THE CORPORATION OF THE TOWN OF HEARST

BY-LAW NO. 58-17

Being a by-law to adopt the Town
of Hearst Asset Management Plan

BE IT ENACTED by the Council of the Town of Hearst that the Town of Hearst 2016 Asset Management Plan be hereby adopted.

READ AND PASSED IN OPEN COUNCIL

THIS 29th DAY OF AUGUST, 2017.

_____
MAYOR

_____
CLERK

AMP2016

The 2016 Asset Management Plan for the
Town of Hearst

Content

List of Figures

List of Tables

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 Hearst's infrastructure portfolio comprises ten distinct infrastructure categories: road network, bridges & culverts, buildings, storm, water, wastewater, land improvements, vehicles, machinery & equipment, and furniture & fixtures. The ten asset classes analyzed in this asset management plan for the town had a total 2016 valuation of $198.7 million, of which the road network, water services, and buildings comprised 68% of the asset base.

Strategic asset management is critical in extracting the highest total value from public assets at the lowest lifecycle cost. This AMP, the town's second following the completion of its first edition in 2013, 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.

Similar to other municipalities in Ontario, the Town of Hearst experienced a period of increasing levels of investment beginning in the 1970s and 1980s. The town also experienced rapid investments in the early 1990s, which have remained relatively stable since. Since the early 1990s investment has steadily increased until 2011. However between 2012-2016 the town has experienced a significant decrease in investment totaling $9.5 million versus $23 million in the previous period (2007-2011).

Based on 2016 replacement cost, and a blend of age-based and observed data, 48% of the town's total asset portfolio as analysed in this AMP is in poor to very poor condition, 36% of the assets, with a valuation of $70 million, are in good to very good condition. While age is not a precise indicator of the health of assets, it can serve as a useful approximation of asset deterioration. Approximately 60% of the municipality's assets, with a valuation of $117 million, have at least 10 years of useful life remaining. However, a large portion, with a valuation of $27.2 million, remains in operation beyond their useful life. An additional 14% of assets valued at $28.6 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 town to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements. This AMP provides financial strategies to achieve fiscal sustainability for the town's tax and rate funded assets.

The average annual investment requirement for the municipality's tax categories is $4,804,000. Annual revenue currently allocated to these assets for capital purposes is $698,000 leaving an annual deficit of $4,106,000. To put it another way, these infrastructure categories are currently funded at 15% of their long-term requirements. In 2016, the municipality has annual tax revenues of $5,644,000. We recommend a 20 year option in for phasing in full funding, including the use of OCIF funding. This involves full funding being achieved over 20 years by:

- Increasing tax revenues by 3.4% 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 and OCIF revenue and scheduled grant increases to the infrastructure deficit.

The average annual investment requirement for the town's rate funded categories is $1,924,000. Annual revenue currently allocated to these assets for capital purposes is $280,000, leaving an annual deficit of $1,644,000. To put it another way, these infrastructure categories are currently funded at 15% of their long-term requirements. In 2016, Hearst has annual wastewater revenues of $633,000 and annual water revenues

of \$935,000. We recommend a 20 year option for phasing in full funding, including the reallocations of debt repayment. This involves full funding being achieved over 20 years by:

- Increasing rate revenues by 2.9% for sanitary services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- Increasing rate revenues by 6.8% for water services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.

A critical aspect of this asset management plan is the level of confidence the town has in the data used to develop the state of the infrastructure and form the appropriate financial strategies. The town has indicated a very high degree of confidence in the accuracy, validity and completeness of the asset data for all categories analyzed in this asset management plan.

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

Provincial
$158.4B (41%)

Municipal
$216.9B (57%)
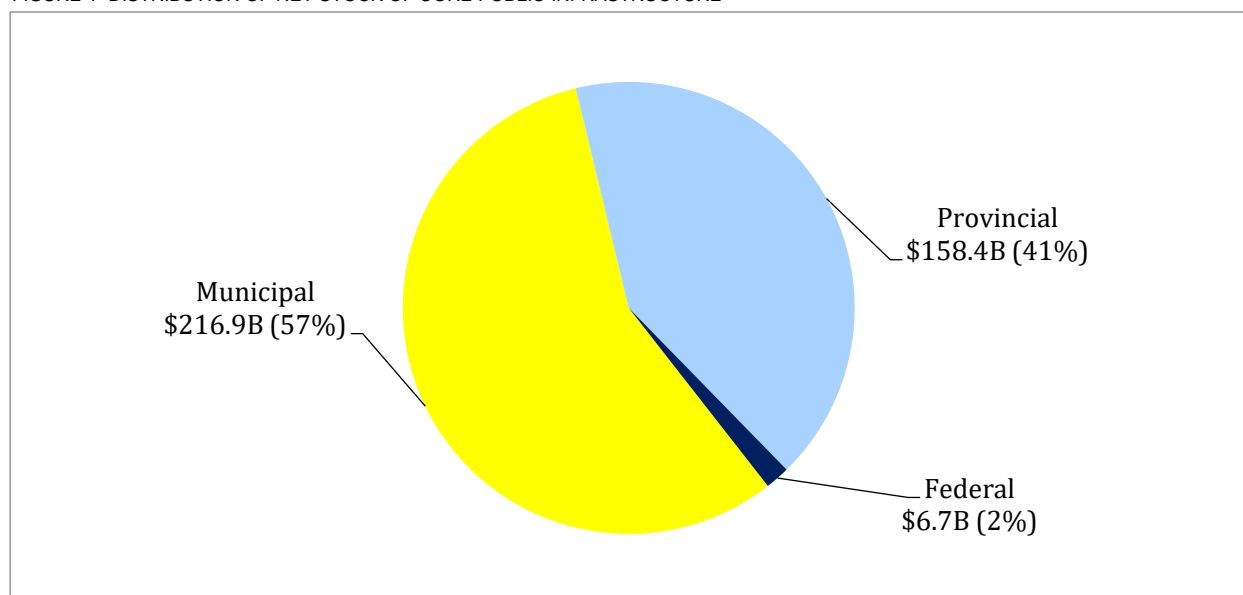
Federal
$6.7B (2%)

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.
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 Institute of Asset Management (IAM) recommends the adoption of seven key principles for a sustainable asset management program. According to IAM, asset management must be:[2]

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

Holistic	Asset management must be cross-disciplinary, total value focused
Systematic	Rigorously applied in a structured management system
Systemic	Looking at assets in their systems context, again for net, total value
Risk-based	Incorporating risk appropriately into all decision-making
Optimal	Seeking the best compromise between conflicting objectives, such as costs versus performance versus risks etc.
Sustainable	Plans must deliver optimal asset life cycles, ongoing systems performance, environmental and other long term consequences.
Integrated	At the heart of good asset management lies the need to be joined-up. The total jigsaw puzzle needs to work as a whole - and this is not just the sum of the parts.

---

[2] "Key Principles", The Institute of Asset Management, *www.iam.org*

III. AMP Objectives and Content

This AMP is one component of the Town of Hearst'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, assess 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 2013, 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. Similar to the first AMP, the following asset categories are analysed in this document: road network; bridges & culverts; water, sanitary sewer, storm sewer, facilities; machinery & equipment; fleet; and land improvements, and furniture & fixtures.

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 an excel spreadsheet used for PSAB 3150 financial reporting. This dataset includes key asset attributes and 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 presents 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.

2   Financial Data

In this AMP, the average annual requirement is the amount based on current replacement costs that municipalities 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 and aggregated; data for the previous three years is analyzed, 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.

In addition to the annual shortfall, the majority of municipalities face 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.

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. Government grants and other 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, e.g., 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:

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 provides 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**	**Performance and Financial Capacity**	**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 underpreparing 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 operations 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 2   DEVELOPING THE AMP - WORK FLOW AND PROCESS
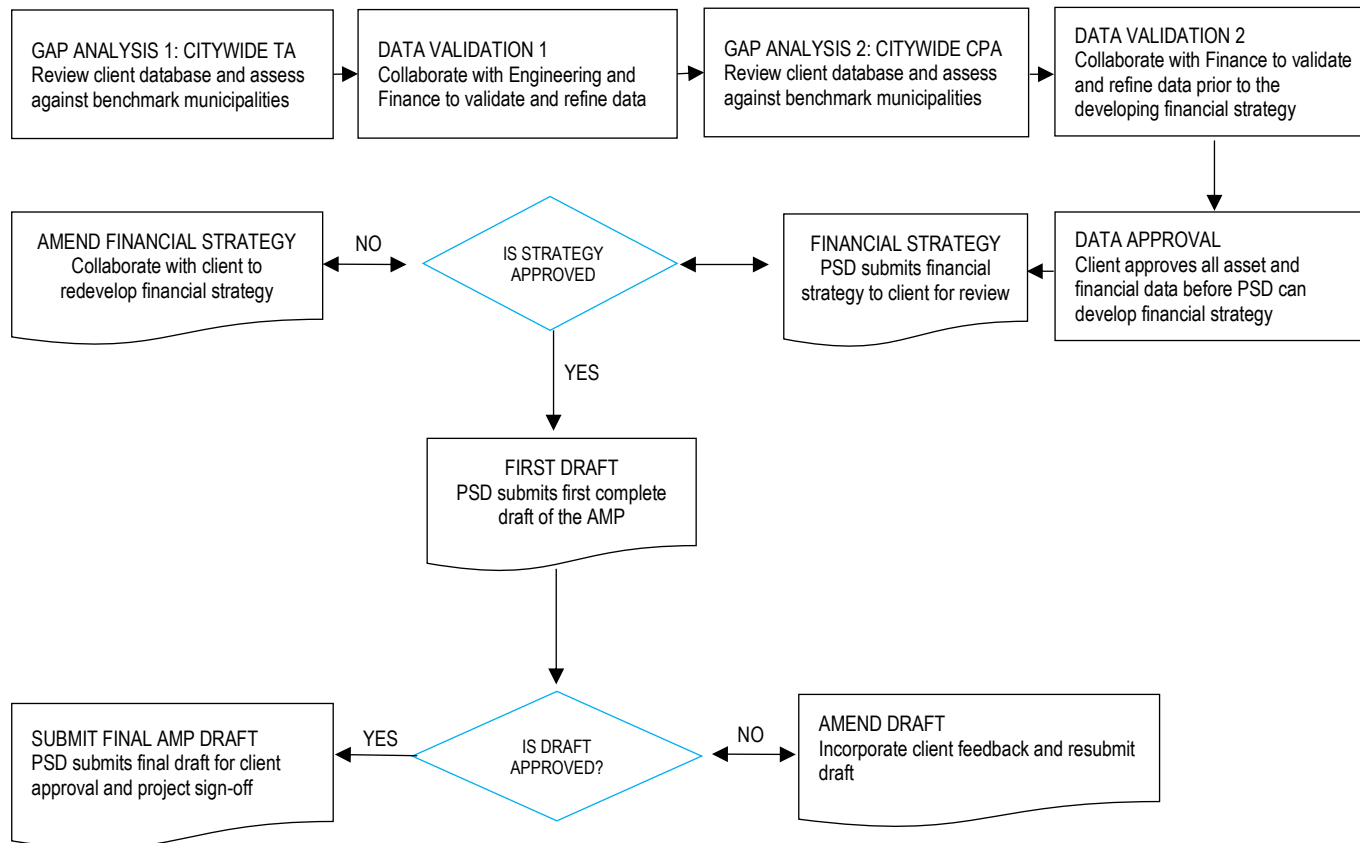
6   Data Confidence Rating

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 the City of Brantford's approach. 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.

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

19

V. Key Stats

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

1   Asset Valuation

The ten asset classes analyzed in this asset management plan for the town had a total 2016 valuation of $198.7 million, of which the road network, water services, and buildings comprised 68% of the asset base.

FIGURE 3 2016 ASSET VALUATION BY CLASS

Vehicles: $2,323,419 (1%)
Furniture and Fixtures: $2,796,784 (1%)
Machiney And Equipment: $3,191,278 (2%)
Land Improvements: $4,620,128 (2%)
Bridges & Culverts: $10,750,000 (5%)
Storm Sewer System: $15,287,787 (8%)
Sanitary Sewer System: $23,485,607 (12%)
Buildings: $31,977,935 (16%)
Roads: $59,973,375 (30%)
Water System: $44,306,499 (22%)
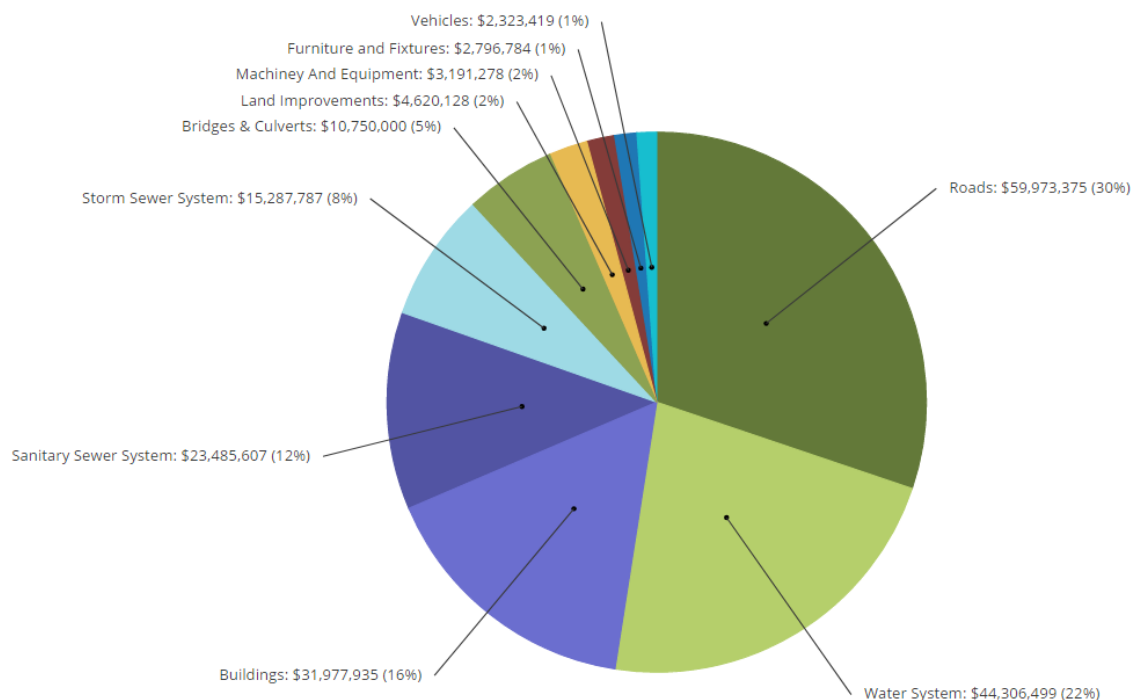
2   Source of Condition Data by Asset Class

Observed data will provide the most precise indication of an asset's physical health. In the absence of such information, 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	Assessed (Road Surfaces)
Bridges & Culverts	Assessed
Water	Age-based
Wastewater	Age-based
Storm	Age-based
Buildings	Age-based
Machinery & Equipment	Age-based
Land Improvements	Age-based
Vehicles	Age-based
Furniture & Fixtures	Age-based

3   Overall Condition – All Asset Classes

Based on 2016 replacement cost, and a blend of age-based and observed data, 48% of the town's total asset portfolio as analysed in this AMP is in poor to very poor condition, 36% of the assets, with a valuation of $70 million, are in good to very good condition.

FIGURE 4 ASSET CONDITION DISTRIBUTION BY REPLACEMENT COST - ALL CLASSES

Very Good: $22,922,726 (12%)
Very Poor: $65,994,716 (33%)
Good: $47,330,009 (24%)
Poor: $30,519,901 (15%)
Fair: $31,945,460 (16%)

21
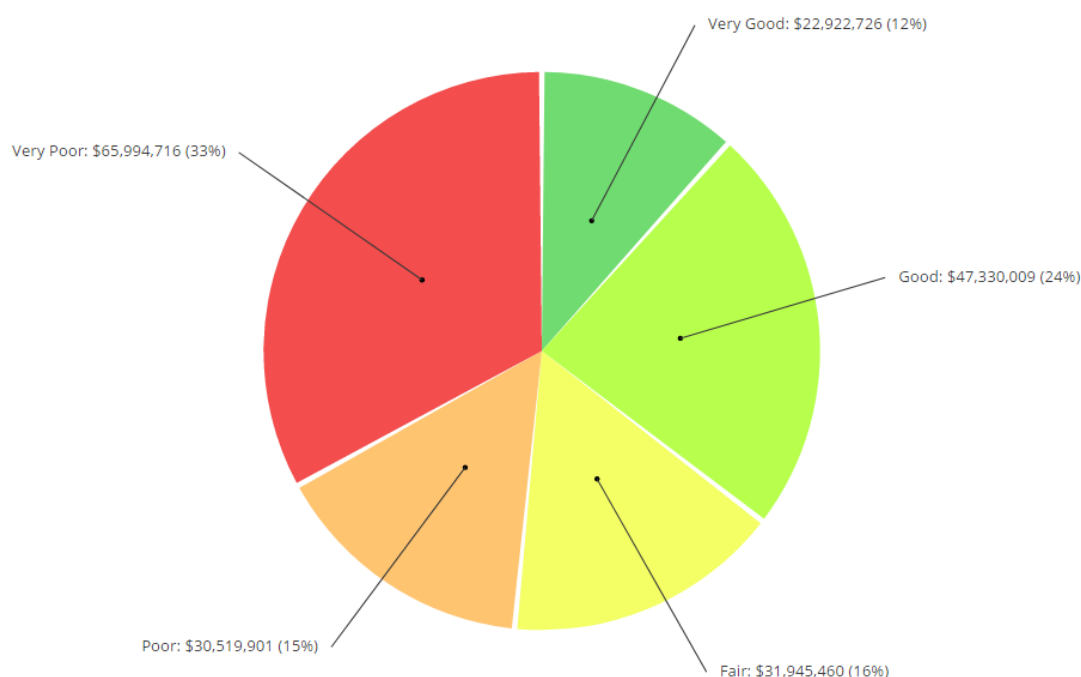
In conjunction with condition data, two other measurements can augment staff understanding of the state of infrastructure and impending and long-term infrastucture needs: installation year profile, and useful life remaining. The installation year profile in the figure below illusrates the historical invesments in infrastructure across key asset classes. Often, investment in critical infrastructure parallels population growth or other significant shifts in demographics.

