

Asset Management Plan

Township of Ewanturel

2021

This Asset Management Program was prepared by:



Empowering your organization through advanced
asset management, budgeting & GIS solutions

Key Statistics

Replacement cost of
asset portfolio

\$16.4 million

Replacement cost of
infrastructure per household

\$80,932 (2021)

Percentage of assets in fair or
better condition

59%

Percentage of assets with
assessed condition data

53%

Annual capital
infrastructure deficit

\$493,000

Recommended timeframe
for eliminating annual
infrastructure deficit

20 Years

Target reinvestment
rate

3.6%

Actual reinvestment
rate

0.57%

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Executive Summary

Municipal infrastructure provides the foundation for the economic, social, and environmental health and growth of a community through the delivery of critical services. The goal of asset management is to deliver an adequate level of service in the most cost-effective manner. This involves the development and implementation of asset management strategies and long-term financial planning.

Scope

This AMP identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

Asset Category

 Road Network	 Bridges & Culverts
 Stormwater Network	
 Vehicles, Equipment & Machinery	
 Buildings & Land Improvements	

With the development of this AMP the Township has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2022. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2024 and 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals \$16.4 million. 59% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 53% of assets. For the remaining 47% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (paved roads) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals \$586,000. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$93,000 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of \$493,000.

It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Annual Tax Increase
Per Household



Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Township's infrastructure deficit based on a 20-year plan:



Recommendations to guide continuous refinement of the Township's asset management program. These include:

- Review data to update and maintain a complete and accurate dataset
- Develop a condition assessment strategy with a regular schedule
- Review and update lifecycle management strategies
- Development and regularly review short- and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction & Context

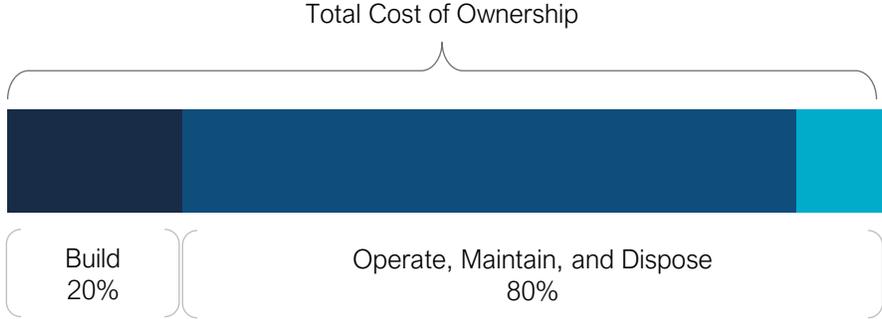
Key Insights

- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio
- The Township's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management
- An asset management plan is a living document that should be updated regularly to inform long-term planning
- Ontario Regulation 588/17 outlines several key milestone and requirements for asset management plans in Ontario between July 1, 2022 and 2025

1.1 An Overview of Asset Management

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.

The acquisition of capital assets accounts for only 10-20% of their total cost of ownership. The remaining 80-90% derives from operations and maintenance. This AMP focuses its analysis on the capital costs to maintain, rehabilitate and replace existing municipal infrastructure assets.



These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

1.1.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the municipality's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Township adopted By-law No. 2019-21 "Being a By-law to adopt a Strategic Asset Management Policy for the Corporation of the Township of Evanturel" on June 26th, 2019 in accordance with Ontario Regulation 588/17.

The asset management plan satisfies the policy statement 1.00:

"The Township of Evanturel will implement a municipal-wide Strategic Asset Management Plan that will promote asset lifecycle and risk management of the Municipality's capital infrastructure assets. A primary goal will be to achieve the lowest cost of ownership while meeting desired levels of service."

1.1.2 Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the municipality plans to achieve asset management objectives through planned activities and decision-making criteria.

The Township completed an Asset Management Strategy in August 2021. The strategy identifies seven core elements, and 36 recommendations, distributed over four timeframes. The Township's overall asset management maturity was assessed as 'Basic', suggesting that the municipality is in the learning stage of asset management. At this stage, it is typical to find many gaps across each of the seven core elements of asset management, particularly datasets and business processes.

Implementing the 36 recommendations over the three years and beyond will help the Township reach a higher state of maturity in asset management programming. By completing this asset management plan, the Township takes a significant step forward in fulfilling the recommendations outlined in the Asset Management Strategy. However, it is worth reiterating that asset management planning and programming is best when an iterative approach is taken to continually improve current practices.

1.1.3 Asset Management Plan

The asset management plan (AMP) presents the outcomes of the municipality's asset management program and identifies the resource requirements needed to achieve a defined level of service. The AMP typically includes the following content:

- State of Infrastructure
- Asset Management Strategies
- Levels of Service
- Financial Strategies

The AMP is a living document that should be updated regularly as additional asset and financial data becomes available. This will allow the municipality to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

1.2 Key Concepts in Asset Management

Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

1.2.1 Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset’s characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: maintenance, rehabilitation and replacement. The following table provides a description of each type of activity and the general difference in cost.

Lifecycle Activity	Description	Example (Roads)	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	\$
Rehabilitation/ Renewal	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Re-surface	\$\$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	\$\$\$

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations.

The Township's approach to lifecycle management is described within each asset category outlined in this AMP. Developing and implementing a proactive lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

1.2.2 Risk Management Strategies

Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be used to prioritize maintenance, rehabilitation and replacement strategies for critical assets.

1.2.3 Levels of Service

A level of service (LOS) is a measure of what the Township is providing to the community and the nature and quality of that service. Within each asset category in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the Township as worth measuring and evaluating. The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.

Technical Levels of Service

Technical levels of service are a measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures and tend to reflect the impact of the municipality's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Township plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

Proposed levels of service should be realistic and achievable within the timeframe outlined by the Township. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability. Once proposed levels of service have been established, and prior to July 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.3 Ontario Regulation 588/17

As part of the *Infrastructure for Jobs and Prosperity Act, 2015*, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (O. Reg 588/17). Along with creating better performing organizations, more liveable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them.

The diagram below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.

2019

Strategic Asset Management Policy

2024

Asset Management Plan for Core and Non-Core Assets (same components as 2022)

2022

Asset Management Plan for Core Assets with the following components:

1. Current levels of service
2. Inventory analysis
3. Lifecycle activities to sustain LOS
4. Cost of lifecycle activities
5. Population and employment forecasts
6. Discussion of growth impacts

2025

Asset Management Policy Update and an Asset Management Plan for All Assets with the following additional components:

1. Proposed levels of service for next 10 years
2. Updated inventory analysis
3. Lifecycle management strategy
4. Financial strategy and addressing shortfalls
5. Discussion of how growth assumptions impacted lifecycle and financial

1.3.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2022. Next to each requirement a page or section reference is included in addition to any necessary commentary.

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 4.4.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 4.4.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 – 4.4.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 4.4.2	Complete
Description of municipality’s approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 4.4.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 4.3.6	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4.1.6 – 4.3.6	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 – 4.3.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	5.1-5.2	Complete

2 Scope and Methodology

Key Insights

- This asset management plan includes 5 tax-funded asset categories
- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation
- Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life

2.1 Assets categories included in this AMP

This asset management plan for the Township of Ewanturel is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges & culverts, and stormwater).

The AMP summarizes the state of the infrastructure for the Township’s asset portfolio, establishes current levels of service and the associated technical and customer oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Source of Funding
Road Network	
Bridges & Culverts	
Stormwater Network	Tax Levy
Buildings & Land Improvement	
Vehicles, Equipment & Machinery	

2.2 Deriving Replacement Costs

There are a range of methods to determine the replacement cost of an asset, and some are more accurate and reliable than others. This AMP relies on two methodologies:

- User-Defined Cost and Cost/Unit:** Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience
- Cost Inflation/CPI Tables:** Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Township incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

2.3 Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Township expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

By using an asset's in-service data and its EUL, the Township can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Township can more accurately forecast when it will require replacement. The SLR is calculated as follows:

$$\text{Service Life Remaining (SLR)} = \text{In Service Date} + \text{Estimated Useful Life (EUL)} - \text{Current Year}$$

2.4 Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost.

By comparing the actual vs. target reinvestment rate the Township can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

$$\text{Target Reinvestment Rate} = \frac{\text{Annual Capital Requirement}}{\text{Total Replacement Cost}}$$

$$\text{Actual Reinvestment Rate} = \frac{\text{Annual Capital Funding}}{\text{Total Replacement Cost}}$$

2.5 Deriving Asset Condition

An incomplete or limited understanding of asset condition can mislead long-term planning and decision-making. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life.

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Township’s asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated	80-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-60
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

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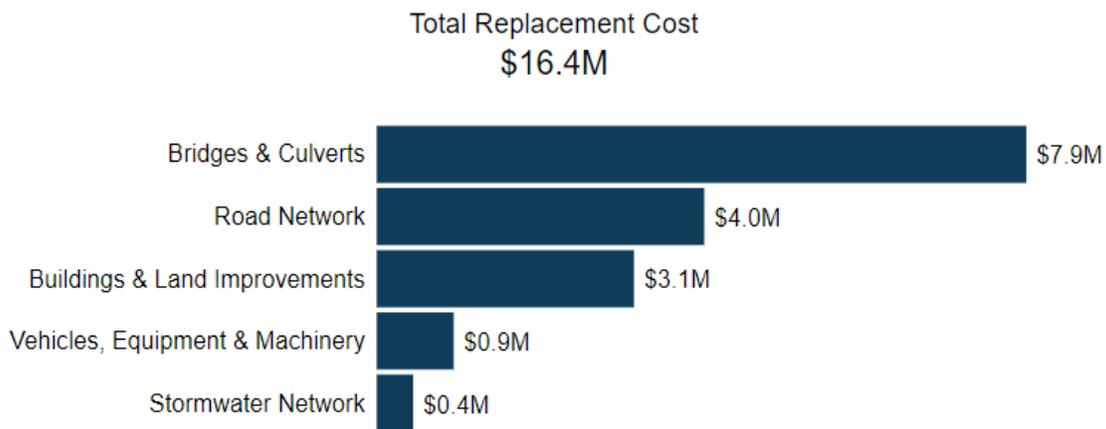
Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is \$16.4 million
- The Township's target re-investment rate is 3.57%, and the actual re-investment rate is 0.57%, contributing to an expanding infrastructure deficit
- 59% of all assets are in fair or better condition
- 32% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total \$5.9 million per year across all assets

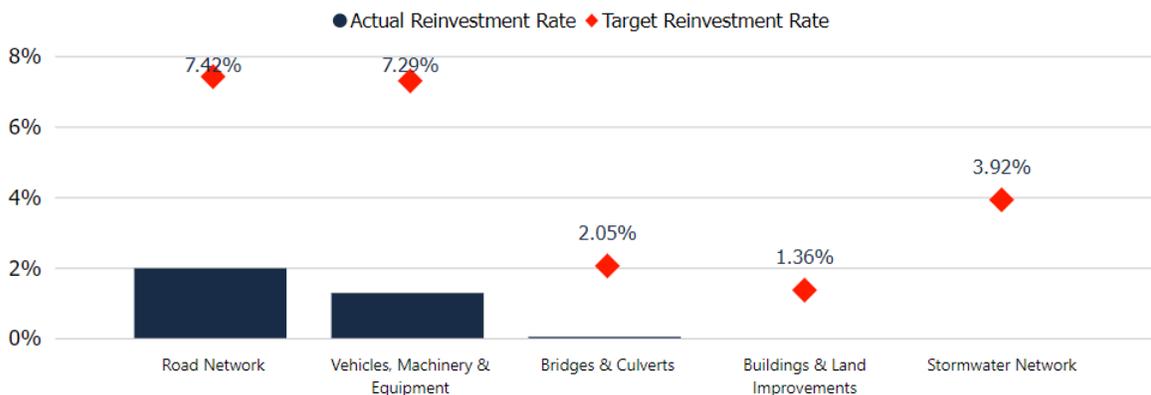
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of \$16.4 million based on inventory data from 2021. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



