AMP2016

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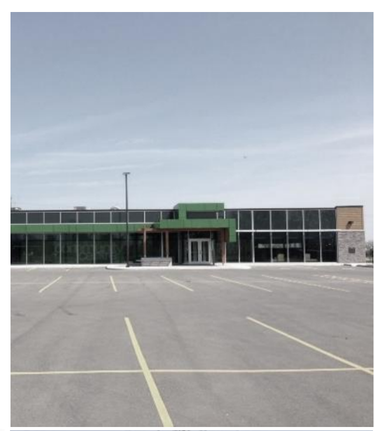
The 2016 Asset Management Plan for the

Town of Lakeshore



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Executive Summary

Infrastructure is inextricably linked to the economic, social and environmental advancement of a community. Municipalities own and manage nearly 60% of the public infrastructure stock in Canada. As analyzed in this asset management plan (AMP), the Town of Lakeshore's infrastructure portfolio comprises nine distinct infrastructure categories: road network, bridges & culverts, facilities, storm water, water, waste water, land improvements, vehicles, and machinery & equipment. Note that only in-service assets are considered while the municipality's land assets are not included in the analysis of this AMP. Together, these nine asset categories had a total valuation of $724 million in 2016, with the water network comprising 26% of the portfolio valuation, followed by the road network at 24%. Valuation is defined as the 2016 replacement cost of the assets without consideration of expansion, betterments or acquisition of new assets. The method used to calculate the replacement cost for each asset category is outlined in section VI 'State of Local Infrastructure'.

Similar to other municipalities in Ontario, Lakeshore experienced a period of increasing levels of investment beginning in the 1980s, with more rapid increases in the late 1990s. The majority of investment was made in roads, water, buildings and waste water assets. Since 2010, significant investments have been made in buildings ($46 million), waste water network ($28 million), and road network ($27 million).

Strategic asset management is critical in extracting the highest total value from public assets at the lowest lifecycle cost. This AMP, the municipality's second following the completion of its first edition in 2014, details the state of infrastructure of the municipality's service areas and provides asset management and financial strategies designed to facilitate its pursuit of developing an advanced asset management program and mitigate long-term funding gaps.

Based on 2016 replacement cost, and primarily age-based data, while the majority, 65%, of the municipality's total asset portfolio as analyzed in this AMP is in very good or good condition, more than 20% of the assets, with a valuation of $158 million, is in poor to very poor condition. While age is not a precise indicator of an asset's health, it can serve as a meaningful approximation in the absence of condition data. Approximately 80% of the municipality's assets, with a valuation of $559 million, have at least 10 years of useful life remaining. However, a significant portion, with a valuation of $95 million, remain in operation beyond their useful life. An additional 4% of assets valued at $31 million will reach the end of their useful life in the next five years.

In order for an AMP to be effectively put into action, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the municipality to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

We've developed recommendations and strategies to produce full funding for both tax and user rate based assets.

The average annual investment requirement for the municipality's tax funded categories is $14,116,000. Annual revenue currently allocated to these assets for capital purposes is $6,554,000 leaving an annual deficit of $7,562,000. To put it another way, these infrastructure categories are currently funded at 46% of their long-term requirements. In 2016, the municipality has annual tax revenues of $24,845,000. Our recommendations include capturing decreases in debt repayment cost and allocating them to the infrastructure deficit. Based on the above analysis, our strategy for full funding specific to the Municipality of Lakeshore requires a 20 years phase-in period.

We recommend the following:

- When realized, reallocating the debt cost reductions of $333,000 to the infrastructure deficit
- Increasing tax revenues by 1.5% each year for the next 20 years solely for the purpose of phasing in full funding to the tax funded asset categories covered in this AMP.
- Maintaining existing allocations of Federal Gas Tax revenue and OCIF revenue
- Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

The average annual investment requirement for the municipality's user rate funded categories is $4,661,000. Annual revenue currently allocated to these assets for capital purposes is $926,000, leaving an annual deficit of $3,735,000. To put it another way, these infrastructure categories are currently funded at 20% of their long-term requirements. In 2016, Lakeshore has annual waste water revenues of $4,740,000 and annual water revenues of $7,866,000. Our recommendations incorporate debt reductions from each of waste water and water services. Our strategy for full funding requires a 15-year phase-in period. We recommend the following:

- when realized, reallocating the debt cost reductions of $1,020,000 for waste water services and $1,349,000 for water services to the applicable infrastructure deficit.
- increasing rate revenues by 1.6% for waste water services and 0.2% for water services each year for the next 15 years solely for the purpose of phasing in full funding to the rate funded asset categories covered in this AMP.
- increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

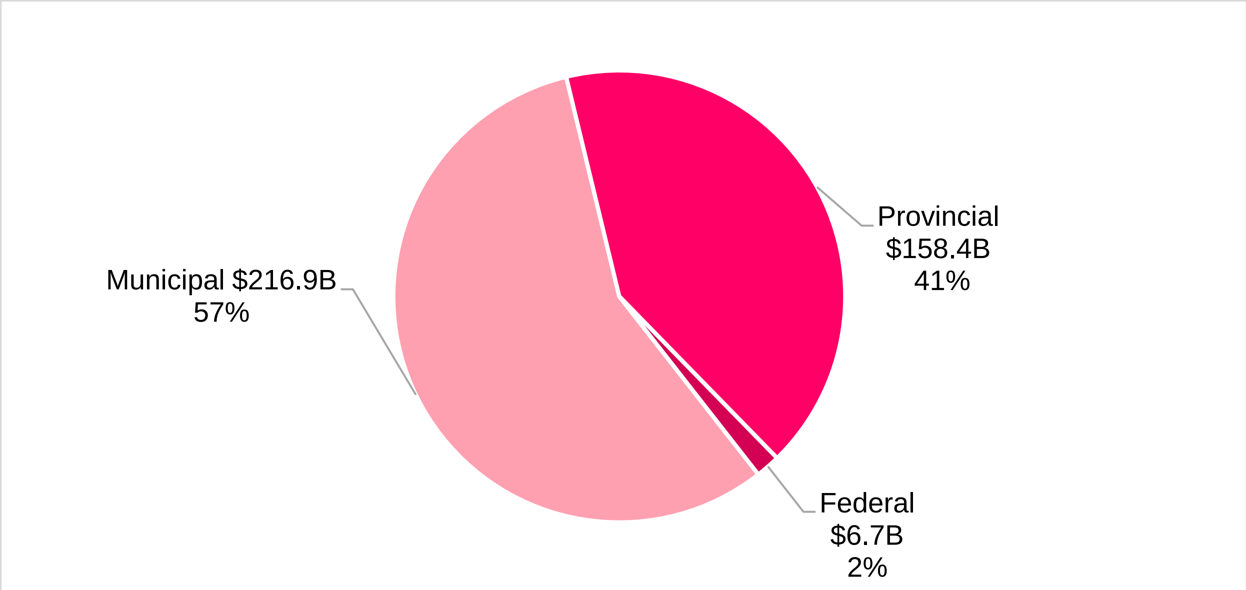
A critical aspect of this asset management plan is the level of confidence the municipality has in the data used to develop the state of the infrastructure and form the appropriate financial strategies. With the exception of facilities, land improvement assets, and machinery and equipment, the municipality has a high degree of confidence in the data used to develop this AMP. See Data Confidence within section V. Key Stats for more info.

Based on the analysis presented in this AMP, a list of projects that have been identified as a priority are outlined in Appendix 2.

I. Introduction & Context

Across Canada, municipal share of public infrastructure increased from 22% in 1955 to nearly 60% in 2013. The federal government's share of critical infrastructure stock, including roads, water and wastewater, declined by nearly 80% in value since 1963.[1]

FIGURE 1 DISTRIBUTION OF NET STOCK OF CORE PUBLIC INFRASTRUCTURE



Ontario's municipalities own more of the province's infrastructure assets than both the provincial and federal government. The asset portfolios managed by Ontario's municipalities are also highly diverse. The municipality relies on these assets to provide residents, businesses, employees and visitors with safe access to important services, such as transportation, recreation, culture, economic development and much more. As such, it is critical that the municipality manage these assets optimally in order to produce the highest total value for taxpayers. This asset management plan, (AMP) will assist the municipality in the pursuit of judicious asset management for its capital assets.

[1] Larry Miller, Updating Infrastructure In Canada: An Examination of Needs And Investments Report of the Standing Committee on Transport, Infrastructure and Communities, June 2015

II. Asset Management

Asset management can be best defined as an integrated business approach within an organization with the aim to minimize the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service for present and future customers. It includes the planning, design, construction, operation and maintenance of infrastructure used to provide services. By implementing asset management processes, infrastructure needs can be prioritized over time, while ensuring timely investments to minimize repair and rehabilitation costs and maintain municipal assets.

TABLE 1 OBJECTIVES OF ASSET MANAGEMENT

Inventory	Capture all asset types, inventories and historical data.
Current Valuation	Calculate current condition ratings and replacement values (without expansion, betterments or new acquisitions).
Life Cycle Analysis	Identify Maintenance and Renewal Strategies & Life Cycle Costs.
Service Level Targets	Define measurable Levels of Service Targets.
Risk & Prioritization	Integrates all asset categories through risk and prioritization strategies.
Sustainable Financing	Identify sustainable Financing Strategies for all asset categories.
Continuous Processes	Provide continuous processes to ensure asset information is kept current and accurate.
Decision Making & Transparency	Integrate asset management information into all corporate purchases, acquisitions and assumptions.
Monitoring & Reporting	At defined intervals, assess the assets and report on progress and performance.

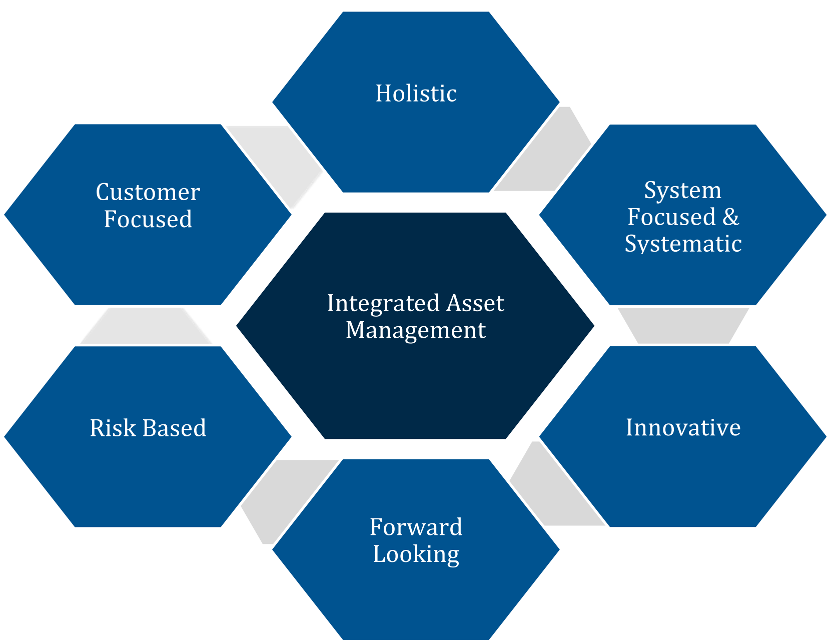
1. Overarching Principles

The Town of Lakeshore will employ a corporate asset management program to manage all its assets in a strategic, comprehensive and organization wide manner. Thus, the Town will treat all assets as essential components in an interrelated system, rather than as isolated parts. Departments will assess, manage or enhance assets using a corporate approach and collaborative processes across areas. The asset management program does not replace existing corporate strategy and business planning; or the budget management system and processes already in place. Instead, the asset management system complements and aligns to these initiatives, with the intent to provide a service-centric, global perspective that supports business strategies, objectives and plans.

TABLE 2 PRINCIPLES OF ASSET MANAGEMENT – THE INSTITUTE OF ASSET MANAGEMENT (IAM)

Holistic	Taking a comprehensive approach that visualizes the full impact of managing all aspects of the asset's life.
Systematic	Adopting a formal, consistent, repeatable approach to the management of infrastructure assets, will enable services to be provided in the most cost effective manner.
System Focused	Considering the assets within the context of the larger system, in terms of interrelationships between different assets, as opposed to optimizing individual assets in isolation.
Risk-based	Managing the asset risk associated with attaining the agreed levels of service, focusing resources, expenditures and priorities based upon risk and the corresponding cost/benefit
Innovative	Continuous improvement will be a key part of our asset management approach and will focus on driving innovation in the development of tools, techniques and solutions.
Forward Looking	Making the appropriate decisions and provisions to better enable our assets to meet the challenges of future customer expectations, legislative requirements and climate change.
Customer Focus	Adhering to the levels of service defined by Town Council from time to time, and adhering to good, or where proven cost effective, best practices or processes in asset management, supported by continually improving confidence in our asset and customer data.

FIGURE 2 PRINCIPLES OF ASSET MANAGEMENT



III. AMP Objectives and Content

This AMP is one component of Lakeshore's overarching corporate strategy. It was developed to support the municipality's vision for its asset management practice and programs. It provides key asset attribute data, including current composition of the municipality's infrastructure portfolio, inventory, useful life etc., summarizes the physical health of the capital assets, assesses the municipality's current capital spending framework, and outlines financial strategies to achieve fiscal sustainability in the long-term while reducing and eventually eliminating funding gaps.

As with the first edition of the municipality's asset management plan in 2014, this AMP is developed in accordance with provincial standards and guidelines, and new requirements under the Federal Gas Tax Fund stipulating the inclusion of all eligible asset categories. Previously, only core infrastructure categories were analyzed. The following asset categories are analysed in this document: road network, bridges & culverts, facilities, storm water, water, waste water, land improvements, vehicles, and machinery & equipment.

This AMP includes a detailed discussion of the state of local infrastructure and assets for each category; outlines industry standards levels of service and key performance indicators (KPIs); outlines asset management renewal strategy for major infrastructure; and provides financial strategy to mitigate funding shortfalls.

IV. Data and Methodology

The municipality's dataset for the asset categories analyzed in this AMP are maintained in PSD's CityWide® Tangible Assets module. This dataset includes key asset attributes and accounting disclosure (PSAB 3150) data, including historical costs, in-service dates, field inspection data (as available), asset health, replacement costs, etc.

1. Condition Data

Municipalities implement a straight-line amortization schedule approach to depreciate their capital assets. In general, this approach may not be reflective of an asset's actual condition and the true nature of its deterioration, which tends to accelerate toward the end of the asset's lifecycle. However, it is a useful approximation in the absence of standardized decay models and actual field condition data and can provide a benchmark for future requirements. We analyze each asset individually; therefore, while deficiencies may be present at the individual level, imprecisions are minimized at the asset-class level as the data is aggregated.

As available, actual field condition data was used to make recommendations more precise. The value of condition data cannot be overstated as they provide a more accurate representation of the state of infrastructure. See the section 2 'Condition Assessment' within the 'Asset Management Strategies' chapter for further recommendations related to condition assessments.

2. Financial Data

In this AMP, the average annual requirement is the amount based on current replacement costs that the municipality should set aside annually for each infrastructure class so that assets can be replaced upon reaching the end of their lifecycle.

To determine current funding capacity, all existing sources of funding are identified, aggregated, and an average for the previous three years is calculated, as data is available. These figures are then assessed against the average annual requirements, and are used to calculate the annual funding shortfall (surplus) and for forming the financial strategies.

Many municipalities face not only an annual shortfall, but also significant infrastructure backlogs. The infrastructure backlog is the accrued financial investment needed in the short-term to bring the assets to a state of good repair. This amount is identified for each asset class for Lakeshore in this report.

Only predictable sources of funding are used, e.g., tax and rate revenues, user fees, and other streams of income the municipality can rely on with a high degree of certainty including Federal Gas Tax and formula based OCIF funding allocations. Other government grants and ad-hoc injections of capital are not enumerated in this asset management plan given their unpredictability. As senior governments make greater, more predictable and permanent commitments to funding municipal infrastructure programs, as seen with the Federal Gas Tax Fund, future iterations of this asset management plan will account for such funding sources.

3. Infrastructure Report Card

The asset management plan is a complex document, but one with direct implications on the public, a group with varying degrees of technical knowledge. To facilitate communications, we've developed an Infrastructure Report Card that summarizes our findings in accessible language that municipalities can use for internal and external distribution. The report card is developed using two key, equally weighted factors as outlined in the table below. See Section X '2016 Infrastructure Report Card' for Lakeshores report card for each asset category.

TABLE 3 INFRASTRUCTURE REPORT CARD DESCRIPTION

Financial Capacity		A municipality's financial capacity is determined by how well it's meeting the average annual investment requirements (0-100%) for each infrastructure class.	
Asset Health		Using either field inspection data as available or age-based data, the asset health provide a grade for each infrastructure class based on the portion of assets in poor to excellent condition (0-100%). We use replacement cost to determine the weight of each condition group within the asset class.	
Letter Grade	**Rating**	**General Meaning**	**Description**
A	Very Good	Assets are fit for the future and the municipality is funding at least 90% of its annual needs.	The asset is functioning and performing well, only normal preventative maintenance is required. The municipality is fully prepared for its long-term replacement needs based on existing infrastructure portfolio.
B	Good	Assets are adequate for now and the municipality is meeting 70-89% of its annual needs.	The municipality is well prepared to fund its long-term replacement needs but requires additional funding strategies in the short-term to begin to increase its reserves.
C	Fair	Assets require intervention and the municipality is meeting 60-69% of its annual needs.	The asset's performance or function has started to degrade and repair/rehabilitation is required to minimize lifecycle cost. The municipality is under prepared to fund its long-term infrastructure needs. The replacement of assets in the short- and medium-term will likely be deferred to future years.
D	Poor	Assets are at risk and the municipality is meeting between 40-59% of its annual needs.	The asset's performance and function is below the desired level and immediate repair/rehabilitation is required. The municipality is not well prepared to fund its replacement needs in the short-, medium- or long-term. Asset replacements will be deferred and levels of service may be reduced.
F	Very Poor	Assets unfit for sustained service and the municipality is meeting less than 40% of its annual needs.	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.

4. Limitations and Assumptions

Several limitations continue to persist as municipalities advance their asset management practices.

1. As available, we use field condition assessment data to determine both the state of infrastructure and develop the financial strategies. However, in the absence of observed data, we rely on the age of assets to estimate their physical condition.

2. A second limitation is the use of inflation measures, for example using CPI/NRBCPI to inflate historical costs in the absence of actual replacement costs. While a reasonable approximation, the use of such multipliers may not be reflective of market prices and may over- or understate the value of a municipality's infrastructure portfolio and the resulting capital requirements.

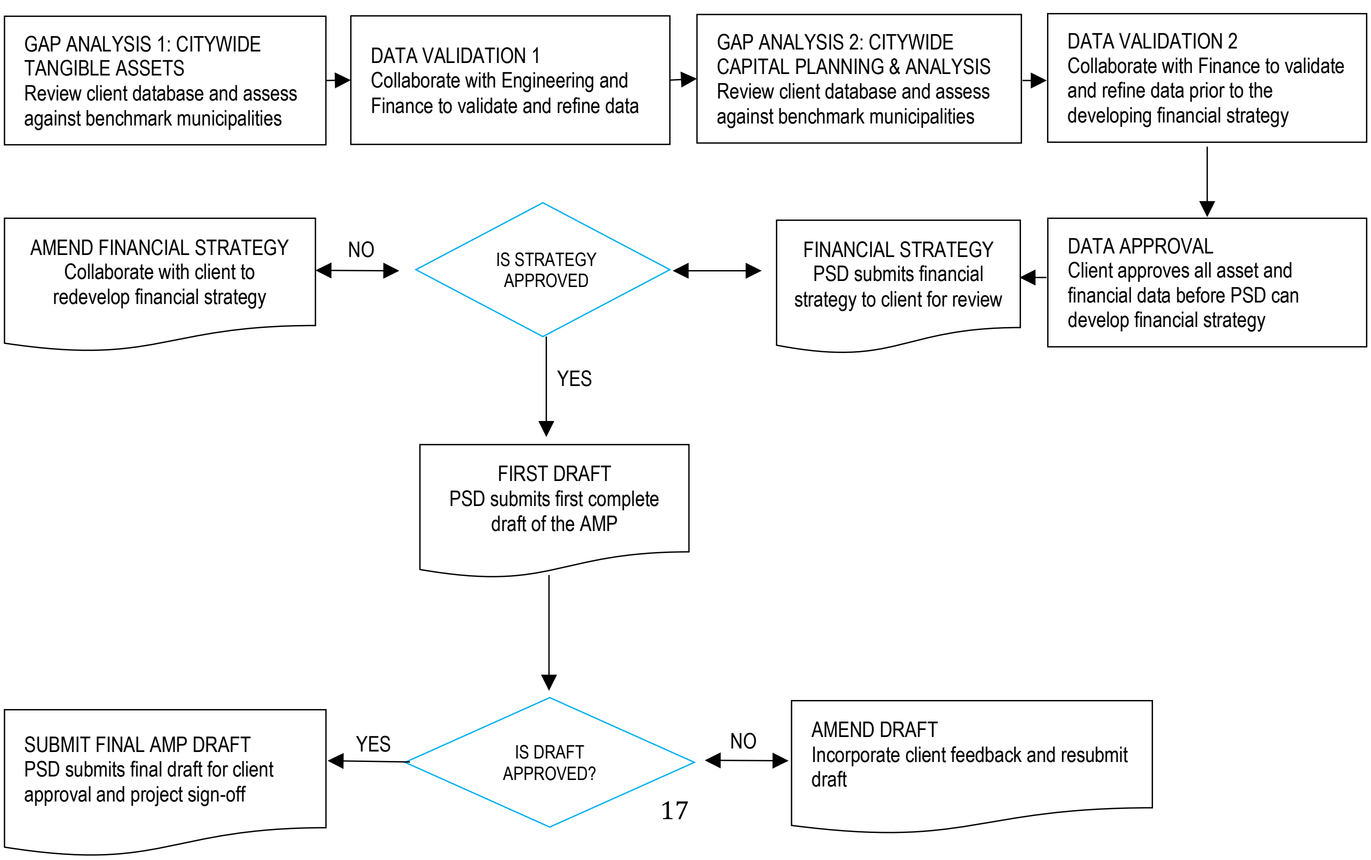
3. Our calculations and recommendations will reflect the best available data at the time this AMP was developed.

4. The focus of this plan is restricted to capital expenditures and does not capture operational and maintenance expenditures on infrastructure.

5. Process

High data quality is the foundation of intelligent decision-making. Generally, there are two primary causes of poor decisions: Inaccurate or incomplete data, and the misinterpretation of data used. The figure below illustrates an abbreviated version of our work order/work flow process between PSD and municipal staff. It is designed to ensure maximum confidence in the raw data used to develop the AMP, the interpretation of the AMP by all stakeholders, and ultimately, the application of the strategies outlined in this AMP.

FIGURE 3 DEVELOPING THE AMP - WORK FLOW AND PROCESS



6. Data Confidence Rating

Staff confidence in the data used to develop the AMP can determine the extent to which recommendations are applied. Low confidence suggests uncertainty about the data and can undermine the validity of the analysis. High data confidence endorses the findings and strategies, and the AMP can become an important, reliable reference guide for interdepartmental communication as well as a manual for long-term corporate decision-making. Having a numerical rating for confidence also allows the municipality to track its progress over time and eliminate data gaps.

Data confidence in this AMP is determined using five key factors and is based on industry best practices. Municipal staff provide their level of confidence (score) in each factor for major asset classes along a spectrum, ranging from 0, suggesting low confidence in the data, to 100 indicative of high certainty regarding inputs. The five Factors used to calculate the municipality's data confidence ratings are:

F1	F2	F3	F4	F5
The data is up to date.	The data is complete and uniform.	The data comes from an authoritative source	The data is error free.	The data is verified by an authoritative source.

The municipality's self-assessed score in each factor is then used to calculate data confidence in each asset class using Equation 1 below.

$$Data\ Confidence\ Rating = Sum\ of\ Score\ in\ each\ factor \times \frac{1}{5}$$

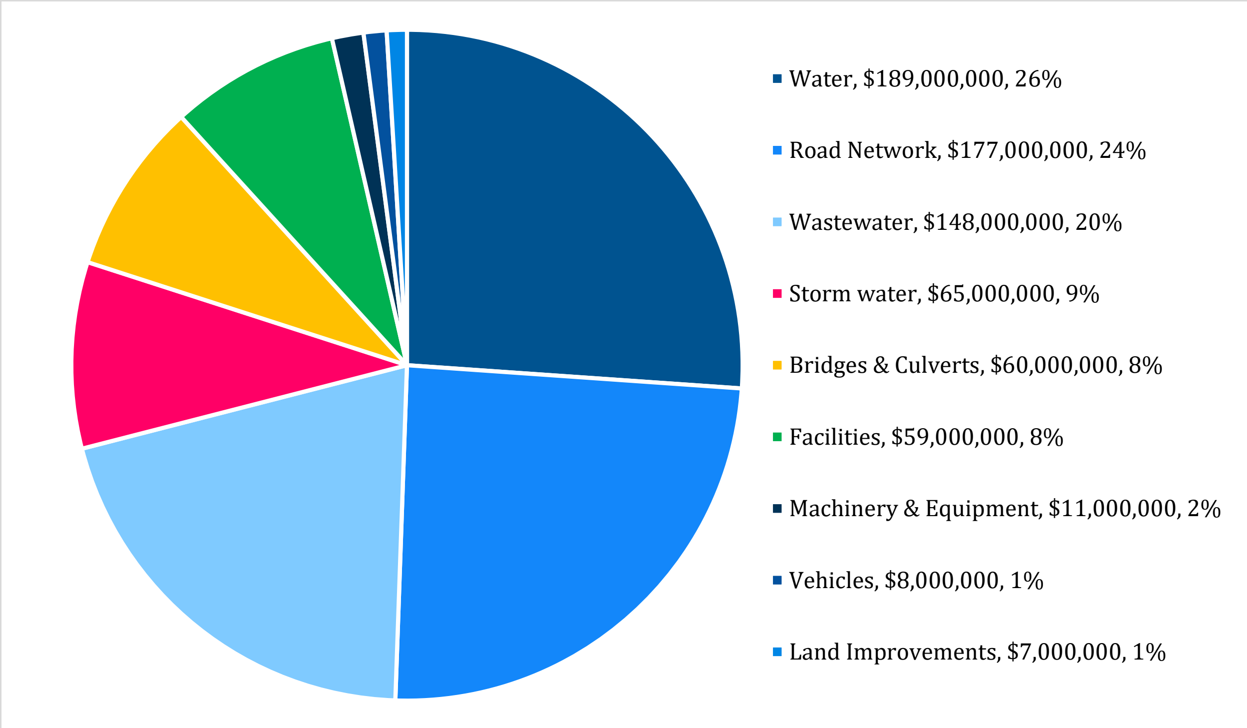
V. Key Stats

In this section, we provide aggregate indicators to summarize key elements of the municipality's asset classes in this AMP.

1. Asset Valuation

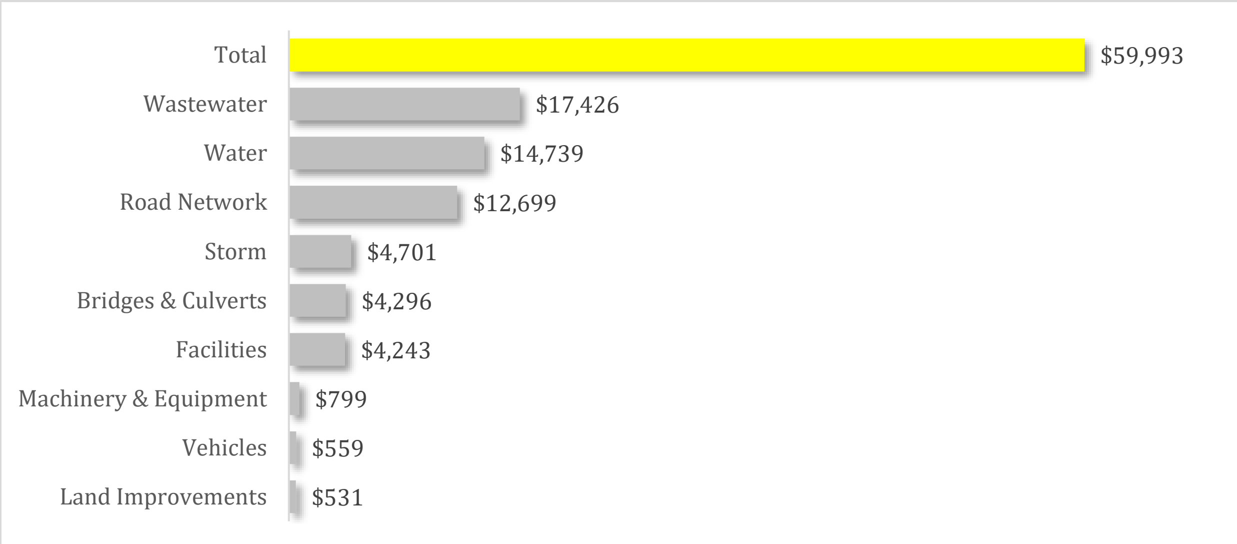
The nine asset classes analyzed in this asset management plan for the municipality had a total 2016 valuation of $724 million, of which the water network comprises 26%, followed by the road network at 24%. Note that facilities includes ATC Phase I only and that water and waste water facilities are included within each asset category.

FIGURE 4 2016 ASSET VALUATION BY CLASS



The total cost per household for each asset class has been calculated using the appropriate number of households for each service area. There are 13,912 for all asset categories except for water with 12,820 households and waste water with 8,481.

FIGURE 5 2016 COST PER HOUSEHOLD



2. Source of Condition Data by Asset Class

Observed data will provide the most precise indication of an asset's physical health. In the absence of such information, or where such condition information is incomplete or outdated, age of capital assets can be used as a meaningful approximation of the asset's condition. Table 4 indicates the source of condition data used for each of the nine asset classes in this AMP.

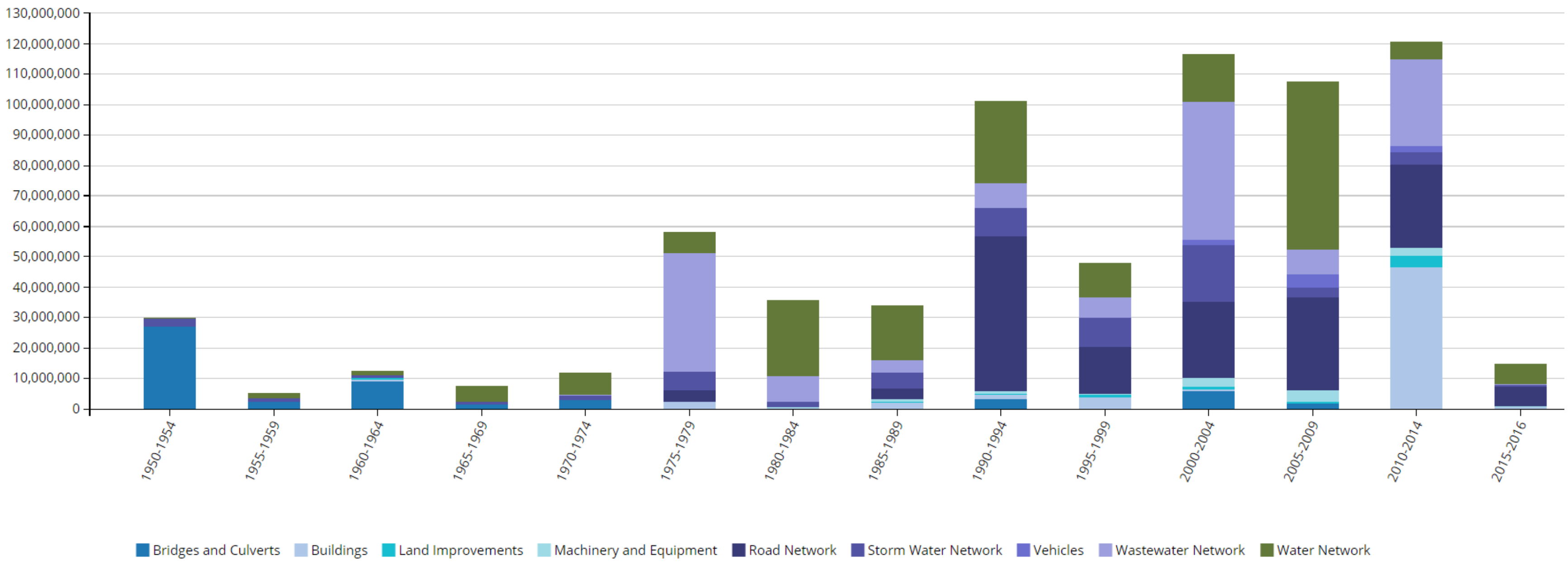
TABLE 4 SOURCE OF CONDITION DATA BY ASSET CLASS

Asset Class	Source of Condition Data
Road Network	Age-based
Bridges & Culverts	Condition based
Waste Water	Age-based
Water	Age-based
Storm Water	Age-based
Vehicles	Age-based
Machinery & Equipment	Age-based
Facilities	Age-based
Land improvements	Age-based

3. Historical Investment in Infrastructure – All Asset Classes

In conjunction with condition data, two other measurements can augment staff understanding of the state of infrastructure and impending and long-term infrastucture needs: installation year profile, and useful life remaining. The installation year profile in the figure below illustrates the historical investments in infrastructure across key asset classes. Often, investment in critical infrastructure parallels population growth or other significant shifts in demographics.

