GREER GALLOWAY
CONSULTING ENGINEERS

TOWNSHIP OF ELIZABETHTOWN-KITLEY
2022 COMPREHENSIVE ROAD NEEDS STUDY

Project: 22-5-5290
October 2022

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Table of Contents

1. Background

The Greer Galloway Group Inc. was retained by the Township of Elizabethtown-Kitley to complete a Roads Needs Study for the municipal road system. This study was completed in order to provide the Township with a current evaluation of municipal road assets and allow municipal staff to develop short and long-term capital and maintenance programs.

All of the Township's roads were reviewed and have been included in this report. The study will assist the Township of Elizabethtown-Kitley in identifying the physical and financial needs of the Township with respect to the road network and recommend improvements for a 10-year horizon.

The municipal road system consists of approximately 366 kilometers of roads, built and maintained for the purposes of moving traffic, people, goods, and services throughout the Township of Elizabethtown-Kitley. Of these 366 kilometers of road; 133 kilometers are paved, 27 kilometers are surface-treated, and 206 kilometers are gravel.

2. Purpose

The primary objectives of this study are to:

- Provide an overview of the entire municipal road network and the individual sections that make up the system in a form that will allow the Township to objectively consider the needs of each section as identified in the assessment.
- Provide an assessment of the condition of the municipal road system through an established rating system and an evaluation of defined parameters for each of the sections of the road system.
- To determine the current value of road assets currently owned and maintained by the Township.
- Provide recommended rehabilitation and reconstruction strategies for all road sections based on available information, minimum maintenance standards, municipal guidelines and standards, and current industry standards and methodologies.
- Provide the Township with options related to the management of the road system and allow municipal staff to develop short (now), mid (1-5 years), and long (6-10 years) term capital and maintenance programs based on the needs of the road network and in the best interest of public health and safety; and,
- Provide cost estimates for the required rehabilitation or reconstruction of municipal assets based on appropriate benchmark costs.

3. Methodology

The municipal road network is broken down into sections of road that are relatively consistent throughout their length in terms of surface type, condition, speed limit, cross section, or a combination of the above mentioned. For example, a road section with a hot mix asphalt surface that changes from good condition to poor condition will be broken up into separate sections or if the speed limit changes for a section of the road, it would be broken up into separate sections.

Field data is obtained through visual examination of the following features:

- Section traffic volume estimates.

- Level of service.
- Maintenance demand.
- Surface condition.
- Posted speed limit.
- Right of way.
- Surface and shoulder width; and,
- Drainage

A field judgement was made recommending the type of improvement required for each section of road. As well, a table summarizing pertinent information associated with each road section (speed limit, length, condition rating, road material, road type, classification, etc.) has been provided separately to the Township.

Road sections are evaluated based on surface conditions only. The condition of underground infrastructure is not considered in the assessment. Each road section was evaluated and assigned a rating for the following factors:

- Structural Adequacy (maximum 20 points): describes the load supporting ability and resistance to deformation or rupture of the surface and base course. A high structural adequacy indicates that few signs of distress have been observed in the surface and base course.
- Surface Condition (maximum 10 points): describes the driving ease, comfort, and safety. A high surface condition rating indicates a driving surface free of inadequacies, such as uneven crowns, cracking, etc.
- Surface Width Rating (maximum 15 points): describes the width of the road in relation to the road class and type of road (urban, semi-urban, rural). A high surface width rating indicates that the road is of sufficient width for its type and class.
- Shoulder Condition (maximum 10 points): describes the overall condition and width of the shoulders. A high shoulder condition rating indicates a shoulder that is free of inadequacies, such as erosion, steep slopes, soft slopes, etc. and is of sufficient width for the class of road.
- Drainage Rating (maximum 15 points): describes the adequacy of the drainage in regard to the height of the grade line, the cross slope of the crown, shoulders and ditches, the slope of gutters and the frequency of outlets or catch basins, and the capacity of the cross culverts. A high drainage rating indicates that the road is well drained.
- Maintenance Demand (maximum 10 points): describes the maintenance effort required for the road section. A high maintenance demand rating indicates that the road requires a low demand for maintenance.
- Horizontal Alignment (maximum 10 points): describes the overall condition of the horizontal alignment of the road section, including drivability, presence and adequacy of advanced warning signs, and inadequate stopping sight distances. A high rating indicates there were no substandard horizontal alignments noted.
- Vertical Alignment (maximum 10 points): describes the overall condition of the vertical alignment of the road section, including blind areas or inadequate stopping sight distances. A high rating indicates there were no substandard vertical alignments noted.

Road sections are assessed and provided with a condition priority rating which helps in determining their recommended time of rehabilitation as “0 years”, “1-5 years”, or “6-10 years”. The road section priority ratings can be found in **Appendix A.**

“0 Years” Needs

These sections of road warrant immediate improvements due to a significant deficiency or particularly poor condition. Roads could be rated as “0 Years” needs due to a requirement for: full road base reconstruction, grade raise or re-grading, cross fall corrections, shoulder rehabilitation, drainage improvements, or resurfacing.

