
366		snowplough refresher
367		Book 7 training
368		basics of supervision



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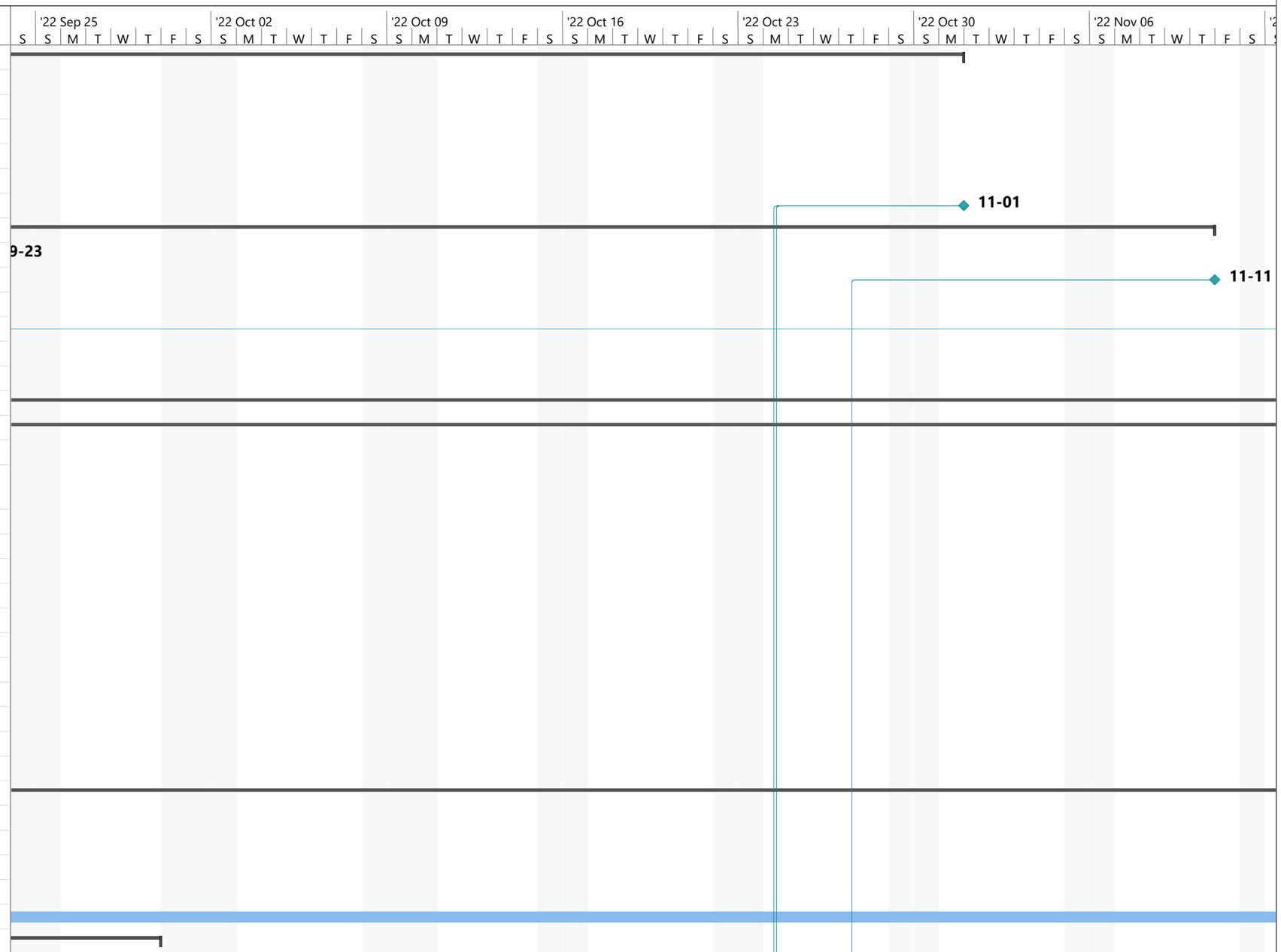
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
1		**Enviromental Factors**
2		Snow has melted
3		Half loads
4		Warm weather
5		permit for weed harvesting
6		After spring growth
7		Winter season start
8		**Township Events**
9		Dunvegan living history day
10		rememberence day
11		community living run
12		Highland games
13		New building move in
14		Canada Day
15		**Lochiel**
16		**Operations**
17		**Type 1 activities after snow has melted**
18		Spring inspections, culverts, condition of roads, ditches etc
19		Grading
20		Lochiel wash and sweep sidewalks and bridges
21		post winter equipment maintenance
22		Lochiel cold patch
23		**Type 2 activities after half loads**
24		Spring Gravel
25		Dust treatment
26		Snow plough damage repair
27		Put up speed control signs
28		Replacing sidewalk panels
29		culvert repairs per culvert
30		**Type 3 activities need warm weather**
31		line painting Lochiel
32		trim brush around bridges and guardrails
33		washing bridges Lochiel
34		Warm weather patching
35		roadside grass cutting
36		**Type 4 activities after spring growth**



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Summary	Inactive Summary	Manual Summary	External Milestone		

ID	Task Mode	Task Name
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38		Catch basin cleaning
39		Landscape accessory maintenance
40		**Type 5 activities before winter**
41		loading up winter storage
42		Clean catch basins with sewer sucker truck
43		Preperation for winter sidewalks
44		Tandem winter conversion
45		Winter Dry Run
46		**Recurring Activities**
47		**Empty garbage cans**
75		**Public Relations Work**
76		Clean out molding building
77		Alexandria Garbage x2 per week
78		moving boxes for the archives
79		move speed signs to requested location
80		**Vacations**
81		
82		
83		2
84		3
85		
86		
87		1
88		
89		
90		1
91		2
92		**Kenyon**
93		**Operations**
94		**Event Preperation**
95		**Dunvegan living history day**
96		Put 1812 banners up
97		Take 1812 banners down
98		**Highland games**
99		hang flower baskets, highland game banners and b
100		Maxville clean up for highland games

'22 Sep 25 | '22 Oct 02 | '22 Oct 09 | '22 Oct 16 | '22 Oct 23 | '22 Oct 30 | '22 Nov 06

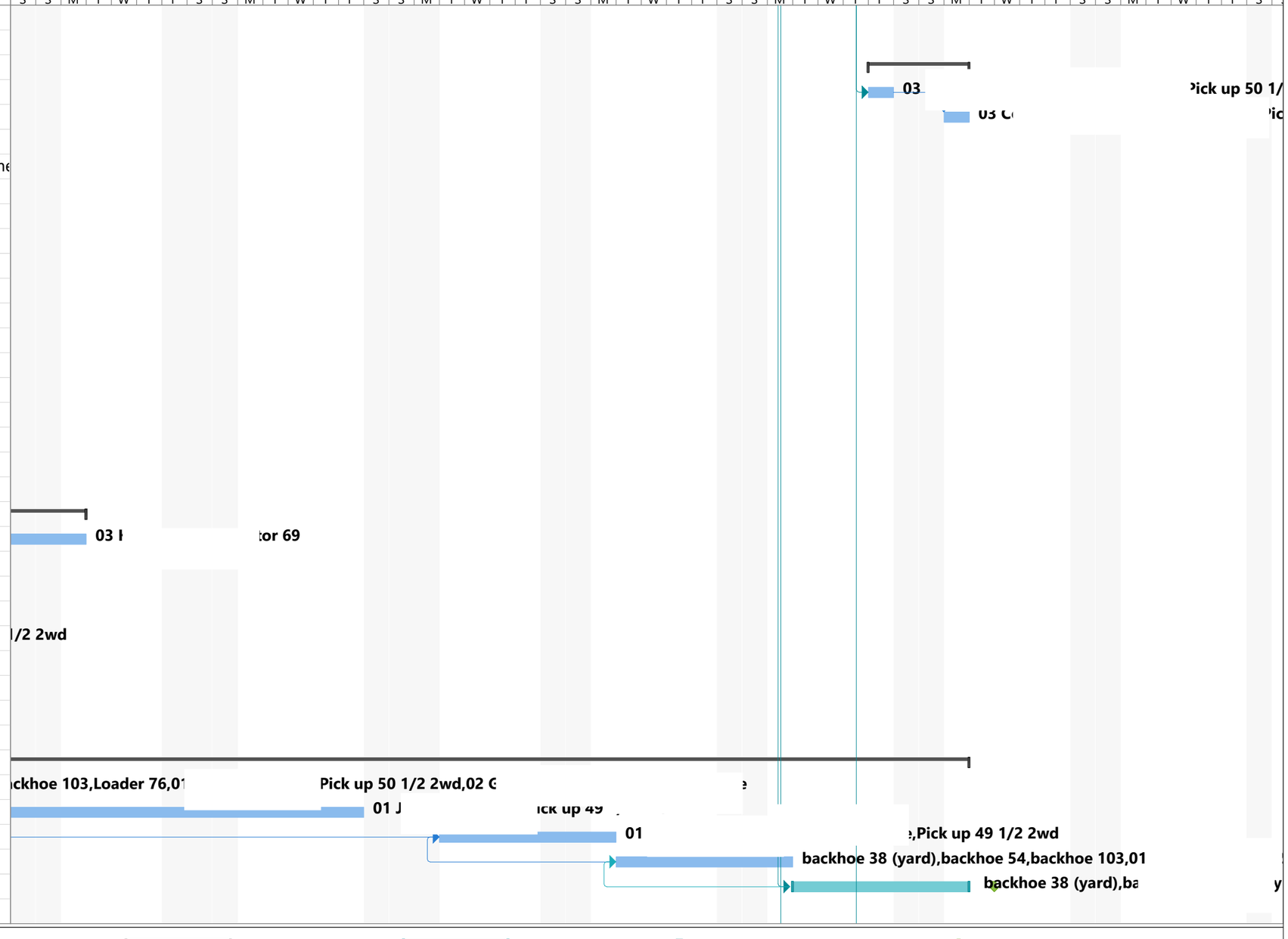
S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S S M T W T F S

Project: Roads Workplan set da
Date: Mon 22-06-06

Task | Split | Milestone | Summary
Project Summary | Inactive Task | Inactive Milestone | Inactive Summary
Manual Task | Duration-only | Manual Summary Rollup | Manual Summary
Start-only | Finish-only | External Tasks | External Milestone
Deadline | Progress | Manual Progress

Work Plan Roads

ID	Task Mode	Task Name
101		remove maxville decorations
102		Canada Day
103		**Rememberence Day**
104		Putting up banners for rememberance day
105		taking down banners for rememberance day
106		**Type 1 activities after snow has melted**
107		Spring inspections, culverts, condition of roads, ditche
108		Grading
109		Wash and sweep sidewalks and bridges
110		Initial cold patch
111		post winter equipment maintenance
112		Spring brushing
113		**Type 2 activities after half loads**
114		Spring Gravel
115		Dust treatment
116		Snow plough damage repair
117		Replacing sidewalk panels
118		culvert repairs per culvert
119		Put up speed control signs
120		put the flags up at cenotaph
121		**Type 3 activities need warm weather**
122		roadside grass cutting
123		washing bridges Kenyon
124		line painting Kenyon
125		Warm weather patching
126		trim brush around bridges and guardrails
127		**Type 4 activities after spring growth**
128		Autumn Brushing
129		Catch basin cleaning
130		Landscape accessory maintenance
131		**Type 5 activities before winter**
132		loading up winter storage
133		Clean catch basins with sewer sucker truck
134		Preperation for winter sidewalks
135		Tandem winter conversion
136		Winter Dry Run
137		**Public Relations Work**

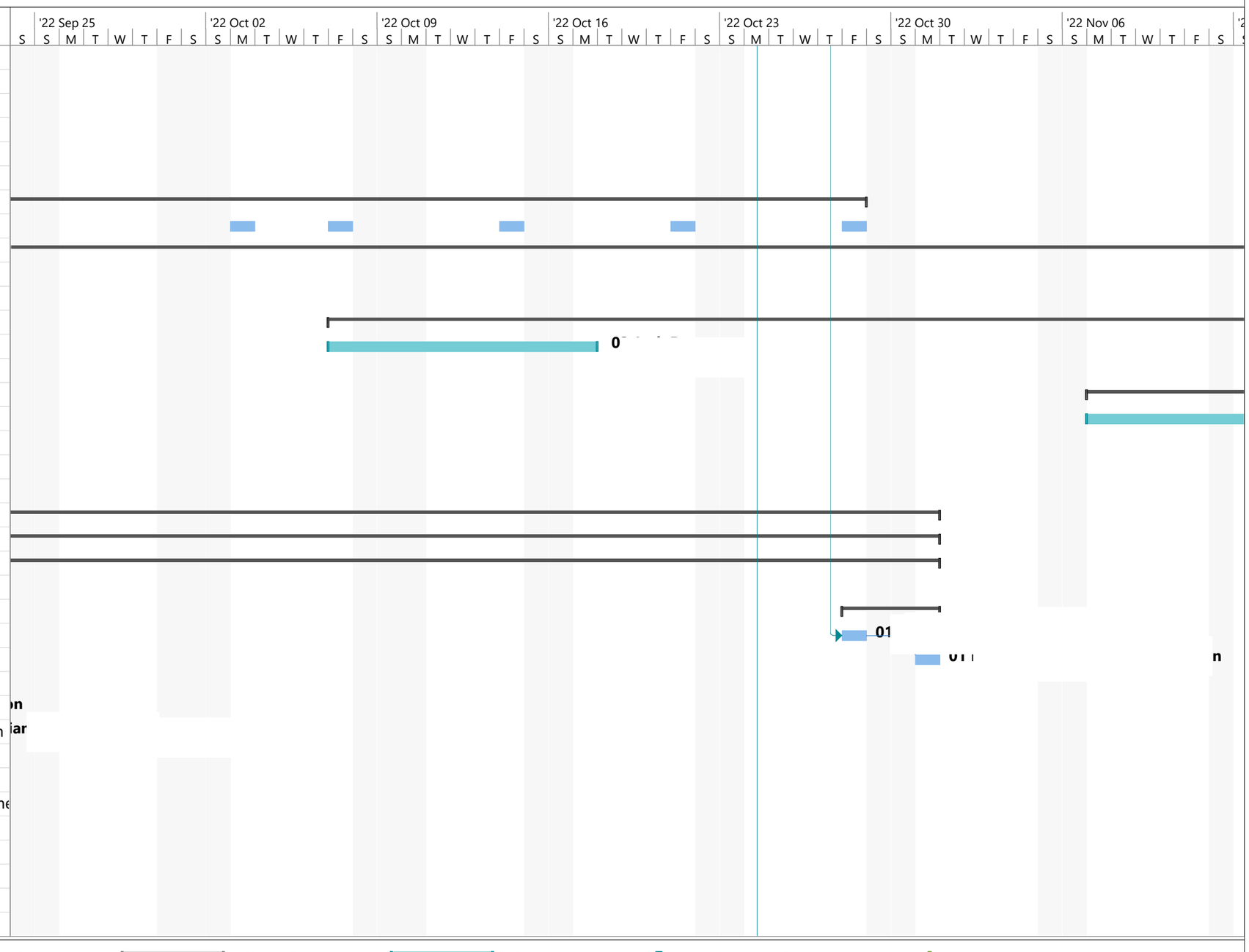


Project: Roads Workplan set da
Date: Mon 22-06-06

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
138		Clean out molding building
139		Alexandria Garbage x2 per week
140		moving boxes for the archives
141		move speed signs to requested location
142		**Emergency Activities**
143		Storm damage
144		**Recurring Activities**
145		**Empty garbage cans**
173		**Vacations**
174		
175		
176		
177		
178		2
179		
180		
181		
182		
183		
184		**Alexandria**
185		**Operations**
186		**Event Preperation**
187		Canada Day
188		**Rememberence Day**
189		Putting up banners for rememberance day
190		taking down banners for rememberance day
191		**Community Living**
192		putting up banners for the community living run
193		taking down banners for the community living run
194		**Type 1 activities after snow has melted**
195		Alexandria wash and sweep sidewalks and islands
196		Spring inspections, culverts, condition of roads, ditche
197		post winter equipment maintenance
198		**Type 2 activities after half loads**
199		Initial cold patch
200		Snow plough damage repair
201		Alexandria washing of three bridges



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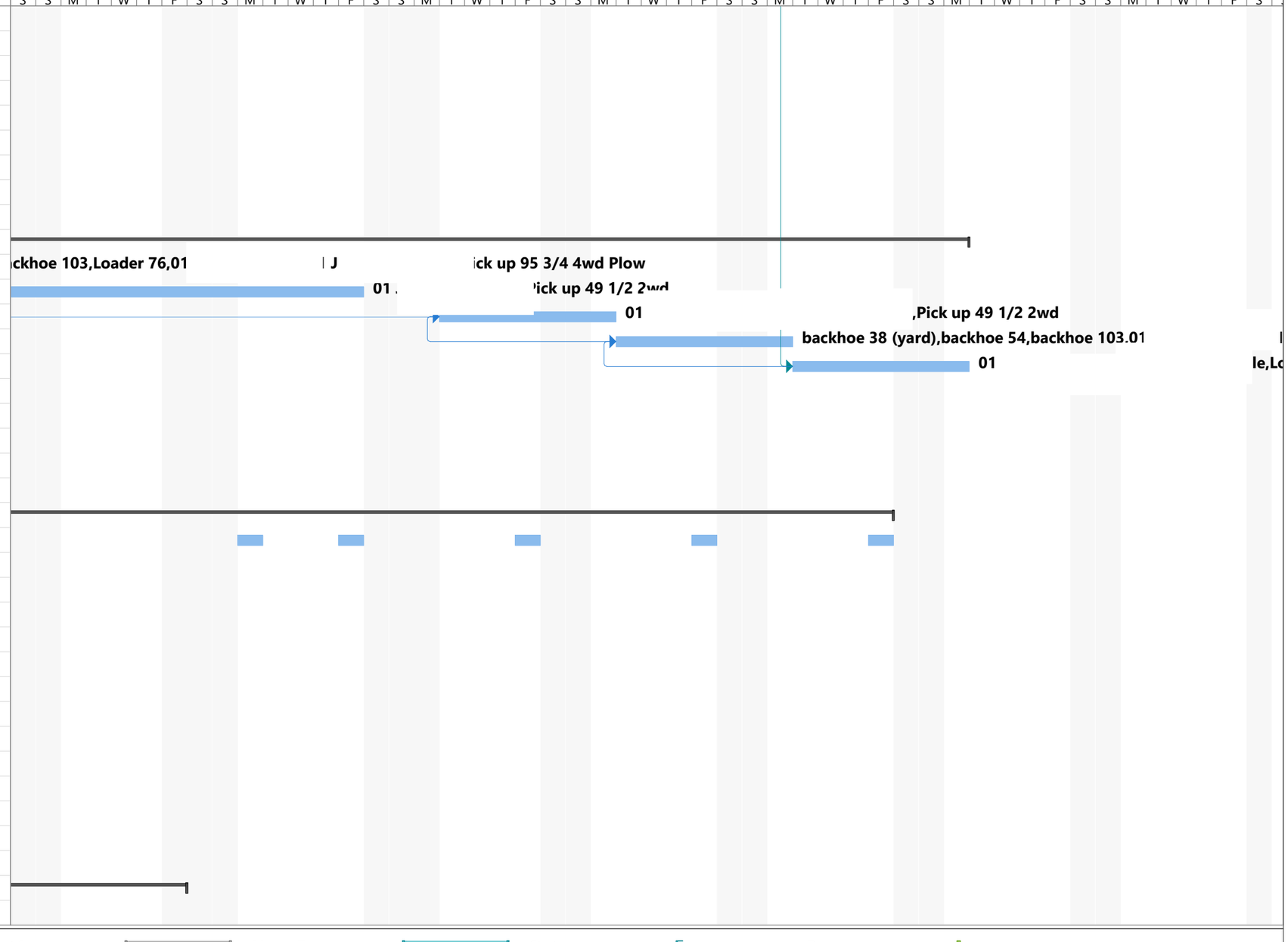
Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone

Work Plan Roads

ID	Task Mode	Task Name
202		Alexandria setting out mill square
203		Put up speed control signs
204		Alexandria sidewalk repairs and maintenance
205		**Type 3 activities need warm weather**
206		put the flags up at cenotaph
207		line painting Alexandria
208		Weed harvesting for Canada Day
209		Remaining weed harvesting
210		cold patching
211		**Type 5 activities before winter**
212		loading up winter storage
213		Clean catch basins with sewer sucker truck
214		Preperation for winter sidewalks
215		Tandem winter conversion
216		Winter Dry Run
217		**Public Relations Work**
218		Clean out molding building
219		Alexandria Garbage x2 per week
220		moving boxes for the archives
221		move speed signs to requested location
222		**Recurring Activities**
223		**Empty garbage cans**
251		**Vacations**
252		
253		
254		2
255		3
256		4
257		5
258		6
259		
260		1
261		2
262		
263		1
264		**Joint Operations**
265		**Equipment maintenance**



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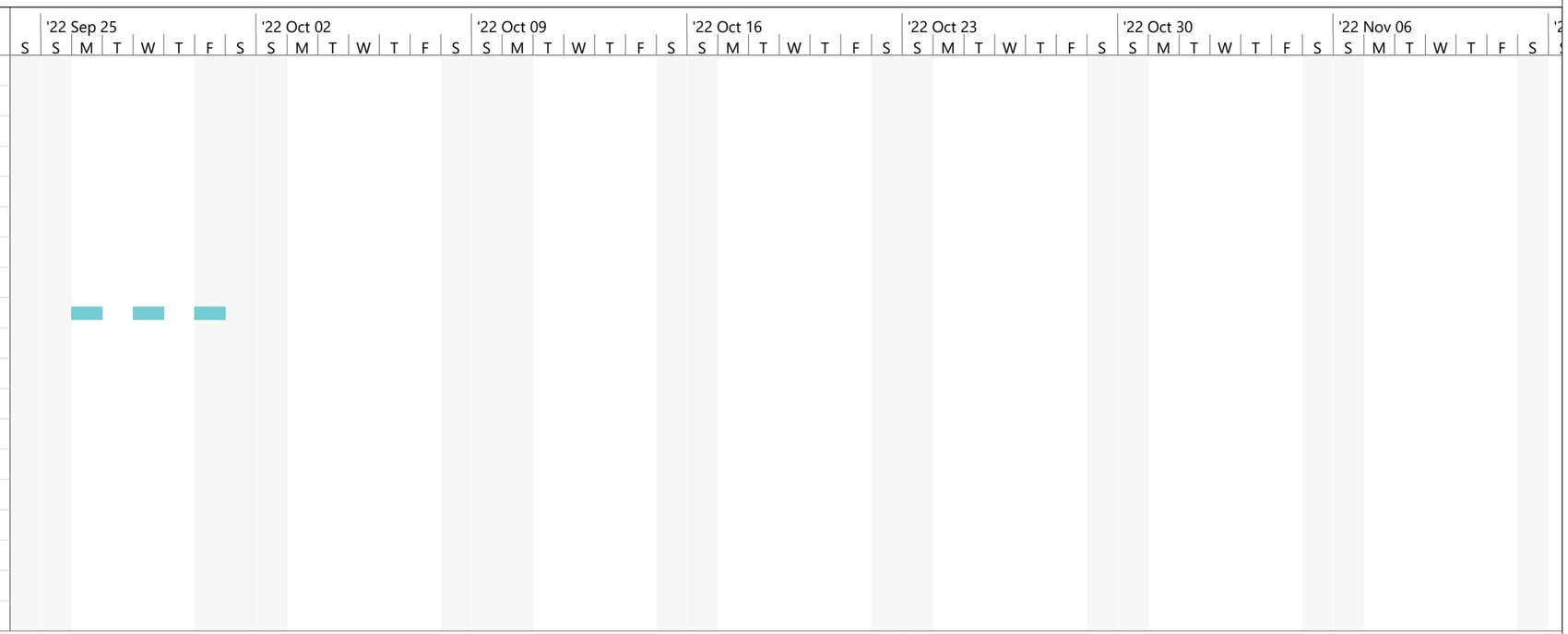
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

Work Plan Roads

ID	Task Mode	Task Name
266		Loader
267		**Emergency Activities**
268		Storm damage
269		**Emergency Activities**
270		Storm damage
271		**Type 3 Ditch Maintenance**
272		Summer brushing RAZOR
273		Ditching + edge dozer
274		**Watering flowers**
333		**Whipper Snipping**
360		**Training**
361		Mental Health First Aid Training
362		Roadschool - 2 year basic TJ Mahoney
363		grader not ground force - Gueph
364		loader backhoe
365		Shovel
366		snowplough refresher
367		Book 7 training
368		basics of supervision



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Summary	Inactive Summary	Manual Summary	External Milestone		

Township of North Glengarry | Canton de Glengarry Nord
3720 Cty Rd 34 | 3720 Route de comté 34
Alexandria ON K0C 1A0
Telephone: 613-525-1110 | Email: info@northglengarry.ca

Traffic Summary

Station # - 000001, McCormick Rd
Date - 0:00 August 24, 2022 to 0:00 October 28, 2022 (65 days of data)

Volume

	Total	Weekday	Weekend	ADT	AWDT	AWET
Combined	45066	34342	10724	693	731	596
East	22051	16891	5160	339	359	287
West	23015	17451	5564	354	371	309
Days	65	47	18	65	47	18

Speed

	All Days	Weekdays	Weekend	
Mean speed	87.9	87.9	88.1	km/h
Median speed	88.7	88.7	88.9	km/h
85% speed	102.2	102.1	102.4	km/h

PSL = 60 km/h

Class

Class (*Scheme F3*)	All Days	%	Weekdays	Weekend
1 - CYCLE	821	1.822%	421	400
2 - PC	28588	63.44%	21273	7315
3 - 2A-4T	11411	25.32%	9008	2403
4 - BUS	431	0.956%	397	34
5 - 2A-6T	3053	6.775%	2614	439
6 - 3A-SU	301	0.668%	227	74
7 - 4A-SU	38	0.084%	21	17
8 - <5A DBL	23	0.051%	22	1
9 - 5A DBL	201	0.446%	181	20
10 - >6A DBL	142	0.315%	135	7
11 - <6A MULTI	0	0.000%	0	0
12 - 6A MULTI	0	0.000%	0	0
13 - >6A MULTI	57	0.126%	43	14

Average Daily Volume

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
East	307	351	366	372	398	324	249
West	318	371	368	392	405	344	275
Combined	625	723	734	764	804	668	524
AM Pk East	19	21	22	22	23	26	19
PM Pk East	31	38	41	38	42	32	26
AM Pk West	35	46	41	48	40	31	23
PM Pk West	27	28	28	30	32	29	25
Days	9	9	10	10	9	9	9

Township of North Glengarry | Canton de Glengarry Nord
3720 Cty Rd 34 | 3720 Route de comté 34
Alexandria ON K0C 1A0
Telephone: 613-525-1110 | Email: info@northglengarry.ca

Speed Study Summary

Station # - 000001, McCormick Rd
Date - 0:00 August 24, 2022 to 0:00 October 28, 2022 (65 days of data)

Volume

	Total	Weekday	Weekend	ADT	AWDT	AWET
Combined	45072	34348	10724	693	731	596
East	22055	16895	5160	339	359	287
West	23017	17453	5564	354	371	309
Days	65	47	18	65	47	18

PSL = 60 km/h

Speed combined

Bin (km/h)	##Speed Bin?##	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120	120 - 130	130 - 140
Total (45072)	**##SpeedBin?##**	**116**	**272**	**358**	**345**	**874**	**2540**	**6814**	**12916**	**12176**	**5988**	**1877**	**533**	**183**
Percent	##Speed Bin?##%	0.257%	0.603%	0.794%	0.765%	1.939%	5.635%	15.12%	28.66%	27.01%	13.29%	4.164%	1.183%	0.406%

Average speed = 87.9 km/h | 50% speed = 88.7 km/h | 85% speed = 102.2 km/h | 95% speed = 111.4 km/h
ADT = 693 | 20km/h pace (79.4) 25127 (55.75%) | Speeding = 43101 (95.63%) | Mean exceeding = 89.9 km/h

Speed East

Bin (km/h)	##Speed Bin?##	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120	120 - 130	130 - 140
Total (22055)	**##SpeedBin?##**	**51**	**137**	**194**	**105**	**349**	**1315**	**3803**	**7172**	**6058**	**2173**	**510**	**131**	**40**
Percent	##Speed Bin?##%	0.231%	0.621%	0.880%	0.476%	1.582%	5.962%	17.24%	32.52%	27.47%	9.853%	2.312%	0.594%	0.181%

Average speed = 86.2 km/h | 50% speed = 87.1 km/h | 85% speed = 98.8 km/h | 95% speed = 106.6 km/h
ADT = 339 | 20km/h pace (77.6) 13498 (61.20%) | Speeding = 21215 (96.19%) | Mean exceeding = 87.9 km/h

Speed West

Bin (km/h)	##Speed Bin?##	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120	120 - 130	130 - 140
Total (23017)	**##SpeedBin?##**	**65**	**135**	**164**	**240**	**##SpeedBin?##**	**1225**	**3011**	**5744**	**6118**	**3815**	**1367**	**402**	**##SpeedBin?##**
Percent	##Speed Bin?##%	0.282%	0.587%	0.713%	1.043%	2.281%	5.322%	13.08%	24.96%	26.58%	16.57%	5.939%	1.747%	0.621%

Average speed = 89.6 km/h | 50% speed = 90.5 km/h | 85% speed = 105.1 km/h | 95% speed = 114.5 km/h
ADT = 354 | 20km/h pace (81.7) 11976 (52.03%) | Speeding = 21886 (95.09%) | Mean exceeding = 91.9 km/h

NORTH GLENGARRY NORD

Ontario's Celtic Heartland
Le centre celtique de l'Ontario

Speed Bins Summary

McCormick Road

August 23, 2022 to October 28, 2022

Time	10KM-20KM	20KM-30KM	30KM-40KM	40KM-50KM	50KM-60KM	60KM-70KM	70KM-80KM	80KM-90KM	90KM-100KM	100KM-110KM	110KM-120KM	120KM-130KM	130KM-140KM	140KM-150KM	150KM-160KM
0:00	0	0	0	2	2	2	17	41	35	22	10	4	0	3	1
1:00	0	0	0	2	1	7	7	25	24	11	4	2	1	1	2
2:00	0	1	0	0	0	7	13	25	22	13	5	1	0	1	0
3:00	0	0	0	1	2	13	13	15	14	8	4	0	0	0	0
4:00	1	0	0	0	1	13	23	25	29	28	32	24	10	2	0
5:00	0	1	0	0	1	7	30	128	97	70	26	11	7	2	1
6:00	0	4	2	2	23	51	199	424	361	180	48	27	7	2	2
7:00	4	6	5	8	39	187	478	750	873	530	175	48	27	3	2
8:00	1	7	15	16	51	129	338	716	680	384	140	22	2	2	1
9:00	5	8	19	15	61	180	476	784	647	350	97	27	6	1	1
10:00	11	16	29	27	59	179	466	855	729	333	69	26	5	1	1
11:00	7	28	30	26	52	192	510	889	772	364	124	24	11	6	1
12:00	4	28	31	55	73	211	522	1014	875	412	130	23	13	3	0
13:00	12	30	38	38	85	271	623	964	859	398	118	30	7	0	0
14:00	2	34	43	39	63	225	724	1047	936	379	120	33	12	1	3
15:00	15	26	22	29	56	166	552	1174	1034	478	115	33	5	2	2
16:00	14	31	39	19	60	187	437	1068	1227	563	174	46	17	6	1
17:00	7	17	27	22	105	160	413	1022	1147	547	147	37	8	4	0
18:00	6	12	21	15	66	101	316	691	656	368	129	34	10	1	1
19:00	13	13	8	9	46	112	235	488	468	211	64	22	11	3	1
20:00	5	6	6	7	18	65	186	322	293	145	45	20	10	4	1
21:00	9	5	10	3	11	37	123	180	146	79	50	24	7	0	1
22:00	0	0	10	8	2	30	68	154	108	53	27	9	4	1	2
23:00	0	0	3	2	1	14	50	131	160	70	27	8	4	1	0
Total	**116**	**273**	**358**	**345**	**878**	**2546**	**6819**	**12932**	**12192**	**5996**	**1880**	**535**	**184**	**50**	**24**

Appendix D: When to Pave a Gravel* Road

by Kentucky Transportation Center, University of Kentucky at Lexington,KY

Contents

*Gravel as used here may refer to sand and gravel,or to crushed stone.

A Word About the Term "Paved"

What is meant by a "paved" road? For some, a light chip seal coat is considered paving. For others, paving is four or more inches of bituminous asphalt or "hot mix." The primary purpose of a pavement is to protect the subgrade. As the loads get heavier, the pavement thickness must be increased.

Generally speaking, bituminous concrete (hot mix asphalt) has little real load-bearing capacity of its own until it reaches a thickness of two inches. In fact, the Asphalt Institute has a firm policy of recommending a minimum pavement thickness of 4 inches full depth asphalt or 3 inches asphaltic concrete plus a suitable granular base even for low volume roads. Their research shows that 4 inches of hot mix will carry about 10 times as much traffic as 2 inches of hot mix when constructed over thin granular bases.

A pavement less than two inches thick primarily protects the base materials by shedding water and providing a smooth riding surface. Such a road is more properly called a surface-treated road. Roads with thin pavements must have excellent drainage designed into them and be diligently maintained throughout their service life.

In this paper we will consider even a light surface treatment as paving,however. The assumption is that,when a town first applies a chip seal treatment,for example, it has taken a first step toward eventually achieving a load-bearing pavement.

Introduction

Two-thirds of the highway systems in the United States and more than 90 percent of all the roads in the world are unsurfaced or lightly surfaced low volume roads. In Kentucky, more than 19,000 miles of local roads have gravel surfaces.

Most local roads were not designed with the same considerations used in the design of state and interstate highways. Most have evolved from primitive trails. Paths of least resistance first created by wild animals were later used by settlers. As needs and traffic increased, these traveled ways became roads which were gradually improved with gravel or crushed rock. Little engineering went into these improvements. Using available materials and "keeping them out of the mud" were the extent of efforts to maintain a road.

As paving occurred, the tendency was to make minor modifications to the foundations of the evolved road and to seal or pave the surface. As a result,many low volume roads in Kentucky now have continual maintenance problems because of inadequate base support in addition to alignment and drainage problems.

To add to the problem, roads throughout Kentucky are experiencing ever-increasing weights and volumes of traffic. Population growth and tourism make traffic demands. Coal trucks and other commercial vehicles are carrying heavier loads than ever before. These higher volumes and greater weights are putting a steadily increasing strain on local road maintenance and reconstruction budgets.

Gravel or Paved: A Matter of Trade-Offs

The decision to pave is a matter of trade-offs. Paving helps to seal the surface from rainfall, and thus protects the base and subgrade material.It eliminates dust problems, has high user acceptance because of increased smoothness, and can accommodate many types of vehicles such as tractor-trailers that do not operate as effectively on unsurfaced roads.

In spite of the benefits of paved roads, well-maintained gravel roads are an effective alternative. In fact, some local agencies are reverting to gravel roads. Gravel roads have the advantage of lower construction and sometimes lower maintenance costs. They may be easier to maintain, requiring less equipment and possibly lower operator skill levels. Potholes can be patched more effectively. Gravel roads generate lower speeds than paved surfaces. Another advantage of the unpaved road is its forgiveness of external forces. For example, today vehicles with gross weights of 100,000 pounds or more operate on Kentucky's local roads. Such vehicles would damage a lightly paved road so as to require resealing, or even reconstruction. The damage on a gravel road would be much easier and less expensive to correct.

There is nothing wrong with a good gravel road. Properly maintained, a gravel road can serve general traffic adequately for many years.

Should We Pave This Gravel Road? A Ten Part Answer

When a local government considers paving a road,it is usually with a view toward reducing road maintenance costs and providing a smooth riding surface. But is paving always the right answer? After all, paving is expensive. How does a county or city know it is making the most cost-effective decision?

We will consider ten answers to the question,"Should we pave this gravel road?" In fact they are ten parts of one answer. If one of the ten is not considered, the final decision may not be complete. The ten answers taken together provide a framework for careful decision making.

Answer 1: After Developing a Road Management Program

If the road being considered for paving does not fit into a countywide road improvement program,it is quite possible that funds will not be used to the fullest advantage. The goal of a road management system is to improve all roads or streets by using good management practices. A particular road is only one of many in the road system.

A road management system is a common sense, step-by-step approach to scheduling and budgeting for road maintenance work. It consists of surveying the mileage and condition of all roads in the system,establishing short-term and long-term maintenance goals and prioritizing road projects according to budget constraints.

A road management system helps the agency develop its road budget and allows the use of dollars wisely because its priorities and needs are clearly defined.

Through roadway management, local governments can determine the most cost-effective, long-term treatments for their roads, control their road maintenance costs, and spend tax dollars more wisely. Local governments that stick with the program will be rewarded with roads that are easier and less costly to maintain on a yearly basis. Pertinent information about all roads will be readily available for years to come instead of scattered among files or tucked away in an employee's head.

Steps in a Road Management Program:

1. Inventory the roads. The amount of time available and the miles of road in a county or city will determine how much detail to go into.
2. Assess the condition of the roads. Develop simple and easy techniques to use each year. Maintain a continuing record of the assessed condition of each road so that changes in condition can be noted easily and quickly.
3. Select a road management plan. Select the most appropriate treatment to repair each road, bridge, or problem area.
4. Determine overall needs. Estimate the cost of each repair job using generalized average costs and tally up the total.Establish long-range goals and objectives that in turn will help the agency justify its budget requests.
5. Establish priorities. Keep good roads in good shape (preventive maintenance) and establish a separate budget, or request a temporary increase, to reconstruct really bad roads.

Answer 2: When the Local Agency Is Committed to Effective Management

A commitment to effective management is an attitude. It is a matter of making sure that taxpayers' money is well spent—as if it were one's own money. It does not mean paving streets with gold but it does mean using the best materials available. It does not mean taking short cuts resulting in a shoddy project but it does mean using correct construction techniques and quality control.A commitment to effective management means planning for 5 or even 10 years instead of putting a band-aid on today's problem. It means taking the time to do things right the first time and constructing projects to last.

Consider a child's tree house compared to a typical three-bedroom house in a Kentucky town. Because each protects people from the wind and rain each comes under the definition of a shelter. However, the tree house was built with available materials and little craftsmanship. The other was planned, has a foundation, sound walls and roof and, with care, can last hundreds of years. One is a shack and the other is a family dwelling. Only one was built with a commitment to excellence.

Many roads are like the tree house. They qualify under the definition but they are not built to last.

The horse and buggy days are over. We are in an age of travelers' demands, increasing traffic, declining revenues and taxpayer revolts. We are expected to do more with less. Building roads to last requires an attitude of excellence. Such an attitude helps to make better decisions, saves money in the long run, and results in a better overall road system.

Answer 3: When Traffic Demands It

The life of a road is affected by the number of vehicles and the weight of the vehicles using it.Generally speaking, the more vehicles using a road,the faster it will deteriorate.

The average daily traffic volumes (ADT) used to justify paving generally range from a low of 50 vehicles per day to 400 or 500.When traffic volumes reach this range, serious consideration should be given to some kind of paving.

Traffic volumes alone are merely guides. Types of traffic should also be considered. Different types of traffic (and drivers) make different demands on roads. Will the road be used primarily by standard passenger cars or will it be a connecting road with considerable truck traffic? Overloaded trucks are most damaging to paved roads.