FIGURE 6 HISTORICAL INVESTMENT IN INFRASTRUCTURE - ALL ASSET CLASSES

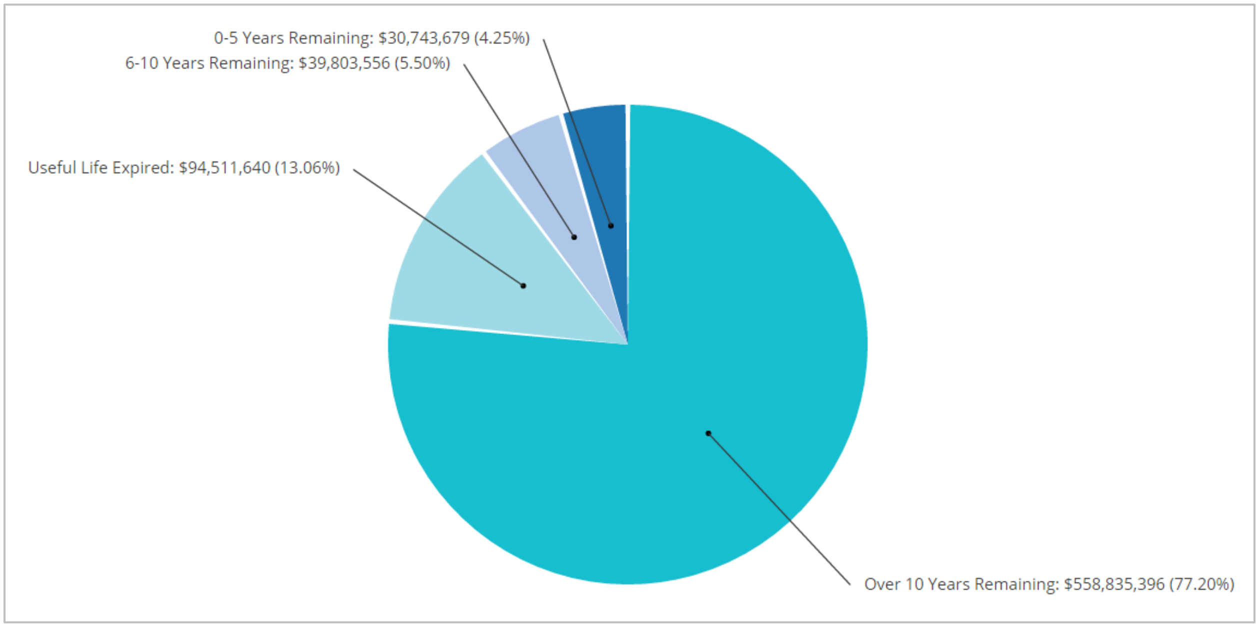


Similar to other municipalities in Ontario, Lakeshore experienced a period of increasing levels of investment beginning in the 1980s, with more rapid increases in the late 1990s. The majority of investment was made in roads, water, buildings and waste water assets. Since 2010, significant investments have been made in buildings ($46 million), waste water network ($28 million), and road network ($27 million).

4. Useful Life Consumption – All Asset Classes

While age is not a precise indicator of an asset's health, it can serve as a meaningful approximation in the absence of adequate condition data. Figure 7 shows the distribution of assets based on the amount of useful life already consumed.

FIGURE 7 USEFUL LIFE REMAINING - ALL ASSET CLASSES



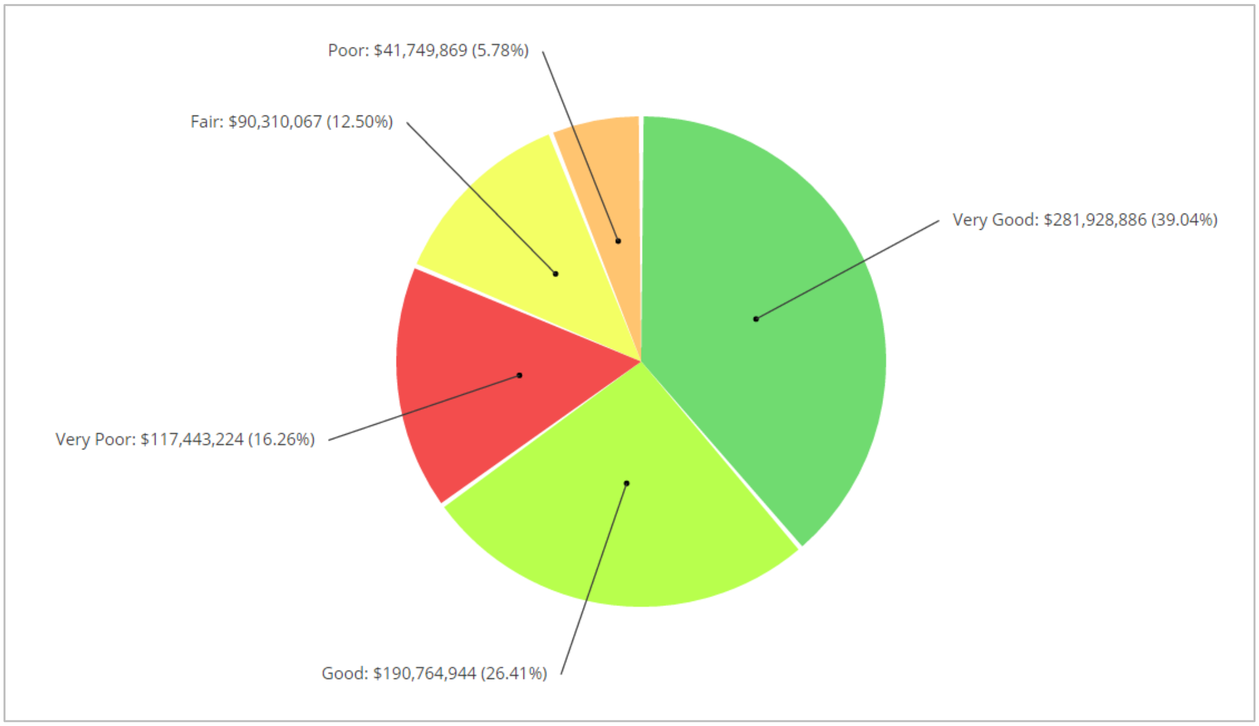
Approximately 80% of the municipality's assets, with a valuation of $559 million, have at least 10 years of useful life remaining. However, a significant portion, with a valuation of $95 million, remain in operation beyond their useful life. An additional 4% of assets valued at $31 million will reach the end of their useful life in the next five years.

Further, this plan does not address needs for enhancement, betterment or expansion arising from municipal growth, legislative changes or such other external factors.

5. Overall Condition – All Asset Classes

Based on 2016 replacement cost, and primarily age-based data, while the majority, 65%, of the municipality's total asset portfolio as analysed in this AMP is in very good or good condition, over 22% of the assets, with a valuation of $158 million, is in poor to very poor condition. The municipality provided observed data only for its bridges & culverts assets based on the Ontario Structure Inspection Manual (OSIM) inspection; for remaining classes, age data was used to estimate condition. Condition data for some assets was considered outdated and not used. As part of the Asset Management initiative, condition assessment protocols and data gathering will be put in place in the near future.

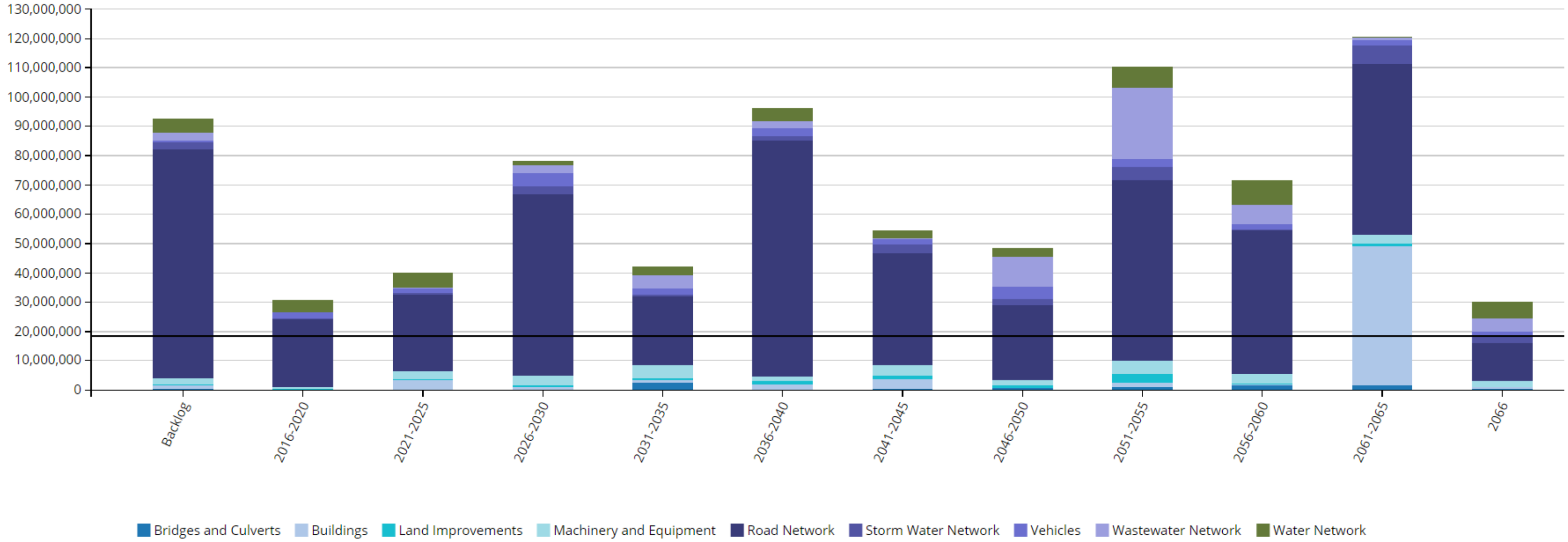
FIGURE 8 ASSET CONDITION DISTRIBUTION BY REPLACEMENT COST - ALL CLASSES



6. Replacement Profile – All Asset Classes

In this section, we illustrate the aggregate short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's nine asset classes. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 9 REPLACEMENT PROFILE - ALL ASSET CLASSES



Based primarily on age data, the municipality has a combined backlog of $93 million, more than $78 million of which is attributed to roads. Aggregate replacement needs for the municipality's nine asset classes are forecasted to be $31 million over the next five years. An additional $40 million will be required between 2021 and 2025. Roads comprise the vast majority of such replacement-related expenditures. The municipality's aggregate annual requirements (indicated by the black line) for its nine asset classes total $18,777,000. At this funding level, the municipality will be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset categories as they arise without the need for deferring projects and accruing annual infrastructure deficits. This annual requirement does not capture any additional needs for the construction of new assets or enhancement of existing assets. The municipality is currently allocating a combined $6.5 million for its tax-based categories, creating an annual deficit of $7.5 million, and $926,000 for its rate-based categories, leaving an annual deficit of $3.7 million. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, fulfilling the annual requirements will position the municipality to meet its future replacement needs at the current level without any expansion, betterment, or new acquisitions. It should be noted that an injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

7. Data Confidence

With the exception of facilities, land improvement assets, and machinery & equipment, the municipality has a very high degree of confidence in the data used to develop this AMP, receiving a weighted confidence rating of 80%. This is indicative of significant effort in collecting and refining its data set.

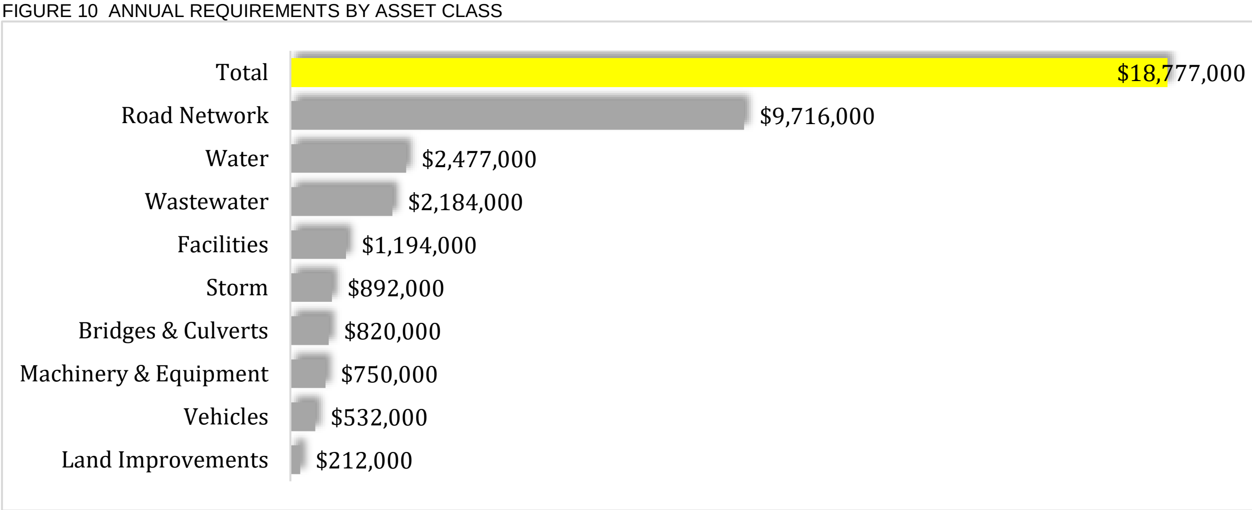
TABLE 5 DATA CONFIDENCE RATINGS

Asset Class	The data is up-to-date.	The data is complete and uniform.	The data comes from an authoritative source.	The data is error free.	The data is verified by an authoritative source.	Average Confidence Rating	Weighted Average Data Confidence Rating
Road Network	80%	80%	100%	50%	80%	78%	19%
Bridges & Culverts (>3m)	100%	100%	100%	80%	100%	96%	8%
Water	70%	80%	80%	80%	100%	82%	21%
Waste water	100%	80%	80%	80%	100%	88%	18%
Storm water	100%	80%	80%	80%	100%	88%	8%
Facilities	100%	10%	20%	50%	50%	46%	4%
Land Improvements	50%	50%	0%	50%	50%	40%	<1%
Vehicles	100%	50%	100%	80%	100%	86%	1%
Machinery & Equipment	80%	50%	70%	50%	100%	70%	1%
Overall Weighted Average Data Confidence Rating							80%

8. Financial Profile

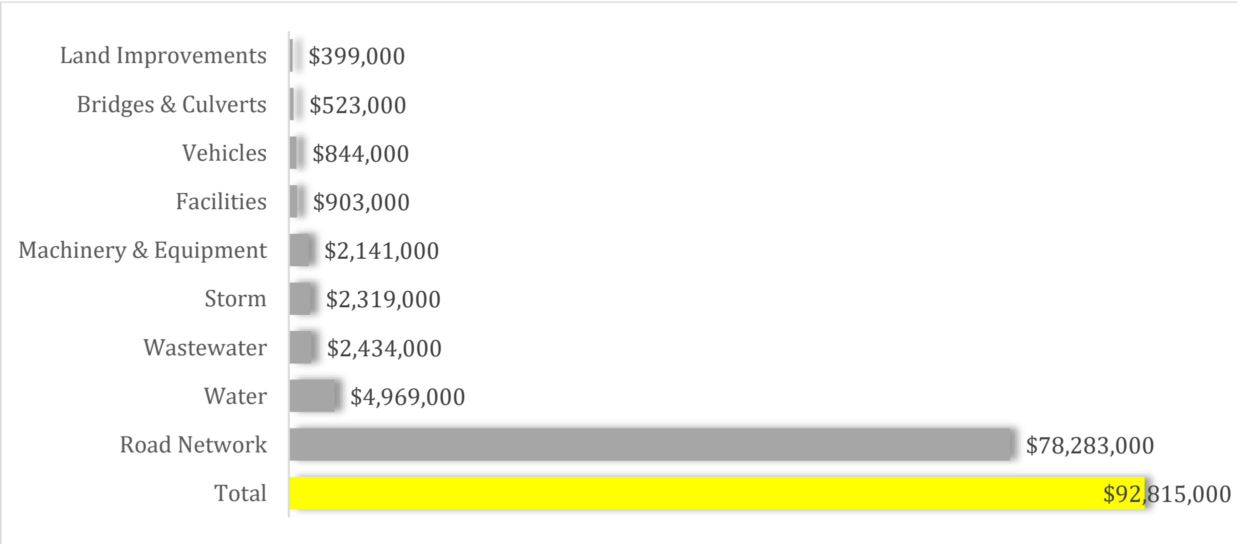
This section details key financial indicators related to the municipality's asset classes as analyzed in this asset management plan.

FIGURE 10 ANNUAL REQUIREMENTS BY ASSET CLASS



The annual requirements represent the amount the municipality should allocate annually to each of its asset classes to meet replacement needs as they arise and prevent infrastructure backlogs. In total, the municipality must allocate $18.8 million annually for the assets covered in this AMP.

FIGURE 11 INFRASTRUCTURE BACKLOG - ALL ASSET CLASSES



The municipality has a combined infrastructure backlog of $93 million, with roads comprising 84%. The backlog represents the investment needed today to meet previously deferred replacement needs. This data is based on assessed condition as available, and age-based data in the absence of such information. In the absence of assessed condition, the backlog represents the value of assets that remain in operation beyond their useful life.

VI. State of Local Infrastructure

In this section, we detail key indicators for each class discussed in this asset management plan. The state of local infrastructure includes the full inventory, condition ratings, useful life consumption data, and the backlog and upcoming infrastructure needs for each asset class.

1. Road Network

1.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 6 illustrates key asset attributes for the municipality's road network, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement cost were derived. In total, the municipality's roads assets are valued at $177 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with its Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

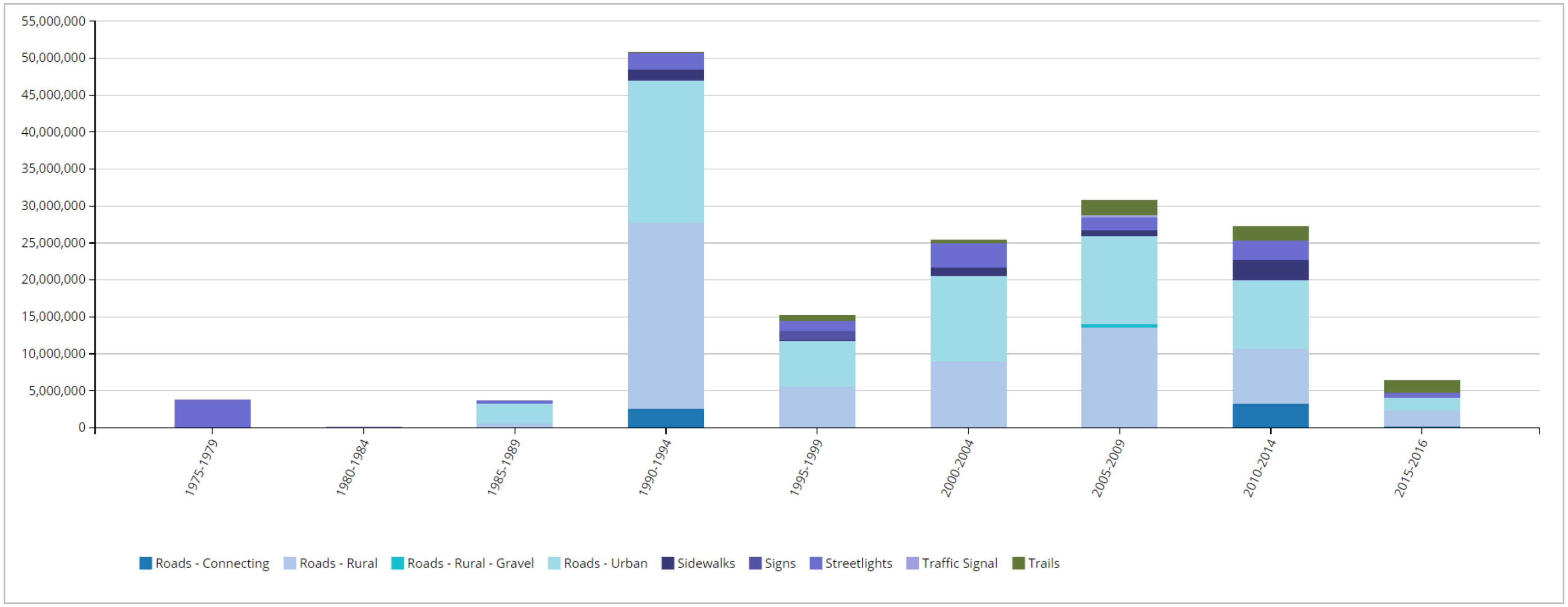
TABLE 6 KEY ASSET ATTRIBUTES – ROADS

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Road Network	Paved - Urban	121,532m	20	NRBCPI (Toronto)	$59,982,245
	Surface Treated - Rural	206,649m	12	NRBCPI (Toronto)	$41,679,415
	Paved - Rural	60,059m	20	NRBCPI (Toronto)	$21,537,286
	Streetlights	3,352	25	NRBCPI (Toronto)	$16,014,380
	Gravel - Rural	1,072,607m^2	100	Cost/Unit	$13,228,595
	Trails	131,590m^2	15 to 50	Cost/Unit	$7,237,482
	Sidewalks	105,387m^2	30	Cost/Unit	$6,371,995
	Paved - Connecting	6,910m	20	NRBCPI (Toronto)	$6,075,870
	Surface Treated - Urban	14,883m	12	NRBCPI (Toronto)	$2,642,050
	Signs	Pooled	20	NRBCPI (Toronto)	$1,287,875
	Traffic Signals	6	10 to 25	NRBCPI (Toronto)	$437,698
	Gravel - Urban	13,835m^2	100	Cost/Unit	$169,477
				Total	$176,664,368

1.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 12 HISTORICAL INVESTMENT – ROAD NETWORK

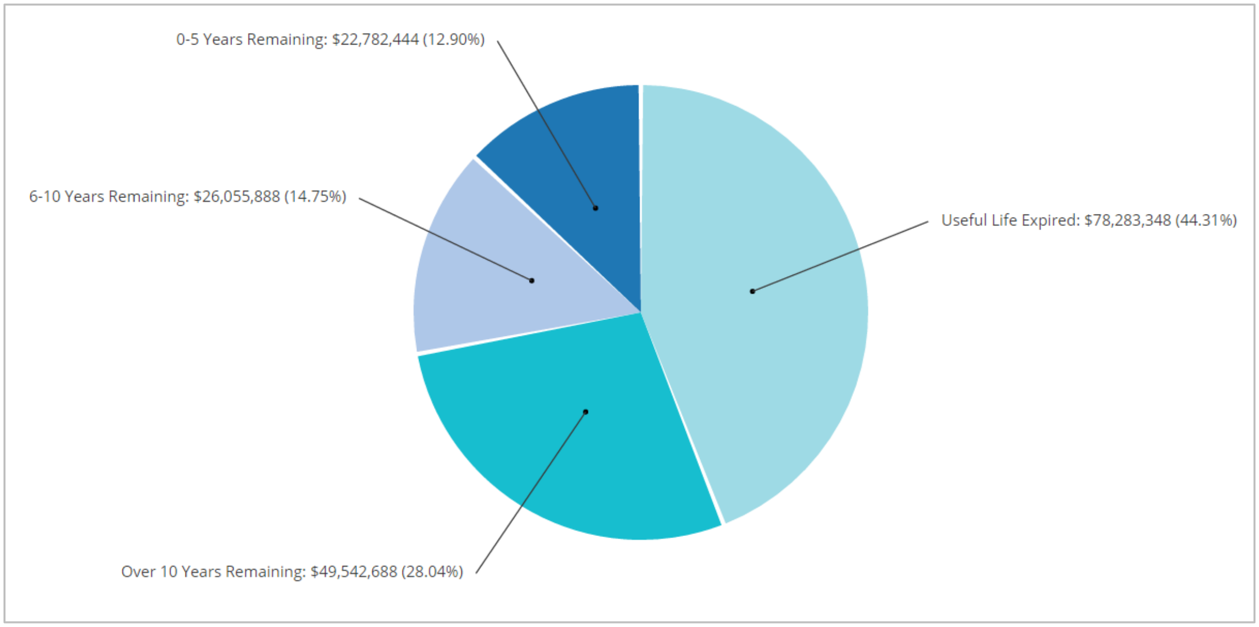


Investments in the road network peaked between 1990-1994, with expenditures totalling $51 million. Since 2010, expenditures have totaled approximately $34 million.

1.3 Useful Life Consumption

In this section, we detail the extent to which assets have consumed their useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's road network.

FIGURE 13 USEFUL LIFE CONSUMPTION - ROAD NETWORK

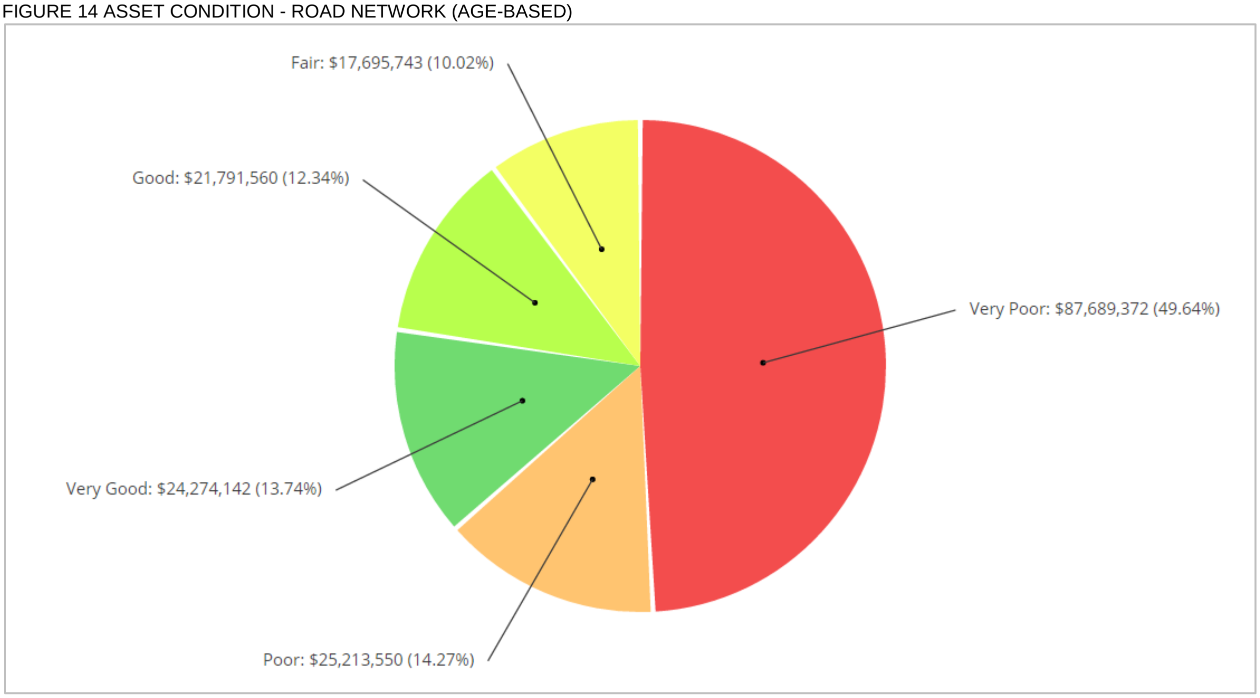


While 28% of the municipality's road assets have at least 10 years of useful life remaining, more than 44%, with a valuation of $78 million, remain in operation beyond their established useful life. Further, an additional 13%, with a valuation of $23 million, will reach the end of their useful life within the next five years.

1.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's roads network. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. A roads needs study was completed in 2008, however was not factored into this calculation since the study is now considered out dated. As a result, age-based condition data was used.

FIGURE 14 ASSET CONDITION - ROAD NETWORK (AGE-BASED)

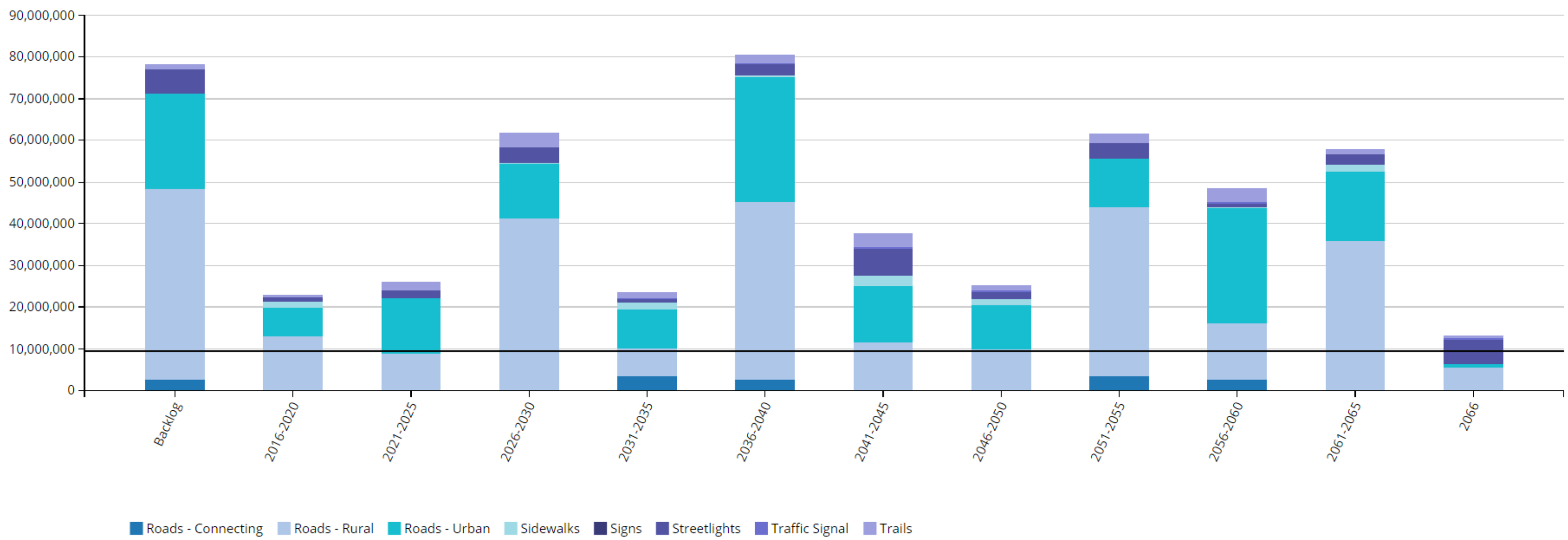


Based on age data, more than 60% of the municipality's roads assets, valued at $117 million, are in poor to very poor condition; less than 25% are in good to very good condition, indicative of impending replacement needs.

1.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's road network assets. The backlog is the aggregate investment in replacement projects that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 15 FORECASTING REPLACEMENT NEEDS - ROAD NETWORK



Age-based data shows a significant backlog of $78 million. In addition, investment needs for the road network assets are forecasted to be $23 million over the next five years. An additional $26 million will be required between 2021 and 2025. The municipality's annual requirements (indicated by the black line) for its road network total $9,716,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $5,146,000, leaving an annual deficit of $4,570,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

1.6 Recommendations – Roads

- Based on age data, the majority of the municipality's roads portfolio is in poor to very poor condition. Further, based on age data, the municipality's infrastructure backlog totals nearly $80 million, the largest among all asset classes. To gain a more precise estimate of its backlog, ongoing annual needs, and future replacement needs, the municipality should implement a comprehensive condition assessment program to more accurately define field needs and to assist in the prioritization of the short- and long-term capital budget. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- In addition to the above, a continued cycle of condition assessment data should be captured on a periodic basis to maintain data accuracy and currency.

- While the municipality's confidence in its data is high, there is no formal data verification policy in place. To maintain a high degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- The municipality is funding only 53% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- The municipality should assess its short-, medium- and long-term operations and maintenance (O&M) needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- Road network key performance indicators should be established and tracked annually as part of an overall level of service model. See Section 7 'Levels of Service'.

- Once the above data sets and key performance indicators have been established, this Asset Management plan should be updated accordingly.