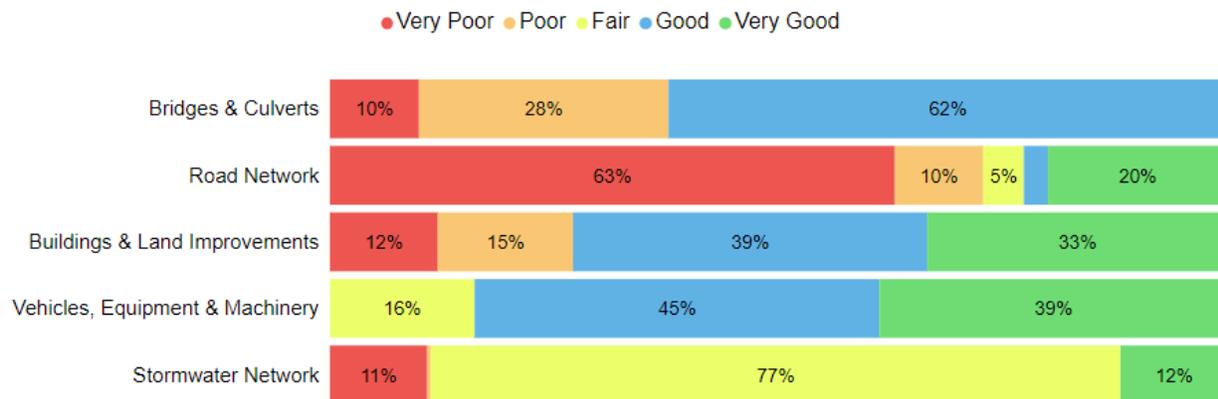
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately \$586,000 annually, for a target reinvestment rate of 3.57%. Actual annual spending on infrastructure totals approximately \$93,000, for an actual reinvestment rate of 0.57%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 72% of assets in Ewanturel are in fair or better condition. This estimate relies on both age-based and field condition data.



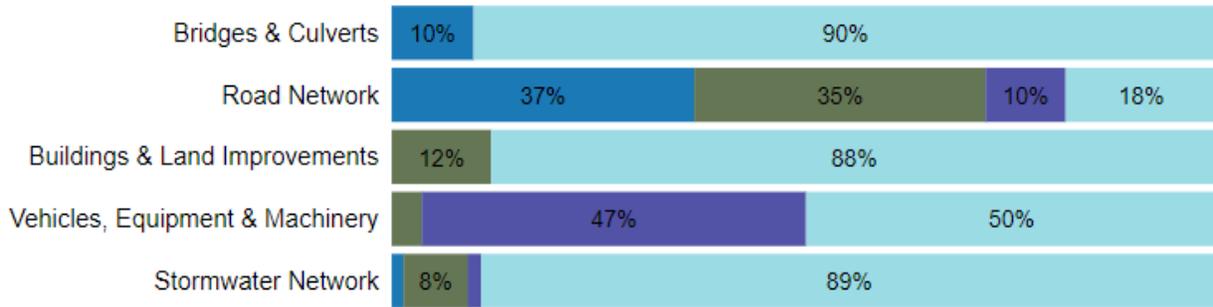
This AMP relies on assessed condition data for 53% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved Roads	0%	N/A
	Surface Treated Road	0%	N/A
	Gravel Road	80%	Staff Assessments
Bridges & Culverts	Bridges	100%	2021 OSIM Report
	Culverts	100%	2021 OSIM Report
Stormwater Network	All	100%	Staff Assessments
Buildings & Land Improvements	All	18%	N/A
Vehicles, Equipment & Machinery	All	43%	N/A

3.4 Service Life Remaining

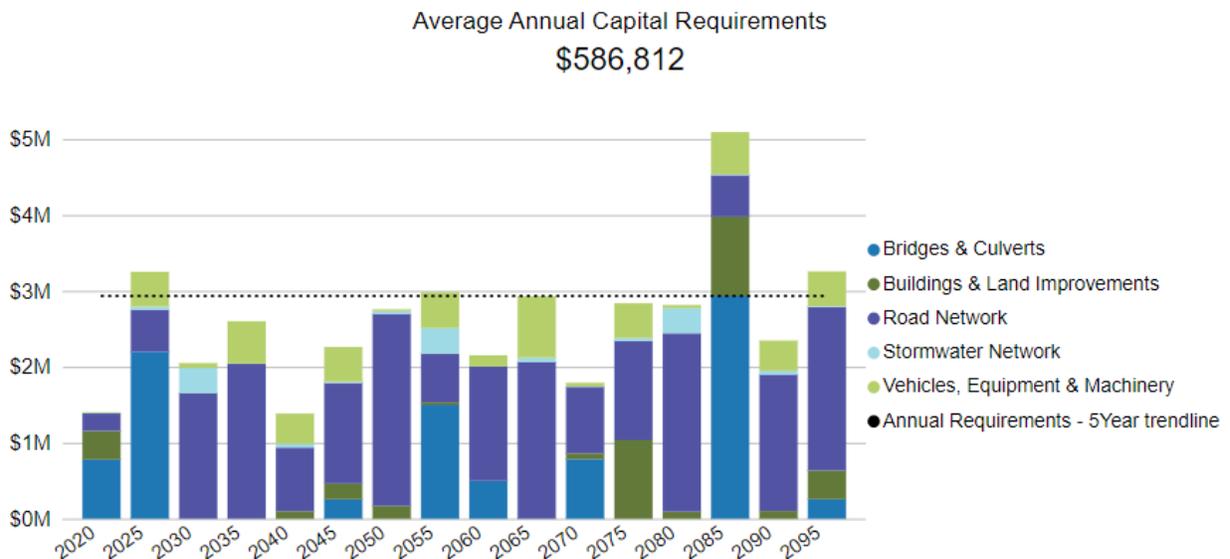
Based on asset age, available assessed condition data and estimated useful life, 32% of the Township's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix A.

● No Service Life Remaining ● 0-5 Years Remaining ● 6-10 Years Remaining ● Over 10 Years Remaining



3.5 Forecasted Capital Requirements

The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Township can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 75 years.



4 Analysis of Tax-funded Assets

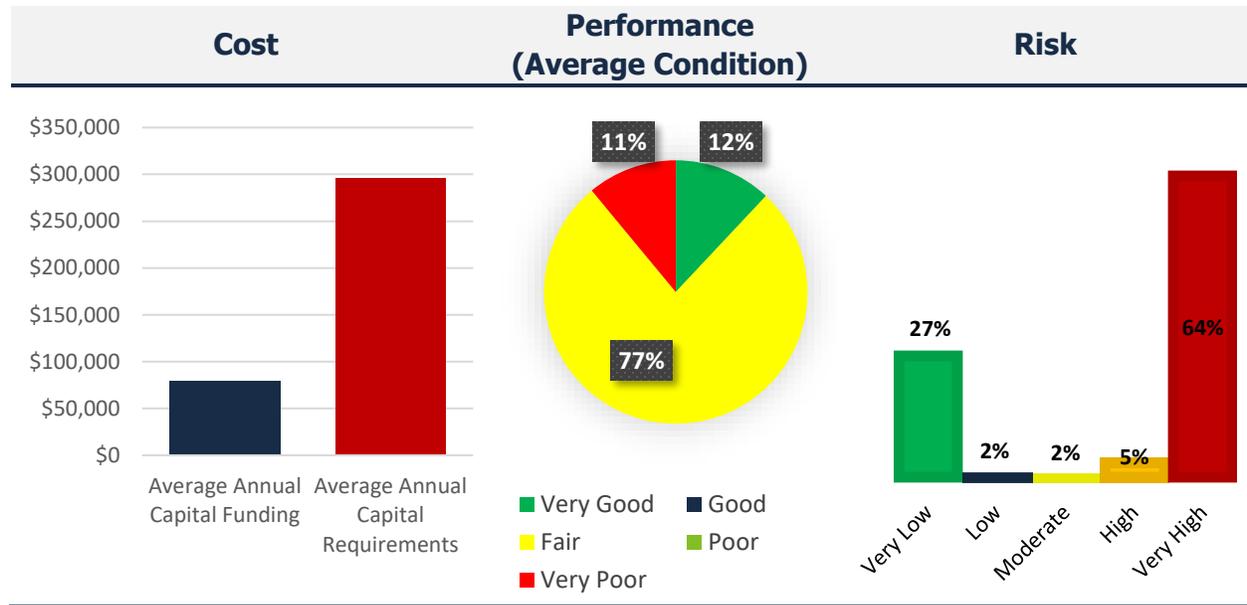
Key Insights

- Tax-funded assets are valued at \$16.4 million
- 72% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately \$0.6 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

4.1 Road Network

The Road Network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the Township’s asset portfolio. It includes all municipally owned and maintained.

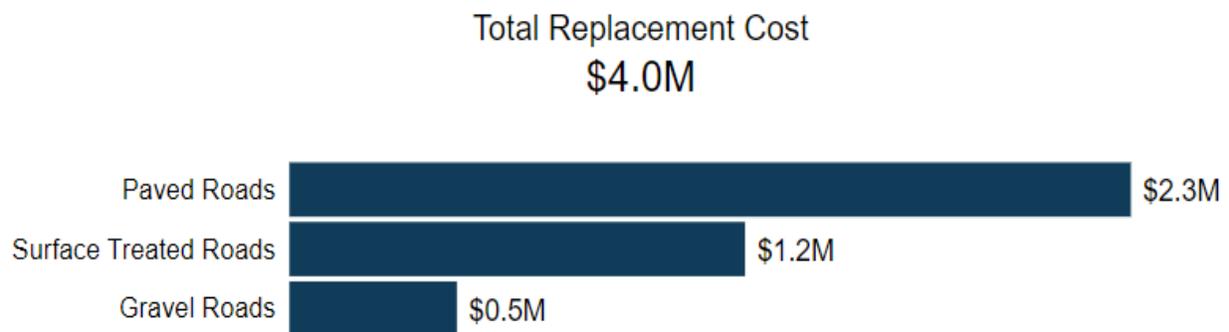
The table below outlines high-level service indicators for Roads.



4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Road Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Paved Roads (HCB)	5.4 km	User-Defined Cost	\$2,293,600
Surface Treated Roads (LCB)	13.7 km	User-Defined Cost	\$1,242,150
Gravel Roads	45.2 km	User-Defined Cost ¹	\$456,630
			\$3,992,380

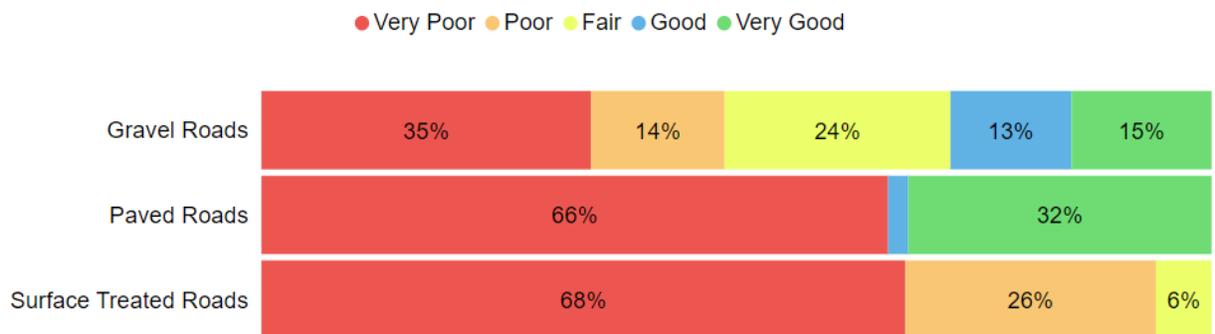


¹ Replacement costs for gravel roads are defined as the total capital costs of re-gravelling the road.