The functional importance of the highway should also be considered.Generally speaking, if the road is a major road, it probably should be paved before residential or side roads are paved. On the other hand, a residential street may be economically sealed or paved while a road with heavy truck usage may best be surfaced with gravel and left unpaved until sufficient funds are available to place a thick load-bearing pavement on the road.

Answer 4: After Standards Have Been Adopted

Written standards in the areas of design,construction and maintenance define the level of service we hope to achieve. They are goals to aim for. Without written standards there is no common understanding about what a local government is striving for in road design, construction and maintenance. In deciding to pave a gravel road, is the local government confident it would be achieving the desired standards?

Design and construction standards do not have to be complex. It takes only a few pages to outline such things as right-of-way width, traveled way width, depth of base, drainage considerations (such as specifying minimum 18”culvert pipe),types of surfacing and the like.

Maintenance standards address the need for planned periodic maintenance. A good maintenance plan protects local roads, which for most counties represents many millions of dollars of investment. It also is an excellent aid when it comes time to create a budget.

Considerations include: How often shall new gravel be applied to a gravel road? (Some roads require it more than others do.) How many times per year are roads to be graded? How often and in what locations should calcium chloride or other road stabilizers be applied? What is our plan for checking road signs? (Because of legal liability, a missing sign can be very costly if not replaced.) What is our plan for ditching and shouldering?

Answer 5: After Considering Safety and Design

Paving a road tempts drivers to drive faster. As speed increases, the road must be straighter, wider, and as free as possible from obstructions for it to be safe. Paving low volume roads before correcting safety and design inadequacies encourages speeds which are unsafe, especially when the inadequacies “surprise” the driver. Because of the vast mileage of low volume roads, it is difficult to reduce speeds by enforcement.

Roads must be designed to provide safe travel for the expected volume at the design speed. To do this a number of physical features must be considered:

- Sight Distance
- Alignment and Curves
- Lane Width
- Design Speed
- Surface Friction
- Superelevation

It may be necessary to remove trees or other obstructions such as boulders from the road’s edge. Some engineers insist that no road should be paved that is less than 22 feet wide. If this standard is accepted, gravel roads must be widened before paving. Bridges may need widening. Considering these and other safety and design factors in the early stages of decision making can help to achieve the most economical road and one that will meet transportation needs. It makes no sense to pave a gravel road which is poorly designed and hazardous.

Answer 6: After the Base and Drainage Are Improved

"Build up the road base and improve drainage before paving." This cardinal rule cannot be stressed enough. If the foundation fails, the pavement fails. If water is not drained away from the road, the pavement fails. Paving a road with poor base or with inadequate drainage is a waste of money. It is far more important to ask,"Does this road need strengthening and drainage work?" than it is to ask,"Should we pave this gravel road?"

Soil is the foundation of the road and, as such, it is the most important part of the road structure. A basic knowledge of soil characteristics in the area is very helpful and can help avoid failures and unneeded expense. Soils vary throughout the country. For highway construction in general, the most important properties of a soil are its size grading, its plasticity, and its optimum moisture content.

There is a substantial difference in the type of crushed stone or gravel used for a gravel road-riding surface versus that used as a base under a pavement. The gravel road surface needs to have more fines plus some plasticity to bind it together, make it drain quicker and create a hard riding surface. Such material is an inferior base for pavement. If pavement is laid over such material, it traps water in the base. The high fines and the plasticity of the material make the wet base soft. The result is premature pavement failure.

Answer 7: After Determining the Costs of Road Preparation

The decision to pave a gravel road is ultimately an economic one. Policy makers want to know when it becomes economical to pave.

There are two categories of costs to consider:total road costs and maintenance costs.

Local government needs to determine what the costs are to prepare a road for paving. Road preparation costs are the costs of construction before paving actually takes place.

For example, if standards call for a traveling surface of 22 feet and shoulders of two feet for a paved road, the costs of new material must be calculated. Removing trees, brush or boulders, adding new culverts or other drainage improvements, straightening a dangerous curve, improving slopes and elevations, constructing new guardrails, upgrading signs and making other preparations – all must be estimated.

Costs will vary greatly from project to project depending on topography, types of soils, availability of good crushed stone or gravel, traffic demands and other factors. One important factor is the standards. That is one reason why we should carefully consider what is contained in the road policy (#4 above). For larger projects it may be desirable to hire an engineering consulting firm (another cost) to design the road and make cost estimations. For smaller projects construction costs can be fairly closely calculated by adding the estimated costs of materials, equipment and labor required to complete the job.

Answer 8: After Comparing Pavement Costs, Pavement Life and Maintenance Costs

A second financial consideration is to compare maintenance costs of a paved road to maintenance costs of a gravel road. To make a realistic comparison we must estimate the years of pavement life (how long the pavement will be of service before it requires treatment or overlay) and the actual cost of paving. It is at this point that we can begin to actually compare costs between the two types of roads.

Consider the following maintenance options:

A. For both paved and gravel roads, a local government must: maintain shoulders – keep ditches clean – clean culverts regularly – maintain roadsides (brush, grass, etc.) – replace signs and signposts.
B. PAVED roadways require: patching – resealing (chip, slurry, crack seal) and striping.
C. GRAVEL roadways require: regraveling – grading and stabilization of soils or dust control.

Since the maintenance options in "A" are common to both paved and gravel roads, they do not have to be considered when comparing maintenance costs. These costs for either type of road should be about the same. But the costs of the maintenance options in "B" and "C"are different and therefore should be compared.

Figure 16 shows costs for maintaining gravel roads over a six-year period in a hypothetical situation.If records of costs are not readily available, you may use a "best guess"allowing for annual inflation costs.

Three paving options are listed in Figure 17. Each includes estimated costs for paving and an estimated pavement life. You should obtain up-to-date cost estimates and expected pavement life figures for these and other paving options by talking to your state department of transportation,contractors, and neighboring towns and counties.

YEAR	1	2	3	4	5	6	TOTALS
GRADING							
Equipment	270	280	290	300	310	320	1,770
Labor	90	100	110	120	130	140	690
REGRAVEL							
Materials	–	–	4,000	–	–	–	4,000
Equipment	–	–	2,500	–	–	–	2,500
Labor	–	–	2,300	–	–	–	2,300
STABILIZATION/DUST CONTROL							
Materials	800	900	1,200	920	950	975	5,745
Equipment	30	35	70	40	50	60	285
Labor	100	110	150	125	140	150	775
Totals	1,290	1,425	10,620	1,505	1,580	1,645	$18,065

Figure 16: Gravel Road Maintenance Cost Per Mile

Let's consider the cost of a double surface treatment operation and the projected cost of maintaining it before anything major has to be done to the pavement (end of pavement life). We see in Figure 17 that the estimated cost to double surface treat one mile of road is $20,533. Estimated maintenance costs over a six-year period could be:

Patching	$1,800	Total maintenance	$4,300
Striping	$500	Construction	$20,533
Sealing	$2,000	Total cost over six years	$24,833
	$4,300		

When we compare this cost to the cost of maintaining an average mile of gravel road over the same period of six years ($18,065), we find a difference in dollar costs of $6,768.It is not cost beneficial to pave in this hypothetical example, even without considering the costs of road preparation (#7).

This is not a foolproof method, but it does give us a handle on relative maintenance costs in relation to paving costs and pavement life. The more accurate the information,the more accurate the comparisons will be. The same method can be used in helping to make the decision to turn paved roads back to gravel.

Option	Life	Cost Per Mile	Cost/Mile Per Year	Calculations	Maintenance Per Mile/Year
Chip Seal-Double Surface Treatment	6 yrs.	$20,533	$3,422	Based on price of $1.75 per sy; 20 ft. wide x 5,280 ft. = 105,600 sf 105,600 sf ÷ 9 = 11,733 sy 5 $1.75 = $20,533	?
Bituminous Concrete-Hot Mix	12 yrs.	$58,080	$4,840	Based on estimated price of $30 per ton; 1 sy of stone and hot mix/ cold mix 1" thick weighs about 110 lbs. Therefore 3" = 330 lbs. per sy. 11,733 sy (1 mile of pavement) 5 330 lbs. = 3,871,890 lbs. 3,871,890 lbs. = 1936T x $30 = $58,080	?
Cold Mix	8 yrs.	$48,390	$6,048	At $30 per ton, using same formula as hot mix, 2 1/2" of cold mix equals 1,613T x $30 = $48,390	?

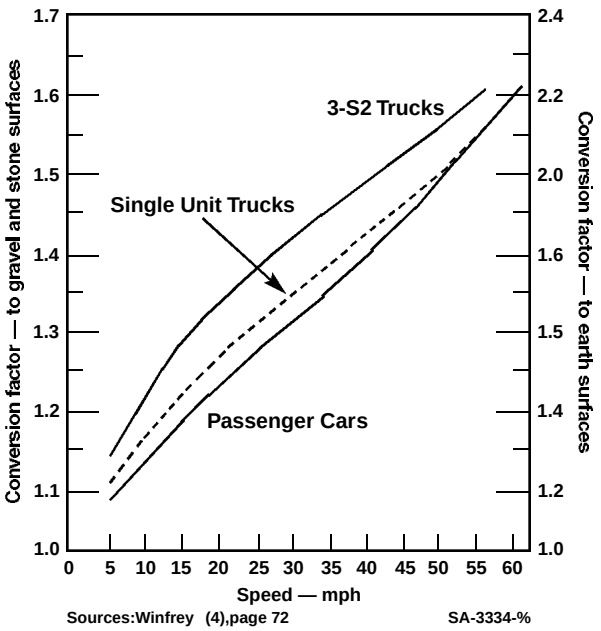
*These costs must be determined before any conclusions can be reached regarding the most cost-effective pavement method. The thinner the pavement, the greater the maintenance cost. Traffic, weather conditions, proper preparation before paving and many other factors can affect maintenance costs. No Kentucky data exists upon which to base estimates of maintenance costs on low volume roads of these paving options; and, therefore, we offer no conclusion as to the "best" way to pave.

Figure 17: Paving Options (Costs and road life are estimates and may vary)

Answer 9: After Comparing User Costs

Not all road costs are reflected in a highway budget. There is a significant difference in the cost to the user between driving on a gravel surface and on a paved surface. User costs, therefore, are appropriate to consider in the pave/not pave decision. By including vehicle-operating costs with construction and maintenance costs, a more comprehensive total cost can be derived.

Vehicles cost more to operate on gravel surfaces than on paved surfaces, often 2 or 3 times greater than for bituminous concrete roads in the same locations. There is greater rolling resistance and less traction which increase fuel consumption. The roughness of the surface contributes to additional tire wear and influences maintenance and repair expenses. Dust causes extra engine wear, oil consumption and maintenance costs. Figure 18 from AASHTO'S "A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements" shows the impacts of gravel surfaces on user costs. For example, an average running speed of 40 MPH on a gravel surface will increase the user costs of passenger cars by 40% (1.4 conversion factor). The general public is not aware that their costs would actually be less if some of these roads were surface treated.



To use this chart, determine the type of vehicle, the speed and the type of road surface. Follow the speed line vertically to the vehicle type. Go horizontally to multiplier factor of road surface. Multiply the cost of travelling on a paved surface by this number to determine the cost of operating the same vehicle on gravel surface or dirt surface. Example: If it costs 28¢ per mile to operate a passenger car* at 40 mph on pavement, it will cost 39¢ per mile to operate it on a gravel road at the same speed and 50¢ per mile on a dirt road.

*1984 Federal Highway Administration Statistics quotes an operating cost of 28¢ per mile for an intermediate size passenger car traveling on average suburban pavement. You must determine your own vehicle operating costs on pavement in order to use these multiplicative factors to calculate

Figure 18: Impacts of Gravel Surfaces on User Costs

Add to the gravel road maintenance the user costs over a six-year period. Estimate an average daily traffic (ADT) of 100 cars and 50 single unit trucks, traveling at 40 mph. Estimate that it costs $.25 per mile to operate the vehicles on pavement. Using the chart in Figure 3, we see it costs 1.4 times as much (or $.35) to drive a car 40 mph one mile on gravel road and 1.43 times as much (or $.36) to drive a single unit (straight frame) truck 40 mph one mile on gravel road.

100 cars x 365 days x $.10 added cost x 1 mile = $3,650

50 trucks x 365 days x $.11 added cost x 1 mile = $2,008

User costs for the gravel road is $5,659 per year or $33,954 for a six-year period.Assuming we still do not consider road preparation costs, it now appears justified to pave the road.Such an approach can be used to establish a "rule of thumb"ADT. For example, some agencies give serious consideration to paving roads with an ADT above 125.

Answer 10: After Weighing Public Opinion

Public opinion as to whether to pave a road can be revealing, but it should not be relied upon to the exclusion of any one of points 1-9 already discussed.If a decision to pave is not based on facts, it can be very costly. Public opinion should not be ignored, of course, but there is an obligation by government leaders to inform the public about other important factors before making the decision to pave.

Stage Construction

Local government may consider using "stage construction design"as an approach to improving roads. This is how it works. A design is prepared for the completed road,from base and drainage to completed paving. Rather than accomplishing all the work in one season, the construction is spread out over three to five years. Paving occurs only after the base and drainage have been proven over approximately one year. Crushed gravel treated with calcium chloride serves as the wearing course for the interim period. Once all weak spots have been repaired,the road can be shaped for paving.

There are some advantages to keeping a road open to traffic for one or more seasons before paving:

1. Weak spots that show up in the sub-grade or base can be corrected before the hard surface is applied,eliminating later expensive repair;
2. Risky late season paving is eliminated;
3. More mileage is improved sooner;
4. The cost of construction is spread over several years.

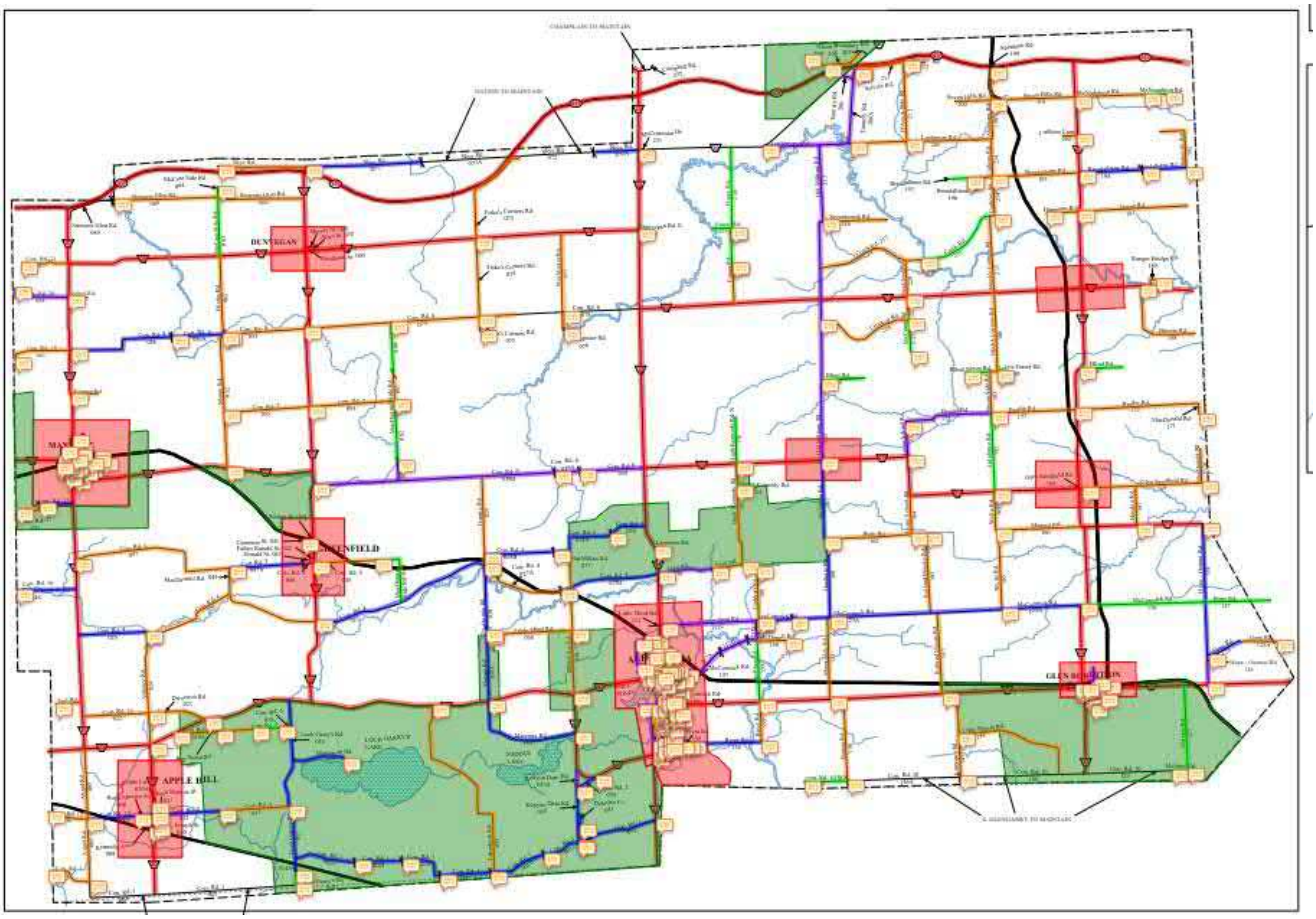
Note:Advantages may disappear if timely maintenance is not performed. Surface may deteriorate more rapidly because it is thinner than a designed pavement.

Summary

Some local roads are not well engineered. Today, larger volumes of heavy trucks and other vehicles are weakening them at a fast rate. Paving roads as a sole means of improving them without considering other factors is almost always a costly mistake. Counties and cities should consider these ten points first. Carefully considering them will help to assure local government officials that they are making the right decision about paving a gravel road.

No.	IMPROVEMENT	2023
Original (from 2021 RNS)		
123A	McCormick Road	1540500
Optimized (from 2021 RNS)		
138	Rigaud Street	73000
139	Sauvé Street	146000
140	Dashney Street	36500
141	Chisholm Street	146000
142	Hope Lane	25200
143	Clara Street	36500
144	Seguin Mill Street	73000
145	Irwin St	36500
145A	Annie St	36500
Crossings		
	County Road 34 crossing at GDH	40000
	County Road 46 crossing at Dome a	40000
Road Work to seal road after watermain work		
	Tobin street (post relining)	163000
	Tobin Drainage	25000
	Tobin Patrol Yard	62000
Remainder of Glen Robertson (Mobilization)		
	Florence st	63000
	Emma lane	40000
	Fox lane	16000
	london lane	17000
	Community Centre	12000
Total		1075200
Money Allocated for County		465300

GEOTECHNICAL INVESTIGATION REPORT - NORTH GLENGARRY LCB ROADS



Project No.: CCO-22-5139

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December 8th, 2022

McINTOSH PERRY

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APPENDICES

1.0 INTRODUCTION

1.1 Project Description, Objective, and Scope of Work

McIntosh Perry Consulting Engineers Ltd. (McIntosh Perry) has been retained by the Township of North Glengarry – Public Works Department to conduct a pavement investigation and provide recommendations for the rehabilitation of the following roadway sections within the township:

- Location A: Kenyon Concession Road 2
- Location B: Kenyon Dam Road
- Location C: Marcoux Road
- Location D: Dornie Road
- Location E: Kenyon Concession Road 4 East
- Location F: Kenyon Concession Road 4 West
- Location G: River Road
- Location H: Power Dam Road
- Location I: McCormick Road
- Location J: Concession Road 16
- Location K: Kenyon Concession Road 8
- Location L: Athol Road

The intent of the work was to summarize geotechnical data for the roadways and establish future rehabilitation options to be presented to the Township of North Glengarry – Public Works Department in the form of this pavement design report.

The scope of work first involved a background review of available information, as summarized in Sections 1.2 through 1.4, followed by a geotechnical investigation through the advancement of pavement boreholes, material sampling and testing, and the synthesis of the pavement design report outlining factual geotechnical data and recommendations for the rehabilitation of select roadways throughout the Township. Site investigation and design methodologies are presented in Sections 2.0 and 3.0, respectively.

1.2 Traffic Data

Pertinent traffic data for select roadway sections investigated has been compiled through the study of daily traffic volumes using traffic counting stations. An individual calculated annual growth rate was utilized for 15-year pavement design equivalent single axle load calculations. Commercial truck percentages were gathered during the traffic study. Traffic data for remaining roadway sections was estimated, and this data is shown in **bold** in the following table.

Table 1: Average Annual Daily Traffic (AADT) volumes for the Subject Investigation

Section No.	Roadway	Limits	AADT (2022)	Truck %
A	Kenyon Concession Road 2	CR 20 to Loch Garry's Road	160	3.6
B	Kenyon Dam Road	Concession Road 1 to Concession Road 2	660	3.9
C	**Marcoux Road**	**CR 45 to CR 43**	**200**	**8.0**
D	Dornie Road	CR 43 to Little Third Road	220	8.6
E	Kenyon Concession Road 4 East	CR 30 to MacDonnell Side Road 41	180	7.4
F	**Kenyon Concession Road 4 West**	**Vallance Road to CR 20**	**150**	**10.0**
G	**River Road**	**Macleod Crescent to Unknown Creek Bridge**	**220**	**8.0**
H	**Power Dam Road**	**CR 34 to Cuthbert Road**	**490**	**8.0**
I	McCormick Road	Ouellette Road to Rolland Massie Road	490	7.9
J	**Concession Road 16**	**200 m West of CR 20 to CR 20**	**220**	**8.0**
K	Kenyon Concession Road 8	CR 20 to Blythe Road	220	8.5
L	**Athol Road**	**1.4 km West of CR 20 to CR 20**	**220**	**8.0**

1.3 Project Limit General Physiography

When assessing the roadways within this project, two physiographic regions were encountered. From west to east these regions are:

- **Winchester Clay Plain:** Is characterized as a large flat or gently-sloping area of land comprised of clay**.** Location K is fully encompassed by this region, while Location J travels between this region and the Glengarry Till Plain.
- **Glengarry Till Plain:** Is characterized as a large flat or gently-sloping area of land on which glacial till has been deposited from a melted glacier. Locations A, B, C, D, E, F, G, H, and I lie within this region.

1.4 Frost Depth

Based on OPSD 3090.101, derived from the Ministry of Transportation and Communications Research Publication RR225 "Aspects of Prolonged Exposure of Pavements to Sub-Zero Temperatures" dated 1981, the Frost Penetration Depth (f) for the project area is 1.7 m.

2.0 GEOTECHNICAL INVESTIGATION DETAILS

The site investigation was conducted to gain an understanding of the existing pavement structure, provide a summary, and further establish potential rehabilitation recommendation options for each section of road. After confirming the drilling program to be implemented, and performing an initial site reconnaissance visit and borehole layout, McIntosh Perry coordinated locates with Ontario OneCall prior to proceeding with the investigation. Boreholes were generally spaced at 1.0 km intervals unless otherwise indicated; however, some borehole locations were moved at the discretion of MP field staff to provide ample sight lines for traffic control purposes and to ensure adequate information for areas of poor performance and culvert locations.

2.1 Geotechnical Drilling

The investigation consisted of making site observations, geotechnical drilling, logging, and the collection of representative granular and soil samples for index testing and characterization. Members of the investigation team took part in daily tailgate safety meetings conducted by McIntosh Perry prior to commencing the field investigation to ensure each member was aware of their role, and the site-specific hazards and conditions to be expected for that day. Traffic control during the site investigation was conducted as per OTM Book 7.

The geotechnical drilling was completed by Sproule Powerline Construction Ltd. (of Vankleek Hill, ON) under the direction of McIntosh Perry staff over the course of the investigation, spanning, as weather permitted, from June 6th to June 14th, 2022. Boreholes were generally advanced using a 9" solid stem auger to a depth of 1.7 m or practical refusal. The pavement structure was documented, outlining the surface treatment, base and subbase depths including the underlying subsoil stratigraphy which are discussed in Section 4.0. The borehole records are provided in full in Appendix C. Auger samples of the road base, subbase, and subgrade soils were taken, as necessary, at these locations and used in conjunction with the measured pavement thicknesses to model the existing pavement structure. All boreholes were backfilled with auger cuttings, compacted, and sealed with premium asphaltic concrete cold patch upon completion.

The borehole program primarily emphasized the concept of midlane drilling, as edge of pavement boreholes may miss narrower historic pavement structures which underlie a road. Boreholes were drilled at midlane locations at approximately 1.0 km intervals to supplement the mainline resurfacing recommendations, at culvert replacement locations, and at areas where significant distresses were observed. The drilling program and sampling particularly focused on the total depth and layer thicknesses of pavement structure (e.g. asphalt or surface treatment depth, granular base and subbase depths, and the type and gradation of subgrade material).

2.2 Logging, Sampling, and Laboratory Testing

Soil logging was undertaken in accordance with the MTC Soil Classification and the Canadian Foundation Engineering Manuals (2006). Pavement structure samples from the boreholes were logged and placed in a plastic bag, sealed, and labelled. Following the completion of the site investigation program, all granular

and soil samples were further examined by tactile and visual means at our facility. Select granular and soil samples were delivered to McIntosh Perry's Ottawa laboratory (CCIL and RAQs certified) for testing in accordance with MTO's laboratory testing manual and were integrated into the borehole records. The corresponding laboratory index granular and soil testing that was conducted included:

- LS-602/702 Grain Size Analysis of Aggregates
- LS-702 Grain Size Analysis of Soils
- LS-701 Determination of Moisture Content of Soils
- LS-703/704 Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- LS 619 Micro Deval Testing

3.0 DESIGN METHODOLOGIES

The main design tools used to determine if design options meet requirements are the Routine (GBE) Method combined with the AASHTO 93 Method. Both methods are viable and, in the case of the Township roads, complement each other as described below.

3.1 Routine Method

The 'Routine Method' was used extensively for pavement design analysis prior to the introduction of the AASHTO method described below. It is typically not used for high-volume freeways and highways where traffic volumes have far exceeded those used in the original analysis. It is based on GBE (Granular Base Equivalencies), subgrade, and AADTs under Ontario conditions. There are two pertinent tables from the Pavement Design and Rehabilitation Manual [4] that recommend pavement structure thicknesses and GBE values:

- Table 3.3.2, Structural Design Guidelines for Flexible Pavements-King's Highways and Freeways; and
- Table 3.3.3, Structural Design Guidelines for Flexible Pavements-Secondary Highways.

Table 3.3.3 for secondary highways is suitable for AADT volumes of up to 3000, which is typical of lower volume township roads, where half-load seasons may apply. However, for higher volume roads (AADT<5000) or roads that are anticipated to maintain loading year-round, Table 3.3.2 for King's Highways and Freeway is referred to. For the purposes of this assignment, Table 3.3.3 will be used for analysis.

The table thicknesses recommended for the base and subbase are not strictly followed, as long as the GBE value is achieved. However, the recommended asphalt/surface treatment depths provided in the tables, as a minimum, are typically adhered to.

3.2 AASHTO 93

AASHTO 93 (American Association of State Highway and Transportation Officials) is a pavement design tool based on empirical formulas developed beginning with the AASHO Road Test. The Road Test was the first in a series of experiments carried out by AASHTO to determine how traffic contributed to the deterioration of highway pavements. This design tool incorporates structural analysis using equivalent single axle loads, and rather than granular base equivalencies it uses structural and drainage coefficients assigned to the various pavement material types. In addition, it provides a value M_r (Modulus of Resilience) to the subgrade material. Its output is a measure of the thickness and characteristics of the pavement layers using a Structural Number (SN) to determine requirements. The parameters have been adjusted to reflect Ontario traffic conditions (Hajek Report[2]) and the tables utilized were with respect to the "Adaptation and Verification of AASHTO Pavement Design Guide for Ontario Conditions, 2008" and the addendum report entitled "Recommended Initial and Terminal Serviceability Levels" dated 2001[2].

3.2.1 Design Parameters

The design criteria and parameters selected for all of the input values with respect to the pavement and soil model are shown in Table 2. The parameters selected refer to rural roads and are based on the traffic data provided. The Roadbed Soil Resilient Modulus and the Structural Layer Coefficient variables described in Table 2 are determined from the borehole investigation.

Table 2: Parameters Selected for Design Analysis

Design Criteria	Parameter Reference	Value Used
Initial Serviceability (Po)	Table 3-13	4.2
Terminal Serviceability (Pt)	Table 3-13	2.0
Overall Standard Deviation	Table 3-14	0.49
Reliability Level, %	Table 3-15	85
Roadbed Soil Resilient Modulus (MPa)	Table 4-1	Varies, dependent on subgrade material
Structural Layer Coefficients	Table 4-5	Quality Dependent
Drainage Coefficients	Table 4-8	Typically, 1.0 for HL and 0.9 for Base and Subbase

4.0 SITE INVESTIGATION RESULTS AND RECOMMENDATIONS

The following sections outline the site investigation results and corresponding rehabilitation recommendations for each section of road outlined in the RFQ. This report has been formatted such that each road is displayed independently of one another over the course of the following subsections. It should also be noted that a list of geotechnical abbreviations has been included in Appendix B for reference when viewing the borehole logs which are appended as Appendix C.

In general, the traffic volumes and use patterns on the existing roads and the existing subgrade conditions are suitable for the application of surface treatment. In MP's opinion, none of the below road sections require an immediate upgrade to hot-mix asphalt surfaces. Should significant increases to traffic volumes occur in the future, a review of the warrant for hot-mix should be reviewed.

4.1 Location A: Kenyon Concession Road 2

4.1.1 Location and Section Description

Location A of the RFQ, Kenyon Concession Road 2, is approximately 3.5 km in length and the limits are noted to be from the Apple Hill Village limits easterly to Loch Garry Road. Within the project limits, the road transitions from surface treatment to gravel road. The treated section of the roadway travels through flat farm fields, while the gravel portion travels through low-lying marsh area. The Average Annual Daily Traffic volumes (AADT) are 160 with a commercial percentage of 3.6%. The road has ditches on both sides, however significant vegetation growth was noted at some locations. Additionally, standing water was noted alongside the road throughout the low-lying gravel section.

4.1.2 Pavement Condition and Distresses

This roadway section is composed of both gravel and surface-treated sections. The gravel section is constructed on an old corduroy road but is currently in good condition. The surface-treated section of the road is in fair to poor condition, exhibiting the following distresses:

- Intermittent, moderate longitudinal wheel track cracking
- Frequent, moderate ravelling
- Intermittent potholing
- Intermittent moderate multiple centreline cracking, including alligator cracking
- Intermittent, moderate distortion (frost heaves)

Photographs of typical conditions, showing the above distresses are included in Figure 4.1.1.

Figure 4.1.1: Location A, Typical Road Section

4.1.3 Borehole Location Plan

Figure 4.1.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.1.2: Location A, Borehole Locations

4.1.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location A, Kenyon Concession Road 2, have been appended in Appendix C and summarized in Table 4.1.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analysis and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.1.5 Typical Pavement Structure and Observations

The following Table 4.1.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.1.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20	170-330	240-1370
Average, where encountered (mm)	20	235	640

Base

The base generally consisted of Grey Gravel and Sand Trace Silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase was generally comprised of Grey Coarse Gravel with Sand some Silt, to Brown Sand with Gravel some Silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to an excess of fines passing the 0.075 mm sieve.

Subgrade

The subgrade material was composed of Brown Medium Sand trace Silt, to Brown Silt and Sand some Clay trace Gravel. The grain size analysis testing indicated that the subgrade material has a low susceptibility to frost heaving (LSFH).

4.1.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.1.2 and 4.1.3 provide design values based on Location A, Kenyon Concession Road 2 existing conditions and traffic data. An AADT of 161, a percent commercial of 3.59%, and a Roadbed Soil Resilient Modulus of 35 MPa (silty sands and gravels) were used

as design inputs. The Routine Method stipulates a required GBE value of 200 mm with no requirement for a bituminous surface course. The AASHTO method stipulates a required SN = 53.81 mm.

Table 4.1.2 – Required Routine Method Table Values	
AADT (2022)	**161**
Subgrade Material	**Silty Sands and Gravels**
Table 3.3.3 for AADT 200 to 1000; Sands and Silts, 5 to 75 um <40%	
Gravel	-
Base	100
Subbase	150
GBE	200

Table 4.1.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	18,219	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.26052504
Terminal Serviceability (Pt)	2	2	C	8.44155731
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	3.38831533
Roadbed Soil Resilient Modulus (MPa)	30.0		F	4.62335468
Zr	-1.037		Goal	0.00000761
ΔPSI	2.2		Target	0
The Required SN =	**53.81**	**mm**		

4.1.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.1.4 provides two pavement rehabilitation methods for Kenyon Concession Road 2, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.1.4 – Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	53.81	200	0	Pulverize 150 mm, Double Surface Treatment	0	78.42	588.75	20 mm grade raise
2				Pulverize 150 mm, Add 100 mm Granular A and Double Surface Treatment	0	92.42	688.75	50 mm grade raise

Recommended Alternative:

Both options satisfy the structural requirements of Kenyon Concession Road 2; however, based on the observed distresses and advanced age of the roadway the addition of Granular A is recommended to prolong the life of the pavement. **Option 2**, Pulverize 150 mm, followed by the addition of 100 mm Granular A and an application of Double Surface Treatment is recommended for this stretch of roadway.

4.2 Location B: Kenyon Dam Road

4.2.1 Location and Section Description

Location B of the RFQ, Kenyon Dam Road, is approximately 2 km in length and the limits are noted to be from Kenyon Concession Road 1 northerly to County Road 45. Within the project limits, the road is surface treated and travels through undulating wooded and cleared residential areas. The Average Annual Daily Traffic volumes (AADT) are 660 with a commercial percentage of 3.85 %. The road has ditches on both sides of the road; however, vegetation growth in the ditches was noted throughout the section length.

4.2.2 Pavement Condition and Distresses

From discussion with the Township, this existing pavement surface is approximately 6 years old. This section of the road is typically in fair condition. In general, the road exhibited the following distresses.

- Intermittent, moderate longitudinal cracking
- Few, moderate potholes
- Intermittent, moderate ravelling
- Intermittent moderate distortions (frost heaves)

Photographs of typical conditions, showing the above distresses are included in Figure 4.2.1.

Figure 4.2.1: Location B, Typical Road Section

4.2.3 Borehole Location Plan

Figure 4.2.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.2.2: Location B, Borehole Locations

4.2.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location B, Kenyon Dam Road, have been appended in Appendix C and summarized in Table 4.2.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D and incorporated into the borehole logs, in Appendix C.

4.2.5 Typical Pavement Structure and Observations

The following Table 4.2.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.2.1: Typical Pavement Structure			
Material	**Surface Treatment**	**Base**	**Subbase**
Range, where encountered (mm)	20	130-230	270-790
Average, where encountered (mm)	20	180	550

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of dark brown sand with gravel with cobbles trace silt to grey crushed gravel some sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of brown medium sand some silt some gravel to sandy silt silty gravel trace clay. Grain size analysis testing indicated that the material has low susceptibility to frost heaving (LSFH).

4.2.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.2.2 and 4.2.3 provide design values based on Location B, Kenyon Dam Road existing conditions and traffic data. An AADT of 660, a percent commercial of 3.85%, and a Roadbed Soil Resilient Modulus of 30 MPa (silty sands and gravels) were used as design inputs. The Routine Method stipulates a required GBE value of 250 mm with surface treatment. The AASHTO method stipulates a required SN = 63.75 mm.

Table 4.2.2 – Required Routine Method Table Values	
AADT (2022)	**660**
Subgrade Material	**Silty Sands and Gravels**
Table 3.3.2 for AADT 200 to 1000; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	-
Base	150
Subbase	150
GBE	250

Table 4.2.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	52,850	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.72304292
Terminal Serviceability (Pt)	2	2	C	8.44155731
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	2.01816883
Roadbed Soil Resilient Modulus (MPa)	30.0		F	5.10380329
Zr	-1.037		Goal	0.00011750
ΔPSI	2.2		Target	0
The Required SN =	**63.75**	**mm**		

4.2.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.2.4 provides two pavement rehabilitation methods for Kenyon Concession Road 2, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.2.4 – Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	63.75	250	0	Pulverize 150 mm, Double Surface Treatment	0	66.00	462.5	20 mm grade raise
2				Pulverize 100 mm, add 100 mm Granular A and Double Surface Treatment	0	78.4	590	100 mm grade raise

Recommended Alternative:

Both options satisfy the structural requirements of Kenyon Dam Road. With a higher AADT and a 6-year-old roadway surface and existing granular base thickness, **Option 2**: Pulverize 100 mm, followed by the addition of 100 mm of Granular A and an application of Double Surface Treatment is recommended.

4.3 Location C: Marcoux Road

4.3.1 Location and Section Description

Location C of the RFQ, Marcoux Road, is approximately 3.2 km in length and the limits are noted to be from County Road 45 westerly to County Road 43. Within the project limits, the road is surface treated and travels through gently undulating hills. The Average Annual Daily Traffic volumes (AADT) are 200 with a commercial percentage of 8.0%. The road has ditches on both sides, with some vegetation growth noted in the south ditch along the road section.

4.3.2 Pavement Condition and Distresses

From discussion with the Township, this section of road is approximately 12 years old. The road is typically in fair to poor condition, exhibiting the following distresses:

- Intermittent, moderate potholing
- Throughout, moderate ravelling
- Moderate distortion at culvert location in wet area

Photographs of typical conditions, showing the above distresses are included in Figure 4.3.1.

Figure 4.3.1: Location C, Typical Road Section

4.3.3 Borehole Location Plan

Figure 4.3.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.3.2: Location C, Borehole Locations

4.3.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location C, Marcoux Road, have been appended in Appendix C and summarized in Table 4.3.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.3.5 Typical Pavement Structure and Observations

The following Table 4.3.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.3.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20	80-360	150-480
Average, where encountered (mm)	20	205	350

Base

The base typically consisted of grey crushed gravel and sand trace silt.

Subbase

The subbase typically consisted of brown coarse gravel and sand trace silt to brown sand with gravel. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of dark grey silt some clay to silty sand trace gravel. Woody organics were noted at the bottom of Boreholes 7 (0.70 m – 1.20 m) and 9 (1.50 m – 1.70 m). The grain size analysis testing indicated that the subgrade has a low susceptibility to frost heaving (LSFH).

4.3.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.3.2 and 4.3.3 provide design values based on Location C, Marcoux Road existing conditions, and traffic data estimates. An AADT of 200, a percent commercial of 8.0%, and a Roadbed Soil Resilient Modulus of 25 MPa (silts and silty sands) were used as design inputs. The Routine Method stipulates a required GBE value of 250 mm with a surface treatment. The AASHTO method stipulates a required SN = 64.32 mm.

Table 4.3.2 – Required Routine Method Table Values	
AADT (2022)	**200**
Subgrade Material	**Silts and Sandy Silts**
Table 3.3.3 for AADT 200 to 1000; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	Yes
Base	150
Subbase	150
GBE	250

Table 4.3.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	36,662	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.56421958
Terminal Serviceability (Pt)	2.0	2	C	8.25785682
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	1.96529830
Roadbed Soil Resilient Modulus (MPa)	25.0		F	5.12982142
Zr	-1.037		Goal	0.00007289
ΔPSI	2.2		Target	0
The Required SN =	64.32	mm		

4.3.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.3.4 provides two pavement rehabilitation methods for Marcoux Road, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.3.4 – Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	64.32	250	0	Pulverize 150 mm, Add 100 mm, Double Surface Treatment	0	68.30	521.25	120 mm grade raise
2				Pulverize 100 mm, Add 100 mm Granular A, Double Surface Treatment	0	73.70	558.75	150 mm grade raise

Recommended Alternative:

While both options satisfy the structural requirements of Marcoux Road, the road is exhibiting advanced stages of deterioration with an existing surface that is approximately 12-years old. The recommended treatment alternative for this section of roadway is **Option 1**, Pulverize 150 mm, followed by the addition of 100 mm of Granular A and an application of Double Surface Treatment.