2. Bridges & Culverts

2.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 7 illustrates key asset attributes for the municipality's bridges & culverts that are greater than 3m, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's bridges & culverts assets are valued at $60 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

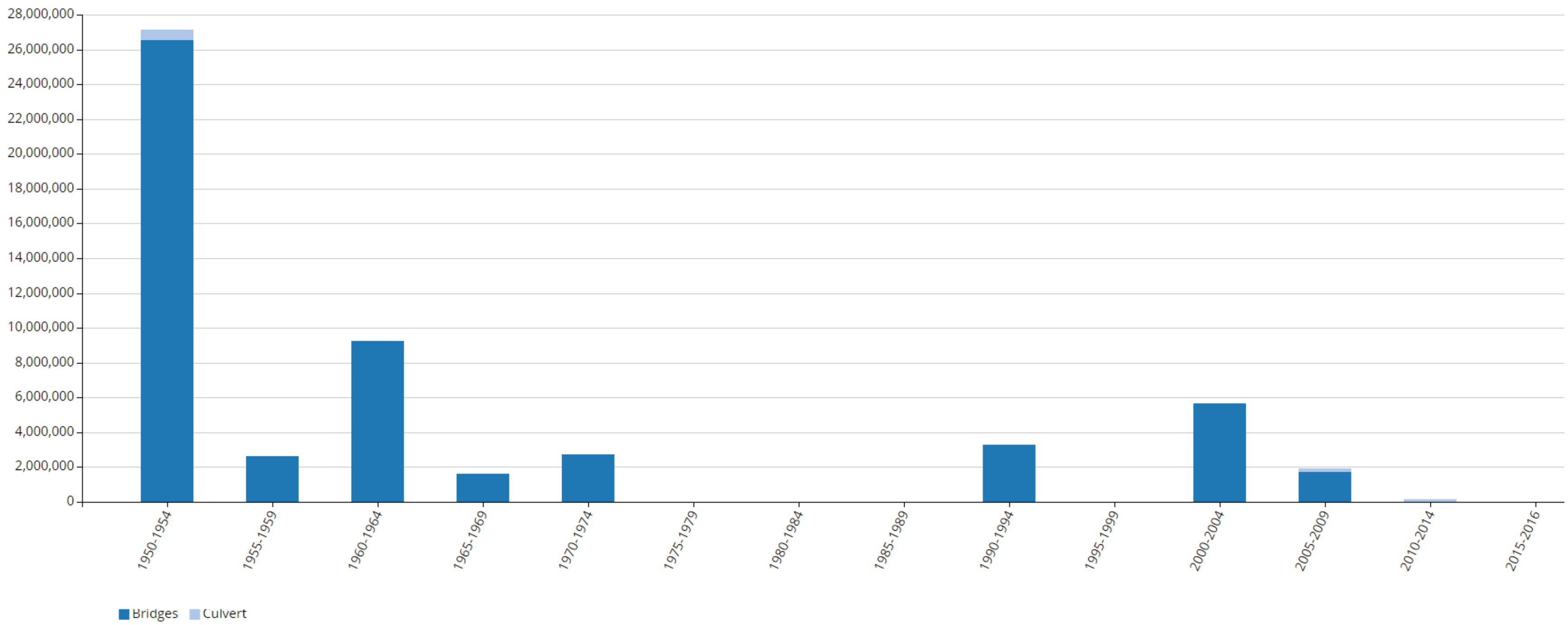
TABLE 7 KEY ASSET ATTRIBUTES – BRIDGES & CULVERTS

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Bridges & Culverts	Bridges	1,035m	75	User-Defined Cost	$58,874,532
	Culverts	99m	50 to 75	NRBCPI (Toronto)	$896,933
				Total	$59,771,465

2.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 16 HISTORICAL INVESTMENT - BRIDGES & CULVERTS

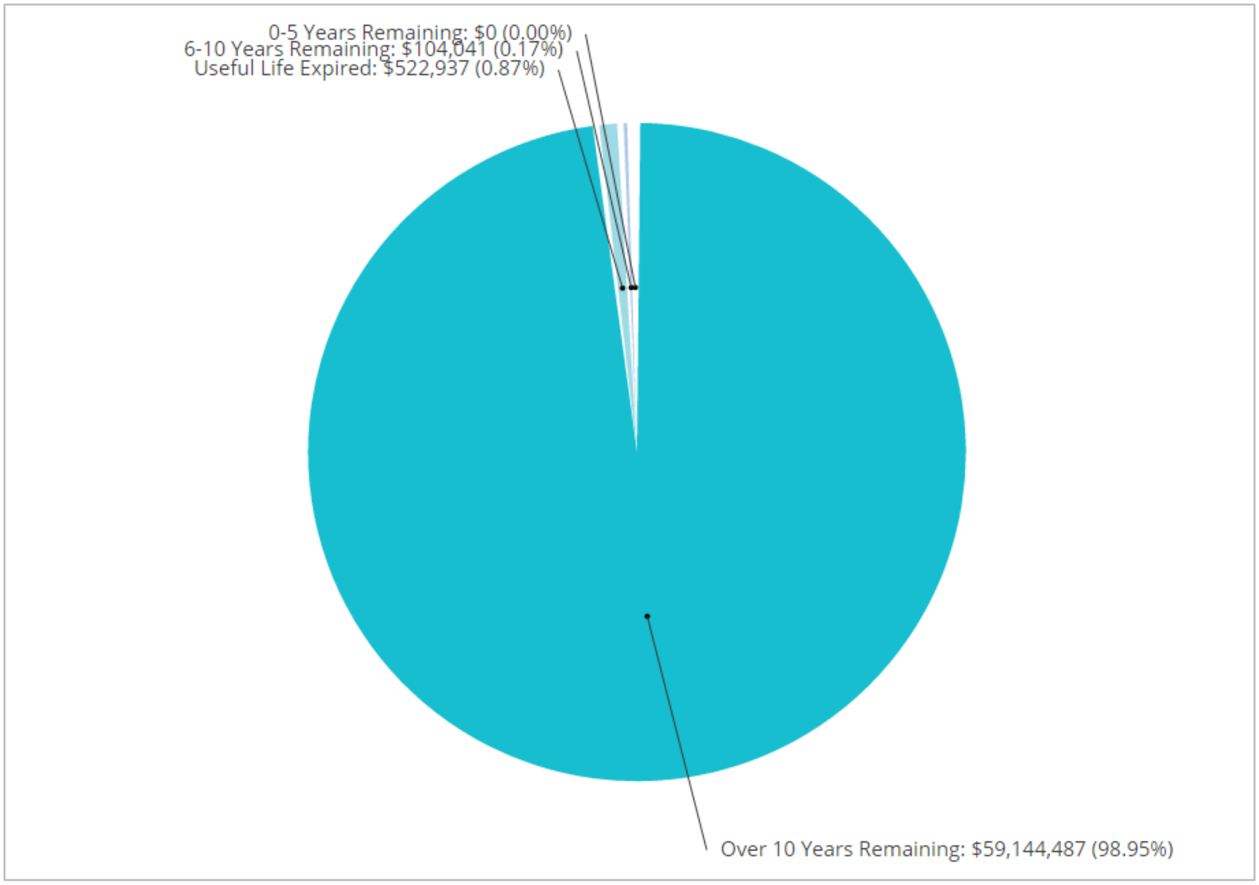


Similar to many other municipalities in Ontario, major investments in bridges & culverts were made in the 1950s and 1960s. Expenditures between 1950-1954 totaled more than $27 million. Since 2000, expenditures have totaled nearly $8 million.

2.3 Useful Life Consumption

In this section, we detail the extent to which assets have consumed their useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's bridges & culverts.

FIGURE 17 USEFUL LIFE CONSUMPTION – BRIDGES & CULVERTS

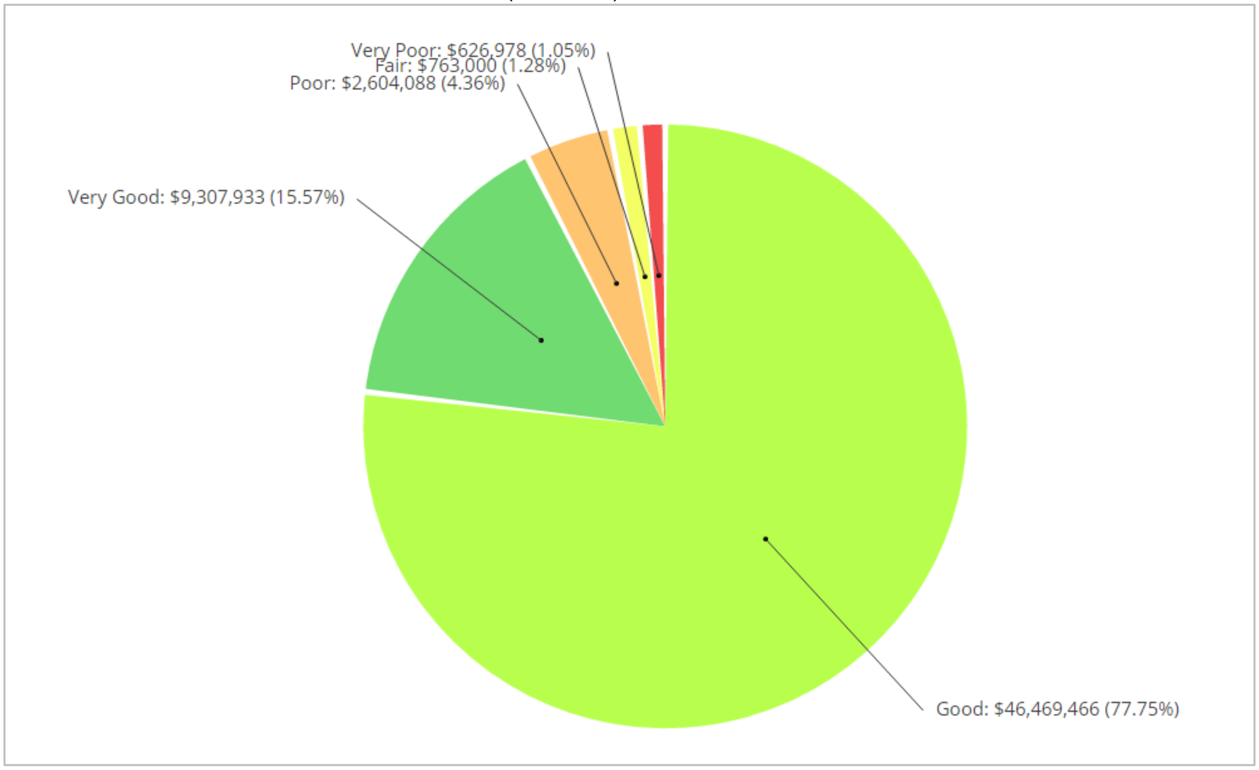


Nearly all of the municipality's bridges & culverts assets have at least 10 years of useful life remaining. Less than 1% of assets, worth $523,000, remain in operation beyond their useful life. Note this only includes bridges and culverts over 3m.

2.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's bridges & culverts. By default, we rely on observed field data adapted from OSIM inspections as provided by the municipality.

FIGURE 18 ASSET CONDITION – BRIDGES & CULVERTS (ASSESSED)

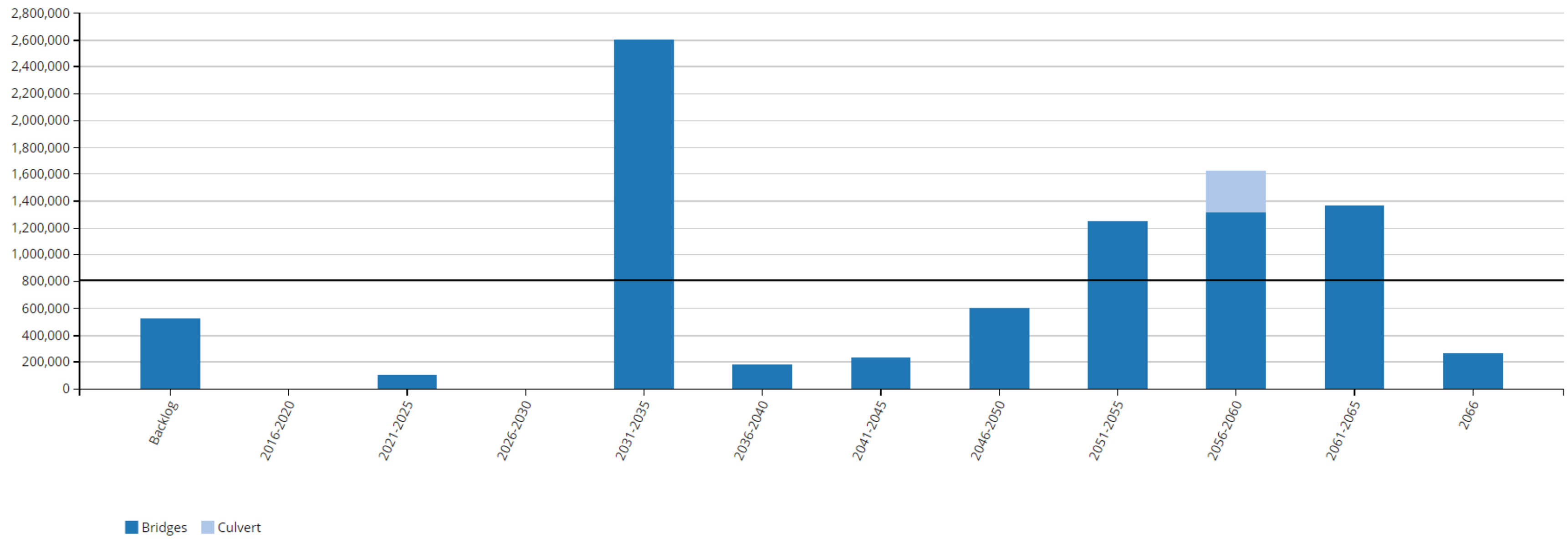


More than 90% of bridges & culverts assets are in good to very good condition; however, 5%, with a valuation of more than $3.2 million are in poor to very poor condition. Note this only includes bridges and culverts over 3m.

2.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's bridges & culverts. The backlog is the aggregate investment in replacement projects that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 19 FORECASTING REPLACEMENT NEEDS - BRIDGES & CULVERTS



In addition to a backlog of $523,000, as assets reach the end of their useful life, replacement needs will begin to increase between 2031-2035, totaling $2.6 million. The municipality's annual requirements (indicated by the black line) for its bridges & culverts total $820,000. At this funding level, the municipality is allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual deficits. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $318,000, leaving an annual deficit of $502,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

2.6 Recommendations – Bridges & Culverts

- The results and recommendations from the Ontario Structure Inspection Manual (OSIM) inspections should be used to generate the short-and long-term capital and maintenance budgets for the bridge and large culvert structures. See Section VIII, ‘Asset Management Strategies’.

- Bridge & culvert structure key performance indicators should be established and tracked annually as part of an overall level of service model. See Section VII ‘Levels of Service’.

- The municipality is funding only 39% of it’s annual requirements needed for replacement needs. See the ‘Financial Strategy’ section on how to achieve more sustainable funding levels.

- This section of the AMP only considers bridges and culverts greater than 3m. This should eventually be updated to include all bridges and culverts.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality’s O&M requirements.

- This AMP should be updated annually to gauge the performance of the municipality against quantified targets.

3. Water

3.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 8 illustrates key asset attributes for the municipality's water services assets, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the municipality's water services assets are valued at $189 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module. Note, the replacement cost for water mains was calculated using a 2007 cost per unit which was then inflated using NRBCPI.

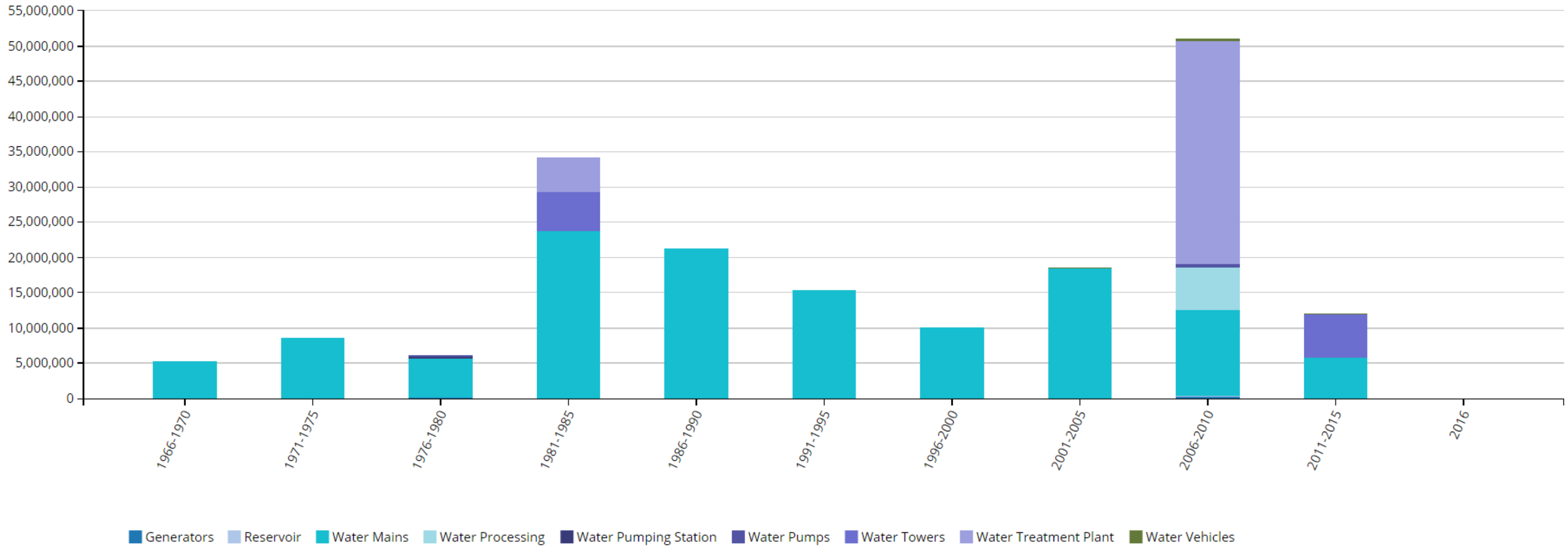
TABLE 8 KEY ASSET ATTRIBUTES – WATER

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Water Services	Generators	4	20 to 40	CPI (Ontario)	$409,779
	Reservoir	1	10	NRBCPI (Toronto)	$124,294
	Water Processing	13	10 to 60	NRBCPI (Toronto)	$6,008,145
	Water Pumping Station	4	75	User-Defined Cost	$381,000
	Water Pumps	18	25	CPI (Ontario)	$765,423
	Water Towers	2	70	NRBCPI (Toronto)	$11,521,406
	Water Treatment Plant	2	75	NRBCPI (Toronto)	$36,421,757
	Water Vehicles	14	8 to 10	CPI (Ontario)	$627,519
	Water Mains 25 (mm)	453m	40 to 100	User-Defined Cost	$52,199
	Water Mains 38 (mm)	71m	40	User-Defined Cost	$8,182
	Water Mains 50 (mm)	110,243m	50 to 100	User-Defined Cost	$12,703,656
	Water Mains 75 (mm)	774m	100	User-Defined Cost	$112,704
	Water Mains 100 (mm)	92,023m	50 to 100	User-Defined Cost	$16,189,492
	Water Mains 150 (mm)	228,615m	50 to 100	User-Defined Cost	$45,802,219
	Water Mains 200 (mm)	82,513m	50 to 100	User-Defined Cost	$19,524,563
	Water Mains 250 (mm)	12,677m	50 to 100	User-Defined Cost	$4,153,711
	Water Mains 300 (mm)	48,217m	50 to 100	User-Defined Cost	$18,205,791
	Water Mains 350 (mm)	1,597m	50	User-Defined Cost	$862,543
	Water Mains 400 (mm)	17,942m	50 to 100	User-Defined Cost	$10,779,244
	Water Mains 500 (mm)	1,111m	100	User-Defined Cost	$802,352
	Water Mains 600 (mm)	3,069m	100	User-Defined Cost	$2,588,947
	Water Mains 1200 (mm)	1,080m	100	User-Defined Cost	$911,162
				Total	$188,956,088

3.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 20 HISTORICAL INVESTMENT – WATER NETWORK

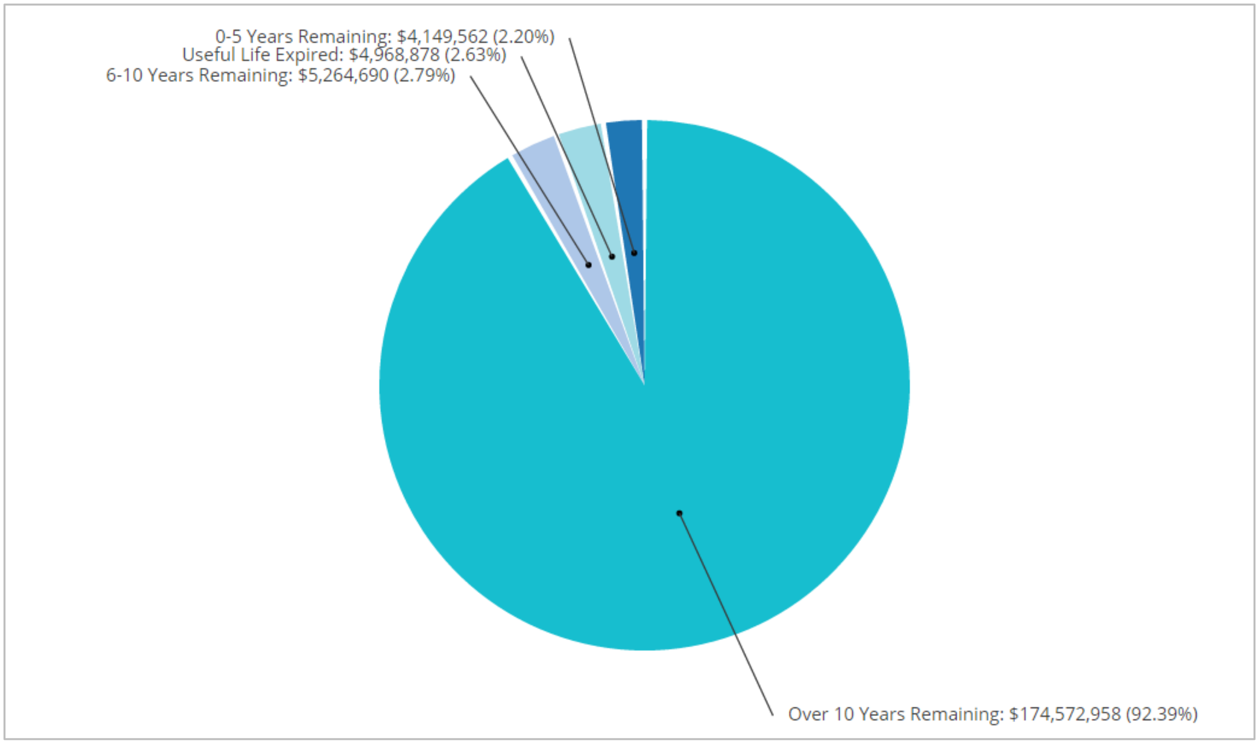


The municipality's investments in water mains and facilities increased rapidly in the early 1980s, with expenditures decreasing in subsequent decades. However, between 2006 and 2010, expenditures increased sharply again, with investments totaling nearly $45 million, with $32 million allocated to the municipality's water treatment plant.

3.3 Useful Life Consumption

In this section, we detail the extent to which assets have consumed their useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's water services.

FIGURE 21 USEFUL LIFE CONSUMPTION – WATER NETWORK

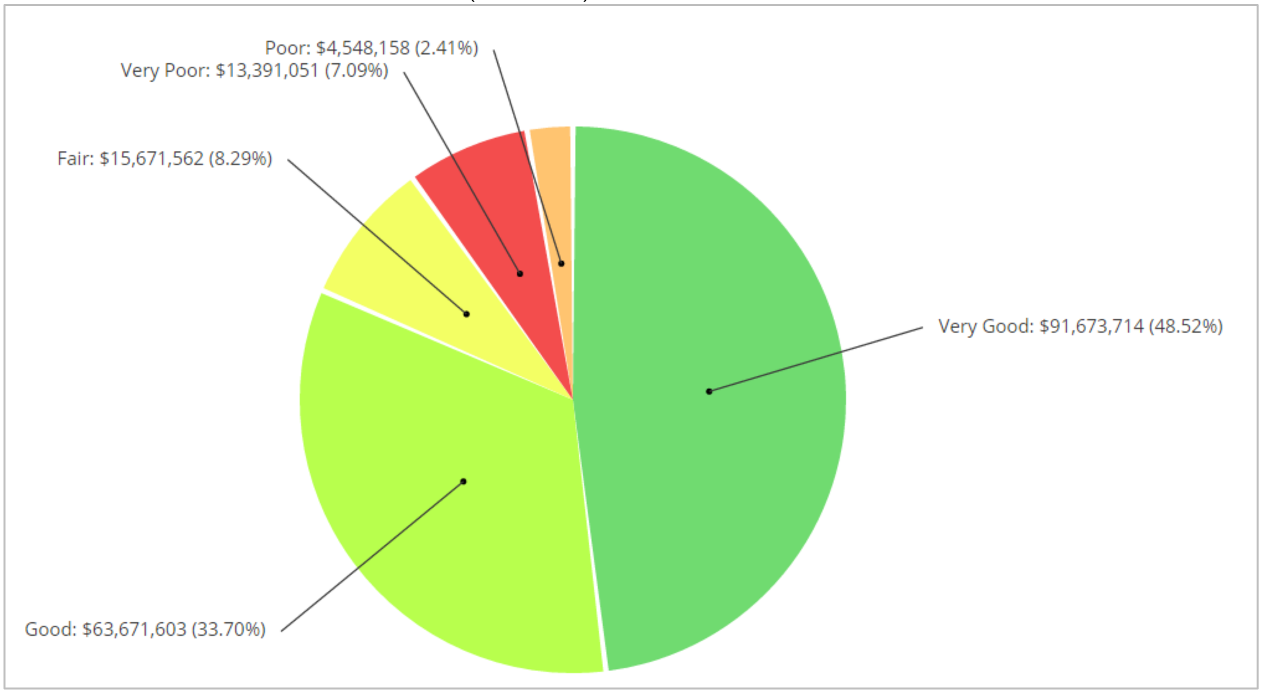


More than 90% of the municipality's water services assets have at least 10 years of useful life remaining. However, 3%, with a valuation of more than $5 million remain in operation beyond their useful life. An additional 2% of assets, valued at nearly $4 million will reach the end of their useful life in the next five years.

3.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's water services. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not available for this asset category.

FIGURE 22 ASSET CONDITION – WATER NETWORK (AGE-BASED)

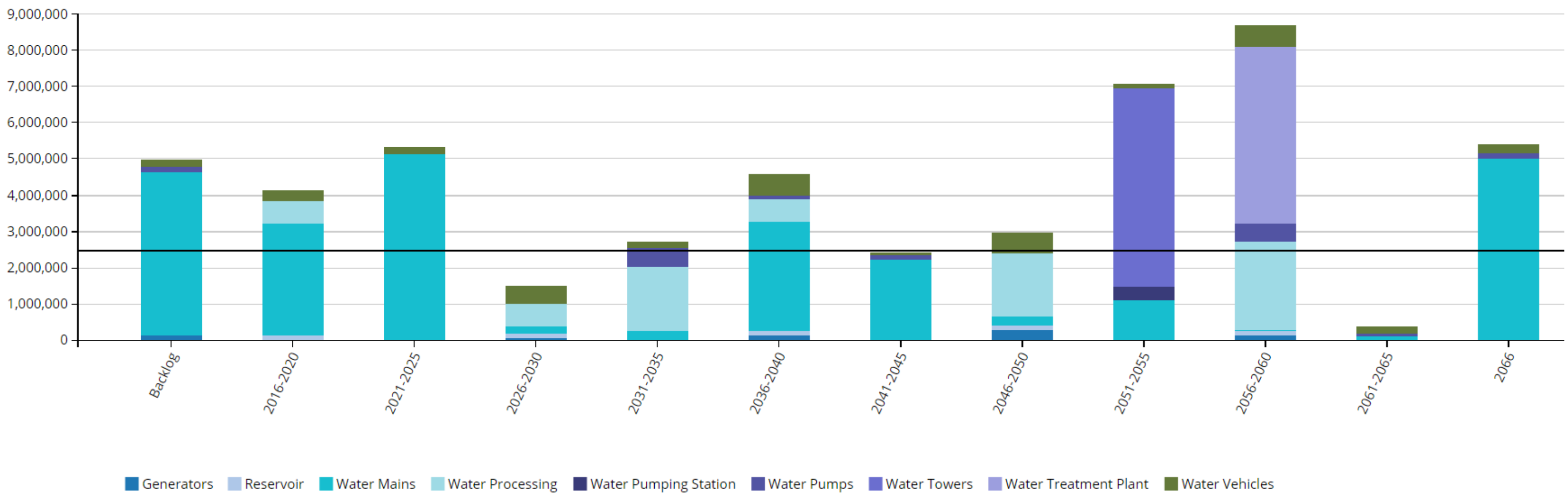


Based on age, while more than 80% of water assets, valued at $155 million, are in good to very good condition, 10%, with a valuation of $18 million are in poor to very poor condition.

3.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's water services assets. The backlog is the aggregate investment in replacement projects that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 23 FORECASTING REPLACEMENT NEEDS – WATER NETWORK



In addition to a significant backlog totaling $5 million, the municipality's replacement needs will total more than $9 million over the next 10 years. The municipality's annual requirements (indicated by the black line) for its water services total $2,477,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $926,000, leaving an annual deficit of $1,551,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

3.6 Recommendations – Water

- Similar to bridges & culverts, water services are uniquely consequential to a community's wellbeing. While age-based data shows the majority of assets to be in good to very good condition, the municipality should establish a condition assessment program. This will provide a more accurate assessment of the physical health of the mains and the financial requirements related to the municipality's water network, including more precise estimation of the backlog of $5 million. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- Condition data generated from the above initiative should be integrated with a risk management framework. Together, this data should be used to systematically prioritize short-, medium-, and long-term replacement needs for the municipality's water assets. See Section 4, 'Risk' in the 'Asset Management Strategies' chapter.

- While the municipality's confidence in its data is high, there is no formal data verification policy in place. To maintain a high degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- Water distribution system key performance indicators should be established and tracked annually as part of an overall level of service model. See Section VII 'Levels of Service'.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding only 37% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

4. Waste Water

4.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 9 illustrates key asset attributes for the municipality's waste water assets, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the municipality's waste water services assets are valued at $148 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module. Note, the replacement cost for waste water mains was calculated using a 2007 cost per unit which was then inflated using NRBCPI.