“1-5 Years” Needs

These sections of road are anticipated to need either reconstruction or resurfacing within the next 5 years based on the review of their current conditions. These sections are in poor condition or rapidly deteriorating condition and warrant improvements in the near future.

“6-10 Years” Needs

These sections of road are anticipated to need either reconstruction or resurfacing within the next 6 to 10 years based on the review of their current conditions. These road sections include durable (hot mix) roads in fair condition and shorter life surface treated road surfaces.

4. Road Structure and Maintenance

All road sections in the Township have a driving surface of either hot mix asphalt, surface treatment, or gravel. Each wearing surface has a different life expectancy, maintenance procedure, and associated costs.

Hot Mix Asphalt

Generally, the life expectancy for an asphalt surfaced road is 20 years. However, this will vary depending on the adequacy of the initial design, maintenance program, drainage, traffic volume, and traffic type.

Proper maintenance programs will maximize the life expectancy of an asphalt surface and should include the following components:

- Spot improvements to the asphalt surface.
- Spot improvements and maintenance of the roadside ditches
- Seal coats to extend the service life of existing surface treatment.
- Microsurfacing to correct minor rutting and cross section abnormalities.
- HMA overlays to extend the service life of asphalt with minor cracking or rutting.
- Crack sealing at the appropriate time.

Surface Treatment

Surface treatment is a cost-effective alternative to hot mix asphalt. A double surface treated road will have a life expectancy of 7 to 10 years if the initial design and application are adequate (surface treatment placed on a poor base, poorly drained area, or other inappropriate condition may have a life expectancy of 5 years or less).

Gravel Surface

Gravel roads, although cheaper to build, have many hidden costs associated with the maintenance of them. Proper maintenance of gravel roads includes the following components:

- Addition of appropriate amounts of gravel at the proper times.
- Drainage.
- Grading; and,
- Dust control.

5. Service Life and Road Maintenance

Every road is designed to last for a specific number of years based on current and future traffic demands. Pavement design includes granular base, subbase, and subgrade. Good pavement designs also consider the average annual daily traffic and percentage of heavy trucks using the road. Generally, it is accepted that properly constructed roadways, which include adequate base and subbase materials, will have a life span of approximately 40 years with intermittent surface rehabilitation. High class bitumen (HCB) or asphalt will provide a high riding quality for between 12 and 16 years before needing to be resurfaced. A road surface of Low-Class Bitumen (LCB) or surface treatment will provide a high riding quality for 6 to 10 years before needing to be resurfaced.

The performance of LCB and HCB pavement types depends greatly on the traffic loading to which the roads are subjected. Road deterioration, pavement deterioration in particular, begins at a relatively slow pace for a newly constructed road. Over time, as the road is subjected to vehicular loading, distresses begin to manifest in the road surface. Distress in the road surface accelerates the deterioration as surface water penetrates more readily into the road base and subbase. The process of deterioration can be greatly accelerated in areas where the road is subject to high traffic volumes or heavy vehicular traffic. In rural areas such as Elizabethtown-Kitley, the impacts of heavy agricultural traffic need to be considered.

5.1 Maintenance

Road maintenance begins immediately after a road is constructed and takes one of three forms: preventative, routine, or corrective.

General roadway maintenance considers road components within the right-of-way and includes activities such as shoulder grading, roadside mowing, and erosion control. Completion of these tasks improve the performance of the road surface. Ideally, these activities are completed proactively in order to prevent problems from occurring in the future.

Routine maintenance is generally considered a reactive process that includes inexpensive, localized work that can be completed by municipal forces. This would include such tasks as pothole repairs, drainage improvements, and shallow patching.

Preservation activities include work such as creak sealing, functional milling and resurfacing, and micro surfacing and are generally expected to service the road for five to ten years.

Rehabilitation strategies are required when additional preservation measures are no longer cost effective due to the road surface condition. These activities include resurfacing, cold in-place recycling, and full depth reconstruction.

6. Road System

The make-up of the municipal road system by surface type is shown in the following table:

	HCB (1)	LCB (2)	Gravel	Total
Length (km)	133.3	27.1	205.5	365.9
Length (%)	36.4	7.4	56.2	100

(1) HCB: High Class Bituminous (Hot Mix Asphalt)
(2) LCB: Low Class Bituminous (Double Surface Treatment)

Table 1: Road Network by Surface Type

The Municipality has a road system that is made up of urban, semi-urban and rural roadside environments as shown in the following table:

	Urban	Semi-Urban	Rural	Total
Length (km)	0.0	28.3	337.6	365.9
Length (%)	0.0	7.7	92.3	100

Table 2: Road Network by Roadside Environment

Urban Roads are areas where there is curb and gutter on both sides of the road served with sewers, or curb and gutter on one side served with storm sewers, or paved shoulders with sewers, or subdivisions.