FIGURE 5 HISTORICAL INVESTMENT IN INFRASTRUCTURE – ALL ASSET CLASSES
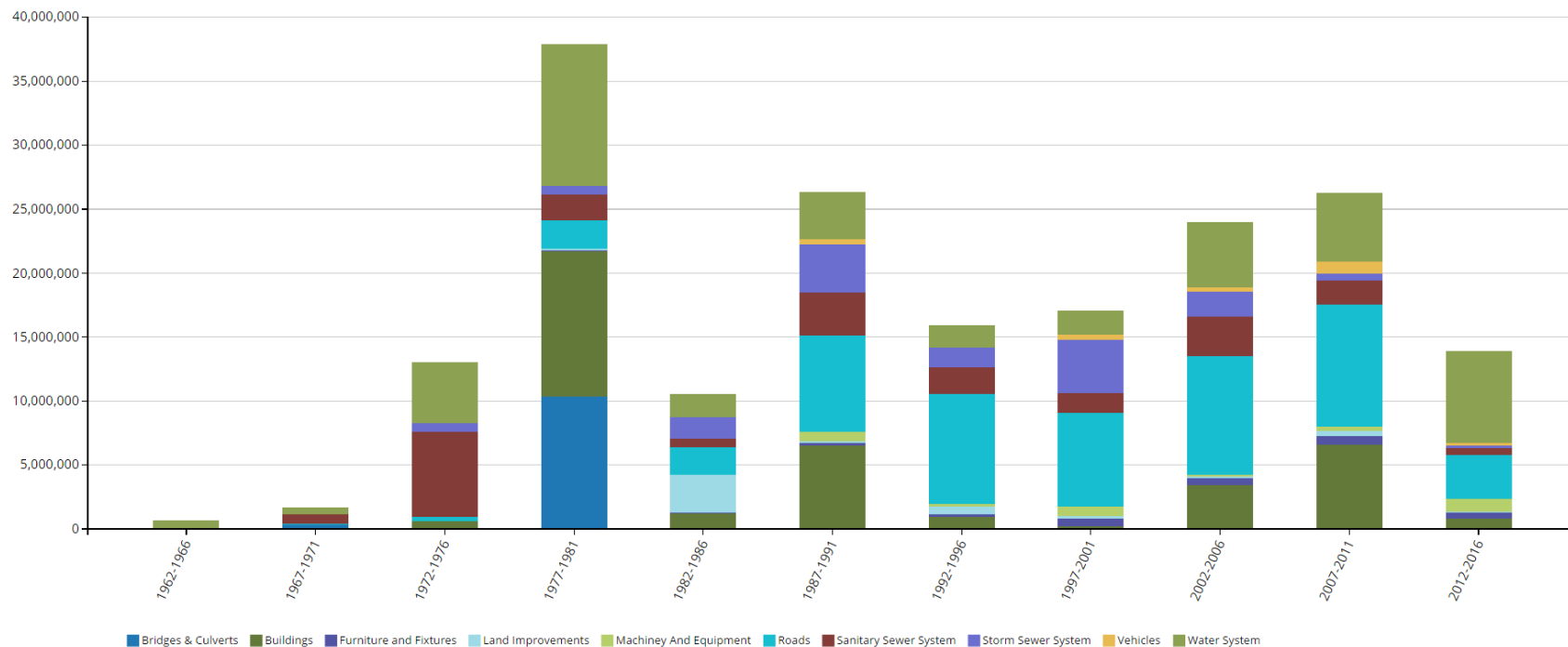
Similar to other municipalities in Ontario, the Town of Hearst experienced a period of increasing levels of investment beginning in the 1970s and 1980s. The town also experienced rapid investments in the early 1990s, which have remained relatively stable since. Since the early 1990s investment has steadily increased until 2011. However between 2012-2016 the town has experienced a significant decrease in investment totaling $9.5 million versus $23 million in the previous period (2007-2011).

While age is not a precise indicator of an asset's health, it can serve as a meaningful approxmiation in the absence of condition data and can serve as a signal. The following figure shows the distibution of assets based on the amount of useful life already consumed (excluding gravel roads).

FIGURE 6 USEFUL LIFE REMAINING - ALL ASSET CLASSES
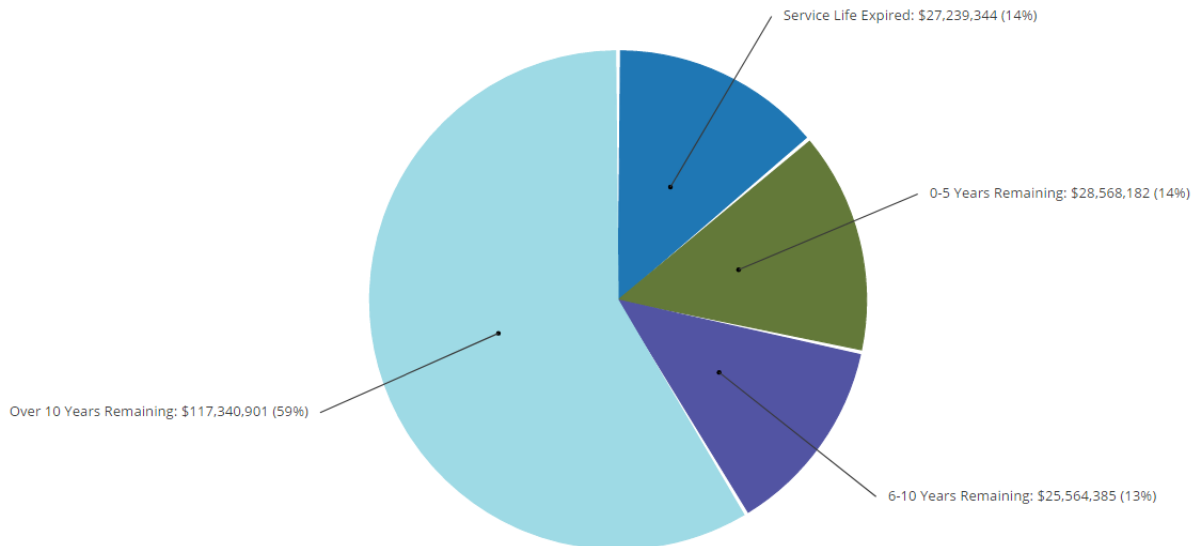
Approximately 60% of the municipality's assets, with a valuation of $117 million, have at least 10 years of useful life remaining. However, a large portion, with a valuation of $27.2 million, remains in operation beyond their useful life. An additional 14% of assets valued at $28.6 million will reach the end of their useful life in the next five years.

3   Data Confidence

Overall the town has a very high degree of confidence in the data used to develop this AMP, receiving a weighted confidence rating of 89%. This is indicative of significant effort in collecting and refining its data set. The lowest data confidence rating was assigned to the town's machinery & equipment, vehicles, and furniture & fixtures.

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 Data Confidence Rating
Road Network	100%	100%	100%	80%	100%	96%
Bridges & Culverts	70%	70%	100%	80%	100%	84%
Water	100%	100%	100%	90%	100%	98%
Wastewater	100%	100%	100%	90%	100%	98%
Storm	100%	100%	100%	90%	100%	98%
Buildings	70%	70%	100%	80%	100%	84%
Machinery & Equipment	80%	80%	80%	80%	80%	80%
Land Improvements	90%	100%	100%	70%	100%	92%
Vehicles	80%	80%	80%	80%	80%	80%
Furniture & Fixtures	80%	80%	80%	80%	80%	80%
					Weighted Data Confidence Rating	89%

4   Financial Profile

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

FIGURE 7 ANNUAL REQUIREMENTS BY ASSET CLASS

Asset Class	Amount
Vehicles	$139,000
Bridges & Culverts	$154,000
Land Improvements	$164,000
Machinery & Equipment	$171,000
Storm Network	$306,000
Furniture & Fixtures	$442,000
Sanitary Sewer Services	$570,000
Buildings	$963,000
Water Services	$1,354,000
Road Network	$2,465,000
Total	$6,728,000
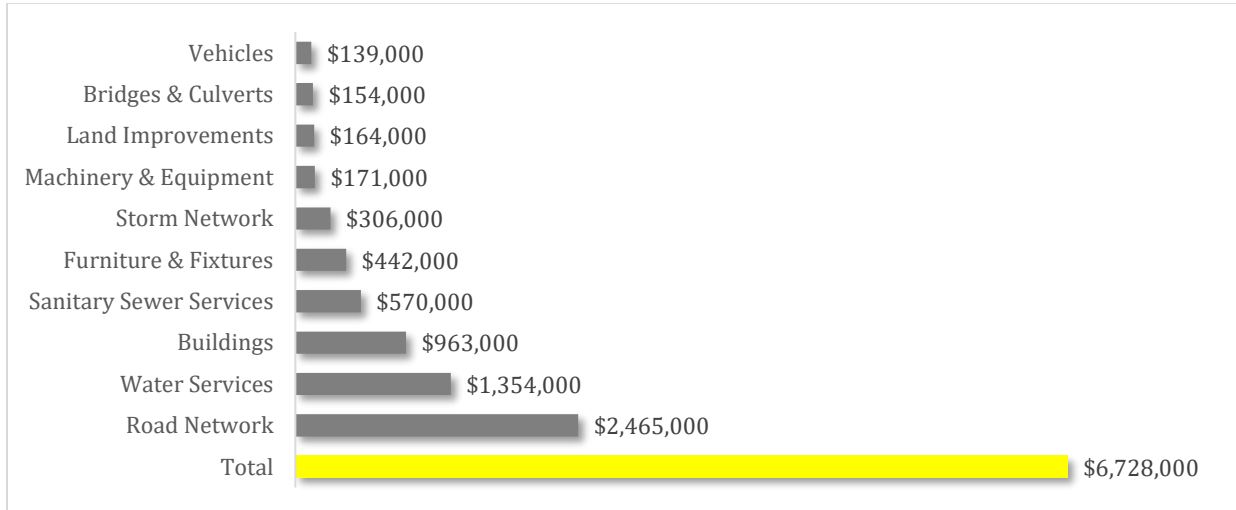
The annual requirements represent the amount the municipality should allocate annually to each of its asset classes to meet replacement need as they arise and prevent infrastructure backlogs. In total, the municipality must allocate $6.7 million annually for the assets covered in this AMP.

FIGURE 8 INFRASTRUCTURE BACKLOG - ALL ASSET CLASSES

Asset Class	Amount
Bridges & Culverts	$0
Storm Network	$44,000
Vehicles	$722,000
Machinery & Equipment	$834,000
Land Improvements	$1,082,000
Buildings	$1,210,000
Sanitary Sewer Services	$1,780,000
Water Services	$1,782,000
Furniture & Fixtures	$1,864,000
Road Network	$16,605,000
Total	$25,923,000
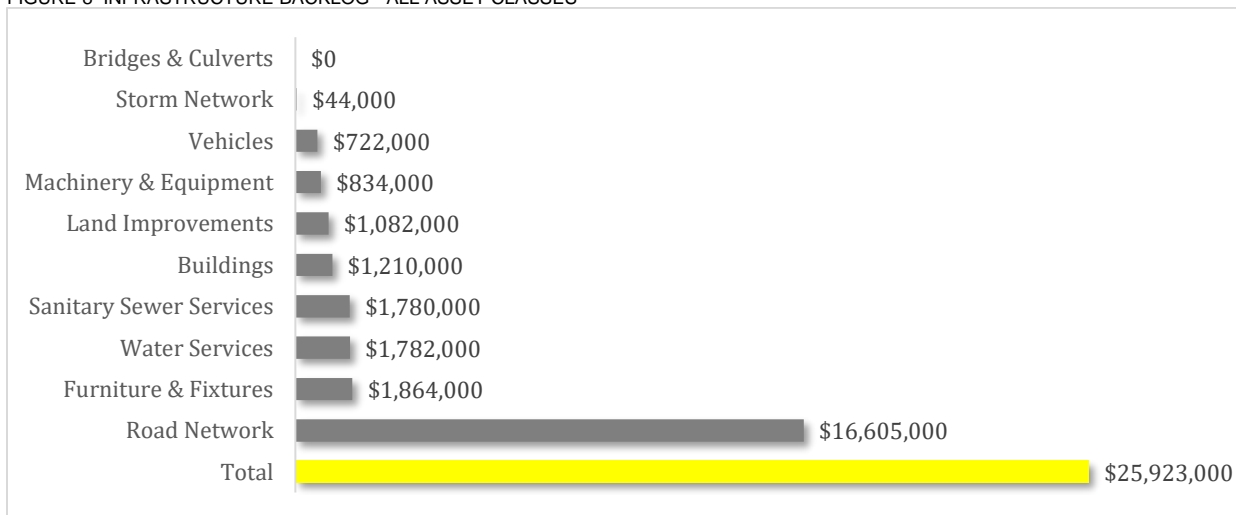
The town has a combined infrastructure backlog of $25.9 million, with the road network comprising 64%. The backlog represents the investment needed today to meet previously deferred replacement needs. This data is based on assessed condition as available and age-based data in the absence of such information.

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 town'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 town's roads assets are valued at $59.9 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 6 KEY ASSET ATTRIBUTES – ROADS

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Road Network	Paved Surfaces	51.31km	20	NRBCPI	$17,789,148
	Surface Treated Roads	37.85km	5	NRBCPI	$1,185,267
	Gravel Roads	40.20km	10	NRBCPI	$1,561,354
	Road Bases	93.56km	40	NRBCPI	$25,407,055
	Curbs	42,298.22m	20	NRBCPI	$7,456,398
	Streetlights	Pooled	20	NRBCPI	$805,797
	Sidewalks	40,951.40m	20	NRBCPI	$5,768,356
				Total	**$59,973,375**

1.2   Historical Investment in Infrastructure

In these sections, we provide the installation profile and useful life consumption levels using in-service data obtained from the Town's PSAB inventory. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at Hearst. The chart below illustrates the historical levels of investment in roads at the town of Hearst.

FIGURE 9 HISTORICAL INVESTMENT – ROAD NETWORK
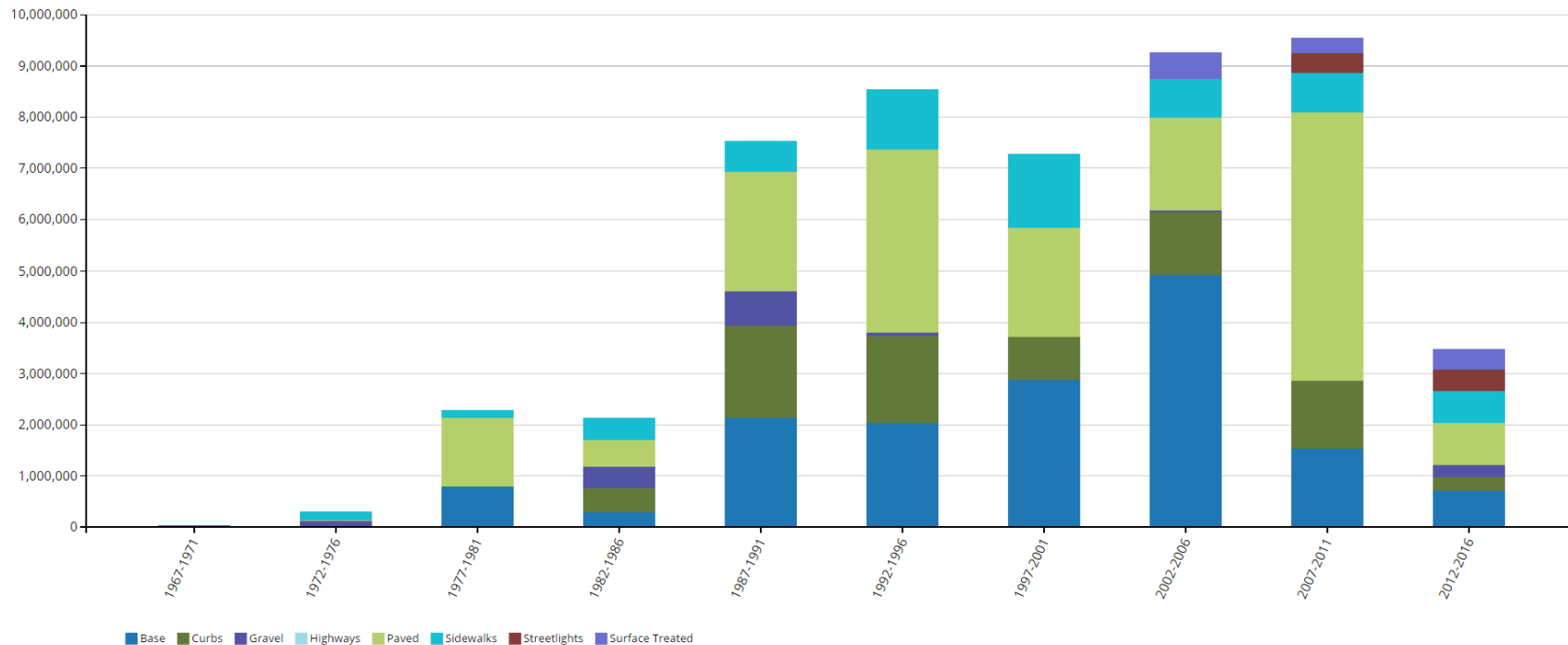
Beginning in the late 1980s, there was a significant increase in the investment in roads infrastructure increasing from $2 million in the previous period to $7.5 million. The late 1990s saw a slight decrease, but this was then followed by a second wave of increased spending up to the end of 2011 and capping at $9.5 million. Since the peak the last 5 years has been the lowest investment in 35 years coming close to early 1980 levels of investment at $3.5 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 town's road network.