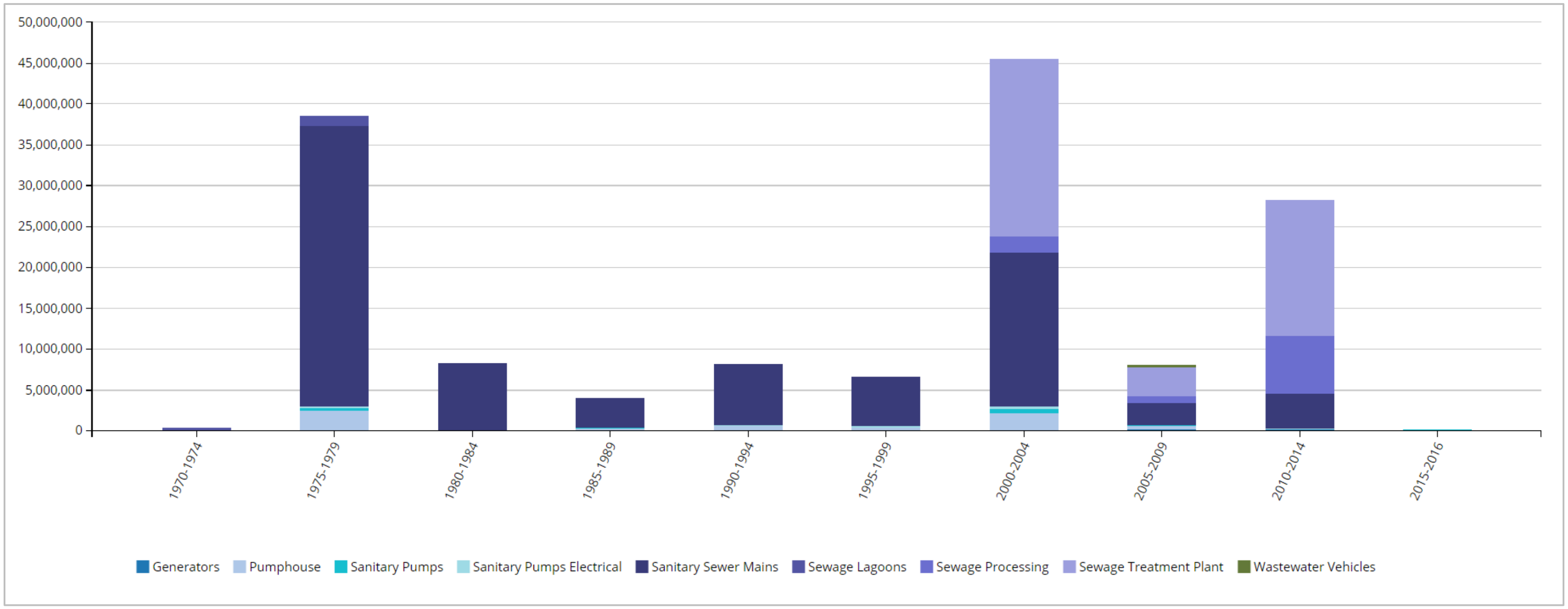
TABLE 9 ASSET INVENTORY - WASTE WATER

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Waste Water Services	Generators	5	20 to 40	CPI (Ontario)	$344,680
	Pumphouse	27	64 to 75	NRBCPI (Toronto)	$6,162,172
	Sanitary Pumps	61	25	CPI (Ontario)	$1,048,904
	Sanitary Pumps Electrical	28	30	CPI (Ontario)	$800,788
	Sewage Lagoons	3	100	NRBCPI (Toronto)	$1,697,281
	Sewage Processing	12	10 to 60	NRBCPI (Toronto)	$9,790,155
	Sewage Treatment Plant	5	75	NRBCPI (Toronto)	$41,901,722
	Wastewater Vehicles	2	15	CPI (Ontario)	$263,417
	Mains 50 (mm)	1,044m	100	User-Defined Cost	$454,488
	Mains 75 (mm)	1,029m	100	User-Defined Cost	$447,958
	Mains 100 (mm)	2,632m	100	User-Defined Cost	$1,145,897
	Mains 150 (mm)	1,452m	100	User-Defined Cost	$632,105
	Mains 200 (mm)	73,703m	75 to 100	User-Defined Cost	$32,495,542
	Mains 250 (mm)	39,432m	75 to 100	User-Defined Cost	$17,166,217
	Mains 300 (mm)	13,736m	75 to 100	User-Defined Cost	$8,063,937
	Mains 350 (mm)	690m	75	User-Defined Cost	$405,080
	Mains 375 (mm)	4,010m	75 to 100	User-Defined Cost	$2,354,159
	Mains 400 (mm)	329m	75	User-Defined Cost	$193,147
	Mains 450 (mm)	5,752m	75 to 100	User-Defined Cost	$4,424,202
	Mains 525 (mm)	580m	90	User-Defined Cost	$446,112
	Mains 600 (mm)	2,961m	90	User-Defined Cost	$2,277,480
	Mains 675 (mm)	2,239m	90	User-Defined Cost	$1,722,146
	Mains 750 (mm)	4,230m	90	User-Defined Cost	$5,820,965
	Mains 900 (mm)	5,558m	90	User-Defined Cost	$7,648,445
	Mains Unknown	1	100	NRBCPI (Toronto)	$81,695
				Total	$147,788,694

4.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 24 HISTORICAL INVESTMENT – WASTE WATER

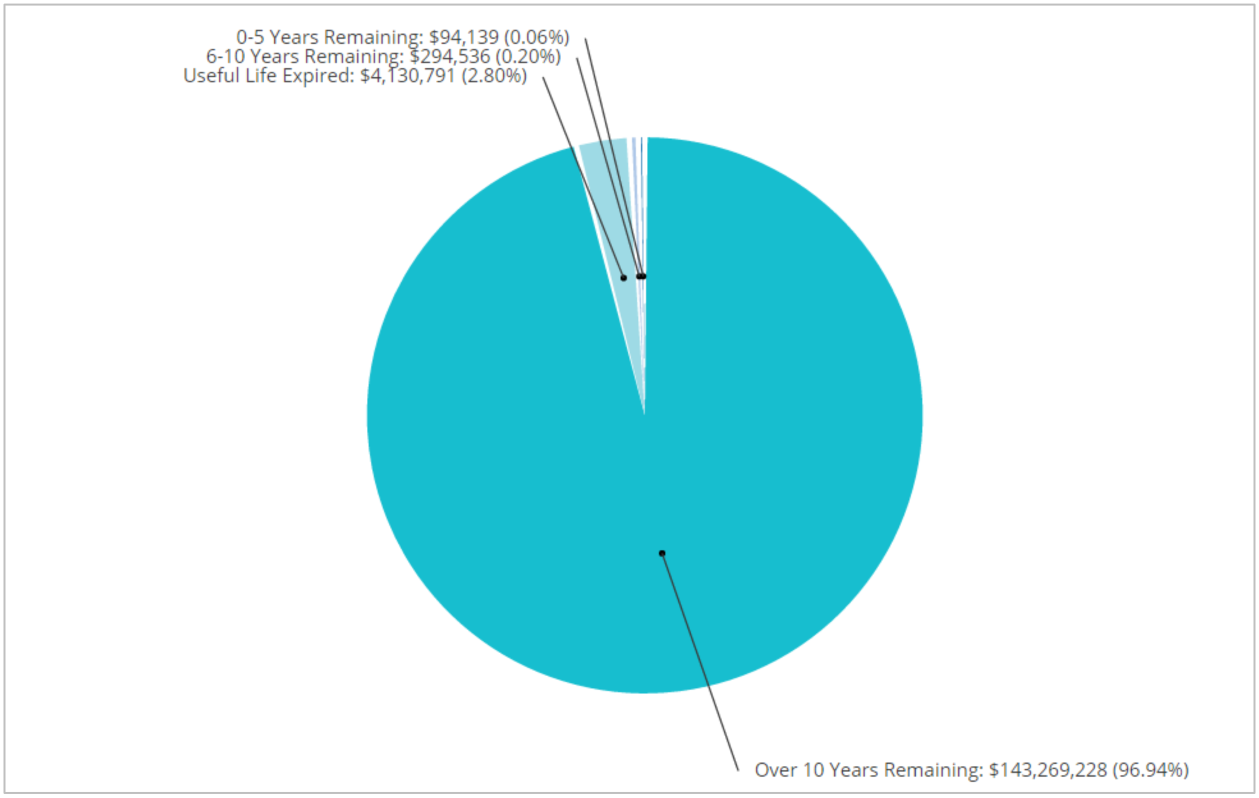


The municipality's investments in waste water increased sharply in the 1970s as the municipality expanded its waste water assets portfolio with $34 million in expenditures allocated to mains. During a second wave of expenditures in the early 2000s, the municipality 's investments totaled more than $45 million, $22 million of which was allocated for a treatment plant.

4.3 Useful Life Consumption

In this section, we detail the extent to which assets have consumed their useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's waste water services.

FIGURE 25 USEFUL LIFE CONSUMPTION – WASTE WATER

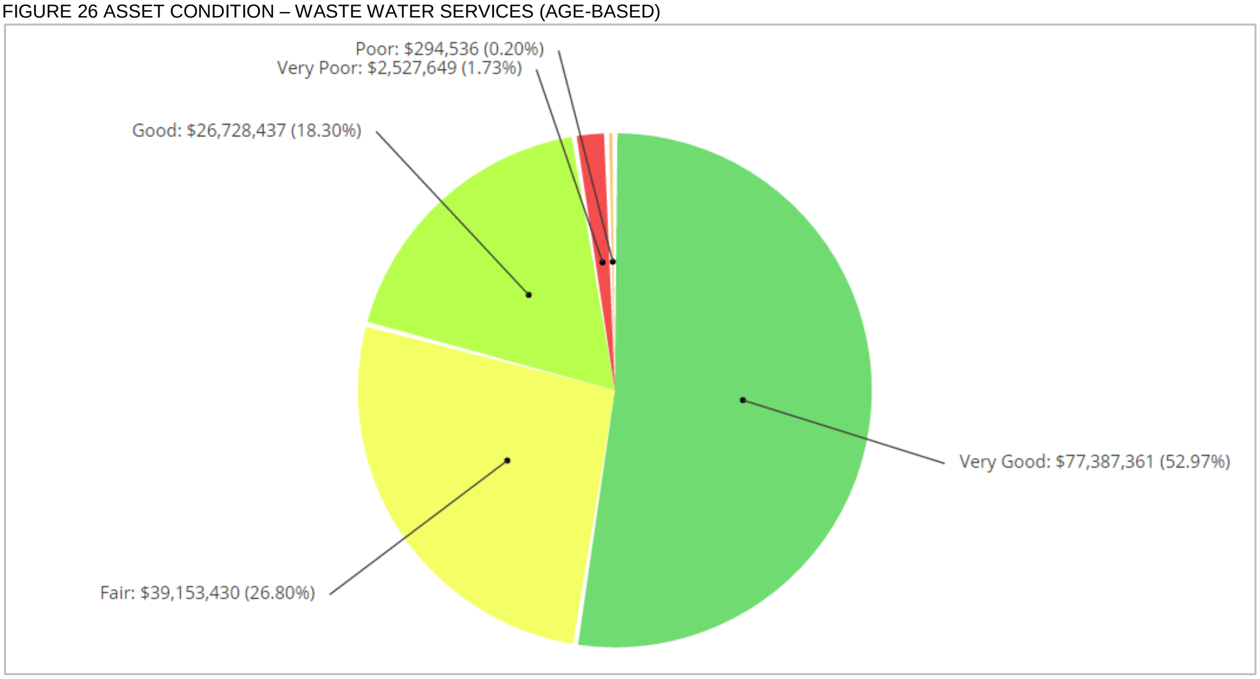


More than 95% of the municipality's waste water assets have at least 10 years of useful life remaining. However, 3%, with a valuation of more than $4 million, remain in operation beyond their useful life.

4.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's waste water services. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 26 ASSET CONDITION – WASTE WATER SERVICES (AGE-BASED)

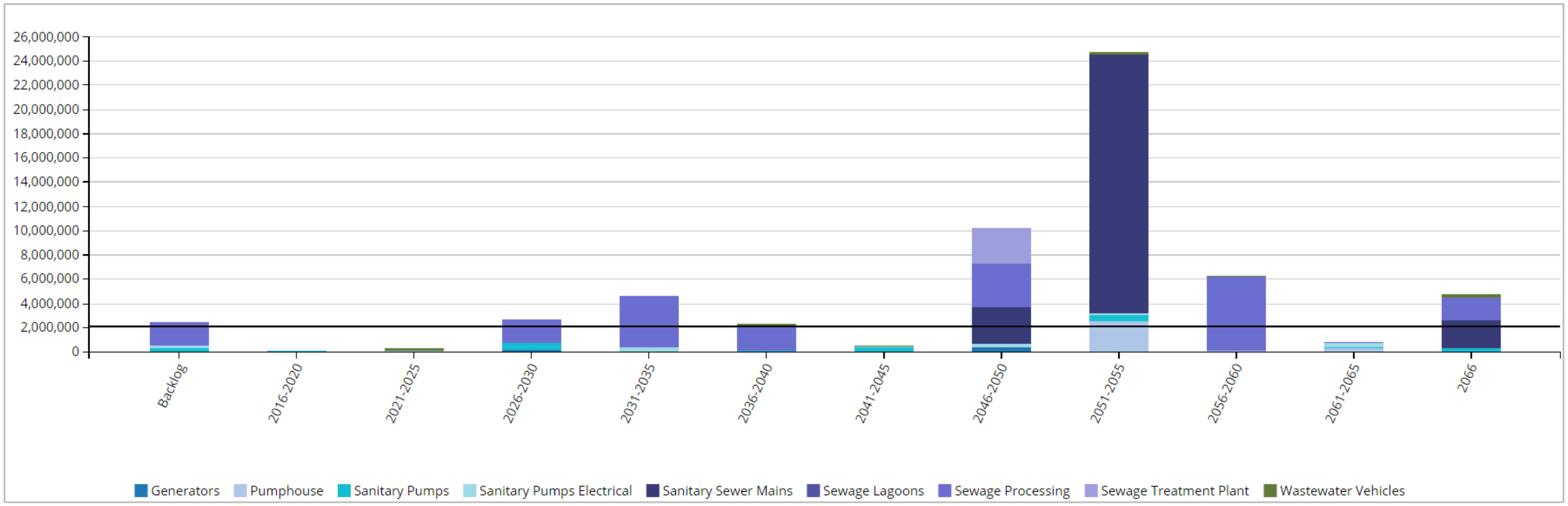


Based on age, 70% of the municipality's waste water assets are in good to very condition. Less than 2%, with a valuation of $2.8 million are in poor to very poor condition.

4.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's waste water services assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 27 FORECASTING REPLACEMENT NEEDS – WASTE WATER SERVICES



In addition to an age-based backlog of $2.4 million, the municipality's forecasted replacement expenditures will total more than $3 million in the next five years. An additional $1.2 million will be required between 2021-and 2025. These replacement needs will continue to rise until 2036-2040, when expenditures will total $9.5 million. The municipality's annual requirements (indicated by the black line) for its waste water assets total $2,184,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $0, leaving an annual deficit of $2,184,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

4.6 Recommendations – Waste water

- Based on age data, the majority of the municipality's waste water assets are in fair to very good condition. However, there is a backlog of replacement totaling $2.4 million. The municipality should establish a condition assessment program. This will provide a more accurate assessment of the physical health of the mains and the financial requirements related to the municipality's waste water network, including more precise estimation of the backlog. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The municipality should establish a systematic lifecycle activity framework that reflects the consumption of its waste water assets. At the least, these activities should be designed to maintain existing levels of service, and should reflect the overarching priorities of the municipality. See Section 3, 'Lifecycle Analysis Framework' in the 'Asset Management Strategies' chapter.

- Waste water collection system key performance indicators should be established and tracked annually as part of an overall level of service model. See Section VII 'Levels of Service'.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding only 0% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

5. Storm Water

5.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 10 illustrates key asset attributes for the municipality's storm water assets, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's storm water assets are valued at $65 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module. Note, the replacement cost for storm water mains was calculated using a 2009 cost per unit which was then inflated using NRBCPI.

TABLE 10 ASSET INVENTORY – STORM WATER

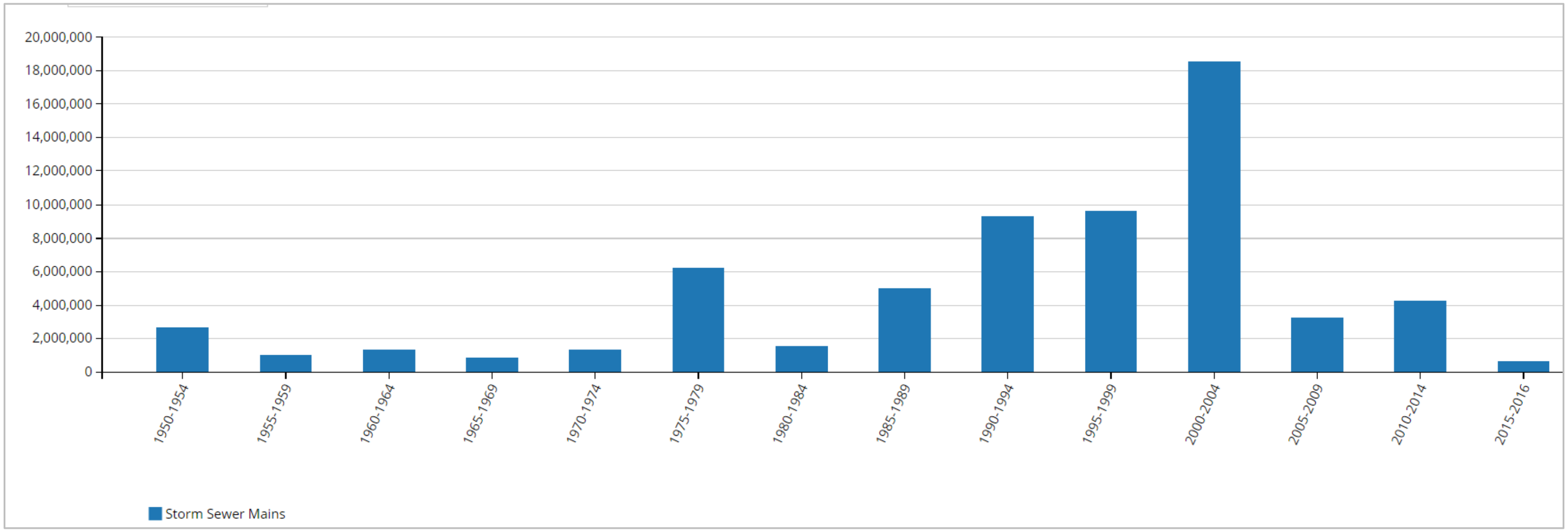
Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Storm water Services	Mains 100 (mm)	472m	75 to 100	User-Defined Cost	$90,286
	Mains 150 (mm)	3,628m	75 to 100	User-Defined Cost	$746,464
	Mains 200 (mm)	4,791m	25 to 100	User-Defined Cost	$1,371,944
	Mains 250 (mm)	3,486m	25 to 100	User-Defined Cost	$1,123,340
	Mains 300 (mm)	18,977m	50 to 100	User-Defined Cost	$6,771,798
	Mains 350 (mm)	415m	75	User-Defined Cost	$155,820
	Mains 375 (mm)	13,608m	35 to 100	User-Defined Cost	$5,110,158
	Mains 400 (mm)	61m	50	User-Defined Cost	$22,811
	Mains 450 (mm)	13,650m	25 to 100	User-Defined Cost	$6,539,270
	Mains 500 (mm)	86m	50	User-Defined Cost	$47,263
	Mains 525 (mm)	5,096m	35 to 100	User-Defined Cost	$2,808,410
	Mains 530 (mm)	35m	75	User-Defined Cost	$19,027
	Mains 575 (mm)	96m	75	User-Defined Cost	$52,787
	Mains 600 (mm)	6,482m	25 to 100	User-Defined Cost	$5,101,428
	Mains 675 (mm)	4,766m	100	User-Defined Cost	$4,257,273
	Mains 685 (mm)	94m	75	User-Defined Cost	$84,356
	Mains 750 (mm)	8,465m	75 to 100	User-Defined Cost	$7,563,981
	Mains 825 (mm)	1,518m	75	User-Defined Cost	$1,355,479
	Mains 900 (mm)	5,765m	75 to 100	User-Defined Cost	$5,664,187
	Mains 975 (mm)	59m	75	User-Defined Cost	$58,000
	Mains 1050 (mm)	2,973m	75 to 100	User-Defined Cost	$3,669,946
	Mains 1200 (mm)	2,959m	75 to 100	User-Defined Cost	$5,343,287

	Mains 1350 (mm)	1,298m	75	User-Defined Cost	$2,379,058
	Mains 1500 (mm)	800m	75	User-Defined Cost	$1,611,939
	Mains 1730 (mm)	137m	75	User-Defined Cost	$331,876
	Mains 1880 (mm)	710m	25	User-Defined Cost	$2,148,526
	Mains Unknown	139m	100	NRBCPI (Toronto)	$978,471
				Total	$65,407,185

5.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 28 HISTORICAL INVESTMENT – STORM WATER

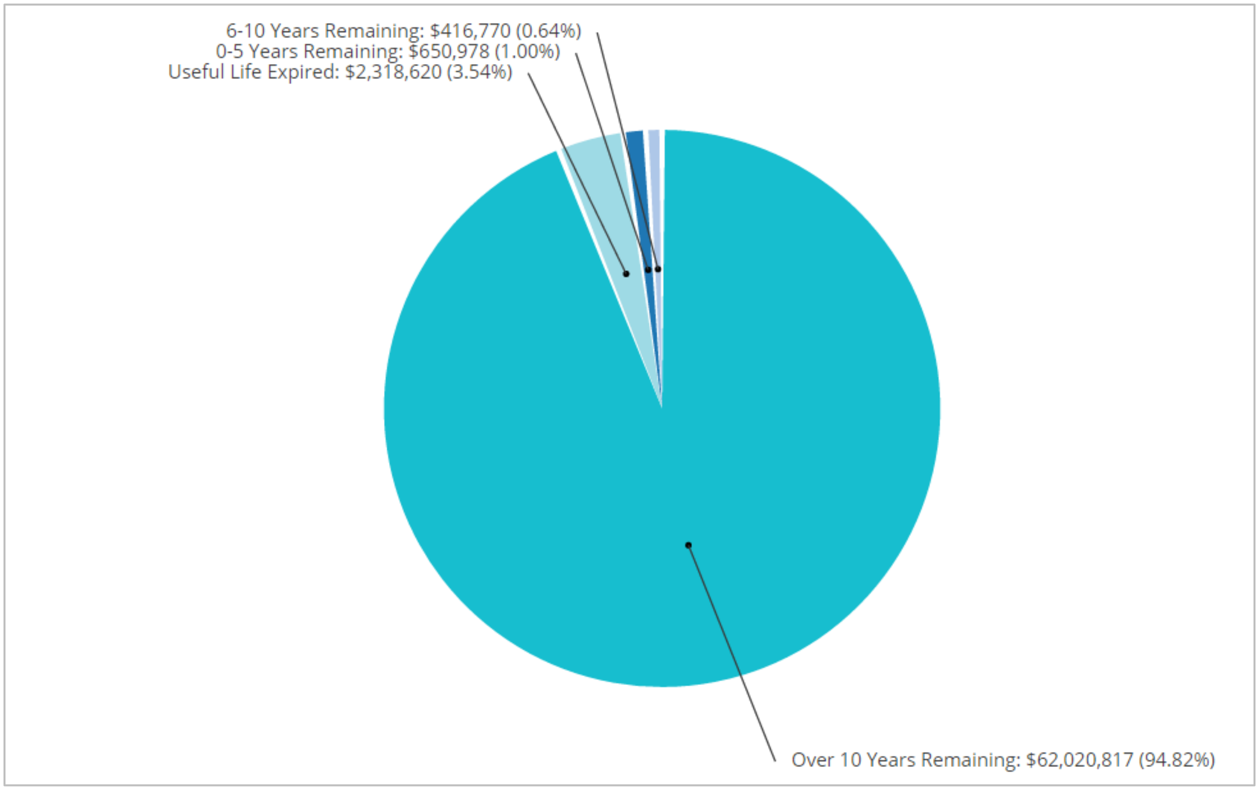


Similar to other municipalities, expenditures in storm water mains rose consistently beginning in the 1980s. The period of largest investments was 2000-2004, during which the municipality's expenditures on mains totaled $18.5 million. Since 2005, investments have totaled more than $8 million.

5.3 Useful Life Consumption

In this section, we detail the extent to which the asset class has consumed its useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's storm water assets.

FIGURE 29 USEFUL LIFE CONSUMPTION – STORM WATER

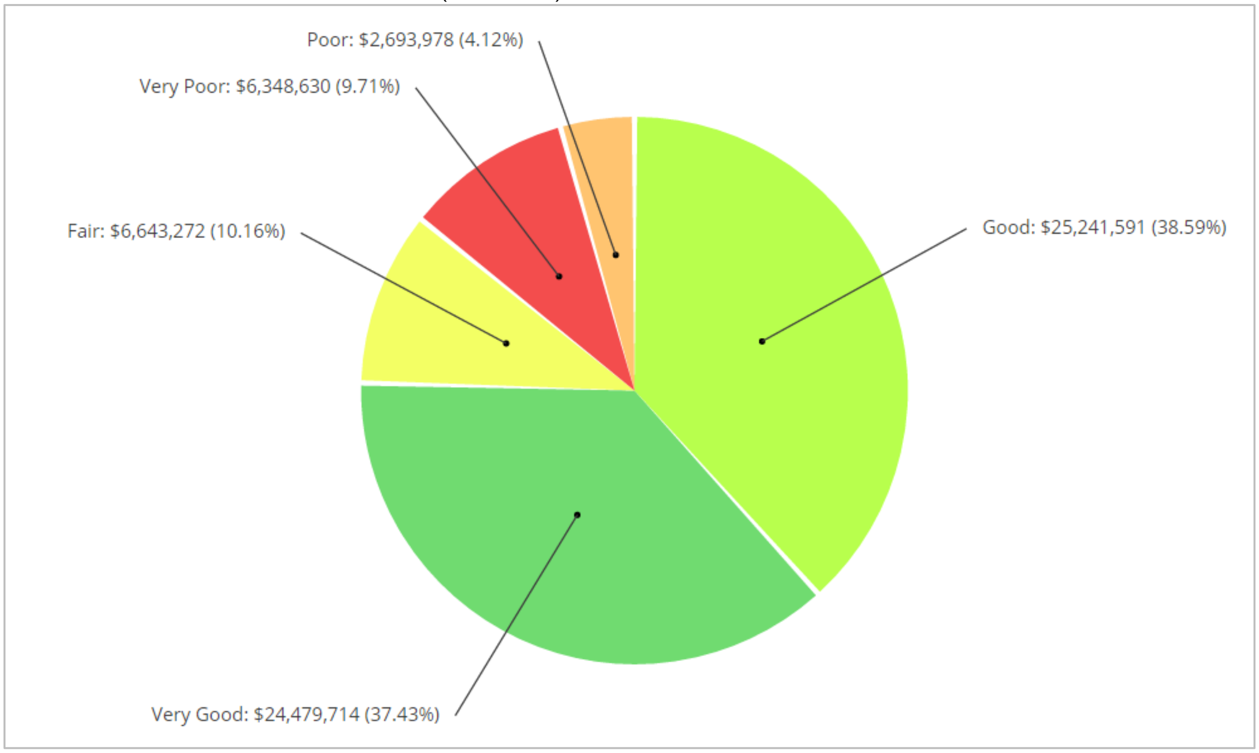


While less than 4% of asset, with a valuation of $2.3 million remain in operation beyond their useful life, 95% have at least 10 years of useful life remaining.

5.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's storm water services. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 30 ASSET CONDITION – STORM WATER (AGE-BASED)

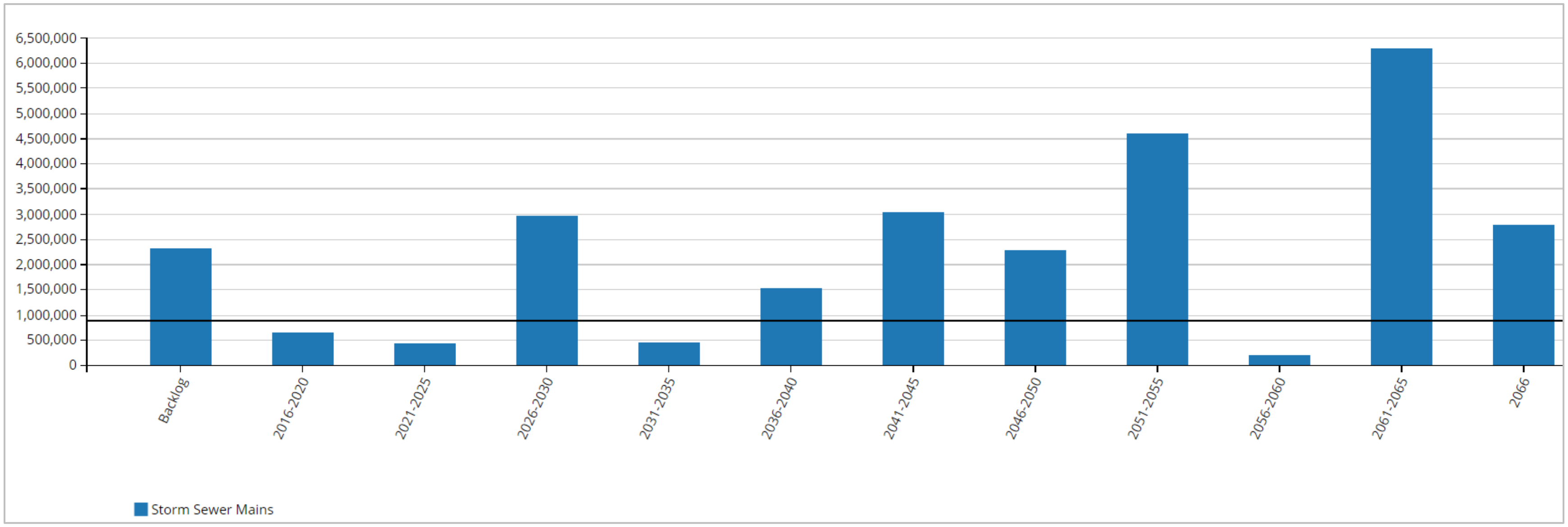


Age-based data shows that while nearly 80% of assets are in good to very good condition, nearly 15% with a valuation of more than $7 million, are in poor to very poor condition.

5.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's storm water services assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 31 FORECASTING REPLACEMENT NEEDS – STORM WATER



In addition to an age-based backlog of $2.3 million, the municipality's forecasted replacement expenditures will total more than $1 million in the next 10 years. These replacement needs will rise to $3 million. The municipality's annual requirements (indicated by the black line) for its storm water assets total $892,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $282,000, leaving an annual deficit of $610,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

5.6 Recommendations – Storm Water

- Based on age data, the majority of the municipality's storm water assets are in good to very good condition. However, there is a backlog of replacement totaling $2.3 million. The municipality should establish a condition assessment program. This will provide a more accurate assessment of the physical health of the mains and the financial requirements related to the municipality's storm water network, including more precise estimation of the backlog. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The municipality should establish a systematic lifecycle activity framework that reflects the consumption of its storm water assets. See Section 3, 'Lifecycle Framework' in the 'Asset Management Strategies' chapter.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding only 32% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

6. Facilities

6.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 11 illustrates key asset attributes for the municipality's facilities, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement cost were derived. In total, the municipality's facilities assets are valued at $59 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

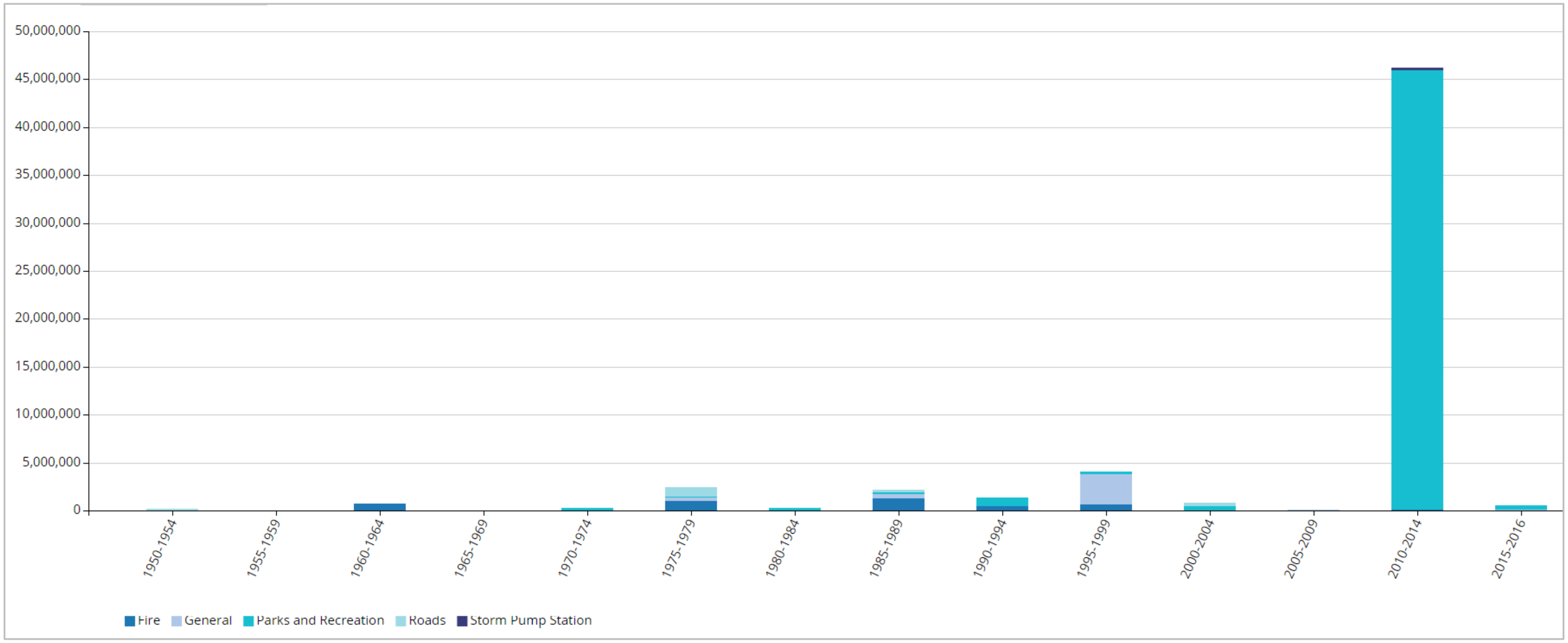
TABLE 11 KEY ASSET ATTRIBUTES – FACILITIES

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Facilities	Fire	5	30 to 50	User-Defined Cost	$4,085,096
	General (Municipal Office, OPP and Comber Medical)	3	50	User-Defined Cost	$4,177,618
	Parks and Recreation (includes all structures: parks, washrooms, gazebos, picnic shelters, docks, marina etc.)	34	40 to 50	NRBCPI (Toronto)	$48,641,764
	Roads (West Yard, Salt Storage Shed etc.)	4	50	User-Defined Cost	$1,848,356
	Storm Pump Station	1	75	NRBCPI (Toronto)	$274,614
				Total	$59,027,448

6.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 32 HISTORICAL INVESTMENT - FACILITIES

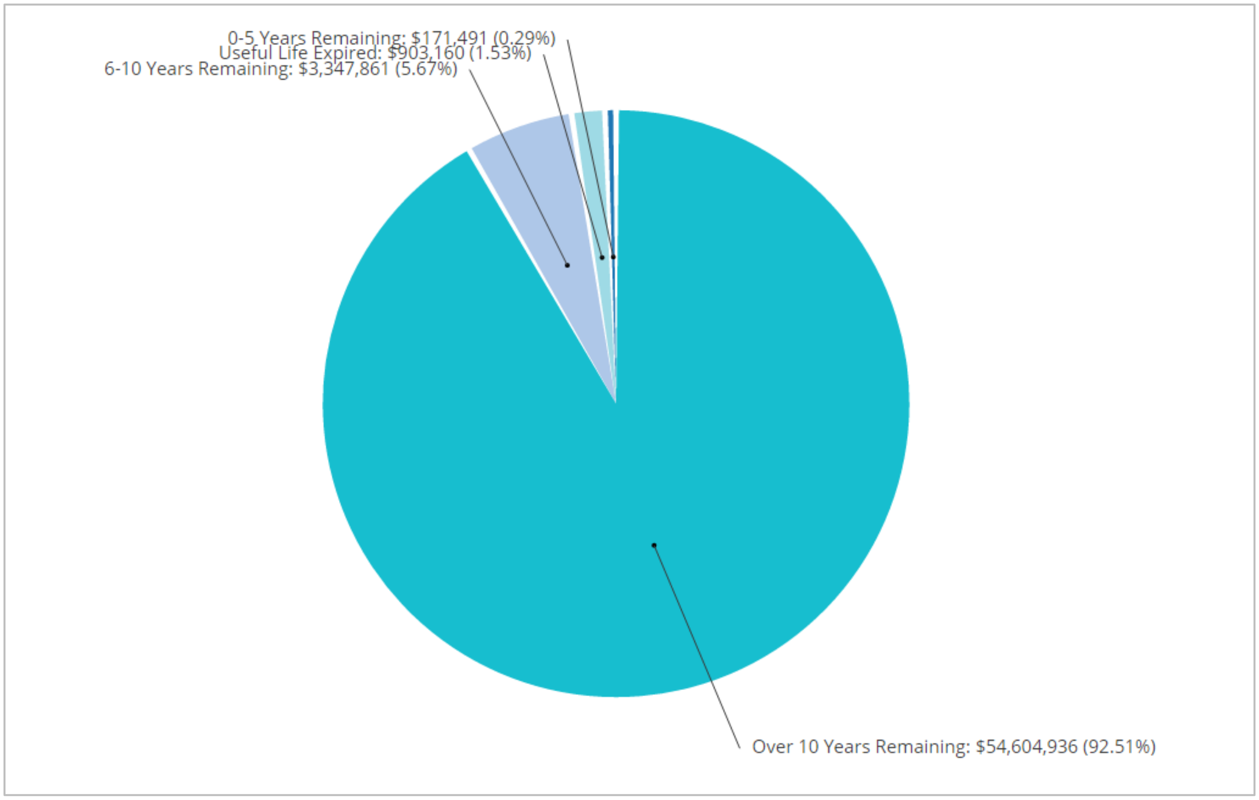


Investments in buildings peaked in 2010-2014, following decades of minimal expenditures. The municipality has invested nearly $47 million in its Parks and Recreation since 2010 which has included the Libro and ATC Phase I projects. This recent investment included new assets and an increased level of service as well as replacement of existing assets.