4.4 Location D: Dornie Road

4.4.1 Location and Section Description

Location D of the RFQ, Dornie Road, is approximately 3.8 km in length and the limits are noted to be from County Road 43 northerly to Kenyon Concession Road 4. Within the project limits, the road is surface treated, and travels through gently undulating hills. The Average Annual Daily Traffic volumes (AADT) are 218 with a commercial percentage of 8.58%. There are ditches on both sides of the road, with some vegetation growth noted on either side of the road.

4.4.2 Pavement Condition and Distresses

This section of the road is typically in fair to poor condition, exhibiting the following distresses:

- Intermittent, moderate potholing
- Frequent ravelling throughout
- Moderate intermittent pavement edge breakup
- Centreline strip repair in northern half of road section
- Moderate to severe frost heave at Civic #3220
    - Property owner indicated the presence of a possible blocked subdrain

Photographs of typical conditions, showing the above distresses are included in Figure 4.4.1.

Figure 4.4.1: Location D, Typical Road Section

4.4.3 Borehole Location Plan

Figure 4.4.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.4.2: Location D, Borehole Locations

4.4.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location D, Dornie Road, have been appended in Appendix C and summarized in Table 4.4.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.4.5 Typical Pavement Structure and Observations

The following Table 4.4.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.4.1: Typical Pavement Structure			
Material	**Surface Treatment**	**Base**	**Subbase**
Range, where encountered (mm)	20	160-360	260-930
Average, where encountered (mm)	20	230	615

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of grey crushed coarse gravel and sand trace silt to brown crushed gravelly sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of grey silty clay some organics to brown silt with sand trace gravel. A 200 mm thick layer of black organics with silt was noted from 1.30 m to 1.50 m in Borehole 12. Grain size analysis testing indicated that the subgrade has a low susceptibility to frost heaving (LSFH).

4.4.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.4.2 and 4.4.3 provide design values based on Location D, Dornie Road existing conditions, and traffic data. An AADT of 218, a percent commercial of 8.58%, and a Roadbed Soil Resilient Modulus of 30 MPa (silty sands and gravels) were used as design inputs. The Routine Method stipulates a required GBE value of 200 mm with surface treatment. The AASHTO method stipulates a required SN = 61.69 mm.

Table 4.4.2: Required Routine Method Table Values	
AADT (2022)	**218**
Subgrade Material	**Silty Sands and Gravels**
Table 3.3.3 for AADT 200 to 1000; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	0
Base	100
Subbase	150
GBE	200

Table 4.4.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	42,859	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.63204338
Terminal Serviceability (Pt)	2	2	C	8.44155731
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	2.22638944
Roadbed Soil Resilient Modulus (MPa)	30.0		F	5.00899576
Zr	-1.037		Goal	0.00043113
ΔPSI	2.2		Target	0
The Required SN =	61.69	mm		

4.4.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.4.4 provides two pavement rehabilitation methods for Dornie Road, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.4.4 – Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	61.69	200	-	Pulverize 150 mm, Double Surface Treatment	0	76.08	572.5	20 mm grade raise
2				Pulverize 150 mm, Add 150 mm Granular A and Double Surface Treatment	0	97.08	722.5	150 mm grade raise

Recommended Alternative:

While both options satisfy the structural requirements of Dornie Road, the road is exhibiting advanced stages of deterioration with an existing surface that is approximately 12-years old. It is recommended, to mitigate issues with drainage, and to mitigate the fine-grained subgrade materials near the pavement surface, the granular A be added in order to raise the grade of Dornie Road. The recommended treatment alternative for this section of roadway is **Option 2**: Pulverize 150 mm, followed by the addition of 150 mm of Granular A and an application of Double Surface Treatment.

4.5 Location E: Kenyon Concession Road 4 East

4.5.1 Location and Section Description

Location E of the RFQ, Kenyon Concession Road 4 East, is approximately 5 km in length and the limits are noted to be from Dornie Road westerly to County Road 30. Within these limits, the road is surface treated, and travels through flat farmland and gently undulating hills. The AADT is 178 with a commercial percentage of 7.38%. There are ditches on both sides of the road; however, shallow ditches were noted in some areas from Dornie Road to County Road 30.

4.5.2 Pavement Condition and Distresses

This section of the road is typically in fair condition. There are several hot-mix patches throughout the limits from previous repairs to due excess loads. In general, the road exhibited the following distresses:

- Intermittent, moderate potholing
- Intermittent, moderate meander cracking

4.5.3 Borehole Location Plan

Figure 4.5.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.5.2: Location E, Borehole Locations

4.5.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location E, Kenyon Concession Road 4 East, have been appended in Appendix C and summarized in Table 4.5.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.5.5 Typical Pavement Structure and Observations

The following Table 4.5.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.5.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20-25	160-270	250-1050
Average, where encountered (mm)	20	210	670

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of grey coarse crushed gravel and sand trace silt to brown gravelly sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of brown sand some silt trace gravel to brown sandy silt some clay. Black organics were noted in Borehole 12 from 1.50 m to 1.70 m below the road surface. Grain size analysis testing indicated that the subgrade has low susceptibility to frost heaving (LSFH).

4.5.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.5.2 and 4.5.3 provide design values based on Location E, Kenyon Concession Road 4 East existing conditions and traffic data. An AADT of 178, a percent

commercial of 7.38%, and a Roadbed Soil Resilient Modulus of 50 MPa (Poorly Graded Gravels and Sands) were used as design inputs. The Routine Method stipulates a required GBE value of 200 mm with no requirement for a bituminous surface. The AASHTO method stipulates a required SN = 48.10 mm.

Table 4.5.2: Required Routine Method Table Values	
AADT (2022)	**178**
Subgrade Material	**Poorly Graded Gravels and Sands**
Table 3.3.3 for AADT 200 to 1000; Sands and Silts, 5 to 75 um <40%	
Gravel	-
Base	100
Subbase	150
GBE	200

Table 4.5.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	30,101	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.47857596
Terminal Serviceability (Pt)	2	2	C	8.95624641
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49		E	4.80746079
Roadbed Soil Resilient Modulus (MPa)	50.0		F	4.31899772
Zr	-1.037		Goal	0.00003754
ΔPSI	2.2		Target	0
The Required SN =	**48.10**	**mm**		

4.5.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.5.4 provides two pavement rehabilitation methods for Concession Road 4 East, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.5.4: Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	48.10	200	-	Pulverize 150 mm, Double Surface Treatment	0	77.34	581.25	20 mm grade raise
2				Pulverize 100 mm, Add 75 mm Granular A and Double Surface Treatment	0	82.74	618.75	50 mm grade raise

Recommended Alternative:

While both options satisfy the structural requirements of Kenyon Concession Road 4 the recommended treatment alternative for this section of roadway is **Option 2**, Pulverize 100 mm, followed by the addition of 75 mm of Granular A and an application of Double Surface Treatment.

4.6 Location F: Kenyon Concession Road 4 West

4.6.1 Location and Section Description

Location F of the RFQ, Kenyon Concession Road 4 West, was limited from Vallance Road westerly to County Road 20. Within these limits, the road is surface treated, and travels through flat farmland and gently undulating hills. The estimated AADT is 150 with a commercial percentage of 10.0%. There are ditches in good condition on both sides of the road within the project limits.

4.6.2 Pavement Condition and Distresses

From discussions with the Township, the existing surface course is an ultrathin approximately 7 years old. This section of the road is typically in fair condition. There are several recent culvert replacement patches. There was noted to be significant distresses in the surface treatment at the entrance to the feed plant at approximately Sta. 11+320, at Civic #18408, likely due to turning movements of heavy slow moving vehicles entering the commercial property.. In general, the road exhibited the following distresses:

- Intermittent, moderate potholing
- Intermittent, moderate longitudinal cracking

Figure 4.6.1: Location F, Typical Road Section

4.6.3 Borehole Location Plan

Figure 4.6.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.6.3: Location F, Borehole Locations

4.6.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location F, Kenyon Concession Road 4 West, have been appended in Appendix C and summarized in Table 4.6.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, Appendix C.

4.6.5 Typical Pavement Structure and Observations

The following Table 4.6.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.6.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20	250-390	310-480
Average, where encountered (mm)	20	330	390

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of brown gravelly sand. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of black silty clay to black silt some clay trace gravel. Grain size analysis testing on non-organic samples of the subgrade indicated a low susceptibility to frost heaving (LSFH) for the subgrade soil. A 560 mm thick layer of woody organics was noted in Borehole 1 from 0.94 m to 1.50 m below the road surface; despite this presence, the organics do not appear to be impacting the overall performance of the road and, at this time, are recommended to be left in place.

4.6.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.6.2 and 4.6.3 provide design values based on Location F, Kenyon Concession Road 4 West existing conditions and traffic data. An AADT of 150, a percent commercial of 10.0%, and a Roadbed Soil Resilient Modulus of 20 MPa (Low Plasticity Clays and Compressible Silts) were used as design inputs. The Routine Method stipulates a required GBE value of 200 mm with no requirement of a bituminous surface. The AASHTO method stipulates a required SN = 68.99 mm.

Table 4.6.2: Required Routine Method Table Values	
AADT (2022)	**150**
Subgrade Material	**Low Plasticity Clay**
Table 3.3.3 for AADT 1000 to 2000; Sands and Silts, 5 to 75 um <40%	
Gravel	-
Base	100
Subbase	150
GBE	200

Table 4.6.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	34,371	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.53619086
Terminal Serviceability (Pt)	2.0	2	C	8.03302559
Reliability (%)	85.0	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	1.60319162
Roadbed Soil Resilient Modulus (MPa)	20.0		F	5.33588987
Zr	-1.037		Goal	-0.00088291
ΔPSI	2.2		Target	0
The Required SN =	**68.99**	**mm**		

4.6.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.6.4 provides two pavement rehabilitation methods for Concession Road 4 West, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.6.4: Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	48.10	200	-	Pulverize 150 mm, Double Surface Treatment	0	70.68	535	20 mm grade raise
2				Pulverize 100 mm, 100 mm Granular A and Double Surface Treatment	0	76.08	572.5	100 mm grade raise

Recommended Alternative:

Option 2 is recommended for the rehabilitation of Concession 4 West As noted, there are significant pavement distresses observed in the vicinity of Civic #18408. Based on the Townships budgetary constraints and other preferences, MP proposes two options for the mediation of this distress:

Option 1: Following the pulverizing for the mainline treatment, 150 mm of granular A be added within the limit of this distress area, followed by the placement of 50 mm HL-3 surface course. The raised grade in

this distress area shall transition at 400:1 back into the mainline area. This option will provide longer-term remediation of the distress.

Option 2: Treat the distress as part of the mainline treatment. This option will provide moderate remediation length at a lower cost.

4.7 Location G: River Road

4.7.1 Location and Section Description

Location G of the RFQ, River Road, is approximately 2 km in length and the limits are noted to be from Macleod Crescent easterly to Unknown Creek Bridge. Within the project limits, the road is asphalt and travels through flat farmland. The estimated Average Annual Daily Traffic volumes (AADT) are 220 with a commercial percentage of 8.0%. There are ditches on both sides of the road section, with minimal vegetation growth noted. This section of road was rehabilitated and has since begun to exhibit meander cracking. The scope of work for this area was to advance boreholes for the purposes of determining the cause of the distress.

4.7.2 Pavement Condition and Distresses

From a discussion with the Township, the existing surface course on this road is approximately 2 years old. The most recent treatment involved a 50 mm overlay, and crack sealing one year ago. The road is generally in good condition, except for the single meander crack that can be observed throughout. Photographs showing the condition of River Road are included in Figure 4.7.1 below.

Figure 4.7.1: Location G, Typical Road Section

4.7.3 Borehole Location Plan

Figure 4.7.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.7.2: Location G, Borehole Locations

4.7.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location G, River Road, have been appended in Appendix C and summarized in Table 4.7.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.7.5 Typical Pavement Structure and Observations

The following Table 4.7.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.7.1: Typical Pavement Structure

Material	Asphalt	Base	Subbase
Range, where encountered (mm)	50	160-230	360-590
Average, where encountered (mm)	50	195	475

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of grey crushed coarse gravel and sand trace silt to brown gravelly sand trace silt. Grain size analysis testing indicated that the material meets the criteria for Granular B Type I.

Subgrade

The subgrade typically consisted of brown silty sand some clay some gravel to brown silty clay. The grain size analysis indicated that the subgrade has low susceptibility to frost heaving (LSFH).

Meander Cracking

The gradations of the existing granular base and subbase materials are acceptable or marginally acceptable on the Granular A and Granular B Type I criteria, and do not appear to be significantly contributing to the manifestation of the meander cracking. However, moist silt materials were observed within the frost penetration depth and may be contributing to frost action. To address the meander cracking, it is recommended that, when the road undergoes future rehabilitation, drainage be improved through ditching and stripping of vegetation from the existing side slopes, and a minimum of 150 mm of granular A material be placed prior to future rehabilitation to both raise the grade higher out of frost susceptible material and provide adequate support for the placement of future hot-mix asphalt.

4.8 Location H: Power Dam Road

4.8.1 Location and Section Description

Location H of the RFQ, Power Dam Road, is approximately 2.7 km in length and the limits are noted to be from County Road 34 easterly to Cuthbert Road. Within the project limits, the road is asphalt, and travels through flat farm fields. The Average Annual Daily Traffic volumes (AADT) are 490 with a commercial percentage of 8.0%. There are ditches on both sides of the road section, with minimal vegetation growth noted; however, standing water was noted in the ditch on the north side of the road (shown in Figure 4.8.1) at the time of the field review. This section of road was rehabilitated and has since begun to exhibit meander cracking. The scope of work for this area was to advance boreholes for the purposes of determining the cause of distress.

4.8.2 Pavement Condition and Distresses

From discussion with the Township, the existing surface course on this road is approximately 1 year old. The most recent treatment involved expanded asphalt recycling. The road is generally in good condition, except for the single meander crack that can be observed throughout. Photographs showing the condition of River Road are included in Figure 4.8.1 below.

Figure 4.8.1: Location H, Typical Road Section

4.8.3 Borehole Location Plan

Figure 4.8.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.8.2: Location H, Borehole Locations

4.8.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location H, Power Dam Road, have been appended in Appendix C and summarized in Table 4.8.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, Appendix C.

4.8.5 Typical Pavement Structure and Observations

The following Table 4.8.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.8.1: Typical Pavement Structure

Material	Asphalt	Base	Subbase
Range, where encountered (mm)	30	190-310	280-880
Average, where encountered (mm)	30	245	615

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of grey crushed coarse gravel and sand trace silt to brown gravelly sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade consisted of stiff brown silty clay. Grain size analysis testing indicated that the subgrade has low susceptibility to frost heaving (LSFH).

Meander Cracking

The gradations of the existing granular base and subbase materials are marginally acceptable on the Granular A and Granular B Type I criteria; however, the granular materials have excess fines passing on the 0.075 mm sieve. Given that the most recent treatment is understood to be expanded asphalt on a very old previous bituminous treatment, which incorporated the existing granular materials, it appears that the granular base structure has been weakened by the incorporation of fines, as observed in the lab test data. In addition, wet clays were observed within the frost penetration depth and may be contributing to frost action. To address the meander cracking, it is recommended that, when the road undergoes future rehabilitation, drainage be improved through ditching and stripping of vegetation from the existing side slopes, and a minimum of 150 mm of granular A material be placed prior to future rehabilitation to both raise the grade higher out of frost susceptible material and provide adequate support for the placement of future hot-mix asphalt.

4.9 Location I: McCormick Road

4.9.1 Location and Section Description

Location I of the RFQ, McCormick Road, is approximately 12.5 km in length and the limits are noted to be from Cuthbert Road easterly to County Road 10. Within the project limits, the road is surface treated, and travels through flat farm fields and gently undulating hills. The Average Annual Daily Traffic volumes (AADT) are 487 with a commercial percentage of 7.87%. There are ditches on both sides of the road section; however, it was noted that some areas have shallow ditches or vegetation growth.

4.9.2 Pavement Condition and Distresses

From discussion with the Township, the existing age of the surface course is not known. The road is generally in fair to poor condition. The predominant distresses that were noted include:

- Extensive, moderate longitudinal cracking;
- Frequent, moderate ravelling; and
- Intermittent, moderate potholing
- Few severe distortions
- Intermittent moderate meander cracking (some addressed with strip repairs)

The condition of McCormick Road is pictured in Figure 4.9.1.

Figure 4.9.1: Location I, Typical Road Section

4.9.3 Borehole Location Plan

Figure 4.9.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.9.2: Location I, Borehole Locations

4.9.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location I, McCormick Road, have been appended in Appendix C and summarized in Table 4.9.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.9.5 Typical Pavement Structure and Observations

The following Table 4.9.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.9.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20-80*	165-430	120-1410
Average, where encountered (mm)	25	255	640

**80 mm represents a patched area*

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing on samples of granular base indicated that the material was generally marginally acceptable (<1% excess passing on 0.075 mm sieve).

Subbase

The subbase typically consisted of grey crushed coarse gravel and sand trace silt to brown gravelly sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of silty clay trace organics to sandy silt some clay some organics. There were organic layers encountered in six boreholes. Table 4.9.2 outlines the depth encountered and field classification of the organic layers. The grain size analysis indicated that the non-organic subgrade has low susceptibility to frost heaving (LSFH); however, organic material typically is susceptible to frost effects due to the high moisture retention of the material.

Table 4.9.2: Organic Layers on McCormick Road		
BH ID	**Depth Encountered (m)**	**Field Classification**
BH-6	1.15-1.70	Black silty organic
BH-10	0.79-1.45	Woody organic some silt
BH-14	0.86-1.35	Silty organic trace sand trace gravel
BH-17	0.95-1.20	Woody organic some silt
BH-18	1.25-1.50	Sandy organic trace silt
BH-25	1.40-1.70	Woody organic some silt some sand

4.9.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.9.3 and 4.9.4 provide design values based on Location I, McCormick Road existing conditions, and traffic data. An AADT of 487, a percent commercial of 7.87%, and a Roadbed Soil Resilient Modulus of 25 MPa (Silts and Sandy Silts) were used as design inputs. The Routine Method stipulates a required GBE value of 250 mm with surface treatment. The AASHTO method stipulates a required SN = 73.61 mm.

Table 4.9.3: Required Routine Method Table Values	
AADT (2022)	**487**
Subgrade Material	**Silts and Sandy Silts**
Table 3.3.3 for AADT 200 to 500; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	-
Base	150
Subbase	150
GBE	250

Table 4.9.4: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	87,882	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.94360329
Terminal Serviceability (Pt)	2	2	C	8.25785682
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49		E	1.33889867
Roadbed Soil Resilient Modulus (MPa)	25.0		F	5.53015238
Zr	-1.037		Goal	-0.00015262
ΔPSI	2.2		Target	0
The Required SN =	**73.61**	**mm**		

4.9.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.9.4 provides three pavement rehabilitation methods for McCormick Road, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.9.4: Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	73.61	250	-	Pulverize 150 mm, Double Surface Treatment	0	81.12	607.5	20 mm grade raise
2				Remove Surface Treatment, Add 50 mm Granular A, Double Surface Treatment	0	80.62	601.25	45 mm grade raise
3				Pulverize 150 mm, Add 150 mm Granular A, Double Surface Treatment	0	95.12	707.50	120 mm grade raise
4				Add 50 mm RAP and 50 mm Granular A, 150 mm Expanded Asphalt Recycling, Double Surface Treatment	0	97.88	731.25	45 mm grade raise

Recommended Alternative:

The existing surface on McCormick Road is heavily deteriorated in some areas and shows signs of previous repairs to meander cracking. As such, it is recommended that the existing materials be strengthened through pulverizing and that the grade be raised with the addition of granular to raise the road surface further from frost susceptible materials and organics below. In discussion with the Township, it was indicated that The United Counties of Stormont Dundas and Glengarry are carrying out expanded asphalt treatments on nearby roads, and some opportunity for collaboration exists; in addition, that excess RAP from nearby projects may be incorporated into the treatment on McCormick Road.

Due to the above factors, the recommended treatment alternative for this section of roadway is **Option 4**, add 50 mm RAP and 50 mm Granular A, carry out 150 mm Expanded Asphalt Recycling and place Double Surface Treatment.

It should be noted that McCormick Road currently has a 40-foot road allowance, below the Townships standard allowance, which may constitute a safety concern with higher traffic volumes and speeds. While not in the scope of the geotechnical investigation and reporting outlined herein, it is recommended that a traffic study be conducted to analyze the effect of pavement treatments encouraging higher driver speeds from a safety perspective.

4.10 Location J: Concession Road 16

4.10.1 Location and Section Description

Location J of the RFQ, Concession Road 16, is approximately 200 m in length and the limits are noted to be 200 m West of County Road 20 to County Road 20. Within the project limits, the road is surface treated, and travels through low-lying marsh area. The estimated Average Annual Daily Traffic volumes (AADT) are 220 with a commercial percentage of 8.0%. There are ditches on both sides of the road section; however, there was significant vegetation growth and standing water noted.

4.10.2 Pavement Condition and Distresses

The section on Concession 16 is limited to a very severe frost heave just west of where the road meets County Road 20. The frost heave is pictured in Figure 4.10.1.

Figure 4.10.1: Location J, Severe Frost Heave

4.10.3 Borehole Location Plan

Figure 4.10.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.10.2: Location J, Borehole Locations

4.10.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location J, Concession Road 16, have been appended in Appendix C and summarized in Table 4.10.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.10.5 Typical Pavement Structure and Observations

The following Table 4.10.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.10.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20	220	190-410
Average, where encountered (mm)	20	220	330

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase consisted of brown gravelly sand trace silt.

Subgrade

There was no soil subgrade found within the site limits. Refusal on boulders or rock fill occurred in all three boreholes advanced.

4.10.6 Frost Heave Treatment Recommendations

The field investigation generally revealed the site condition consisted of surface treatment and granular base overlying rock refusal, recorded as boulders, at an average depth of 415 mm. At this location, the road appears to be constructed in a low-lying wetland area. While the existing materials were not found to be frost susceptible, they did far exceed the allowable content of fines passing the 0.075 mm sieve. In addition, it is possible the material underlying boulders additionally contribute to the frost action. The roadway section is recommended to be excavated as per MTO specification OPSD 205.060 to rock, expected to be encountered at an average depth of 0.4 m. A non-woven geotextile separator, F.O.S 75-150 µm, is recommended to be installed on top of the exposed rock. 200 mm of Granular B Type I, 150 mm of Granular A, and 50 mm of HL-4 hot-mix (surface treatment is not conducive to short treatment lengths) shall be placed within the excavated area. Ditching on both sides of the highway shall be completed to provide positive drainage away from the distressed area. It is recommended in year 5 to review the cracking patterns in the hot-mix and to apply rout and seal as applicable as part of routine maintenance.

4.11 Location K: Kenyon Concession Road 8

4.11.1 Location and Section Description

Location K of the RFQ, Kenyon Concession Road 8, is approximately 4.5 km in length and the limits are noted to be from County Road 20 easterly to Blyth Road. Within the project limits, the road is surface treated, and travels through farmlands, marshes, and occasional hills. The Average Annual Daily Traffic volumes (AADT) are 218 with a commercial percentage of 8.5%. There are ditches on both sides of the road section, some vegetation growth was noted.

4.11.2 Pavement Condition and Distresses

From discussion with the Township, the existing age of the surface course is approximately 15 years old. The road is generally in fair to poor condition. It was noted that the crown of the road appeared low in some areas. The predominant distresses that were noted include:

- Intermittent, moderate meander cracking
- Frequent, moderate potholing
- Intermittent moderate longitudinal cracking at pavement edge

The condition of Concession Road 8 is pictured in Figure 4.11.1.

Figure 4.11.1: Location K, Typical Road Section

4.11.3 Borehole Location Plan

Figure 4.11.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

Figure 4.11.2: Location K, Borehole Locations

4.11.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location K, Kenyon Concession Road 8, have been appended in Appendix C and summarized in Table 4.11.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.11.5 Typical Pavement Structure and Observations

The following Table 4.11.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.11.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20	260-360	310-920
Average, where encountered (mm)	20	290	670

Base

The base typically consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase typically consisted of grey crushed coarse gravel and sand trace silt to brown gravelly sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular B Type I, due to excess fines passing the 0.075 mm sieve.

Subgrade

The subgrade typically consisted of silty clay trace sand trace organics to brown sandy silt some organics. The grain size analysis testing indicated that the subgrade has a low susceptibility to frost heaving (LSFH).

Distresses

The distresses observed on Kenyon Concession Road 8 include:

- Intermittent, moderate ravelling;
- Intermittent, moderate potholing; and
- Intermittent, moderate longitudinal cracking

4.11.6 Design Analysis

The AASHTO and Routine Method background information and common selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is

considered a local, arterial, or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.11.2 and 4.11.3 provide design values based on Location K, Kenyon Concession Road 8 existing conditions and traffic data. An AADT of 218, a percent commercial of 8.51%, and a Roadbed Soil Resilient Modulus of 25 MPa (Silt and Sandy Silt) were used as design inputs. The Routine Method stipulates a required GBE value of 250 mm with surface treatment. The AASHTO method stipulates a required SN = 65.82 mm.

Table 4.11.2: Required Routine Method Table Values	
AADT (2022)	**218**
Subgrade Material	**Silt and Sandy Silt**
Table 3.3.3 for AADT 200 to 500; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	-
Base	150
Subbase	150
GBE	250

Table 4.11.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	42,509	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.62848565
Terminal Serviceability (Pt)	2	2	C	8.25785682
Reliability (%)	85	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49		E	1.83625793
Roadbed Soil Resilient Modulus (MPa)	25.0		F	5.19720742
Zr	-1.037		Goal	0.00001254
ΔPSI	2.2		Target	0
The Required SN =	65.82	mm		

4.11.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.11.4 provides two pavement rehabilitation methods for Kenyon Concession Road 8, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.11.4 – Rehabilitation Method Summary

Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	73.61	250	-	Pulverize 150 mm, Double Surface Treatment	0	86.52	645	20 mm grade raise
2				Pulverize 150 mm, Add 100 mm Granular A and Double Surface Treatment	0	93.52	695	50 mm grade raise

Recommended Alternative:

While both options satisfy the structural requirements of Kenyon Concession Road 8 The recommended treatment alternative for this section of roadway is **Option 2**: Pulverize 150 mm, add 100 mm of Granular A followed by Double Surface Treatment.

4.12 Location L: Athol Road

4.12.1 Location and Section Description

Location L of the RFQ, Athol Road, is approximately 1.4 km in length and the limits are noted to be from 1.4 km West of County Road 20 to County Road 20. Within the project limits, the road surface is surface treated, and travels through flat farm fields and gently undulating hills. The estimated Average Annual Daily Traffic volumes (AADT) are 220 with a commercial percentage of 8.0%.

4.12.2 Pavement Condition and Distresses

From a discussion with the Township, the existing age of the surface course is approximately 20 years old. The road is generally in fair condition, outside of several distress areas. The predominant distresses that were noted include:

- Intermittent, severe distortions, including severe alligator cracking
- Intermittent, moderate potholing
- Stripping at the township boundary

The condition of Concession Road 8 is pictured in Figure 4.12.1.

Figure 4.12.1: Location L, Typical Road Section

4.12.3 Borehole Location Plan

Figure 4.12.2, below, shows the approximate subject road investigation limits with the locations of boreholes advanced during the investigation, as collected via GPS.

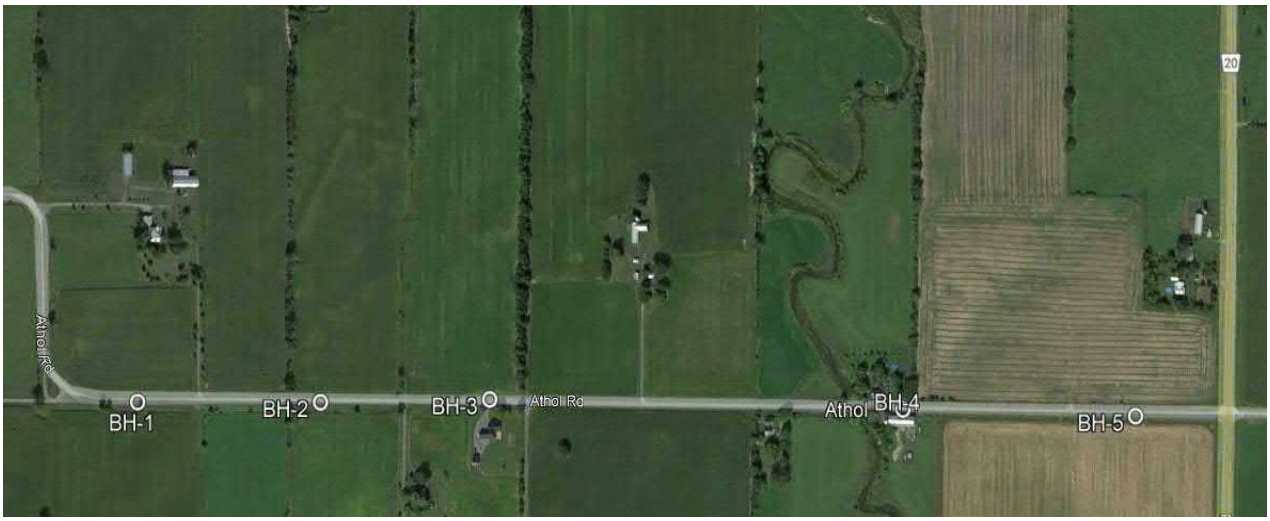

Figure 4.11.2: Location L, Borehole Locations

4.12.4 Borehole Logs and Laboratory Results

The borehole logs completed for Location L, Athol Road, have been appended in Appendix C and summarized in Table 4.12.1. In addition to the borehole stratigraphy, the borehole logs describe the borehole locations by providing the centreline offset, coordinates, and occasional lane descriptions.

Granular and soil samples were submitted to McIntosh Perry's Ottawa laboratory for testing of grain size analyses and moisture content. The laboratory testing results have been provided in Appendix D, and incorporated into the borehole logs, in Appendix C.

4.12.5 Typical Pavement Structure and Observations

The following Table 4.12.1, provides a summary of pavement structure thicknesses, followed by descriptions of materials. Groundwater was not encountered in any of the boreholes.

Table 4.12.1: Typical Pavement Structure

Material	Surface Treatment	Base	Subbase
Range, where encountered (mm)	20-50	135-265	125-400
Average, where encountered (mm)	30	185	280

Base

The base consisted of grey crushed gravel and sand trace silt. Grain size analysis testing indicated that the material does not meet the criteria for Granular A, due to excess fines passing the 0.075 mm sieve.

Subbase

The subbase consisted of brown gravelly sand trace silt.

Subgrade

The subgrade typically consisted of black sandy silt trace gravel to grey silty clay trace sand. Grain size analysis testing indicated that the subgrade has a low susceptibility to frost heaving (LSFH).

Distresses

The distresses observed on Athol Road include:

- Frequent, moderate longitudinal cracking in centreline, wheel path and edge of pavement; and
- Intermittent, moderate wheel path rutting

4.12.6 Design Analysis

The AASHTO and Routine Method background information and commonly selected engineering parameters are provided in Section 3.0. In addition to this, the AASHTO method calculations require a "truck factor" (TF) correction value to account for the type of truck traffic anticipated on the subject road section. The truck factor is based on the functional highway classification, i.e., rural or urban, and whether the road is considered a local, arterial or freeway road. The functional highway classification for this road section has been determined to be Rural Local.

For the purposes of design analysis, the following Tables 4.12.2 and 4.12.3 provide design values based on Location L, Athol Road's existing conditions, and estimated traffic data. An AADT of 220, a percent commercial of 8.0%, and a Roadbed Soil Resilient Modulus of 30 MPa (Low Plasticity Clay and Compressible Silts) were used as design inputs. The Routine Method stipulates a required GBE value of 250 mm with surface treatment. The AASHTO method stipulates a required SN = 70.73 mm.

Table 4.12.2: Required Routine Method Table Values	
AADT (2022)	**220**
Subgrade Material	**Low Plasticity Clay**
Table 3.3.3 for AADT 200 to 500; Sands and Silts, 5 to 75 um <40%	
Surface Treatment	-
Base	150
Subbase	150
GBE	250

Table 4.12.3: Required Structural Number (SN) Calculations				
Input Design Parameters		**ESAL Input**		**Calculations**
Cumulative ESAL's	40,329	0: Manually 1: Linear 2: Geometric	A	-0.50813000
Initial Serviceability (Po)	4.2		B	4.60561226
Terminal Serviceability (Pt)	2.0	2	C	8.03302559
Reliability (%)	85.0	Manual ESAL Below	D	-0.08894108
Overall Standard Deviation	0.49	0	E	1.49424706
Roadbed Soil Resilient Modulus (MPa)	30.0		F	5.41022777
Zr	-1.037		Goal	0.00005949
ΔPSI	2.2		Target	0
The Required SN =	61.10	mm		

4.12.7 Rehabilitation Recommendations

Rehabilitation recommendations are based on a field review of the subject road, a thorough review of the borehole investigation results and subsequent laboratory testing, GBE analysis, and AASHTO 93, as well as discussions with the Township of North Glengarry regarding their rehabilitation preferences. Additionally, the road is essentially in a rural area with few entrances and intersecting roads, thus, a minor grade raise is considered acceptable to incorporate into the road rehabilitation.

The following Table 4.12.4 provides two pavement rehabilitation methods for Kenyon Concession Road 16, which takes into consideration the Townships' preferred rehabilitation methods.

Table 4.12.4: Rehabilitation Method Summary								
Rehab Option No.	Required Design Values			Rehabilitation Description	Calculated Pavement Values for Rehab. Options			Rehabilitation Method Notes
	AASHTO Structural No.	Rtn. Method Table 3.4			New Asph (mm)	AASHTO Structural No.	Routine Method GBE	
		GBE	Asph (mm)					
1	61.10	250	-	Pulverize 150 mm, Add 100 mm Granular A, Double Surface Treatment	0	62.18	478.75	100 mm grade raise
2				Pulverize 150 mm, Add 150 mm Granular A, Double Surface Treatment	0	69.18	622.75	150 mm grade raise

Recommended Alternative:

While both options satisfy the structural requirements of Athol Road, the recommended treatment alternative for this section of roadway is **Option 2**: Pulverize 150 mm, add 150 mm of Granular A followed by Double Surface Treatment.

4.13 Summary of Recommended Treatments

Table 4.1.3 below summarizes the treatment recommendations outlined in the previous sections, including the required thickness of new Granular A for each rehabilitation.

Table 4.1.3 Treatment Summary		
Road Section	Treatment	New Granular A
Kenyon Concession 2	Pulverize 150 mm, add 100 mm Granular A, Double Surface Treatment	100 mm
Kenyon Dam Road	Pulverize 100 mm, add 100 mm Granular A, Double Surface Treatment	100 mm
Marcoux Road	Pulverize 150 mm, add 100 mm Granular A, Double Surface Treatment	100 mm
Dornie Road	Pulverize 150 mm, add 150 mm Granular A, Double Surface Treatment	150 mm
Kenyon Concession 4	Pulverize 100 mm, add 75 mm Granular A, Double Surface Treatment	75 mm
Kenyon Concession 4 (IL 15)	Pulverize 150 mm, add 100 mm Granular A, Double Surface Treatment	100 mm
McCormick Road	Add 50 mm RAP, add 50 mm Granular A, 150 mm Expanded Asphalt Recycling, Double Surface Treatment	50 mm
Kenyon Concession 16	Sub-excavate frost heave, place geotextile, place 200 mm Granular B Type I, 150 mm Granular A, and 50 mm HMA	150 mm
Kenyon Concession 8	Pulverize 150 mm, add 100 mm Granular A, Double Surface Treatment	100 mm
Athol Road	Pulverize 150 mm, add 150 mm Granular A, Double Surface Treatment	150 mm

5.0 GENERAL (NON-SITE SPECIFIC) RECOMMENDATIONS

Although the rehabilitation recommendations outlined herein and those which may ultimately be the rehabilitation option for a subject section of road may differ, the following outlines general recommendations to be considered which may or may not be entirely applicable to the subject rehabilitation option.

Note that MP, in the past, has recommended some intermittent testing of aggregates to ensure the quality of limestone aggregates, particularly with regards to the abrasion resistance.

5.1 Granular Surface Preparation and Compaction Requirements

The exposed material (if any after rehabilitation or reconstruction) should be graded to achieve the desired crossfall and to promote positive drainage. Any granular material forming part of the pavement structure should be compacted to 100% of its respective Standard Proctor Maximum Dry Density (SPMDD) based on either a field or lab determination.

Prior to placement of any additional granular or new surface treatment, the exposed granular section (if applicable) should be proof rolled with a large steel drum roller or fully loaded tri-axle and monitored under the direction of a competent inspector (recommended) for deformation, rutting or flexing. Any wet, soft, organics or otherwise deleterious materials should be removed prior to preparing pavement materials. Any soft areas should be sub-excavated and replaced with OPSS granular that is generally consistent with the subgrade material, whether that may be Granular A, Granular B Type II or III, placed in maximum 300 mm lifts and compacted to 95% SPMDD within the subgrade zone, including a taper to avoid a vertical face of differing material. The top surface of the additional material should be placed at the same elevation as that of the bottom of the subbase material and the overlying granular subbase and base should then be placed and compacted to 100% SPMDD to match the adjacent granular depths with the inclusion of the aforementioned taper.

All compaction should be completed in accordance with OPSS 501 before the subsequent layer is placed. Generally, the intent for a pavement rehabilitation/reconstruction project is to have the aforementioned granular meet the physical property and production requirements of OPSS.MUNI 1010 (April 2013) Tables 2 and 3 respectively.

The use of geogrid, woven, and non-woven geotextiles in a case of a failed proof roll should be considered on a scenario-specific basis. Generally, with respect to:

- Woven geotextile, the primary purpose is additional strength with a secondary emphasis on separation;
- Non-woven geotextile's primary purpose is separation with a secondary emphasis on strength;
- Geogrid is generally utilized as an added strength between granular lifts to spread structural loads over a larger area; and
- Either of these may apply to a site-specific scenario.

5.2 Surface Treatment Placement

All surface treatment applied initially under this project should utilize Class 2 Aggregate with HF150 emulsion and comply with the requirements of MTO PERF 2224. HF150P (polymer modified) emulsion can also be considered. A follow-up single surface treatment could also consider a finer aggregate such as Class 1 or Class 6 for a slightly smoother surface, with a matching emulsion such as CRS-2 and HFRS respectively. Similarly, a slurry seal would likely utilize a finer aggregate such as a Type 2 material.

5.2.1 Surface Treatment Maintenance

A follow-up single surface treatment or slurry seal; should be applied after 5-7 years to maintain performance on all sections where a double surface treatment is currently recommended.

Regular maintenance of the ditching, brushing, and patching along surface-treated roads is recommended to achieve the desired longevity of pavement performance.

5.3 Ditch Cleanouts and Granular Daylighting

Daylighting the granular material rounding to rounding will help to improve the cross section lateral drainage characteristics and overall performance of the road. This technique avoids having a vertical face of differing materials at the edge of pavement and helps to provide continuity when compared to construction of the travelled lanes only which may create an area for water to collect. Employing a rounding to rounding technique ensures that a shoulder material that may pose lateral drainage path issues is removed, i.e. “bath tub effect”. In doing this it also helps to reduce the potential for granular sumps, impediments to the subsurface lateral drainage and minimize the potential for differential frost action.