Semi-Urban Roads are areas still within the urban areas but without curb and gutter, or sewer systems.

Rural Roads are areas with sparse development and no curb and gutter or sewer systems.

Using the “Municipal Act, 2001 – Ontario Regulation 239/02 – Minimum Maintenance Standards for Municipal Highways”, the roads were further categorized by Class as shown in Table 3 below.

	Class 2	Class 3	Class 4	Class 5	Class 6	Total
Length (km)	0.0	4.2	260.7	44.2	56.8	365.9
Length (%)	0.0	1.2	71.2	12.1	15.5	100

Table 3: Road Network by Class

The determination of the road class is based on the speed limit and average annual daily traffic (AADT) applicable to the section of road (as shown below in Table 4 from the Minimum Maintenance Standards for Municipal Highways). AADT measures used to calculate road class are generally as provided by the Township, with some counts being obtained through Greer Galloway field investigation. These counts have been identified in Section 7.

Average Annual Daily Traffic (number of motor vehicles)	Posted or Statutory Speed Limit (kilometres per hour)						
	91 - 100	81 - 90	71 - 80	61 - 70	51 - 60	41 - 50	1 - 40
15,000 or more	1	1	1	2	2	2	2
12,000 - 14,999	1	1	1	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	3	3
5,000 - 5,999	1	2	2	3	3	3	3
4,000 - 4,999	1	2	3	3	3	3	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	4	4
1,000 - 1,999	1	3	3	3	4	4	5
500 - 999	1	3	4	4	4	4	5
200 - 499	1	3	4	4	5	5	5
50 - 199	1	3	4	5	5	5	5
0 - 49	1	3	6	6	6	6	6

Table 4: Classification of Highways

7. Traffic Counting Study

As part of this assignment, it was requested that Greer Galloway complete updated traffic counts for a portion of the roads within the Township. It is understood that traffic volume data is imperative to classification of roads, determining the appropriate type of surface, and determining priority for rehabilitation. As traffic volume can change yearly due to increased population density, developments, and the appearance of new commercial enterprises, it is recommended that the Township develop a traffic counting program to monitor volumes on their roadways. Ideally, this program would involve collecting data on all roadways each year. It is recommended at a minimum that the major roadways be reviewed each year.

The traffic volumes collected by this study are summarized in Appendix B.

8. Costing

Many road rehabilitation, maintenance, and construction projects can be categorized to describe various types of improvements. These categories lend themselves to preliminary cost estimating in common units, such as kilometers, tonnes, meters, square meters, etc.

For this study, benchmark costing was developed as shown in the following table. The costing was generated from recent construction project pricing, municipal project costs, and the past experience of Greer Galloway. Costs are per kilometer of road based on the assumptions listed below.

Item	Surface Type	Cost
Complete Urban Reconstruction	Asphalt	$1,000,000/km
Complete Rural Reconstruction	Asphalt	$430,000/km
	Surface Treatment	$310,000/km

Resurfacing	Asphalt Overlay	$175,000/km
	Microsurfacing	$70,000/km
	Surface Treatment	$56,000/km
	Gravel	$25,200/km
Ditching	-	40,000/km

Table 5: Benchmark Costing Items

Unit Costs			
Item	**Base Unit**	**Cost**	**Cost/m**
Asphalt (50mm)	Tonne	200	175
Granular A (50mm)	Tonne	30	25.2
Double Surface Treatment	m^2	8	56
Micro surfacing	m^2	10	70
Base Replacement			
Granular A (150mm)	Tonne	30	75.6
Granular B (350mm)	Tonne	30	176.4
Curb and Gutter	m	120	120
Sidewalk	m	300	300
Topsoil and Hydroseed	m^2	12	36
Ditching	m	40	40
Shoulder Rehab	m		

Table 6: Unit Costs Used for Benchmark Costing Items

- Costs for “Complete Urban Reconstruction” include full base replacement, new 7-meter-wide road base, 50 mm HL3 asphalt surface, curb and gutter, sidewalk, and topsoil / sod.
- Costs for “Complete Rural Reconstruction” include full base replacement and new surface for a 7-meter-wide road.
- Costs for “Resurfacing” include the removal of the existing surface and placement of new surface material (50 mm HL3 asphalt surface, double surface treatment, or 50 mm granular A), assuming a 7-meter-wide road.
- Costs for “Ditching” include ditch excavation for half of the length of the road section. Ditching is only expected to be required for half of the length of the road section due to entrances, existing ditches, high points, etc.
- Costs for “Shoulder Rehabilitation” include removal and disposal of excess shoulder material and vegetation for the full length of the road section.
- Other related costs, such as property acquisition, utilities, engineering, etc., are not included in the Benchmark Costs. Where the Township feels these factors may impact construction, a 10% markup should be applied to items to cover these professional fees and contingencies.