6.3 Useful Life Consumption

In this section, we detail the extent to which the asset class has consumed its useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's facilities assets.

FIGURE 33 USEFUL LIFE CONSUMPTION – FACILITIES

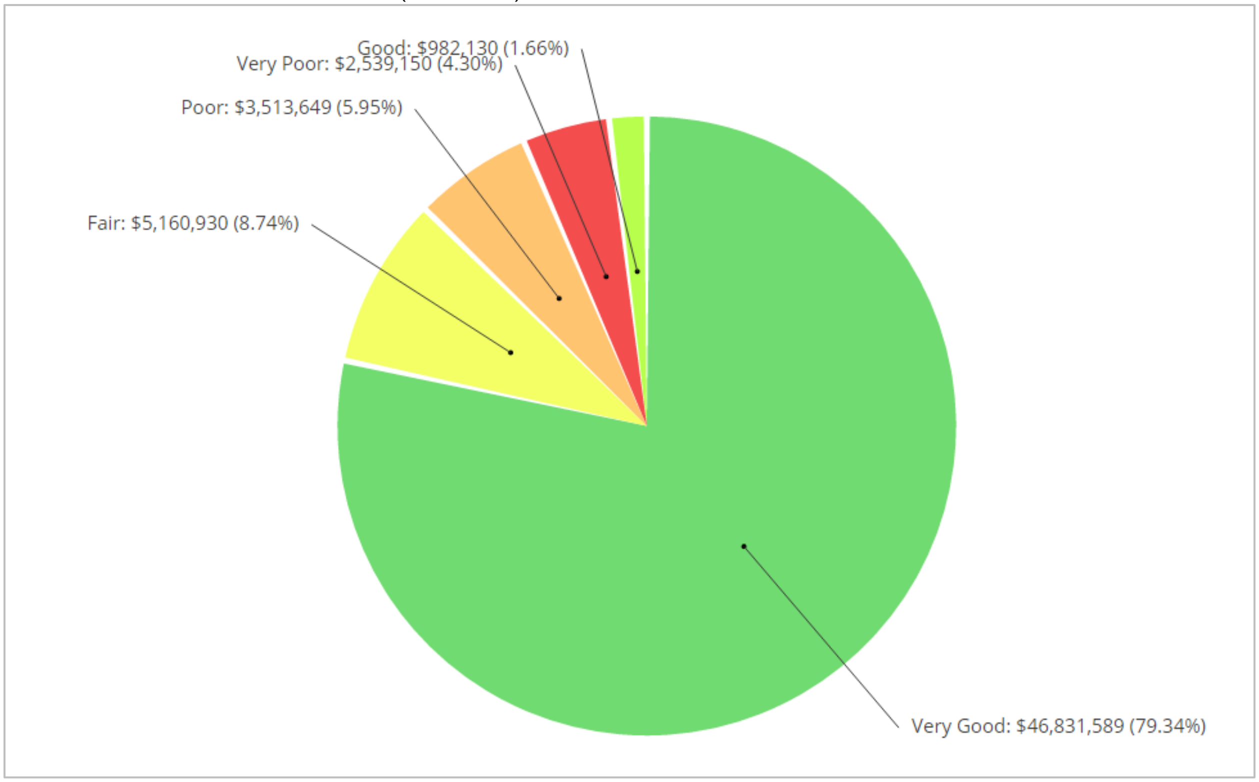


More than 90% of the municipality's buildings assets have at least 10 years of useful life remaining. Assets worth approximately $1 million remain in operation beyond their established useful life.

6.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's buildings assets. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 34 ASSET CONDITION – FACILITIES (AGE-BASED)

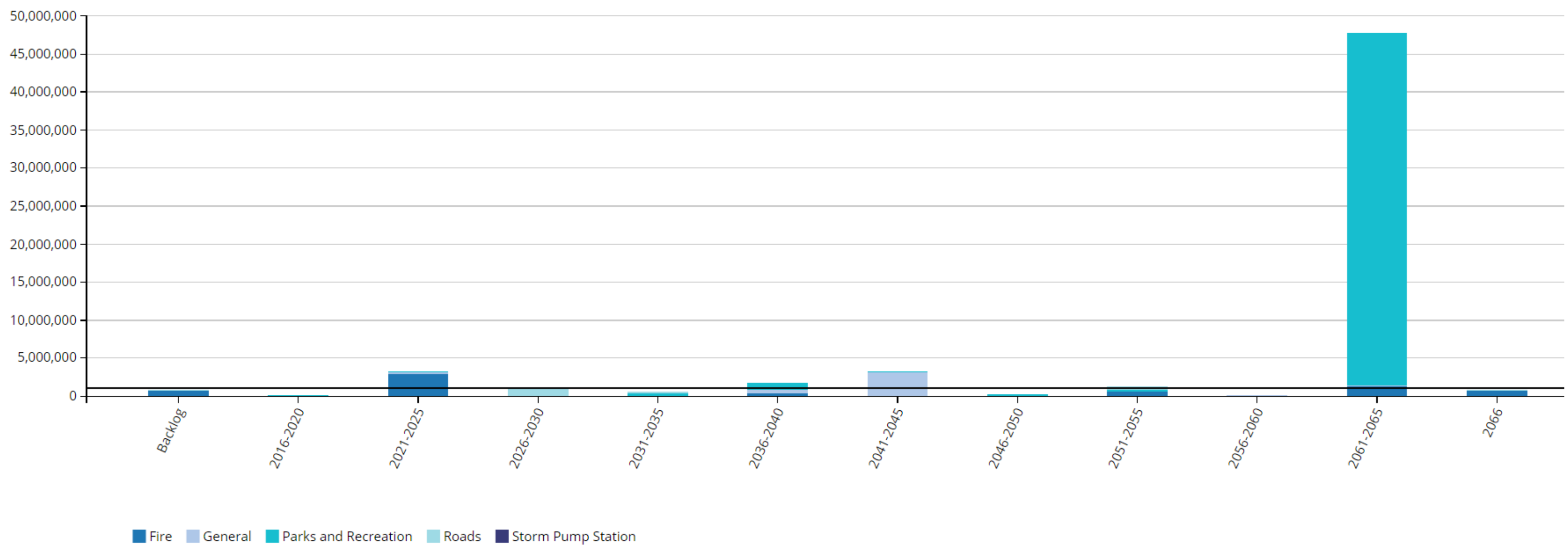


Age-based data shows that more than 80% of assets are in good to very good condition. However, 10%, with a valuation of $6 million are in poor to very poor condition.

6.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's facilities assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 35 FORECASTING REPLACEMENT NEEDS – FACILITIES



Age-based data shows an infrastructure backlog of $903,000. While replacement needs total $3.5 million over the next 10 years, as assets reach the end of their useful life, expenditure requirements will peak to $48 million in 2061-2065. The municipality's annual requirements (indicated by the black line) for its buildings total $1,194,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $371,000, leaving an annual deficit of $823,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

6.6 Recommendations – Facilities

- Due to the lack of condition data, the municipality should implement a component based condition inspection program for its facilities. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The municipality's confidence in its data is low and there is no formal data verification policy in place. To establish a higher degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding 31% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- The municipality should develop a strategy to address facility needs arising from expansion or betterment due to growth or legislative changes.

- Facility key performance indicators should be established and tracked annually as part of an overall level of service model. See Section VII 'Levels of Service'.

7. Machinery & Equipment

7.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 12 illustrates key asset attributes for the municipality's machinery and equipment assets, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's machinery & equipment assets are valued at $11 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset (TCA) Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module. Note that there are limitations to the TCA furniture and fixtures inventory as it only includes new purchases for the new recreational facility which is a fraction of corporate wide furniture and fixtures.

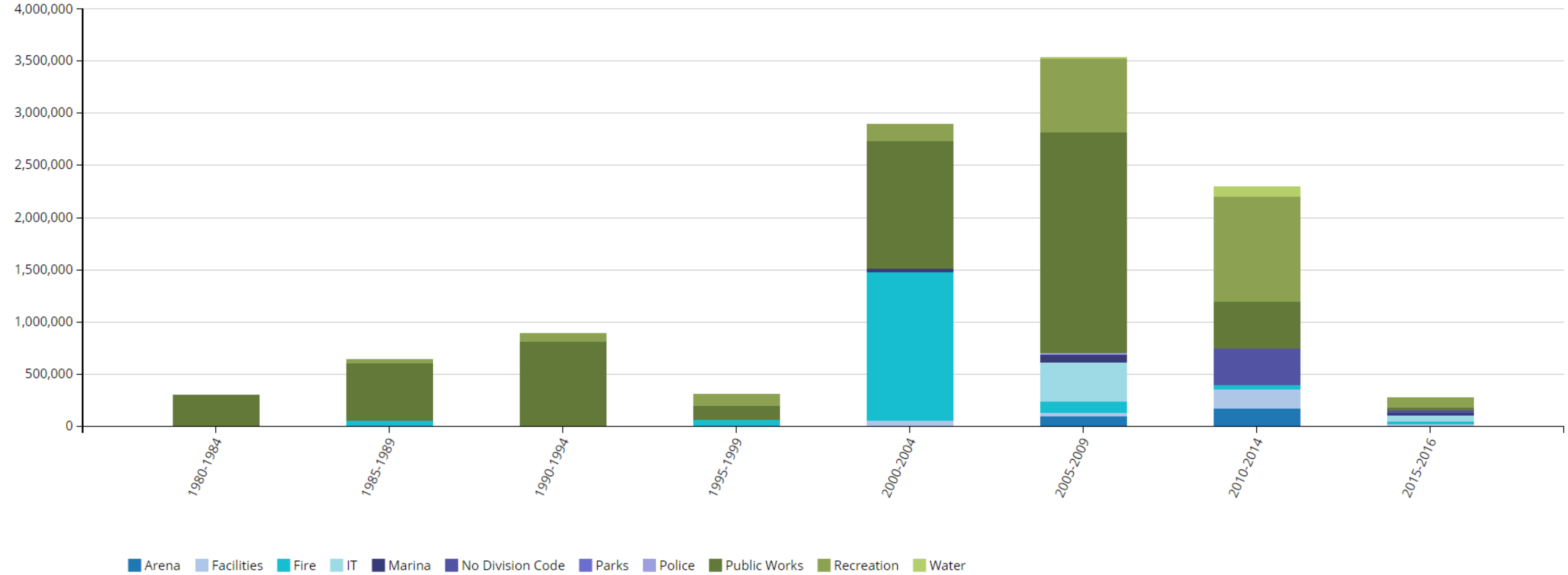
TABLE 12 ASSET INVENTORY – MACHINERY & EQUIPMENT

Asset Type	Components	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Machinery & Equipment	Canteen-Kitchen Equipment	Pooled	10	CPI (Ontario)	$143,213
	Computer Equipment	Pooled	4 to 6	CPI (Ontario)	$439,130
	Facilities Cleaning Equipment	Pooled	10	CPI (Ontario)	$75,006
	Fire Equipment	Pooled	5 to 25	CPI (Ontario)	$1,662,127
	Furniture and Fixtures	Pooled	10	CPI (Ontario)	$225,792
	General Equipment	7	10 to 20	CPI (Ontario)	$170,492
	Generators	5	20	CPI (Ontario)	$262,102
	Gymnasium & Arena Equipment	9	10 to 20	CPI (Ontario)	$510,767
	Marina Pumps	3	15	CPI (Ontario)	$92,408
	Parks Equipment	10	10 to 20	CPI (Ontario)	$174,390
	Playground Equipment	52	20	CPI (Ontario)	$1,481,972
	Public Works Equipment	16	10 to 20	CPI (Ontario)	$1,629,220
	Recreation Equipment	4	10	CPI (Ontario)	$268,902
	Storm Pumps	36	25	CPI (Ontario)	$3,860,000
	Storm Pumps Electrical	1	30	CPI (Ontario)	$99,579
	Telephone Equipment	Pooled	10	CPI (Ontario)	$19,789
				Total	$11,114,889

7.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 36 HISTORICAL INVESTMENT – MACHINERY & EQUIPMENT

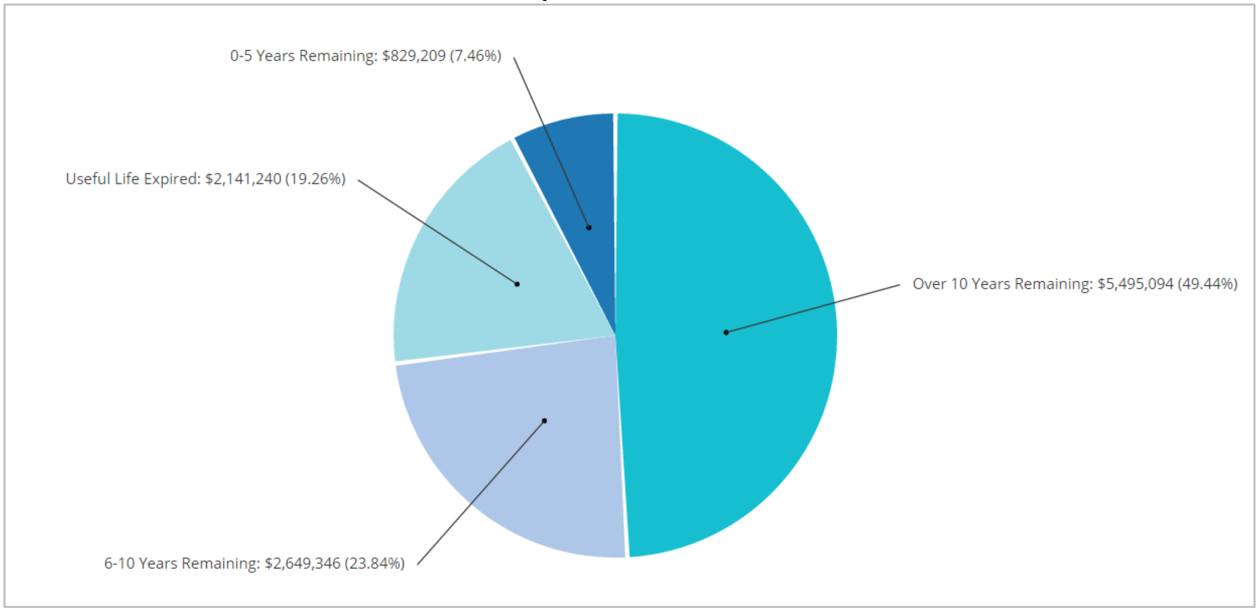


Investments in machinery & equipment rose significantly in the early 2000s, with expenditures totaling $2.9 million, the majority of which was allocated to fire and public works. Between 2005-2009, the period of largest expenditures, the municipality invested $3.5 million, with major investments in recreation, public works and IT. Since 2010, investments have totaled more than $3.5 million.

7.3 Useful Life Consumption

In this section, we detail the extent to which the asset class has consumed its useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's machinery & equipment assets.

FIGURE 37 USEFUL LIFE CONSUMPTION – MACHINERY & EQUIPMENT

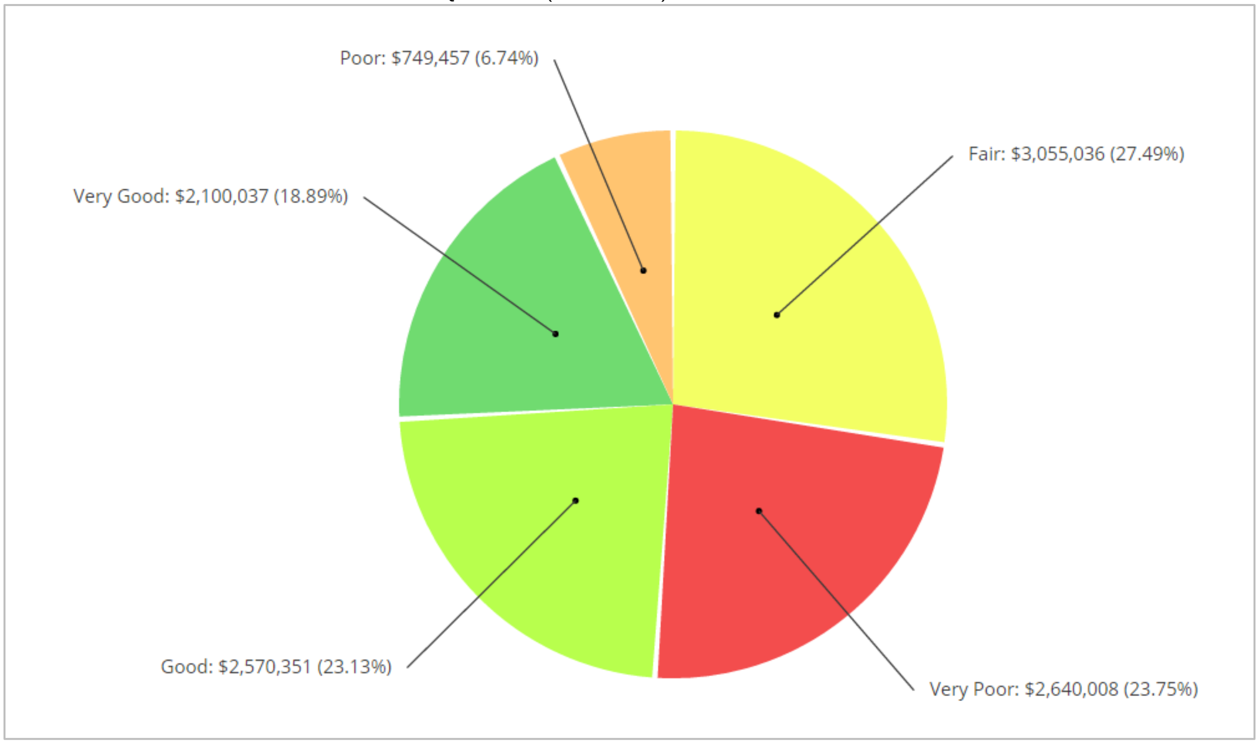


While 50% of equipment assets have at least 10 years of useful life remaining, 20% of the assets, with a valuation of $2.1 million, remain in operation beyond their established useful life. Further, nearly 8% will reach the end of their useful life within the next five years.

7.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's machinery & equipment assets. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 38 ASSET CONDITION – MACHINERY & EQUIPMENT (AGE-BASED)

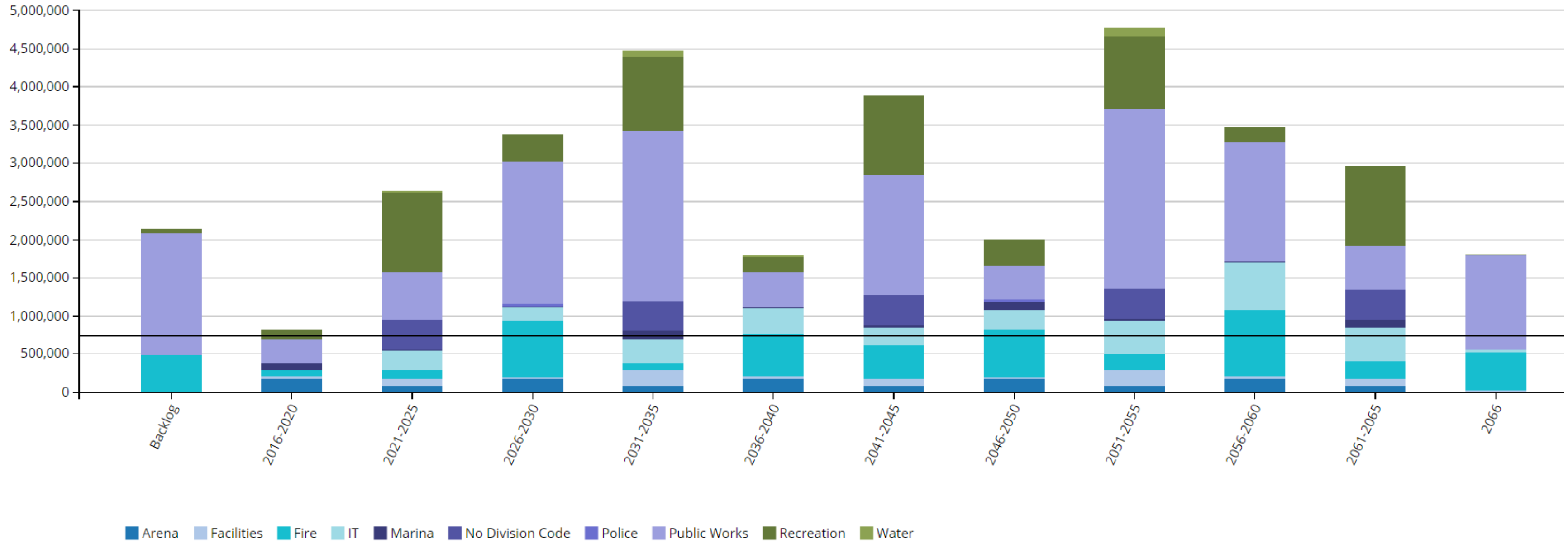


Approximately 30% of machinery & equipment at the municipality, with a valuation of $3.3 million, are in poor to very poor condition; more than 40% are in good to very good condition.

7.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's machinery & equipment assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 39 FORECASTING REPLACEMENT NEEDS – MACHINERY & EQUIPMENT



In addition to a backlog of $2.1 million, the municipality's replacement needs total approximately $830,000 in the next five years. An additional $2.6 million will be required between 2021-2025. The municipality's annual requirements (indicated by the black line) for its machinery & equipment total $750,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $259,000, leaving an annual deficit of $491,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

7.6 Recommendations – Machinery & Equipment

- Age-based data indicates a backlog of $2.1 million. Condition assessment data and utilization data (e.g., hours consumed), once gathered, should be used to provide better estimate of this pent-up demand. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- While the municipality's confidence in its data is relatively high, there is no formal data verification policy in place. To maintain a high degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding 35% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

8. Land Improvements

8.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 13 illustrates key asset attributes for the municipality's land improvement assets, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's land improvements assets are valued at $7.4 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

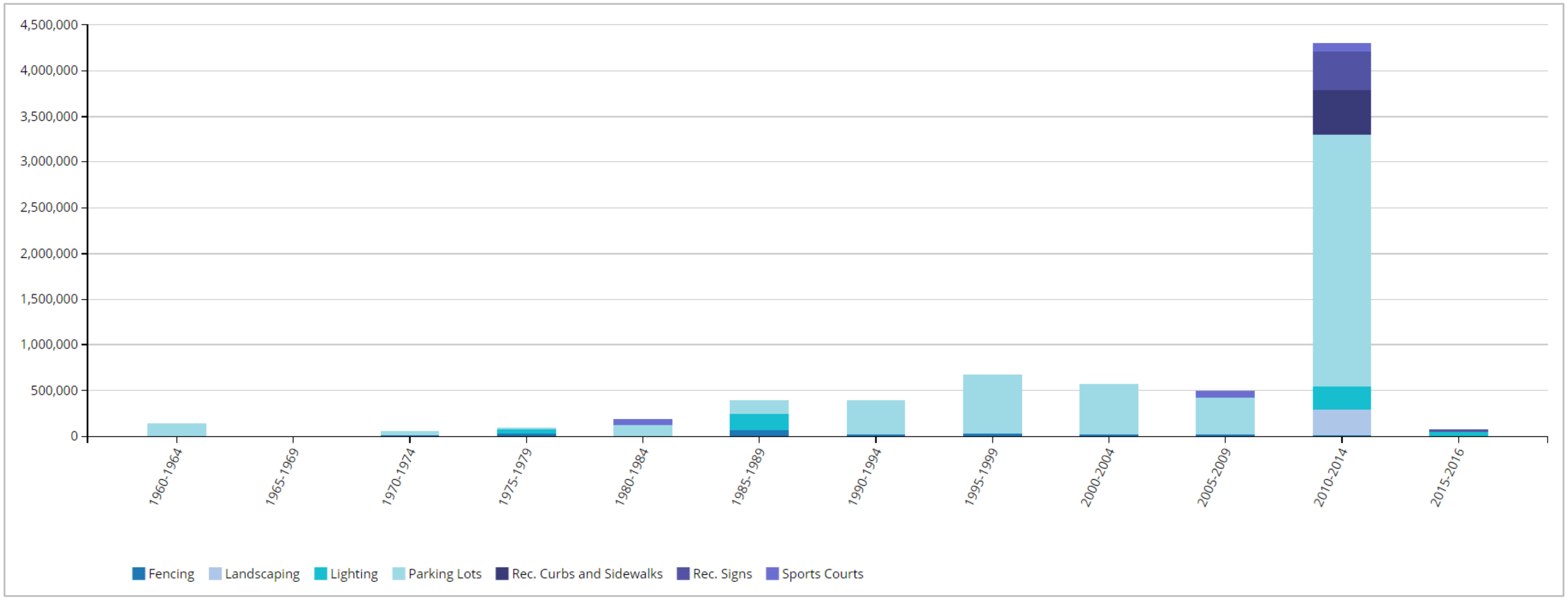
TABLE 13 ASSET INVENTORY - LAND IMPROVEMENTS

Asset Type	Components	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Land Improvements	Fencing	85	20 to 40	User-Defined Cost	$245,367
	Landscaping	2	20	CPI (Ontario)	$278,821
	Lighting	26	50	CPI (Ontario)	$523,531
	Parking Lots	36	40	CPI (Ontario)	$5,166,456
	Rec. Curbs and Sidewalks	2	30	CPI (Ontario)	$493,887
	Rec. Signs	17	20 to 50	CPI (Ontario)	$447,990
	Sports Courts/Fields	7	20	CPI (Ontario)	$232,364
				Total	$7,388,416

8.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 40 HISTORICAL INVESTMENT - LAND IMPROVEMENTS

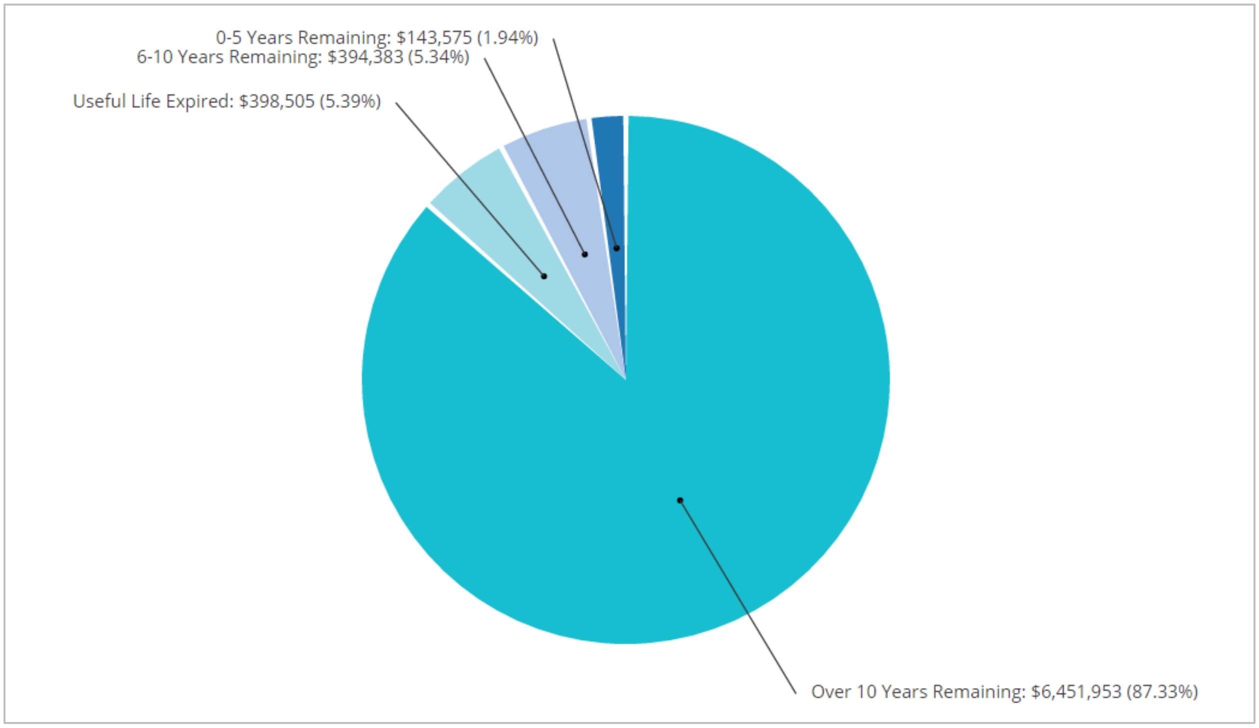


The municipality's investments in land improvements remained minor until the late 2000s. Since 2010, expenditures have totaled $4.4 million, $2.7 million of which was allocated to parking lots.

8.3 Useful Life Consumption

In this section, we detail the extent to which the asset class has consumed its useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's land improvement assets.