Additionally, in areas where cattails or standing water is observed, performing a ditch cleanout to ensure positive drainage and to convey water away from pavement structure will help to mitigate the potential for the subgrade to become saturated and negatively affect the performance of the road. It is generally agreed upon in the pavement engineering community that drainage is a key element, if not the key element, to establishing adequate roadway performance. Periodic review of the ditching throughout the road is recommended and ditch cleanouts completed when necessary to ensure positive drainage away from the pavement structure.

5.4 Transitions and Tie-Ins

Pavement transitions are required at the project limits and at all intersections and paved commercial entrances. Transitions shall be butt joints

5.5 Partially Treated Shoulders

It is recommended, where feasible, to instate partially treated shoulders to provide increased drainage from the main travelled lanes. Where instated, the existing gravel shoulder should be bladed off to provide adequate thickness and crossfall for the surface treatment that shall be extended to 0.5 m past the edge of the travelled lane. Where the existing shoulders are less than 1.0 m in width it is recommended that the surface treatment be carried out to the full width of the shoulder.

5.6 Crossfall

In all sections, crossfall should be corrected after the additional Granular A material has been added, and prior to surface treating. The additional Granular A specified in the recommended options in Section 8.1, should be graded to obtain the correct crossfall.

Where the wearing surface will be surface treatment, a 3% cross-fall on tangent is recommended to promote better surface drainage due to the inherent coarseness of the surface treatment. The 3% crossfall shall be carried across the width of the partially treated shoulder. Granular shoulders, where present shall be graded to a crossfall of 6%.

6.0 CLOSURE AND STATEMENT OF LIABILITY

The geotechnical investigations included a limited sampling of the roadway and the information presented herein is representative of the findings at the specific borehole locations. Conditions other than those noted in this report may exist within the site and cannot be extrapolated extensively away from the sample locations. If differing site conditions are encountered or if the Township of North Glengarry becomes aware of any additional information that differs from or is relevant to the McIntosh Perry Consulting Engineers (McIntosh Perry) findings, the Township of North Glengarry agrees to immediately advise McIntosh Perry so that the information presented in this report may be re-evaluated.

Under no circumstances shall the liability of McIntosh Perry for any claim in contract or in tort, related to the services provided and/or the content and recommendations in this report, exceed the extent that such liability is covered by such professional liability insurance from time to time in effect including the deductible therein and which is available to indemnify McIntosh Perry. Such errors and omissions policies are available for inspection by the Township of North Glengarry at all times upon request and if the Township of North Glengarry desires to obtain further insurance to protect it against any risks beyond the coverage provided by such policies, McIntosh Perry will co-operate with the Township of North Glengarry to obtain such insurance.

McIntosh Perry prepared this report for the exclusive use of the Township of North Glengarry for the assignment titled “LCB Road Investigation”. Any use which a third party makes of this report or any reliance on or decision to be made based on it, are the responsibility of such third parties. McIntosh Perry accepts no responsibility and will not be liable for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

Prepared:

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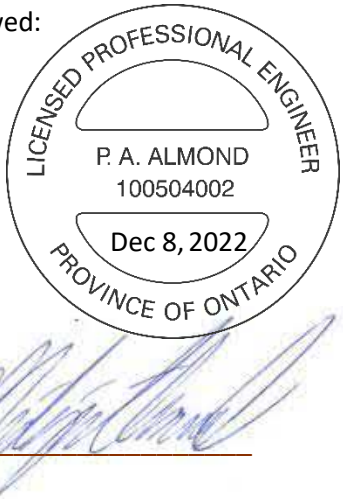
Geotechnical Engineer
T. 343.344.2684

Reviewed:



Philip Almond, P.Eng.
Manager, Pavement Engineering
T. 343.344.2679

7.0 REFERENCES

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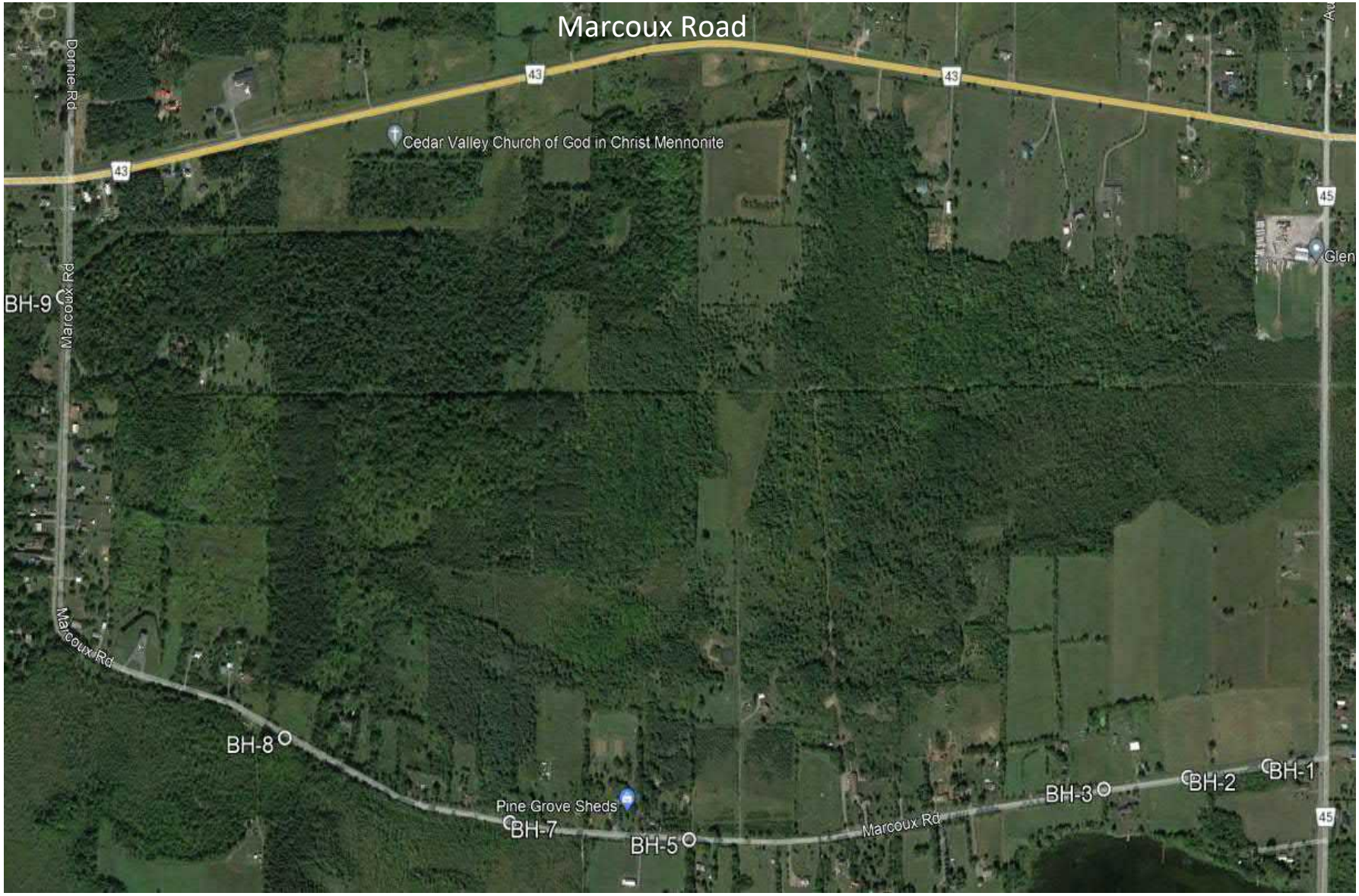
2. Ministry of Transportation and Communications Research Publication RR225 “Aspects of Prolonged Exposure of Pavements to Sub-Zero Temperatures:” dated 1981[5], the Frost Penetration Depth (f)
3. Ministry of Transportation, “MTO Pavement Design and Rehabilitation Manual”, 2013 (Second Edition)
4. Hajek, Jerry, MTO November 1995. Procedures for Estimating Traffic Loads for Pavement Design in Ontario. (Updated 1998)

APPENDIX A: BOREHOLE LOCATION PLANS


Kenyon Concession Road 2
20
John Coleman Drain
Apple Hill Scout Reserve
BH-6
BH-5
BH-4
BH-3
BH-2
BH-1
Apple Hill
Zion United Church
St. Anthony Catholic Church


Kenyon Dam Road
45
BH-4
BH-3
BH-2
BH-1


Marcoux Road
Dornie Rd
43
Cedar Valley Church of God in Christ Mennonite
45
BH-9
Marcoux Rd
Marcoux Rd
BH-8
Pine Grove Sheds
BH-7
BH-5
Marcoux Rd
BH-3
BH-2
BH-1
45

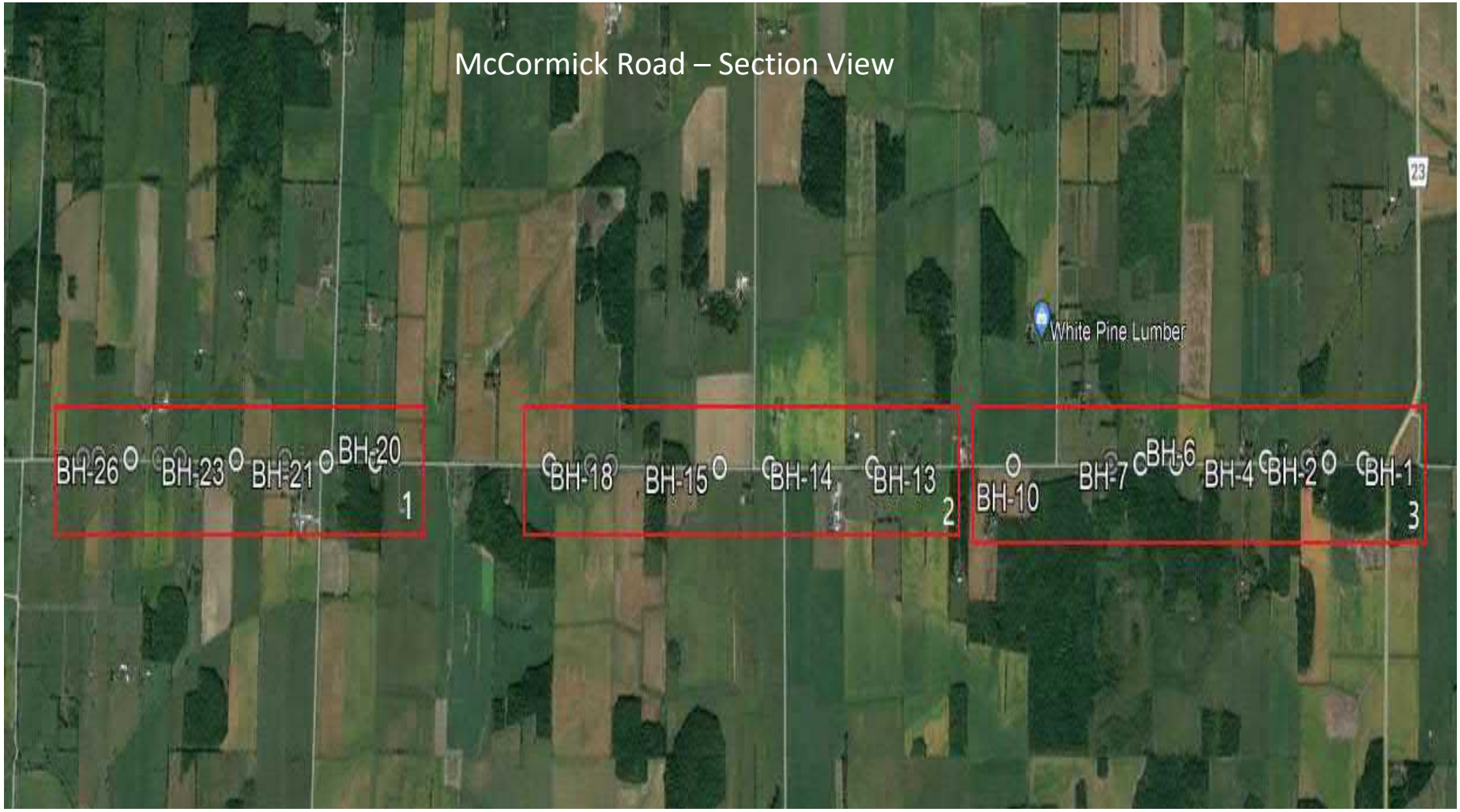

Dornie Road
Dornie
BH-12
BH-11
BH-10
BH-8
BH-6
BH-5
BH-4
BH-3
BH-2
43
Cedar Valley C

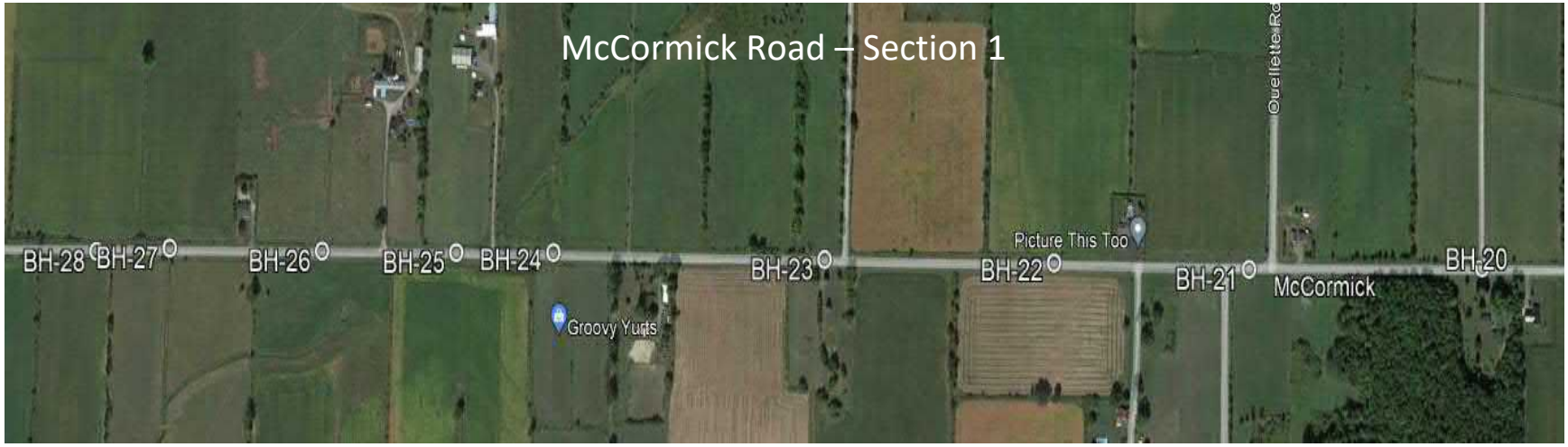

Bottom To Top Renovations
Greenfield
Kenyon Concession Road 4
BH-1
BH-2
The Auto Glass Shop
BH-3
BH-4
BH-6
BH-7
30
BH-8
BH-11
BH-12
BH-13
Phillips Marcel Body Shop


Kenyon Concession Road 15
BH-1
Concession Rd 15
BH-2
BH-3
Concession Rd 15
BH-4
Vallance Rd


River Road
Rd
River Rd
BH-1
BH-2


Power Dam Road
34
BH-31
Power Dam Rd
Power Dam Rd
BH-30
Power Dam Rd
Power Dam Rd
BH-29
Alexandria Aerodrome
Alexandria Moulding
Cuthbert Rd
Cuthbert Rd


McCormick Road – Section View
White Pine Lumber
23
BH-26
BH-23
BH-21
BH-20
1
BH-18
BH-15
BH-14
BH-13
2
BH-10
BH-7
BH-6
BH-4
BH-2
BH-1
3


McCormick Road – Section 1
BH-28
BH-27
BH-26
BH-25
BH-24
BH-23
BH-22
BH-21
BH-20
Picture This Too
Groovy Yurts
McCormick


McCormick Road – Section 2
BH-18
BH-17
BH-16
McCormick Rd
BH-15
BH-14
McCormick Rd
BH-13
McCormick Rd
BH-10


McCormick Road – Section 3
BH-8
BH-9
BH-7
BH-6
McCormick Rd
BH-4
BH-3
BH-2
McCormick Rd
BH-1


Concession Road 16
Concession Rd 16
BH-3
BH-1
BH-2
20


Kenyon Concession Road 8
20
BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-7
BH-9
Saint Elmo
Cedar Ridge Designs


Athol Road
Athol Rd
BH-1
BH-2
BH-3
Athol Rd
Athol
BH-4
BH-5
20

APPENDIX B: GEOTECHNICAL ABBREVIATIONS

Accep	acceptable	Gry	grey	Quant	quantity
Agg	aggregate	H	heavy	Reinf	reinforced
Amor	amorphous	Hi	highly	RF	rock fill
Asph	asphalt	HM	hot mix	RSS	remoulded shear strength
BH	borehole	HP	high plasticity	Sa (y)	sand (y)
Bl	blue	Ip	plasticity index	Sat	saturated
Bld (y)	boulder (y)	L	loose	SH	shale
Blds	boulders	Liq	liquid	Sh Rk	shot rock
Blk	black	Lo	loam	Si (y)	silt (y)
Br	brown	Lt	light	Sl (y)	slight (ly)
BR	bedrock	Matl	material	SP	slight plasticity
BU	break up	Max	maximum	SSM	select subgrade material
CF	channel face	MDD	maximum dry density	St	sensitivity
Cl (y)	clay (ey)	Med	medium	Stn (y)	stone (y)
Co	coarse	Mod	moderate	Stks	streaks
Cob	cobbles	Mott	mottled	Surf	surface
Comp	compact	MP	medium plasticity	Temp	temperature
Conc	concrete	Mrl	marl	TH	test hole
Contam	contaminated	Mul	mulch	TP	test pit
Cord	corduroy	MWD	maximum wet density	Tps	topsoil
Cr	crushed	NFP	no further progress	Tr	trace
D	dense	NFP (blds)	no further progress (boulders)	Unreinf	unreinforced
Decomp	decomposed	Num	numerous	USS	undisturbed shear strength
Dk	dark	Ob	overburden	Varv	varved
D_R	relative density	Occ	occasional	VF	very fine
E	earth	Ora	orange	w	field moisture content
F	fine	Org	organic	W	with
FB	frost boil	Org M	organic matter	W_L	liquid limit
FH	frost heave	Pavt	pavement	Wd (y)	wood (y)
Fib	fibrous	Pedo	pedological	Weath	weathered
Fr Wat	free water	Pen Mac	penetration macadam	Wopt	optimum moisture content
Gr (y)	gravel (ly)	Poss	possible	Wp	plastic limit
Gran	granular	PST	prime and surface treated	WT	water table
Grn	green	Psty	polystyrene	Yel	yellow

SUSCEPTIBILITY TO FROST HEAVING

HSFH – High
MSFH – Medium
LSFH – Low

ONTARIO PROVINCIAL STANDARD DRAWING

ABBREVIATIONS

GEOTECHNICAL

Nov 2006 | Rev 1

OPSD 100.060

APPENDIX C: BOREHOLE LOGS

Borehole Records
Site Investigation: June 2022
Logged By: Jake Oddie
Checked By: Scott Keeley/Philip Almond

Start of Concession #2 (Apple Hill)

BH No.: 1
Coordinates: 45.2237; -74.7642, 1.2 m Rt

0	-	20	ST
20	-	250	Gry Cr Gr and Sa Tr Si (AS-1)
			Percent Passing:
			26.5 mm = 100 %
			19.0 mm = 97.7 %
			13.2 mm = 86.9 %
			9.5 mm = 74.4 %
			4.75 mm = 47.5 %
			1.18 mm = 21.2 %
			0.300 mm = 13.1 %
			0.075 mm = 8.8 %
			Not Accept Gran A
250	-	580	Gry Co Gr W Sa Some Si (AS-2)
580	-	1.70	Br Med Sa Tr Si (Moist)

BH No.: 2
Coordinates: 45.2245; -74.7628, 1.2 Lt

0	-	20	ST
20	-	250	Gry Cr Gr and Sa Tr Si (AS-9)
250	-	1.15	Gry Co Gr W Sa Tr Si (Fill)
1.15	-	1.70	Gry Sa(y) Gr Tr Si (Wet)

BH No.: 3
Coordinates: 45.2263; -74.7585, 1.2 m Lt

0	-	20	ST
20	-	190	Gry Cr Gr and Sa Tr Si (AS-6)
190	-	490	Br Sa and Si W Gr (AS-7)
490	-	1.60	Br Si and Sa Some CL Tr Gr (AS-8)
			Percent Passing:
			13.2 mm = 100 %
			9.5 mm = 98.7 %
			4.75 mm = 92.6 %
			2.00 mm = 86.7 %
			0.250 mm = 70.0 %
			0.075 mm = 52.9 %
			Not Accept Gran B Type I
			LSFH
			w = 8.0 %
1.60	-	NFP	RF

BH No.: 4
Coordinates: 45.2268; -74.7576, 1.2 m Rt

0	-	20	ST
20	-	250	Gry Cr Sa and Gr Tr Si
250	-	330	Cob
330	-	600	Br Sa W Gr Some Si
600	-	1.60	Drk Br Si Some CL
1.60	-	1.80	Br Med Sa Some Si

BH No.: 5 (Frost Heave)
Coordinates: 45.2277; -74.7556, 1.0 m Lt

0	-	20	ST
20	-	250	Gry Cr Gr and Sa Tr Si (AS-3)
250	-	490	Br Gr(ly) Si(y) Sa Some CL (AS-4)
			Percent Passing:
			26.5 mm = 100 %
			19.0 mm = 89.2 %
			13.2 mm = 82.7 %
			9.5 mm = 77.0 %
			4.75 mm = 69.5 %
			2.00 mm = 62.6 %
			0.250 mm = 46.1 %
			0.075 mm = 34.8 %
			Not Accept Gran B Type I
			LSFH
			w = 7.3 %
490	-	1.80	Br Si and Sa Some CL Tr Gr (AS-5)
1.80	-	NFP	RF

BH No.: 6
Coordinates: 45.2312; -74.7471, 1.0 m Rt

0	-	40	Gry Cr Gr and Sa Tr Si
40	-	330	Gry Gr(ly) Sa Tr Si
330	-	700	Br Sa(y) Gr Tr Si
700	-	1.70	Gry Cr Gr W Sa Tr Si (Wet)

Severe water infiltration after drilling

BH No.: 7
In swamp, skipped to avoid infiltration. Road in good condition.

End of Concession #2 (Apple Hill)
Start of Kenyon Dam Road

BH No.: 1
Coordinates: 45.2670; -74.6359, 1.2 m Rt

0	-	20	Asphalt
20	-	150	Gry Cr Gr and Sa Some Si (AS-10) Percent Passing: 26.5 mm = 100 % 19.0 mm = 98.4 % 13.2 mm = 87.2 % 9.5 mm = 79.3 % 4.75 mm = 58.4 % 1.18 mm = 35.2 % 0.300 mm = 23.7 % 0.075 mm = 15.8 % Not Accept Gran A
150	-	550	Drk Br Sa(y) Gr Some Si (AS-11) Percent Passing: 53.0 mm = 100 % 37.5 mm = 78.9 % 26.5 mm = 71.5 % 19.0 mm = 65.4 % 13.2 mm = 57.2 % 9.5 mm = 49.2 % 4.75 mm = 41.2 % 1.18 mm = 31.9 % 0.300 mm = 23.8 % 0.075 mm = 16.0 % Not Accept Gran B Type I
550	-	1.80	Br Sa(y) Si(y) Gr Tr CL (AS-12) Percent Passing: 26.5 mm = 100 % 19.0 mm = 74.3 % 13.2 mm = 68.7 % 9.5 mm = 63.2 % 4.75 mm = 55.6 % 2.00 mm = 49.6 % 0.250 mm = 36.7 % 0.075 mm = 28.1 % 0.005 mm = 9.0 % LSFH w = 5.1 %

BH No.: 2
Coordinates: 45.2718; -74.6400, 1.2 Lt

0	-	20	Asphalt
20	-	170	Gry Cr Gr and Sa Tr Si
170	-	900	Gry Cr Gr Some Sa Tr Si
900	-	NFP	BR/RF

BH No.: 3
Coordinates: 45.2749; -74.6424, 1.0 m Lt

0	-	20	Asphalt
20	-	230	Gry Cr Gr and Sa
230	-	500	Drk Br Sa W Gr W Cob
500	-	1.65	Br Med Sa Some Si Some Gr
1.65	-	NFP	BR/RF

BH No.: 4
Coordinates: 45.2761; -74.6434, 1.2 Rt

0	-	20	Asphalt
20	-	250	Gry Cr Gr and Sa Tr Si (AS-13)
250	-	1.04	Br Gr(ly) Sa Some Si
1.04	-	1.70	Sa(y) Si Some Gr

End of Kenyon Dam Road
Start of Marcoux Road

BH No.: 1
No coordinates recorded, 1.3 m Rt

0	-	20	Asphalt
20	-	100	Gry Cr Gr and Sa Tr Si
100	-	580	Br Cr Gr and Sa Tr Si
580	-	NFP	RF

BH No.: 2
No coordinates recorded, 1.3 Rt

0	-	20	Asphalt
20	-	380	Gry Cr Gr and Sa Tr Si
380	-	850	Gry Cr Gr and Sa Some Si
850	-	1.40	Drk Gry Si Some Cl Tr Org (AS-14)
			Percent Passing:
			16.0 mm = 100 %
			13.2 mm = 98.3 %
			9.5 mm = 95.9 %
			4.75 mm = 93.2 %
			2.00 mm = 90.9 %
			0.250 mm = 80.4 %
			0.075 mm = 70.8 %
			0.005 mm = 34.8 %
			LSFH
			w = 50.0 %
1.40	-	1.70	Drk Gry CL(y) Si Some Sa Some Gr
			(AS-15)
			Percent Passing:
			37.5 mm = 100 %
			26.5 mm = 89.1 %
			19.0 mm = 89.1 %
			13.2 mm = 89.1 %
			9.5 mm = 87.0 %
			4.75 mm = 85.1 %
			2.00 mm = 82.9 %
			0.250 mm = 74.0 %
			0.075 mm = 65.8 %
			0.005 mm = 39.1 %
			LSFH
			w = 38.5 %

BH No.: 3
Coordinates: 45.2868; -74.6581, 1.3 m Rt

0	-	20	Asphalt
20	-	240	Br Cr Gr and Sa Tr Si
240	-	700	Br Co Gr and Sa Tr Si
700	-	1.70	Drk Gr Si Some Cl

BH No.: 4
Skipped (Culvert was recently replaced)

BH No.: 5
Coordinates: 45.2824; -74.6658, 1.0 m Lt

0	-	20	Asphalt
20	-	210	Gry Cr Gr and Sa Tr Si
210	-	550	Br CR Gr and Sa Tr Si
550	-	1.30	Br Sa W Gr Some Si
1.30	-	1.70	Si(y) Sa Tr Gr

BH No.: 6
Skipped (Culvert was recently replaced)

BH No.: 7
Coordinates: 45.2812; -74.6697, 1.4 m Rt

0	-	20	Asphalt
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	610	Gry Co Gr and Sa Tr Si
610	-	700	Br Gr and Sa Some Si
700	-	1.20	Wdy Org (AS-16)
1.20	-	1.70	Br Si and Cl Some Gr

BH No.: 8
Coordinates: 45.2883; -74.6750, 1.2 m Rt

0	-	20	Asphalt
20	-	170	Gry Cr Gr and Sa Tr Si
170	-	420	Br Sa W Gr
420	-	830	Br Sa W Si W Gr
830	-	NFP	Bld

BH No.: 9
Coordinates: 45.2840; -74.6848, 1.2 m Lt

0	-	20	Asphalt
20	-	170	Gry Cr Gr and Sa Tr Si
170	-	320	Br Gr and Sa Tr Si (AS-17)
			Percent Passing:
			19.0 mm = 100 %
			13.2 mm = 97.6 %
			9.5 mm = 88.1 %
			4.75 mm = 68.1 %
			1.18 mm = 41.9 %
			0.300 mm = 26.5 %
			0.075 mm = 17.3 %
			Not Accept Gran B Type I
320	-	650	Br Sa W Si Some Gr
650	-	1.00	Gry Sa W Si
1.00	-	1.50	Gry Cl(y) Si Some Wdy Org
1.50	-	1.70	Wdy Org

End of Marcoux Road
Start of Dornie Road

BH No.: 2
No coordinates recorded, 1.3 Rt

0	-	20	ST
20	-	380	Br Cr Gr and Sa Tr Si (Fine)
380	-	1.31	Br Cr Co Gr(ly) Sa Tr Si
1.31	-	NFP	RF

BH No.: 3 (PDA)
No coordinates recorded, 1.3 m Lt

0	-	20	ST
20	-	220	Gry Cr Gr and Sa Tr Si
220	-	590	Gry Cr Co Gr and Sa Tr Si
590	-	1.20	Gry Si(y) Cl Some Org (Firm)
1.20	-	1.60	Gry Si(y) Cl Some Org (Stiff)
1.60	-	NFP	BR

Owner of House No. 3213 says subdrain installed, but does not drain. Possible cause for distress in front of house.

BH No.: 4
Coordinates: 45.2917; -74.6910, 1.3 m Rt

0	-	20	ST
20	-	340	Gry Sa(y) Gr Tr Si (AS-18) Percent Passing: 26.5 mm = 100 % 19.0 mm = 98.0 % 13.2 mm = 80.4 % 9.5 mm = 60.1 % 4.75 mm = 38.8 % 1.18 mm = 21.7 % 0.300 mm = 13.8 % 0.075 mm = 9.6 % Not Accept Gran A w = 3.2 %
340	-	1.10	Gry Gr and Sa Tr Si
1.10	-	1.60	Br Si W Sa Tr Gr
1.60	-	NFP	BR

BH No.: 5
Coordinates: 45.2952; -74.6939, 1.0 m Rt

0	-	20	ST
20	-	190	Gry Cr Gr and Sa Tr Si
190	-	730	Br Cr Gr(ly) Sa Tr Si
730	-	1.70	Br Si(y) Sa and Gr Tr CL (AS-19) Percent Passing: 37.5 mm = 100 % 26.5 mm = 88.6 % 19.0 mm = 80.6 % 13.2 mm = 76.7 % 9.5 mm = 72.8 % 4.75 mm = 67.1 % 2.00 mm = 60.1 % 0.250 mm = 44.5 % 0.075 mm = 34.3 % 0.005 mm = 10.7 % LSFH w = 7.4 %

BH No.: 6
Coordinates: 45.2981; -74.6962, 1.0 m Rt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si
290	-	910	Br Cr Gr(ly) Sa Tr Si
910	-	1.70	Gry Si(y) Cl Some Org (AS-20)

BH No.: 7
Skipped (Culvert was recently replaced)

BH No.: 8
Coordinates: 45.3054; -74.7023, 1.0 m Rt

0	-	20	ST
20	-	180	Gry Cr Gr and Sa Tr Si
180	-	860	Br Sa and Gr Some Si (AS-21) Percent Passing: 53.0 mm = 100% 37.5 mm = 88.5 % 26.5 mm = 88.5 % 19.0 mm = 88.5 % 13.2 mm = 84.6 % 9.5 mm = 77.1 % 4.75 mm = 56.9 % 1.18 mm = 35.0 % 0.300 mm = 22.3 % 0.075 mm = 14.7 % Not Accept Gran B Type I
860	-	1.10	Br Sa W Gr Some Si
1.10	-	1.55	Br Si W Sa Tr Gr
1.55	-	1.70	Gry Si(y) Cl Some Org (Firm)

BH No.: 9
Skipped (Culvert was recently replaced)

BH No.: 10
Coordinates: 45.3075; -74.7042, 1.1 m Rt

0	-	20	ST
20	-	190	Gry Cr Gr and Sa Tr Si
190	-	770	Br Sa W Gr Tr Si
770	-	1.20	Gry Si W Sa Some Cl Some Gr
1.20	-	NFP	Bld

BH No.: 11
No Coordinates Recorded, 1.0 m Rt

0	-	20	ST
20	-	190	Br Cr Gr and Sa Tr Si
190	-	450	Br Cr Co Gr and Sa Tr Si
450	-	1.05	Br Si(y) Sa Tr Gr
1.05	-	1.45	Gry Si(y) Sa Tr Gr
1.45	-	NFP	Bld

BH No.: 12
Coordinates: 45.3140; -74.7096, 1.0 m Rt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si (AS-22) Percent Passing: 26.5 mm = 100 % 19.0 mm = 97.7 % 13.2 mm = 90.5 % 9.5 mm = 79.3 % 4.75 mm = 60.3 % 1.18 mm = 36.4 % 0.300 mm = 24.4 % 0.075 mm = 17.0 % Not Accept Gran A
290	-	1.10	Gry Cr Gr and Sa Tr Si (Finer)
1.10	-	1.30	Sa(y) Si W Gr
1.30	-	1.50	Blk Org W Si
1.50	-	1.70	Gry Si(y) Cl Some Org

End of Dornie Road
Start of Concession 4 East

BH No.: 1
Coordinates: 45.3143; -74.7133, 1.2 m Lt

0	-	20	Asphalt
20	-	260	Gry Cr Gr and Sa Tr Si
260	-	740	Br Gr(ly) Sa Tr Si
740	-	950	Br Sa Some Si Tr Gr (AS-56)
950	-	NFP	Bld

BH No.: 2 (Culvert)
Coordinates: 45.3137; -74.7141, 1.2 Lt

0	-	25	Asphalt
25	-	190	Gry Cr Gr and Sa Tr Si
190	-	610	Gry Cr Co Gr and Sa Tr Si
610	-	1.40	Br Gr(ly) Sa Tr Si Tr Cob
1.40	-	NFP	Bld

BH No.: 3
Coordinates: 45.3103; -74.7176, 1.2 Rt

0	-	20	Asphalt
20	-	210	Gry Cr Gr and Sa Tr Si
210	-	870	Gry Cr Co Gr and Sa Tr Si
870	-	930	Br Gr(ly) Sa Tr Si Tr Cob
930	-	NFP	Bld

BH No.: 4 (Culvert)
Coordinates: 45.3083; -74.7194, 1.2 Rt

0	-	25	Asphalt
20	-	240	Gry Cr Gr and Sa Tr Si
240	-	740	Gry Cr Co Gr and Sa Tr Si
740	-	1.20	Br Gr(ly) Sa Tr Si
1.20	-	1.40	Br Sa Some Si Tr Wdy Org
1.40	-	NFP	Bld

BH No.: 6
Coordinates: 45.3058; -74.7224, 1.1 Lt

0	-	20	Asphalt
20	-	210	Gry Cr Gr and Sa Tr Si (AS-23)
			Percent Passing:
			53.0 mm = 100 %
			37.5 mm = 94.6 %
			26.5 mm = 86.0 %
			19.0 mm = 86.0 %
			13.2 mm = 82.3 %
			9.5 mm = 72.7 %
			4.75 mm = 53.1 %
			1.18 mm = 30.8 %
			0.300 mm = 19.9 %
			0.075 mm = 13.6 %
			Not Accept Gran A
210	-	500	Gry Cr Co Gr and Sa Tr Si
500	-	610	Br Gr(ly) Sa Some Si (AS-24)
			Percent Passing:
			19.0 mm = 100 %
			13.2 mm = 95.3 %
			9.5 mm = 89.6 %
			4.75 mm = 70.2 %
			1.18 mm = 45.7 %
			0.300 mm = 29.6 %
			0.075 mm = 19.5 %
			Not Accept Gran B Type I
610	-	NFP	RF

BH No.: 7
Coordinates: 45.3046; -74.7238, 1.2 Rt

0	-	20	Asphalt
20	-	180	Gry Cr Gr and Sa Tr Si (Fine)
180	-	750	Gry Cr Co Sa(y) Gr Tr Si
750	-	1.20	Br Gr(ly) Sa Tr Si
1.20	-	1.70	Br Si(y) Sa Some Gr

BH No.: 8
Coordinates: 45.3013; -74.7267, 1.3 Lt

0	-	20	Asphalt
20	-	290	Gry Cr Gr and Sa Tr Si
290	-	900	Br Cr Co Gr and Sa Tr Si
900	-	1.26	Br Gr(ly) Sa Tr Si
1.26	-	1.70	Sa and Si Tr Gr Tr CL (AS-25)
			Percent Passing:
			19.0 mm = 100 %
			13.2 mm = 98.2 %
			9.5 mm = 96.7 %
			4.75 mm = 91.4 %
			2.00 mm = 86.2 %
			0.250 mm = 67.4 %
			0.075 mm = 47.5 %
			0.005 mm = 15.0 %
			LSFH
			w = 24.2 %

BH No.: 11 (Culvert)
Coordinates: 45.2925; -74.7356, 1.2 Rt

0	-	25	Asphalt
25	-	250	Gry Cr Gr and Sa Tr Si
250	-	780	Gry Cr Co Gr and Sa Tr Si
780	-	1.30	Br Gr(ly) Sa Tr Si Tr Cob
1.30	-	NFP	RF

BH No.: 12
Coordinates: 45.2876; -74.7432, 1.2 Lt

0	-	20	Asphalt
20	-	190	Gry Cr Gr and Sa Tr Si
190	-	440	Br Gr(ly) Sa Tr Si
440	-	990	Si(y) Sa Some Gr
990	-	1.70	Br Med Sa With Si

BH No.: 13
Coordinates: 45.2838; -74.7497, 1.3 Rt

0	-	20	Asphalt
20	-	270	Gry Cr Gr and Sa Tr Si
270	-	700	Gry Cr Sa(y) Gr Tr Si
700	-	1.30	Br Sa W Si
1.30	-	1.70	Br Si(y) Sa

End of Concession 4 East

Start of Concession 4 West

BH No.: 1
Coordinates: 45.2520; -74.8223, 0.9 Rt

0	-	20	Asphalt
20	-	270	Br Cr Gr and Sa Some Si (AS-26) Percent Passing: 26.5 mm = 100 % 19.0 mm = 98.8 % 13.2 mm = 88.9 % 9.5 mm = 75.6 % 4.75 mm = 52.3 % 1.18 mm = 26.3 % 0.300 mm = 16.1 % 0.075 mm = 10.9 % Not Accept Gran A
270	-	940	Br Sa and Gr Some Si Tr Cl (AS-27) Percent Passing: 26.5 mm = 100 % 19.0 mm = 96.9 % 13.2 mm = 92.9 % 9.5 mm = 84.3 % 4.75 mm = 65.0 % 2.00 mm = 49.0 % 0.250 mm = 27.5 % 0.075 mm = 19.1 % 0.005 mm = 7.3 % Not Accept Gran B Type I LSFH w = 3.4 %
940	-	1.50	Wdy Org
1.50	-	1.70	Blk Si Some Cl Tr Gr

BH No.: 2
Coordinates: 45.2546; -74.8163, 0.9 Lt

0	-	20	Asphalt
20	-	410	Gry Cr Gr and Sa Tr Si
410	-	720	Br Gr(ly) Sa
720	-	NFP	BR

BH No.: 3
No coordinates recorded, 0.9 Lt

0	-	20	ST
20	-	390	Gry Cr Gr and Sa Tr Si
390	-	870	Br Gr(ly) Sa
870	-	NFP	BR

BH No.: 4
No coordinates recorded, 1.0 Rt

0	-	20	Asphalt
20	-	340	Gry Cr Gr and Sa Tr Si (AS-28)
340	-	720	Br Cr Gr and Sa Tr Si
720	-	1.30	Blk Sa W Si
1.30	-	1.70	Blk Si(y) Cl

End of Concession 4 West
Start of McCormick Road

BH No.: 1
Coordinates: 45.376; -74.521, 0.8 Rt

0	-	20	ST
20	-	270	Gry Cr Gr and Sa Tr Si
270	-	800	Gry Cr Co Gr and Sa Tr Si
800	-	1.45	Br Gr(ly) Sa Tr Si
1.45	-	1.70	Sa(y) Si Some Cl Some Org

BH No.: 2
Coordinates: 45.375; -74.523, 1.0 Rt

0	-	20	ST
20	-	260	Gry Cr Gr and Sa Tr Si
260	-	670	Gry Cr Co Gr and Sa Tr Si
670	-	1.10	Br Gr(ly) Sa Tr Si
1.10	-	1.70	Br Sa(y) Si Some Cl Some Org

BH No.: 3
Coordinates: 45.374; -74.525, 1.0 Lt

0	-	20	ST
20	-	320	Gry Cr Gr and Sa Tr Si
320	-	700	Gry Cr Co Gr and Sa Tr Si
700	-	1.40	Br Gr(ly) Sa Tr Si
1.40	-	1.70	Gry Si(y) Cl Tr Org Tr Sa

BH No.: 4 (Culvert)
Coordinates: 45.373; -74.528, 0.9 Rt

0	-	20	ST
20	-	380	Gry Cr Gr and Sa Tr Si
380	-	1.70	Gry Cr Co Gr and Sa Tr Si

BH No.: 6
Coordinates: 45.370; -74.534, 1.0 Rt

0	-	20	ST
20	-	240	Gry Cr Gr and Sa Tr Si
240	-	680	Gry Cr Co Gr and Sa Tr Si
680	-	1.15	Br Gr(ly) Sa Tr Si
1.15	-	1.70	Blk Si(y) Org (AS-32)

BH No.: 7
Coordinates: 45.369; -74.537, 1.0 Rt

0	-	20	ST
20	-	260	Gry Cr Gr and Sa Tr Si
260	-	810	Gry Cr Co Gr and Sa Tr Si
810	-	1.10	Gr(ly) Sa Some Si
1.10	-	1.70	Sa(y) Si Some Gr

BH No.: 8
Coordinates: 45.368; -74.539, 1.1 Lt

0	-	20	ST
20	-	320	Gry Cr Gr and Sa Tr Si
320	-	NFP	Bld

BH No. 9 is approximately 10 m from BH No. 8

BH No.: 9 (Meander Cracking)
Coordinates: 45.368; -74.539, 1.1 Lt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si
290	-	410	Gry Cr Co Gr and Sa Tr Si
410	-	NFP	Bld

Moved 3 m away to try again.