9. Review of Field Data and Assessment of Needs

There were a few prominent features of the Township's infrastructure that were evident during the collection of field data. The first such feature was a commitment to maintenance and improvements of roadways. The majority of the bituminous roadways were in a generally adequate condition, with the roads that are in notably poor condition being already included in the Township's current rehabilitation plan. Another common observation was that, while overall roadside drainage is generally adequate, the roadways that are in poorer condition typically have defects that are indicative of subsurface drainage issues. These defects include alligator cracking, map cracking, and frost boils. To remediate these issues, it is recommended that base repair is completed in these areas and proper base drainage is provided by ensuring shoulders are properly cut and maintained. These defects were used as indicators to differentiate between roads in need of base repairs and roads that only require resurfacing.

During our review of the bituminous roadways, it was noted that several roads had an HCB riding surface despite a relatively low AADT. Two of these roads in particular, Elgin Street and Lockwood Road, are both in substandard condition and have a low AADT, with daily traffic volumes of 1 and 57 respectively. It is our recommendation that consideration be given to downgrading these roadways to a gravel driving surface to permit reduced long-term maintenance costs. It is recommended that, as HCB roadways come up for rehabilitation, the AADT and usage of these roads should be reviewed, and consideration given to reinstatement with surface treatment (LCB). Placement of pavement for roadways in scenarios where it is not required by one or more of high AADT, heavy traffic, or as part of an overall hamlet construction can result in increased maintenance and reinstatement costs for the Township in the long and short term. Therefore, it is recommended that HMA only be placed in scenarios where it is necessary to meet usage or planning requirements.

The gravel roadways throughout the Township were generally in acceptable condition with good roadside drainage. There were some instances of roadways with substandard widths and drainage, but this was typically associated with low volume, rural roads. It was noted that some of the provided estimated AADT's for the gravel roadways approach or exceed 200 vehicles per day. The Inventory Manual for Municipal Roads recommends that all roadways that exceed 200 AADT be converted to surface treatment. This practice can reduce maintenance costs over time on high volume gravel roadways. It is recommended that the Township continue to monitor AADT on the gravel roadways to determine if they are suitable candidates for conversion to surface treatment. In addition to the requisite AADT, this should only be considered on roadways with adequate base construction and roadside drainage. Furthermore, surface treatment should generally not be utilized on roadways with a high percentage of heavy vehicle traffic (such as agricultural equipment). In these instances, consideration should be given to placing hot mix asphalt as an alternative to surface treatment.

As a part of this study, Greer Galloway has organized roads that require rehabilitation into three categories:

1) **Now** – Roads requiring imminent repair, generally full rehabilitation, to meet current traffic demands. Roads that are classified as Now need were generally roads with a Structural adequacy of 11 and bellow with a higher priority rating.

2) **1-5 Years** – Roads requiring rehabilitation within 5-years, again generally full rehabilitation with some preservation work included. Roads that are classified as 1-5 Year need were generally roads with a structural adequacy between 12 and 15 with a higher priority rating.
3) **6-10 years** – Roads requiring rehabilitation as part of the Township's long-term plan. These are generally roads requiring a preservation treatment or resurfacing, and also includes some roadways that do not have sufficient AADT to be included in the Township's immediate plans. It should be noted that the long-term planning can be subject to change as road surface conditions and rates of deterioration can vary drastically year to year. Roads that are classified as 1-5 Year need were generally roads with a structural adequacy between 16 and 18 with a higher priority rating. The 6-10 year will also include roads that have lower structural adequacies but did not have priority ratings to justify fitting into the Now or 1-5 Years budget.

To further provide guidance to the Township, Greer Galloway has produced a year-by-year guide for the rehabilitation of the Township's hard top roadways. This guide will need to be reviewed frequently to address any sudden changes in the state of the Township's infrastructure.

10. Projected Capital Improvement Plan and Recommendations

Through the collection of field data and subsequent analysis, Greer Galloway has produced a guide for rehabilitation of the Township's Road infrastructure in years 1-10. To compile these guides, Greer Galloway considered the following features:

- AADT
- Structural Adequacy
- Overall Condition Rating
- Priority Rating

For this report roads were prioritized with respect to the priority rating and structural adequacy. Priority rating has been calculated as per the equation on Page 55 of the Inventory Manual for Municipal Roads, and considers both condition rating and AADT. Specifically, in the case of Elizabethtown-Kitley, these ratings need to be viewed with the understanding that large discrepancies in AADT will cause certain roads to always be at the top of the priority list. This is true in the case of portions of Seeley Road, 2nd concession, and Sharpe's Lane which all have considerably higher AADT's than the rest of the road network. The existing condition of these roadways needs to be carefully examined to determine when rehabilitation and maintenance are appropriate.