FIGURE 10 USEFUL LIFE CONSUMPTION – ROAD NETWORK
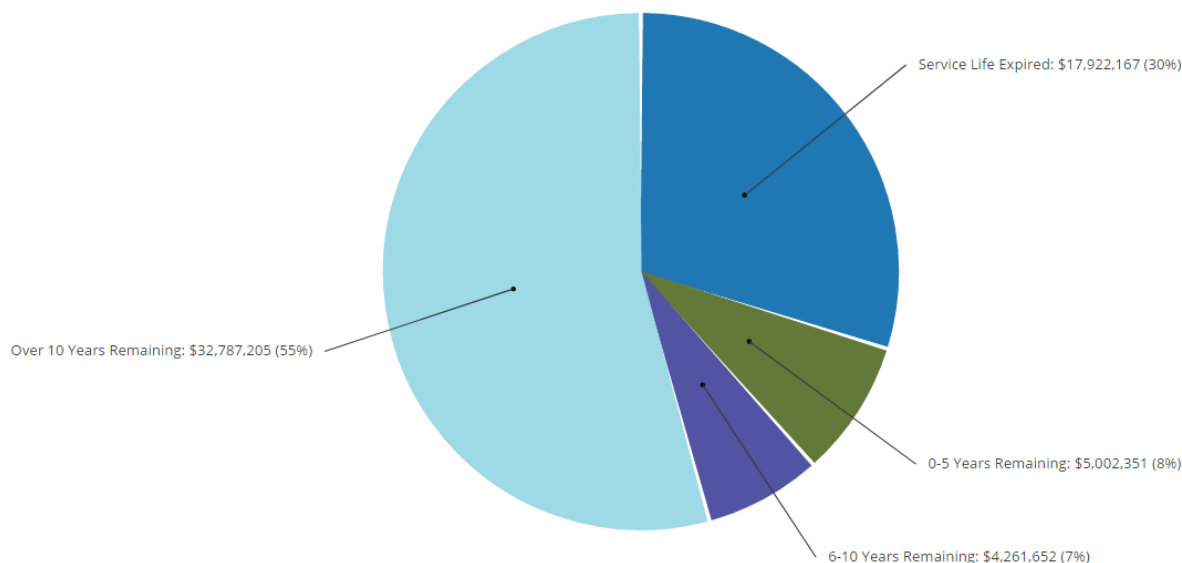
While 55% of the town's road network assets have at least 10 years remaining, 30% with a valuation of $18 million, remain in operation beyond their useful life. An additional 8% of assets valued at $5 million will reach the end of their useful life in the next five years.

1.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's roads network. By default, we rely on observed field data as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 11 ASSET CONDITION – ROAD SURFACES EXCLUDES GRAVEL (ASSESSED & AGE-BASED)

Very Poor: $2,086,580 (11%)
Very Good: $1,770,766 (9%)
Poor: $1,599,940 (8%)
Good: $7,261,178 (38%)
Fair: $6,255,951 (33%)
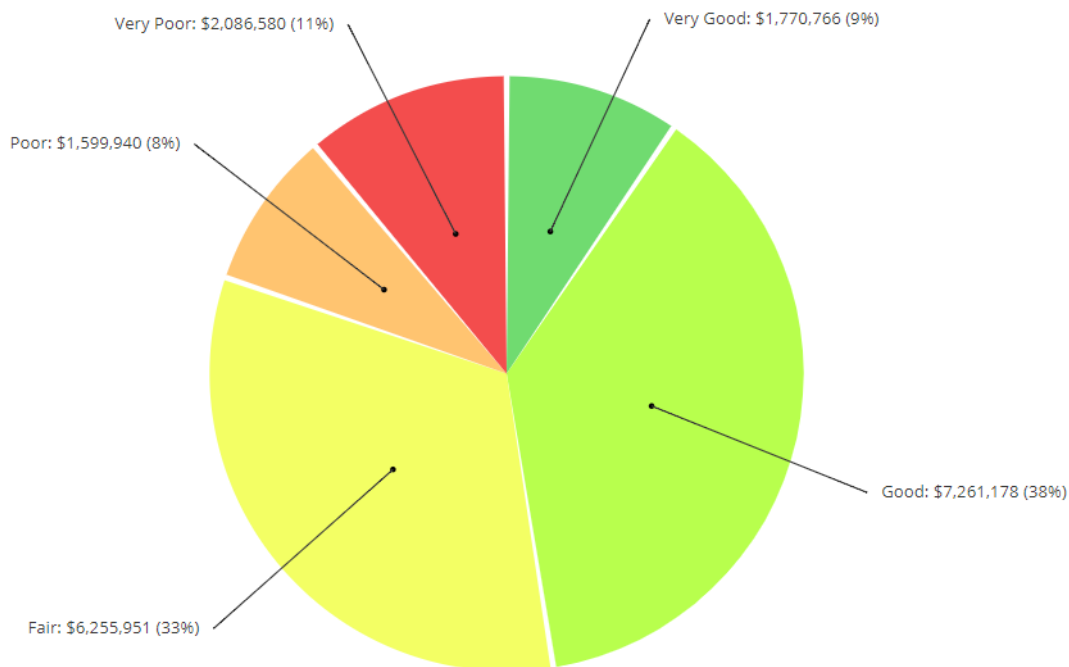
Based on assessed condition, 47% of the town's road surface assets are in good to very good condition with a valuation cost of $9.0 million. An additional 33% are in fair condition with the remaining 19% with a valuation of $3.9 million, being in poor to very poor condition.

FIGURE 12 ASSET CONDITION - ROAD BASES (AGE-BASED)

Very Good: $1,699,258 (7%)
Good: $6,048,399 (24%)
Very Poor: $11,230,930 (44%)
Fair: $4,109,626 (16%)
Poor: $2,318,842 (9%)
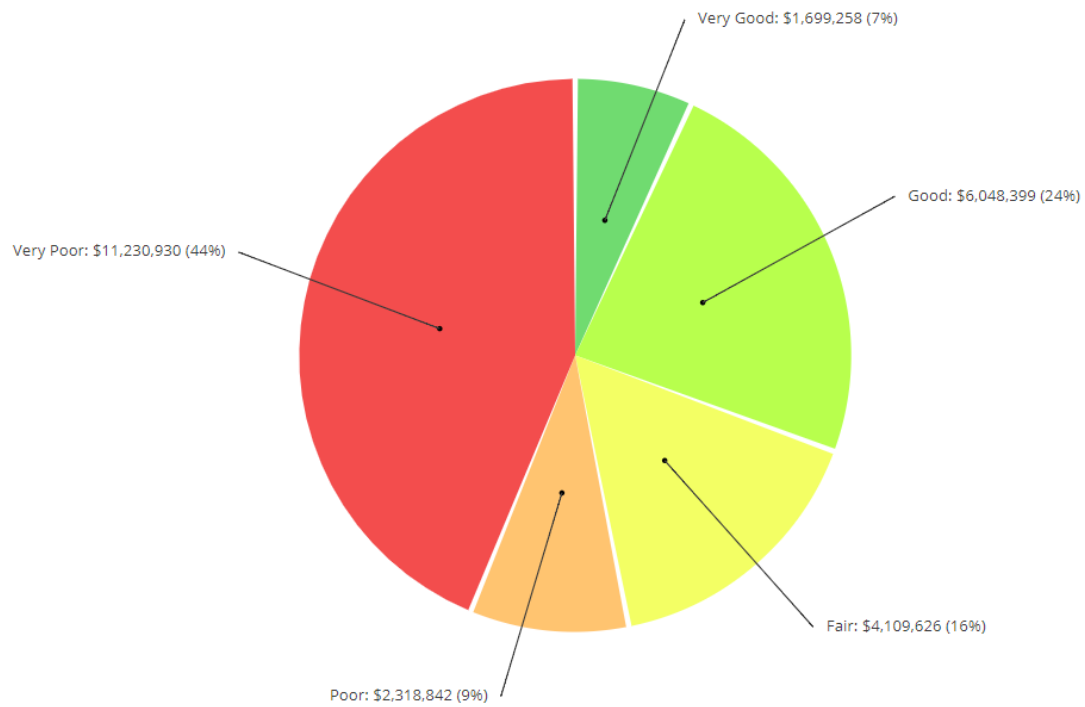
Based on age-based data, 53% of road bases, with a valuation of $13.5 million are in poor to very poor condition. 31% are in good to very good condition.

FIGURE 13 ASSET CONDITION – OTHER – CURBS, STREETLIGHTS, SIDEWALKS (AGE-BASED)

Very Good: $1,308,964 (9%)
Good: $1,343,113 (10%)
Fair: $2,204,356 (16%)
Very Poor: $7,796,034 (56%)
Poor: $1,378,084 (10%)
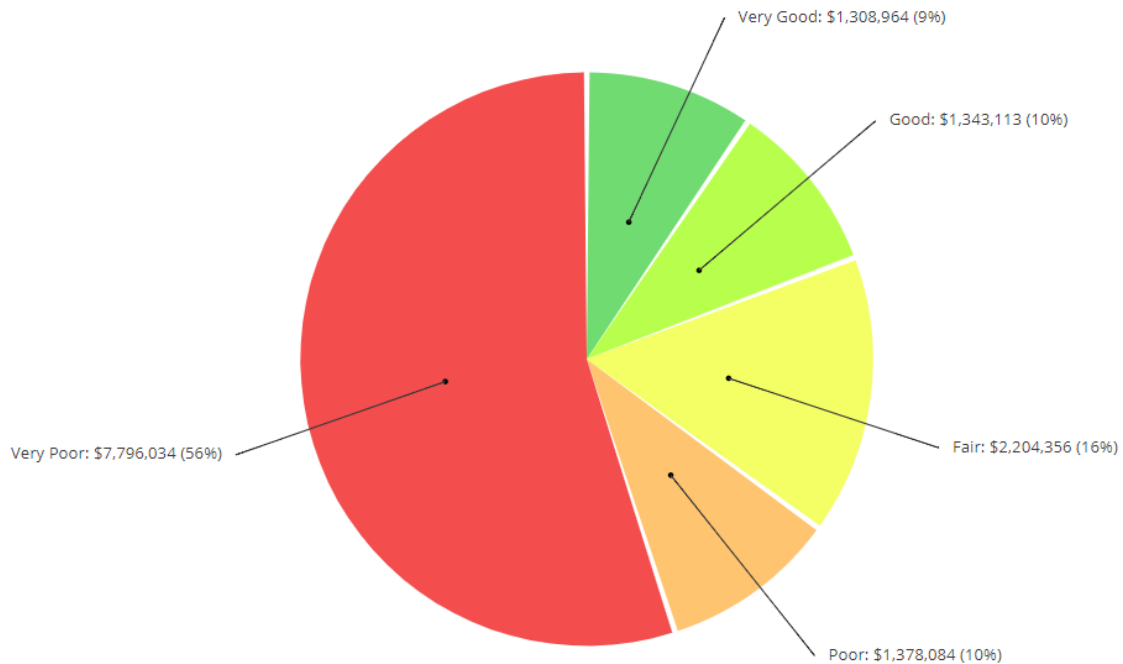
Based on age data, 66% of the town's curbs, streetlights, and sidewalks are in poor to very poor condition; 19%, with a valuation of $2.7 million, are in good to very good condition.

31

1.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's road network 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 14 FORECASTING REPLACEMENT NEEDS - ROAD NETWORK
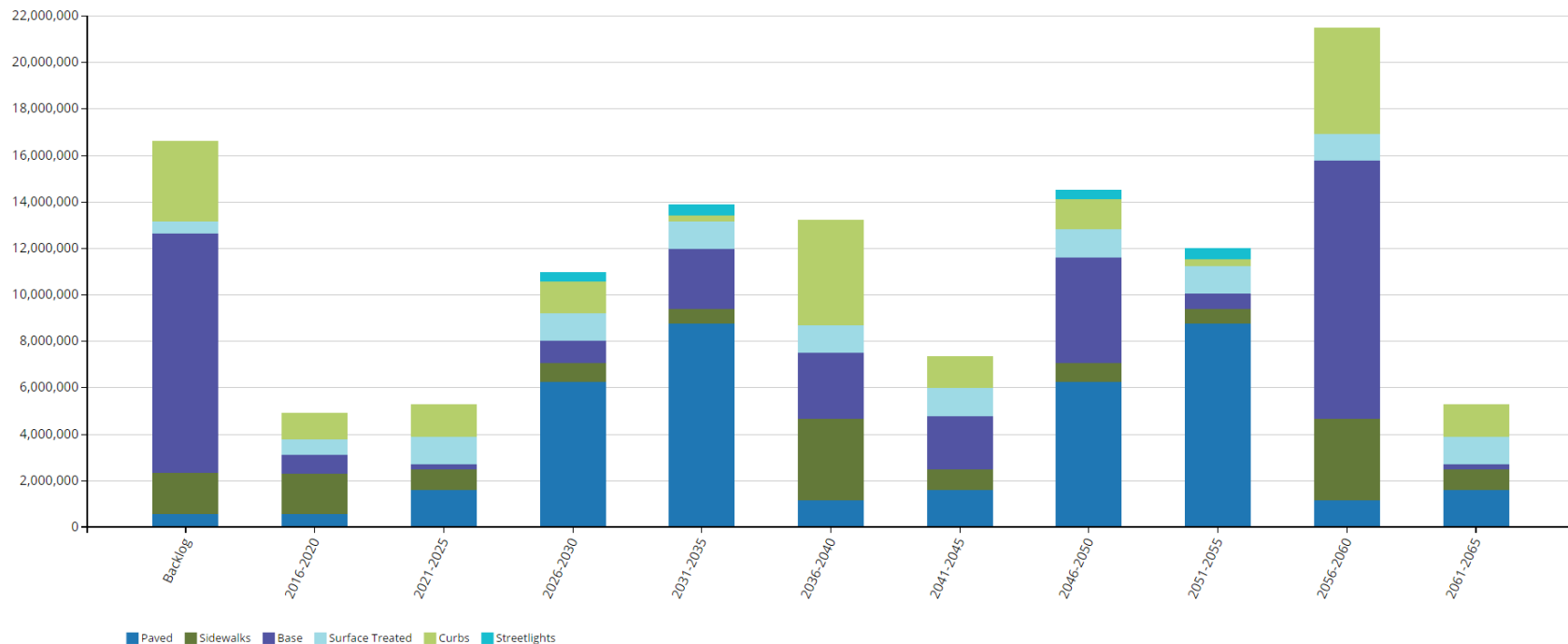
In addition to the backlog of $16.6 million, investments needs for the road network assets are forecasted to be $4.8 million over the next five years. An additional $5.2 million will be required between 2021 and 2025. The period of largest investment requirements will be 2056-2060, when nearly $21.4 million will be required. The town's annual requirements for its road network total $2,465,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. However, the town is currently allocating $418,000, leaving an annual deficit of $2,047,000.

32

1.6   Recommendations – Roads

- There are significant needs to be addressed in the next 10 years, therefore, the condition assessment data, along with risk management strategies, should be reviewed together to aid in prioritizing overall needs for rehabilitation and replacement.

- In addition to the above, a tailored life cycle activity framework should also be developed to promote standard life cycle management of the road network as outlined further within the "Asset Management Strategy" section of this AMP.

- This AMP and any LOS and KPIs established should be updated annually to gauge the performance of the town against quantified targets.

2. Bridges & Culverts

2.1. Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 7 illustrates key asset attributes for the town's bridges & culverts, 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 town's bridges & culverts assets are valued at $10.8 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

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	4	50, 65, 75	User-Defined	$9,500,000
	Culverts	5	60	User-Defined	$1,250,000
				Total	**$10,750,000**

2.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. Figure 15 illustrates the historical levels of investment in the town's bridges & culverts.

FIGURE 15 HISTORICAL INVESTMENT - BRIDGES & CULVERTS
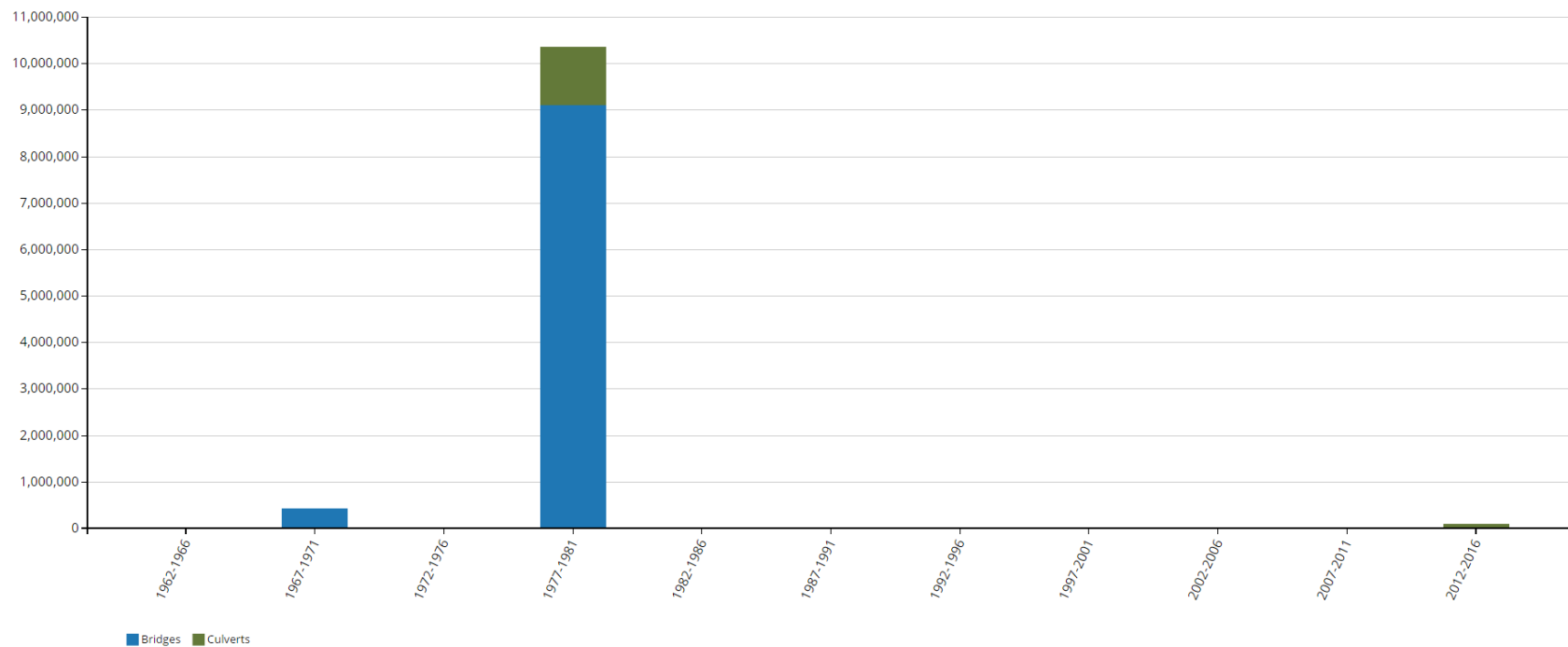
The construction of the town's bridges & culverts all occurred during the late 1970s with a total investment of $10.3 million. Since that point the assets have been maintained with 1 bridge recently being converted to a culvert.