FIGURE 41 USEFUL LIFE CONSUMPTION - LAND IMPROVEMENTS

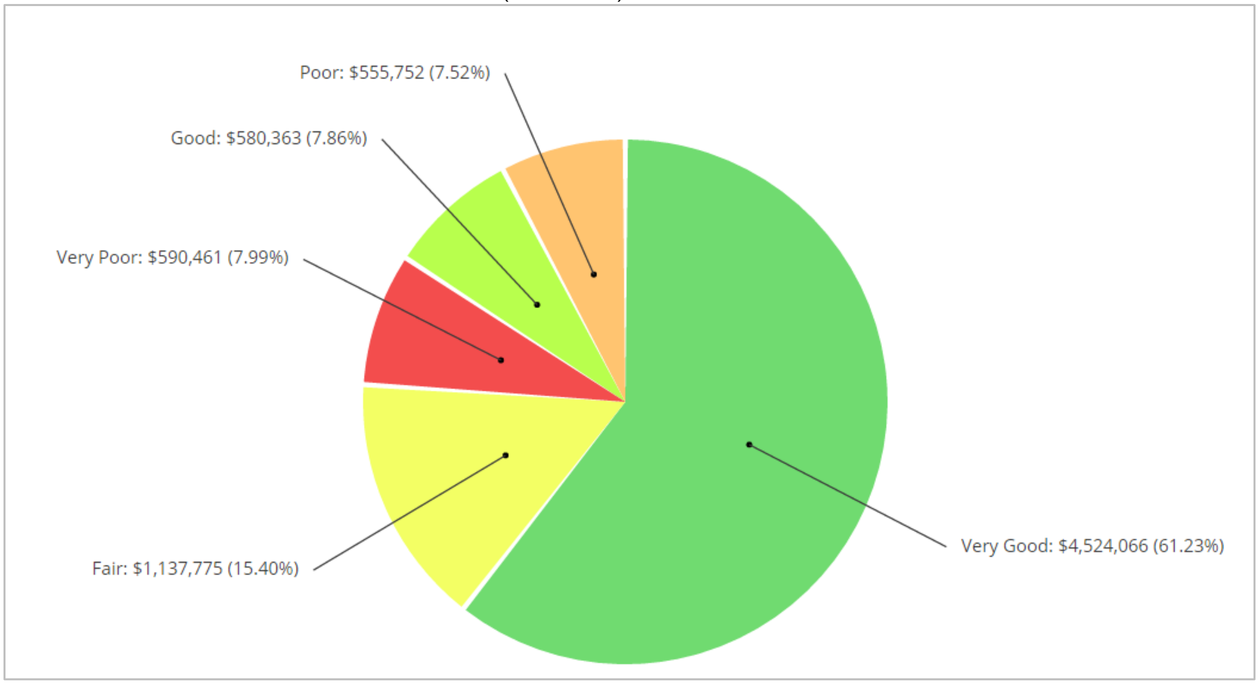


Nearly 90% of the municipality's land improvement assets, with a valuation of $6.4 million, have at least 10 years of useful life remaining; 5%, with a valuation of $400,000 remain in operation beyond their useful life.

8.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's land improvement assets. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 42 ASSET CONDITION - LAND IMPROVEMENTS (AGE-BASED)

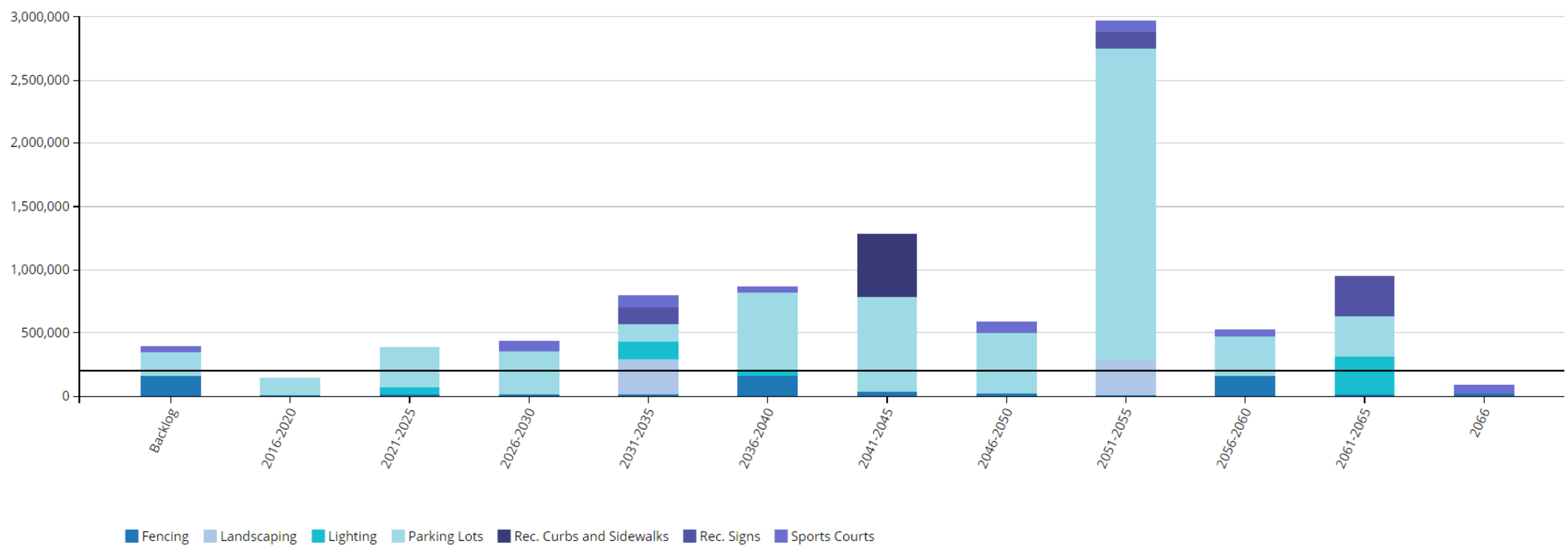


Based on age data, 70% of the assets are in good to very good condition; however, more than 15%, with a valuation of more than $1 million are in poor to very poor condition.

8.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's land improvement assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 43 FORECASTING REPLACEMENT NEEDS - LAND IMPROVEMENTS



In addition to a backlog of $400,000, the municipality's replacement needs will begin to increase from $144,000 for 2016-2020, to $800,000 between 2031-2035. The municipality's annual requirements (indicated by the black line) for its land improvement assets total $212,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $32,000, leaving an annual deficit of $180,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

8.6 Recommendations – Land improvements

- While age-based data shows that majority of land improvement assets are in good to very good condition, the municipality should establish a comprehensive condition assessment program. This will provide a more accurate estimate of the physical health of the assets and the financial requirements related to the municipality's land improvements. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The municipality's confidence in its data is very low and there is no formal data verification policy in place. To maintain a high degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding 15% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

9. Vehicles

9.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 14 illustrates key asset attributes for the municipality's vehicles assets, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's vehicles assets are valued at $7.8 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the municipality in accordance with the Tangible Capital Asset Policy and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

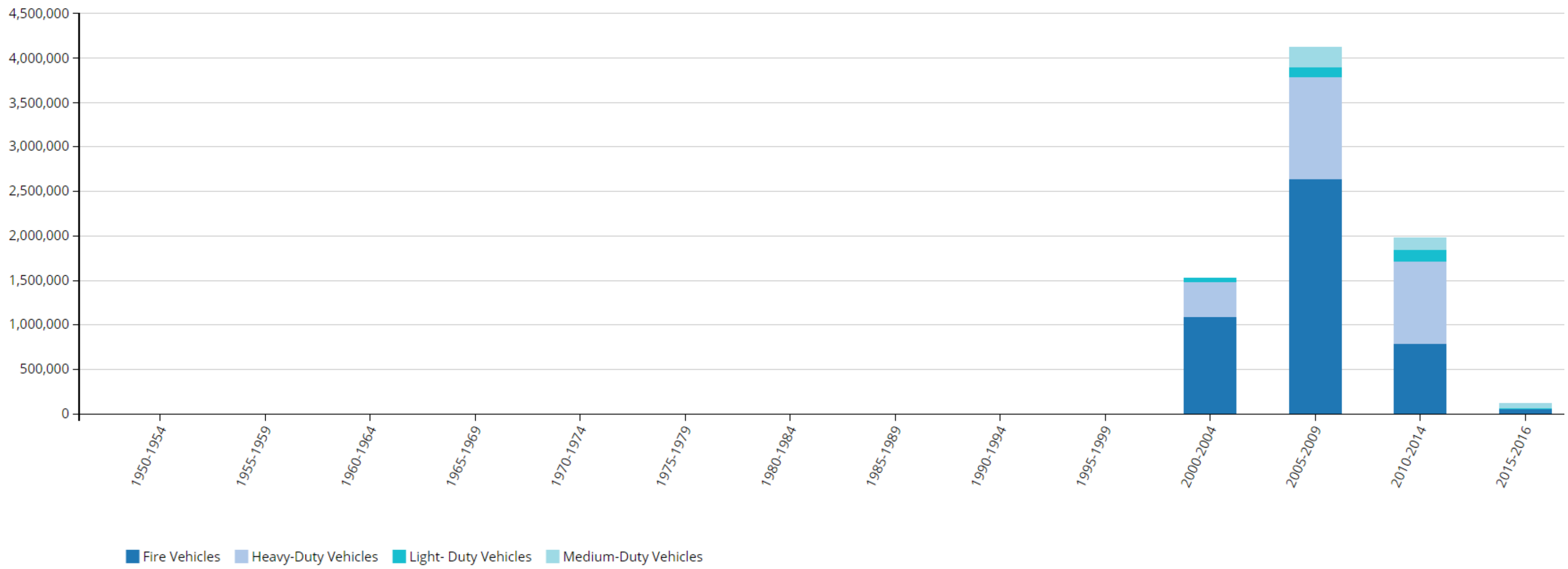
TABLE 14 ASSET INVENTORY - VEHICLES

Asset Type	Components	Quantity	Useful Life in Years	Valuation Method	2016 Replacement Cost
Land Improvements	Fire Vehicles	16	8 to 20	CPI (Ontario)	$4,573,401
	Light-Duty Vehicles	11	8 to 10	CPI (Ontario)	$329,929
	Medium-Duty Vehicles	5	8 to 12	CPI (Ontario)	$423,387
	Heavy-Duty Vehicles	14	8 to 12	CPI (Ontario)	$2,449,000
				Total	$7,775,717

9.2 Historical Investment in Infrastructure

In the next two sections, we provide the installation profile and useful life consumption levels using in-service data obtained from CityWide® Tangible Assets. While observed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, these graphs illustrate historical infrastructure investment trends and can assist in forecasting short-, medium- and long-term replacement needs.

FIGURE 44 HISTORICAL INVESTMENT – VEHICLES

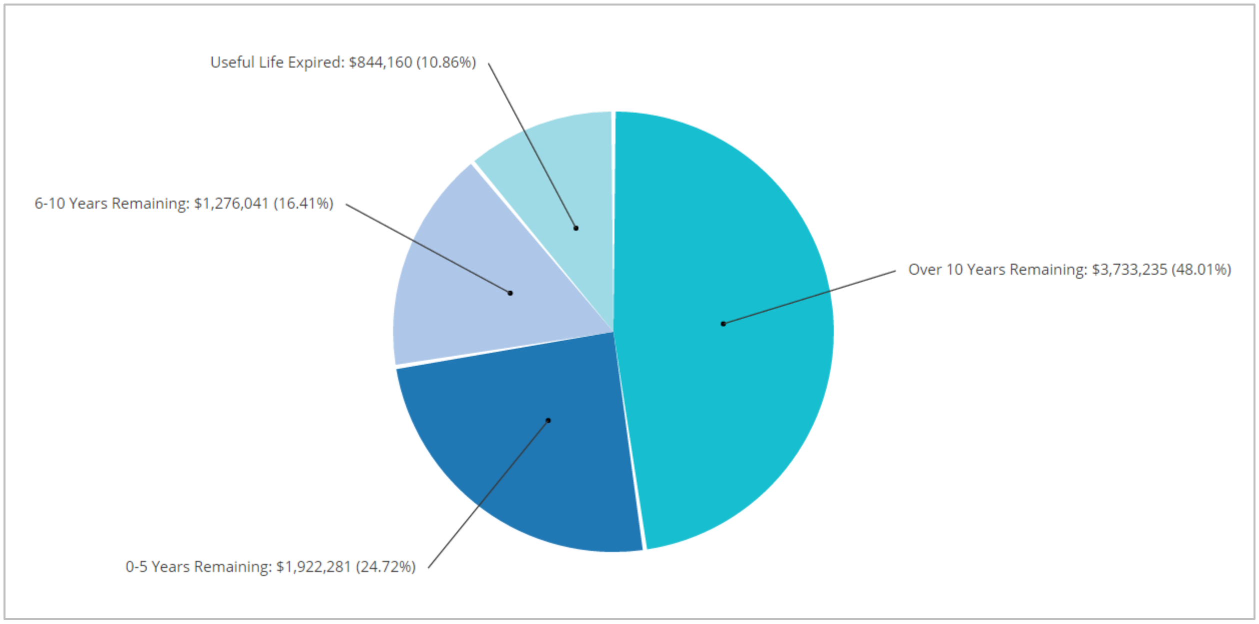


The municipality's expenditures in vehicles have totaled $7.7 million since 2000, with fire and heavy-duty vehicles comprising the largest share.

9.3 Useful Life Consumption

In this section, we detail the extent to which the asset class has consumed its useful life based on the above, established useful life standards. In conjunction with asset condition data, understanding the consumption rate of assets based on industry established useful life measures provides a more complete profile of the state of a community's infrastructure. The figure below illustrates the useful life consumption levels for the municipality's vehicles.

FIGURE 45 USEFUL LIFE CONSUMPTION – VEHICLES

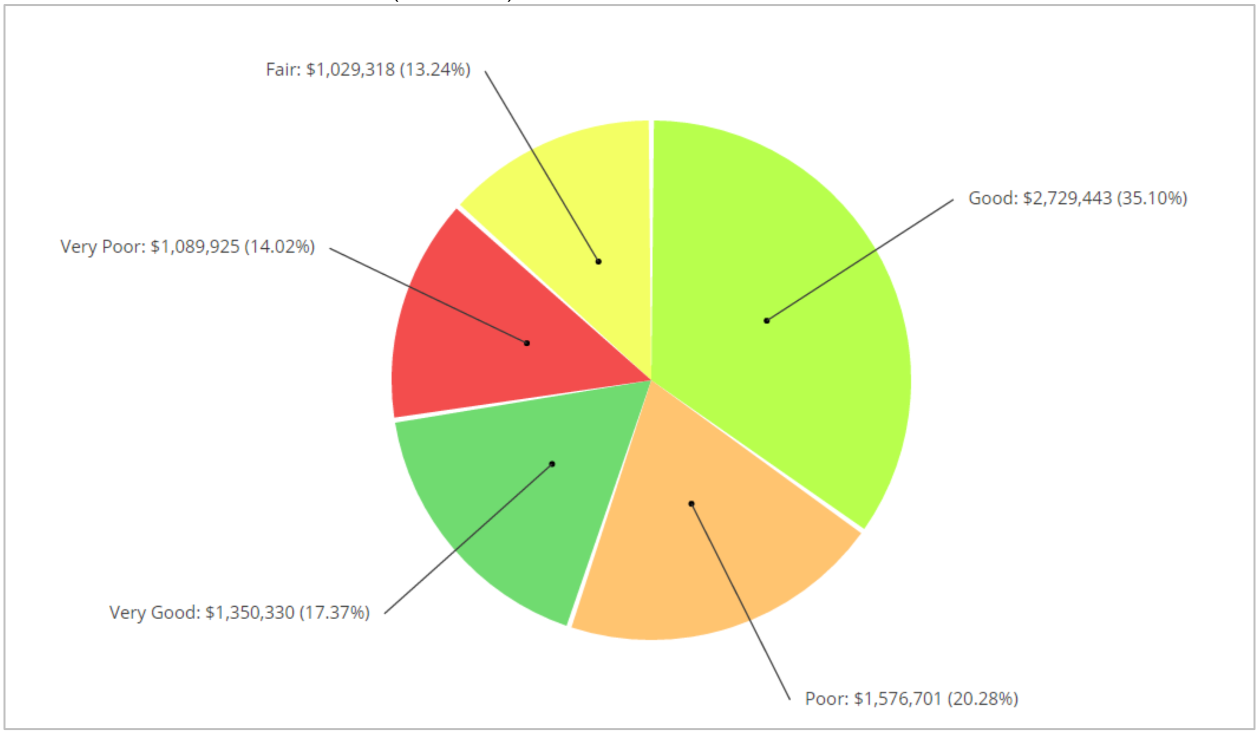


While nearly 50% of the municipality's vehicles assets have at least 10 years of useful life remaining, more than 10%, with a valuation of $844,000 remain in operation beyond their useful life. An additional 25% will reach the end of their useful life in the next five years.

9.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the municipality's vehicles assets. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. Condition data was not provided by the municipality.

FIGURE 46 ASSET CONDITION – VEHICLES (AGE-BASED)

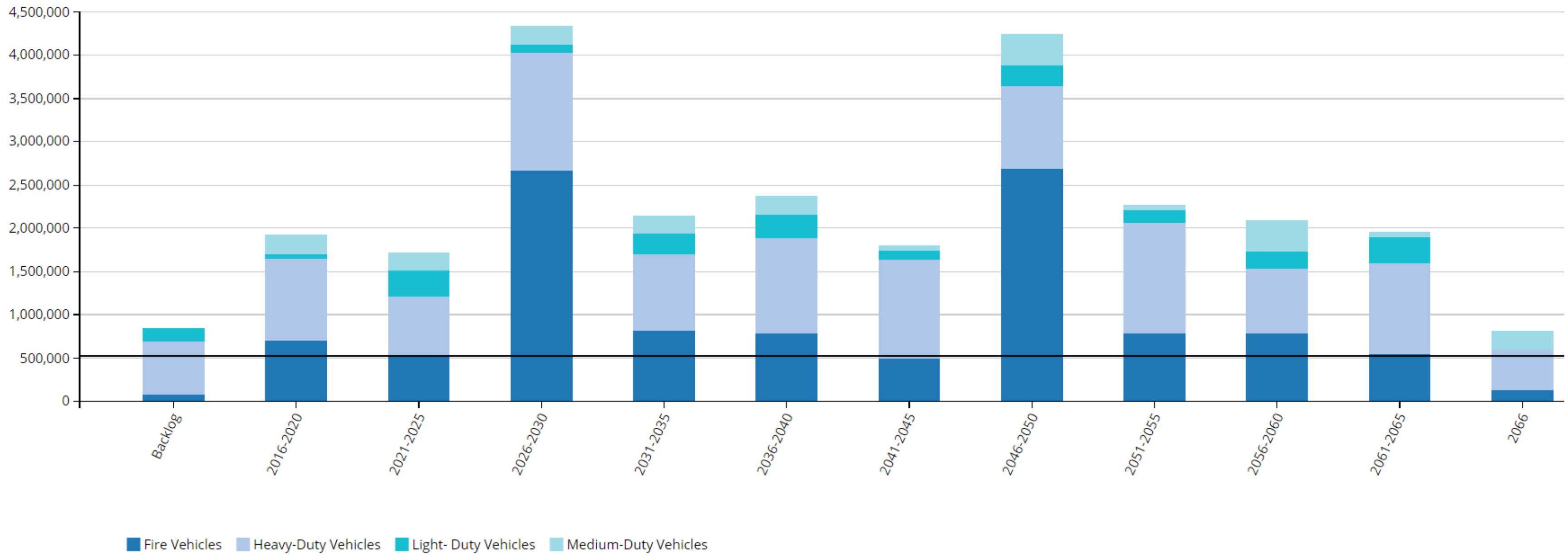


While more than 50% of the municipality's vehicles assets are in good to very good condition, more than 33%, with a valuation of $2.7 million are in poor to very poor condition.

9.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the municipality's vehicles assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

FIGURE 47 FORECASTING REPLACEMENT NEEDS - VEHICLES



In addition, a backlog of $844,000, replacement needs will total $1.9 million over the next five years; an additional $1.7 million will be required between 2021-2025. Replacement needs will continue to climb, peaking at $4.3 million between 2026-2030. The municipality's annual requirements (indicated by the black line) for its vehicles total $532,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. This annual requirement does not capture the additional needs for the construction of new assets or the enhancement of existing assets. The municipality is currently allocating $146,000, leaving an annual deficit of $386,000. See the 'Financial Strategy' section for achieving a sustainable funding level. Further, while fulfilling the annual requirements will position the municipality to meet its future replacement needs, injection of additional revenues will be needed to mitigate existing infrastructure backlogs.

9.6 Recommendations – Vehicles

- Age-based data shows that 33% of the assets are in poor to very poor condition; there is also a replacement backlog of $844,000. A preventative maintenance and life cycle assessment program should be established for the fleet class to gain a better understanding of current condition and performance as well as the pent-up demand. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- While the municipality's confidence in its data is high, there is no formal data verification policy in place. To maintain a high degree of data confidence over time and minimize deficiencies, the municipality should establish a systematic data verification policy.

- The municipality should assess its short-, medium- and long-term operations and maintenance needs. An appropriate percentage of the replacement costs should then be allocated for the municipality's O&M requirements.

- The municipality is funding 27% of it's annual requirements needed for future replacement needs. See the 'Financial Strategy' section on how to achieve more sustainable funding levels.

- This AMP and any Level of Service (LOS) and Key Performance Indicators (KPIs) established should be updated annually to gauge the performance of the municipality against quantified targets.

VII. Levels of Service

The two primary risks to a municipality's financial sustainability are the total lifecycle costs of infrastructure, and establishing levels of service (LOS) that exceed its financial capacity. In this regard, municipalities face a choice: overpromise and underdeliver; under promise and overdeliver; or promise only that which can be delivered efficiently without placing inequitable burden on taxpayers. In general, there is often a trade-off between political expedience and judicious, long-term fiscal stewardship.

Developing realistic LOS using meaningful key performance indicators (KPIs) can be instrumental in managing citizen expectations, identifying areas requiring higher investments, driving organizational performance, and securing the highest value for money from public assets. However, municipalities face diminishing returns with greater granularity in their LOS and KPI framework. That is, the objective should be to track only those KPIs that are relevant and insightful and reflect the priorities of the municipality.

1. Guiding Principles for Developing LOS

Beyond meeting regulatory requirements, levels of service established should support the intended purpose of the asset and its anticipated impact on the community and the municipality. LOS generally have an overarching corporate description, a customer oriented description, and a technical measurement. Many types of LOS, e.g., availability, reliability, safety, responsiveness, and cost effectiveness, are applicable across all service areas in a municipality. The following levels of service categories are established as guiding principles for the LOS that each service area in the municipality should strive to provide internally to the municipality and to residents/customers. These are derived from the Town of Whitby's *Guide to Developing Service Area Asset Management Plans*.

- **Available**: Services of sufficient capacity are convenient and accessible to the entire community
- **Cost Effective**: Services are provided at the lowest possible cost for both current and future customers, for a required level of service, and are affordable
- **Reliable**: Services are predictable and continuous
- **Responsive**: Opportunities for community involvement in decision making are provided; and customers are treated fairly and consistently, within acceptable timeframes, demonstrating respect, empathy and integrity
- **Safe**: Services are delivered such that they minimize health, safety and security risks
- **Suitable**: Services are suitable for the intended function (fit for purpose)
- **Sustainable**: Services preserve and protect the natural and heritage environment.

While the above categories provide broad strategic direction to council and staff, specific and measurable KPIs related to each LOS category are needed to ensure the municipality remains steadfast in its pursuit of delivering the highest value for money to various internal and external stakeholders.

2. Key Performance Indicators and Targets

In this section, we identify industry standard KPIs for major infrastructure classes that the municipality can incorporate into its performance measurement and for tracking its progress over future iterations of its AMPs. The municipality should develop appropriate and achievable targets that reflect evolving demand on infrastructure, its fiscal capacity and the overall corporate objectives.

TABLE 15 KEY PERFORMANCE INDICATORS - ROAD NETWORK AND BRIDGES & CULVERTS

Level	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related to right-of-way)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Cost per capita for roads, and bridges & culverts • Maintenance cost per square metre • Revenue required to maintain annual network growth • Total cost of borrowing vs. total cost of service
Tactical	• Overall Bridge Condition Index (BCI) as a percentage of desired BCI • Percentage of road network rehabilitated/reconstructed • Percentage of paved road lane km rated as poor to very poor • Percentage of bridges and large culverts rated as poor to very poor • Percentage of asset class value spent on O&M • Percentage of signage that pass reflectivity test. The remaining should be replaced
Operational Indicators	• Percentage of roads inspected within the last five years • Percentage of bridges and large culverts inspected within the last two years • Operating costs for paved lane per km • Operating costs for bridge and large culverts per square metre • Percentage of customer requests with a 24-hour response rate

TABLE 16 KEY PERFORMANCE INDICATORS - BUILDINGS & FACILITIES

Level	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related buildings and facilities)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Revenue required to meet growth related demand • Repair and maintenance costs per square metre • Energy, utility and water cost per square metre
Tactical	• Percentage of component value replaced • Overall facility condition index as a percentage of desired condition index • Annual adjustment in condition indexes • Annual percentage of new facilities (square metre) • Percent of facilities rated poor or critical • Percentage of facilities replacement value spent on operations and maintenance Increase facility utilization rate by [x] percent by 2020. • $Utilization\ Rate = \frac{Occupied\ Space}{Facility\ Usable\ Area}$
Operational Indicators	• [x] sq.ft. of facilities per full-time employee (or equivalent), i.e., maintenance staff • Percentage of facilities inspected within the last five years • Number/type of service requests • Percentage of customer requests responded to within 24 hours

TABLE 17 KEY PERFORMANCE INDICATORS – FLEET AND VEHICLES

Level	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Cost per capita for roads, and bridges & culverts • Maintenance cost per square metre • Revenue required to maintain annual network growth • Total cost of borrowing vs. total cost of service
Tactical	• Percentage of all vehicles replaced • Average age of fleet vehicles • Percent of vehicles rated poor or critical • Percentage of fleet replacement value spent on operations and maintenance
Operational Indicators	• Average downtime per fleet category • Average utilization per fleet category and/or each vehicle • Ratio of preventative maintenance repairs vs. reactive repairs • Percent of vehicles that received preventative maintenance • Number/type of service requests • Percentage of customer requests responded to within 24 hours

TABLE 18 KEY PERFORMANCE INDICATORS – WATER, WASTE WATER AND STORM WATER NETWORKS

Level	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related water / waste water / storm water)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Total cost of borrowing compared to total cost of service • Revenue required to maintain annual network growth • Lost revenue from system outages
Tactical	• Percentage of water / waste water / storm water network rehabilitated / reconstructed • Overall water / waste water / storm water network condition index as a percentage of desired condition index • Annual adjustment in condition indexes • Annual percentage of growth in water / waste water / storm water network • Percentage of mains where the condition is rated poor or critical for each network • Percentage of water / waste water / storm water network replacement value spent on operations and maintenance
Operational Indicators	• Percentage of water / waste water / storm water network inspected • Operating costs for the collection of wastewater per kilometre of main. • Number of wastewater main backups per 100 kilometres of main • Operating costs for storm water management (collection, treatment, and disposal) per kilometre of drainage system. • Operating costs for the distribution/ transmission of drinking water per kilometre of water distribution pipe. • Number of days when a boil water advisory issued by the medical officer of health, applicable to a municipal water supply, was in effect. • Number of water main breaks per 100 kilometres of water distribution pipe in a year. • Number of customer requests received annually per water / waste water / storm water networks • Percentage of customer requests responded to within 24 hours per water / waste water / storm water network

3. Future Performance

In addition to the financial capacity, and legislative requirements, e.g., *Safe Drinking Water Act*, the Minimum Maintenance Standards for municipal highways, building codes and the *Accessibility for Ontarians with Disability Act*, many factors, internal and external, can influence the establishment of LOS and their associated KPIs, both target and actual, including the municipality's overarching mission as an organization, the current state of its infrastructure, and the municipality's financial capacity.

Strategic Objectives and Corporate Goals
The municipality's long-term direction is outlined in its corporate and strategic plans. This direction will dictate the types of services it aims to deliver to its residents and the quality of those services. These high-level goals are vital in identifying strategic (long-term) infrastructure priorities and as a result, the investments needed to produce desired levels of service.

State of the Infrastructure
The current state of capital assets will determine the quality of service the municipality can deliver to its residents. As such, levels of service should reflect the existing capacity of assets to deliver those services, and may vary (increase) with planned maintenance, rehabilitation or replacement activities and timelines.

Community Expectations
The general public will often have qualitative and quantitative opinions and insights regarding the levels of service a particular asset should deliver, e.g., what a road in 'good' condition should look like or the travel time between destinations. The public should be consulted in establishing LOS; however, the discussions should be centered on clearly outlining the lifecycle costs associated with delivering any improvements in LOS.

Economic Trends
Macroeconomic trends will have a direct impact on the LOS for most infrastructure services. Fuel costs, fluctuations in interest rates, and the purchasing power of the Canadian dollar can impede or facilitate any planned growth in infrastructure services.

Demographic Changes
The type of residents that dominate a municipality can also serve as infrastructure demand drivers, and as a result, can change how a municipality allocates its resources (e.g., an aging population may require diversion of resources from parks and sports facilities to additional wellbeing centers). Population growth is also a significant demand driver for existing assets (lowering LOS), and may require the municipality to construct new infrastructure to parallel community expectations.

Environmental Change
Forecasting for infrastructure needs based on climate change remains an imprecise science. However, broader environmental and weather patterns have a direct impact on the reliability of critical infrastructure services.

4. Monitoring, Updating and Actions

The municipality should collect data on its current performance against the KPIs listed and establish targets that reflect the current fiscal capacity of the municipality, its corporate and strategic goals, and as feasible, changes in demographics that may place additional demand on its various asset classes. For some asset classes, e.g., minor equipment, furniture, etc. cursory levels of service and their respective KPIs will suffice. For major infrastructure classes, detailed technical and customer-oriented KPIs can be critical. Once this data is collected and targets are established, the progress of the municipality should be tracked annually.

VIII. Asset Management Strategies

The asset management strategy will develop an implementation process that can be applied to the needs identification and prioritization of renewal, rehabilitation, and maintenance activities. This will assist in the production of a 10-year plan, including growth projections, to ensure the best overall health and performance of the municipality's infrastructure.

This section includes an overview of condition assessment; the life cycle interventions required; and prioritization techniques, including risk, to determine which priority projects should move forward into the budget first.

1. Non-Infrastructure Solutions and Requirements

The municipality should explore, as requested through the provincial requirements, which non-infrastructure solutions should be incorporated into the budgets for its infrastructure services. Non-Infrastructure solutions are such items as studies, policies, condition assessments, consultation exercises, etc., that could potentially extend the life of assets or lower total asset program costs in the future without a direct investment into the infrastructure.

Typical solutions for a municipality include linking the asset management plan to the strategic plan, growth and demand management studies, infrastructure master plans, better integrated infrastructure and land use planning, public consultation on levels of service, and condition assessment programs. As part of future asset management plans, a review of these requirements should take place, and a portion of the capital budget should be dedicated for these items in each programs budget.

It is recommended, under this category of solutions, that the municipality should develop and implement holistic condition assessment programs for all asset classes. This will advance the understanding of infrastructure needs, improve budget prioritization methodologies, and provide clearer path of what is required to achieve sustainable infrastructure programs.

2. Condition Assessment Programs

The foundation of good asset management practice is based on having comprehensive and reliable information on the current condition of the infrastructure. Municipalities need to have a clear understanding regarding performance and condition of their assets, as all management decisions regarding future expenditures and field activities should be based on this knowledge. An incomplete understanding about an asset may lead to its premature failure or premature replacement.

Some benefits of holistic condition assessment programs within the overall asset management process are listed below:

- Understanding of overall network condition leads to better management practices
- Allows for the establishment of rehabilitation programs
- Prevents future failures and provides liability protection
- Potential reduction in operation/maintenance costs
- Accurate current asset valuation
- Allows for the establishment of risk assessment programs
- Establishes proactive repair schedules and preventive maintenance programs
- Avoids unnecessary expenditures
- Extends asset service life therefore improving level of service

- Improves financial transparency and accountability
- Enables accurate asset reporting which, in turn, enables better decision making

Condition assessment can involve different forms of analysis such as subjective opinion, mathematical models, or variations thereof, and can be completed through a very detailed or very cursory approach.

When establishing the condition assessment of an entire asset class, the cursory approach (metrics such as good, fair, poor, very poor) is used. This will be a less expensive approach when applied to thousands of assets, yet will still provide up to date information, and will allow for detailed assessment or follow up inspections on those assets captured as poor or critical condition later.

2.1 Pavement Network

Typical industry pavement inspections are performed by consulting firms using specialized assessment vehicles equipped with various electronic sensors and data capture equipment. The vehicles will drive the entire road network and typically collect two different types of inspection data – surface distress data and roughness data.

Surface distress data involves the collection of multiple industry standard surface distresses, which are captured either electronically, using sensing detection equipment mounted on the van, or visually, by the van's inspection crew.

Roughness data capture involves the measurement of the roughness of the road, measured by lasers that are mounted on the inspection van's bumper, calibrated to an international roughness index.

Another option for a cursory level of condition assessment is for municipal road crews to perform simple windshield surveys as part of their regular patrol. Many municipalities have created data collection inspection forms to assist this process and to standardize what presence of defects would constitute a good, fair, poor, or critical score. Lacking any other data for the complete road network, this can still be seen as a good method and will assist greatly with the overall management of the road network. The CityWide Works software has a road patrol component built in that could capture this type of inspection data during road patrols in the field, enabling later analysis of rehabilitation and replacement needs for budget development.