For the purpose of this report, Greer Galloway has assumed a starting annual budget of $1,800,000 with increases of $100,000 per year. If additional funding becomes available, roads can be moved up in the proposed schedule based on priority rating and structural adequacy. The proposed expenditures for 2024-2032 using this projected budget are located in **Appendix A.**

It should be noted that the road management plan provided in Appendix A is intended to be used as a guide, and that situations can arise that will require modification or deviation from the stated recommendations. Generally, the aim in putting together the yearly rehabilitation plans is to slightly underrun the projected yearly budget, with the understanding that actual construction costs may slightly

vary from the estimates provided. The ratings shown in Appendix A are based on current conditions, and do not account for how roads may degrade between now and the time that they are rehabilitated. Costs were estimated by GGG using values from recent projects. Based on recent unit cost fluctuations it is expected that costs will change over the course of these budgets, roads should be adjusted in the schedule based on priority rating and structural adequacy to accommodate these changes.

Greer Galloway has also developed a plan for the rehabilitation of gravel roads. It should be noted that identifying the state of deterioration and source of distresses on a gravel road can be difficult to precisely perform. The observable frequency and magnitude of distresses in the road surface are often a function of

- Amount of elapsed time between date of observation and date of last routine maintenance, since maintenance will often render the road surface in a pristine-looking condition, hiding distresses.
- Timing of date of observation relative to onset of spring and the progression of associated freeze-thaw cycles that can advance deficiencies such as general distortion, potholing, and frost heaving/boiling.
- Timing of date of observation relative normal inclement weather events, which can have an accelerated effect on some distress manifestation.

Deterioration of gravel roads to the point that they would require full depth reconstruction can be mitigated ideally through the periodic replenishment the surface with new gravel (properly graded and compacted) along with proper maintenance techniques including routine (multiple times a year) dragging/grading of surfaces and ditches, material recovery, vegetation removal from shoulders, and dust control. Greer Galloway has noted that the Township's gravel road infrastructure is in generally good condition.

Since the precise deterioration rate of gravel roads is difficult to predict, a list of gravel roads that may require full depth reconstruction has been provided in Appendix A in descending priority. The intent of this table is to offer a suggestion of the sequence in which these roads should receive resurfacing or reconstruction. The logic behind this sequence is that these roads are displaying the most advanced deterioration since they last experienced maintenance and are therefore presumably most in need of having additional subsurface work completed.

Greer Galloway recommends that the Township make every effort to rehabilitate the roadways as shown, and that the Township consider these to be the maximum delays to rehabilitation. It has been noted that the utilized budget of 1.8 million with an increase of $100,000 year over year appears adequate to address the Township's short and long-term road rehabilitation needs. It should also be noted that the potential consequences of delaying/reducing the road maintenance program include:

- Deterioration of road conditions.
- Compromising of road safety.
- Deterioration of the existing level of service to a point at which it will become inadequate.
- Detachment of local communities.
- Diminished tourism and positive public perception.
- Reduced efficiency of movement of goods and services.
- Damage to vehicles due to road conditions.
- Decreased emergency response times.

11. Conclusions and Recommendations

11.1 Conclusions

Based on the observations of the field review, discussions with senior municipal staff, and general knowledge of the region, the following conclusions are put forward.

- The Township of Elizabethtown-Kitley has approximately 366 kilometers of road.
- 36.4% of the road system has a hot mix asphalt surface, 7.4% has a surface treated surface, and 56.2% has a gravel surface.
- 7.7% has been constructed to a semi-urban cross-section, and 92.3% of the road system has been constructed to a rural cross section.
- 1.2% of the road system consists of Class 3 roads, 71.2% are Class 4 roads, 12.1% are Class 5 roads, and 15.5% are Class 6 roads.
- The roads with high traffic demand are generally in very good condition throughout the Township. The roads in need of major base repairs are typically roads that have minimal traffic demand.
- Drainage in terms of ditching is generally adequate. Regardless, the majority of repairs are indicative of base issues, properly maintained shoulders are needed to ensure proper base drainage.
- Generally, shoulder width is substandard with 60% scoring at or below a 5/10 and only 12% scoring at or above a 7/10. By improving and properly maintaining shoulders the overall condition ratings and base drainage of roads will be improved.

11.2 Recommendations

The following recommendations are put forward and take into account: the safety of the users of the system and the corresponding liability risk to the municipality, the cost of and revenue available for capital improvement, and the cost effectiveness of recommended expenditures.