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 town's bridges & culverts.

FIGURE 16 USEFUL LIFE CONSUMPTION – BRIDGES & CULVERTS

Service Life Expired: $0 (0%)
0-5 Years Remaining: $0 (0%)
6-10 Years Remaining: $0 (0%)

Over 10 Years Remaining: $10,750,000 (100%)
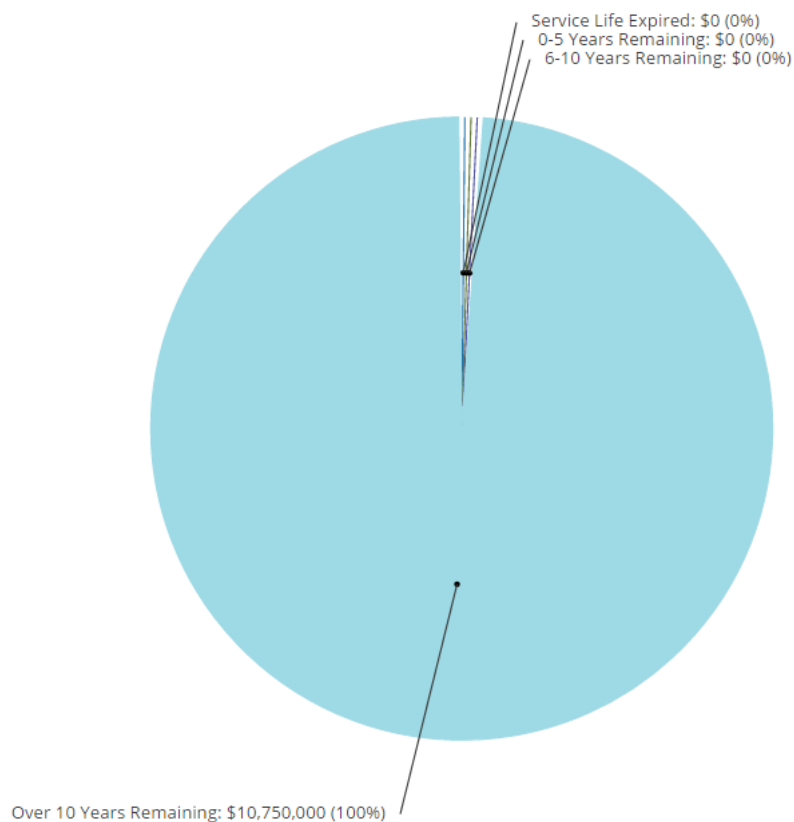
100% of the town's bridges & culverts have at least 10 years of useful life remaining.

2.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's bridges & culverts. By default, we rely on observed field data adapted from OSIM inspections as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 17 ASSET CONDITION – BRIDGES & CULVERTS (ASSESSED)
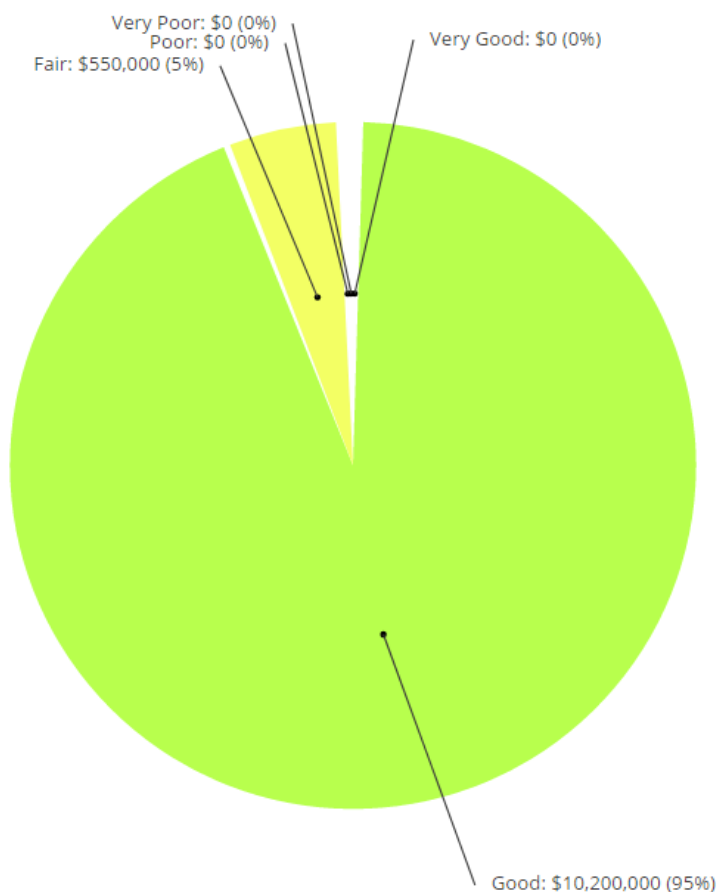
Based on assessed condition, the majority, 95%, of the bridges and culverts assets are in good condition. While a relatively small percentage 5% with a valuation of $550,000 are in fair condition. Given the critical nature of bridges and culverts, these assets should be prioritized for further review.

2.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's bridges & culverts. 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 18 FORECASTING REPLACEMENT NEEDS - BRIDGES & CULVERTS
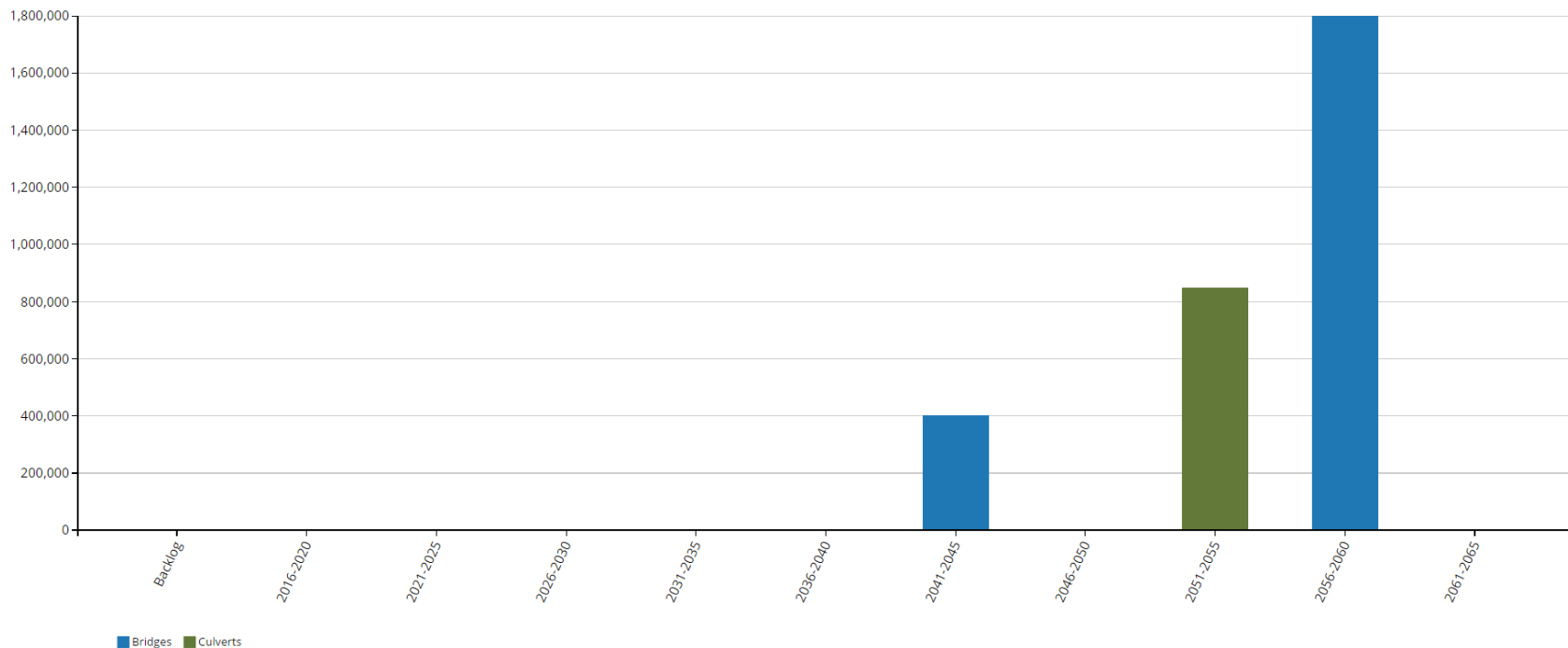
There is no backlog or short-term replacement needs for bridges & culverts. The first major investment of $400,000 will happen between 2041-2045 which will then be followed by a substantial investment requirement of $2.65 million in the 2050s. The town's annual requirements for its bridges & culverts total $154,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. However, the town is currently allocating $0, leaving an annual deficit of $155,000.

2.6   Recommendations – Bridges & Culverts

- The majority of the town's bridges & culverts are in good to very good condition. The town should integrate a risk management framework with its OSIM condition assessment programs to prioritize bridges & culverts capital projects within the short and long term budget. See Section 2, 'Condition Assessment Programs' and Section 4, 'Risk' in the 'Asset Management Strategies' chapter.

- 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'.

3 Water

3.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 8 illustrates key asset attributes for the town'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 town's water services assets are valued at $44.3 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting policy.

TABLE 8 KEY ASSET ATTRIBUTES – WATER

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Water Services	Watermains (50mm)	86m	50	NRBCPI	$16,320
	Watermains (150mm)	19,617.723m	50	NRBCPI	$10,351,459
	Watermains (200mm)	11,963.744m	50	NRBCPI	$5,341,521
	Watermains (250mm)	3,760.407m	50	NRBCPI	$1,759,959
	Watermains (300mm)	10,717.794m	50	NRBCPI	$6,341,757
	Watermains (350mm)	21m	50	NRBCPI	$11,097
	Watermains (400mm)	62m	50	NRBCPI	$62,337
	Water Filtration Plant	1	20, 40	User-defined	$15,596,500
	Water Tower	1	20, 40	User-defined	$4,200,000
	Water Meters	Pooled	5, 15	NRBCPI	$625,549
				Total	$44,306,499

3.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. Figure 19 illustrates the historical levels of investment in the town's water services assets.

FIGURE 19 HISTORICAL INVESTMENT – WATER NETWORK
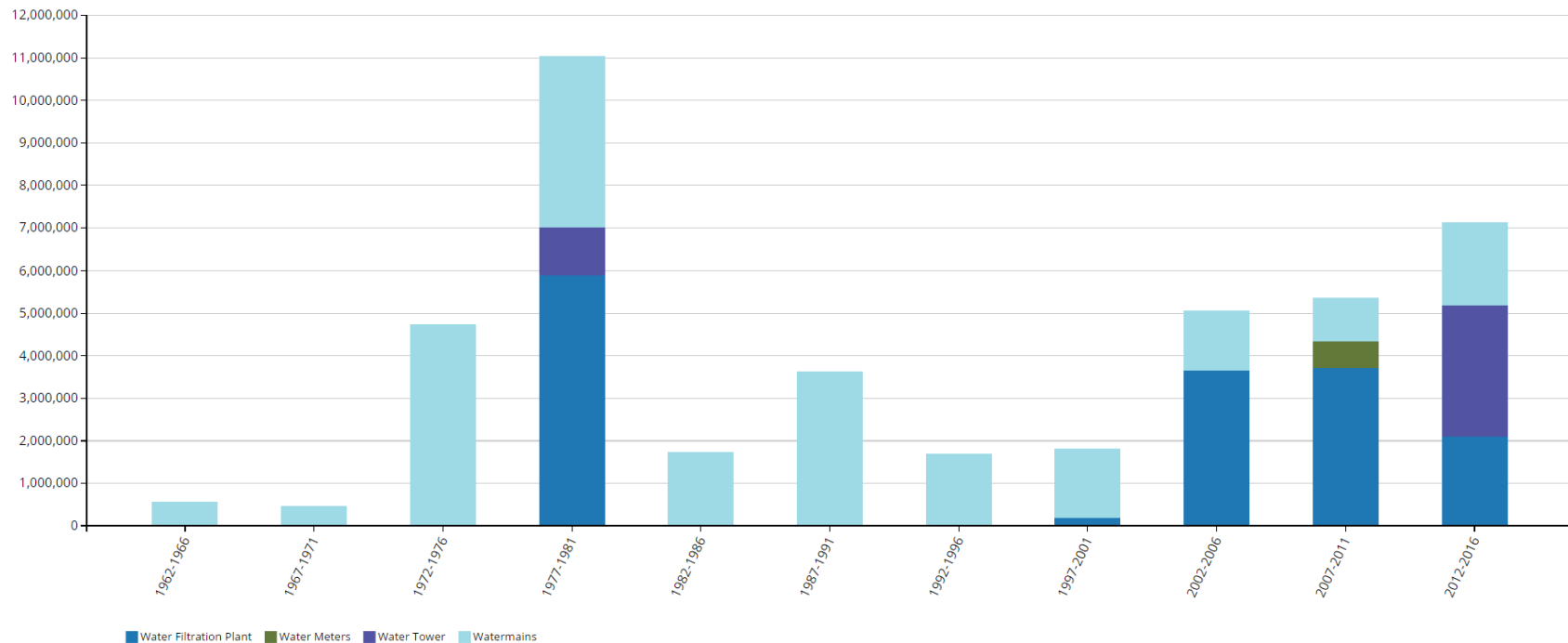
The late 1970s represented the period of largest investments in the town's water services, with expenditures totaling more than $11 million, with the water filtration plant comprising the vast majority. The last 5 years has had a moderate increase in investment that can be attributed to the town's water tower.

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 town's water services.

FIGURE 20 USEFUL LIFE CONSUMPTION – WATER NETWORK

Service Life Expired: $1,781,618 (4%)
0-5 Years Remaining: $8,277,774 (19%)
6-10 Years Remaining: $5,422,249 (12%)
Over 10 Years Remaining: $28,824,858 (65%)
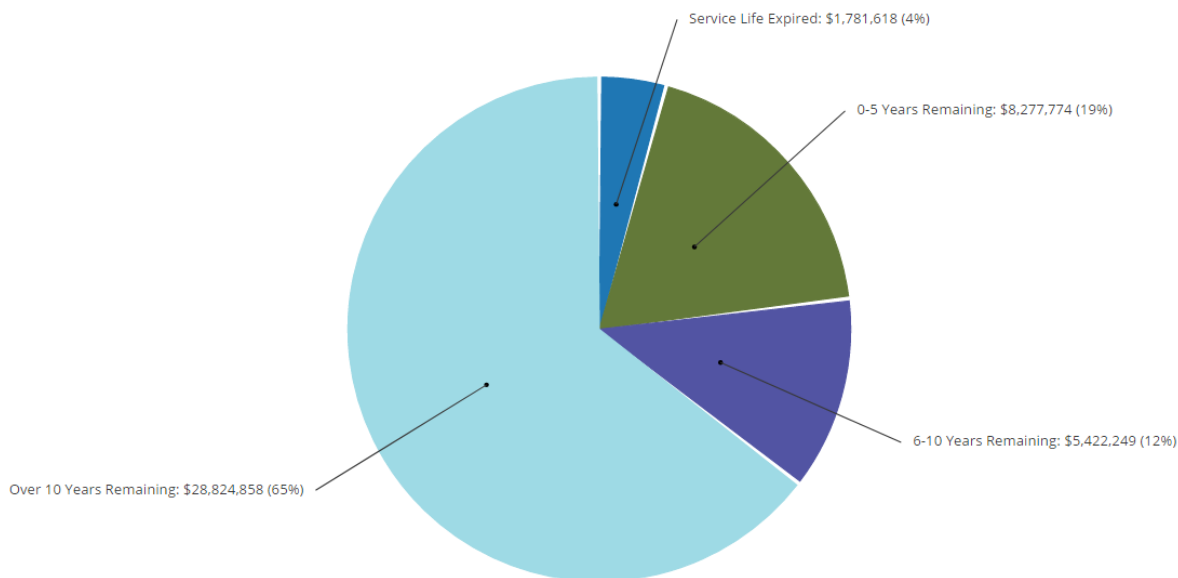
Nearly 65% of the town's water services assets have at least 10 years of useful life remaining. However, 4%, with a valuation of $1.8 million remain in operation beyond their useful life.