BH No.: 9A (Meander Cracking)
Coordinates: 45.368; -74.539, 1.1 Lt

0	-	20	ST
20	-	220	Gry Cr Gr and Sa Tr Si
220	-	NFP	Bld

BH No.: 10
Coordinates: 45.365; -74.546, 0.8 Rt

0	-	20	ST
20	-	240	Gry Cr Gr and Sa Tr Si
240	-	790	Gry Cr Co Gr and Sa Tr Si
790	-	1.45	Wdy Org Some Sa
1.45	-	1.70	Sa(y) Si Tr Gr

BH No.: 11
Coordinates: 45.363; -74.550, 0.8 Lt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si (AS-35)
290	-	580	Gry Cr Co Gr and Sa Some Si (AS-36) Percent Passing: 37.5 mm = 100 % 26.5 mm = 94.5 % 19.0 mm = 94.5 % 13.2 mm = 84.5 % 9.5 mm = 77.6 % 4.75 mm = 64.8 % 1.18 mm = 33.0 % 0.300 mm = 17.3 % 0.075 mm = 13.3 % Not Accept Gran B Type I
580	-	1.15	Br Gr(ly) Sa Tr Si
1.15	-	1.50	Gry Sa(y) Si Some Wdy Org
1.50	-	1.70	Br Sa(y) Si (Soft)

BH No.: 12 (Meander Crack)
Coordinates: 45.361; -74.555, 1.0 Rt

0	-	20	ST
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	490	Gry Cr Co Gr and Sa Tr Si
490	-	NFP	Bld

BH No.: 13 (Culvert)
Coordinates: 45.3607; -74.5560, 1.0 Rt

0	-	20	ST
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	NFP	Bld

Moved over approximately 1 m and tried again.

BH No.: 13A (Culvert)
Coordinates: 45.3607; -74.5560, 2.0 Rt

0	-	20	ST
20	-	310	Gry Cr Gr and Sa Tr Si
310	-	NFP	Bld

Moved approximately 5 m west to try again.

BH No.: 13B (Culvert)
Coordinates: 45.3607; -74.5560, 1.0 Rt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si
290	-	NFP	Bld

BH No.: 14 (Meander Crack)
Coordinates: 45.3576; -74.5634, 0.9 Rt

0	-	35	ST
35	-	250	Gry Sa(y) Gr Tr Si (AS-30)
			Percent Passing:
			26.5 mm = 100 %
			19.0 mm = 98.9 %
			13.2 mm = 84.5 %
			9.5 mm = 64.0 %
			4.75 mm = 38.3 %
			1.18 mm = 19.2 %
			0.300 mm = 12.3 %
			0.075 mm = 8.8 %
			Not Accept Gran A
			w = 7.7 %
250	-	510	Gry Sa(y) Co Gr Tr Si
510	-	860	Br Gr(ly) Sa Tr Si (AS-31)
860	-	1.35	Si(y) Org Tr Sa Tr Gr
1.35	-	1.55	Gry Si(y) Cl Tr Gr
1.55	-	NFP	Bld

BH No.: 15
Coordinates: 45.3560; -74.5669, 1.2 Rt

0	-	20	ST
20	-	260	Gry Cr Gr and Sa Tr Si
260	-	460	Br Sa(y) Gr Tr Si
460	-	NFP	Bld

BH No.: 16
Coordinates: 45.353; -74.575, 1.1 Lt

0	-	20	ST
20	-	260	Gry Cr Gr and Sa Tr Si
260	-	510	Gry Cr Co Gr and Sa Tr Si
510	-	NFP	Bld/RF

Standing water in ditch. BH No. 17 is approximately 25 m away.

BH No.: 17
Coordinates: 45.352; -74.576, 1.2 Lt

0	-	20	ST
20	-	240	Gry Cr Gr and Sa Tr Si
240	-	500	Gry Cr Co Gr and Sa Tr Si
500	-	950	Br Gr(ly) Sa Tr Si
950	-	1.20	Wdy Org Some Sa
1.20	-	1.70	Gry Si(y) Cl Tr Wdy Org Tr Sa (AS-37)

BH No.: 18
Coordinates: 45.350; -74.579, 1.4 Lt

0	-	20	ST
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	550	Gry Cr Co Gr and Sa Tr Si
550	-	970	Br Gr(ly) Sa Tr Si
970	-	1.25	Sa(y) Si Some Org
1.25	-	1.50	Sa(y) Org Tr Si
1.50	-	1.70	Gry Si(y) Cl Tr Sa

BH No.: 20
Coordinates: 45.345; -74.591, 1.1 Lt

0	-	20	ST
20	-	230	Gry Cr Gr and Sa Tr Si
230	-	560	Gry Cr Co Gr and Sa Tr Si
560	-	1.05	Br Gr(ly) Sa Tr Si
1.05	-	1.70	Gry Si(y) Cl Tr Sa Tr Wdy Org

BH No.: 21
Coordinates: 45.344; -74.595, 1.1 Rt

0	-	20	ST
20	-	190	Gry Cr Gr and Sa Tr Si
190	-	380	Gry Sa(y) Co Gr Tr Si
380	-	460	Br Gr(ly) Sa Tr Si
460	-	NFP	Bld

BH No.: 22
Coordinates: 45.343; -74.598, 1.0 Lt

0	-	80	ST
80	-	290	Gry Cr Gr and Sa Tr Si
290	-	1.70	Gry Cr Co Gr and Sa Tr Si

BH No.: 23 (PDA)
Coordinates: 45.305; -74.634, 1.2 Lt

0	-	20	ST
20	-	450	Gry Cr Gr and Sa Tr Si
450	-	890	Si(y) Sa Some Gr (AS-38)
890	-	1.70	Sa(y) Si Tr Gr (AS-39)
			Percent Passing:
			37.5 mm = 100 %
			26.5 mm = 89.3 %
			19.0 mm = 81.8 %
			13.2 mm = 80.1 %
			9.5 mm = 78.9 %
			4.75 mm = 73.6 %
			2.00 mm = 66.7 %
			0.250 mm = 51.4 %
			0.075 mm = 43.6 %
			0.005 mm = 18.8 %
			LSFH
			w = 8.2 %

BH No.: 24
Coordinates: 45.339; -74.607, 1.6 Lt

0	-	20	ST
20	-	240	Gry Cr Gr and Sa Tr Si
240	-	560	Gry Cr Co Gr and Sa Tr Si
560	-	1.20	Sa(y) Si Some Org (AS-40)
1.20	-	1.70	Si(y) Cl Tr Sa

BH No.: 25
Coordinates: 45.339; -74.607, 1.3 Lt

0	-	20	ST
20	-	210	Gry Cr Gr and Sa Tr Si
210	-	500	Gry Cr Co Gr and Sa Tr Si
500	-	1.40	Br Gr(ly) Sa Tr Si
1.40	-	1.70	Wdy Org Some Sa Some Si

BH No.: 26
Coordinates: 45.338; -74.609, 2.2 Lt

0	-	20	ST
20	-	290	Gry Cr Gr and Sa Tr Si
290	-	650	Gry Cr Co Gr and Sa Tr Si
650	-	1.35	Sa(y) Si Tr Gr
1.35	-	1.70	Sa(y) Si Tr Cob (Moist)

BH No.: 27
Coordinates: 45.337; -74.611, 2.2 Lt

0	-	20	ST
20	-	400	Gry Cr Gr and Sa Tr Si
400	-	1.10	Sa(y) Si Tr Gr
1.10	-	1.70	Si(y) Cl tr Sa (AS-41)

BH No.: 28 (PDA)
Coordinates: 45.3368; -74.6126, 1.1 Rt

0	-	25	Asphalt
25	-	190	Gry Cr Gr and Sa Tr Si
190	-	420	Br Sa(y) Gr Tr Si
420	-	640	Br Sa(y) Gr Some Si (AS-29)
			Percent Passing:
			53.0 mm = 100 %
			37.5 mm = 91.7 %
			26.5 mm = 83.0 %
			19.0 mm = 72.6 %
			13.2 mm = 66.0 %
			9.5 mm = 55.5 %
			4.75 mm = 40.5 %
			1.18 mm = 27.5 %
			0.300 mm = 17.8 %
			0.075 mm = 10.5 %
			Not Accept Gran B Type I
640	-	1.10	Br Gr(ly) Sa Some Si
1.10	-	1.70	Si(y) Gr(ly) Sa Tr CL (AS-30)
			Percent Passing:
			26.5 mm = 100 %
			19.0 mm = 91.2 %
			13.2 mm = 85.4 %
			9.5 mm = 84.3 %
			4.75 mm = 78.6 %
			2.00 mm = 71.7 %
			0.250 mm = 52.8 %
			0.075 mm = 37.9 %
			0.005 mm = 13.9 %
			LSFH

Standing water in ditches, fields higher than road. Some moisture at bottom of borehole.

End of McCormick Road

Start of Athol Road

BH No.: 1
Coordinates: 45.318; -74.899, 1.0 Rt

0	-	25	ST
25	-	290	Gry Cr Gr and Sa Some Si (AS-45) Percent Passing: 37.5 mm = 100 % 26.5 mm = 93.1 % 19.0 mm = 92.0 % 13.2 mm = 90.0 % 9.5 mm = 84.2 % 4.75 mm = 63.9 % 1.18 mm = 37.7 % 0.300 mm = 23.2 % 0.075 mm = 15.5 % Not Accept Gran A
290	-	650	Br Gr(ly) Sa Tr Si
650	-	1.15	Blk Sa(y) Si Tr Gr (AS-46) Percent Passing: 53.0 mm = 100 % 37.5 mm = 94.0 % 26.5 mm = 94.0 % 19.0 mm = 91.0 % 13.2 mm = 86.1 % 9.5 mm = 82.1 % 4.75 mm = 72.0 % 2.00 mm = 64.9 % 0.250 mm = 50.3 % 0.075 mm = 38.5 % 0.005 mm = 14.6 % LSFH w = 10.8 %
1.15	-	1.60	Gry Si(y) Cl Tr Sa Tr Org (AS-47)
1.60	-	NFP	Bld/RF

BH No.: 2 (PDA)
Coordinates: 45.319; -74.894, 1.1 Rt

0	-	25	ST
25	-	195	Gry Cr Gr and Sa Tr Si
195	-	320	Br Gr(ly) Sa Tr Si
320	-	NFP	Bld/RF

Moved 3 m away and try again. Standing water in ditch.

BH No.: 2A (PDA)
Coordinates: 45.319; -74.894, 1.1 Rt

0	-	25	ST
25	-	210	Gry Cr Gr and Sa Tr Si
210	-	440	Br Gr(ly) Sa Tr Si
440	-	NFP	Bld/RF

BH No.: 3 (PDA)
Coordinates: 45.319; -74.894, 1.3 Lt

0	-	45	ST
45	-	180	Gry Cr Gr and Sa Tr Si (AS-42)
180	-	1.30	Blk Sa(y) Si Tr Gr (AS-43)
1.30	-	1.70	Br Si(y) Gr(ly) Sa Tr CL (Moist) (AS-44) Percent Passing: 37.5 mm = 100 % 26.5 mm = 96.9 % 19.0 mm = 90.7 % 13.2 mm = 87.6 % 9.5 mm = 84.8 % 4.75 mm = 77.2 % 2.00 mm = 70.8 % 0.250 mm = 54.0 % 0.075 mm = 34.9 % 0.005 mm = 10.6 % LSFH w = 11.0 %

BH No.: 4 (PDA)
Coordinates: 45.322; -74.888, 0.7 Rt

0	-	50	ST
50	-	240	Gry Cr Gr and Sa Tr Si
240	-	1.20	Br Gr(ly) Sa Some Si
1.20	-	1.60	Br Sa(y) Si Tr Gr
1.60	-	NFP	Bld/RF

BH No.: 5
Coordinates: 45.323; -74.885, 1.9 Rt

0	-	20	ST
20	-	180	Gry Cr Gr and Sa Tr Si
180	-	580	Br Gr(ly) Sa Tr Si
580	-	1.30	Br Si(y) Sa Some Gr
1.30	-	1.70	Gry Si(y) Cl Tr Sa

End of Athol Road

Start of Concession 8

BH No.: 1
Coordinates: 45.333; -74.830, 1.3 Lt

0	-	20	ST
20	-	340	Gry Cr Gr and Sa Tr Si
340	-	1.10	Br Gr(ly) Sa Tr Si
1.10	-	1.30	Sa(y) Si Tr Gr Tr Org
1.30	-	NFP	Bld

BH No.: 2
Coordinates: 45.333; -74.832, 1.2 Rt

0	-	20	ST
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	540	Gry Cr Co Gr and Sa Tr Si
540	-	1.00	Br Gr(ly) Sa Tr Si
1.00	-	1.40	Br Gr(ly) Sa Tr Si (Moist)
1.40	-	1.70	Sa(y) Si Some Wdy Org

BH No.: 3
Coordinates: 45.331; -74.836, 1.1 Rt

0	-	20	ST
20	-	310	Gry Cr Gr and Sa Tr Si
310	-	1.20	Br Gr(ly) Sa Tr Si
1.20	-	1.70	Sa(y) Si Some CL Some Gr (AS-52) Percent Passing: 26.5 mm = 100 % 19.0 mm = 97.3 % 13.2 mm = 94.0 % 9.5 mm = 92.2 % 4.75 mm = 89.9 % 2.00 mm = 87.7 % 0.250 mm = 72.3 % 0.075 mm = 59.3 % 0.005 mm = 27.0 % LSFH w = 23.3 %

Marshy area, standing water beside road.

BH No.: 4
Coordinates: 45.329; -74.839, 2.2 Lt

0	-	20	ST
20	-	380	Gry Cr Gr and Sa Tr Si
380	-	790	Br Gr(ly) Sa Tr Si
790	-	1.30	Sa(y) Si Tr Gr Tr Org
1.30	-	1.70	Si(y) Cl Tr Sa Tr Org

BH No.: 5
Coordinates: 45.324; -74.853, 1.1 Rt

0	-	20	ST
20	-	300	Gry Cr Gr and Sa Tr Si
300	-	810	Br Gr(ly) Sa Tr Si
810	-	1.35	Br Sa(y) Si Tr Gr (AS-50)
1.35	-	1.70	Br Si(y) Sa Some Gr Some CL (Moist) (AS-51) Percent Passing: 26.5 mm = 100 % 19.0 mm = 97.7 % 13.2 mm = 91.9 % 9.5 mm = 88.8 % 4.75 mm = 84.4 % 2.00 mm = 77.2 % 0.250 mm = 57.8 % 0.075 mm = 43.5 % 0.005 mm = 15.3 % LSFH w = 11.0 %

BH No.: 6
Coordinates: 45.322; -74.857, 1.0 Lt

0	-	20	ST
20	-	280	Gry Cr Gr and Sa Tr Si
280	-	590	Br Gr(ly) Sa Tr Si
590	-	1.30	Sa(y) Si Tr Org Tr Gr
1.30	-	1.70	Si(y) Cl Tr Org Tr Sa (AS-53)

BH No.: 7
Coordinates: 45.318; -74.860, 1.3 Rt

0	-	20	ST
20	-	280	Gry Cr Gr and Sa Tr Si (AS-48) Percent Passing: 26.5 mm = 100 % 19.0 mm = 97.6 % 13.2 mm = 88.2 % 9.5 mm = 74.6 % 4.75 mm = 49.7 % 1.18 mm = 24.5 % 0.300 mm = 15.3 % 0.075 mm = 11.1 % Not Accept Gran A
280	-	590	Gry Cr Co Gr and Sa Tr Si (AS-49) Percent Passing: 75.0 mm = 100 % 53.0 mm = 87.3 % 37.5 mm = 82.8 % 26.5 mm = 69.6 % 19.0 mm = 56.8 % 13.2 mm = 39.2 % 9.5 mm = 27.7 % 4.75 mm = 16.2 % 1.18 mm = 9.3 % 0.300 mm = 6.8 % 0.075 mm = 5.1 % Not Accept Gran B Type I
590	-	1.05	Br Gr(ly) Sa Tr Si
1.05	-	1.30	Br Si(y) Sa Some Gr
1.30	-	1.70	Br Sa(y) Si Some Gr

BH No.: 8
Skipped (Culvert was recently replaced)

BH No.: 9
Coordinates: 45.313; -74.872, 1.2 Lt

0	-	20	ST
20	-	280	Gry Cr Gr and Sa Tr Si
280	-	1.20	Br Gr(ly) Sa Tr Si (AS-54)
1.20	-	1.70	Si(y) Cl Tr Org Tr Sa

End of Concession 8

Start of Concession 16

BH No.: 1 (PDA)
Coordinates: 45.261; -74.832, 1.0 Lt

0	-	20	ST
20	-	240	Gry Cr Gr and Sa Tr Si (AS-55) 16.0 mm = 100 % 13.2 mm = 98.2 % 9.5 mm = 86.9 % 4.75 mm = 64.0 % 1.18 mm = 34.8 % 0.300 mm = 22.9 % 0.075 mm = 17.7 % Not Accept Gran A
240	-	410	Br Gr(ly) Sa Tr Si
410	-	NFP	BR

BH No.: 2
Coordinates: 45.261; -74.832, 1.2 Rt

0	-	20	ST
20	-	410	Br Gr(ly) Sa Tr Si
410	-	NFP	BR

BH No.: 3
Coordinates: 45.261; -74.832, 1.2 Lt

0	-	20	ST
20	-	430	Br Gr and Sa Some Si (AS-54) Percent Passing: 37.5 mm = 100 % 26.5 mm = 94.4 % 19.0 mm = 83.5 % 13.2 mm = 78.5 % 9.5 mm = 71.9 % 4.75 mm = 55.2 % 1.18 mm = 36.8 % 0.300 mm = 25.9 % 0.075 mm = 18.0 % Not Accept Gran A w = 3.3 %
430	-	NFP	BR

BH No. 4 & 5 not advanced due to presence of boulder at PDA

End of Concession 16

Start of Power Dam Road

BH No.: 29
Coordinates: 45.333; -74.619, 0.5 Rt

0	-	30	Asphalt
30	-	340	Gry Cr Gr and Sa Tr
340	-	620	Gry Cr Co Gr and Sa Tr Si
620	-	NFP	Bld

BH No.: 30
Coordinates: 45.328; -74.632, 0.5 Rt

0	-	30	Asphalt
30	-	270	Gry Cr Gr and Sa Some Si (AS-57) 37.5 mm = 100 % 26.5 mm = 92.5 % 19.0 mm = 91.5 % 13.2 mm = 87.1 % 9.5 mm = 79.1 % 4.75 mm = 56.5 % 1.18 mm = 29.6 % 0.300 mm = 17.7 % 0.075 mm = 12.3 % Not Accept Gran A
270	-	780	Gry Cr Co Gr and Sa Some Si (AS-58) 37.5 mm = 100 % 26.5 mm = 89.7 % 19.0 mm = 87.0 % 13.2 mm = 79.7 % 9.5 mm = 68.7 % 4.75 mm = 50.8 % 1.18 mm = 27.1 % 0.300 mm = 17.1 % 0.075 mm = 12.2 % Not Accept Gran B Type I
780	-	960	Br Gr(y) Sa Tr Si (AS-59)
960	-	1.70	Br CL Some Si (Stiff) (AS-60) 4.75 mm = 100 % 2.00 mm = 100 % 0.250 mm = 99.6 % 0.075 mm = 99.3 % 0.005 mm = 91.8 % LSFH w = 37.6 %

BH No.: 31
Coordinates: 45.322; -74.645, 0.5 Lt

0	-	30	Asphalt
30	-	220	Gry Cr Gr and Sa Tr Si
220	-	520	Gry Cr Co Gr and Sa Tr Si
520	-	1.10	Br Gr(ly) Sa Tr Si
1.10	-	1.70	Br Si(y) Cl (Stiff)

End of Power Dam Road

Start of River Road

BH No.: 1
Coordinates: 45.303; -74.609, 0.2 Rt

0	-	50	Asphalt
50	-	280	Gry Cr Gr and Sa Tr Si (AS-61) 37.5 mm = 100 % 26.5 mm = 91.3 % 19.0 mm = 91.3 % 13.2 mm = 86.8 % 9.5 mm = 74.1 % 4.75 mm = 43.6 % 1.18 mm = 17.9 % 0.300 mm = 11.4 % 0.075 mm = 8.5 % Not Accept Gran A
280	-	410	Gry Sa(y) Gr Tr Si (AS-62) 53.0 mm = 100 % 37.5 mm = 93.4 % 26.5 mm = 88.1 % 19.0 mm = 72.0 % 13.2 mm = 58.9 % 9.5 mm = 47.8 % 4.75 mm = 27.3 % 1.18 mm = 11.8 % 0.300 mm = 7.9 % 0.075 mm = 5.7 % Accept Gran B Type I
410	-	870	Br Gr(ly) Si(y) Sa (AS-63) 26.5 mm = 100 % 19.0 mm = 98.3 % 13.2 mm = 89.9 % 9.5 mm = 84.2 % 4.75 mm = 69.0% 1.18 mm = 47.5 % 0.300 mm = 33.0 % 0.075 mm = 24.0 % Not Accept Gran B Type I
870	-	1.40	Br Sa(y) Si Tr Gr (Stiff) (AS-64)
1.40	-	1.70	Br Si(y) Sa Some CL Some Gr (Moist) (AS-65) 26.5 mm = 100 % 19.0 mm = 95.7 % 13.2 mm = 93.0 % 9.5 mm = 91.5 % 4.75 mm = 85.3 % 2.00 mm = 78.5 % 0.250 mm = 60.5 % 0.075 mm = 45.9 % 0.005 mm = 21.5 % LSFH w = 17.2 %

BH No.: 2
Coordinates: 45.307; -74.600, 1.2 Rt

0	-	50	Asphalt
50	-	210	Gry Cr Gr and Sa Tr Si
210	-	430	Gry Cr Co Gr and Sa Tr Si
430	-	570	Br Gr(ly) Sa Tr Si
570	-	1.70	Br Si(y) Cl (Stiff)

End of River Road

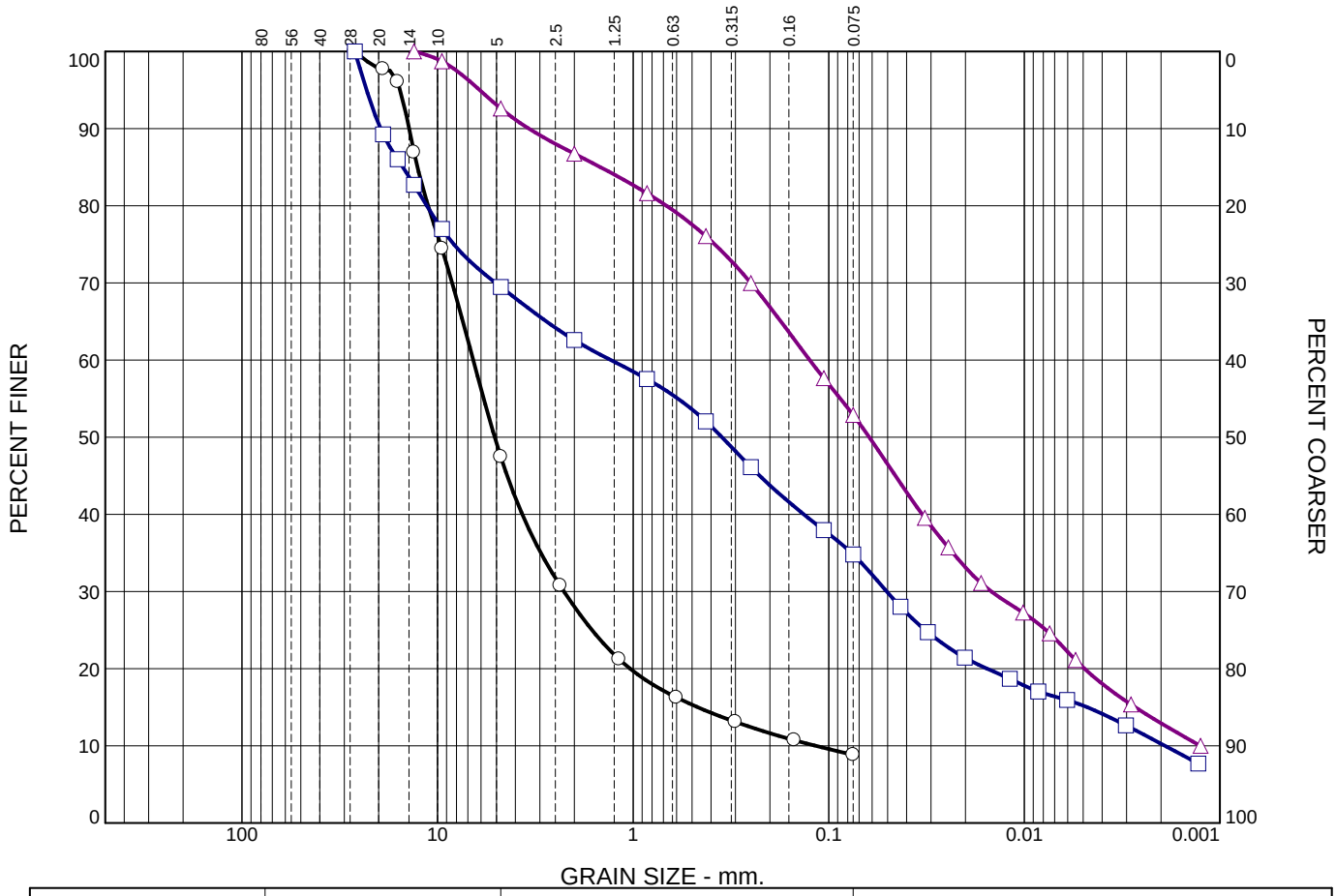
APPENDIX D: LABORATORY TEST RESULTS

McINTOSH PERRY

WATER CONTENT DETERMINATION

Test Method Utilized	☑ MTO LS-701	☐ ASTM D 2216	☐ AASHTO T-265				
Project No.: CCO-22-5139-00-03					Date Received: June 20,2022		
Project Name/Location: Pavement Invest. - North Glengarry					Date Tested: June 21,2022		
Material Type: Soils					Lab Sample No.: OL-22051		
Borehole No.	Depth Sample Taken (m)	Sample Container I.D.	Wet Sample + Tare (A)	Dry Sample + Tare (B)	Tare (C)	Mass of Sample (D) (B-C)	% Moisture (A-B)/Dx100
Concession 2							
BH-5 AS-4	0.25-0.49	Tr.109	718.76	679.08	134.86	544.22	**7.3**
BH-3 AS-8	0.49-1.60	Tr.201	667.43	629.53	154.61	474.92	**8.0**
Kenyon Dam Road							
BH-1 AS-12	0.55-1.80	Tr.120	987.39	946.20	130.68	815.52	**5.1**
Marcoux Road							
BH-2 AS-14	0.85-1.40	Tr.251	806.86	596.63	176.44	420.19	**50.0**
BH-2 AS-15	1.40-1.70	Tr.139	740.83	572.85	137.07	435.78	**38.5**
Dornie Road							
BH-4 AS-18	0.02-0.34	Tr.232	1049.95	1021.97	151.66	870.31	**3.2**
BH-5 AS-19	0.73-1.70	Tr.137	911.10	857.36	132.81	724.55	**7.4**
Concession 4 East							
BH-8 AS-25	1.30-1.70	Tr.275	928.37	783.10	182.92	600.18	**24.2**
Concession 4 West							
BH-1 AS-27	0.27-0.94	Tr.209	1001.64	974.93	183.46	791.47	**3.4**
McCormick Road							
BH-28 AS-30	1.10-1.70	Tr.107	877.54	824.17	133.67	690.50	**7.7**
BH-23 AS-39	0.89-1.70	Tr.283	870.61	816.99	160.13	656.86	**8.2**
Athol Road							
BH-3 AS-44	1.30-1.70	Tr.254	1477.21	1349.75	192.05	1157.70	**11.0**
BH-1 AS-46	0.65-1.15	Tr.169	1432.44	1305.37	133.29	1172.08	**10.8**
Concession 8							
BH-5 AS-51	1.35-1.70	Tr.252	806.44	744.36	181.78	562.58	**11.0**
BH-3 AS-52	1.20-1.70	Tr.262	802.80	684.65	178.62	506.03	**23.3**
Concession 16							
BH-3 AS-54	0.20-0.43	Tr.123	1630.64	1583.46	136.83	1446.63	**3.3**
Power Dam Road							
BH-2 AS-60	0.96-1.70	Tr.269	985.73	766.81	184.57	582.24	**37.6**
River Road							
BH-1 AS-65	1.40-1.70	Tr.500	718.61	632.64	132.55	500.09	**17.2**
Non-Conformance's from Test Procedure: N/A							
Comments:							
Checked by: J.H-J				Signature:			

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.3	50.2	19.5	13.5	5.7	8.8	
□	0.0	10.7	19.8	6.9	10.6	17.2	24.5	10.3
△	0.0	0.0	7.4	5.9	10.7	23.1	40.0	12.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Concession 2	AS-1	0.02-0.25m	Sand and Gravel trace Silt/Clay	
□	Concession 2	AS-4	0.25-0.49m	Gravelly Silty Sand some Clay	
△	Concession 2	AS-8	0.49-1.60m	Silt and Sand some Clay trace fine Gravel	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.2m Rt
Depth: 0.02-0.25m **Sample Number:** AS-1
Material Description: Sand and Gravel trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1219.87	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	27.95	97.7	2.3
			16.0mm	48.02	96.1	3.9
			13.2mm	159.44	86.9	13.1
			9.5mm	311.93	74.4	25.6
			4.75mm	640.88	47.5	52.5
			2.36mm	844.69	30.8	69.2
			1.18mm	961.11	21.2	78.8
			0.600mm	1021.54	16.3	83.7
			0.300mm	1060.20	13.1	86.9
			0.150mm	1089.14	10.7	89.3
			0.075mm	1112.41	8.8	91.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.3	50.2	52.5	19.5	13.5	5.7	38.7			8.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1170	0.4683	1.0383	2.2571	3.6922	5.1025	6.5745	11.1866	12.6792	13.9891	15.5068

Fineness Modulus	C_u	C_c
4.88	56.20	6.62

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-5 1.0m Lt
Depth: 0.25-0.49m **Sample Number:** AS-4
Material Description: Gravelly Silty Sand some Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
544.22	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	58.54	89.2	10.8
			16.0mm	76.03	86.0	14.0
			13.2mm	94.12	82.7	17.3
			9.5mm	125.26	77.0	23.0
			4.75mm	166.14	69.5	30.5
			2.00mm	203.58	62.6	37.4
55.45	0.00	0.00	0.850mm	4.48	57.5	42.5
			0.425mm	9.34	52.0	48.0
			0.250mm	14.60	46.1	53.9
			0.106mm	21.83	38.0	62.0
			0.075mm	24.63	34.8	65.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 62.6
Weight of hydrometer sample =55.45
Table of composite correction values:

Temp., deg. C:	21.2	20.9
Comp. corr.:	-5.5	-7.0

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	31.0	25.5	0.0130	30.0	11.0	0.0430	28.0	72.0
2.00	21.2	28.0	22.5	0.0130	27.0	11.6	0.0312	24.7	75.3
5.00	21.2	25.0	19.5	0.0130	24.0	12.1	0.0202	21.4	78.6
15.00	21.2	22.5	17.0	0.0130	21.5	12.6	0.0119	18.7	81.3
30.00	21.2	21.0	15.5	0.0130	20.0	12.9	0.0085	17.0	83.0
60.00	21.2	20.0	14.5	0.0130	19.0	13.0	0.0060	15.9	84.1
250.00	21.2	17.0	11.5	0.0130	16.0	13.6	0.0030	12.6	87.4

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	20.9	14.0	7.0	0.0130	13.0	14.2	0.0013	7.7	92.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	10.7	19.8	30.5	6.9	10.6	17.2	34.7	24.5	10.3	34.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0019	0.0048	0.0155	0.0505	0.1343	0.3516	1.3012	11.3581	15.0535	19.5970	23.0719

Fineness Modulus	C_u	C_c
2.97	681.26	1.03

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-3 1.2m Lt
Depth: 0.49-1.60m **Sample Number:** AS-8
Material Description: Silt and Sand some Clay trace fine Gravel
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
474.92	0.00	0.00	13.2mm	0.00	100.0	0.0
			9.5mm	6.07	98.7	1.3
			4.75mm	35.15	92.6	7.4
			2.00mm	62.96	86.7	13.3
109.99	0.00	0.00	0.850mm	6.50	81.6	18.4
			0.425mm	13.56	76.0	24.0
			0.250mm	21.28	70.0	30.0
			0.106mm	36.90	57.6	42.4
			0.075mm	42.95	52.9	47.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 86.7
Weight of hydrometer sample =109.99
Table of composite correction values:

Temp., deg. C:	21.9	20.9
Comp. corr.:	-4.5	-5.5

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	56.0	51.5	0.0129	55.0	6.3	0.0323	39.5	60.5
2.00	21.9	51.0	46.5	0.0129	50.0	7.3	0.0245	35.7	64.3
5.00	21.9	45.0	40.5	0.0129	44.0	8.4	0.0166	31.1	68.9
15.00	21.9	40.0	35.5	0.0129	39.0	9.3	0.0101	27.3	72.7
30.00	21.9	36.5	32.0	0.0129	35.5	10.0	0.0074	24.6	75.4
60.00	21.9	32.0	27.5	0.0129	31.0	10.9	0.0055	21.1	78.9
250.00	21.9	24.5	20.0	0.0129	23.5	12.3	0.0028	15.4	84.6
1440.00	20.9	18.5	13.0	0.0130	17.5	13.4	0.0013	10.0	90.0

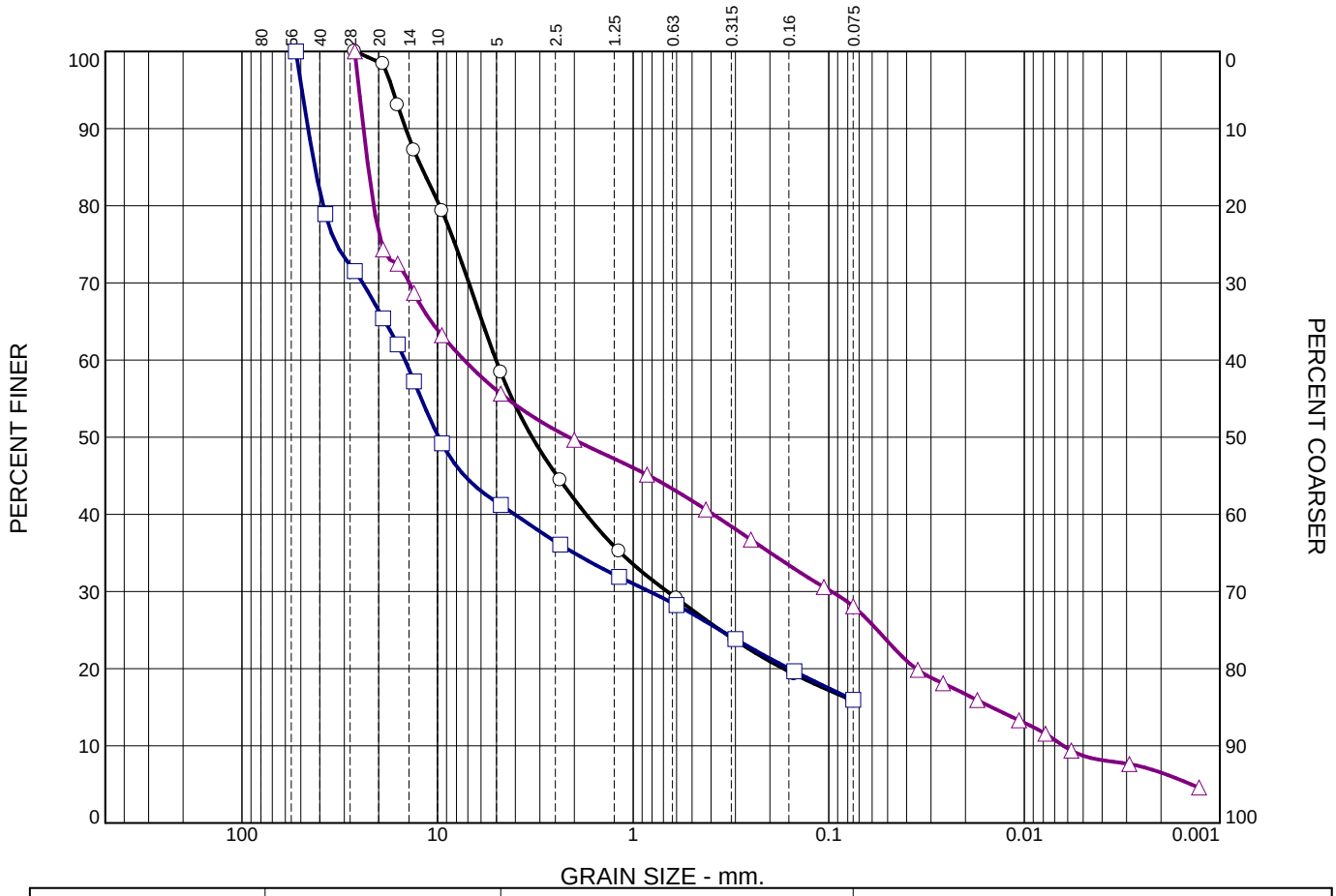
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.4	7.4	5.9	10.7	23.1	39.7	40.0	12.9	52.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0013	0.0027	0.0049	0.0148	0.0333	0.0621	0.1251	0.6759	1.4714	3.4185	6.0973