- Prioritize, plan, and implement rehabilitation and improvement projects based on the capital improvement plan provided in Appendix A of this report.
- When resurfacing an existing roadway, it is recommended that the Township ensure adequate drainage and base conditions are present prior to surface rehabilitation. The Township should be advised that performing upgrades without ensuring adequate drainage and subsurface conditions are present can lead to premature failure of the roadway and increased maintenance costs.
- In areas where full reconstruction is anticipated, the Township should complete a geotechnical investigation prior to proceeding with the design process. Generally, boreholes should be completed at 250 m intervals along the section of proposed road work. This is as per the Provincial Pavement Engineering Investigation Guidelines (June 2021). However, the amount of of boreholes completed may vary based on site conditions and as outlined by the geotechnical consultant completing the work. The cost of geotechnical investigations is relatively insignificant, and the generated reports help to ensure that the new road structure is sufficient to last the typical service life. The consequences of overlooking this crucial part of the design process can include unexpected project budget overages, premature failure of new asphalt services, and increased maintenance costs.
- In areas where full depth reconstruction has not been specified, it is recommended that the Township review the roadway to determine if spot repairs with base replacement are necessary. Factors in determining this should include the presence of alligator cracking, frost damage and distortion.

- To allow for cost savings during constructions roads that have been identified as needing base reconstruction should be reviewed to allow for spot repair instead of full length reconstruction.
- Review AADT of HMA roads at time of repair for possible replacement with surface treatment or granular
- A regular traffic counting program should be commenced, completing the entire road network on a three to five-year cycle on a continuing basis. This will help to aid in identifying required road upgrades and allocating maintenance.
- The condition of the road system should be reviewed on a regular basis to measure the effectiveness of strategies and the sufficiency of funding levels.
- Greer Galloway recognizes the value of improving the condition of hamlet roads, despite their inherently lower AADT. Greer Galloway recommends that the Township continue to improve the major hamlets as funds become available. Where existing infrastructure prevents proper ditching, the Township should consider installation of storm sewer and curb. These systems not only improve drainage and increase the life of the roadway, but also improve the aesthetics of the area.
- Township staff should complete regular shoulder maintenance of roads where shoulders are higher than the road surface. It is recommended that each spring, the shoulders be cut and graded away from the road to reinstate proper drainage.
- In areas where the roadway does not have an adequate cross section, and does not require base repair, the Township should consider removal of existing asphalt, shaping with granular A, and subsequent resurfacing to restore a proper crown to the roadway. This will aid in drainage off of the driving surface and minimize surface infiltration into the underlying subbase and subgrade.

Respectfully submitted,
The Greer Galloway Group Inc.

Kevin Hawley, P. Eng

Garret Hoegi, E.I.T

Appendix A
Proposed Roads Budget

Table 1 - 2024 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
260	Elgin Street	St. George Street	Dead End	29.86	5	Gravel Resurface (Downgrade)	$630.00
389	Lily Bay Drive S	Dead End	Dead End	21.6	14	Microsurface	$13,195.00
464	New Dublin Road	County Road 29	6th Concession Road	19.31	12	*Full Depth Reconstruction	$780,800.00
185	Applewood Circle	2nd Concession Road	Dead End	16.2	10	Downgrade to Surface Treatment	$15,000.00
N/A	Kitley Line 3 Road	0.1km West of Willows Road	County Road 1	22.04	11	*Full Depth Reconstruction	$872,863.00
475	Paul Road	County Road 2	Wanda Drive	17.96	14	*Full Depth Reconstruction	$96,990.00
						Totals:	$1,779,478.00

Table 2 - 2025 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
415	Kitley Line 8 Road	Church Street	Edwards Road	23.49	11	*Full Depth Reconstruction	$416,020.00
293	Hallecks Road N	Hallecks Road East	CNR Tracks	34.69	11	*Full Depth Reconstruction	$439,200.00
210	Bronze	Airport Road	Susan Drive	16.71	13	Asphalt Resurfacing with Ditching	$39,000.00
356	Kitley Line 9 Road	County Road 29	1km West of County Road 29	27.02	15	Microsurface	$24,500.00
429	Lyn Valley road	Main Street West	Dead End	25.47	11	*Full Depth Reconstruction	$38,430.00
503	Seeley Road	Howe Road	Cross Road	36.54	15	*Full Depth Reconstruction	$718,580.00
502	Seeley Road	Cross Road	Lake Street	34.44	17	*Full Depth Reconstruction	$226,920.00
						Totals:	$1,902,650.00

Table 3 - 2026 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
203	Bowery Street	Main Street West	Victoria Street	19.74	14	Asphalt Resurfacing	$10,000.00
304	Howe	County Road 27	County Road 46	14.07	14	*Full Depth Reconstruction	$1,444,480.00
334	Kinch Street	County Road 29	Lockwood Road	32.86	10	Microsurface	$44,800.00
302	Heather Crescent	Debruge Road	Dead End	12.41	13	Asphalt Resurfacing with Ditching	$95,000.00
332	Killkenny Road	County Road 29	Burnbrae Road	26.91	14	Asphalt Resurfacing	$406,250.00
						Totals:	$2,000,530.00