3.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's water services. By default, we rely on observed field data as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 21 ASSET CONDITION – WATER NETWORK (AGE-BASED)
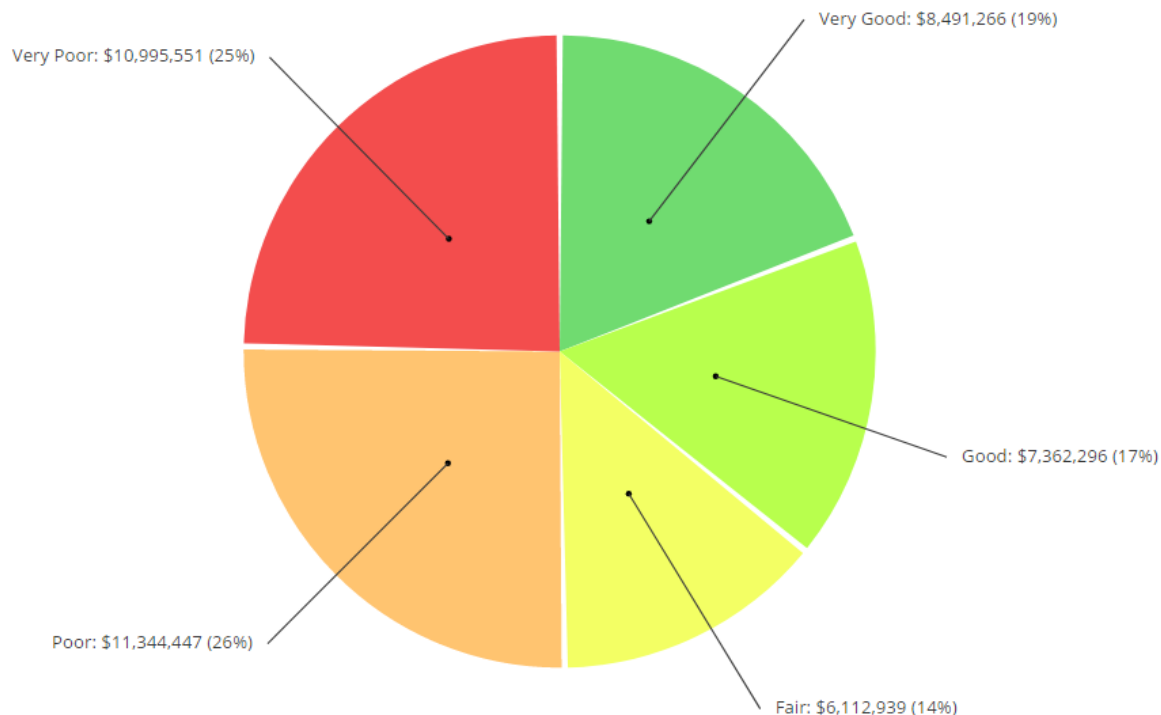
Based on age data, over 50% of water assets, valued at $22.3 million, are in poor to very poor condition, 35%, with a valuation of $15.9 million are in good to very good condition.

3.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's 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 22 FORECASTING REPLACEMENT NEEDS – WATER NETWORK
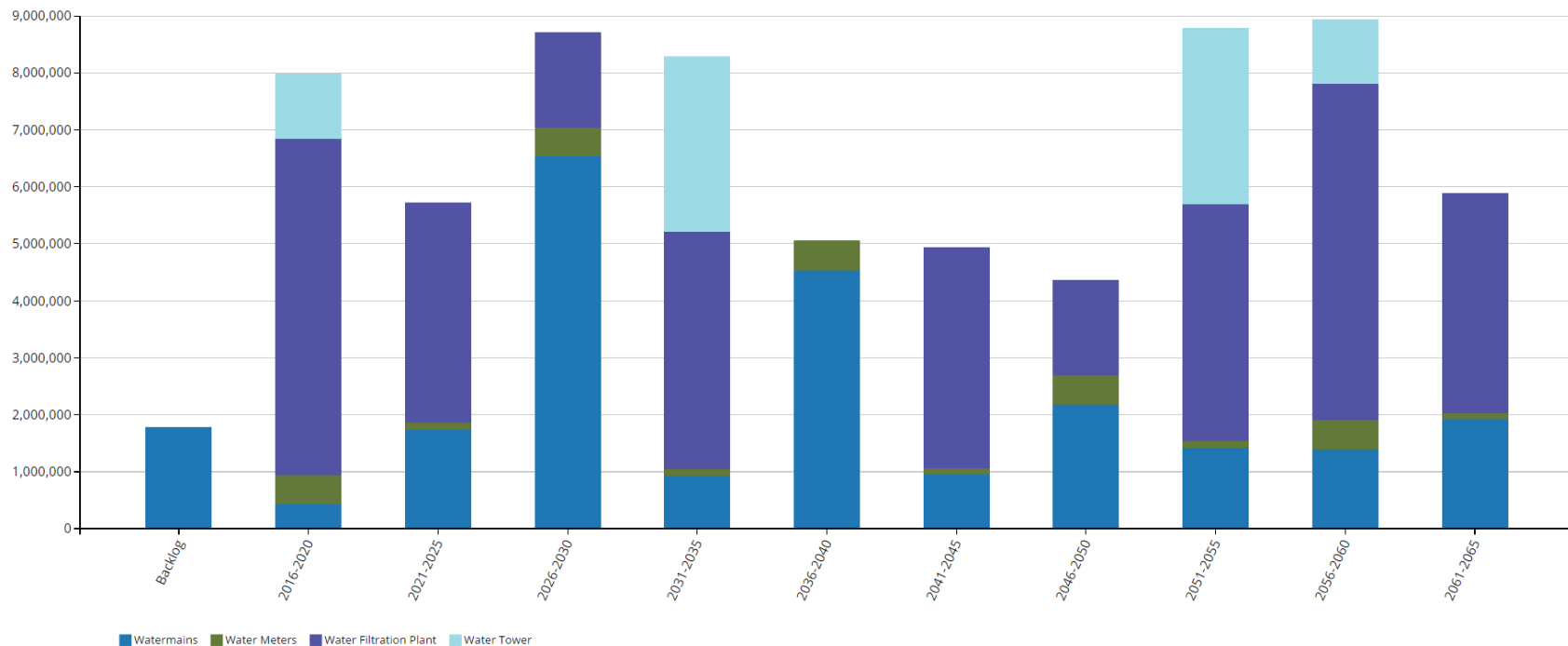
The town has a backlog totaling $1.8 million, but the town's replacement needs will total $8 million over the next five years. Between 2021 and 2025, replacement needs will decrease to $5.7 million, however, that will be followed by the peak investment of more than $8.7 million between 2026-2030 which is mainly attributed to watermains. The town's annual requirements for its water network total $1,354,000. The town is currently allocating $81,000, leaving an annual deficit of $1,273,000.

3.6   Recommendations – Water

- Similar to bridges & culverts, water services are uniquely consequential to a community's wellbeing. In Hearst, water services comprises the third largest share of the overall asset portfolio. While age-based data indicates that the major portion (50.4%) of water assets are in poor to very poor condition, field inspection may suggest otherwise. Field inspections also will provide a more accurate estimate of the asset conditions and their minimum sustainable funding levels. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- While water facilities undergo visual inspections by structural engineer upon request, the town should establish a more strategic and systematic assessment schedule. 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 town's water assets. See Section 4, 'Risk' in the 'Asset Management Strategies' chapter.

- The town should continue to audit its capital assets data and update old data with more current information.

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

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

4   Wastewater Services

4.1   Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 9 illustrates key asset attributes for the town's wastewater 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 town's wastewater services assets are valued at $23.5 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting policy.

TABLE 9 KEY ASSET ATTRIBUTES – WASTEWATER SERVICES

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Wastewater Services	Sewermains (100mm)	38.802m	50	NRBCPI	$17,568
	Sewermains (150mm)	1,670.15m	50	NRBCPI	$219,781
	Sewermains (200mm)	25,289.292m	50	NRBCPI	$11,493,404
	Sewermains (250mm)	2,763.826m	50	NRBCPI	$1,184,175
	Sewermains (300mm)	7,001.321m	50	NRBCPI	$3,274,892
	Sewermains (350mm)	2,360.010m	50	NRBCPI	$749,858
	Sewermains (375mm)	2,665.395m	50	NRBCPI	$1,685,916
	Sewermains (450mm)	455.233m	50	NRBCPI	$185,409
	Sewermains (525mm)	953.142m	50	NRBCPI	$293,454
	Sewermains (600mm)	457.983m	50	NRBCPI	$138,371
	Pumping Stations	7	20, 40	NRBCPI	$1,333,746
	Municipal Lagoon	1	20, 40	NRBCPI	$2,909,033
				Total	**$23,485,607**

4.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. Figure 23 illustrates the historical levels of investment in the town's wastewater assets.

FIGURE 23 HISTORICAL INVESTMENT – WASTEWATER SERVICES
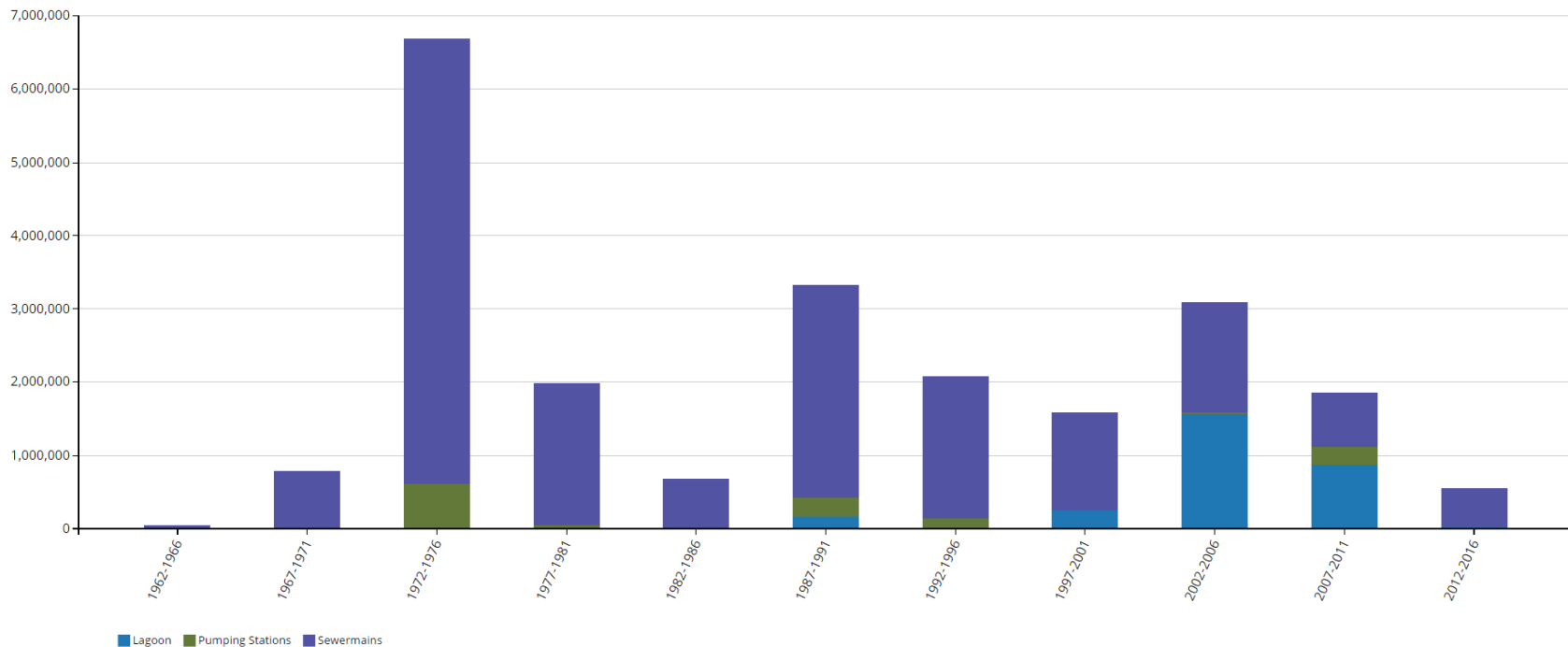
The town's investments in wastewater have fluctuated over the decades, with major expenditures occurring in the mid-1970s and late 1980s. Since 2002, investments in wastewater have had a steady decrease with only $540,000 being invested from 2012-2016.

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 town's wastewater services.

FIGURE 24 USEFUL LIFE CONSUMPTION – WASTEWATER SERVICES
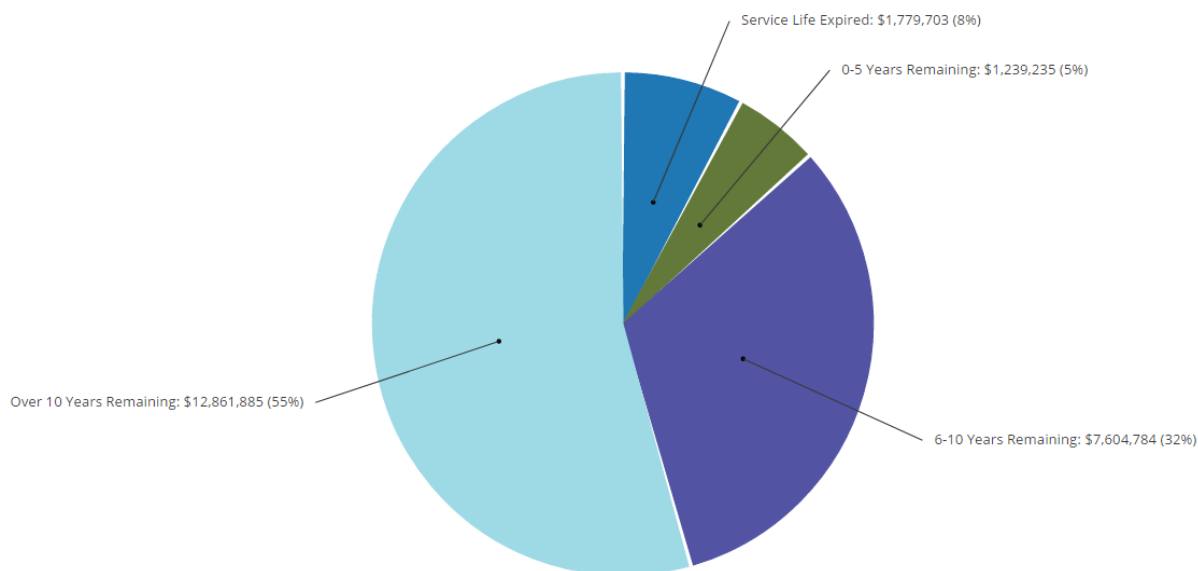
55% of wastewater assets have at least 10 years of useful life remaining. 8% remain in operation beyond their established useful life totaling $1.8 million with another 5% or $1.2 million reaching end of life within the next 5 years.

4.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's wastewater services. By default, we rely on observed field data as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 25 ASSET CONDITION – WASTEWATER SERVICES (AGE-BASED)

Very Good: $2,111,413 (9%)

Good: $4,575,529 (19%)

Very Poor: $8,922,745 (38%)

Fair: $4,032,601 (17%)

Poor: $3,843,319 (16%)
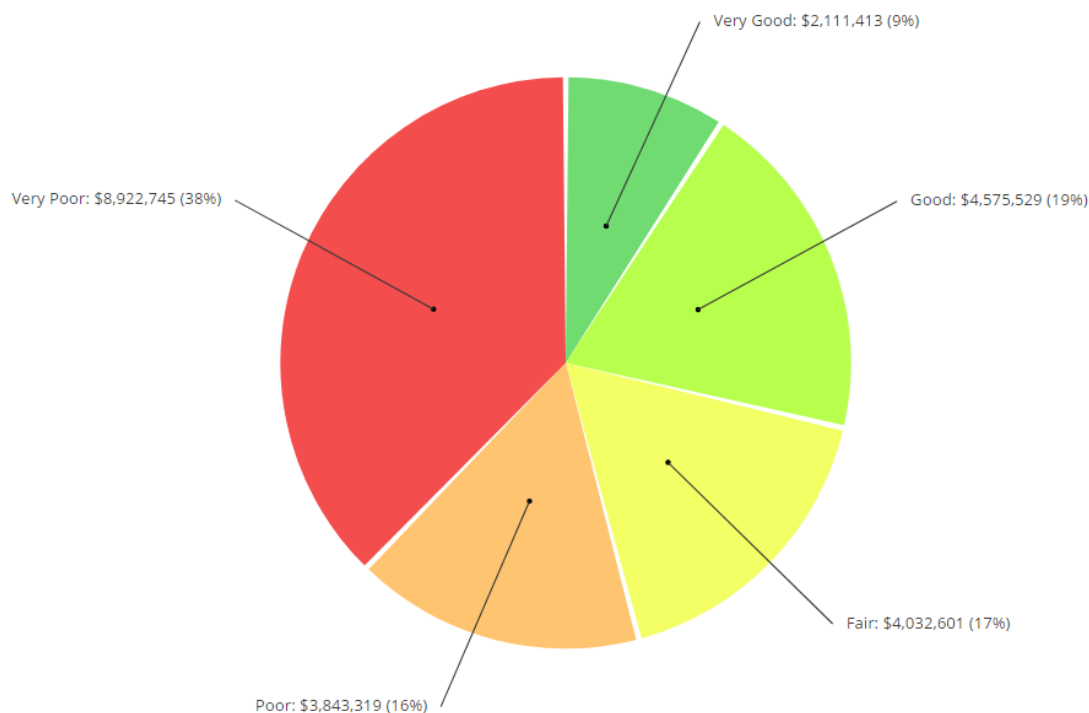
Based on age data, 54% of wastewater assets are in poor to very poor condition with a valuation of $12.8 million while 28% with a valuation of $6.7 million are in good to very good condition.