4.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Paved Roads	28%	Poor	Age-based
Surface Treated Roads	11%	Very Poor	Age-based
Gravel Roads	39%	Poor	80% Assessed, 20% Age-based
	24%	Poor	9% Assessed, 91% Age-based



Current Approach to Condition Assessment

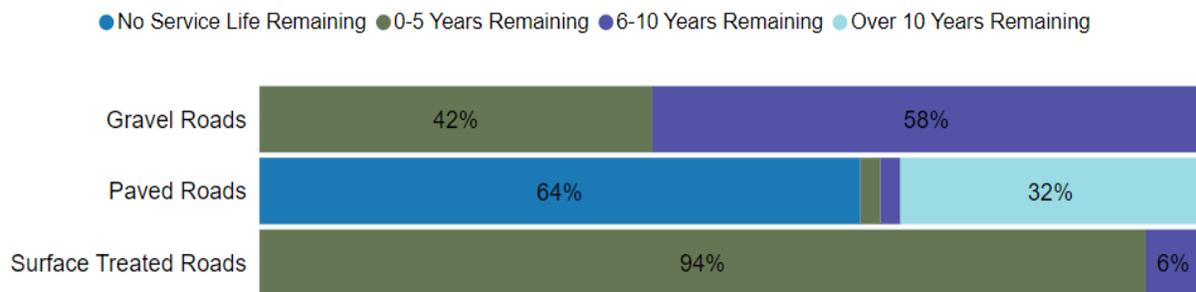
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Visual inspection for roads and roadside assets is performed by staff through a road patrol twice per month.
- Road conditions are estimated by the foreman and no formal assessment programs currently in place.
- Signs are inspected twice per month during the road patrol.
- Road inspection results are recorded in the checklist forms, summarizing defects and suggested actions. However, these results are not consolidated to a numerical condition score.

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned using a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Paved Roads	15 Years	26.0	-11.0
Surface Treated Roads	10 Years	14.6	-4.6
Gravel Roads	10 Years	113.3	4.8
		88.8	1.7



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

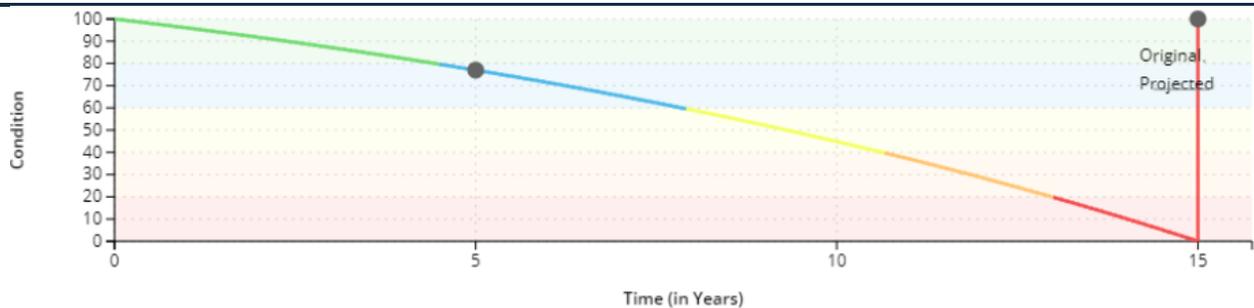
4.1.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset’s characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of paved roads and surface treated roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

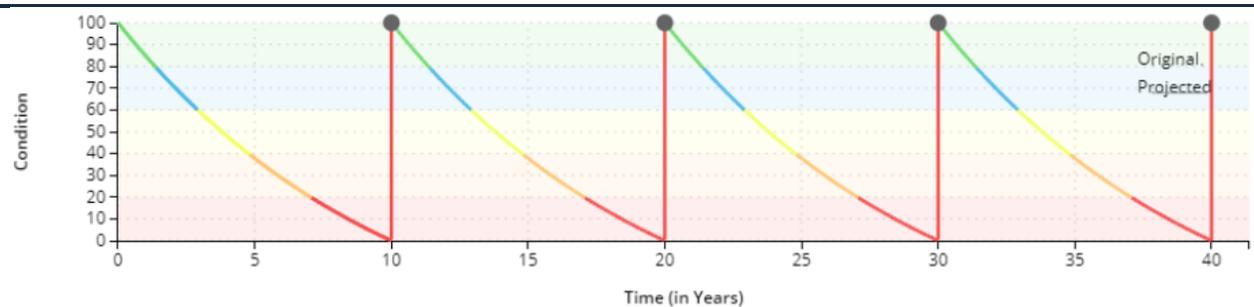
Paved Roads (HCB)

Event Name	Event Class	Event Trigger
Crack Sealing	Preventative Maintenance	5 Years
Pothole Patching	Maintenance	30 to 70 Condition
Full Reconstruction	Replacement	0 Condition



Surface Treated Roads (LCB)

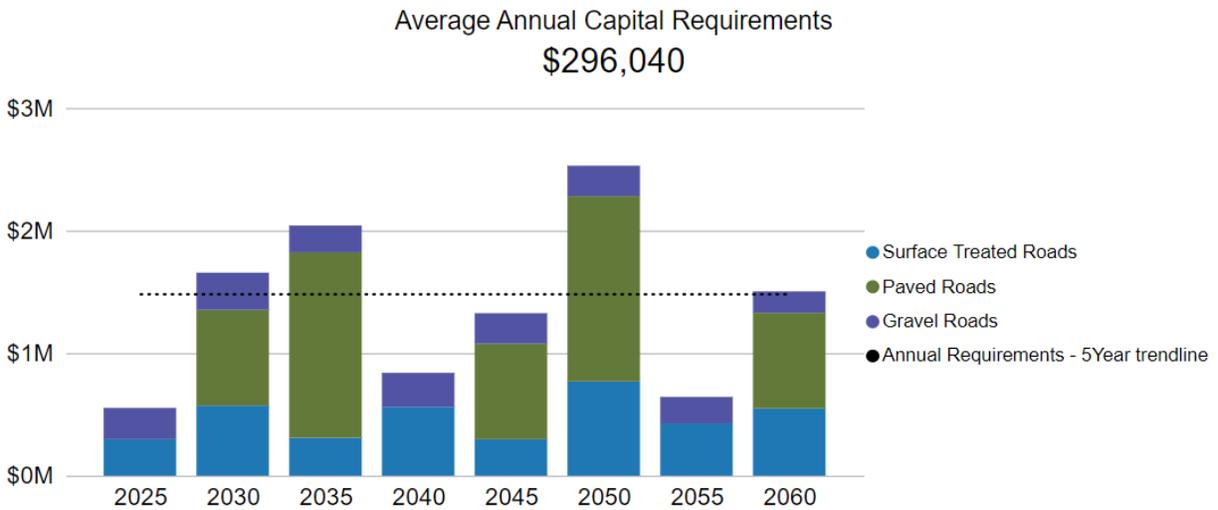
Event Name	Event Class	Event Trigger
Cold Mix Patching	Maintenance	30 to 70 Condition
Double Surface Treatment	Rehabilitation	Every 10 years (Repeated 3 times)
Full Reconstruction	Replacement	0 Condition



Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for Paved Roads and Surface Treated Roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Road Network.

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.1.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2021 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

Consequence	5	- \$0.00	- \$0.00	- \$0.00	- \$0.00	3.80 unit(s), km \$2,058,000.00
	4	1.00 unit(s) \$732,000.00	- \$0.00	- \$0.00	1.00 unit(s) \$254,800.00	- \$0.00
	3	- \$0.00	- \$0.00	1.00 unit(s) \$72,800.00	1.00 unit(s) \$72,800.00	1.85 km \$247,750.00
	2	- \$0.00	0.80 km \$48,800.00	- \$0.00	- \$0.00	3.40 km \$127,697.00
	1	7.62 km \$67,334.28	6.58 km \$58,167.20	12.27 km \$108,493.32	7.27 km \$64,284.48	8.19 km \$79,453.92
		1	2	3	4	5
		Probability				

Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



Climate Change & Extreme Weather Events

The trend of climate change-induced extreme weather events is projected to continue. The increase in rainfall and snowfall can result in accelerating the deterioration of road surfaces and weakening the base and sub-base. This can result in unexpected failures, posing significant risk to access for emergency vehicles. The current lifecycle strategies may need to be revised to focus on more proactive maintenance and drainage improvements, ensuring the current levels of service are maintained going forward.

4.1.6 Levels of Service

The following tables identify the Township’s current level of service for the Road Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Road Network.

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	<p>Very Poor: Widespread signs of deterioration. Requires remedial work to bring road up to standard. Service is affected.</p> <p>Poor: Large portions of road exhibiting deterioration with rutting, potholes, distortions, longitude and lateral cracking. Road is mostly below standard.</p> <p>Fair: Some sections of road starting to deteriorate. Requires some remedial work and surface upgrade in near future.</p> <p>Good: Road is in overall good condition. Few sections are starting to show signs of minimal deterioration.</p> <p>Very Good: Road is well maintained and in excellent condition. Surface was newly or recently upgraded. No signs of deterioration or remedial work required.</p>

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Road Network.

Service Attribute	Technical Metric	Current LOS (2020)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km ²)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km ²)	0
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km ²)	0.33
Quality	Average pavement condition index for paved roads in the municipality	28% Paved Road, 11% Surface Treated Roads
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Very Poor
Performance	Capital reinvestment rate	1.98%

4.1.7 Recommendations

Asset Inventory

- Review road inventory to determine whether all municipal assets within these asset segments have been accounted for.
- Continue to review road construction contracts to estimate the full cost of road replacement.