Table 4 - 2027 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
333	Killkenny Road	County Road 46	Burnbrae Road	23.28	14	Asphalt Resurfacing	$418,750.00
227	Coons Road	County Road 29	Dead End	31.35	12	Asphalt Resurfacing with Ditching	$245,200.00
418	Kitley Line 8 Road	Healey Road	Lake Eloida Road	15.19	16	*Full Depth Reconstruction	$384,300.00
417	Kitley Line 8 Road	Edwards Road	Leacock Road	29.43	11	*Full Depth Reconstruction	$538,020.00
388	Lily Bay Drive N	County Road 2	Count Road 2	14.23	14	Asphalt Resurfacing	$251,250.00
525	Temperance Lake Road	County Road 29	0.6 km West of County Road 29	25.32	15	*Full Depth Reconstruction	$226,920.00
440	Meg Avenue	Heather Crescent	Airport Road	9.43	15	Asphalt Resurfacing	$14,900.00
						Totals:	$2,079,340.00

Table 5 - 2028 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
387	Leacock Road	Kitley Line Road 8	Cecil's Road	12.26	16	*Full Depth Reconstruction	$1,134,600.00
328	Kelly Road	County Road 26	Concession Road 2	18.8	13	Full Depth Reconstruction	$338,620.00
507	Sharpes Lane	CNR Tracks	County Road 2	33.17	17	*Full Depth Reconstruction	$198,250.00
524	Susan Drive	Dead End	Dead End	11.58	12	Asphalt Resurfacing with Ditching	$83,714.29
	Kitley Line 8 Road	1km West of County Road 29	County Road 29	34.35	13	*Full Depth Reconstruction	$384,300.00
						Totals:	$2,139,484.29

Table 6 - 2029 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
386	Leacock	Cecil's Road	County Road 7	11.69	17	*Full Depth Reconstruction	$1,248,060.00
355	Kitley Line 9 Road	County Road 29	East 700m	21.62	12	Surface Treatment Reconstruction (Downgrade)	$285,200.00
182	Airport Road	2.1 km South of Fairfield Road	Debruge Road	24.35	13	*Full Depth Reconstruction	$794,220.00
						Totals:	$2,327,480.00

Table 7 - 2030 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
208	Brockmere Cliff	1000 Island Parkway	County Road 2	24	15	*Full Depth Reconstruction	$1,307,840.00
282	Graham Lake	County Road 46	Front of Yonge Township Boundary	23.23	10	*Full Depth Reconstruction LCB	$961,000.00
425	Long Beach Drive	County Road 2	Dead End	20.17	11	*Full Depth Reconstruction	$139,080.00
						Totals:	$2,407,920.00

Table 8 - 2031 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
457	Murray Road	County Road 29	McDougall Road	17.75	16	*Full Depth Reconstruction	$237,900.00
378	Lake Eloida	Mother Barnes Road	Kitley Line 9 Road	16.41	11	*Full Depth Reconstruction	$587,979.00
292	Hallecks Road N	CNR Tracks	Murphy Road	36.22	12	*Full Depth Reconstruction	$329,400.00
526	Temperance Lake Road	0.6 km West of County Road 29	Yonge Escott Bounday	31.84	13	Rural Base Reconstruction with Ditching	$1,045,500.00
317	Jellyby Road	Rail Crossing	Mills Road	12.37	15	*Full Depth Reconstruction	$115,290.00
476	Pearl Street	Main Street West	Dead End	26.13	13	*Full Depth Reconstruction	$33,550.00
441	Mill Street	Main Street West	Dead End	21.58	16	*Full Depth Reconstruction	$27,450.00
492	Rock Lane	Main Street West	Victoria Street	20.48	15	*Full Depth Reconstruction	$25,620.00
325	Jessie Street	Main Street West	Victoria Street	20.43	14	*Full Depth Reconstruction	$27,450.00
203	Bowery Street	Main Street West	Victoria Street	19.74	14	*Full Depth Reconstruction	$24,400.00
530	Victoria Street	Bowery Street	Jessie Street	19.66	14	*Full Depth Reconstruction	$25,620.00
						Totals:	$2,480,159.00

Table 9 - 2032 Roads Budget

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Cost
469	Old Red Road	County Road 46	Parkdale Avenue	23.81	18	*Full Depth Reconstruction	$653,310.00
222	Church Street	Laura Street	Dead End	19.31	15	*Full Depth Reconstruction	$67,710.00
385	Laura Street	Church Street	Lyn Valley Road	18.54	15	*Full Depth Reconstruction	$57,340.00
198	Billings Crescent	Cummins Road	Dead End	13.97	12	*Full Depth Reconstruction	$85,400.00
197	Bethel Road	County Road 27	Augusta Township Boundary	24.73	17	*Full Depth Reconstruction	$302,560.00
NA	Addison Greenbush Road	County Road 28	County Road 7	19.48	15	*Full Depth Reconstruction	$1,327,360.00
297	Hanna Drive	Rowsome Road East	Dead End	12.17	16	*Full Depth Reconstruction	$73,200.00
						Totals:	$2,566,880.00