Fineness Modulus	C_u	C_c
1.23	99.27	1.38

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	1.6	40.0	16.5	15.6	10.5	15.8	
□	0.0	34.5	24.3	6.2	8.9	10.1	16.0	
△	0.0	25.6	18.8	6.0	9.0	12.5	21.6	6.5

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Kenyon Dam	AS-10	0.02-0.15m	Sand and Gravel some Silt/Clay	
□	Kenyon Dam	AS-11	0.25-0.49m	Sandy Gravel some Silt/Clay	
△	Kenyon Dam	AS-12	0.55-1.80m	Sandy Silty Gravel trace Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.2m Rt
Depth: 0.02-0.15m **Sample Number:** AS-10
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
986.84	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	15.94	98.4	1.6
			16.0mm	68.65	93.0	7.0
			13.2mm	126.60	87.2	12.8
			9.5mm	203.94	79.3	20.7
			4.75mm	410.48	58.4	41.6
			2.36mm	548.46	44.4	55.6
			1.18mm	639.39	35.2	64.8
			0.600mm	699.65	29.1	70.9
			0.300mm	753.39	23.7	76.3
			0.150mm	796.58	19.3	80.7
			0.075mm	830.63	15.8	84.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.6	40.0	41.6	16.5	15.6	10.5	42.6			15.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1705	0.6698	1.7415	3.2865	5.0258	9.7577	12.1060	14.5642	16.9420

Fineness Modulus
4.12

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.2m Rt
Depth: 0.25-0.49m **Sample Number:** AS-11
Material Description: Sandy Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1783.47	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	376.02	78.9	21.1
			26.5mm	507.78	71.5	28.5
			19.0mm	616.94	65.4	34.6
			16.0mm	677.23	62.0	38.0
			13.2mm	762.79	57.2	42.8
			9.5mm	905.93	49.2	50.8
			4.75mm	1048.46	41.2	58.8
			2.36mm	1140.08	36.1	63.9
			1.18mm	1214.82	31.9	68.1
			0.600mm	1279.88	28.2	71.8
			0.300mm	1358.55	23.8	76.2
			0.150mm	1432.90	19.7	80.3
			0.075mm	1498.93	16.0	84.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	34.5	24.3	58.8	6.2	8.9	10.1	25.2			16.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1594	0.8258	4.0373	9.8682	14.6856	38.4719	42.3692	45.9039	49.3929

Fineness Modulus
5.25

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.2m Rt
Depth: 0.55-1.80m **Sample Number:** AS-12
Material Description: Sandy Silty Gravel trace Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
815.52	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	209.27	74.3	25.7
			16.0mm	224.39	72.5	27.5
			13.2mm	255.28	68.7	31.3
			9.5mm	300.04	63.2	36.8
			4.75mm	361.80	55.6	44.4
			2.00mm	410.63	49.6	50.4
110.84	0.00	0.00	0.850mm	10.06	45.1	54.9
			0.425mm	20.17	40.6	59.4
			0.250mm	28.86	36.7	63.3
			0.106mm	42.58	30.6	69.4
			0.075mm	48.14	28.1	71.9

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 49.6
Weight of hydrometer sample =110.84
Table of composite correction values:

Temp., deg. C:	21.9	20.9
Comp. corr.:	-4.5	-5.5

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	50.0	45.5	0.0129	49.0	7.4	0.0351	19.8	80.2
2.00	21.9	46.0	41.5	0.0129	45.0	8.2	0.0260	18.1	81.9
5.00	21.9	41.0	36.5	0.0129	40.0	9.2	0.0174	15.9	84.1
15.00	21.9	35.0	30.5	0.0129	34.0	10.3	0.0106	13.3	86.7
30.00	21.9	31.0	26.5	0.0129	30.0	11.1	0.0078	11.6	88.4
60.00	21.9	26.0	21.5	0.0129	25.0	12.0	0.0057	9.4	90.6
250.00	21.9	22.0	17.5	0.0129	21.0	12.8	0.0029	7.6	92.4

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	20.9	16.0	10.5	0.0130	15.0	13.9	0.0013	4.6	95.4

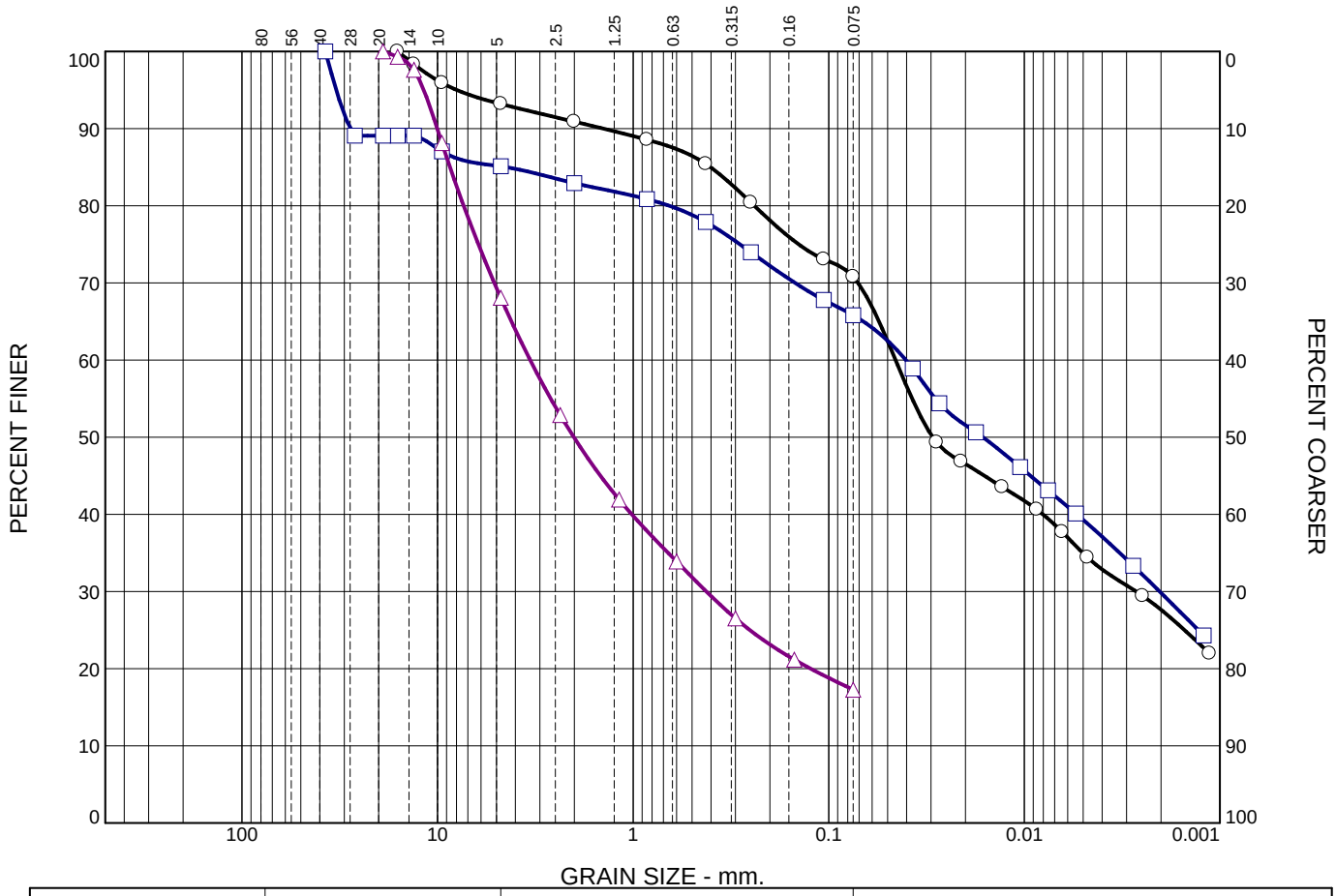
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	25.6	18.8	44.4	6.0	9.0	12.5	27.5	21.6	6.5	28.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0014	0.0063	0.0147	0.0358	0.0969	0.3901	2.1306	7.3185	21.2346	22.6480	23.9434	25.2105

Fineness Modulus	C_u	C_c
3.95	1158.63	0.20

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	6.8	2.3	5.5	14.6	43.2	27.6
□	0.0	10.9	4.0	2.2	5.0	12.1	36.0	29.8
△	0.0	0.0	31.9	18.2	19.8	12.8	17.3	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Marcoux	AS-14	0.85-1.40m	Sandy Clayey Silt trace fine Gravel	
□	Marcoux	AS-15	1.40-1.70m	Clayey Silt some Sand some Gravel	
△	Marcoux	AS-17	0.17-0.32m	Fine Gravelly Sand some Silt/Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: ○ J.H-J □ R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2 1.3m Rt
Depth: 0.85-1.40m **Sample Number:** AS-14
Material Description: Sandy Clayey Silt trace fine Gravel
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
420.19	0.00	0.00	16.0mm	0.00	100.0	0.0
			13.2mm	7.10	98.3	1.7
			9.5mm	17.14	95.9	4.1
			4.75mm	28.62	93.2	6.8
			2.00mm	38.25	90.9	9.1
106.72	0.00	0.00	0.850mm	2.75	88.6	11.4
			0.425mm	6.44	85.4	14.6
			0.250mm	12.31	80.4	19.6
			0.106mm	20.95	73.1	26.9
			0.075mm	23.61	70.8	29.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 90.9
Weight of hydrometer sample =106.72
Table of composite correction values:

Temp., deg. C:	21.9	20.9
Comp. corr.:	-4.5	-5.5

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	64.0	59.5	0.0129	63.0	4.8	0.0281	49.3	50.7
2.00	21.9	61.0	56.5	0.0129	60.0	5.4	0.0210	46.8	53.2
6.00	21.9	57.0	52.5	0.0129	56.0	6.1	0.0130	43.5	56.5
15.00	21.9	53.5	49.0	0.0129	52.5	6.8	0.0086	40.6	59.4
30.00	21.9	50.0	45.5	0.0129	49.0	7.4	0.0064	37.7	62.3
60.00	21.9	46.0	41.5	0.0129	45.0	8.2	0.0048	34.4	65.6
250.00	21.9	40.0	35.5	0.0129	39.0	9.3	0.0025	29.4	70.6
1440.00	20.9	32.0	26.5	0.0130	31.0	10.9	0.0011	22.0	78.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.8	6.8	2.3	5.5	14.6	22.4	43.2	27.6	70.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0027	0.0080	0.0294	0.0455	0.2403	0.4027	1.4211	7.9866

Fineness Modulus
0.85

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2 1.3m Rt
Depth: 1.40-1.70m **Sample Number:** AS-15
Material Description: Clayey Silt some Sand some Gravel
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
435.78	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	47.59	89.1	10.9
			19.0mm	47.59	89.1	10.9
			16.0mm	47.59	89.1	10.9
			13.2mm	47.59	89.1	10.9
			9.5mm	56.45	87.0	13.0
			4.75mm	64.88	85.1	14.9
			2.00mm	74.39	82.9	17.1
53.66	0.00	0.00	0.850mm	1.34	80.9	19.1
			0.425mm	3.26	77.9	22.1
			0.250mm	5.80	74.0	26.0
			0.106mm	9.80	67.8	32.2
			0.075mm	11.08	65.8	34.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 82.9
Weight of hydrometer sample =53.66
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	20.9	46.0	39.2	0.0130	45.0	8.2	0.0372	58.9	41.1
2.00	20.9	43.0	36.2	0.0130	42.0	8.7	0.0272	54.4	45.6
5.00	20.9	40.5	33.7	0.0130	39.5	9.2	0.0177	50.6	49.4
15.00	20.9	37.5	30.7	0.0130	36.5	9.8	0.0105	46.1	53.9
30.00	20.9	35.5	28.7	0.0130	34.5	10.1	0.0076	43.1	56.9
60.00	20.9	33.5	26.7	0.0130	32.5	10.5	0.0054	40.1	59.9
250.00	20.9	29.0	22.2	0.0130	28.0	11.4	0.0028	33.3	66.7

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	20.9	23.0	16.2	0.0130	22.0	12.5	0.0012	24.3	75.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	10.9	4.0	14.9	2.2	5.0	12.1	19.3	36.0	29.8	65.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0020	0.0054	0.0163	0.0403	0.6547	4.4507	27.9211	32.9941

Fineness Modulus
1.49

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-9 1.2m Lt
Depth: 0.17-0.32m **Sample Number:** AS-17
Material Description: Fine Gravelly Sand some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
896.42	0.00	0.00	19.0mm	0.00	100.0	0.0
			16.0mm	6.27	99.3	0.7
			13.2mm	21.46	97.6	2.4
			9.5mm	106.51	88.1	11.9
			4.75mm	286.36	68.1	31.9
			2.36mm	422.57	52.9	47.1
			1.18mm	520.75	41.9	58.1
			0.600mm	592.64	33.9	66.1
			0.300mm	658.78	26.5	73.5
			0.150mm	706.78	21.2	78.8
			0.075mm	741.68	17.3	82.7

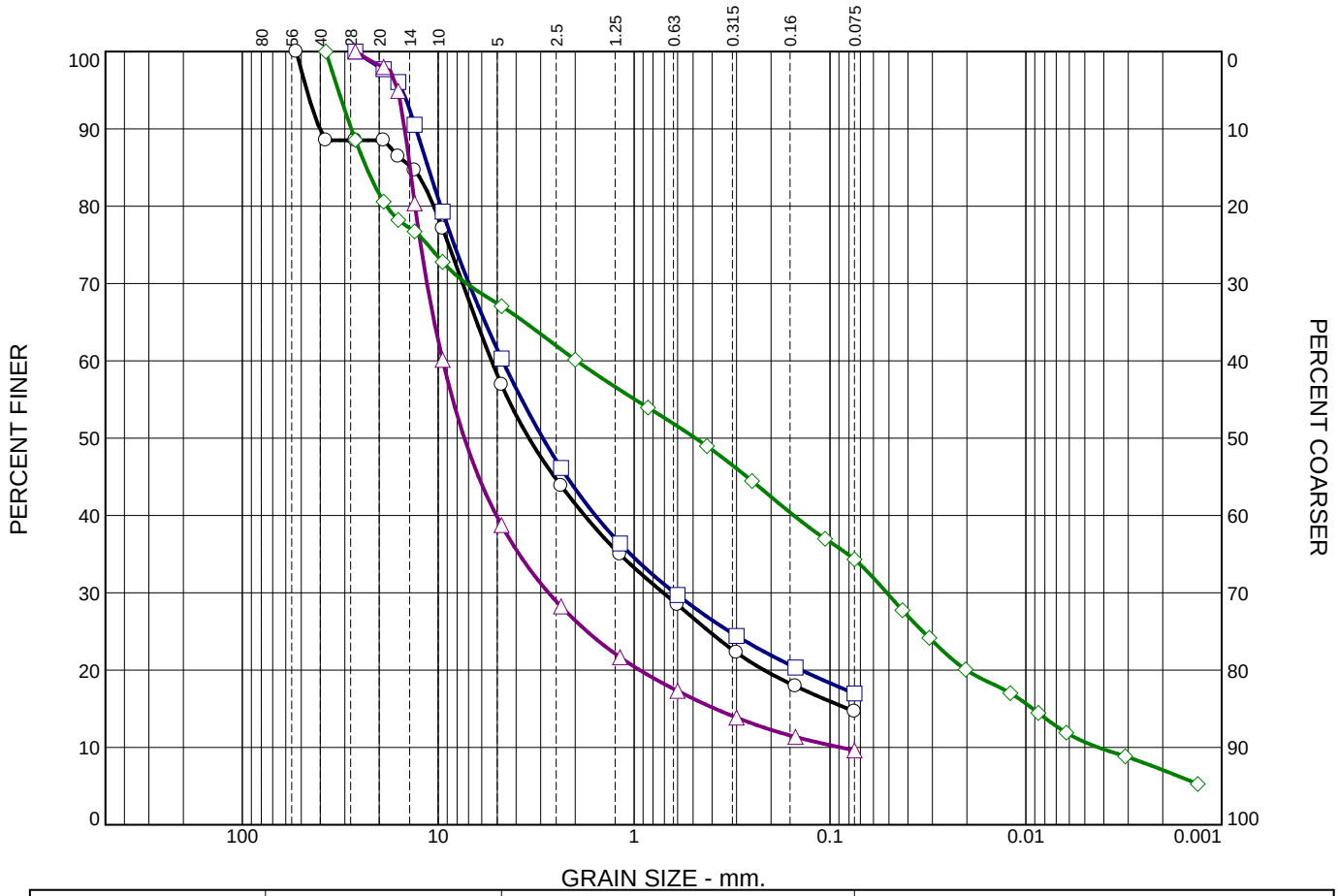
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	31.9	31.9	18.2	19.8	12.8	50.8			17.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1240	0.4226	1.0170	2.0113	3.3635	7.3564	8.6414	10.0427	11.7633

Fineness Modulus
3.67

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	11.5	31.6	15.4	16.3	10.5	14.7	
□	0.0	2.3	37.4	16.9	16.5	9.9	17.0	
△	0.0	2.0	59.2	12.4	10.9	5.9	9.6	
◇	0.0	19.4	13.5	7.0	11.1	14.7	27.2	7.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Dornie	AS-21	0.18-0.86m	Sand and Gravel some Silt/Clay	
□	Dornie	AS-22	0.02-0.29m	Sand and Gravel some Silt/Clay	
△	Dornie	AS-18	0.02-0.34m	Sandy Gravel trace Silt/Clay	
◇	Dornie	AS-19	0.73-1.70m	Silty Sand and Gravel trace Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-7 1.0m Rt
Depth: 0.18-0.86m **Sample Number:** AS-21
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1063.19	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	122.06	88.5	11.5
			26.5mm	122.06	88.5	11.5
			19.0mm	122.06	88.5	11.5
			16.0mm	144.25	86.4	13.6
			13.2mm	163.31	84.6	15.4
			9.5mm	243.40	77.1	22.9
			4.75mm	458.19	56.9	43.1
			2.36mm	596.96	43.9	56.1
			1.18mm	691.45	35.0	65.0
			0.600mm	760.81	28.4	71.6
			0.300mm	826.59	22.3	77.7
			0.150mm	872.68	17.9	82.1
			0.075mm	907.42	14.7	85.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	11.5	31.6	43.1	15.4	16.3	10.5	42.2			14.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0811	0.2170	0.7107	1.7908	3.4451	5.3439	10.5358	13.6179	40.2451	46.8676

Fineness Modulus
4.41

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-12 1.0m Rt
Depth: 0.02-0.29m **Sample Number:** AS-22
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1066.87	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	24.47	97.7	2.3
			16.0mm	42.13	96.1	3.9
			13.2mm	101.06	90.5	9.5
			9.5mm	220.93	79.3	20.7
			4.75mm	423.63	60.3	39.7
			2.36mm	574.65	46.1	53.9
			1.18mm	678.88	36.4	63.6
			0.600mm	749.91	29.7	70.3
			0.300mm	806.33	24.4	75.6
			0.150mm	850.00	20.3	79.7
			0.075mm	885.83	17.0	83.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.3	37.4	39.7	16.9	16.5	9.9	43.3			17.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1408	0.6206	1.5772	2.9239	4.6907	9.7074	11.2500	12.9988	15.2484

Fineness Modulus
4.06

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-4 1.3m Rt
Depth: 0.02-0.34m **Sample Number:** AS-18
Material Description: Sandy Gravel trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
870.31	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	17.42	98.0	2.0
			16.0mm	44.39	94.9	5.1
			13.2mm	170.80	80.4	19.6
			9.5mm	347.03	60.1	39.9
			4.75mm	533.04	38.8	61.2
			2.36mm	624.65	28.2	71.8
			1.18mm	681.83	21.7	78.3
			0.600mm	719.73	17.3	82.7
			0.300mm	749.79	13.8	86.2
			0.150mm	771.54	11.3	88.7
			0.075mm	786.60	9.6	90.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.0	59.2	61.2	12.4	10.9	5.9	29.2			9.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0886	0.3859	0.9363	2.7351	5.0478	7.3568	9.4743	13.1396	13.9418	14.8164	16.0344

Fineness Modulus	C_u	C_c
5.11	106.96	8.91

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-5 1.0m Rt
Depth: 0.73-1.70m **Sample Number:** AS-19
Material Description: Silty Sand and Gravel trace Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
724.55	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	82.85	88.6	11.4
			19.0mm	140.68	80.6	19.4
			16.0mm	157.89	78.2	21.8
			13.2mm	168.66	76.7	23.3
			9.5mm	197.18	72.8	27.2
			4.75mm	238.67	67.1	32.9
			2.00mm	288.82	60.1	39.9
57.31	0.00	0.00	0.850mm	5.90	53.9	46.1
			0.425mm	10.64	49.0	51.0
			0.250mm	14.95	44.5	55.5
			0.106mm	22.07	37.0	63.0
			0.075mm	24.61	34.3	65.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 60.1
Weight of hydrometer sample =57.31
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	20.9	32.5	27.2	0.0130	31.5	10.8	0.0427	27.7	72.3
2.00	20.9	29.0	23.7	0.0130	28.0	11.4	0.0311	24.2	75.8
5.00	20.9	25.0	19.7	0.0130	24.0	12.2	0.0203	20.1	79.9
15.00	20.9	22.0	16.7	0.0130	21.0	12.8	0.0120	17.0	83.0
30.00	20.9	19.5	14.2	0.0130	18.5	13.2	0.0086	14.5	85.5
60.00	20.9	17.0	11.7	0.0130	16.0	13.7	0.0062	11.9	88.1
250.00	20.9	14.0	8.7	0.0130	13.0	14.3	0.0031	8.8	91.2

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	20.9	10.5	5.2	0.0130	9.5	14.9	0.0013	5.3	94.7

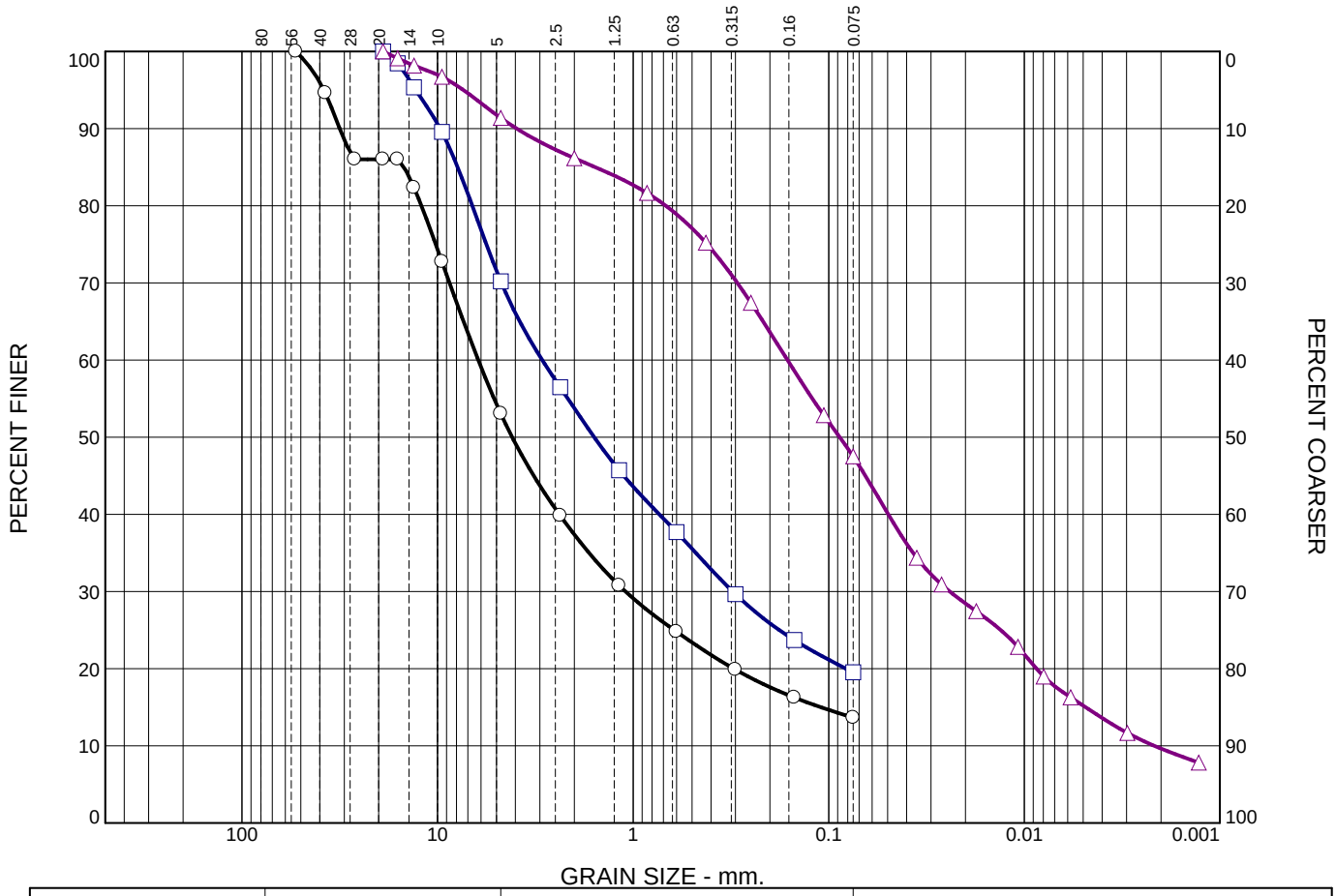
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	19.4	13.5	32.9	7.0	11.1	14.7	32.8	27.2	7.1	34.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0043	0.0092	0.0201	0.0513	0.1532	0.4859	1.9654	18.3569	23.2852	27.7883	32.4165

Fineness Modulus	C_u	C_c
3.24	460.06	0.31

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	14.0	32.9	15.7	15.2	8.6	13.6	
□	0.0	0.0	29.8	16.4	20.2	14.1	19.5	
△	0.0	0.0	8.6	5.2	11.0	27.7	37.9	9.6

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Conc 4 East	AS-23	0.02-0.21m	Sand and Gravel some Silt/Clay	
□	Conc 4 East	AS-24	0.50-0.61m	Fine Gravelly Sand some Silt/Clay	
△	Conc 4 East	AS-25	1.30-1.70m	Sand and Silt trace fine Gravel trace Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-6 1.1m Lt
Depth: 0.02-0.21m **Sample Number:** AS-23
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1095.53	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	59.07	94.6	5.4
			26.5mm	153.22	86.0	14.0
			19.0mm	153.22	86.0	14.0
			16.0mm	153.22	86.0	14.0
			13.2mm	193.45	82.3	17.7
			9.5mm	298.61	72.7	27.3
			4.75mm	514.34	53.1	46.9
			2.36mm	659.10	39.8	60.2
			1.18mm	758.38	30.8	69.2
			0.600mm	824.04	24.8	75.2
			0.300mm	877.90	19.9	80.1
			0.150mm	917.49	16.3	83.7
			0.075mm	946.21	13.6	86.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	14.0	32.9	46.9	15.7	15.2	8.6	39.5			13.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1098	0.3065	1.0953	2.3852	4.1540	6.1959	12.1036	14.8537	31.6810	38.1337

Fineness Modulus
4.62

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-6 1.1m Lt
Depth: 0.50-0.61m **Sample Number:** AS-24
Material Description: Fine Gravelly Sand some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1009.76	0.00	0.00	19.0mm	0.00	100.0	0.0
			16.0mm	15.62	98.5	1.5
			13.2mm	47.00	95.3	4.7
			9.5mm	105.34	89.6	10.4
			4.75mm	300.86	70.2	29.8
			2.36mm	439.55	56.5	43.5
			1.18mm	548.18	45.7	54.3
			0.600mm	629.19	37.7	62.3
			0.300mm	710.38	29.6	70.4
			0.150mm	770.41	23.7	76.3
			0.075mm	812.63	19.5	80.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	29.8	29.8	16.4	20.2	14.1	50.7			19.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0817	0.3101	0.7351	1.5818	2.9164	6.6478	7.8967	9.6985	12.9334

Fineness Modulus
3.47

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-8 1.3m Lt
Depth: 1.30-1.70m **Sample Number:** AS-25
Material Description: Sand and Silt trace fine Gravel trace Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
600.18	0.00	0.00	19.0mm	0.00	100.0	0.0
			16.0mm	5.37	99.1	0.9
			13.2mm	11.00	98.2	1.8
			9.5mm	19.76	96.7	3.3
			4.75mm	51.81	91.4	8.6
			2.00mm	83.06	86.2	13.8
108.99	0.00	0.00	0.850mm	5.70	81.7	18.3
			0.425mm	13.87	75.2	24.8
			0.250mm	23.71	67.4	32.6
			0.106mm	42.15	52.8	47.2
			0.075mm	48.90	47.5	52.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 86.2
Weight of hydrometer sample =108.99
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	20.9	50.0	44.7	0.0130	49.0	7.4	0.0355	34.4	65.6
2.00	20.9	45.5	40.2	0.0130	44.5	8.3	0.0265	30.9	69.1
5.00	20.9	41.0	35.7	0.0130	40.0	9.2	0.0176	27.4	72.6
15.00	20.9	35.0	29.7	0.0130	34.0	10.3	0.0108	22.8	77.2
30.00	20.9	30.0	24.7	0.0130	29.0	11.2	0.0080	19.0	81.0
60.00	20.9	26.5	21.2	0.0130	25.5	11.9	0.0058	16.3	83.7
250.00	20.9	20.5	15.2	0.0130	19.5	13.0	0.0030	11.7	88.3
1440.00	20.9	15.5	10.2	0.0130	14.5	14.0	0.0013	7.8	92.2

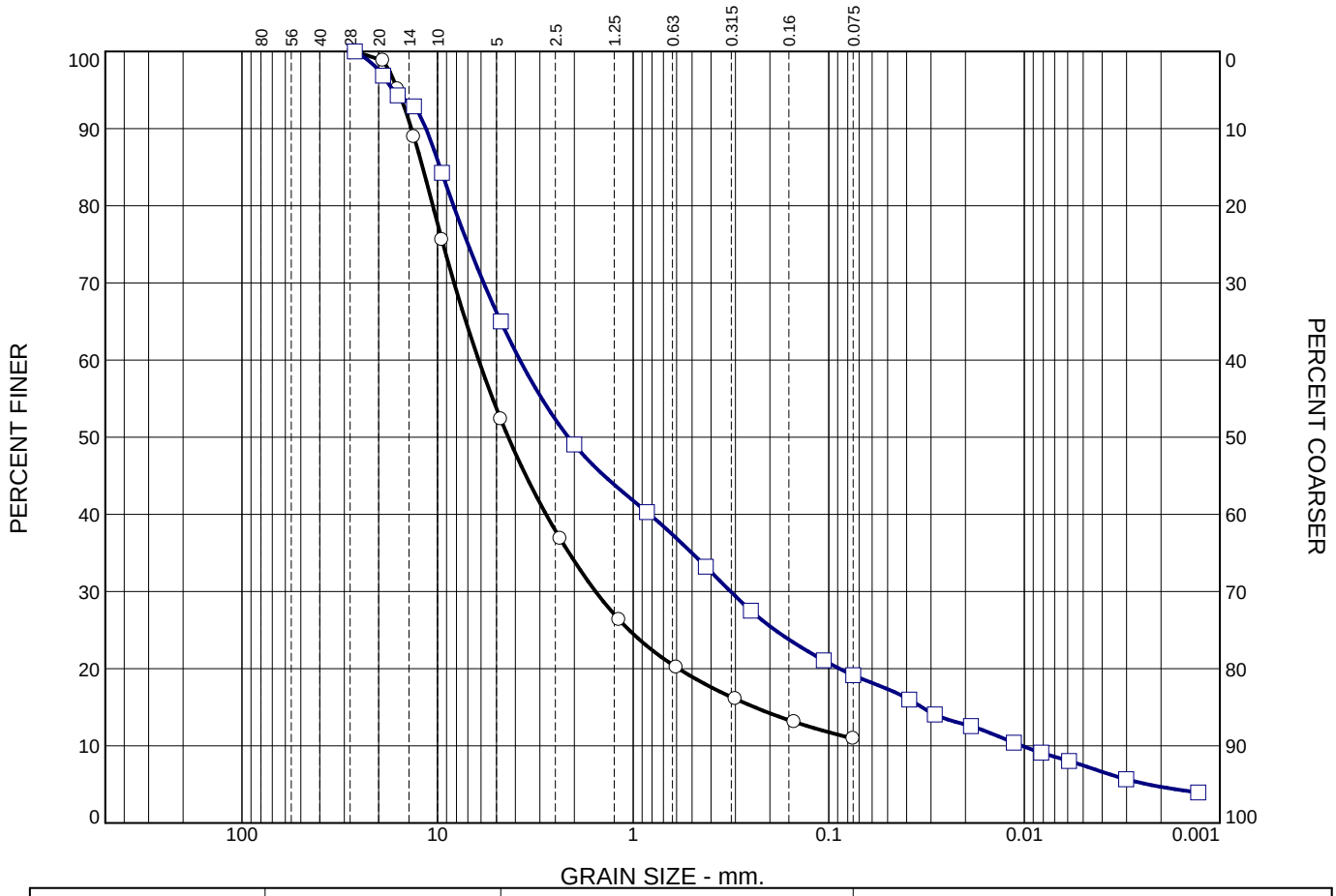
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	8.6	8.6	5.2	11.0	27.7	43.9	37.9	9.6	47.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0022	0.0049	0.0087	0.0241	0.0496	0.0879	0.1626	0.6812	1.5646	3.9434	7.3810

Fineness Modulus	C_u	C_c
1.34	74.99	1.64

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	1.2	46.5	18.4	16.0	7.0	10.9	
□	0.0	3.1	31.9	16.0	15.8	14.1	14.4	4.7

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Conc 4 West	AS-26	0.02-0.27m	Sand and Gravel some Silt/Clay	
□	Conc 4 West	AS-27	0.27-0.94m	Sand and Gravel some Silt trace Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.9m Rt
Depth: 0.02-0.27m **Sample Number:** AS-26
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1092.61	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	12.99	98.8	1.2
			16.0mm	53.43	95.1	4.9
			13.2mm	121.16	88.9	11.1
			9.5mm	266.74	75.6	24.4
			4.75mm	520.92	52.3	47.7
			2.36mm	690.07	36.8	63.2
			1.18mm	804.92	26.3	73.7
			0.600mm	872.37	20.2	79.8
			0.300mm	916.99	16.1	83.9
			0.150mm	949.64	13.1	86.9
			0.075mm	973.27	10.9	89.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.2	46.5	47.7	18.4	16.0	7.0	41.4			10.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.2396	0.5867	1.5567	2.7876	4.3490	6.1673	10.5699	11.9316	13.6041	15.9362

Fineness Modulus
4.61

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.9m Rt
Depth: 0.27-0.94m **Sample Number:** AS-27
Material Description: Sand and Gravel some Silt trace Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
791.47	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	24.85	96.9	3.1
			16.0mm	45.10	94.3	5.7
			13.2mm	56.34	92.9	7.1
			9.5mm	124.58	84.3	15.7
			4.75mm	277.04	65.0	35.0
			2.00mm	403.27	49.0	51.0
110.92	0.00	0.00	0.850mm	19.81	40.3	59.7
			0.425mm	35.81	33.2	66.8
			0.250mm	48.71	27.5	72.5
			0.106mm	63.26	21.1	78.9
			0.075mm	67.62	19.1	80.9

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 49.0
Weight of hydrometer sample =110.92
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	20.9	42.5	37.2	0.0130	41.5	8.9	0.0387	16.0	84.0
2.00	20.9	38.0	32.7	0.0130	37.0	9.7	0.0287	14.1	85.9
5.00	20.9	34.5	29.2	0.0130	33.5	10.4	0.0188	12.5	87.5
15.00	20.9	29.5	24.2	0.0130	28.5	11.3	0.0113	10.4	89.6
30.00	20.9	26.5	21.2	0.0130	25.5	11.9	0.0082	9.1	90.9
60.00	20.9	24.0	18.7	0.0130	23.0	12.4	0.0059	8.0	92.0
250.00	20.9	18.5	13.2	0.0130	17.5	13.4	0.0030	5.7	94.3
1440.00	20.9	14.5	9.2	0.0130	13.5	14.2	0.0013	3.9	96.1

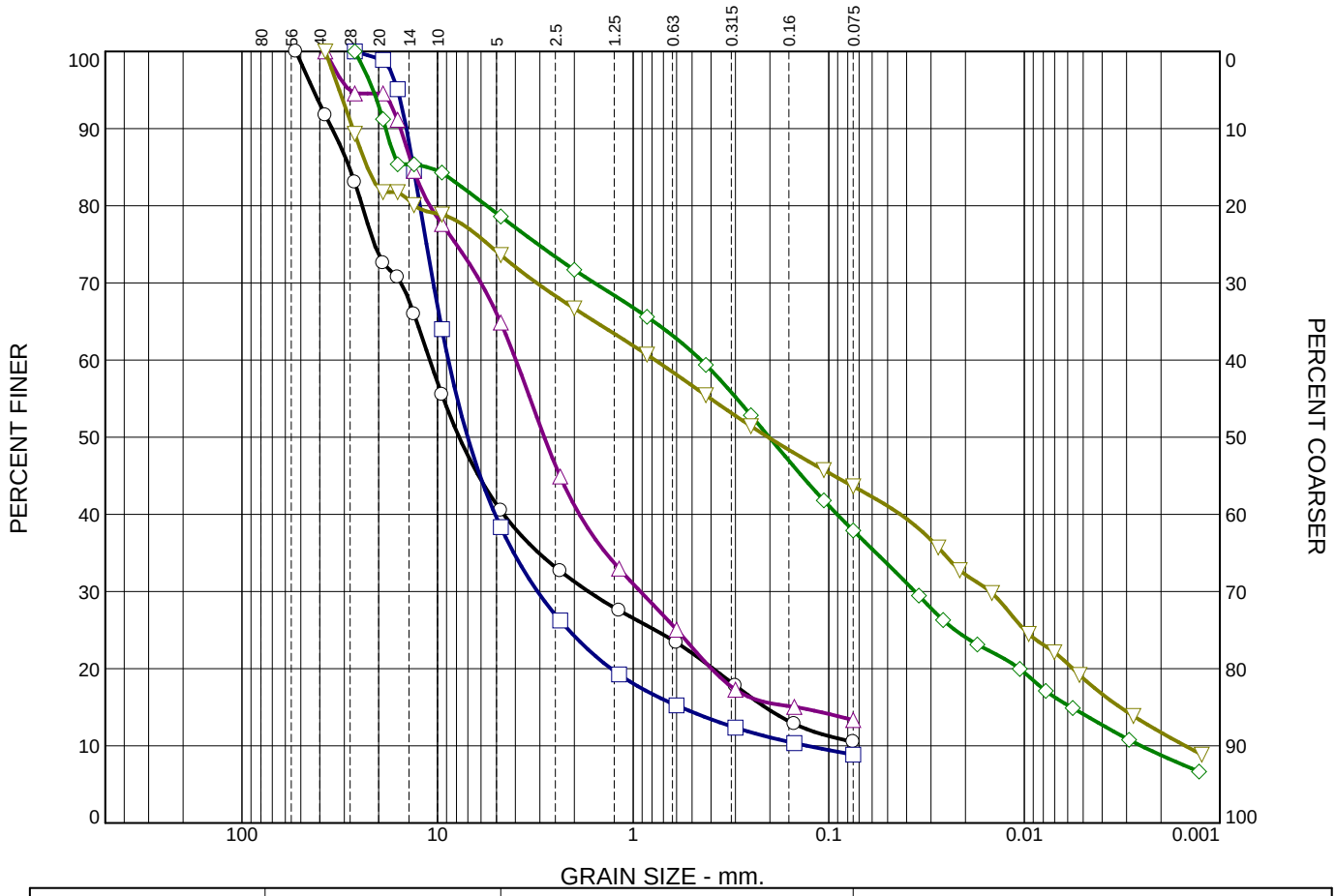
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	3.1	31.9	35.0	16.0	15.8	14.1	45.9	14.4	4.7	19.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0023	0.0103	0.0334	0.0882	0.3179	0.8243	2.1441	3.7948	8.2885	9.7210	11.4534	16.9083