Condition Assessment Strategies

- Consider developing a regular condition assessment program for all roads, identifying defects and recommended improvements
- Update the condition assessment ratings annually, in the Citywide Inventory, using staff judgement.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for Paved and Gravel roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

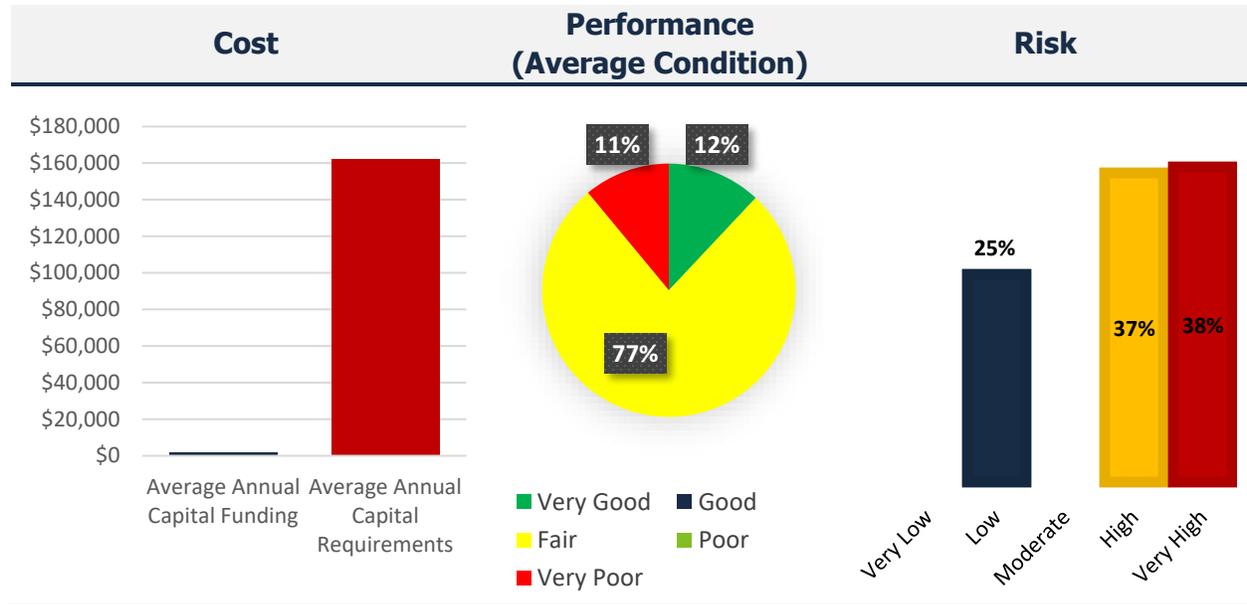
Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.2 Bridges & Culverts

Bridges & Culverts represent a critical portion of the transportation services provided to the community. The Department of Public Works is responsible for the maintenance of all bridges and culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

The table below outlines high-level service indicators for Bridges & Culverts.



4.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township's Bridges & Culverts inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Bridges	2	37% CPI Tables, 63% User-Defined Cost	\$5,133,477
Culverts	6	User-Defined Cost	\$2,785,986
			\$7,919,463

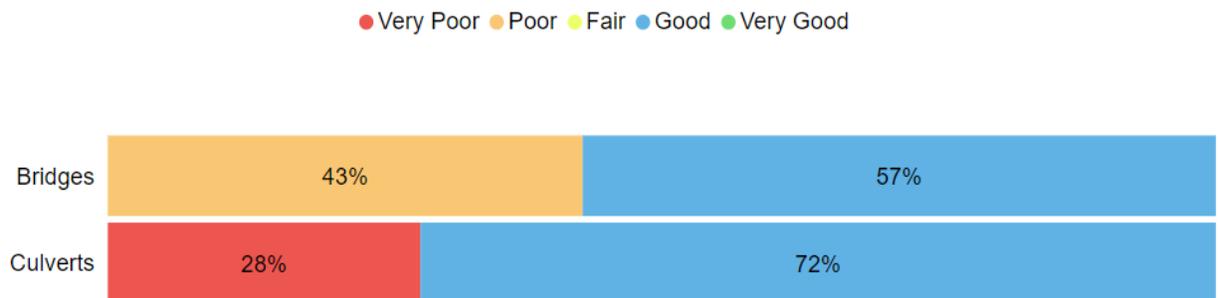
Total Replacement Cost
\$7.9M



4.2.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	57%	Fair	100% Assessed
Culverts	50%	Fair	100% Assessed
	54%	Fair	100% Assessed



To ensure that the Township’s Bridges & Culverts continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation, and replacement activities is required to increase the overall condition of the Bridges & Culverts.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality’s current approach:

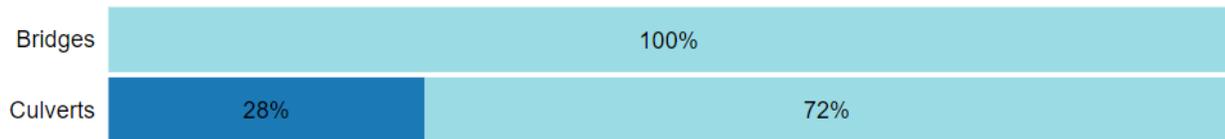
- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM)
- Road patrols are completed twice per month by staff, which includes the inspection of the bridge deck surface and drainage.

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Bridges & Culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Bridges	75 Years	28.5	41.0
Culverts	25-50 Years	40.8	22.8
		37.8	27.3

● No Service Life Remaining ● 0-5 Years Remaining ● 6-10 Years Remaining ● Over 10 Years Remaining



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.2.4 Lifecycle Management Strategy

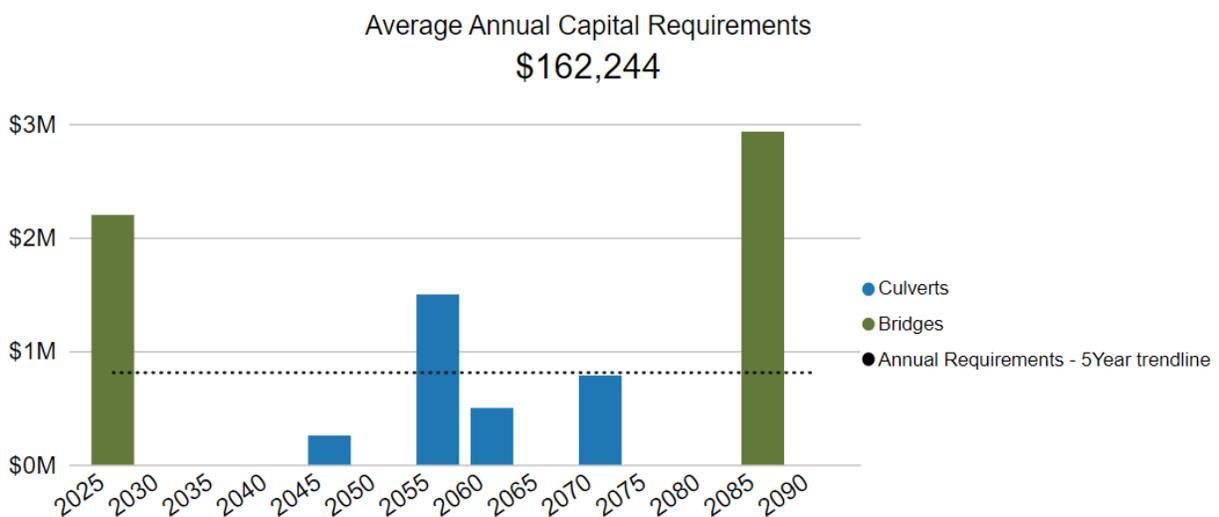
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Bridge cleaning is performed seasonally. Maintenance during freeze/thaw cycles are completed every spring as needed.
Maintenance, Rehabilitation and Replacement	All lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM)
Inspection	The most recent inspection report was completed in 2021 by K. Smart Associates Limited

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.2.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2021 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.



Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



Heavy Vehicle and Equipment Traffic

There are several agricultural users in the area that use the Township’s bridges. These users have heavy agricultural equipment, such as tractors, that require bridges to maintain their current load carrying capacity beyond what typical commuter bridges would require. Bridge repair and reconstruction should be prioritized to ensure all users can be accommodated.



Capital Funding Strategies

Major capital rehabilitation projects for bridges and culverts are entirely dependant on the availability of grant funding opportunities. When grants are not available, bridge rehabilitation projects may be deferred. An annual capital

funding strategy can reduce dependency on grant funding and help prevent deferral of capital works.

4.2.6 Levels of Service

The following tables identify the Township’s current level of service for Bridges & Culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Bridges & Culverts.

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. None of the municipality's structures have loading or dimensional restrictions meaning that most types of vehicles, including heavy agriculture vehicles, buses, motor vehicles, emergency vehicles and cyclists can cross them without restriction.
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges	See Appendix B
	Description or images of the condition of bridges & culverts and how this would affect use of the culverts	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by Bridges & Culverts.

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of bridges in the Township with loading or dimensional restrictions	13%
Quality	Average bridge condition index value for bridges in the Township	59%
	Average bridge condition index value for structural culverts in the Township	50%
Performance	Capital re-investment rate	0.03%

4.2.7 Recommendations

Data Review/Validation

- Continue to review and validate inventory data, assessed condition data and replacement costs for all bridges and structural culverts upon the completion of OSIM inspections every 2 years.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- This AMP only includes capital costs associated with the reconstruction of bridges and culverts. The Township should work towards identifying projected capital rehabilitation and renewal costs for bridges and culverts and integrating these costs into long-term planning.

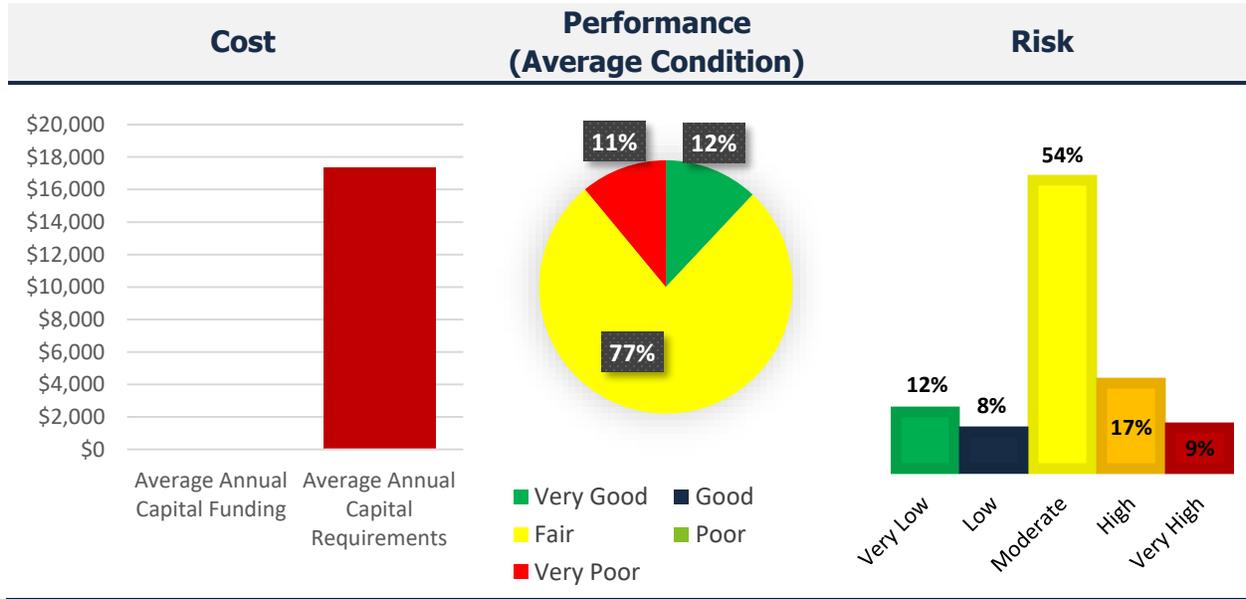
Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.3 Stormwater Network

The Township is responsible for owning and maintaining a stormwater network of catch basins and non-structural culvert.

The table below outlines high-level service indicators for the Stormwater Network.