4.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's wastewater 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 26 FORECASTING REPLACEMENT NEEDS – WASTEWATER SERVICES
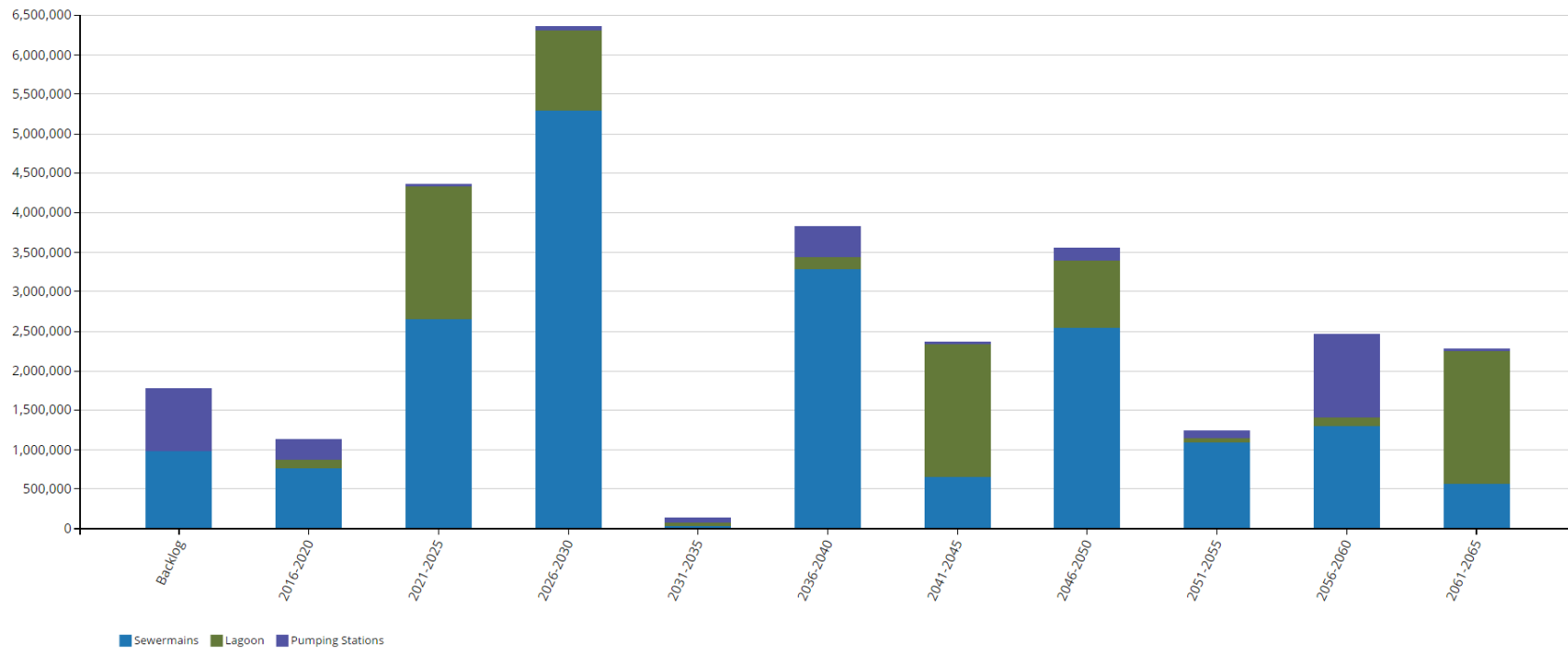
The current backlog for the town's wastewater services is relatively small at $1.8 million. However, replacements needs will rise rapidly over the next 15 years peaking at $6.3 million between 2026-2030. Following that the investment requirements continue to fluctuate on a cyclical basis. The town's annual requirements for its wastewater services total $570,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. However, the town is currently allocating $199,000, leaving an annual deficit of $371,000.

4.6   Recommendations – Wastewater

- Currently, the town does various condition assessments on its wastewater assets. Wastewater facilities are visually assessed on an annual basis. It is recommended that an inspection checklist be added to this inspection. Also, camera inspections are completed on mains on an as-needed basis. It is recommended that inspections be completed annually on high risk assets. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The town should continue to audit its capital assets data and update old data with more current information.

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

- The town 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 town's operations and maintenance requirements.

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

5   Stormwater Services

5.1   Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 10 illustrates key asset attributes for the town's stormwater 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 town's stormwater services assets are valued at $15.2 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 10 KEY ASSET ATTRIBUTES – STORMWATER SERVICES

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Stormwater Services	Stormmains (150mm)	109.019m	50	NRBCPI	$26,499
	Stormmains (250mm)	21.6m	50	NRBCPI	$11,551
	Stormmains (300mm)	15,554.845m	50	NRBCPI	$4,106,908
	Stormmains (375mm)	3,685.499m	50	NRBCPI	$1,098,640
	Stormmains (400mm)	875.123m	50	NRBCPI	$328,744
	Stormmains (450mm)	3,833.874m	50	NRBCPI	$1,717,189
	Stormmains (500mm)	698.871m	50	NRBCPI	$193,704
	Stormmains (525mm)	1,050.672m	50	NRBCPI	$475,917
	Stormmains (600mm)	2,087.363m	50	NRBCPI	$1,553,665
	Stormmains (675mm)	597.685m	50	NRBCPI	$429,020
	Stormmains (750mm)	1,576.98m	50	NRBCPI	$2,125,126
	Stormmains (825mm)	122.959m	50	NRBCPI	$57,413
	Stormmains (900mm)	1,088.822m	50	NRBCPI	$462,354
	Stormmains (1000mm)	43.045m	50	NRBCPI	$31,847
	Stormmains (1050mm)	44.368m	50	NRBCPI	$32,864
	Stormmains (1125mm)	247.254m	50	NRBCPI	$169,508
	Stormmains (1200mm)	2,112.153m	50	NRBCPI	$1,962,731
	Stormmains (1350mm)	287.142m	50	NRBCPI	$504,107
				Total	**$15,287,787**

5.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. Figure 27 illustrates the historical levels of investment in the town's stormwater assets.

FIGURE 27 HISTORICAL INVESTMENT - STORM
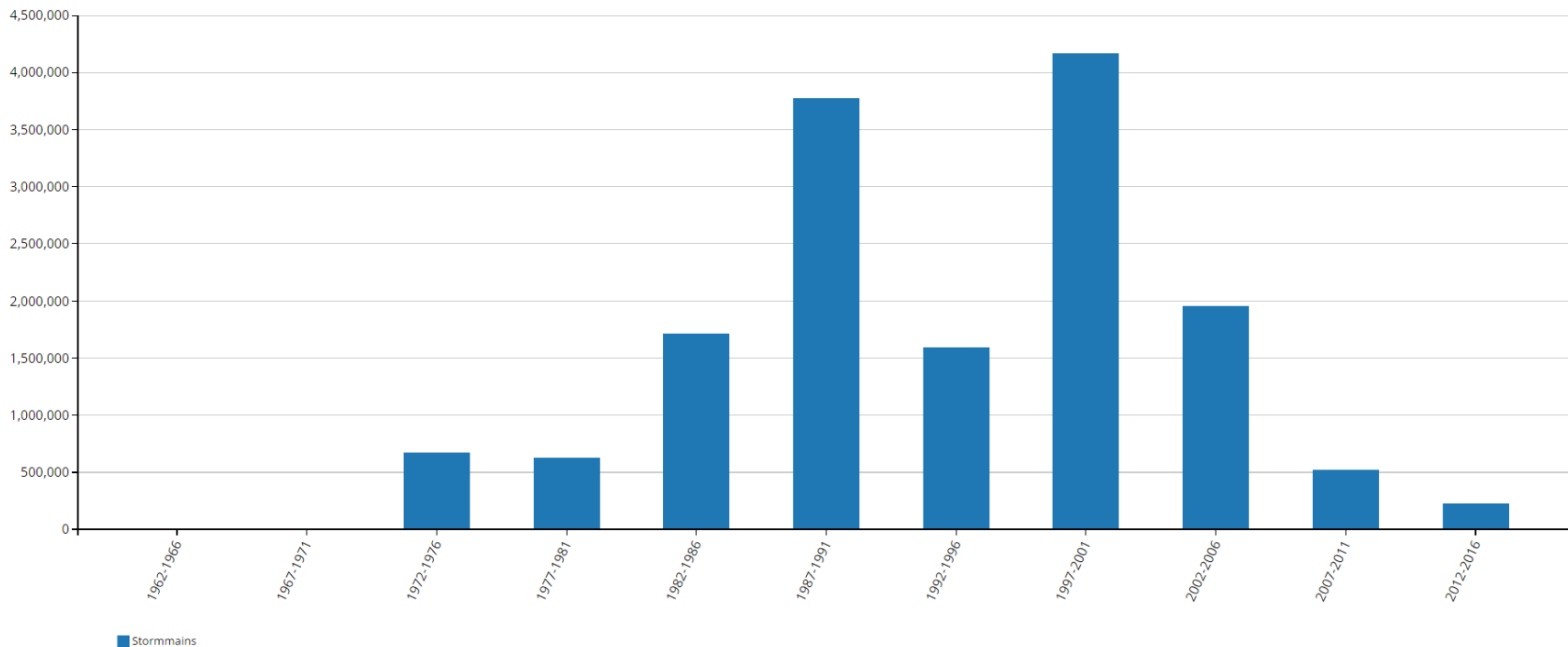
The town started investing in their storm infrastructure in the mid-1970s which continued at an increasing rate up to a major peak in the late 1980s of $3.8 million. The largest expenditures in the town's stormwater services, totaling nearly $4.2 million, occurred in the late 1990s, with investments declining over the proceeding decades.

5.3   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 town's stormwater services.

FIGURE 28 USEFUL LIFE CONSUMPTION – STORMWATER SERVICES

Service Life Expired: $44,152 (<1%)
0-5 Years Remaining: $0 (0%)
6-10 Years Remaining: $666,328 (4%)

Over 10 Years Remaining: $14,577,307 (95%)
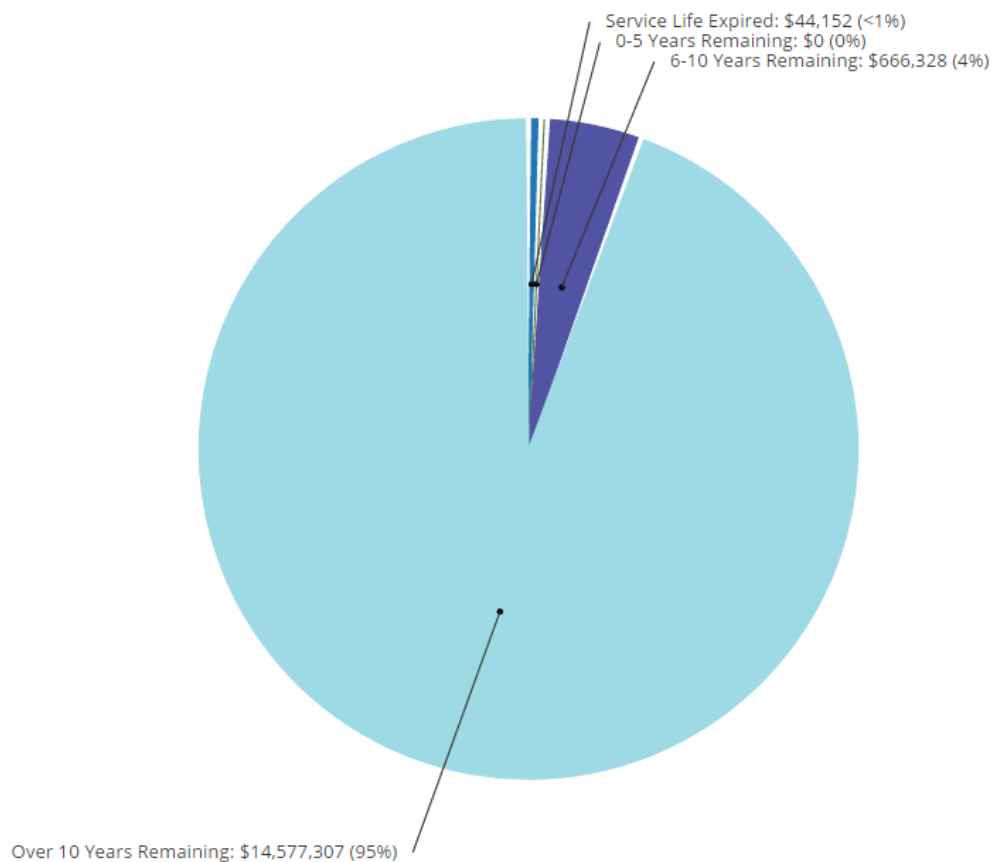
The majority, 95%, of the stormwater asset have at least 10 years of service life remaining with a valuation cost of $14.6 million, while only $44,000 of assets are currently still in use beyond their estimated life.

5.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's stormwater services. By default, we rely on observed field data as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 29 ASSET CONDITION – STORMWATER SERVICES (AGE-BASED)
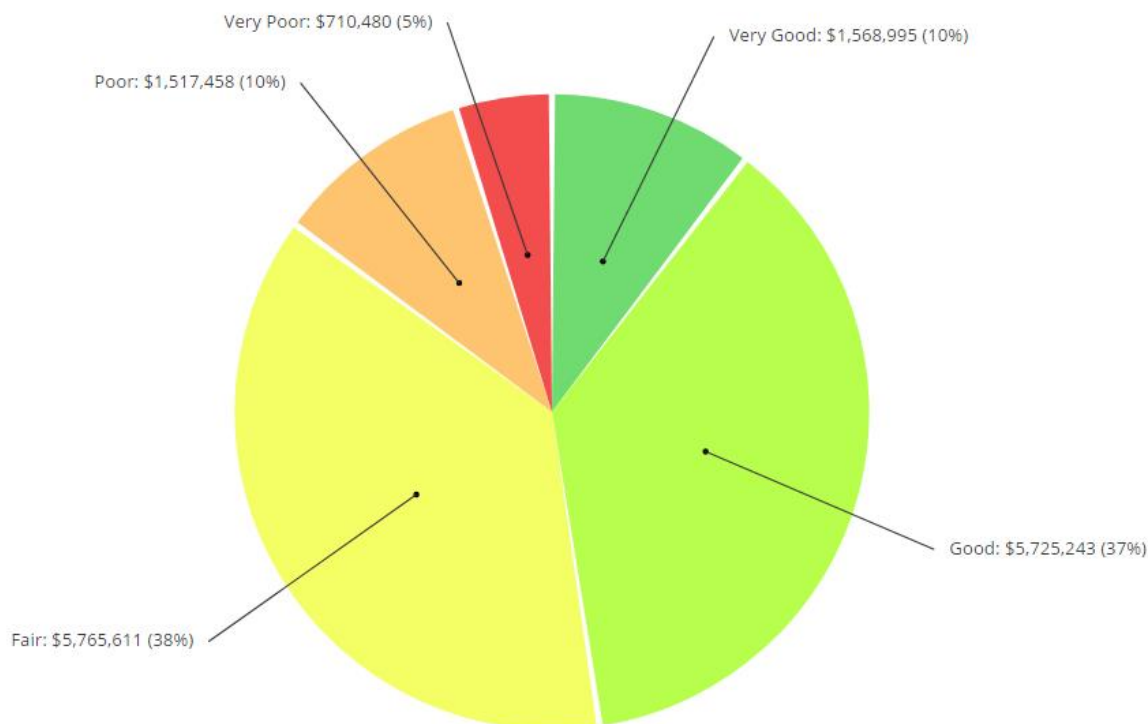
Based on age data, more than 45% of the town's stormwater assets, valued at $7.2 million, are in good to very good condition. Approximately 38% are in fair condition with the remaining 15% in poor to very poor condition.

5.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's stormwater 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 30 FORECASTING REPLACEMENT NEEDS – STORMWATER SERVICES
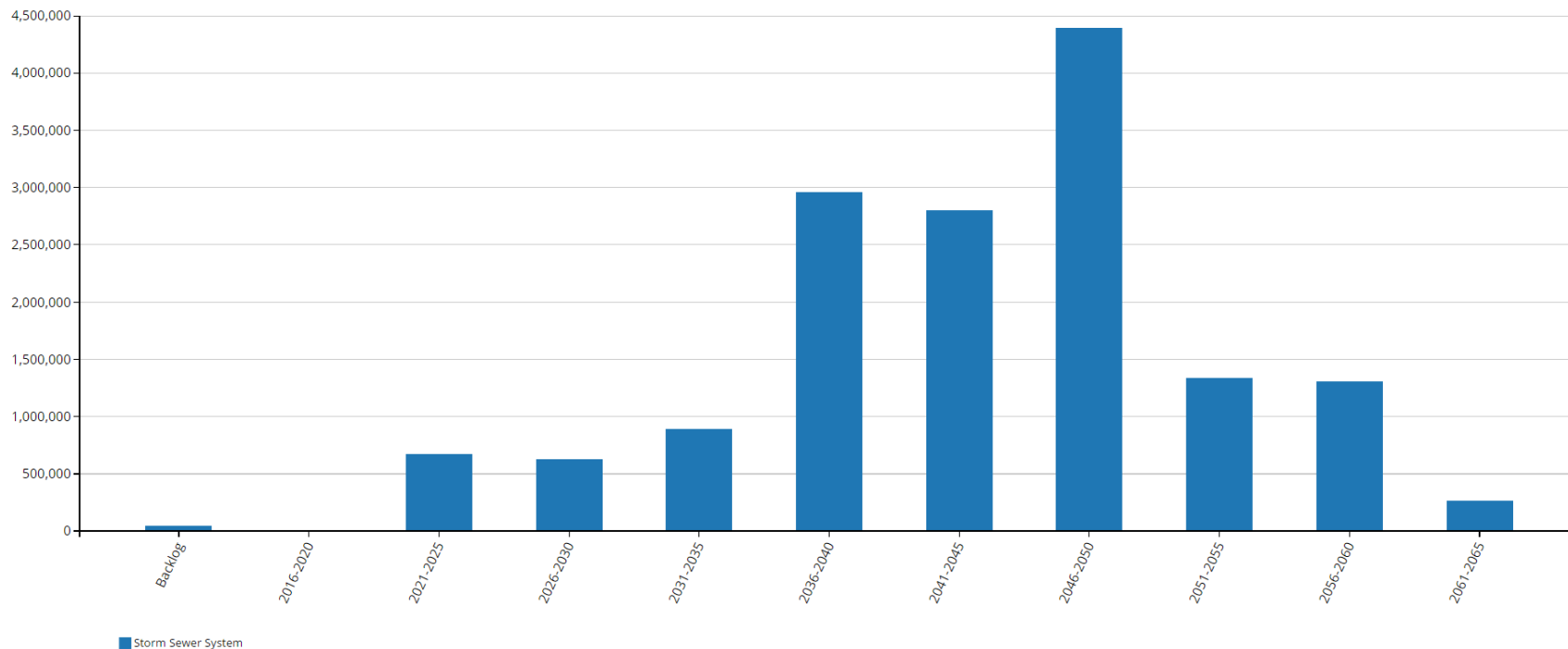
While there is very minimal backlog associated with stormwater services, as assets near the end of their useful life, the town's ten year replacement needs will total $667,000. An additional $1.5 million will be required between 2026 and 2035. Beginning in the mid-2030s a large portion of the stormwater assets begin to reach the end of their useful lives with the investment peaking at $4.4 million. The town's annual requirements for its stormwater services total $306,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. However, the town is allocating $0, leaving an annual deficit of $306,000.