Fineness Modulus	C_u	C_c
3.69	367.76	2.58

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	27.4	32.1	9.2	10.6	10.2	10.5	
□	0.0	1.1	60.6	14.1	10.5	4.9	8.8	
△	0.0	5.5	29.7	23.6	20.5	7.4	13.3	
◇	0.0	8.7	12.7	6.9	12.3	21.5	29.1	8.8
▽	0.0	18.2	8.2	6.9	11.3	11.8	31.9	11.7

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	McCormick	AS-29	0.42-0.64m	Sandy Gravel some Silt/Clay	
□	McCormick	AS-30	0.035-0.25m	Sandy Gravel trace Silt/Clay	
△	McCormick	AS-36	0.58-1.15m	Sand and Gravel some Silt/Clay	
◇	McCormick	AS-30	1.10-1.70m	Silty Gravelly Sand trace Clay	
▽	McCormick	AS-39	0.89-1.70m	Gravelly Sandy Silt some Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: R.C **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-28 1.1m Rt
Depth: 0.42-0.64m **Sample Number:** AS-29
Material Description: Sandy Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1384.27	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	114.42	91.7	8.3
			26.5mm	234.83	83.0	17.0
			19.0mm	379.82	72.6	27.4
			16.0mm	405.34	70.7	29.3
			13.2mm	471.22	66.0	34.0
			9.5mm	615.91	55.5	44.5
			4.75mm	823.72	40.5	59.5
			2.36mm	932.30	32.7	67.3
			1.18mm	1003.12	27.5	72.5
			0.600mm	1060.86	23.4	76.6
			0.300mm	1138.10	17.8	82.2
			0.150mm	1206.70	12.8	87.2
			0.075mm	1238.78	10.5	89.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	27.4	32.1	59.5	9.2	10.6	10.2	30.0			10.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.2113	0.3904	1.6945	4.5940	7.7550	10.9631	24.3072	28.2533	34.6640	43.1803

Fineness Modulus
5.25

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-14 0.9m Rt
Depth: 0.035-0.25m **Sample Number:** AS-30
Material Description: Sandy Gravel trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1199.26	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	13.19	98.9	1.1
			16.0mm	58.72	95.1	4.9
			13.2mm	185.72	84.5	15.5
			9.5mm	431.84	64.0	36.0
			4.75mm	739.37	38.3	61.7
			2.36mm	884.64	26.2	73.8
			1.18mm	968.49	19.2	80.8
			0.600mm	1016.55	15.2	84.8
			0.300mm	1051.16	12.3	87.7
			0.150mm	1075.21	10.3	89.7
			0.075mm	1093.20	8.8	91.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.1	60.6	61.7	14.1	10.5	4.9	29.5			8.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1295	0.5710	1.2982	3.0837	5.0819	7.0194	8.8133	12.3098	13.3004	14.4244	15.9573

Fineness Modulus	C_u	C_c
5.15	68.07	8.33

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-11 0.8m Lt
Depth: 0.58-1.15m **Sample Number:** AS-36
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1137.96	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	62.03	94.5	5.5
			19.0mm	62.03	94.5	5.5
			16.0mm	100.87	91.1	8.9
			13.2mm	176.25	84.5	15.5
			9.5mm	254.68	77.6	22.4
			4.75mm	400.01	64.8	35.2
			2.36mm	627.07	44.9	55.1
			1.18mm	762.88	33.0	67.0
			0.600mm	853.00	25.0	75.0
			0.300mm	941.47	17.3	82.7
			0.150mm	966.93	15.0	85.0
			0.075mm	986.29	13.3	86.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	5.5	29.7	35.2	23.6	20.5	7.4	51.5			13.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1475	0.3986	0.9192	1.8851	2.8462	3.9774	10.9725	13.3997	15.4424	28.2609

Fineness Modulus
4.28

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-28 1.1m Rt
Depth: 1.10-1.70m **Sample Number:** AS-30
Material Description: Silty Gravelly Sand trace Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
690.50	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	60.62	91.2	8.8
			16.0mm	101.00	85.4	14.6
			13.2mm	101.00	85.4	14.6
			9.5mm	108.44	84.3	15.7
			4.75mm	147.74	78.6	21.4
			2.00mm	195.47	71.7	28.3
110.14	0.00	0.00	0.850mm	9.36	65.6	34.4
			0.425mm	18.93	59.4	40.6
			0.250mm	28.96	52.8	47.2
			0.106mm	45.92	41.8	58.2
			0.075mm	51.91	37.9	62.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 71.7
Weight of hydrometer sample =110.14
Table of composite correction values:

Temp., deg. C:	21.9	20.9
Comp. corr.:	-4.5	-5.5

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	51.0	46.5	0.0129	50.0	7.3	0.0346	29.5	70.5
2.00	21.9	46.0	41.5	0.0129	45.0	8.2	0.0260	26.3	73.7
5.00	21.9	41.0	36.5	0.0129	40.0	9.2	0.0174	23.1	76.9
15.00	21.9	36.0	31.5	0.0129	35.0	10.1	0.0105	20.0	80.0
30.00	21.9	31.5	27.0	0.0129	30.5	11.0	0.0078	17.1	82.9
60.00	21.9	28.0	23.5	0.0129	27.0	11.6	0.0057	14.9	85.1
250.00	21.9	21.5	17.0	0.0129	20.5	12.9	0.0029	10.8	89.2

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	20.9	16.0	10.5	0.0130	15.0	13.9	0.0013	6.7	93.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.7	12.7	21.4	6.9	12.3	21.5	40.7	29.1	8.8	37.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0025	0.0058	0.0106	0.0363	0.0907	0.2016	0.4507	5.6105	11.3212	18.4105	21.3532

Fineness Modulus	C_u	C_c
2.41	177.68	1.15

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-23 1.2m Lt
Depth: 0.89-1.70m **Sample Number:** AS-39
Material Description: Gravelly Sandy Silt some Clay
Tested by: R.C **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
656.86	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	70.19	89.3	10.7
			19.0mm	119.83	81.8	18.2
			16.0mm	119.83	81.8	18.2
			13.2mm	130.88	80.1	19.9
			9.5mm	138.90	78.9	21.1
			4.75mm	173.38	73.6	26.4
			2.00mm	218.82	66.7	33.3
110.00	0.00	0.00	0.850mm	9.88	60.7	39.3
			0.425mm	18.57	55.4	44.6
			0.250mm	25.17	51.4	48.6
			0.106mm	34.56	45.7	54.3
			0.075mm	38.05	43.6	56.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 66.7
Weight of hydrometer sample =110
Table of composite correction values:

Temp., deg. C:	21.9	20.9
Comp. corr.:	-4.5	-5.5

Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.9	65.0	60.5	0.0129	64.0	4.6	0.0275	35.7	64.3
2.00	21.9	60.0	55.5	0.0129	59.0	5.5	0.0214	32.8	67.2
5.00	21.9	55.0	50.5	0.0129	54.0	6.5	0.0146	29.8	70.2
15.00	21.9	46.0	41.5	0.0129	45.0	8.2	0.0095	24.5	75.5
30.00	21.9	42.0	37.5	0.0129	41.0	9.0	0.0070	22.1	77.9
60.00	21.9	37.0	32.5	0.0129	36.0	9.9	0.0052	19.2	80.8

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
250.00	21.9	28.0	23.5	0.0129	27.0	11.6	0.0028	13.9	86.1
1440.00	20.9	20.5	15.0	0.0130	19.5	13.0	0.0012	8.9	91.1

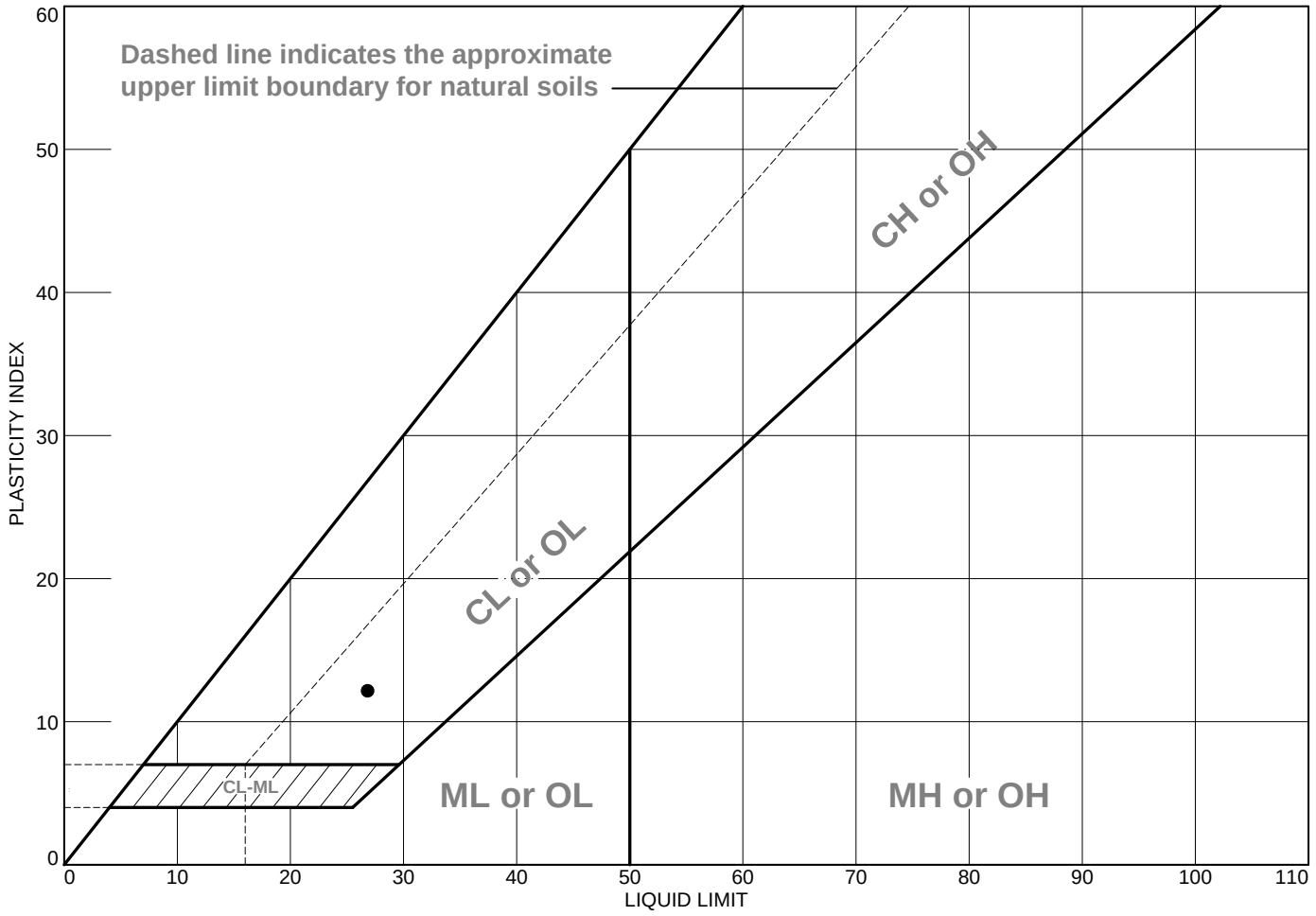
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	18.2	8.2	26.4	6.9	11.3	11.8	30.0	31.9	11.7	43.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0015	0.0032	0.0057	0.0149	0.0431	0.2042	0.7730	13.0870	22.9082	27.0911	31.8549

Fineness Modulus	C_u	C_c
2.76	513.29	0.19

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●		June 14, 2022	July 8, 2022	R.C	26.9	14.8	12.1		

Project No. CCO22-5139 **Client:** Township of North Glengarry

Project: North Glengarry LCB Road

○**Location:** BH-27 2.2m Lt **Depth:** 1.10-1.70m **Sample Number:** AS-41

McINTOSH PERRY

Checked by: J.Hopwood-Jones

Title: Lab Manager

Figure

These results are for the exclusive use of the client for whom they were obtained.

Tested By: R.C **Checked By:** J.Hopwood-Jones

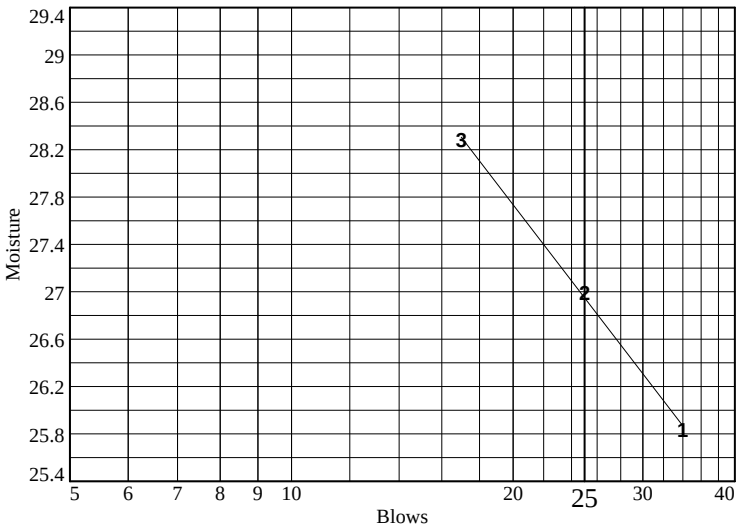
LIQUID AND PLASTIC LIMIT TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-27 2.2m Lt
Depth: 1.10-1.70m **Sample Number:** AS-41
Sample Date: June 14,2022
Tested by: R.C **Test Date:** July 8,2022 **Checked by:** J.Hopwood-Jones **Title:** Lab Manager

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.78	24.69	24.84			
Dry+Tare	23.86	23.81	23.85			
Tare	20.30	20.55	20.35			
# Blows	34	25	17			
Moisture	25.8	27.0	28.3			



Liquid Limit= 26.9
Plastic Limit= 14.8
Plasticity Index= 12.1
Natural Moisture= 13.5
Liquidity Index= -0.1

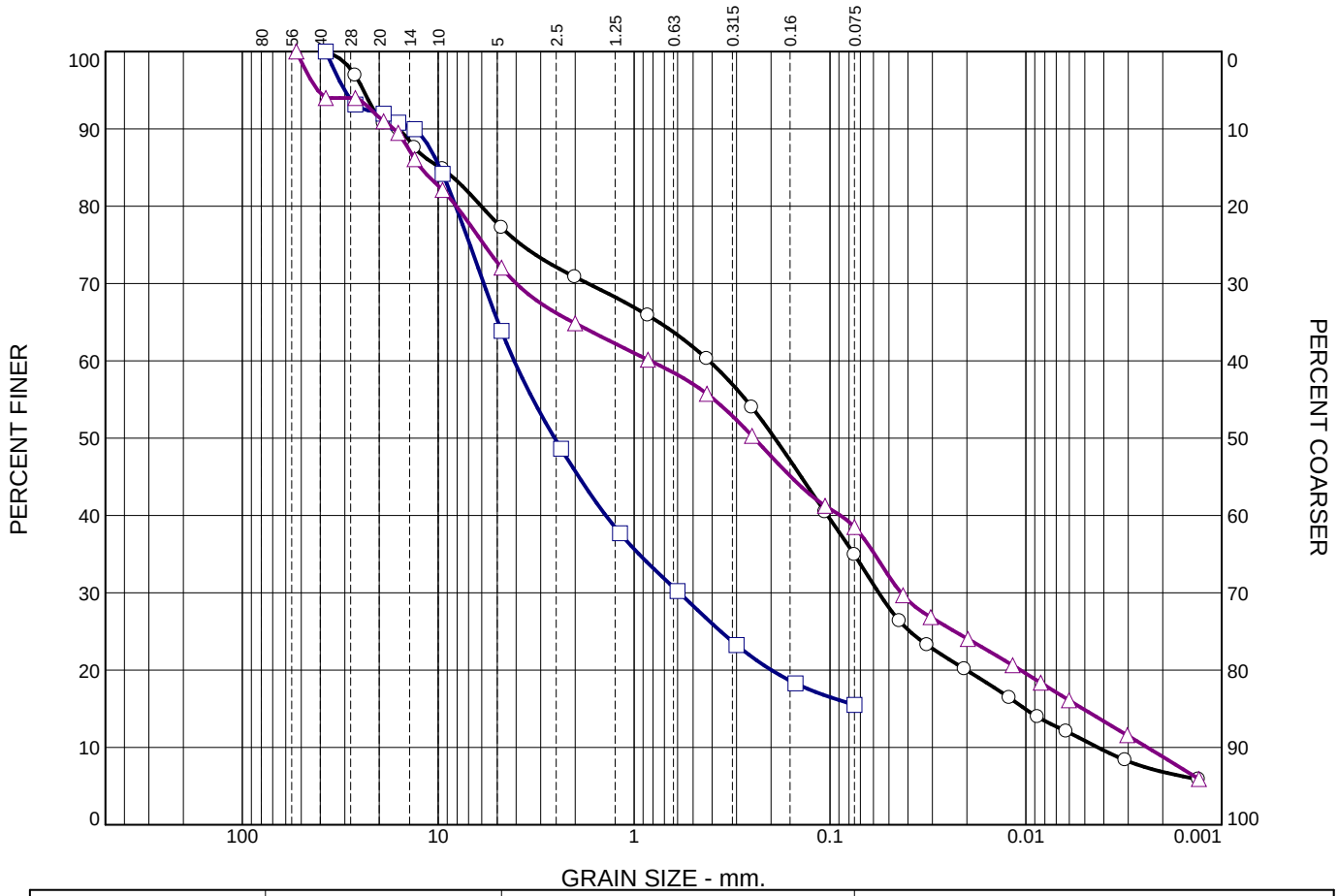
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	23.44	23.28			
Dry+Tare	23.03	22.90			
Tare	20.28	20.32			
Moisture	14.9	14.7			

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
1023.72	918.63	141.81	13.5

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	9.3	13.5	6.4	10.6	25.3	28.1	6.8
□	0.0	8.0	28.1	18.2	19.1	11.1	15.5	
△	0.0	9.0	19.0	7.1	9.2	17.2	29.7	8.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Athol	AS-44	1.30-1.70m	Silty Gravelly Sand trace Clay	
□	Athol	AS-45	0.025-0.29m	Sand and Gravel some Silt/Clay	
△	Athol	AS-46	0.65-1.15m	Silty Gravelly Sand trace Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-3 1.3m Lt
Depth: 1.30-1.70m **Sample Number:** AS-44
Material Description: Silty Gravelly Sand trace Clay
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1157.70	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	35.86	96.9	3.1
			19.0mm	107.41	90.7	9.3
			16.0mm	115.33	90.0	10.0
			13.2mm	143.99	87.6	12.4
			9.5mm	175.87	84.8	15.2
			4.75mm	263.64	77.2	22.8
			2.00mm	337.67	70.8	29.2
55.54	0.00	0.00	0.850mm	3.89	65.9	34.1
			0.425mm	8.30	60.2	39.8
			0.250mm	13.23	54.0	46.0
			0.106mm	23.83	40.4	59.6
			0.075mm	28.17	34.9	65.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 70.8
Weight of hydrometer sample =55.54
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	28.0	21.2	0.0130	27.0	11.6	0.0442	26.3	73.7
2.00	21.2	25.5	18.7	0.0130	24.5	12.1	0.0319	23.2	76.8
5.00	21.2	23.0	16.2	0.0130	22.0	12.6	0.0206	20.1	79.9
15.00	21.2	20.0	13.2	0.0130	19.0	13.1	0.0121	16.4	83.6
30.00	21.2	18.0	11.2	0.0130	17.0	13.5	0.0087	13.9	86.1
60.00	21.2	16.5	9.7	0.0130	15.5	13.8	0.0062	12.1	87.9
250.00	21.2	13.5	6.7	0.0130	12.5	14.4	0.0031	8.3	91.7

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1440.00	21.2	11.5	4.7	0.0130	10.5	14.8	0.0013	5.9	94.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.3	13.5	22.8	6.4	10.6	25.3	42.3	28.1	6.8	34.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0043	0.0101	0.0201	0.0564	0.1031	0.1915	0.4147	6.0341	9.7500	15.9170	24.1165

Fineness Modulus	C_u	C_c
2.42	96.58	1.79

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.0m Rt
Depth: 0.025-0.29m **Sample Number:** AS-45
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1141.42	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	78.32	93.1	6.9
			19.0mm	91.76	92.0	8.0
			16.0mm	105.07	90.8	9.2
			13.2mm	114.60	90.0	10.0
			9.5mm	180.64	84.2	15.8
			4.75mm	412.54	63.9	36.1
			2.36mm	586.29	48.6	51.4
			1.18mm	711.22	37.7	62.3
			0.600mm	796.56	30.2	69.8
			0.300mm	876.19	23.2	76.8
			0.150mm	932.73	18.3	81.7
			0.075mm	964.59	15.5	84.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.0	28.1	36.1	18.2	19.1	11.1	48.4			15.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1993	0.5878	1.3951	2.5436	4.0947	8.1411	9.8254	13.2724	30.0926

Fineness Modulus
4.02

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.0m Rt
Depth: 0.65-1.15m **Sample Number:** AS-46
Material Description: Silty Gravelly Sand trace Clay
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1172.08	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	70.47	94.0	6.0
			26.5mm	70.47	94.0	6.0
			19.0mm	105.82	91.0	9.0
			16.0mm	123.37	89.5	10.5
			13.2mm	163.30	86.1	13.9
			9.5mm	209.95	82.1	17.9
			4.75mm	327.72	72.0	28.0
			2.00mm	411.94	64.9	35.1
55.79	0.00	0.00	0.850mm	4.06	60.1	39.9
			0.425mm	7.85	55.7	44.3
			0.250mm	12.53	50.3	49.7
			0.106mm	20.31	41.2	58.8
			0.075mm	22.67	38.5	61.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 64.9
Weight of hydrometer sample =55.79
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	33.0	26.2	0.0130	32.0	10.7	0.0423	29.7	70.3
2.00	21.2	30.5	23.7	0.0130	29.5	11.1	0.0306	26.8	73.2
5.00	21.2	28.0	21.2	0.0130	27.0	11.6	0.0198	24.0	76.0
15.00	21.2	25.0	18.2	0.0130	24.0	12.2	0.0117	20.6	79.4
30.00	21.2	23.0	16.2	0.0130	22.0	12.6	0.0084	18.4	81.6
60.00	21.2	21.0	14.2	0.0130	20.0	13.0	0.0060	16.1	83.9

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
250.00	21.2	17.0	10.2	0.0130	16.0	13.7	0.0030	11.6	88.4
1440.00	21.2	12.0	5.2	0.0130	11.0	14.7	0.0013	5.9	94.1

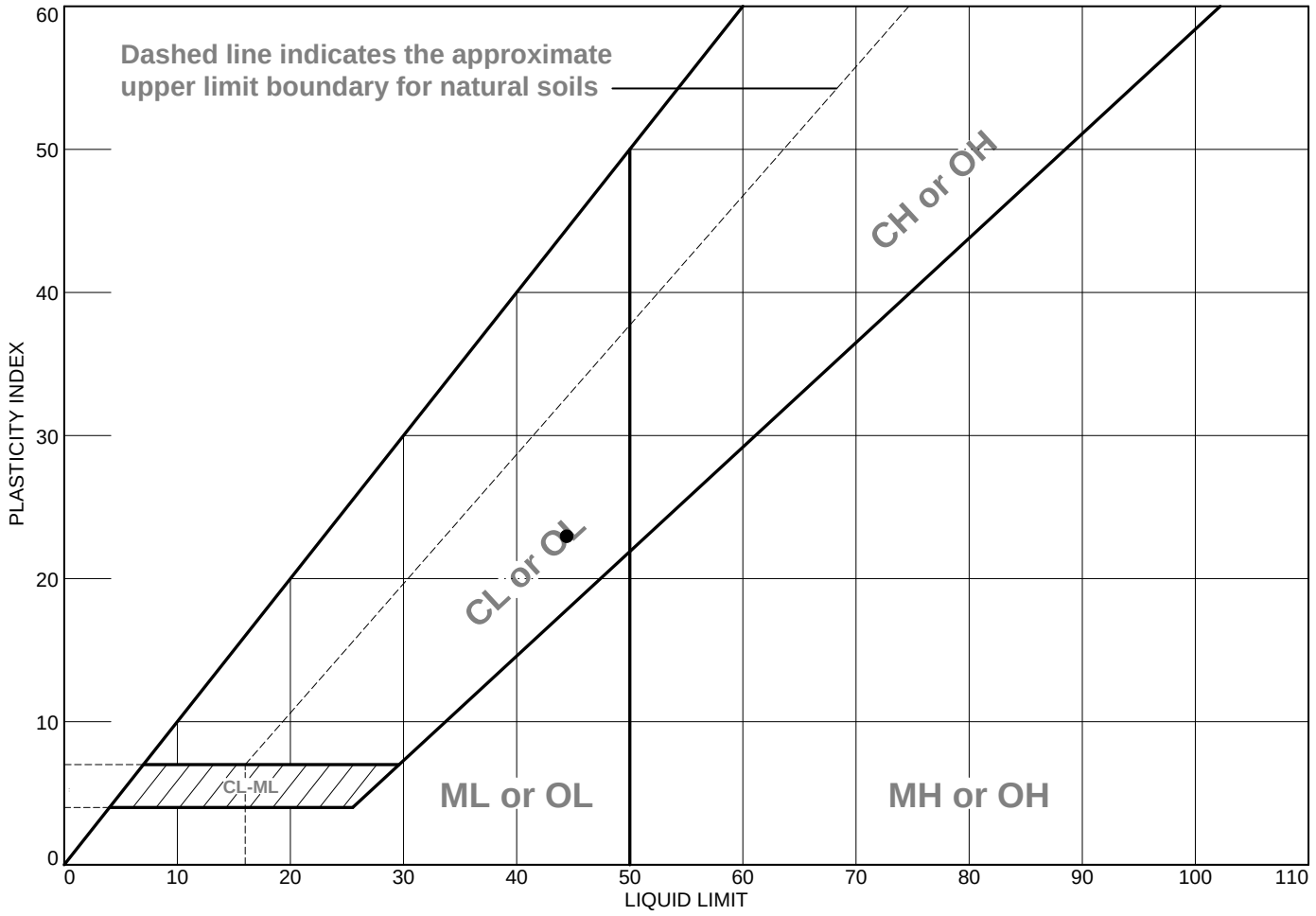
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	9.0	19.0	28.0	7.1	9.2	17.2	33.5	29.7	8.8	38.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0024	0.0051	0.0107	0.0434	0.0885	0.2439	0.8290	8.0789	12.3165	16.7743	41.2523

Fineness Modulus	C_u	C_c
2.78	345.54	0.95

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●		June 20, 2022	July 5, 2022	J.H-J	44.5	21.6	22.9		

Project No. CCO22-5139 **Client:** Township of North Glengarry

Project: North Glengarry LCB Road

○**Location:** BH-1 1.0m Rt **Depth:** 1.15-1.60m **Sample Number:** AS-47

McINTOSH PERRY

Checked by: J.Hopwood-Jones

Title: Lab Manager

Figure

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

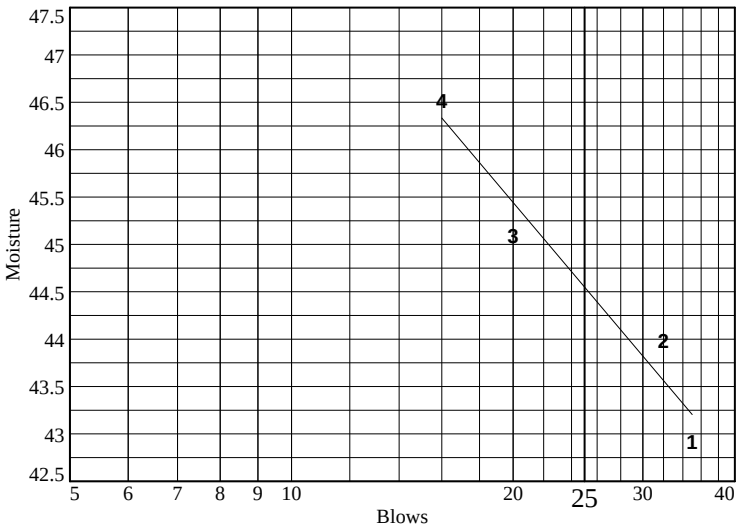
LIQUID AND PLASTIC LIMIT TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.0m Rt
Depth: 1.15-1.60m **Sample Number:** AS-47
Sample Date: June 20,2022
Tested by: J.H-J **Test Date:** July 5,2022 **Checked by:** J.Hopwood-Jones **Title:** Lab Manager

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.59	27.13	27.71	26.63		
Dry+Tare	24.71	25.08	25.50	24.62		
Tare	20.33	20.42	20.60	20.30		
# Blows	35	32	20	16		
Moisture	42.9	44.0	45.1	46.5		



Liquid Limit= 44.5
Plastic Limit= 21.6
Plasticity Index= 22.9
Natural Moisture= 24.5
Liquidity Index= 0.1

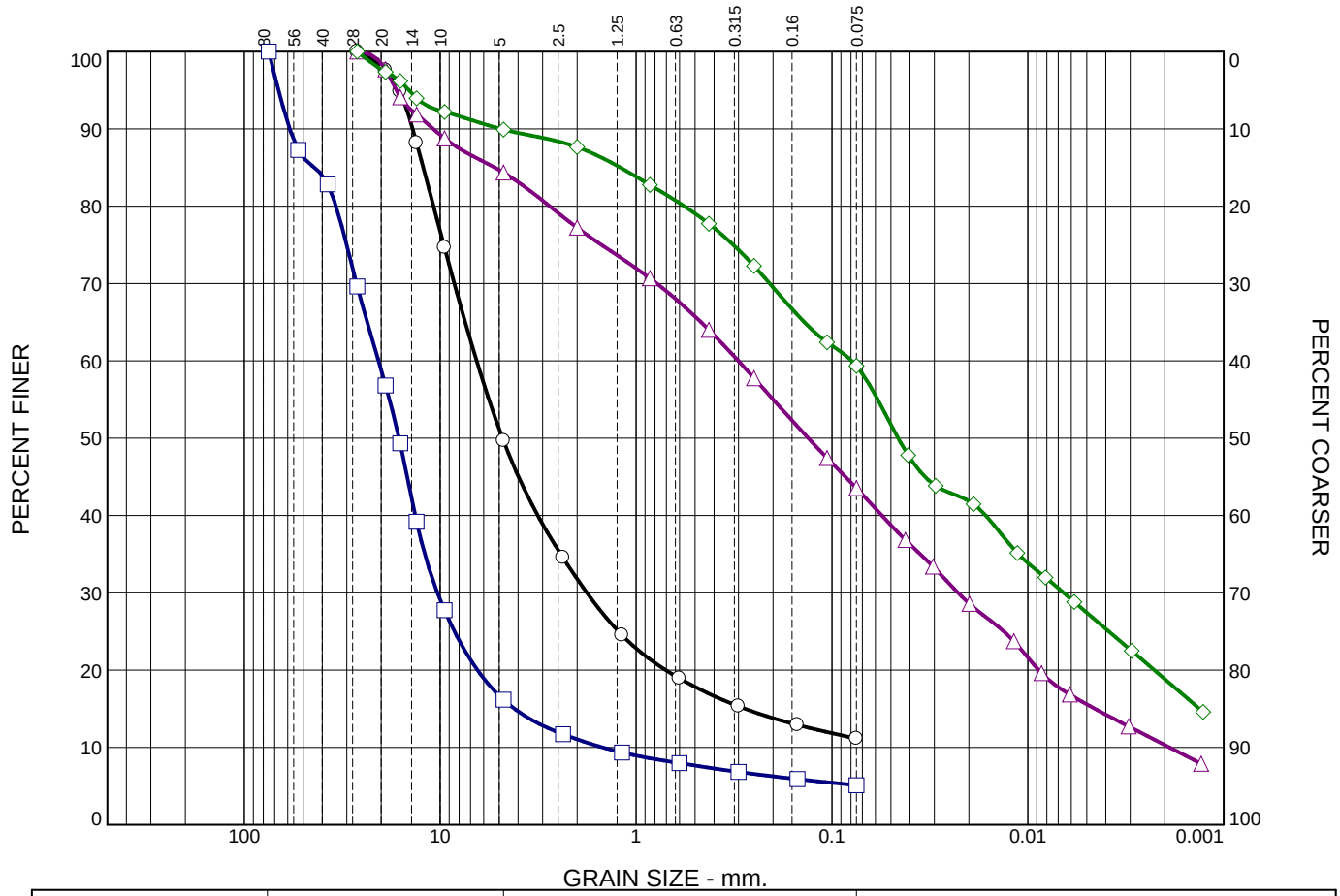
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	23.87	23.32			
Dry+Tare	23.25	22.86			
Tare	20.39	20.72			
Moisture	21.7	21.5			

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
728.67	616.30	157.14	24.5

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	2.4	47.9	17.9	14.9	5.8	11.1	
□	0.0	43.1	40.7	5.2	3.6	2.3	5.1	
△	0.0	2.3	13.3	7.2	13.2	20.5	33.2	10.3
◇	0.0	2.6	7.5	2.2	10.0	18.4	40.5	18.8

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Conc 8	AS-48	0.02-0.28m	Sand and Gravel some Silt/Clay	
□	Conc 8	AS-49	0.28-0.59m	Gravel some Sand trace Silt/Clay	
△	Conc 8	AS-51	1.35-1.70m	Silty Sand some Gravel some Clay	
◇	Conc 8	AS-52	1.20-1.70m	Sandy Silt some Clay some Gravel	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-7 1.3m Rt
Depth: 0.02-0.28m **Sample Number:** AS-48
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1297.79	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	31.47	97.6	2.4
			16.0mm	66.88	94.8	5.2
			13.2mm	153.53	88.2	11.8
			9.5mm	329.13	74.6	25.4
			4.75mm	653.15	49.7	50.3
			2.36mm	849.63	34.5	65.5
			1.18mm	979.63	24.5	75.5
			0.600mm	1052.23	18.9	81.1
			0.300mm	1099.14	15.3	84.7
			0.150mm	1130.33	12.9	87.1
			0.075mm	1153.31	11.1	88.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.4	47.9	50.3	17.9	14.9	5.8	38.6			11.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.2785	0.7067	1.7832	3.1767	4.8042	6.5179	10.8164	12.2088	13.8236	16.1004

Fineness Modulus
4.72

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-7 1.3m Rt
Depth: 0.28-0.59m **Sample Number:** AS-49
Material Description: Gravel some Sand trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1828.09	0.00	0.00	75.0mm	0.00	100.0	0.0
			53.0mm	232.69	87.3	12.7
			37.5mm	314.01	82.8	17.2
			26.5mm	555.39	69.6	30.4
			19.0mm	789.50	56.8	43.2
			16.0mm	926.37	49.3	50.7
			13.2mm	1111.88	39.2	60.8
			9.5mm	1320.95	27.7	72.3
			4.75mm	1532.58	16.2	83.8
			2.36mm	1614.10	11.7	88.3
			1.18mm	1657.44	9.3	90.7
			0.600mm	1682.60	8.0	92.0
			0.300mm	1703.38	6.8	93.2
			0.150mm	1720.34	5.9	94.1
			0.075mm	1734.80	5.1	94.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	43.1	40.7	83.8	5.2	3.6	2.3	11.1			5.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	1.4865	4.1777	6.4587	10.3329	13.4206	16.2200	20.6525	34.0471	43.8197	58.6874	66.9417

Fineness Modulus	C_u	C_c
6.74	13.89	3.48

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-5 1.1m Rt
Depth: 1.35-1.70m **Sample Number:** AS-51
Material Description: Silty Sand some Gravel some Clay
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
562.58	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	12.94	97.7	2.3
			16.0mm	33.25	94.1	5.9
			13.2mm	45.79	91.9	8.1
			9.5mm	63.20	88.8	11.2
			4.75mm	88.04	84.4	15.6
			2.00mm	128.16	77.2	22.8
54.54	0.00	0.00	0.850mm	4.62	70.7	29.3
			0.425mm	9.34	64.0	36.0
			0.250mm	13.75	57.8	42.2
			0.106mm	21.04	47.4	52.6
			0.075mm	23.80	43.5	56.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 77.2
Weight of hydrometer sample =54.54
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	33.5	26.7	0.0130	32.5	10.6	0.0422	36.8	63.2
2.00	21.2	31.0	24.2	0.0130	30.0	11.1	0.0305	33.4	66.6
5.00	21.2	27.5	20.7	0.0130	26.5	11.7	0.0198	28.6	71.4
15.00	21.2	24.0	17.2	0.0130	23.0	12.4	0.0118	23.7	76.3
30.00	21.2	21.0	14.2	0.0130	20.0	13.0	0.0085	19.6	80.4
60.00	21.2	19.0	12.2	0.0130	18.0	13.3	0.0061	16.8	83.2
250.00	21.2	16.0	9.2	0.0130	15.0	13.9	0.0031	12.7	87.3
1440.00	21.2	12.5	5.7	0.0130	11.5	14.6	0.0013	7.9	92.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.3	13.3	15.6	7.2	13.2	20.5	40.9	33.2	10.3	43.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0019	0.0046	0.0088	0.0227	0.0556	0.1322	0.3009	2.7625	5.2687	10.8604	16.7487

Fineness Modulus	C_u	C_c
1.98	158.88	0.91

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-3 1.1m Rt
Depth: 1.20-1.70m **Sample Number:** AS-52
Material Description: Sandy Silt some Clay some Gravel
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
506.03	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	13.42	97.3	2.7
			16.0mm	19.30	96.2	3.8
			13.2mm	30.61	94.0	6.0
			9.5mm	39.48	92.2	7.8
			4.75mm	51.10	89.9	10.1
			2.00mm	62.48	87.7	12.3
53.96	0.00	0.00	0.850mm	3.02	82.7	17.3
			0.425mm	6.11	77.7	22.3
			0.250mm	9.47	72.3	27.7
			0.106mm	15.55	62.4	37.6
			0.075mm	17.43	59.3	40.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 87.7
Weight of hydrometer sample =53.96
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	37.0	30.2	0.0130	36.0	9.9	0.0408	47.8	52.2
2.00	21.2	34.5	27.7	0.0130	33.5	10.4	0.0295	43.8	56.2
5.00	21.2	33.0	26.2	0.0130	32.0	10.7	0.0189	41.5	58.5
15.00	21.2	29.0	22.2	0.0130	28.0	11.4	0.0113	35.1	64.9
30.00	21.2	27.0	20.2	0.0130	26.0	11.8	0.0081	32.0	68.0
61.00	21.2	25.0	18.2	0.0130	24.0	12.2	0.0058	28.8	71.2
250.00	21.2	21.0	14.2	0.0130	20.0	13.0	0.0030	22.5	77.5
1440.00	21.2	16.0	9.2	0.0130	15.0	13.9	0.0013	14.6	85.4