4.3.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township’s Stormwater Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Non-Structural Culvert	233	User-Defined Cost	\$420,004
Catch basins	13	User-Defined Cost	\$23,400
			\$443,404

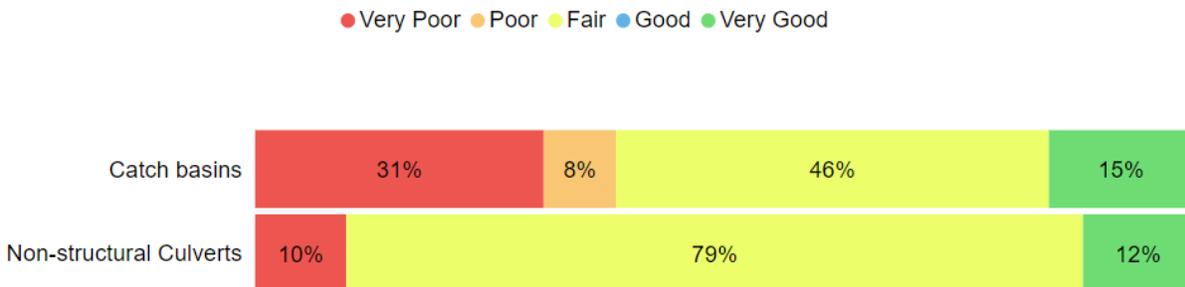
Total Replacement Cost
\$443.4K



4.3.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

	Average Condition (%)	Average Condition Rating	Condition Source
Non-Structural Culvert	48%	Fair	100% Assessed
Catch basins	48%	Fair	100% Assessed
	48%	Fair	100% Assessed



To ensure that the Township’s Stormwater Network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Stormwater Network.

Current Approach to Condition Assessment

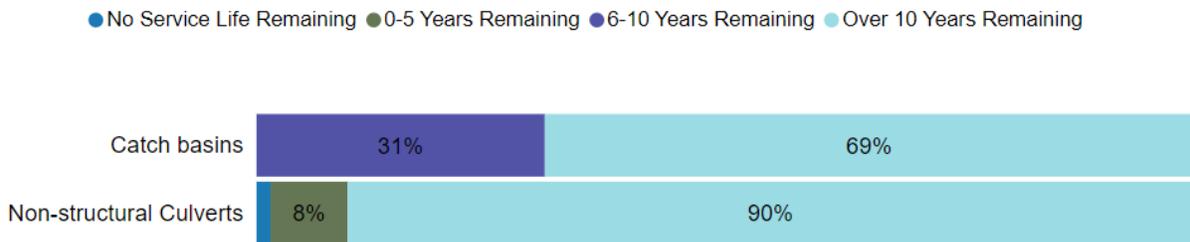
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality’s current approach:

- The drainage superintendent will investigate drainage issues on a complaint basis, over the course of the year. Although no condition score is developed, specific problem will be noted.
- The assessment results and recommended maintenance are provided to the road foreman for implementation.

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Stormwater Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Non-Structural Culvert	25 Years	11.6	11.6
Catch basins	40 Years	36.9	19.7
		13.4	11.8



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.3.4 Lifecycle Management Strategy

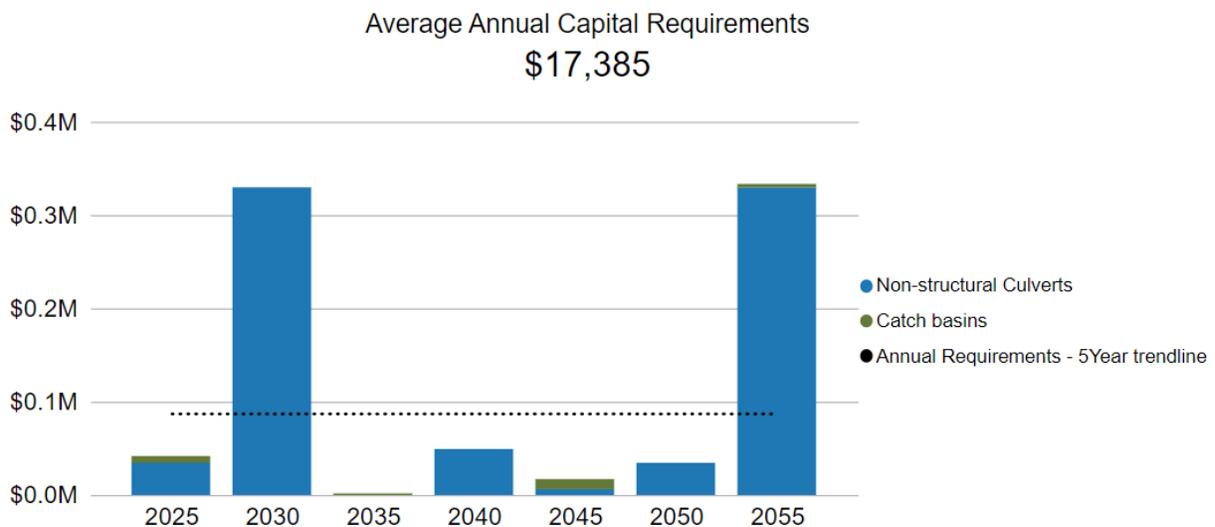
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Erosion control is performed for drains periodically
	Annual catchbasins cleaning is performed to remove obstacles and debris
	Beaver dams are removed periodically
	Road foreman will follow the recommendations by the drainage superintendent for maintenance
Replacement	Full replacement is undertaken once it reaches its end-of-life

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.3.5 Risk & Criticality

Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2021 inventory data. See Appendix C for the criteria used to determine the risk rating of each asset.

Consequence	5	- \$0.00	- \$0.00	- \$0.00	- \$0.00	31.00 m \$8,642.80
	4	133.00 unit(s), m \$32,660.80	- \$0.00	261.00 unit(s), m \$66,338.40	- \$0.00	16.00 unit(s), m \$10,545.60
	3	78.00 m \$18,302.40	- \$0.00	1,272.00 unit(s), m \$237,710.00	1.00 unit(s) \$1,800.00	130.00 m \$21,320.00
	2	12.00 m \$1,968.00	- \$0.00	223.00 m \$36,572.00	- \$0.00	46.00 m \$7,544.00
	1	- \$0.00	- \$0.00	- \$0.00	- \$0.00	- \$0.00
		1	2	3	4	5
		Probability				

Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:



Environmental & Infrastructure Design

Drains constructed near the railroads or underneath the heavy vehicle routes are experiencing higher risks than other drains. The vibration of the ONR (Ontario Northland Railway) traffic can more readily damage the drains, leading to blockages in the drainage system. Similarly, heavy agricultural vehicles can cause accelerated deterioration to drains from heavy loading. A risk-based prioritization can enable the Township to better identify higher risk assets to shortlist for proactive repairs.

Climate Change & Extreme Weather Events



The trend of climate change-induced extreme weather events is projected to continue. High frequency and intensity of precipitation and snowfall can pose a flooding risk to the community. Drainage capacity may need to be increased to accommodate increased rainfall and snowmelt frequencies.

4.3.6 Levels of Service

The following tables identify the Township’s current level of service for Stormwater Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Stormwater Network.

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Stormwater Network.

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties in municipality resilient to a 100-year storm	TBD ²
	% of the municipal stormwater management system resilient to a 5-year storm	100% ³
Performance	Capital reinvestment rate	0%

² The Township does not currently have data available to determine flood protection. Further analysis is required.

³ This is based on the observations of municipal staff.

4.3.7 Recommendations

Asset Inventory

- The catch basins inventory includes a number of pooled assets that should be broken into discrete segments to allow for detailed planning and analysis.

Condition Assessment Strategies

- Determine a consistent condition rating criteria to assess the condition of culverts and catch basins.
- Continue the yearly inspection of the stormwater network and document the results in Citywide Inventory to enable the delivery of effective lifecycle strategies and guide capital planning.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Stormwater Network on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.4 Non-Core Asset Categories

This AMP primarily focuses on core asset categories as defined in O. Reg. 588/17. The following asset categories are not considered core municipal infrastructure:

- Buildings & Land Improvements
- Vehicles, Equipment & Machinery

A high-level analysis of these asset categories. For most of these assets the Township does not currently have assessed condition data available and replacement costs are based primarily on historical cost inflation.

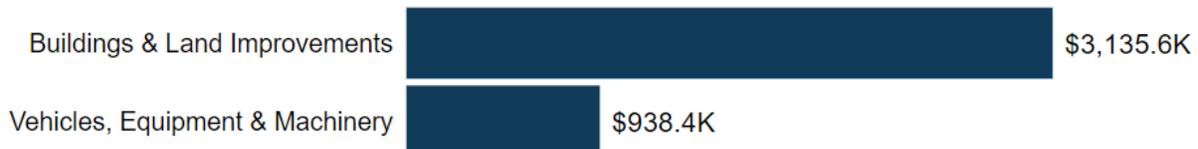
The Township will work towards improving data quality and meeting all requirements required prior to July 1, 2024.

4.4.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each non-core asset category in the Township’s inventory.

Asset Category	Quantity	Replacement Cost Method	Total Replacement Cost
Buildings & Land Improvement	11	User-Defined Cost	\$3,135,604
Vehicles, Equipment & Machinery	11	CPI Tables	\$938,392
			\$4,073,996

Total Replacement Cost
\$4.1M

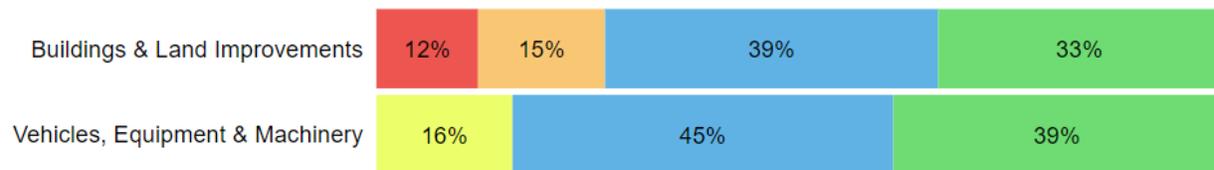


4.4.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each non-core asset category. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Buildings & Land Improvement	63%	Good	Age-based
Vehicles, Equipment & Machinery	71%	Good	Age-based
	57%	Good	Age-based

● Very Poor ● Poor ● Fair ● Good ● Very Good

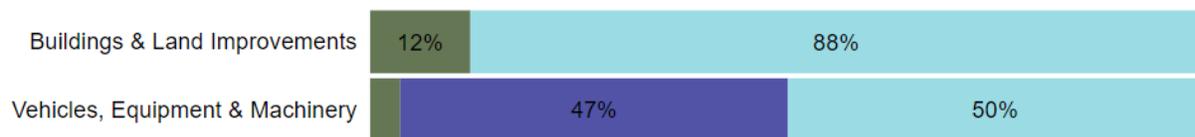


4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for non-core assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Category	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Buildings & Land Improvement	50-75 Years	27.2	44.5
Vehicles, Equipment & Machinery	5-25 Years	4.9	9.8
		17.8	29.8

● No Service Life Remaining ● 0-5 Years Remaining ● 6-10 Years Remaining ● Over 10 Years Remaining