5.6   Recommendations – Storm

- The town should establish a condition assessment program which will provide a more accurate estimate of the condition of assets and the minimum sustainable funding levels required. 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 town's wastewater assets.

- In time, the town should establish a systematic lifecycle activity framework that reflects the consumption of its storm assets. These activities should be designed to maintain existing levels of service, and should reflect the overarching priorities of the town. See Section 3, 'Lifecycle Framework' in the 'Asset Management Strategies' chapter.

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

6   Buildings

6.1   Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 11 illustrates key asset attributes for the town's buildings 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 town's buildings assets are valued at $32 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 11 KEY ASSET ATTRIBUTES - BUILDINGS

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Buildings	Town Hall	1	20, 40	NRBCPI	$2,281,075
	Rene Fontaine Municipal Airport	1	20, 40	NRBCPI	$1,683,089
	Day Care Centre	1	20, 40	NRBCPI	$3,610,004
	Fire Hall	1	20, 40	NRBCPI	$642,205
	Public Works Garage	1	20, 40	NRBCPI	$2,810,838
	Tourism Information Kiosk	1	20, 40	NRBCPI	$5,444,720
	Claude Larose Recreation Centre	1	20, 40	NRBCPI	$14,732,875
	Cemetery	1	20	NRBCPI	$286,877
	Park Structures	Pooled	10, 20	NRBCPI	$486,252
				Total	**$31,977,935**

6.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. The chart below illustrates the historical levels of investment in the town's buildings assets.

FIGURE 31 HISTORICAL INVESTMENT - BUILDINGS
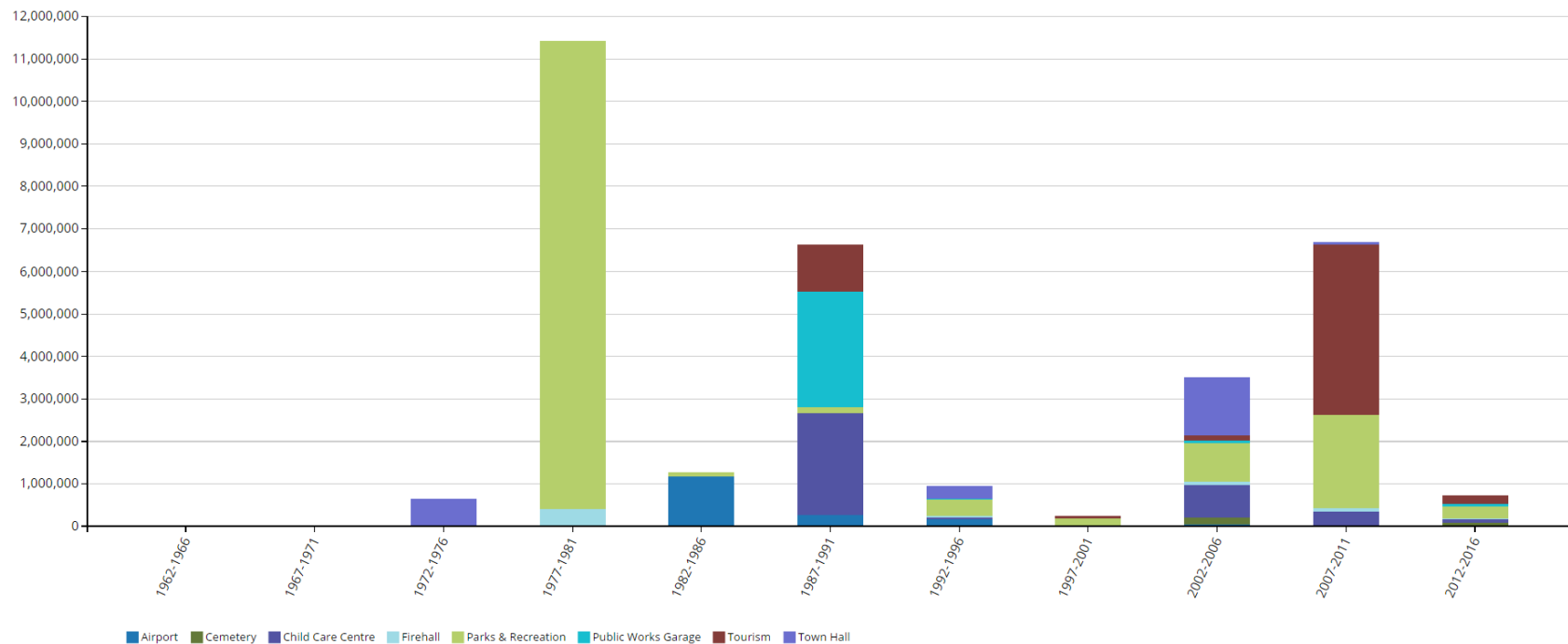
The town's first major investment in buildings occurred in the late 1970s with the construction of the community recreation centre and firehall valued at $10.8 million. The town has had 2 additional spikes in the late 1980s and the late 2000s totaling $6.6 million and $6.7 million respectively. Major investments in buildings have occurred over the last four decades, with recreation centres, public works garage, child care centre, and a tourism centre.

6.3   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 town's buildings assets.

FIGURE 32 USEFUL LIFE CONSUMPTION – BUILDINGS
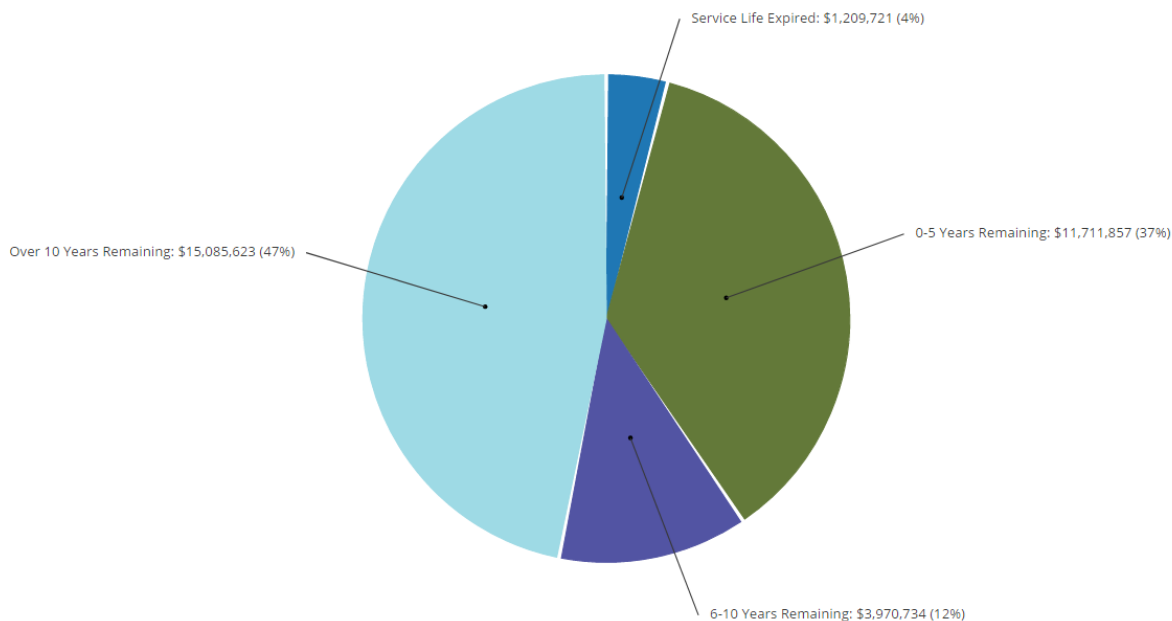
47% of the buildings assets have at least 10 years of useful life remaining. However, 4%, valued at $1.2 million, remain in service beyond their established useful life with an additional 37% valued at $11.7 million having their service life expire within the next 5 years.

6.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's buildings. By default, we rely on observed field data as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 33 ASSET CONDITION – BUILDINGS (AGE-BASED)
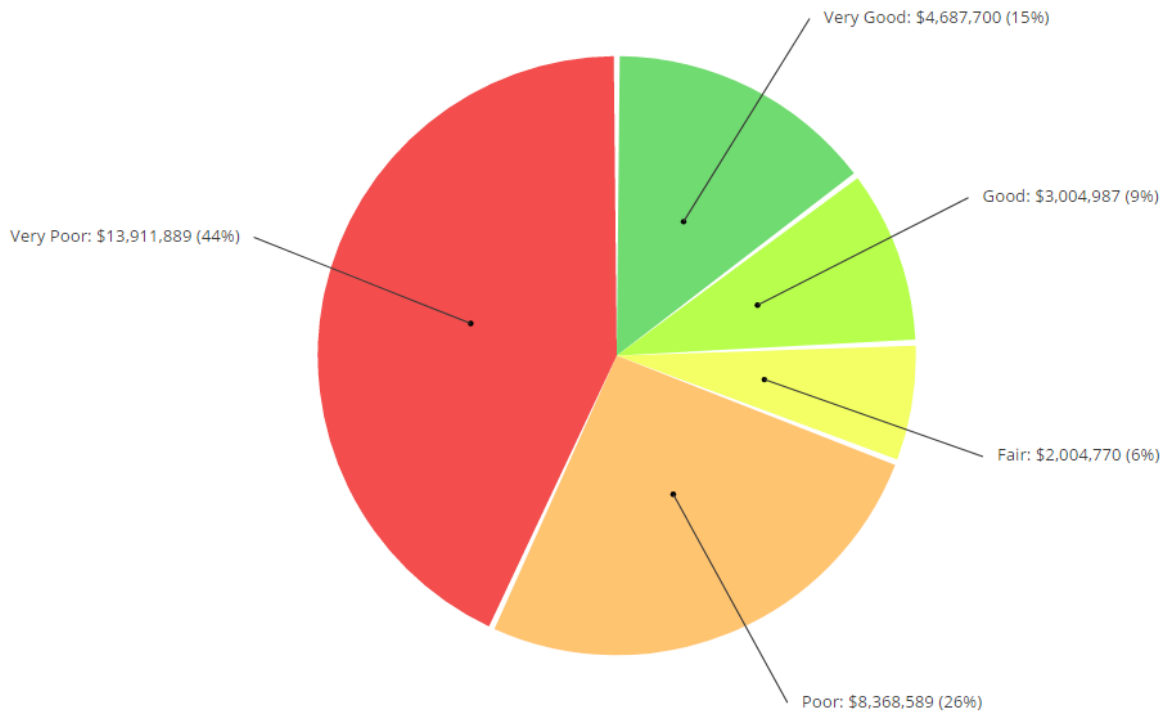
70% of the town's buildings assets are in poor to very poor condition valued at $22.3 million with only 24%, with a valuation of $7.7 million being in good to very good condition.

6.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's buildings 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 34 FORECASTING REPLACEMENT NEEDS – BUILDINGS
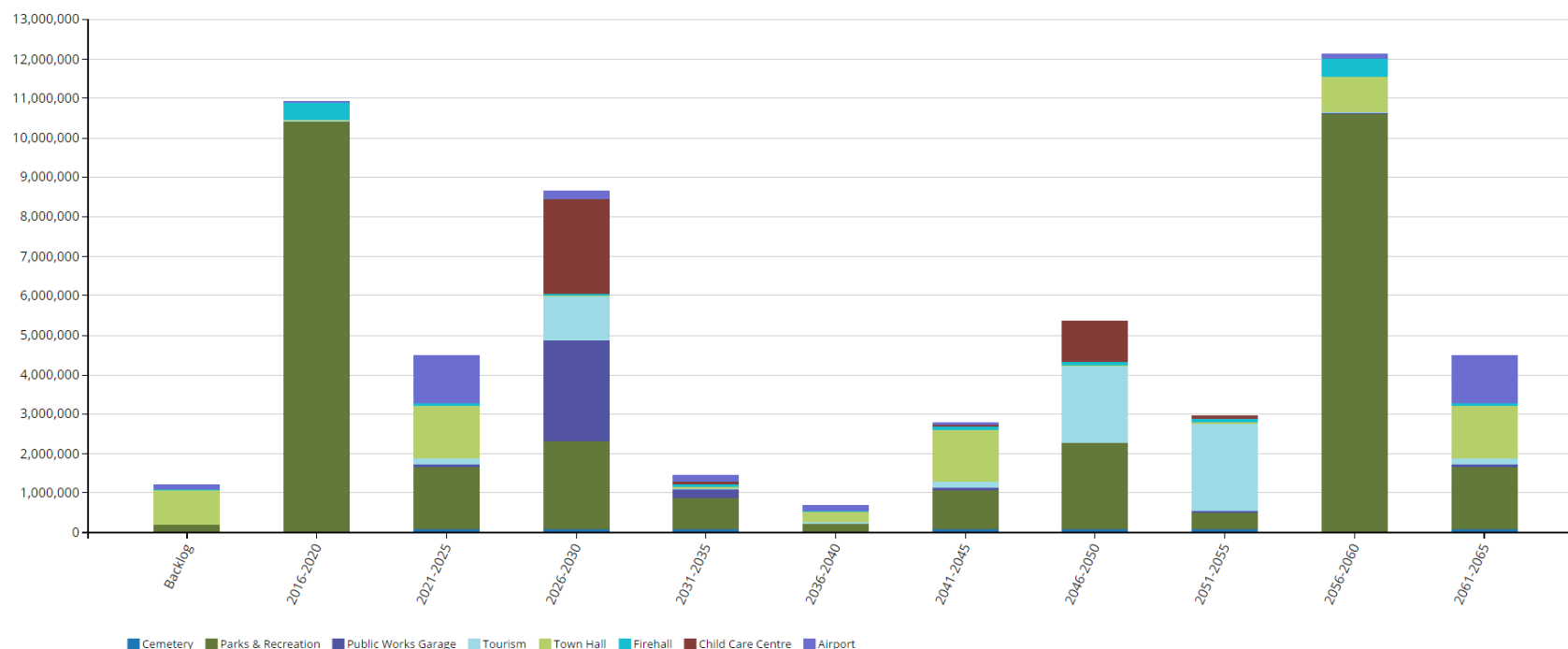
In addition to an infrastructure backlog totalling nearly $1.2 million, the town will need to invest $15.4 million within the next 10 years to meet replacement needs. Community, recreation buildings, town hall, and the airport will comprise the majority of replacement related expenditures. These requirements will continue to rise through 2026-2030 with a decrease following that until the late 2050s. The town's annual requirements for its buildings total $963,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. The town is allocating $55,000, leaving an annual deficit of $908,000. However, existing backlogs will require additional funding to be injected in to the town's buildings assets to bring the infrastructure to a state of good repair.

62

6.6   Recommendations – Buildings

- Conducting comprehensive condition assessments and integrating this data with a risk management framework will help the town obtain a more accurate indication of the backlog, and allow the town to prioritize its buildings related capital expenditures to eliminate the backlog.

- The town should continue to audit its capital assets data and update old data with more current information.

- The town 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 town's operations and maintenance requirements.

- 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 town's machinery & equipment 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 town's machinery & equipment assets are valued at $3.2 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 12 KEY ASSET ATTRIBUTES – MACHINERY & EQUIPMENT

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Machinery & Equipment	Fire	2	20	CPI	$58,690
	Public Works	21	20	CPI	$2,727,732
	Environment	1	10	CPI	$24,525
	Social & Family Services	6	10	CPI	$102,758
	Parks & Recreation	8	5, 10, 20	CPI	$277,573
				Total	**$3,191,278**

7.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. The chart below illustrates the historical levels of investment in the town's machinery & equipment.

FIGURE 35 HISTORICAL INVESTMENT – MACHINERY & EQUIPMENT
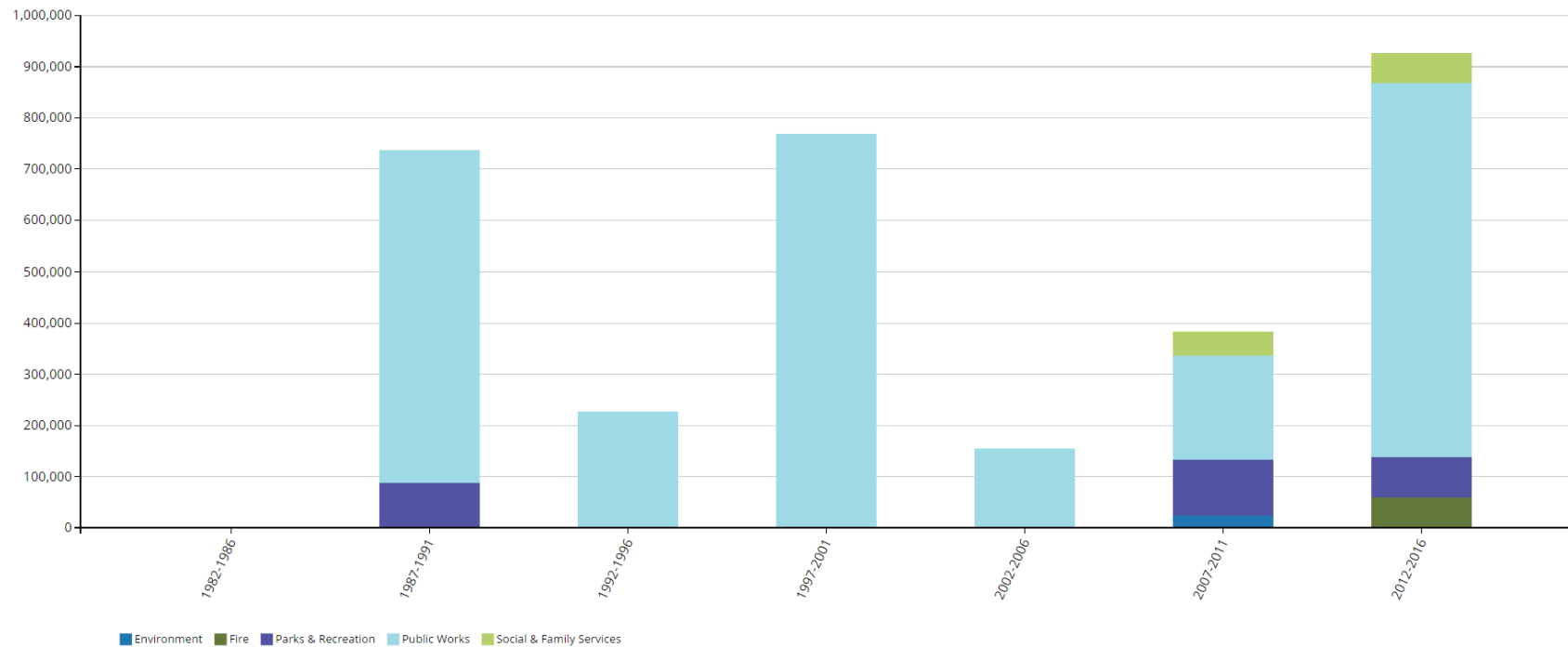
The vast majority of investments in machinery & equipment began in the late 1980s which has been followed by 2 additional peaks in the late 1990s and within the last five years the town has invested almost $1 million.