It is recommended that the municipality establish a pavement condition assessment program and that a portion of capital funding is dedicated to this.

2.2 Bridges & Culverts

Ontario municipalities are mandated by the Ministry of Transportation to inspect all structures that have a span of 3 meters or more, according to the OSIM (Ontario Structure Inspection Manual).

Structure inspections must be performed by, or under the guidance of, a structural engineer, must be performed on a biennial basis (once every two years), and include such information as structure type, number of spans, span lengths, other key attribute data, detailed photo images, and structure element by element inspection, rating and recommendations for repair, rehabilitation, and replacement.

The best approach to develop a 10-year needs list for the municipality’s structure portfolio would be to have the structural engineer who performs the inspections to develop a maintenance requirements report, and rehabilitation and replacement requirements report as part of the overall assignment. In addition to refining the overall needs requirements, the structural engineer should identify those structures that will require more detailed investigations and non-destructive testing techniques. Examples of these investigations are:

- Detailed deck condition survey
- Non-destructive delamination survey of asphalt covered decks
- Substructure condition survey

- Detailed coating condition survey
- Underwater investigation
- Fatigue investigation
- Structure evaluation

Through the OSIM recommendations and additional detailed investigations, a 10-year needs list will be developed for the municipality's bridges.

2.3 Facilities & Buildings

The most popular and practical type of buildings and facility assessment involves qualified groups of trained industry professionals (engineers or architects) performing an analysis of the condition of a group of facilities, and their components, that may vary in terms of age, design, construction methods, and materials. This analysis can be done by walk-through inspection, mathematical modeling, or a combination of both. But the most accurate way of determining the condition requires a walk-through to collect baseline data.

The following five asset classifications are typically inspected:

- Site Components – property around the facility and includes the outdoor components such as utilities, signs, stairways, walkways, parking lots, fencing, courtyards and landscaping.
- Structural Components – physical components such as the foundations, walls, doors, windows, roofs.
- Electrical Components – all components that use or conduct electricity such as wiring, lighting, electric heaters, and fire alarm systems
- Mechanical Components – components that convey and utilize all non-electrical utilities within a facility such as gas pipes, furnaces, boilers, plumbing, ventilation, and fire extinguishing systems
- Vertical movement – components used for moving people between floors of buildings such as elevators, escalators and stair lifts.

Once collected this type of information can be uploaded into the CityWide®, the municipality's asset management and asset registry software database in order for short- and long-term repair, rehabilitation and replacement reports to be generated to assist with programming the short- and long-term maintenance and capital budgets.

It is recommended that the municipality establish a condition assessment program for buildings and facilities. It is also recommended that a portion of capital funding is dedicated to this.

2.4 Fleet

The typical approach to optimizing the maintenance expenditures of a corporate fleet of vehicles is through routine vehicle inspections, routine vehicle servicing, and an established routine preventative maintenance program. Most, if not all, makes and models of vehicles are supplied with maintenance manuals that define the appropriate schedules and routines for typical maintenance and servicing and also more detailed restoration or rehabilitation protocols.

The primary goal of good vehicle maintenance is to avoid or mitigate the consequence of failure of equipment or parts. An established preventative maintenance program serves to ensure this, as it will consist of scheduled inspections and follow up repairs of vehicles and equipment in order to decrease breakdowns and excessive downtimes.

A good preventative maintenance program will include partial or complete overhauls of equipment at specific periods, including oil changes, lubrications, fluid changes and so on. In addition, workers can record equipment or part deterioration so they can schedule to replace or repair worn parts before they fail. The ideal preventative maintenance program would move further and further away from reactive repairs and instead towards the prevention of all equipment failure before it occurs.

It is recommended that a preventative maintenance routine is defined and established for all fleet vehicles and that a software application is utilized for the overall management of the program.

2.5 Water

Unlike sewer mains, it is very difficult to inspect water mains from the inside due to the high-pressure flow of water constantly underway within the water network. Physical inspections require a disruption of service to residents, can be an expensive exercise, and are time consuming to set up. It is recommended practice that physical inspection of water mains typically only occurs for high risk, large transmission mains within the system, and only when there is a requirement. There are a number of high tech inspection techniques in the industry for large diameter pipes but these should be researched first for applicability as they are quite expensive. Examples are:

- Remote eddy field current (RFEC)
- Ultrasonic and acoustic techniques
- Impact echo (IE)
- Georadar

For the majority of pipes within the distribution network gathering key information in regards to the main and its environment can supply the best method to determine a general condition. Key data that could be used, along with weighting factors, to determine an overall condition score are listed below.

- Age
- Material Type
- Breaks
- Hydrant Flow Inspections
- Soil Condition

It is recommended that the municipality develop a rating system for the mains within the distribution network based on the availability of key data, and that funds are budgeted for this development.

2.6 Sewer network inspection (Waste water and Storm Water)

The most popular and practical type of waste water and storm sewer assessment is the use of Closed Circuit Television Video (CCTV). The municipality currently performs video inspections for its storm water and waste water mains. The process involves a small robotic crawler vehicle with a CCTV camera attached that is lowered down a maintenance hole into the sewer main to be inspected. The vehicle and camera then travels the length of the pipe providing a live video feed to a truck on the road above where a technician / inspector records defects and information regarding the pipe. A wide range of construction or deterioration problems can be captured including open/displaced joints, presence of roots, infiltration & inflow, cracking, fracturing, exfiltration, collapse, deformation of pipe and more. Therefore, sewer CCTV inspection is a very good tool for locating and evaluating structural defects and general condition of underground pipes.

Even though CCTV is an excellent option for inspection of sewers it is a fairly costly process and does take significant time to inspect a large volume of pipes.

Another option in the industry today is the use of Zoom Camera equipment. This is very similar to traditional CCTV, however, a crawler vehicle is not used but in it's a place a camera is lowered down a maintenance hole attached to a pole like piece of equipment. The camera is then rotated towards each connecting pipe and the operator above progressively zooms in to record all defects and information about each pipe. The downside to this technique is the further down the pipe the image is zoomed, the less clarity is available to accurately record defects and measurement. The upside is the process is far quicker and significantly less expensive and an assessment of the manhole can be provided as well. Also, it is important to note that 80% of pipe deficiencies generally occur within 20 meters of each manhole

It is recommended that the municipality implement a sewer condition assessment program and that a portion of capital funding is dedicated to this.

2.7 Parks and open spaces

CSA standards provide guidance on the process and protocols in regards to the inspection of parks and their associated assets, e.g., play spaces and equipment. The park inspection will involve qualified groups of trained industry professionals (operational staff or landscape architects) performing an analysis of the condition of a group of Parks and their components. The most accurate way of determining the condition requires a walk-through to collect baseline data.

The following key asset classifications are typically inspected:

- **Physical Site Components –** physical components on the site of the park such as: fences, utilities, stairways, walkways, parking lots, irrigation systems, monuments, fountains.
- **Recreation Components –** physical components such as: playgrounds, bleachers, back stops, splash pads, and benches.
- **Land Site Components** – land components on the site of the park such as: landscaping, sports fields, trails, natural areas, and associated drainage systems.
- **Minor Park Facilities –** small facilities within the park site such as: sun shelters, washrooms, concession stands, change rooms, storage sheds.

It is recommended that the municipality establish a parks condition assessment program and that a portion of capital funding is dedicated to this.

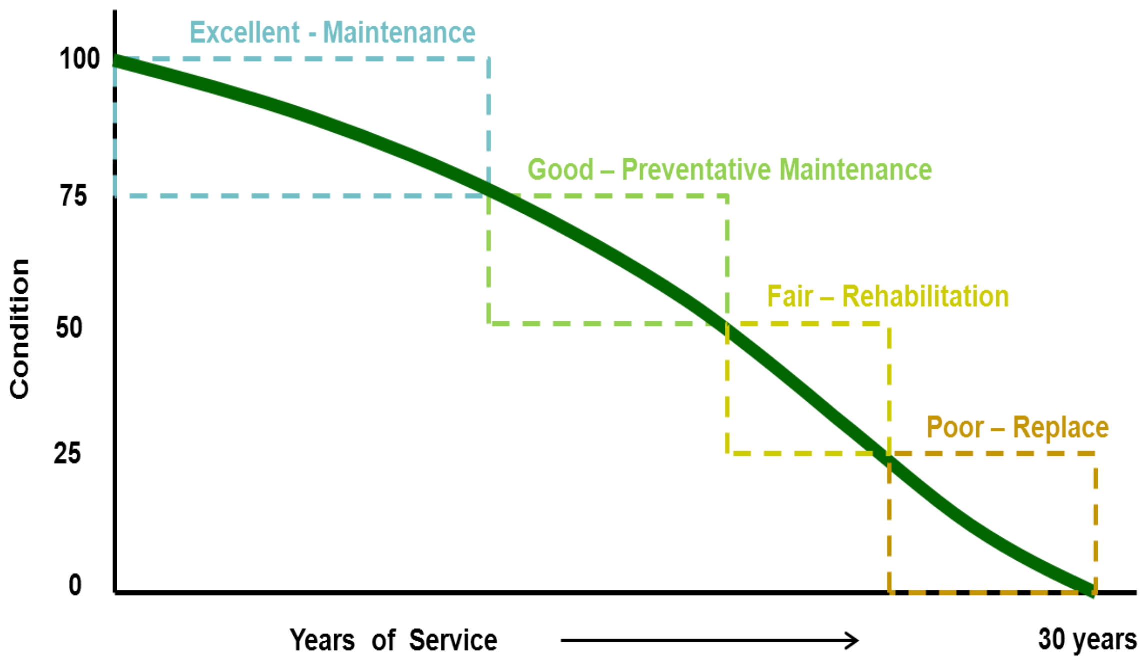
3. Life Cycle Analysis Framework

An industry review was conducted to determine which life cycle activities can be applied at the appropriate time in an asset's life, to provide the greatest additional life at the lowest cost. In the asset management industry, this is simply put as doing the right thing to the right asset at the right time. If these techniques are applied across entire asset networks or portfolios (e.g., the entire road network), the municipality could gain the best overall asset condition while expending the lowest total cost for those programs.

3.1 Paved Roads

The following analysis has been conducted at a fairly high level, using industry standard activities and costs for paved roads. With future updates of this Asset Management Strategy, the municipality may wish to run the same analysis with a detailed review of municipality activities used for roads and the associated local costs for those work activities. All of this information can be input into the CityWide software suite in order to perform updated financial analysis as more detailed information becomes available. The following diagram depicts a general deterioration profile of a road with a 30-year life.

FIGURE 48 PAVED ROAD GENERAL DETERIORATION PROFILE



As shown above, during the road's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; preventative maintenance; rehabilitation; and replacement or reconstruction.

The windows or thresholds for when certain work activities should be applied to also coincide approximately with the condition state of the asset as shown below:

TABLE 19 ASSET CONDITION AND RELATED WORK ACTIVITY - PAVED ROADS

Condition	Condition Range	Work Activity
Excellent condition (Maintenance only phase)	100-76	■ maintenance only
Good Condition (Preventative maintenance phase)	75 - 51	■ crack sealing ■ emulsions
Fair Condition (Rehabilitation phase)	50 -26	■ resurface - mill & pave ■ resurface - asphalt overlay ■ single & double surface treatment (for rural roads)
Poor Condition (Reconstruction phase)	25 - 1	■ reconstruct - pulverize and pave ■ reconstruct - full surface and base reconstruction
Critical Condition (Reconstruction phase)	0	■ critical includes assets beyond their useful lives which make up the backlog. they require the same interventions as the “poor” category above.

With future updates of this asset management strategy, the municipality may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the municipality’s work program. Also note: when adjusting these thresholds, it actually adjusts the level of service provided and ultimately changes the amount of money required. These threshold and condition ranges can be easily updated and a revised financial analysis can be calculated. These adjustments will be an important component of future Asset Management Plans, as the province requires each municipality to present various management options within the financing plan.

It is recommended that the municipality establish a life cycle activity framework for the various classes of paved road within their transportation network.

3.2 Bridges & Culverts

The best approach to develop a 10 year needs list for the municipality’s bridge structure portfolio would be to have the structural engineer who performs the inspections to develop a maintenance requirements report, a rehabilitation and replacement requirements report and identify additional detailed inspections as required.

3.3 Facilities & Buildings

The best approach to develop a 10-year needs list for the municipality’s facilities portfolio would be to have the engineers, operational staff or architects who perform the facility inspections to also develop a complete portfolio maintenance requirements report and rehabilitation and replacement requirements report, and also identify additional detailed inspections and follow up studies as required. This may be performed as a separate assignment once all individual facility audits/inspections are complete. Of course, if the inspection data is housed or uploaded into the CityWide software, then these reports can be produced automatically from the system.

The above reports could be considered the beginning of a 10-year maintenance and capital plan, however, within the facilities industry there are other key factors that should be considered to determine over all priorities and future expenditures. Some examples would be functional / legislative requirements, energy conservation programs and upgrades, customer complaints and health and safety concerns, and also customer expectations balanced with willingness to pay initiatives.

It is recommended that the municipality establish a prioritization framework for the facilities asset class that incorporates the key components outlined above.

3.4 Fleet and Vehicles

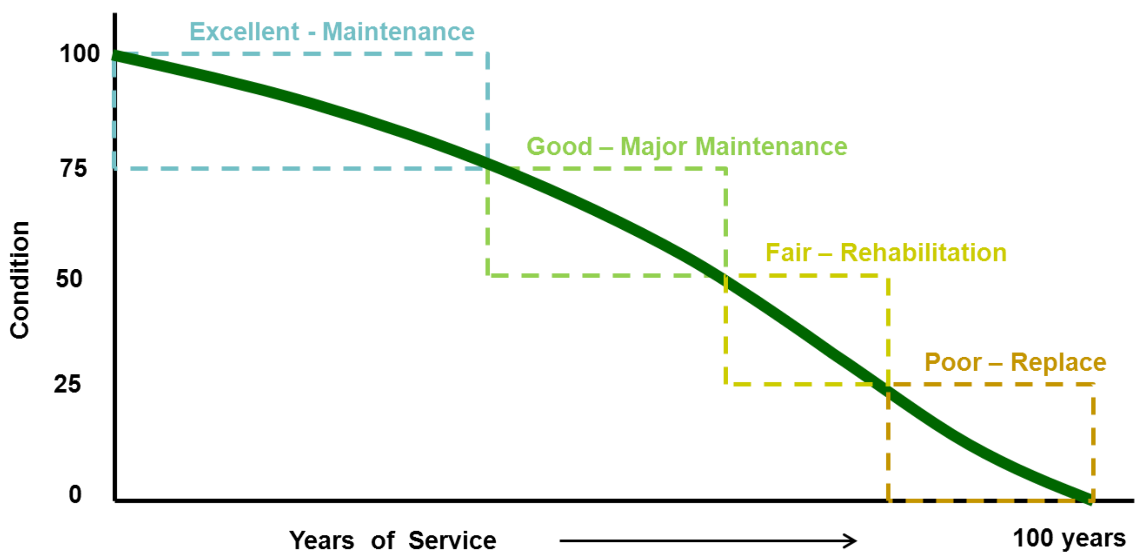
The best approach to develop a 10-year needs list for the municipality's fleet and vehicle portfolio would first be through a defined preventative maintenance program, and secondly, through an optimized life cycle vehicle replacement schedule. The preventative maintenance program would serve to determine budget requirements for operating and minor capital expenditures for part renewal and major refurbishments and rehabilitations. An optimized vehicle replacement program will ensure a vehicle is replaced at the correct point in time in order to minimize overall cost of ownership, minimize costly repairs and downtime, while maximizing potential re-sale value. There is significant benchmarking information available within the fleet industry in regards to vehicle life cycles which can be used to assist in this process. Once appropriate replacement schedules are established the short and long term budgets can be funded accordingly.

There are, of course, functional aspects of fleet management that should also be examined in further detail as part of the long-term management plan, such as fleet utilization and incorporating green fleet, etc. It is recommended that the municipality establish a prioritization framework for the fleet asset class that incorporates the key components outlined above.

3.5 Waste Water and Storm Water Sewers

The following analysis has been conducted at a fairly high level, using industry standard activities and costs for waste water and storm water sewer rehabilitation and replacement. With future updates of this asset management strategy, the municipality may wish to run the same analysis with a detailed review of municipality activities used for sewer mains and the associated local costs for those work activities. All of this information can be input into the CityWide software suite in order to perform updated financial analysis as more detailed information becomes available. The following diagram depicts a general deterioration profile of a sewer main with a 100-year life.

FIGURE 49 SEWER MAIN GENERAL DETERIORATION



As shown above, during the sewer main's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; major maintenance; rehabilitation; and replacement or reconstruction.

The windows or thresholds for when certain work activities should be applied also coincide approximately with the condition state of the asset as shown below:

TABLE 20 ASSET CONDITION AND RELATED WORK ACTIVITY FOR SEWER MAINS

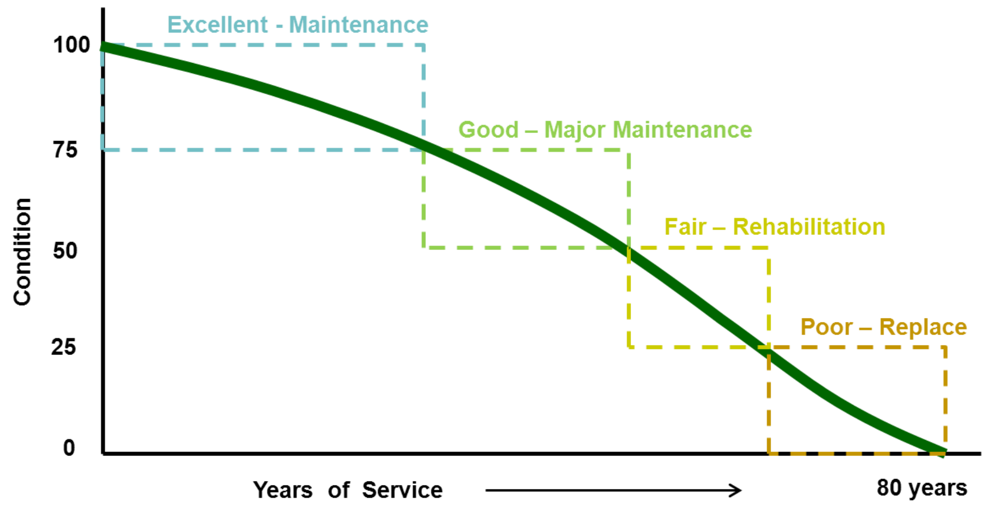
Condition	Condition Range	Work Activity
Excellent condition (Maintenance only phase)	100-76	■ maintenance only (cleaning & flushing etc.)
Good Condition (Preventative maintenance phase)	75 - 51	■ manhole repairs ■ small pipe section repairs
Fair Condition (Rehabilitation phase)	50 -26	■ structural relining
Poor Condition (Reconstruction phase)	25 - 1	■ pipe replacement
Critical Condition (Reconstruction phase)	0	■ critical includes assets beyond their useful lives which make up the backlog. They require the same interventions as the "poor" category above.

With future updates of this Asset Management Strategy the municipality may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the municipality's work program. Also note: when adjusting these thresholds, it actually adjusts the level of service provided and ultimately changes the amount of money required. These threshold and condition ranges can be easily updated with the CityWide software suite and an updated financial analysis can be calculated. These adjustments will be an important component of future Asset Management Plans, as the province requires each municipality to present various management options within the financing plan.

3.6 Water

As with roads and sewers above, the following analysis has been conducted at a fairly high level, using industry standard activities and costs for water main rehabilitation and replacement. The following diagram depicts a general deterioration profile of a water main with an 80-year life.

FIGURE 50 WATER MAIN GENERAL DETERIORATION



As shown above, during the water main's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; major maintenance; rehabilitation; and replacement or reconstruction.

The windows or thresholds for when certain work activities should be applied also coincide approximately with the condition state of the asset as shown below:

TABLE 21 ASSET CONDITION AND RELATED WORK ACTIVITY FOR WATER MAINS

Condition	Condition Range	Work Activity
excellent condition (Maintenance only phase)	100-76	■ maintenance only (cleaning & flushing etc.)
good Condition (Preventative maintenance phase)	75 - 51	■ water main break repairs ■ small pipe section repairs
fair Condition (Rehabilitation phase)	50 -26	■ structural water main relining
poor Condition (Reconstruction phase)	25 - 1	■ pipe replacement
critical Condition (Reconstruction phase)	0	■ critical includes assets beyond their useful lives which make up the backlog. They require the same interventions as the "poor" category above.

4. Growth and Demand

Growth is a critical infrastructure demand driver for most infrastructure services. As such, the municipality must not only account for the lifecycle cost for its existing asset portfolio, but those of any anticipated and forecasted capital projects associated specifically with growth. In 2011, Lakeshore's population totaled 34,546, an increase of 3.9% from the previous census in 2006. Increases in populations can place disproportionate demand on particular infrastructure assets. Analyzing not only the magnitude of population increase but also the demographics shifts within the population is an important factor in planning for the long-term needs of the community.

5. Project Prioritization and Risk Management

Generally, infrastructure needs exceed municipal capacity. As such, municipalities rely heavily on provincial and federal programs and grants to finance important capital projects. Fund scarcity means projects and investments must be carefully selected based on the state of infrastructure, economic development goals, and the needs of an evolving and growing community. These factors, along with social and environmental considerations will form the basis of a robust risk management framework.

5.1 Defining Risk Management

From an asset management perspective, risk is a function of the consequences of failure (e.g., the negative economic, financial, and social consequences of an asset in the event of a failure); and, the probability of failure (e.g., how likely is the asset to fail in the short- or long-term).

The consequences of failure are typically reflective of:

- An asset's **importance in an overall system**
  For example, the failure of an individual computer workstation for which there are readily available substitutes is much less consequential and detrimental than the failure of a network server or telephone exchange system.

- The **criticality of the function performed**
  For example, a mechanical failure on a piece road construction equipment may delay the progress of a project, but a mechanical failure on a fire pumper truck may lead to immediate life safety concerns for fire fighters, and the public, as well as significant property damage.

- The **exposure of the public and/or staff to injury or loss of life**
  For example, a single sidewalk asset may demand little consideration and carry minimum importance to the municipality's overall pedestrian network and performs a modest function. However, members of the public interact directly with the asset daily and are exposed to potential injury due to any trip hazards or other structural deficiencies that may exist.

The probability of failure is generally a function of an asset's physical condition, which is heavily influenced by the asset's age and the amount of investment that has been made in the maintenance and renewal of the asset throughout its life.

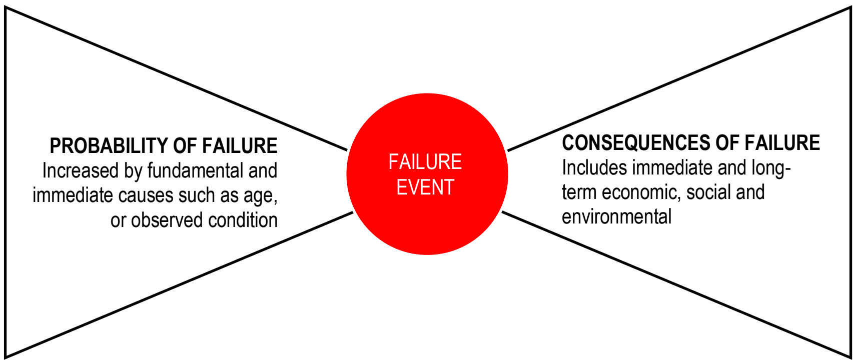
Risk mitigation is traditionally thought of in terms of safety and liability factors. In asset management, the definition of risk should heavily emphasize these factors but should be expanded to consider the risks to the municipality's ability to deliver targeted levels of service

- The impact that actions (or inaction) on one asset will have on other related assets
- The opportunities for economic efficiency (realized or lost) relative to the actions taken

5.2 Risk Matrices

Using the logic above, a risk matrix will illustrate each asset's overall risk, determined by multiplying the probability of failure (PoF) scores with the consequence of failure (CoF) score, as illustrated in the table below. This can be completed as a holistic exercise against any data set by determining which factors (or attributes) are available and will contribute to the PoF or CoF of an asset. The following diagram (known as a bowtie model in the risk industry) illustrates this concept. The probability of failure is increased as more and more factors collude to cause asset failure.

FIGURE 51 BOW TIE RISK MODEL



The risk matrices that follow categorize the municipality's nine asset classes as analyzed in this document based on their consequence of failure and the likelihood of failure events. The first risk matrix illustrates the distribution of all assets.

Probability of Failure

In this AMP, the probability of a failure event is predicted by the condition of the asset.

TABLE 22 PROBABILITIY OF FAILURE – ALL ASSETS

Asset Classes	Condition Rating	Probability of Failure
ALL	0-20 Very Poor	5 – Very High
	21-40 Poor	4 – High
	41-60 Fair	3 – Moderate
	61-80 Good	2 – Low
	81-100 Excellent	1 – Very Low

Consequence of Failure

The consequence of failure for the asset classes analyzed in this AMP will be determined either by the replacement costs of assets, or their material types, classifications (or other attributes). Asset classes for which replacement cost is used include: bridges & culverts, buildings, land improvements, vehicles, and machinery & equipment. This approach is premised on the assumption that the higher the replacement cost, the larger (and likely more important) the asset, requiring higher risk scoring.

Assets for which other attributes are used include: water, wastewater, storm water, roads, and rate facilities. For linear infrastructure, pipe diameter is used to estimate a suitable consequence of failure score. Scoring for roads and rate-based facilities is based on classification or asset type.

TABLE 23 CONSEQUENCE OF FAILURE – BRIDGES & CULVERTS

Replacement Value	Consequence of failure
Up to $200k	Score of 1
$201 to $400k	Score of 2
$401 to $800k	Score of 3
$801 to $1.4 million	Score of 4
$1.4 million and over	Score of 5

TABLE 24 CONSEQUENCE OF FAILURE – BUILDINGS AND FACILITIES

Replacement Value	Consequence of failure
Up to $50k	Score of 1
$51k to $100k	Score of 2
$101k to $300k	Score of 3
$301k to $1 million	Score of 4
Over $1 million	Score of 5

TABLE 25 CONSEQUENCE OF FAILURE – LAND IMPROVEMENTS

Replacement Value	Consequence of failure
Up to $25k	Score of 1
$26k to $50k	Score of 2
$51k to $100k	Score of 3
$101k to $250k	Score of 4
Over $250k	Score of 5

TABLE 26 CONSEQUENCE OF FAILURE – ROLLING STOCK

Replacement Value	Consequence of failure
Up to $25k	Score of 1
$26k to $60k	Score of 2
$61k to $100k	Score of 3
$101k to $300k	Score of 4
Over $300k	Score of 5

TABLE 27 CONSEQUENCE OF FAILURE - EQUIPMENT

Consequence of Failure: Equipment	
Replacement Value	Consequence of failure
Up to $10k	Score of 1
$11k to $25k	Score of 2
$26k to $80k	Score of 3
$81k to $200k	Score of 4
Over $200k	Score of 5

TABLE 28 CONSEQUENCE OF FAILURE - ROADS

Road Classification	Consequence of failure
Gravel (all)	Score of 1
Surface Treatment (Rural)	Score of 2
Surface Treatment (Urban)	Score of 3
Paved (Rural)	Score of 4
Paved (Urban & Connecting)	Score of 5

TABLE 29 CONSEQUENCE OF FAILURE – WASTE WATER SEWERS

Pipe Diameter	Consequence of failure
Less than 200mm	Score of 1
200-300mm	Score of 2
301-400mm	Score of 3
401-550mm	Score of 4
551mm and over	Score of 5

TABLE 30 CONSEQUENCE OF FAILURE – WATER MAINS

Pipe Diameter	Consequence of Failure
Less than 100mm	Score of 1
101–200mm	Score of 2
201–350mm	Score of 3
351–550mm	Score of 4
551mm and over	Score of 5

TABLE 31 CONSEQUENCE OF FAILURE – STORM WATER SEWERS

Pipe Diameter	Consequence of failure
Less than 250mm	Score of 1
251-500mm	Score of 2
501-850mm	Score of 3
851-1,500mm	Score of 4
1,501mm and over	Score of 5

The risk matrices that follow segment assets within each asset class according to the probability and likelihood of failure scores as discussed above. The areas in red show the assets that fall within the highest overall risk category while the assets in green are the lowest risk.