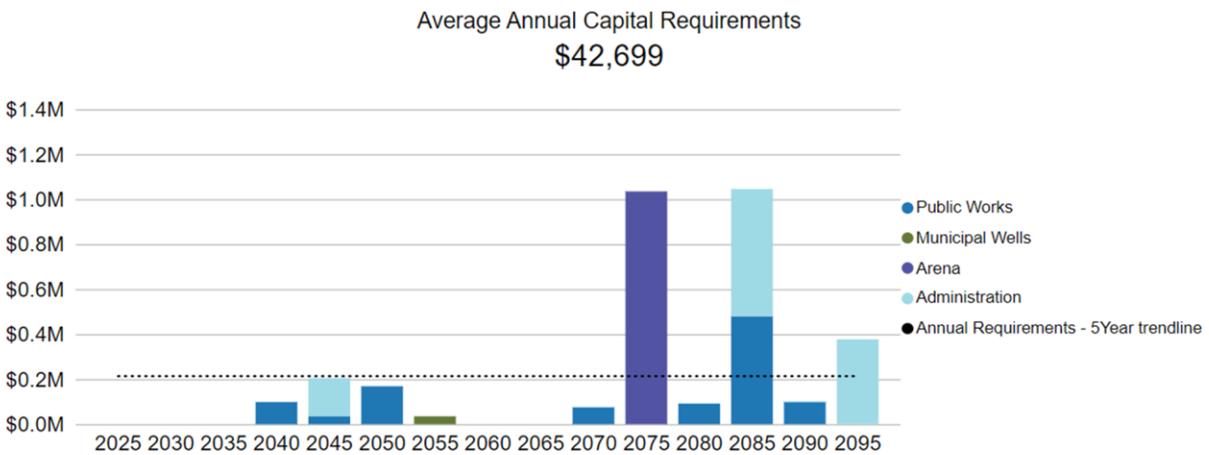


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

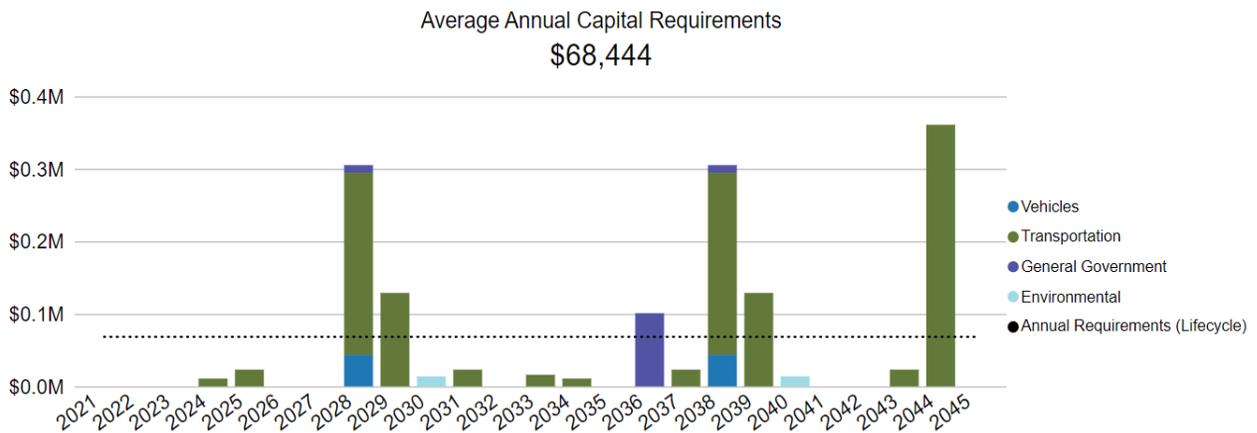
4.4.4 Forecasted Capital Requirements (Replacement Only)

The following graphs forecast long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The following is the annual capital requirement for Buildings & Land Improvement.



The following is the annual capital requirement for Vehicles, Equipment & Machinery.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow the Township to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure
- Minor population and employment growth is expected
- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

5.1 Description of Growth Assumptions

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Township to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

5.1.1 Central Timiskaming Planning Area Official Plan (December 2012)

The Central Timiskaming Planning Area encompasses the Township of Chamberlain, Township of Evanturel, Municipality of Charlton and Dack, and the Town of Englehart. Their Official Plan was developed and given approval by the Ministry of Municipal Affairs and Housing in December 2012 with modifications. The policies contained in the Official Plan cover a planning period to the year 2026.

The following table summarizes the historical population, employment, and total private dwellings based on StatsCan Census.

Year	2011	2016	2021
Population	452	449	502
Employment	N/A	225	N/A
Private Dwellings	194	201	203

Population growth infilling in the Central Timiskaming Planning Area will be directed to areas with existing serviced areas with higher densities. This is primarily towards the Town of Englehart and the Municipality of Charlton and Dack. Notably, the Township of Evanturel has the most developable land for highway commercial uses.

5.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Township's asset management plan must include a discussion of how the assumptions regarding future changes in population and economic activity informed the preparation of the lifecycle management and financial strategy.

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

While Evanturel does not currently own or maintain water and sewage systems, public piped water and sanitary services have been provided to some areas through the Town of Englehart. There are also six areas within Evanturel that have private water systems; four of these systems are private water distribution systems, and the other two are single hookup sites scattered throughout the Town. In the longer term, Evanturel's council intends to review the costs of taking over the six private water distribution services and the private sewerage collection service. Where necessary, the systems will be replaced with new public services, subject to an agreement being reached with Englehart, funding, and appropriate approvals for construction.

6

Financial Strategy

Key Insights

- The Township is committing approximately \$93,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of \$586,000, there is currently a funding gap of \$493,000 annually
- For tax-funded assets, we recommend increasing tax revenues by 1.5% each year for the next 20 years to achieve a sustainable level of funding

6.1 Financial Strategy Overview

For an asset management plan to be effective and meaningful, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow Township of Ewanturel to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. The financial requirements for:
 - a. Existing assets
 - b. Existing service levels
 - c. Requirements of contemplated changes in service levels (none identified for this plan)
 - d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
 - a. Tax levies
 - b. User fees
 - c. Reserves
 - d. Debt
 - e. Development charges
3. Use of non-traditional sources of municipal funds:
 - a. Reallocated budgets
 - b. Partnerships
 - c. Procurement methods
4. Use of Senior Government Funds:
 - a. Gas tax
 - b. Annual grants

Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

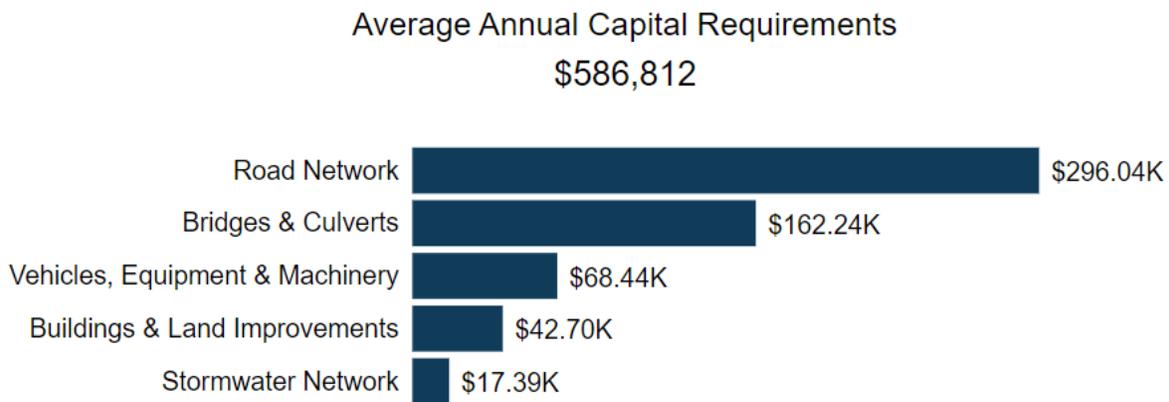
If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

1. In order to reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:
 - a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
 - b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

6.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Township must allocate approximately \$0.6 million annually to address capital requirements for the assets included in this AMP.



For most asset categories the annual requirement has been calculated based on a “replacement only” scenario, in which capital costs are only incurred at the construction and replacement of each asset.

However, for the Road Network and Sanitary Sewer Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township’s roads and sanitary sewer mains respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network and Sanitary Sewer Network:

1. **Replacement Only Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.

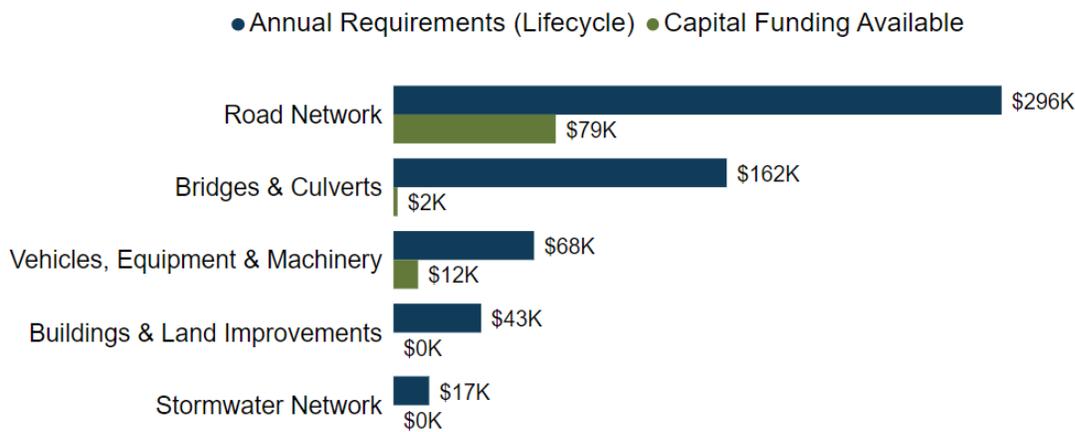
2. **Lifecycle Strategy Scenario:** Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	\$322,785	\$296,040	\$26,744
Bridges & Culverts	\$129,311	\$162,244	\$32,933

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of \$26,744 for the Road Network and \$32,933 cost increase for Bridge & Culverts. This represents an overall reduction of the annual requirements for Roads by 8% and increase of 25% for Bridges & Culverts respectively. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$93,000 towards capital projects per year. Given the annual capital requirement of \$586,000, there is currently a funding gap of \$493,000 annually.



6.2 Funding Objective

We have developed a scenario that would enable Evanturel to achieve full funding within 1 to 20 years for the following assets: Bridges & Culverts, Buildings & Land Improvements, Road Network, Stormwater Network, Vehicles, Equipment & Machinery. These assets are funded through taxes.

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.

For each scenario developed we have included strategies, where applicable, regarding the use of cost containment and funding opportunities.

6.3 Financial Profile

6.3.1 Current Funding Position

The following tables show, by asset category, Evanturel's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	Gas Tax	OCIF	Total Available	
Bridges & Culverts	162,000	2,000	0	0	2,000	160,000
Buildings & Land Improvements	43,000	0	0	0	0	43,000
Road Network	296,000	0	28,000	51,000	79,000	217,000
Stormwater Network	17,000	0	0	0	0	17,000
Vehicles, Equipment & Machinery	68,000	12,000	0	0	12,000	56,000
	586,000	14,000	28,000	51,000	93,000	493,000

The average annual investment requirement for the above categories is \$586,000. Annual revenue currently allocated to these assets for capital purposes is \$93,000 leaving an annual deficit of \$493,000. Put differently, these infrastructure categories are currently funded at 16% of their long-term requirements.

6.3.2 Full Funding Requirements

In 2020, Township of Evanturel had annual tax revenues of \$615,000. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Bridges & Culverts	26.0%
Buildings & Land Improvements	7.0%
Road Network	35.3%
Stormwater Network	2.8%
Vehicles, Equipment & Machinery	9.1%
	80.2%

The following changes in costs and/or revenues over the next number of years should also be considered in the financial strategy:

- a) Evanturel's debt payments for these asset categories will be decreasing by \$68,000 over the next 5 years and by \$77,000 over the next 10 years.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. The table below outlines this concept and presents several options:

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	493,000	493,000	493,000	493,000	493,000	493,000	493,000	493,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-68,000	-77,000	-77,000	-77,000
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
Resulting Infrastructure Deficit:	493,000	493,000	493,000	493,000	425,000	416,000	416,000	416,000
Tax Increase Required	80.2%	80.2%	80.2%	80.2%	69.1%	67.6%	67.6%	67.6%
Annually:	12.5%	6.1%	4.1%	3.0%	11.1%	5.4%	3.6%	2.7%

6.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option. This involves full funding being achieved over 20 years by:

- a) when realized, reallocating the debt cost reductions of \$68,000 and \$77,000 to the infrastructure deficit as outlined above.
- b) increasing tax revenues by 1.5% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- c) allocating the current gas tax and OCIF revenue as outlined previously.
- d) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
- e) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
- f) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment⁴.
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of \$257,000 for Bridges & Culverts, and \$2,399,000 for the Road Network.

Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

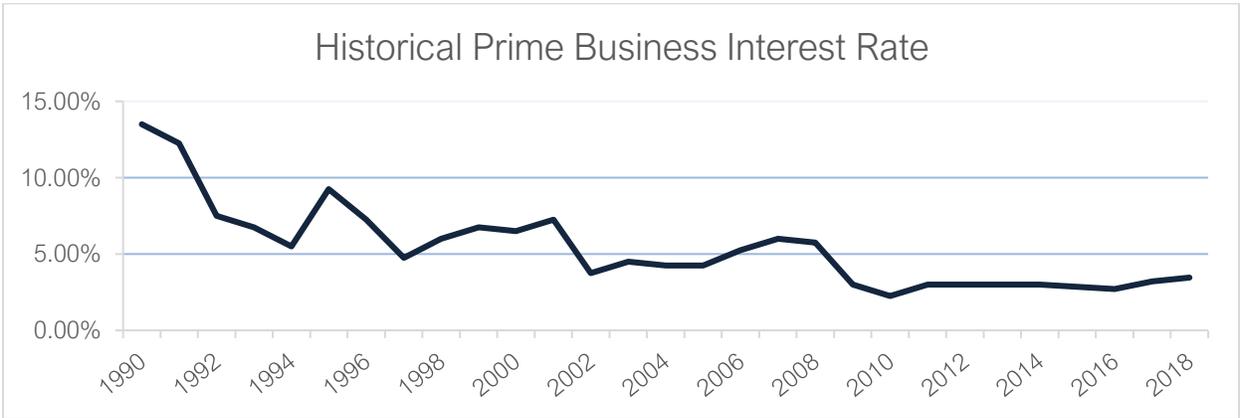
⁴ The Township should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. Depending on the outcome of this review, there may be changes that impact its availability.

6.4 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a \$1M project financed at 3.0%⁵ over 15 years would result in a 26% premium or \$260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

It should be noted that current interest rates are near all-time lows. Sustainable funding models that include debt need to incorporate the risk of rising interest rates. The following graph shows where historical lending rates have been:



⁵ Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The following tables outline how Evanturel has historically used debt for investing in the asset categories as listed. There is currently \$95,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of \$77,000, well within its provincially prescribed maximum of \$155,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Bridges & Culverts	0	0	0	0	0	0
Buildings & Land Improvements	0	0	0	0	0	0
Road Network	63,000	0	0	0	81,000	0
Stormwater Network	0	0	0	0	0	0
Vehicles, Equipment & Machinery	32,000	0	0	0	132,000	0
Total Tax Funded:	95,000	0	0	0	213,000	0

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2021	2022	2023	2024	2025	2026	2031
Bridges & Culverts	0	0	0	0	0	0	0
Buildings & Land Improvements	0	0	0	0	0	0	0
Road Network	11,000	10,000	10,000	10,000	10,000	9,000	0
Stormwater Network	0	0	0	0	0	0	0
Vehicles, Equipment & Machinery	66,000	32,000	0	0	0	0	0
Total Tax Funded:	77,000	42,000	10,000	10,000	10,000	9,000	0

The revenue options outlined in this plan allow Evanturel to fully fund its long-term infrastructure requirements without further use of debt.

6.5 Use of Reserves

6.5.1 Available Reserves

Reserves play a critical role in long-term financial planning. The benefits of having reserves available for infrastructure planning include:

- a) the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors
- b) financing one-time or short-term investments
- c) accumulating the funding for significant future infrastructure investments
- d) managing the use of debt
- e) normalizing infrastructure funding requirement

By asset category, the table below outlines the details of the reserves currently available to Evanturel.

Asset Category	Balance at December 31, 2020
Bridges & Culverts	48,000
Buildings & Land Improvements	696,000
Road Network	103,000
Stormwater Network	48,000
Vehicles, Equipment & Machinery	69,000
Total Tax Funded:	964,000

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Township should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should take into account when determining their capital reserve requirements include:

- a) breadth of services provided
- b) age and condition of infrastructure
- c) use and level of debt
- d) economic conditions and outlook
- e) internal reserve and debt policies.

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Evanturel's judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

6.5.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Ewanturel to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

7

Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B includes several maps that have been used to visualize the current level of service
- Appendix C identifies the criteria used to calculate risk for each asset category
- Appendix D provides additional guidance on the development of a condition assessment program

Appendix A: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years in order to meet projected capital requirements and maintain the current level of service.

Road Network											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Paved Roads	\$1,464,000	\$0	\$0	\$48,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Surface Treated Roads	\$0	\$0	\$27,900	\$49,600	\$0	\$0	\$248,000	\$0	\$0	\$49,600	\$471,200
Gravel Roads	\$0	\$0	\$7,680	\$74,215	\$24,462	\$2,378	\$10,820	\$39,532	\$128,881	\$73,804	\$59,458
	\$1,464,000	\$0	\$35,580	\$172,615	\$24,462	\$2,378	\$258,820	\$39,532	\$128,881	\$123,404	\$530,658

Bridges & Culverts											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Bridges	\$0	\$0	\$0	\$0	\$210,000	\$0	\$0	\$0	\$0	\$2,200,000	\$0
Culverts	\$257,254	\$528,732	\$40,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$257,254	\$528,732	\$40,000	\$0	\$210,000	\$0	\$0	\$0	\$0	\$2,200,000	\$0

Stormwater Network											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Non-Structural Culvert	\$0	\$6,298	\$0	\$0	\$0	\$0	\$34,555	\$0	\$0	\$0	\$0
Catch basins	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,200	\$0	\$0	\$0
	\$0	\$6,298	\$0	\$0	\$0	\$0	\$34,555	\$7,200	\$0	\$0	\$0

Vehicle, Equipment & Machinery

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Transportation	\$0	\$0	\$0	\$0	\$10,923	\$23,155	\$0	\$0	\$250,962	\$129,008	\$0
General Government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,507	\$0	\$0
Vehicles	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$43,736	\$0	\$0
Environmental	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,833
	\$0	\$0	\$0	\$0	\$10,923	\$23,155	\$0	\$0	\$305,205	\$129,008	\$13,833

Buildings & Land Improvements

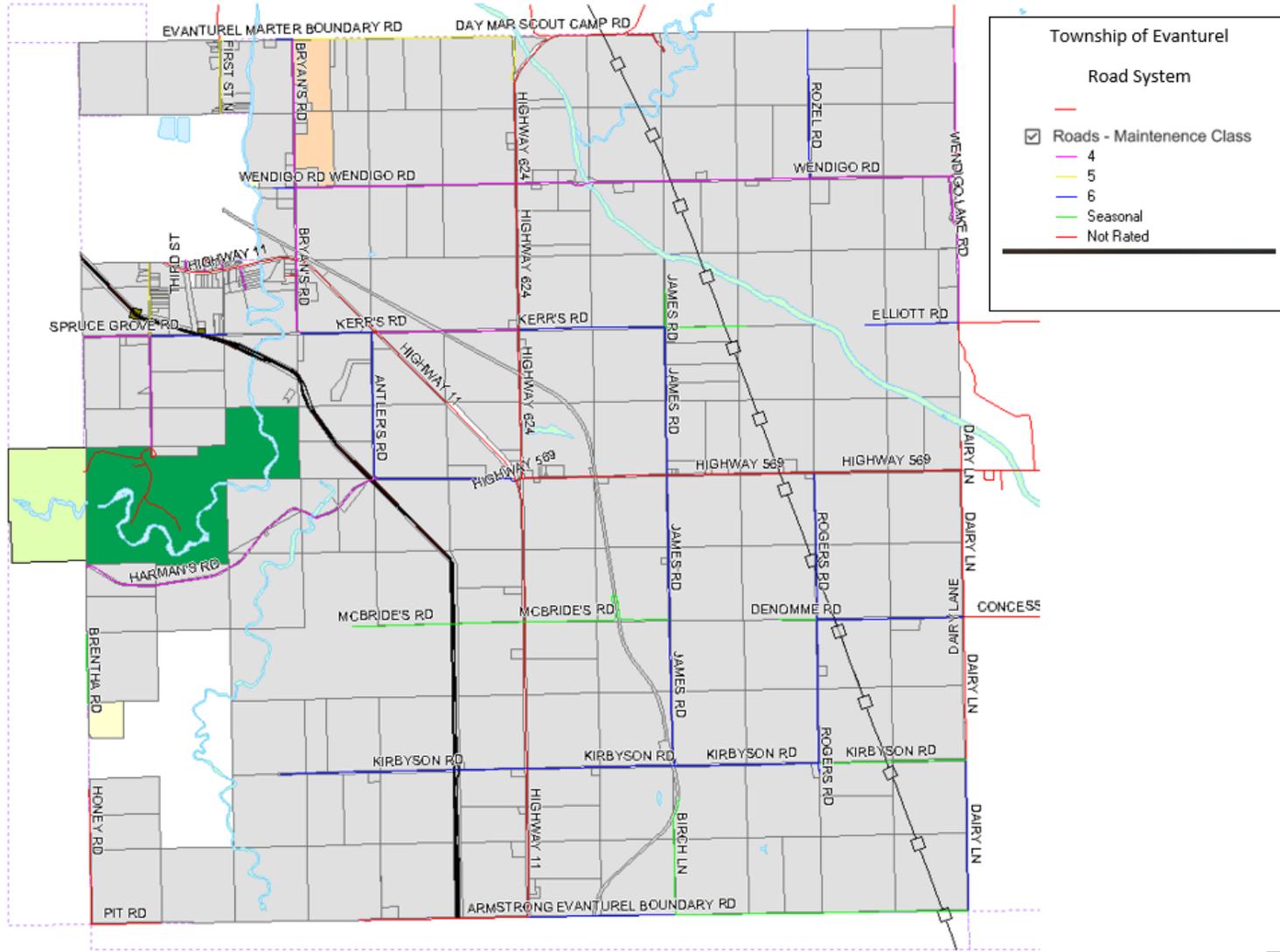
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Administration	\$0	\$0	\$377,325	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Arena	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Public Works	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Municipal Wells	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$377,325	\$0							