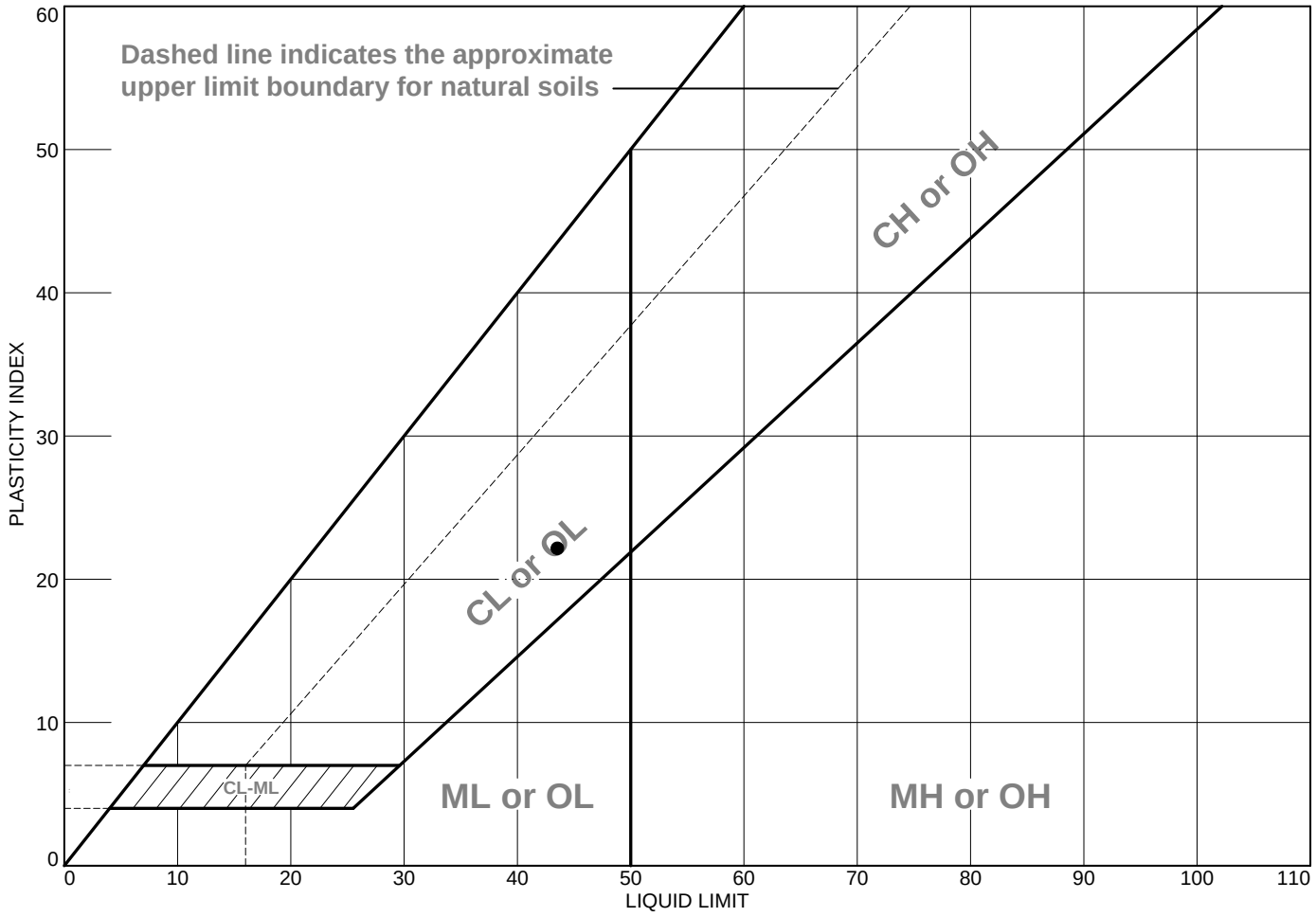
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.6	7.5	10.1	2.2	10.0	18.4	30.6	40.5	18.8	59.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0013	0.0023	0.0066	0.0164	0.0459	0.0793	0.5671	1.2039	4.9172	14.4291

Fineness Modulus
1.27

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●		June 20, 2022	July 5, 2022	J.H-J	43.6	21.5	22.1		

Project No. CCO22-5139 **Client:** Township of North Glengarry

Project: North Glengarry LCB Road

○**Location:** BH-6 1.0m Lt **Depth:** 1.30-1.70m **Sample Number:** AS-53

McINTOSH PERRY

Checked by: J.Hopwood-Jones

Title: Lab Manager

Figure

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

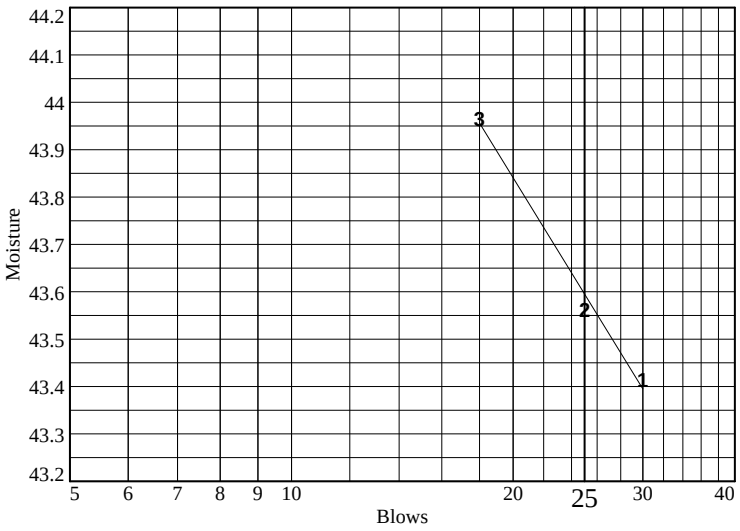
LIQUID AND PLASTIC LIMIT TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-6 1.0m Lt
Depth: 1.30-1.70m **Sample Number:** AS-53
Sample Date: June 20,2022
Tested by: J.H-J **Test Date:** July 5,2022 **Checked by:** J.Hopwood-Jones **Title:** Lab Manager

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.22	26.08	27.55			
Dry+Tare	24.44	24.32	25.40			
Tare	20.34	20.28	20.51			
# Blows	30	25	18			
Moisture	43.4	43.6	44.0			



Liquid Limit= 43.6
Plastic Limit= 21.5
Plasticity Index= 22.1
Natural Moisture= 29.8
Liquidity Index= 0.4

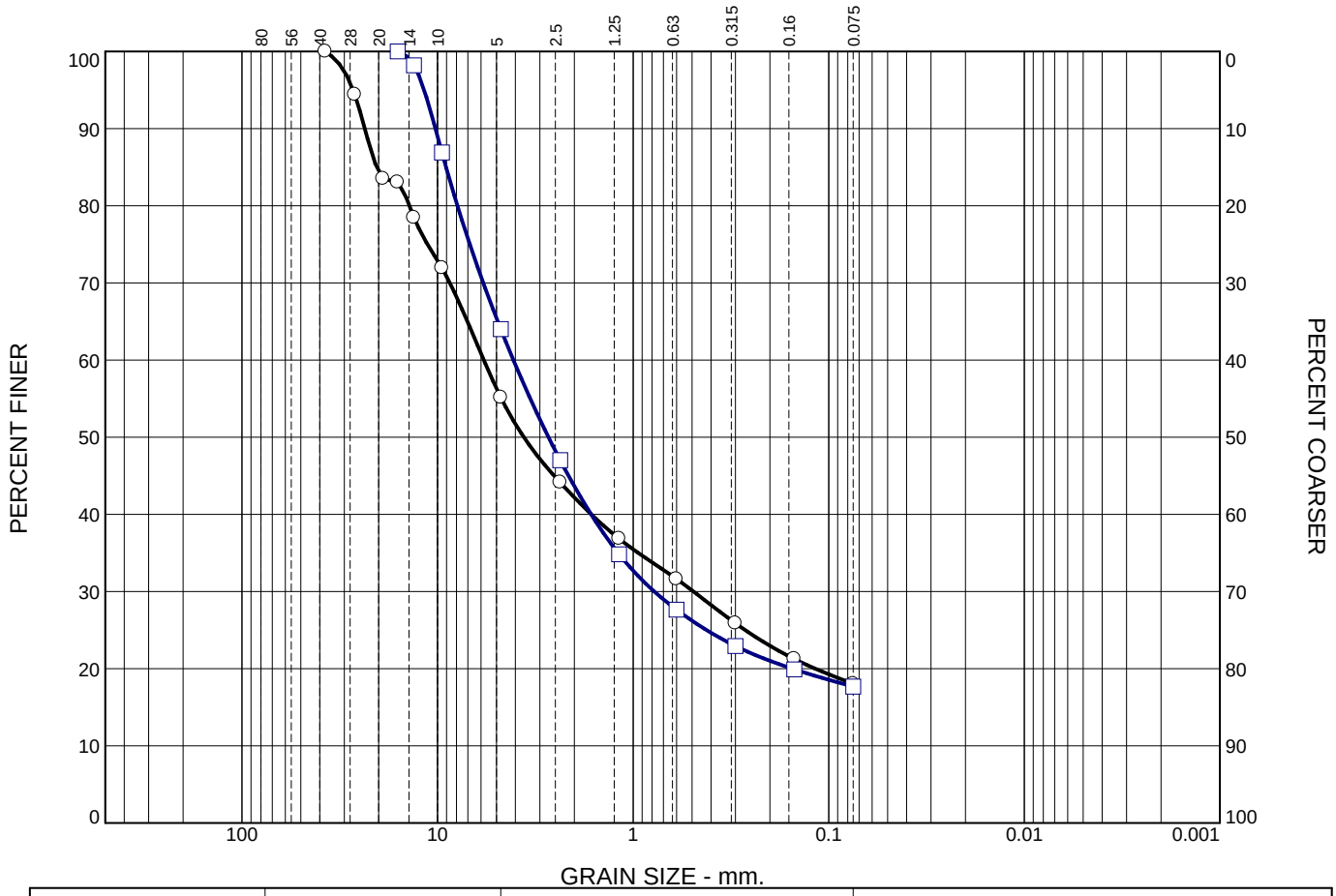
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	23.69	23.60			
Dry+Tare	23.13	23.03			
Tare	20.57	20.33			
Moisture	21.9	21.1			

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
685.66	559.57	136.44	29.8

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	16.5	28.3	13.0	13.4	10.8	18.0	
□	0.0	0.0	36.0	20.3	18.6	7.4	17.7	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Conc 16	AS-54	0.20-0.43m	Sand and Gravel some Silt/Clay	
□	Conc 16	AS-55	0.02-0.24m	Sand and fine Gravel some Silt/Clay	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Checked By: J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-3 1.2m Lt
Depth: 0.20-0.43m **Sample Number:** AS-54
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1446.63	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	81.11	94.4	5.6
			19.0mm	238.73	83.5	16.5
			16.0mm	245.34	83.0	17.0
			13.2mm	311.53	78.5	21.5
			9.5mm	406.18	71.9	28.1
			4.75mm	648.72	55.2	44.8
			2.36mm	808.15	44.1	55.9
			1.18mm	913.78	36.8	63.2
			0.600mm	989.33	31.6	68.4
			0.300mm	1072.32	25.9	74.1
			0.150mm	1139.24	21.2	78.8
			0.075mm	1185.80	18.0	82.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	16.5	28.3	44.8	13.0	13.4	10.8	37.2			18.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1173	0.4921	1.6373	3.6242	5.8030	13.9378	20.5054	23.5757	27.0256

Fineness Modulus
4.30

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 1.0m Lt
Depth: 0.02-0.24m **Sample Number:** AS-55
Material Description: Sand and fine Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1445.01	0.00	0.00	16.0mm	0.00	100.0	0.0
			13.2mm	26.05	98.2	1.8
			9.5mm	189.33	86.9	13.1
			4.75mm	520.11	64.0	36.0
			2.36mm	765.64	47.0	53.0
			1.18mm	941.86	34.8	65.2
			0.600mm	1045.65	27.6	72.4
			0.300mm	1113.62	22.9	77.1
			0.150mm	1157.41	19.9	80.1
			0.075mm	1189.70	17.7	82.3

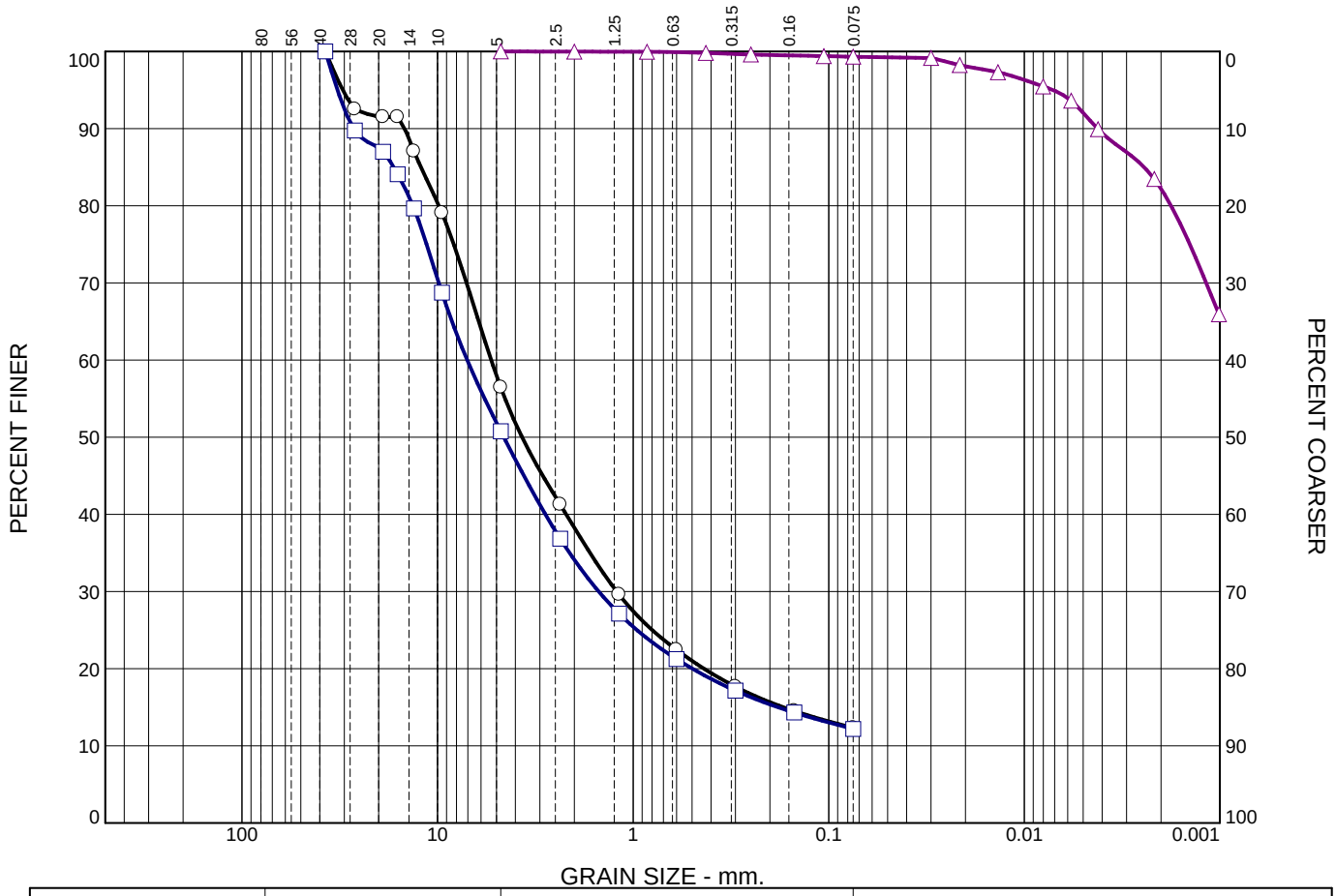
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	36.0	36.0	20.3	18.6	7.4	46.3			17.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.1541	0.7806	1.6411	2.7092	4.0947	7.9156	9.0528	10.2588	11.7181

Fineness Modulus
3.97

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	8.5	35.0	18.2	18.5	7.5	12.3	
□	0.0	13.0	36.2	16.7	15.1	6.8	12.2	
△	0.0	0.0	0.0	0.0	0.2	0.5	17.1	82.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	Power Dam	AS-57	0.03-0.27m	Sand and Gravel some Silt/Clay	
□	Power Dam	AS-58	0.27-0.78m	Sand and Gravel some Silt/Clay	
△	Power Dam	AS-60	0.96-1.70m	Clay some Silt	CH

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2
Depth: 0.03-0.27m **Sample Number:** AS-57
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1438.01	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	107.80	92.5	7.5
			19.0mm	122.25	91.5	8.5
			16.0mm	122.25	91.5	8.5
			13.2mm	186.13	87.1	12.9
			9.5mm	301.02	79.1	20.9
			4.75mm	626.24	56.5	43.5
			2.36mm	844.60	41.3	58.7
			1.18mm	1012.58	29.6	70.4
			0.600mm	1115.35	22.4	77.6
			0.300mm	1184.09	17.7	82.3
			0.150mm	1229.45	14.5	85.5
			0.075mm	1260.94	12.3	87.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.5	35.0	43.5	18.2	18.5	7.5	44.2			12.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1710	0.4352	1.2151	2.2002	3.7003	5.3192	9.8492	12.1709	14.7381	30.5562

Fineness Modulus
4.47

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2
Depth: 0.27-0.78m **Sample Number:** AS-58
Material Description: Sand and Gravel some Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1444.50	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	148.11	89.7	10.3
			19.0mm	187.86	87.0	13.0
			16.0mm	229.92	84.1	15.9
			13.2mm	293.95	79.7	20.3
			9.5mm	451.62	68.7	31.3
			4.75mm	711.23	50.8	49.2
			2.36mm	912.37	36.8	63.2
			1.18mm	1052.69	27.1	72.9
			0.600mm	1137.67	21.2	78.8
			0.300mm	1196.77	17.1	82.9
			0.150mm	1237.82	14.3	85.7
			0.075mm	1268.58	12.2	87.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	13.0	36.2	49.2	16.7	15.1	6.8	38.6			12.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.1819	0.4983	1.5004	2.8109	4.5856	7.0582	13.3705	16.7621	26.8969	32.5179

Fineness Modulus
4.77

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2
Depth: 0.96-1.70m **Sample Number:** AS-60
Material Description: Clay some Silt
USCS: CH
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
582.24	0.00	0.00	4.75mm	0.00	100.0	0.0
			2.00mm	0.15	100.0	0.0
52.73	0.00	0.00	.850mm	0.01	100.0	0.0
			0.425mm	0.09	99.8	0.2
			0.250mm	0.20	99.6	0.4
			0.106mm	0.31	99.4	0.6
			0.075mm	0.35	99.3	0.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =52.73
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	61.0	53.7	0.0130	60.0	5.4	0.0300	99.1	0.9
2.00	21.2	60.5	53.2	0.0130	59.5	5.4	0.0214	98.2	1.8
5.00	21.2	60.0	52.7	0.0130	59.0	5.5	0.0136	97.3	2.7
15.00	21.2	59.0	51.7	0.0130	58.0	5.7	0.0080	95.5	4.5
30.00	21.2	58.0	50.7	0.0130	57.0	5.9	0.0058	93.6	6.4
60.00	21.2	56.0	48.7	0.0130	55.0	6.3	0.0042	89.9	10.1
250.00	21.2	52.5	45.2	0.0130	51.5	7.0	0.0022	83.5	16.5
1440.00	21.2	43.0	35.7	0.0130	42.0	8.8	0.0010	65.9	34.1

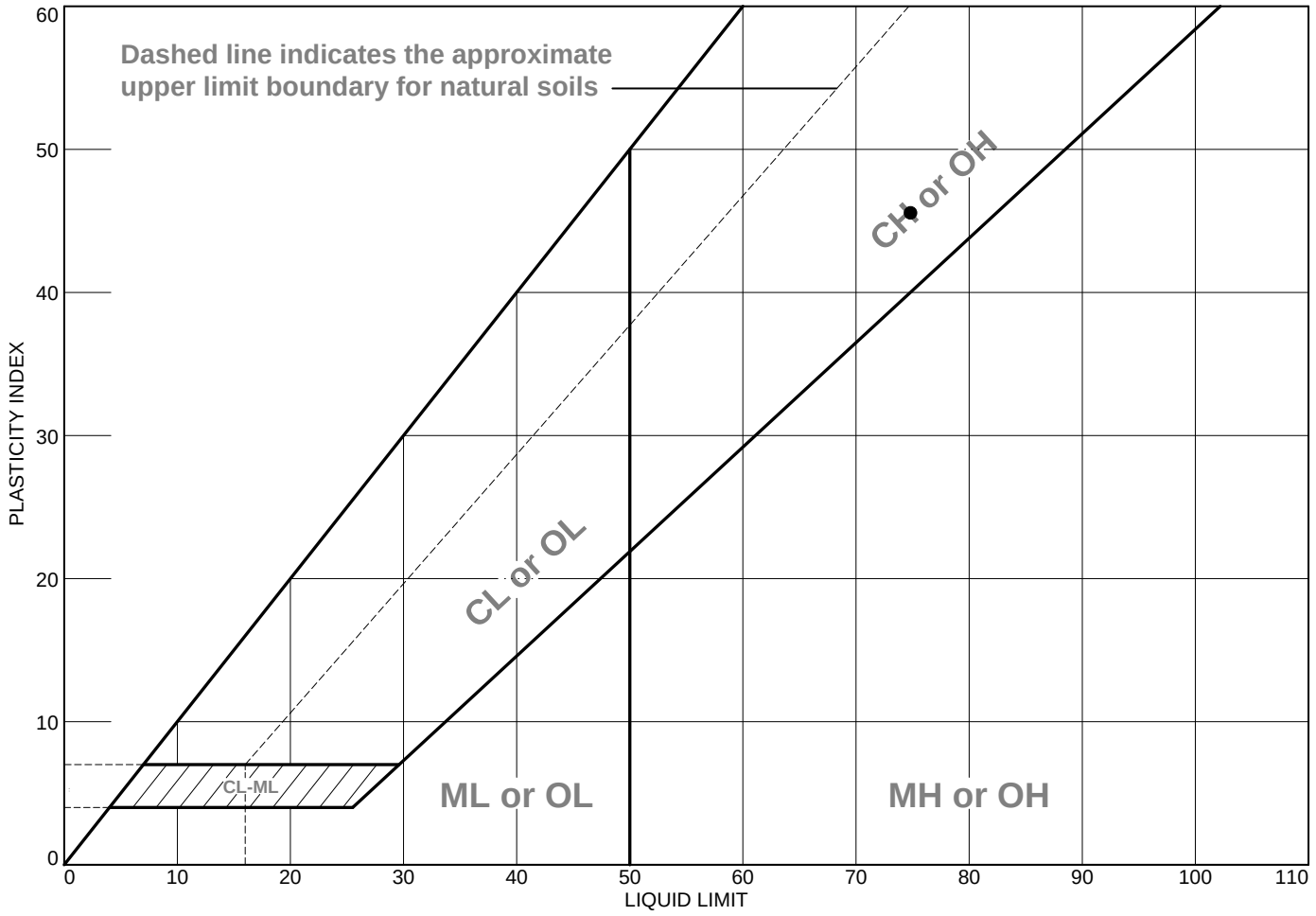
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7	17.1	82.2	99.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.0018	0.0024	0.0042	0.0071

Fineness Modulus
0.01

LIQUID AND PLASTIC LIMITS TEST REPORT



	Material Description	Sampled	Tested	Technician	LL	PL	PI	%<#40	USCS
●	Clay some Silt	June 14, 2022	July 12, 2022	JH-J	74.9	29.4	45.5	99.8	CH

Project No. CCO22-5139 **Client:** Township of North Glengarry

Project: North Glengarry LCB Road

○**Location:** BH-2 **Depth:** 0.96-1.70m **Sample Number:** AS-60

McINTOSH PERRY

Checked by: J.Hopwood-Jones

Title: Lab Manager

Figure

Tested By: JH-J **Checked By:** J.Hopwood-Jones

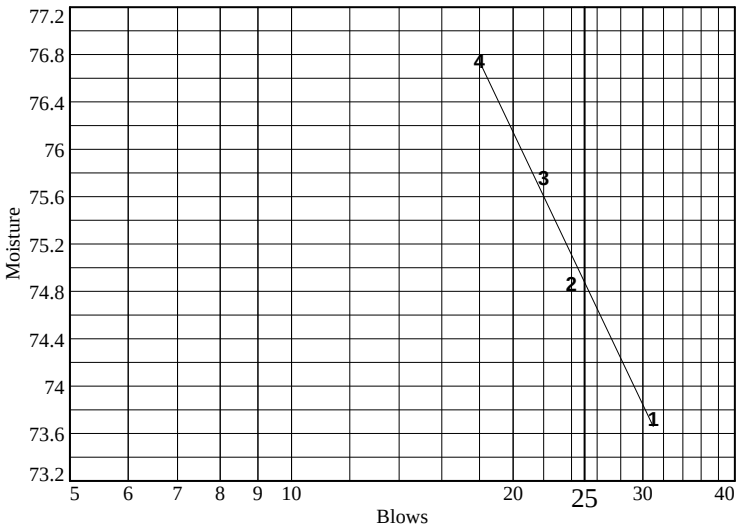
LIQUID AND PLASTIC LIMIT TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-2
Depth: 0.96-1.70m
Sample Number: AS-60
Material Description: Clay some Silt
Sample Date: June 14,2022
%<#40: 99.8
USCS: CH
AASHTO: A-7-6(54)
Tested by: JH-J
Test Date: July 12,2022
Checked by: J.Hopwood-Jones
Title: Lab Manager

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	26.80	26.96	26.13	26.60		
Dry+Tare	24.05	24.16	23.66	23.86		
Tare	20.32	20.42	20.40	20.29		
# Blows	31	24	22	18		
Moisture	73.7	74.9	75.8	76.8		



Liquid Limit= 74.9
Plastic Limit= 29.4
Plasticity Index= 45.5
Natural Moisture= 37.6
Liquidity Index= 0.2

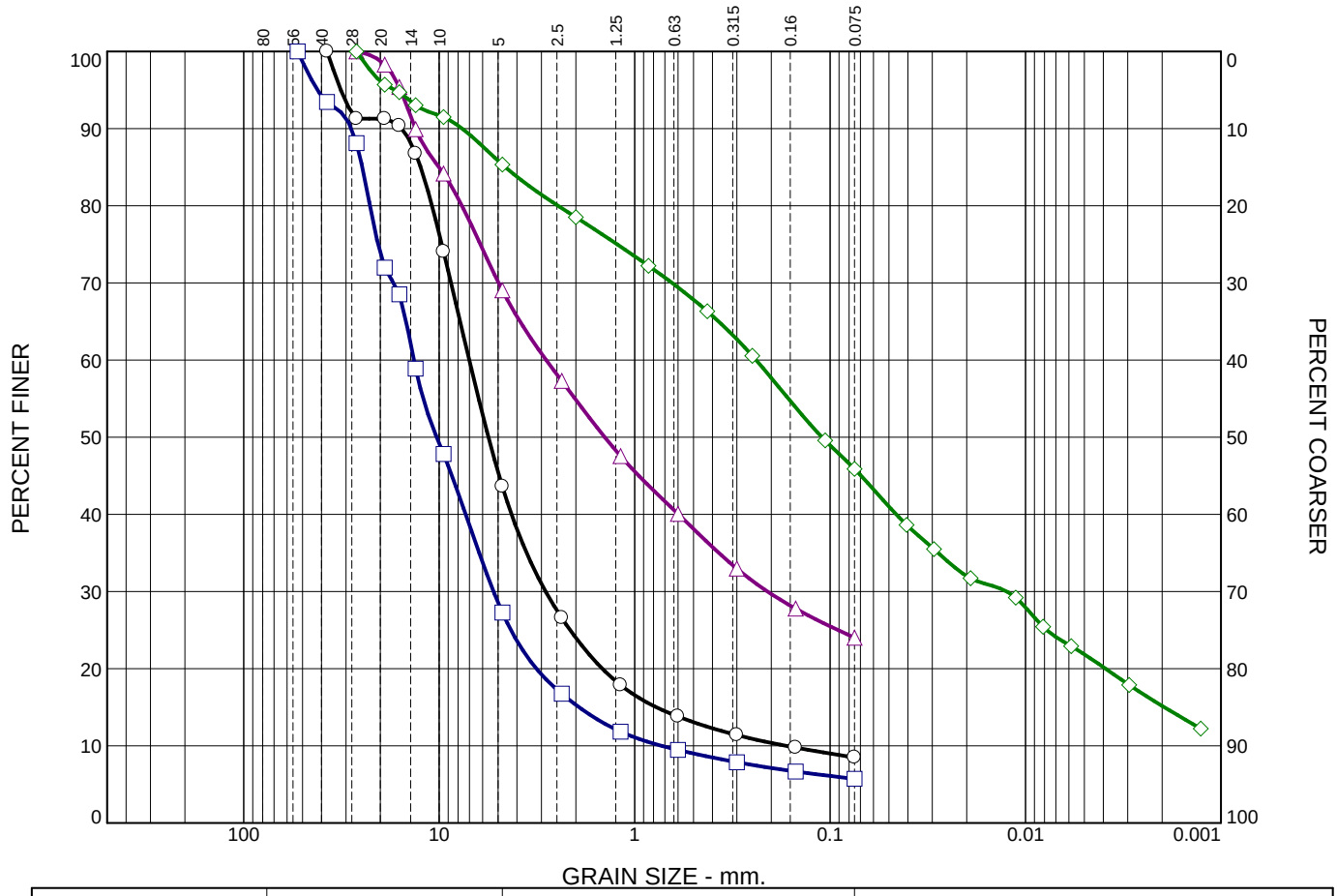
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.52	23.04			
Dry+Tare	22.04	22.55			
Tare	20.44	20.85			
Moisture	30.0	28.8			

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
985.73	766.81	184.57	37.6

Particle Size Distribution Report



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	8.7	47.7	19.6	11.5	4.0	8.5	
□	0.0	28.0	44.7	12.0	6.7	2.9	5.7	
△	0.0	1.7	29.3	14.1	18.5	12.4	24.0	
◇	0.0	4.3	10.4	6.8	12.2	20.4	30.7	15.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (m.)	Material Description	USCS
○	River	AS-61	0.04-0.28m	Sand and Gravel trace Silt/Clay	
□	River	AS-62	0.28-0.41m	Sandy Gravel trace Silt/Clay	
△	River	AS-63	0.41-0.87m	Gravelly Silty/Clayey Sand	
◇	River	AS-65	1.40-1.70m	Silty Sand some Clay some Gravel	

McINTOSH PERRY

Client: Township of North Glengarry

Project: North Glengarry LCB Road

Project No.: CCO22-5139 **Figure**

Tested By: J.H-J **Checked By:** J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.2m Rt
Depth: 0.04-0.28m **Sample Number:** AS-61
Material Description: Sand and Gravel trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1258.87	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	109.87	91.3	8.7
			19.0mm	109.87	91.3	8.7
			16.0mm	121.25	90.4	9.6
			13.2mm	166.76	86.8	13.2
			9.5mm	326.65	74.1	25.9
			4.75mm	709.91	43.6	56.4
			2.36mm	924.33	26.6	73.4
			1.18mm	1034.02	17.9	82.1
			0.600mm	1085.25	13.8	86.2
			0.300mm	1115.54	11.4	88.6
			0.150mm	1136.05	9.8	90.2
			0.075mm	1152.06	8.5	91.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	8.7	47.7	56.4	19.6	11.5	4.0	35.1			8.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.1690	0.7759	1.4650	2.8553	4.2651	5.5991	7.0195	10.8841	12.4492	15.5244	31.8849

Fineness Modulus	C_u	C_c
5.12	41.54	6.87

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.2m Rt
Depth: 0.28-0.41m
Sample Number: AS-62
Material Description: Sandy Gravel trace Silt/Clay
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1550.03	0.00	0.00	53.0mm	0.00	100.0	0.0
			37.5mm	101.61	93.4	6.6
			26.5mm	184.30	88.1	11.9
			19.0mm	434.44	72.0	28.0
			16.0mm	488.06	68.5	31.5
			13.2mm	637.28	58.9	41.1
			9.5mm	808.84	47.8	52.2
			4.75mm	1127.37	27.3	72.7
			2.36mm	1290.44	16.7	83.3
			1.18mm	1366.68	11.8	88.2
			0.600mm	1403.34	9.5	90.5
			0.300mm	1428.11	7.9	92.1
			0.150mm	1446.80	6.7	93.3
			0.075mm	1461.45	5.7	94.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	28.0	44.7	72.7	12.0	6.7	2.9	21.6			5.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.7293	1.9270	3.1838	5.2734	7.3209	10.3024	13.4836	22.6131	24.7621	28.0920	41.9190

Fineness Modulus	C_u	C_c
6.07	18.49	2.83

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.2m Rt
Depth: 0.41-0.87m **Sample Number:** AS-63
Material Description: Gravelly Silty/Clayey Sand
Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
1067.64	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	18.35	98.3	1.7
			16.0mm	49.21	95.4	4.6
			13.2mm	107.59	89.9	10.1
			9.5mm	169.01	84.2	15.8
			4.75mm	330.66	69.0	31.0
			2.36mm	456.02	57.3	42.7
			1.18mm	560.07	47.5	52.5
			0.600mm	640.06	40.0	60.0
			0.300mm	715.79	33.0	67.0
			0.150mm	771.16	27.8	72.2
			0.075mm	811.36	24.0	76.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.7	29.3	31.0	14.1	18.5	12.4	45.0			24.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.2091	0.5972	1.4232	2.8358	7.6510	10.0265	13.2393	15.7546

Fineness Modulus
3.43

GRAIN SIZE DISTRIBUTION TEST DATA

2022-07-14

Client: Township of North Glengarry
Project: North Glengarry LCB Road
Project Number: CCO22-5139
Location: BH-1 0.2m Rt
Depth: 1.40-1.70m **Sample Number:** AS-65
Material Description: Silty Sand some Clay some Gravel
Tested by: J.H-J **Checked by:** J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
500.09	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	21.57	95.7	4.3
			16.0mm	26.44	94.7	5.3
			13.2mm	34.88	93.0	7.0
			9.5mm	42.55	91.5	8.5
			4.75mm	73.34	85.3	14.7
			2.00mm	107.46	78.5	21.5
60.78	0.00	0.00	0.850mm	4.88	72.2	27.8
			0.425mm	9.44	66.3	33.7
			0.250mm	13.91	60.5	39.5
			0.106mm	22.40	49.6	50.4
			0.075mm	25.26	45.9	54.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 78.5
Weight of hydrometer sample =60.78
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -7.0
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.7507 **-** 0.190 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	21.2	37.5	30.7	0.0130	36.5	9.8	0.0406	38.6	61.4
2.00	21.2	35.0	28.2	0.0130	34.0	10.3	0.0294	35.5	64.5
5.00	21.2	32.0	25.2	0.0130	31.0	10.9	0.0191	31.7	68.3
15.00	21.2	30.0	23.2	0.0130	29.0	11.2	0.0112	29.2	70.8
30.00	21.2	27.0	20.2	0.0130	26.0	11.8	0.0081	25.4	74.6
60.00	21.2	25.0	18.2	0.0130	24.0	12.2	0.0058	22.9	77.1
250.00	21.2	21.0	14.2	0.0130	20.0	13.0	0.0030	17.9	82.1
1440.00	21.2	16.5	9.7	0.0130	15.5	13.8	0.0013	12.2	87.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	4.3	10.4	14.7	6.8	12.2	20.4	39.4	30.7	15.2	45.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0020	0.0039	0.0125	0.0459	0.1100	0.2393	2.4683	4.5879	7.6278	16.7818

Fineness Modulus
1.87

McINTOSH PERRY

Moisture, Ash, & Organic Matter of Peat & Other Organic Soils (ASTM D2974)

Test Method Utilized ☑ ASTM D2974-14	
Project No.: CCO-22-5139-01	Date Received: June 20,2022
Project Name/Location: North Glengarry - Marcoux Road	Date Tested: June 23,2022
Location: Marcoux Road BH-7 AS-16	Lab Sample No.: OL-22051
Depth: 0.70-1.20m	

Moisture Content

Mass of Tare (g)	154.04
Mass of Tare & Wet Sample (g)	767.65
Mass of Tare & Dry Sample (g)	519.37
Mass of Water (g)	248.28
Mass of Dry Soil (g)	365.33
Moisture Content (%)	**68.0**

Determination of Ash & Organic Matter

Mass of Oven dried Sample (g)	157.83
Mass of Sample (**Ash**) After Ignition (g)	127.76
Mass of Loss (g)	30.07
Oven Temperature (^{o}C)	480
Ash Content (%)	**80.9**
Organic Matter (%)	**19.1**

Non-Comformance's from Test Procedure: N/A

Comments:

Checked by: J.H-J	Signature:

THE CORPORATION OF THE TOWNSHIP OF NORTH GLENGARRY

BY-LAW 04 - 2023
FOR THE YEAR 2023

BEING A BY-LAW TO ADOPT, CONFIRM AND RATIFY MATTERS DEALT WITH BY RESOLUTION.

WHEREAS s. 5(3) of the *Municipal Act, 2001*, provides that the powers of municipal corporation are to be exercised by its Council by by-law; and

WHEREAS it is deemed expedient that the proceedings, decisions and votes of the Council of the Corporation of the Township of North Glengarry at this meeting be confirmed and adopted by by-law;

THEREFORE, the Council of the Corporation of the Township of North Glengarry enacts as follows:

1. **THAT** the action of the Council at its regular meeting of January 9, 2023 in respect to each motion passed and taken by the Council at its meetings, is hereby adopted, ratified and confirmed, as if each resolution or other action was adopted, ratified and confirmed by its separate by-law and;

2. **THAT** the Mayor and the proper officers of the Township of North Glengarry are hereby authorized and directed to do all things necessary to give effect to the said action, or to obtain approvals where required, and except where otherwise provided, The Mayor and the Clerk are hereby directed to execute all documents necessary in that behalf and to affix the corporate seal of the Township to all such documents.

3. **THAT** if due to the inclusion of a particular resolution or resolutions this By-law would be deemed invalid by a court of competent jurisdiction then Section 1 to this By-law shall be deemed to apply to all motions passed except those that would make this By-law invalid.

4. **THAT** where a “Confirming By-law” conflicts with other by-laws the other by-laws shall take precedence. Where a “Confirming By-Law” conflicts with another “Confirming By-law” the most recent by-law shall take precedence.

READ a first, second and third time, passed, signed and sealed in Open Council this 9th day of January 2023.

CAO/Clerk / Deputy Clerk **Mayor / Deputy Mayor**

I, hereby certify that the forgoing is a true copy of By-Law No. 04-2023, duly adopted by the Council of the Township of North Glengarry on the 9th day of January 2023.

Date Certified **CAO/Clerk / Deputy Clerk**