***Geotechnical investigation recommended**

Gravel Road Candidates for Reconstruction (Descending Priority)

Asset ID	Road Name	From	To	Priority Rating	Structural Adequacy Rating	Treatment	Approximate Cost
453	Murphy Road	County Road 46	Civic 2312	30.42	12	Reconstruction	$409,860.00
368	Kitley-Bastard Road & Burgess Townline Road	Kitley Line 3 Road	Reils Road	29.73	12	Reconstruction	$274,428.00
438	McKay Road	Mud Creek Road	Dead End	28.46	11	Reconstruction	$178,200.00
392	Kitley Line 1 Road East	Hutton Road	County Road 17	27.87	13	Reconstruction	$190,080.00
202	Botham Road	Kitley Line 5 Road	Dead End	26.61	10	Reconstruction	$81,675.00
413	Kitley Line 8 Road	County Road 7	Mulvaugh Road	26.37	13	Reconstruction	$497,178.00
221	Chant Road	Healey Road	1.7km North of Mother Barnes Road	25.87	13	Reconstruction	$230,175.00
219	Cecil's Road	1.7km North of Leackcock Road	Leacock Road	25.16	12	Reconstruction	$282,744.00
218	Cecil's Road	Kinch Street	1.6 km South of Kinch Street	24.59	12	Reconstruction	$266,112.00
217	Cecil's Road	1.6 km South of Kinch Street	1.7 km North of Leacock Road	24.59	12	Reconstruction	$83,160.00
515	Soper Road	Kitley Line 8 Road	Dead End	22.91	11	Reconstruction	$23,760.00
196	Bennett Road	Kitley Line 3 Road	Dead End	22.87	12	Reconstruction	$139,590.00
310	Island Road	Rocksprings Road	Wolford-Elizabethtown Townline Road	22.34	12	Reconstruction	$157,113.00
437	McKay Road	Jellyby Road	Mud Creek Road	21.86	13	Reconstruction	$110,484.00
521	Stanley Hall Road	Dixie Road	Dead End	21.27	13	Reconstruction	$147,015.00
						Totals:	**$3,071,574.00**

Appendix B
Collected Traffic Count Data

22-5-5290 - Elizabethtown Kitley 2022 Traffic Counts

Road	Count Location	Count Date	24-Hour Traffic Volume
Bay Street (Lyn)	At Perth Street	12-Jul-22	45
Billings Crescent (Lyn)	At Cummins Road	7-Nov-22	76
Bowery Street (Lyn)	At County Rd 27	7-Nov-22	32
Brockmere Cliff Drive	At Hwy 2	22-Nov-22	1215
Church Street (Lyn)	At County Rd 27	8-Nov-22	57
Cornell Crescent (Lyn)	At Lyn Heights Dr	8-Nov-22	72
Cummings Road (Lyn)	At Perth Street	9-Nov-22	103
Curzon Avenue	At Fernbank Rd	15-Nov-22	179
Eleanor Fulford Crescent	At Hallecks Road South	23-Nov-22	49
Elgin Street (Lyn)	At St. George Street	10-Nov-22	1
Fernbank Road	At Hwy 2	15-Nov-22	131
Fulford Point Road	At Hwy 2	28-Nov-22	206
Gilbert Road	At Hwy 2	14-Nov-22	110
Grandview Terrace	At Hwy 2	29-Nov-22	35
Hayes Drive (Lyn)	At Perth Street	10-Nov-22	123
Hudson Point Road N	At Hwy 2	23-Nov-22	17
Hudson Point Road S	At Hwy 2	23-Nov-22	174
James Street (Lyn)	At County Rd 27	12-Jul-22	69
Lambton Lane	At Lily Bay Dr N	28-Nov-22	47
Laura Street (Lyn)	At Lyn Valley Rd	9-Nov-22	27
Lily Bay Drive N	At Highway 2	11-Nov-22	106
Lily Bay Drive S	At Gilbert Rd	14-Nov-22	110
Long Beach Drive	At Hwy 2	22-Nov-22	155
Lyn Heights Drive	At Kilkenny Road	8-Nov-22	113
Maplewood Drive	At Hwy 2	15-Nov-22	128
McDonald Road	At Hwy 2	14-Nov-22	64
Pearl Street (Lyn)	At County Rd 27	9-Nov-22	40
Rock Lane (Lyn)	At County Rd 27	7-Nov-22	29
Sherwood Bay Road	At Hwy 2	14-Nov-22	214
St. George Street (Lyn)	At Cummings Rd	7-Nov-22	175