All Asset Categories

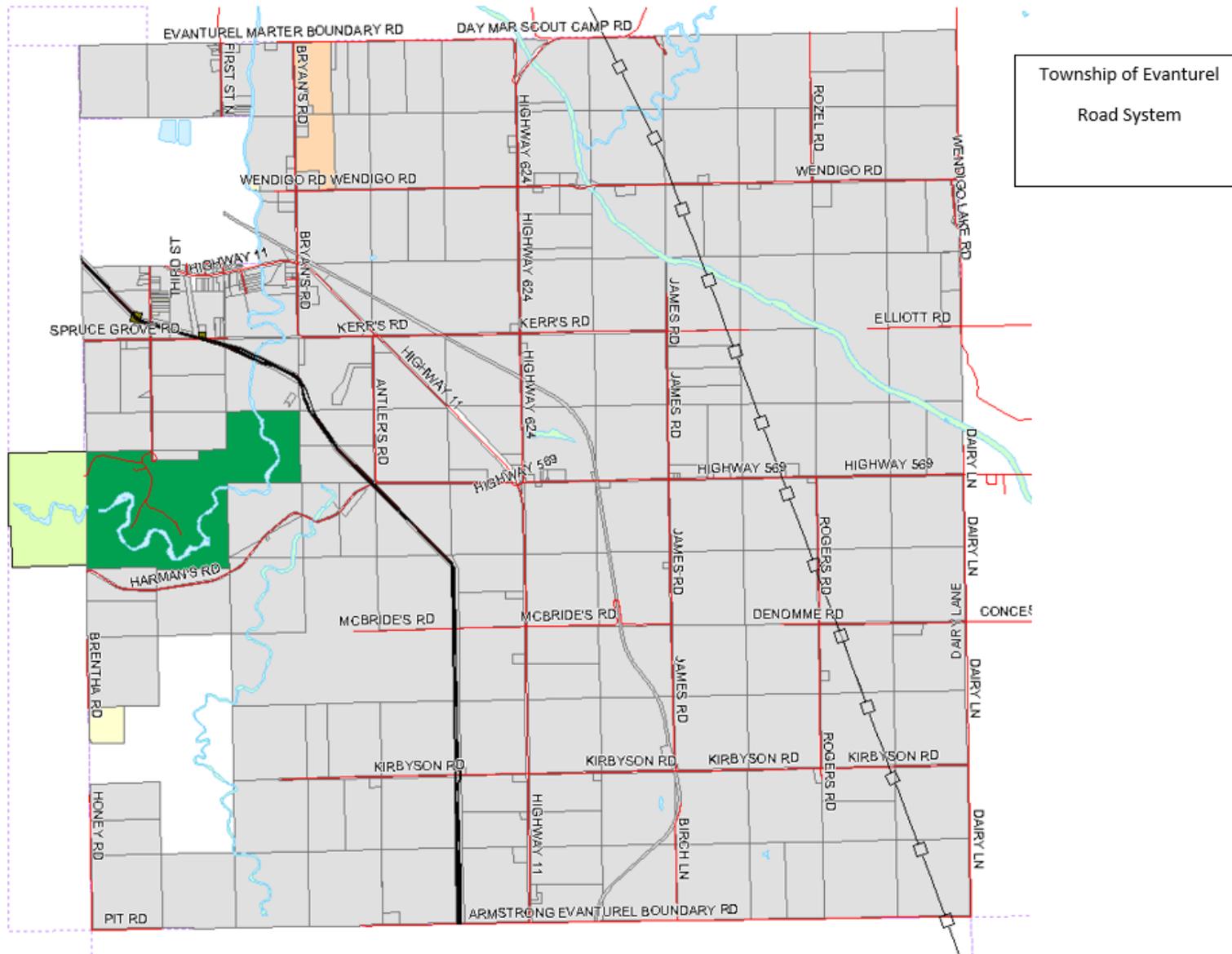
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Road Network	\$1,464,000	\$0	\$35,580	\$172,615	\$24,462	\$2,378	\$258,820	\$39,532	\$128,881	\$123,404	\$530,658
Bridges & Culverts	\$257,254	\$528,732	\$40,000	\$0	\$210,000	\$0	\$0	\$0	\$0	\$2,200,000	\$0
Stormwater Network	\$0	\$6,298	\$0	\$0	\$0	\$0	\$34,555	\$7,200	\$0	\$0	\$0
Vehicles, Equipment & Machinery	\$0	\$0	\$0	\$0	\$10,923	\$23,155	\$0	\$0	\$305,205	\$129,008	\$13,833
Buildings & Land Improvements	\$0	\$0	\$377,325	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$1,721,254	\$535,030	\$452,905	\$172,615	\$434,086	\$2,452,412	\$544,491	\$1,721,254	\$535,030	\$452,905	\$172,615

Appendix B: Level of Service Maps

Road Network Map with Maintenance Class



Road Network Map



Images of Bridge in Fair Condition

Harman's Bridge

Inspected: October 7th, 2021



Photo 1: West Approach (looking east)



Photo 2: Structure Soffit (looking west)



Photo 3: South Railing (looking west)



Photo 4: West Abutment



Photo 5: Corrosion on Floor Beam Braces



Photo 6: Northwest Retaining Wall

Images of Bridge in Good Condition

Wendigo Road Bridge

Inspected: October 7th, 2021

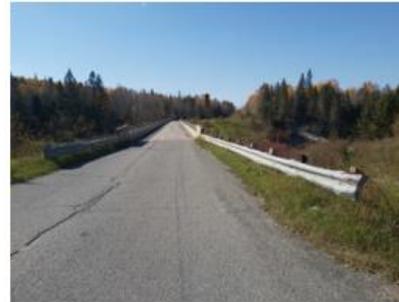


Photo 1: East Approach (looking west)



Photo 2: Central Span (looking east)



Photo 3: West Pier (looking east)



Photo 4: West Abutment



Photo 5: East Span (looking west)



Photo 6: Bell line Run Through Railing

Images of Culvert in Good Condition

Rodger's Road Culvert
Inspected: October 7th, 2021



Photo 1: East Elevation



Photo 2: West Elevation



Photo 3: Inside Barrel (looking east)



Photo 4: South Approach (looking north)



Photo 5: Heaving at Bottom of Culvert



Photo 6: Beaver Dam at Upstream Inlet

Images of Culvert in Very Good Condition

Kirbyson Road Culvert
Inspected: October 7th, 2021



Photo 1: South Elevation



Photo 2: North Elevation



Photo 3: Inside Barrel (looking north)



Photo 4: East Approach (looking west)

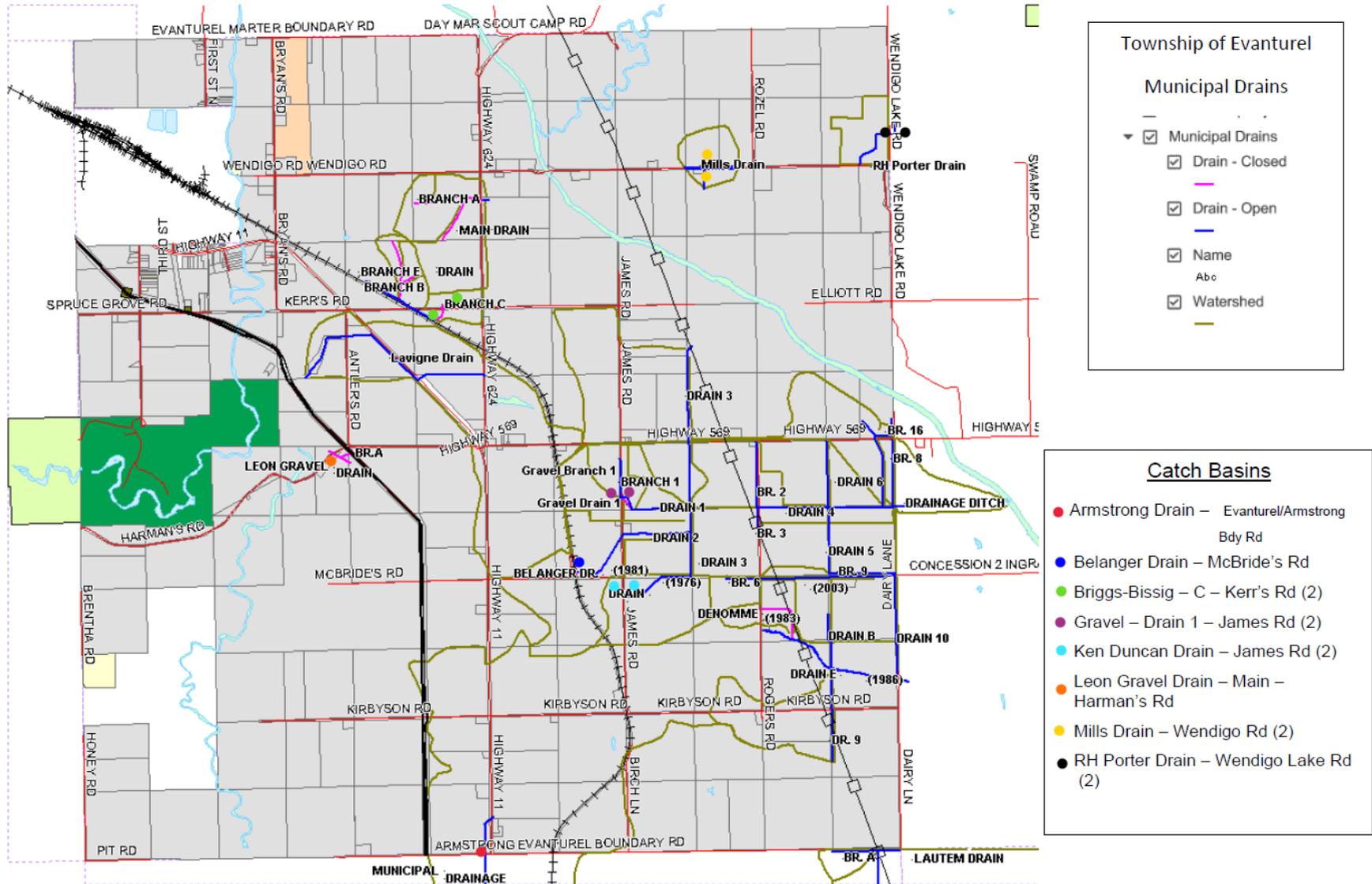


Photo 5: Wearing Surface (looking west)



Photo 6: West Approach (looking east)

Stormwater Network - Municipal Drains Map



Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network (Roads) Bridges & Culverts Stormwater Network	Condition	70%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Paved Roads)	Economic (100%)	Replacement Cost (100%)	\$0-\$10,000	1
			\$10,000-\$50,000	2
			\$50,000-\$500,000	3
			\$500,000-\$750,000	4
			\$750,000+	5
Road Network (Gravel Roads)	Economic (100%)	Replacement Cost (100%)	\$0-\$100,000	1
			\$100,000-\$250,000	2
			\$250,000-\$500,000	3
			\$500,000-\$1,000,000	4
			\$1,000,000+	5
Stormwater Network (Culverts, Catch Basins)	Economic (100%)	Replacement Cost (100%)	\$0-\$500	1
			\$500-\$1,000	2
			\$1,000-\$3,000	3
			\$3,000-\$6,000	4
			\$6,000+	5
Bridges & Culverts	Economic (100%)	Replacement Cost (100%)	\$0-\$100,000	1
			\$100,000-\$250,000	2
			\$250,000-\$500,000	3
			\$500,000-\$1,000,000	4
			\$1,000,000+	5

Appendix D: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the Township's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

Role of Asset Condition Data

The goal of collecting asset condition data is to ensure that data is available to inform maintenance and renewal programs required to meet the desired level of service. Accurate and reliable condition data allows municipal staff to determine the remaining service life of assets, and identify the most cost-effective approach to deterioration, whether it involves extending the life of the asset through remedial efforts or determining that replacement is required to avoid asset failure.

In addition to the optimization of lifecycle management strategies, asset condition data also impacts the Township's risk management and financial strategies. Assessed condition is a key variable in the determination of an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, the Township can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, the Township can develop long-term financial strategies with higher accuracy and reliability.

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource-intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, the Township should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

1. **Relevance:** every data item must have a direct influence on the output that is required
2. **Appropriateness:** the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
3. **Reliability:** the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
4. **Affordability:** the data should be affordable to collect and maintain