FIGURE 52 DISTRIBUTION OF ASSETS BASED ON RISK - ALL ASSETS

Consequence \ Probability	1	2	3	4	5
5	92 Assets 15,713.09 m, unit(s) $151,457,742.00	63 Assets 9,108.01 unit(s), m $26,715,364.00	83 Assets 24,524.99 unit(s), m $40,254,884.00	136 Assets 24,587.62 unit(s), m $12,462,543.00	434 Assets 74,884.97 unit(s), m $36,256,015.00
4	94 Assets 32,619.79 m, unit(s) $21,942,779.00	169 Assets 51,332.65 unit(s), m $34,548,977.72	64 Assets 14,186.71 unit(s), m $14,114,153.47	26 Assets 2,794.98 unit(s), m $6,109,262.48	47 Assets 23,656.88 unit(s), m $11,968,399.00
3	252 Assets 94,931.56 unit(s), m, m2 $29,484,027.40	224 Assets 37,226.23 unit(s), m, m2 $31,061,131.00	96 Assets 7,580.66 unit(s), m $6,725,180.00	27 Assets 911.03 unit(s), m $3,371,585.28	121 Assets 27,247.55 unit(s), m $10,719,741.24
2	811 Assets 166,302.51 unit(s), m, m2 $53,946,199.96	507 Assets 232,006.13 unit(s), m, m2 $68,406,975.60	337 Assets 83,453.39 unit(s), m, m2 $30,784,359.00	86 Assets 46,459.41 unit(s), m2, m $8,197,573.90	284 Assets 197,558.27 unit(s), m2, m $46,954,513.65
1	1652 Assets 60,674.69 unit(s), m, m2 $12,522,703.47	337 Assets 183,000.06 unit(s), m, m2 $26,704,161.09	778 Assets 50,864.96 unit(s), m, m2 $8,540,327.10	369 Assets 54,255.93 unit(s), m2, m $4,267,868.85	1608 Assets 1,114,275.96 unit(s), m2, m $24,680,522.03

FIGURE 53 DISTRIBUTION OF ASSETS BASED ON RISK – ROAD NETWORK

Consequence \ Probability	1	2	3	4	5
5	55 Assets 7,089.19 unit(s), m $7,680,645.00	42 Assets 8,979.01 m, unit(s) $8,463,464.00	60 Assets 13,657.81 m $9,925,724.00	133 Assets 24,583.62 m $10,332,624.00	419 Assets 74,168.50 m $29,655,658.00
4	19 Assets 15,800.92 unit(s), m $2,725,142.00	15 Assets 11,711.42 m, unit(s) $4,902,261.00	21 Assets 6,404.62 m, unit(s) $4,230,129.00	5 Assets 2,588.01 m $1,245,870.00	27 Assets 23,564.88 m $8,433,884.00
3	0 Assets - $0.00	2 Assets 1,167.04 m $121,639.00	0 Assets - $0.00	0 Assets - $0.00	58 Assets 13,715.86 m $2,520,411.00
2	0 Assets - $0.00	20 Assets 30,918.05 m $3,007,803.00	9 Assets 9,064.05 m, unit(s) $1,087,789.00	7 Assets 13,163.41 m $1,681,339.00	107 Assets 153,509.14 m $35,902,484.00
1	1 Assets 1.00 unit(s) $77,294.00	0 Assets - $0.00	0 Assets - $0.00	1 Assets 31,373.36 m2 $396,178.00	92 Assets 1,055,069.44 m2 $12,924,600.64

FIGURE 54 DISTRIBUTION OF ASSETS BASED ON RISK – BRIDGES & CULVERTS

Consequence \ Probability	1	2	3	4	5
5	2 Assets 59.90 m $3,726,000.00	3 Assets 109.00 m $6,797,000.00	0 Assets - $0.00	0 Assets - $0.00	0 Assets - $0.00
4	1 Assets 18.00 m $861,000.00	10 Assets 177.40 m $10,284,000.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $911,334.00	0 Assets - $0.00
3	4 Assets 39.90 m $2,689,000.00	21 Assets 217.40 m $11,480,000.00	0 Assets - $0.00	2 Assets 2.00 unit(s) $1,436,441.00	1 Assets 1.00 unit(s) $522,937.00
2	8 Assets 87.61 m, unit(s) $1,981,579.00	53 Assets 283.00 m $16,025,000.00	3 Assets 23.80 m $763,000.00	1 Assets 1.00 unit(s) $256,313.00	0 Assets - $0.00
1	2 Assets 38.20 m $50,354.00	10 Assets 80.50 m, unit(s) $1,883,466.00	0 Assets - $0.00	0 Assets - $0.00	1 Assets 2.40 unit(s) $104,041.00

FIGURE 55 DISTRIBUTION OF ASSETS BASED ON RISK – WATER

Consequence \ Probability	1	2	3	4	5
5	7 Assets 4,149.00 m $3,500,109.00	0 Assets - $0.00	0 Assets - $0.00	0 Assets - $0.00	0 Assets - $0.00
4	16 Assets 11,224.55 m $6,761,894.00	4 Assets 5,414.00 m $3,369,376.00	4 Assets 2,347.00 m $1,410,073.00	0 Assets - $0.00	1 Assets 67.00 m $40,253.00
3	65 Assets 31,843.92 m $11,540,655.00	28 Assets 17,466.00 m $6,468,909.00	3 Assets 594.00 m $194,635.00	2 Assets 523.00 m $171,370.00	17 Assets 12,064.00 m $4,846,476.00
2	280 Assets 99,373.26 m $21,075,361.00	142 Assets 146,812.00 m $30,186,431.00	39 Assets 14,844.00 m $3,266,231.00	17 Assets 17,201.00 m $3,579,194.00	65 Assets 33,057.00 m $7,219,565.00
1	28 Assets 22,910.17 m $3,595,243.00	120 Assets 159,651.00 m $22,859,130.00	15 Assets 16,151.00 m $1,921,523.00	2 Assets 406.00 m $49,698.00	19 Assets 4,446.00 m $640,639.00

FIGURE 56 DISTRIBUTION OF ASSETS BASED ON RISK – WASTEWATER

Consequence \ Probability	1	2	3	4	5
5	5 Assets 4,275.00 m $5,882,890.00	0 Assets - $0.00	8 Assets 10,713.00 m $11,586,146.00	0 Assets - $0.00	0 Assets - $0.00
4	2 Assets 1,282.00 m $986,061.00	1 Assets 187.00 m $143,833.00	15 Assets 4,863.00 m $3,740,420.00	0 Assets - $0.00	0 Assets - $0.00
3	0 Assets - $0.00	3 Assets 1,929.00 m $1,132,462.00	10 Assets 3,100.00 m $1,819,924.00	0 Assets - $0.00	0 Assets - $0.00
2	234 Assets 47,582.58 m, unit(s) $21,955,487.00	112 Assets 29,117.00 m $13,499,146.00	186 Assets 50,174.00 m $22,271,063.00	0 Assets - $0.00	0 Assets - $0.00
1	23 Assets 5,625.23 m, unit(s) $2,530,110.00	0 Assets - $0.00	1 Assets 533.00 m $232,033.00	0 Assets - $0.00	0 Assets - $0.00

FIGURE 57 DISTRIBUTION OF ASSETS BASED ON RISK – STORM WATER

Consequence \ Probability	1	2	3	4	5
5	0 Assets - $0.00	0 Assets - $0.00	1 Assets 137.18 m $331,876.00	0 Assets - $0.00	9 Assets 710.47 m $2,148,526.00
4	38 Assets 3,956.32 m, unit(s) $6,304,436.00	118 Assets 9,370.83 m $12,555,232.00	8 Assets 495.09 m $486,451.00	3 Assets 170.97 m $167,986.00	0 Assets - $0.00
3	148 Assets 11,180.08 m $8,108,938.00	141 Assets 11,772.79 m $8,863,927.00	51 Assets 3,844.66 m $2,991,329.00	4 Assets 341.03 m $264,303.00	14 Assets 1,413.69 m $1,014,244.00
2	255 Assets 18,908.93 m, unit(s) $7,934,377.00	151 Assets 10,902.36 m $4,404,027.00	76 Assets 6,330.54 m $2,449,012.00	41 Assets 4,093.22 m $1,558,551.00	71 Assets 6,563.70 m $2,491,936.00
1	123 Assets 3,569.39 m, unit(s) $988,569.00	38 Assets 1,110.76 m $286,003.00	31 Assets 1,936.92 m $501,598.00	38 Assets 3,208.21 m $861,940.00	41 Assets 2,553.92 m $693,924.00

FIGURE 58 DISTRIBUTION OF ASSETS BASED ON RISK – BUILDINGS

Consequence \ Probability	1	2	3	4	5
5	3 Assets 3.00 unit(s) $45,442,050.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $3,235,772.00	1 Assets 1.00 unit(s) $1,256,317.00	1 Assets 1.00 unit(s) $1,010,637.00
4	2 Assets 2.00 unit(s) $793,183.00	1 Assets 1.00 unit(s) $370,734.72	3 Assets 3.00 unit(s) $1,547,770.47	2 Assets 2.00 unit(s) $1,550,185.76	2 Assets 2.00 unit(s) $1,054,546.00
3	1 Assets 1.00 unit(s) $274,614.00	3 Assets 3.00 unit(s) $562,001.00	1 Assets 1.00 unit(s) $132,630.00	4 Assets 4.00 unit(s) $606,392.28	2 Assets 2.00 unit(s) $354,453.24
2	4 Assets 4.00 unit(s) $247,080.53	0 Assets - $0.00	2 Assets 2.00 unit(s) $150,637.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $53,201.00
1	3 Assets 3.00 unit(s) $74,661.00	1 Assets 1.00 unit(s) $33,245.00	7 Assets 7.00 unit(s) $110,270.00	6 Assets 6.00 unit(s) $100,754.00	2 Assets 2.00 unit(s) $66,313.00

FIGURE 59 DISTRIBUTION OF ASSETS BASED ON RISK – LAND IMPROVEMENTS

Consequence \ Probability	1	2	3	4	5
5	5 Assets 5.00 unit(s) $2,710,819.00	1 Assets 1.00 unit(s) $280,958.00	1 Assets 1.00 unit(s) $478,157.00	0 Assets - $0.00	0 Assets - $0.00
4	8 Assets 9.00 unit(s) $1,254,511.00	1 Assets 1.00 unit(s) $189,698.00	1 Assets 1.00 unit(s) $138,027.00	4 Assets 15.00 unit(s) $532,951.72	1 Assets 1.00 unit(s) $132,028.00
3	4 Assets 4.00 unit(s) $282,186.00	0 Assets - $0.00	0 Assets - $0.00	4 Assets 4.00 unit(s) $309,494.00	2 Assets 7.00 unit(s) $130,060.00
2	4 Assets 13.00 unit(s) $152,976.28	3 Assets 3.00 unit(s) $122,921.00	2 Assets 7.00 unit(s) $69,636.00	2 Assets 2.00 unit(s) $68,065.00	4 Assets 4.00 unit(s) $148,612.00
1	7 Assets 9.00 unit(s) $38,033.02	10 Assets 10.00 unit(s) $46,751.69	9 Assets 9.00 unit(s) $99,677.35	5 Assets 5.00 unit(s) $14,433.35	30 Assets 64.00 unit(s) $188,420.54

FIGURE 60 DISTRIBUTION OF ASSETS BASED ON RISK – EQUIPMENT

Consequence \ Probability	1	2	3	4	5
5	1 Assets 118.00 unit(s) $250,060.00	1 Assets 3.00 unit(s) $500,000.00	5 Assets 8.00 unit(s) $1,592,114.00	1 Assets 2.00 unit(s) $250,000.00	3 Assets 3.00 unit(s) $926,387.00
4	3 Assets 322.00 unit(s) $318,412.00	13 Assets 24,464.00 unit(s) $1,477,657.00	7 Assets 68.00 unit(s) $948,424.00	5 Assets 11.00 unit(s) $517,215.00	10 Assets 14.00 unit(s) $1,122,936.00
3	7 Assets 26.00 unit(s) $315,750.00	12 Assets 155.00 unit(s) $574,588.00	10 Assets 10.00 unit(s) $423,073.00	10 Assets 36.00 unit(s) $459,291.00	12 Assets 25.00 unit(s) $472,311.00
2	8 Assets 8.00 unit(s) $130,849.00	14 Assets 14.00 unit(s) $242,329.00	5 Assets 5.00 unit(s) $83,257.00	8 Assets 8.00 unit(s) $137,983.00	6 Assets 6.00 unit(s) $111,173.00
1	9 Assets 9.00 unit(s) $51,307.00	36 Assets 36.00 unit(s) $108,448.00	7 Assets 7.00 unit(s) $34,569.00	5 Assets 5.00 unit(s) $11,786.00	10 Assets 29.00 unit(s) $54,970.00

FIGURE 61 DISTRIBUTION OF ASSETS BASED ON RISK – VEHICLES

Consequence \ Probability	1	2	3	4	5
5	0 Assets - $0.00	3 Assets 3.00 unit(s) $1,574,603.00	4 Assets 4.00 unit(s) $1,587,628.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $592,662.00
4	0 Assets - $0.00	3 Assets 3.00 unit(s) $675,487.00	2 Assets 2.00 unit(s) $338,633.00	4 Assets 4.00 unit(s) $913,542.00	5 Assets 5.00 unit(s) $1,062,505.00
3	1 Assets 1.00 unit(s) $66,867.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $90,477.00	0 Assets - $0.00	3 Assets 3.00 unit(s) $221,200.00
2	1 Assets 1.00 unit(s) $46,150.00	2 Assets 2.00 unit(s) $63,843.00	0 Assets - $0.00	3 Assets 3.00 unit(s) $143,463.00	6 Assets 6.00 unit(s) $228,384.00
1	1 Assets 1.00 unit(s) $17,438.00	1 Assets 1.00 unit(s) $24,095.00	2 Assets 2.00 unit(s) $45,884.00	2 Assets 2.00 unit(s) $35,607.00	2 Assets 2.00 unit(s) $47,249.00

FIGURE 62 DISTRIBUTION OF ASSETS BASED ON RISK – WATER AND WASTE WATER FACILITIES

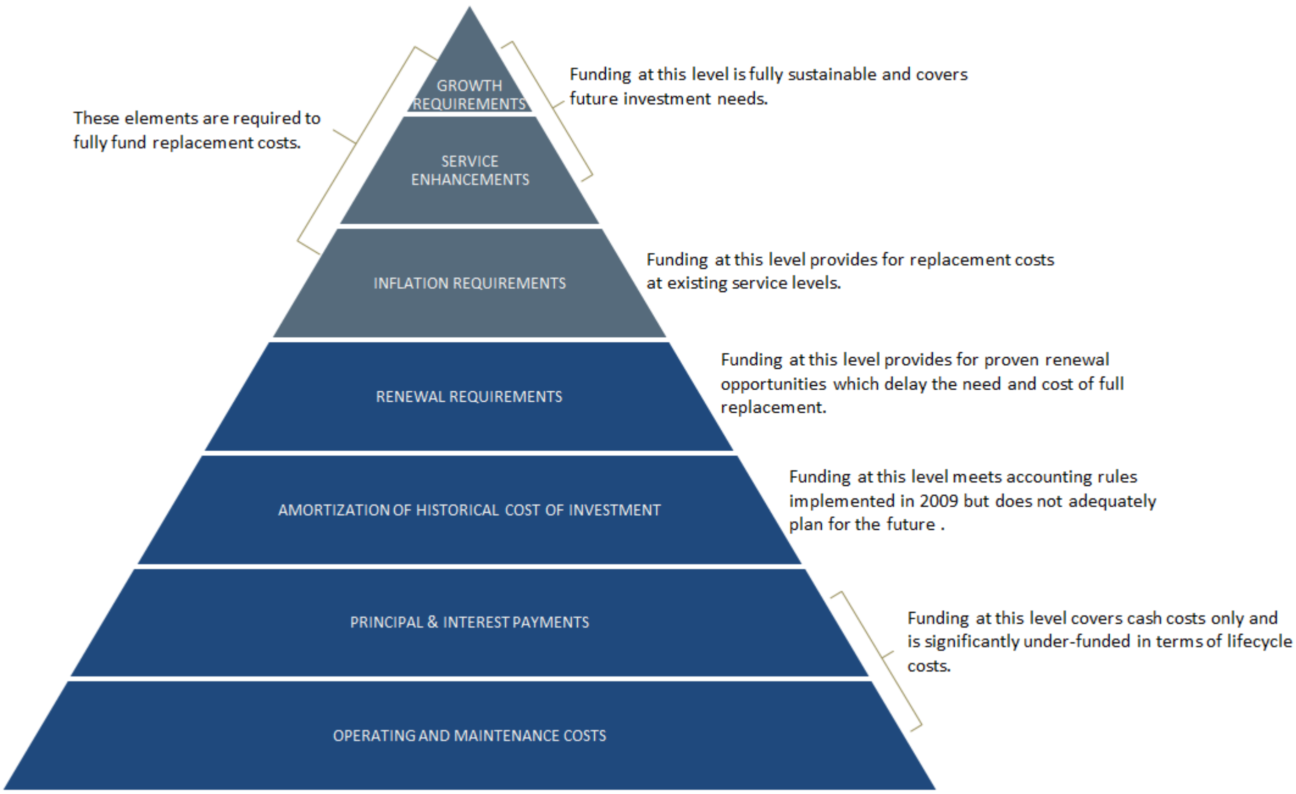
Consequence \ Probability	1	2	3	4	5
5	7 Assets 7.00 unit(s) $75,081,459.00	1 Assets 1.00 unit(s) $3,009,751.00	3 Assets 3.00 unit(s) $11,517,467.00	0 Assets - $0.00	0 Assets - $0.00
4	3 Assets 3.00 unit(s) $1,600,931.00	1 Assets 1.00 unit(s) $313,852.00	3 Assets 3.00 unit(s) $1,274,226.00	0 Assets - $0.00	0 Assets - $0.00
3	9 Assets 9.00 unit(s) $1,470,465.00	7 Assets 7.00 unit(s) $1,294,279.00	1 Assets 2.00 unit(s) $231,000.00	0 Assets - $0.00	0 Assets - $0.00
2	4 Assets 4.00 unit(s) $261,065.00	0 Assets - $0.00	3 Assets 3.00 unit(s) $234,606.00	0 Assets - $0.00	0 Assets - $0.00
1	3 Assets 3.00 unit(s) $48,956.00	0 Assets - $0.00	1 Assets 1.00 unit(s) $50,000.00	0 Assets - $0.00	0 Assets - $0.00

IX. Financial Strategy

1. General overview of financial plan requirements

In order for an AMP to be effectively put into action, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the municipality to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements. The following pyramid depicts the various cost elements and resulting funding levels that should be incorporated into AMPs that are based on best practices.

FIGURE 63 COST ELEMENTS



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 (as documented in the State of Local Infrastructure section of this report) for:
   - existing assets
   - existing service levels
   - requirements of contemplated changes in service levels (none identified for this plan)
   - requirements of anticipated growth (none identified for this plan)

2. use of traditional sources of municipal funds:
   - tax levies
   - user fees
   - reserves
   - debt
   - development charges

3. use of non-traditional sources of municipal funds:
   - reallocated budgets
   - partnerships
   - procurement methods

4. use of senior government funds:
   - gas tax
   - grants (not included in this plan due to Provincial requirements for firm commitments)

If the financial plan component of an AMP 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 municipality'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:
   - if a zero-debt policy is in place, is it warranted? If not, the use of debt should be considered.
   - do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

This AMP includes recommendations that avoid long-term funding deficits.

2. Financial Profile: Tax Funded Assets

2.1 Funding objective

We have developed scenarios that would enable the municipality to achieve full funding within five to 20 years for the following assets: roads; bridges & culverts; storm water sewers; buildings; machinery & equipment; vehicles; and land improvement. For each scenario developed we have included strategies, where applicable, regarding the use of tax revenues, user fees, reserves and debt. The funding strategies outlined reflect only the existing asset stock and do not account for any planned construction or acquisition of new assets.

2.2 Current funding position

Tables 32 and 33 outline, by asset category, the municipality's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

TABLE 32 SUMMARY OF INFRASTRUCTURE REQUIREMENTS AND CURRENT FUNDING AVAILABLE

Summary of Infrastructure Requirements & Current Funding Available for Tax Funded Assets							
		2016 Funding Available					
Asset Category	Average Annual Investment Required	Taxes	Gas Tax	OCIF	Taxes to Reserves	Total Funding Available	Annual Deficit
Road Network	9,716,000	408,000	1,600,000	348,000	2,790,000	5,146,000	4,570,000
Bridges & Culverts	820,000	0	0	0	318,000	318,000	502,000
Storm Water	892,000	0	0	0	282,000	282,000	610,000
Equipment	750,000	6,000	0	0	253,000	259,000	491,000
Facilities	1,194,000	65,000	0	0	306,000	371,000	823,000
Land Improvements	212,000	32,000	0	0	0	32,000	180,000
Vehicles	532,000	0	0	0	146,000	146,000	386,000
Total	14,116,000	511,000	1,600,000	348,000	4,095,000	6,554,000	7,562,000

2.3 Recommendations for full funding

The average annual investment requirement for the above categories is $14,116,000. Annual revenue currently allocated to these assets for capital purposes is $6,554,000 leaving an annual deficit of $7,562,000. To put it another way, these infrastructure categories are currently funded at 46% of their long-term requirements. In 2016, the municipality has annual tax revenues of $24,845,000. As illustrated in Table 33, without consideration of any other sources of revenue, full funding would require the following tax change over time:

TABLE 33 TAX CHANGE REQUIRED FOR FULL FUNDING

Asset Category	Tax Increase Required for Full Funding
Road Network	17.1%
Bridges & Culverts	3.3%
Storm Water	2.5%
Equipment	2.0%
Facilities	3.3%
Land Improvements	0.7%
Vehicles	1.6%
Total	30.5%

As illustrated in the table below, Lakeshore's debt payments for these asset categories will be decreasing by $178,000 over the next 5 years and by $333,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $333,000 and $333,000 over the next 15 and 20 years respectively. Our recommendations include capturing those decreases in cost and allocating them to the infrastructure deficit outlined above.

TABLE 34 EFFECT OF REALLOCATING DECREASES IN DEBT COSTS

	Without Reallocation of Decreasing Debt Costs				With Reallocation of Decreasing Debt Costs			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit as Outlined in Table 39	7,562,000	7,562,000	7,562,000	7,562,000	7,562,000	7,562,000	7,562,000	7,562,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-178,000	-333,000	-333,000	-333,000
Resulting Infrastructure Deficit	**7,562,000**	**7,562,000**	**7,562,000**	**7,562,000**	**7,384,000**	**7,229,000**	**7,229,000**	**7,229,000**
Resulting Tax Increase Required:								
Total Over Time	**30.4%**	**30.4%**	**30.4%**	**30.4%**	**29.7%**	**29.1%**	**29.1%**	**29.1%**
Annually	6.1%	3.0%	2.0%	1.5%	5.9%	2.9%	1.9%	1.5%

Considering all of the above information, we recommend the 20-year option in Table 34 that includes the reallocations. This involves full funding being achieved over 20 years by:

- when realized, reallocating the debt cost reductions of $333,000 to the infrastructure deficit as outlined above.
- increasing tax revenues by 1.5% each year for the next 20 years solely for the purpose of phasing in full funding to the tax funded asset categories covered in this AMP.
- allocating the gas tax revenue and OCIF revenue as outlined in Table 32.
- 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 commitment.

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.

3. While gravel roads are not typically capitalized, and hence, are not included in the analysis presented in this AMP, we have incorporated the cost of the municipality's gravel conversion program in the annual requirements. This amount does not represent the replacement cost of the new paved roads, but rather the cost of implementing the conversion. Future iterations of the AMP will reflect the full current replacement value of the paved roads.

Although this option achieves full funding on an annual basis in 10 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 $65,359,000 for paved roads, $523,000 for bridges & culverts, $2,319,000 for storm sewers, $2,141,000 for machinery & equipment, $903,000 for facilities, $399,000 for land improvements and $844,000 for vehicles. 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. Also, note that this financial analysis is based on the requirements for replacement of assets without consideration of increased service levels, or asset betterments. Additional capital, aside from the recommendations presented above will be required to address those needs.

3. Financial Profile: Rate Funded Assets

3.1 Funding objective

We have developed scenarios that would enable the municipality to achieve full funding within five to 20 years for the following assets: water, and waste water. For each scenario developed we have included strategies, where applicable, regarding the use of tax revenues, user fees, reserves and debt.

3.2 Current funding position

Tables 35 and 36 outline, by asset category, the municipality's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates. Note that the "To Operations" total includes operational reserve requirements.

TABLE 35 SUMMARY OF INFRASTRUCTURE REQUIREMENTS AND CURRENT FUNDING AVAILABLE

Asset Category	Average Annual Investment Required	2016 Annual Funding Available				Annual Deficit
		Rates	To Operations	Other	Total	
Waste water services	2,184,000	4,740,000	-4,740,000	0	0	2,184,000
Water services	2,477,000	7,866,000	-6,940,000	0	926,000	1,551,000
Total	4,661,000	12,606,000	-11,680,000	0	926,000	3,735,000

3.3 Recommendations for full funding

The average annual investment requirement for the above categories is $4,661,000. Annual revenue currently allocated to these assets for capital purposes is $926,000, leaving an annual deficit of $3,735,000. To put it another way, these infrastructure categories are currently funded at 20% of their long-term requirements. In 2016, Lakeshore has annual waste water revenues of $4,740,000 and annual water revenues of $7,866,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following increases over time:

TABLE 36 RATE CHANGE REQUIRED FOR FULL FUNDING

Asset Category	Rate Increase Required for Full Funding
Waste water	46.1%
Water	19.7%

As illustrated in the tables below, Lakeshore's debt payments for sanitary services will be decreasing by $208,000 over the next 5 years and by $439,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $1,020,000 over the next 15 years. For water services, the amounts are $0, $325,000 and $1,349,000 respectively. Our recommendations include capturing those decreases in cost and allocating them to the applicable infrastructure deficit.

TABLE 37 WITHOUT CHANGE IN DEBT COSTS

	Waste Water Network			Water Network		
	5 Years	10 Years	15 Years	5 Years	10 Years	15 Years
Infrastructure Deficit (Surplus) as Outlined in Table 26	2,184,000	2,184,000	2,184,000	1,551,000	1,551,000	1,551,000
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit (Surplus)	2,184,000	2,184,000	2,184,000	1,551,000	1,551,000	1,551,000
Resulting Rate Increase Required:						
Total Over Time	46.1%	46.1%	46.1%	19.7%	19.7%	19.7%
Annually	9.2%	4.6%	3.1%	3.9%	2.0%	1.3%

TABLE 38 WITH CHANGE IN DEBT COSTS

	Waste Water Sewer Network			Water Network		
	5 Years	10 Years	15 Years	5 Years	10 Years	15 Years
Infrastructure Deficit (Surplus) as Outlined in Table 26	2,184,000	2,184,000	2,184,000	1,551,000	1,551,000	1,551,000
Change in Debt Costs	-208,000	-439,000	-1,020,000	0	-325,000	-1,349,000
Resulting Infrastructure Deficit (Surplus)	1,976,000	1,745,000	1,164,000	1,551,000	1,226,000	202,000
Resulting Rate Increase Required:						
Total Over Time	41.7%	36.8%	24.6%	19.7%	15.6%	2.6%
Annually	8.3%	3.7%	1.6%	3.9%	1.6%	0.2%

Considering all of the above information, we recommend the following to achieve full funding within 15 years:

- when realized, reallocating the debt cost reductions of $1,020,000 for sanitary services and $1,349,000 for water services to the applicable infrastructure deficit.
- increasing rate revenues by 1.6% for sanitary services and 0.2% for water services each year for the next 15 years solely for the purpose of phasing in full funding to the rate funded asset categories covered in this AMP.
- 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.

2. Any change in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 15 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 $2,434,000 for sanitary services and $4,969,000 for water services. 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. Also, note that this financial analysis is based on the requirements for replacement of assets without consideration of increased service levels, or asset betterments. Additional capital, aside from the recommendations presented above will be required to address those needs.

4. Use of debt

For reference purposes, Table 39 outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[2] 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 take into account the time value of money or the effect of inflation on delayed projects.

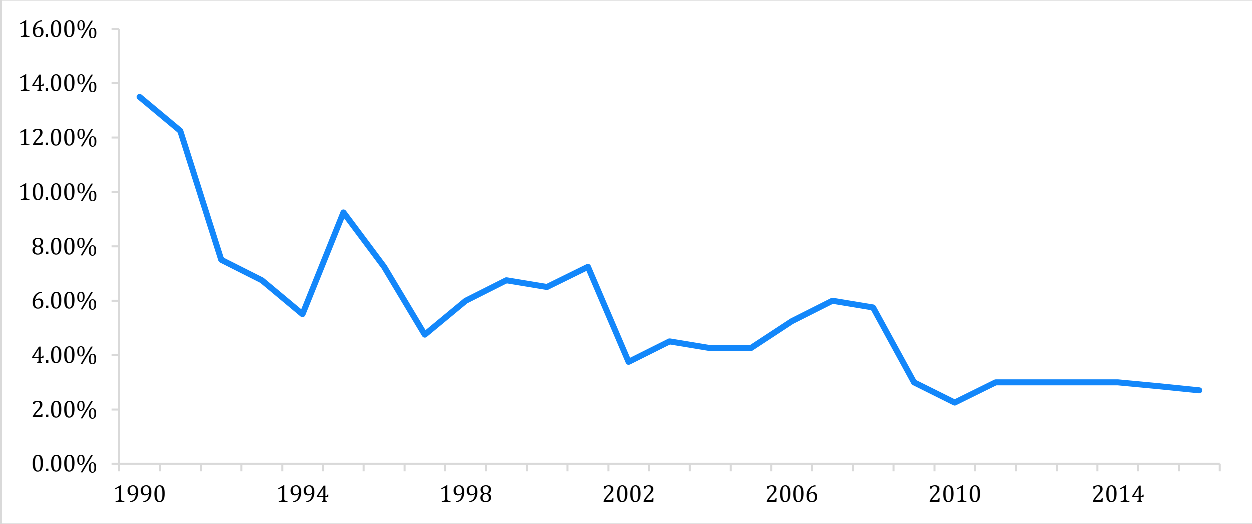
TABLE 39 TOTAL INTEREST PAID AS A % OF PROJECT COSTS

	Number of Years Financed					
Interest Rate	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%

[2] Current municipal Infrastructure Ontario rates for 15 year money is 3.2%.

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:

FIGURE 64 HISTORICAL PRIME BUSINESS INTEREST RATES



As illustrated in Table 39, 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.

Tables 40 and 41 outline how Lakeshore has historically used debt for investing in the asset categories as listed. There is currently $37,337,000 (includes Note 1) of debt outstanding for the assets covered by this AMP with corresponding debt payments of $3,609,000. These principal and interest payments are well within its provincially prescribed annual maximum of $10,260,000.

TABLE 40 OVERVIEW OF USE OF DEBT

Asset Category	Debt at Dec 31st, 2015	Use of Debt in Last Five Years				
		2011	2012	2013	2014	2015
Road Network	495,000	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Storm Water Sewer Network	0	0	0	0	0	0
Equipment	0	0	0	0	0	0
Facilities (see Note 1)	1,363,000	0	0	0	0	1,363,000
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Total Tax Funded	1,858,000	0	0	0	0	1,363,000
Waste water services	8,495,000	7,711,000	1,100,000	0	0	0
Water services	13,784,000	0	0	0	0	2,865,000
Total rate funded	22,279,000	7,711,000	1,100,000	0	0	2,865,000

Note 1: On December 1, 2016, a $13.2M debenture was issued for the Atlas Tube Centre. Terms were 3.3% over 20 years.

TABLE 41 OVERVIEW OF DEBT COSTS

	Principal & Interest Payments in Next Ten Years					
Asset Category	2016	2017	2018	2019	2020	2021
Road Network	178,000	178,000	178,000	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Storm Water Sewer Network	0	0	0	0	0	0
Equipment	0	0	0	0	0	0
Facilities (includes Note 1)	1,062,000	1,062,000	1,062,000	1,062,000	1,062,000	1,062,000
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Total tax funded	1,240,000	1,240,000	1,240,000	1,062,000	1,062,000	1,062,000
Waste water services	1,020,000	1,020,000	1,020,000	812,000	812,000	812,000
Water services	1,349,000	1,349,000	1,349,000	1,349,000	1,349,000	1,349,000
Total rate funded	2,369,000	2,369,000	2,369,000	2,161,000	2,161,000	2,161,000

The revenue options outlined in this plan allow Lakeshore to fully fund its long-term infrastructure requirements without further use of debt. However, project prioritization based on replacing age-based data with observed data for several tax funded and rate funded classes may require otherwise.

5. Use of reserves

5.1 Available reserves

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

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

By infrastructure category, Table 42 outlines the details of the reserves currently available to Lakeshore.

TABLE 42 SUMMARY OF RESERVES AVAILABLE

Asset Category	Balance at December 31, 2015
Road Network	3,639,000
Bridges & Culverts	630,000
Storm Water Sewer Network	270,000
Equipment	1,284,000
Facilities	828,000
Land Improvements	0
Vehicles	968,000
Total Tax Funded	7,619,000
Water Network	3,578,000
Waste Water Network	0
Total Rate Funded	7,458,000

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

- breadth of services provided
- age and condition of infrastructure
- use and level of debt
- economic conditions and outlook
- internal reserve and debt policies.

The reserves in Table 42 are available for use by applicable asset categories during the phase-in period to full funding. This, coupled with Lakeshore’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.

5.2 Recommendation

As Lakeshore updates its AMP, we recommend that future planning should include determining what its long-term reserve balance requirements are and a plan to achieve such balances.

X. 2016 Infrastructure Report Card

The following infrastructure report card is based on condition data (age and assessed) and the municipality's financial capacity to keep its infrastructure in a state of good repair. Appendix 1 provides the full grading scale and conversion chart, as well as detailed descriptions for each grading level.

TABLE 43 2016 INFRASTRUCTURE REPORT CARD

Asset Category	Asset Health Grade	Funding Percentage	Financial Capacity Grade	Comments
Roads	D+	53%	D	Based on 2016 replacement cost, and primarily age-based data, while the majority, 65%, of the municipality's total asset portfolio as analysed in this AMP is in very good or good condition, over 22% of the assets, with a valuation of $158 million, is in poor to very poor condition. The municipality is generally underfunding short-, medium- and long-term replacement requirements for each of its asset classes. On average, the municipality is funding 46% of the long-term replacement needs for its tax-funded asset categories, and 20% for its rate-funded asset categories.
Bridges & Culverts	B	39%	F	
Water	B	37%	F	
Sanitary	B+	0%	F	
Storm	B	32%	F	
Facilities	B+	31%	F	
Vehicles	C+	27%	F	
Land Improvements	B	15%	F	
Machinery & Equipment	C	35%	F	

XI. Appendices: Grading and Conversion Scales

Appendix 1: Grading and Conversion Scales

Table 44 Asset Health Scale

Letter Grade	Numerical Scale	Rating	Description
A	A: 4.50-5.0	Excellent	Asset is new or recently rehabilitated
B	B+: 4.15-4.49 B 3.80-4.14 B-: 3.50-3.79	Good	Asset is no longer new, but is fulfilling its function. Preventative maintenance is beneficial at this stage.
C	C+: 3.15-3.49 C: 2.8-3.14 C-: 2.50-2.79	Fair	Deterioration is evident but asset continues to full its function. Preventative maintenance is beneficial at this stage.
D	D+: 2.15-2.49 D: 1.80-2.14 D-: 1.50-1.79	Poor	Significant deterioration is evident and service is at risk.
F	F: 1-1.49	Very Poor	Asset is beyond expected life and has deteriorated to the point that it may no longer be fit to fulfill its function.

Table 45 Financial Capacity Scale

How well is the municipality funding its long-term infrastructure requirements?
Short Term ➔ Less than 5 years
Medium Term ➔ 5 to 20 years
Long Term ➔Greater than 20 years

Letter Grade	Rating	Funding percent	Timing Requirements	Description
A	Excellent	90-100 percent	Short Term - ☑ Medium Term - ☑ Long Term - ☑	The municipality is fully prepared for its short-, medium- and long-term replacement needs based on existing infrastructure portfolio.
B	Good	70-89 percent	Short Term - ☑ Medium Term - ☑ Long Term - ☒	The municipality is well prepared to fund its short-term and medium-term replacement needs but requires additional funding strategies in the long-term to begin to increase its reserves.
C	Fair	60-69 percent	Short Term - ☑ Medium Term - ☒ Long Term - ☒	The municipality is underpreparing to fund its medium- to long-term infrastructure needs. The replacement of assets in the medium-term will likely be deferred to future years.
D	Poor	40-59 percent	Short Term - ☑/☒ Medium Term - ☒ Long Term - ☒	The municipality is not well prepared to fund its replacement needs in the short-, medium- or long-term. Asset replacements will be deferred and levels of service may be reduced.
F	Very Poor	0-39 percent	Short Term - ☒ Medium Term - ☒ Long Term - ☒	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.

Appendix 2: Priority Projects

Based on the analysis presented in this AMP, the following projects have been identified as a priority for the Municipality of Lakeshore:

- West River Street corridor improvements (Notre Dame Street to Caille Avenue)
- Elmgrove Drive (Majestic to Tecumseh) Road Reconstruction
- St. Peter Street - Road and Storm Water Sewer Improvements
- Oakwood Trunk Sewer Construction
- Stoney Point Lagoon T8reatment Plant Upgrade Design