7.3 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 town's machinery & equipment assets.

FIGURE 36 USEFUL LIFE CONSUMPTION – MACHINERY & EQUIPMENT

Service Life Expired: $834,237 (26%)

Over 10 Years Remaining: $1,088,601 (34%)

6-10 Years Remaining: $291,735 (9%)

0-5 Years Remaining: $976,705 (31%)
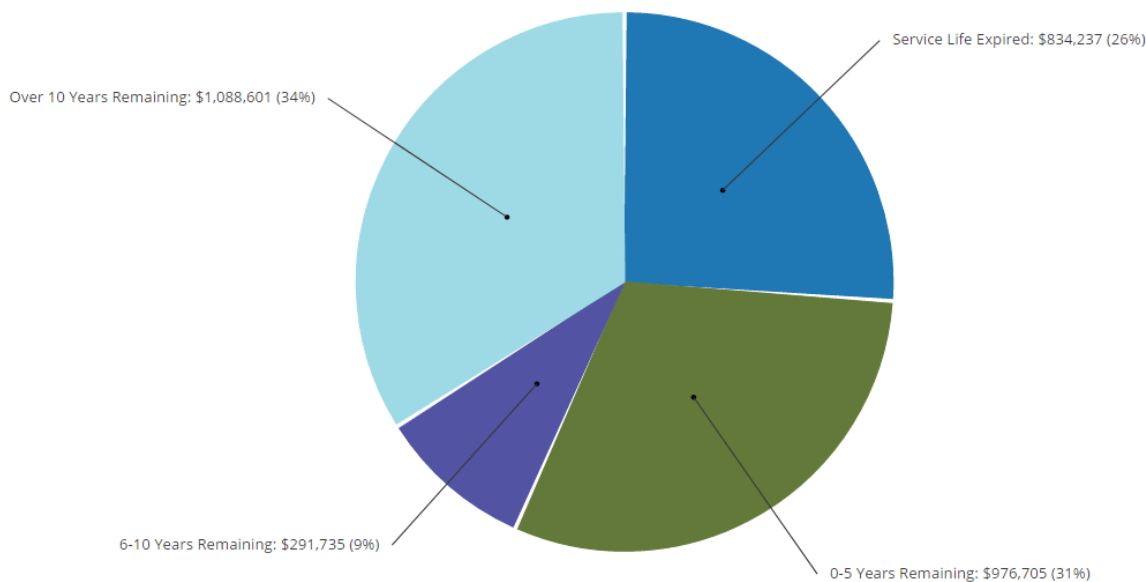
While 34% of the machinery & equipment assets have at least 10 years of useful life remaining, more than 26%, valued at $0.8 million remain in operation beyond their useful life. Further, 31% of assets will reach the end of their useful life in the next five years.

7.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's machinery & equipment assets. By default, we rely on observed field data, e.g., mileage and hours, as provided by the town. In the absence of such information, age-based data is used as a proxy.

FIGURE 37 ASSET CONDITION – MACHINERY & EQUIPMENT (AGE-BASED)
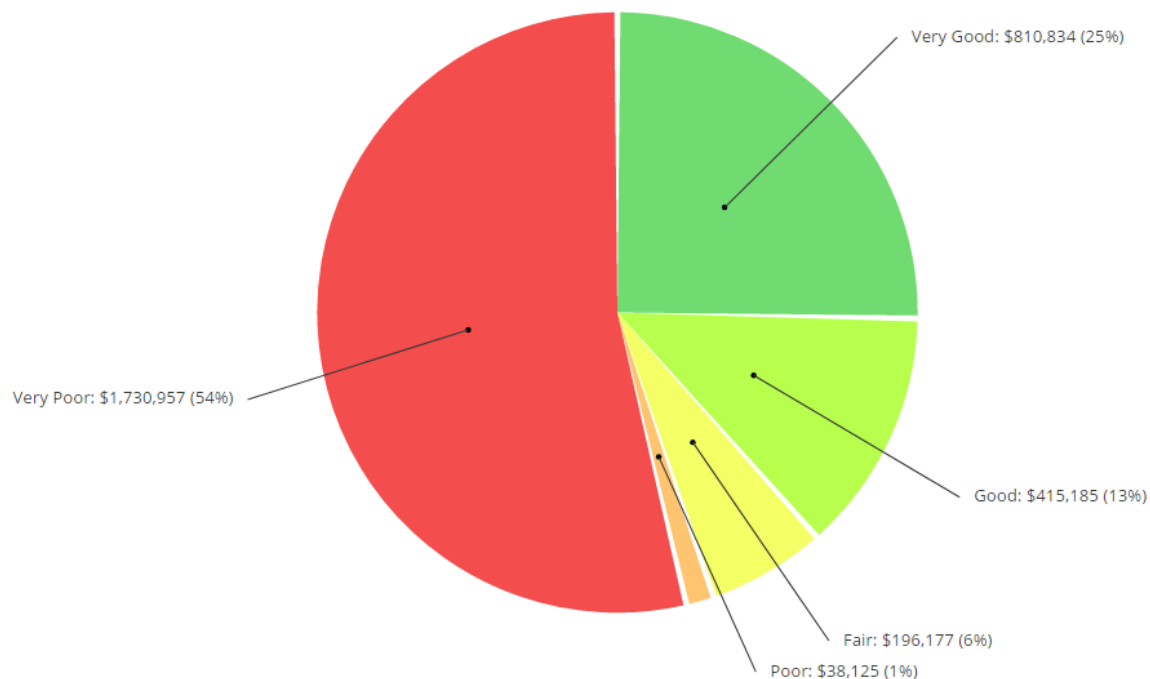
Based on age data, 55% of machinery & equipment assets are in poor to very poor condition valued at $1.8 million with 38% of the assets being in good to very good condition.

7.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town'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 38 FORECASTING REPLACEMENT NEEDS – MACHINERY & EQUIPMENT
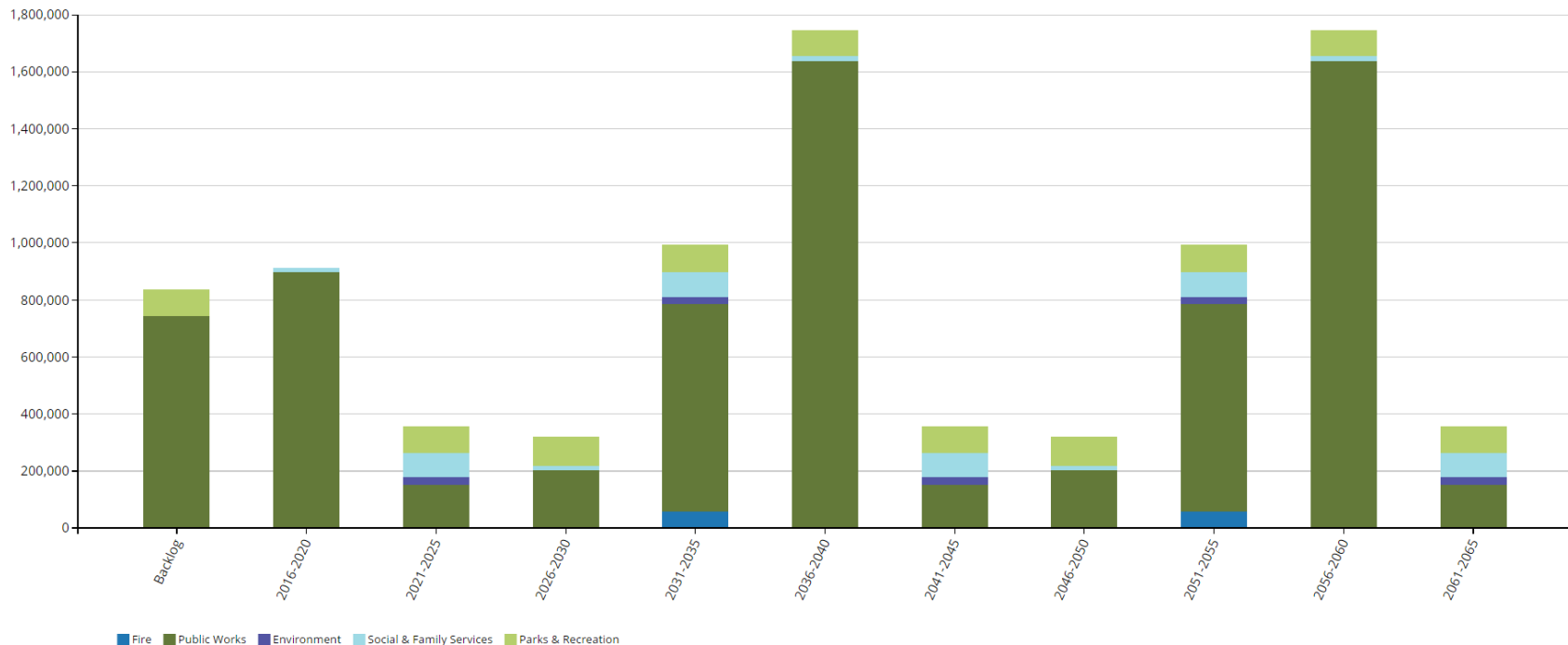
In addition to a backlog of $834,000, the town's replacement needs total approximately $913,000 in the next five years. The town will see a large peak in expenditures of $1.7 million between 2036 and 2040. The town's annual requirements for its machinery & equipment total $171,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. The town is allocating $65,000, leaving an annual deficit of $106,000. While maintaining this funding level can ensure that replacement projects are not deferred, eliminating the existing backlog from previous deferrals of replacement needs require additional funding.

7.6   Recommendations – Machinery & Equipment

- Age-based data indicates a backlog of $834,000. Further, a significant majority of the machinery & equipment assets are in poor to very poor condition. Condition assessment data, once gathered, should be used to provide better estimate of this pent-up demand, and to guide the prioritization of capital projects required to eliminate the backlog. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The town should continue to audit its capital assets data and update old data with more current information.

- The town 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 town's operations and maintenance requirements.

8   Land Improvements

8.1   Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 13 illustrates key asset attributes for the town's land improvement 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 town's land improvement assets are valued at $4.6 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 13 KEY ASSET ATTRIBUTES – LAND IMPROVEMENTS

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Land Improvements	Town Hall	10	20	CPI	$143,692
	Child Care Centre	5	20	CPI	$186,887
	Firehall	8	20	CPI	$62,027
	Parks & Recreation	3	10, 20	CPI	$1,202,063
	Airport	1	10	CPI	$2,905,967
	Tourism		20	CPI	$106,531
	Cemetery		20	CPI	$12,961
				Total	**$4,620,128**

8.2 Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. The chart below illustrates the historical levels of investment in the town's land improvements.

FIGURE 39 HISTORICAL INVESTMENT - LAND IMPROVEMENTS
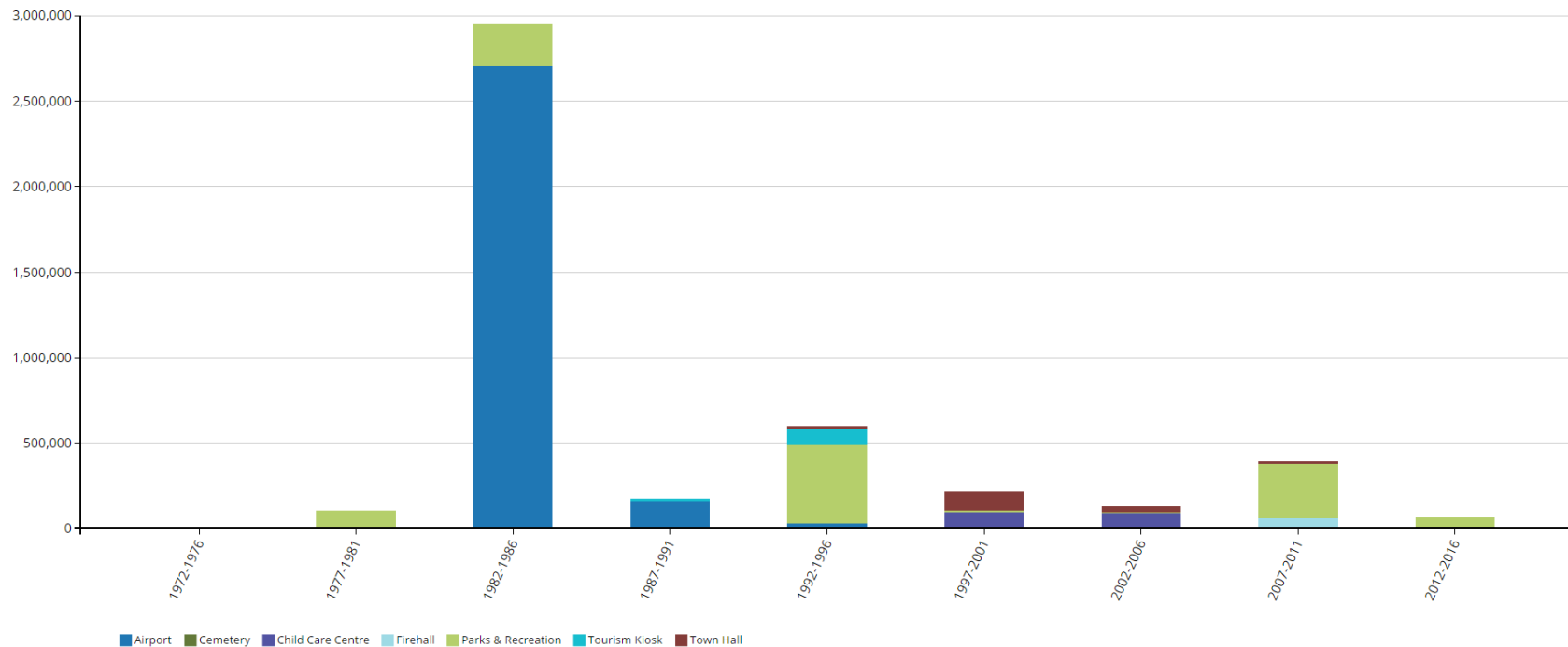
While sporadic investments have taken place in land improvements since the 1970s, the vast majority of expenditures took place in the mid-1980s with the construction of the town airport.

8.3   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 town's land improvement assets.

FIGURE 40 USEFUL LIFE CONSUMPTION - LAND IMPROVEMENTS

Over 10 Years Remaining: $435,327 (9%)
Service Life Expired: $1,081,966 (23%)
0-5 Years Remaining: $268,153 (6%)
6-10 Years Remaining: $2,834,682 (61%)
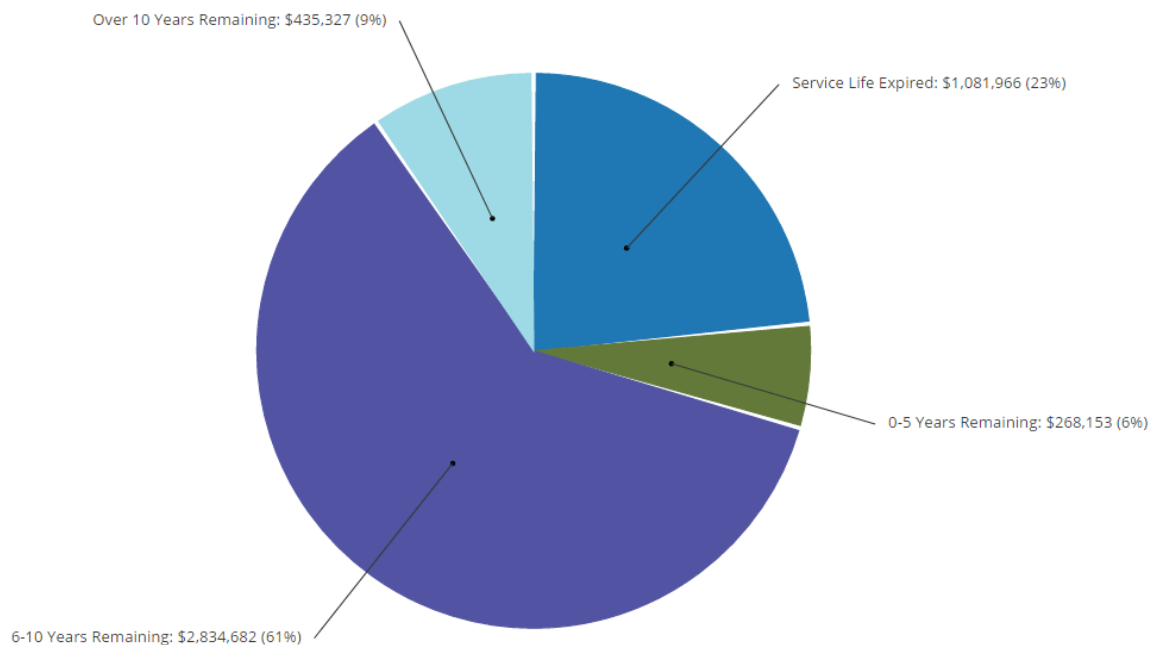
While 61% of assets have at least 10 years of useful life remaining23%, valued at $1.1 million remain in service beyond their useful life.

72

8.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's land improvement assets. In the absence of such information, age-based data is used as a proxy.

FIGURE 41 ASSET CONDITION - LAND IMPROVEMENTS (AGE-BASED)
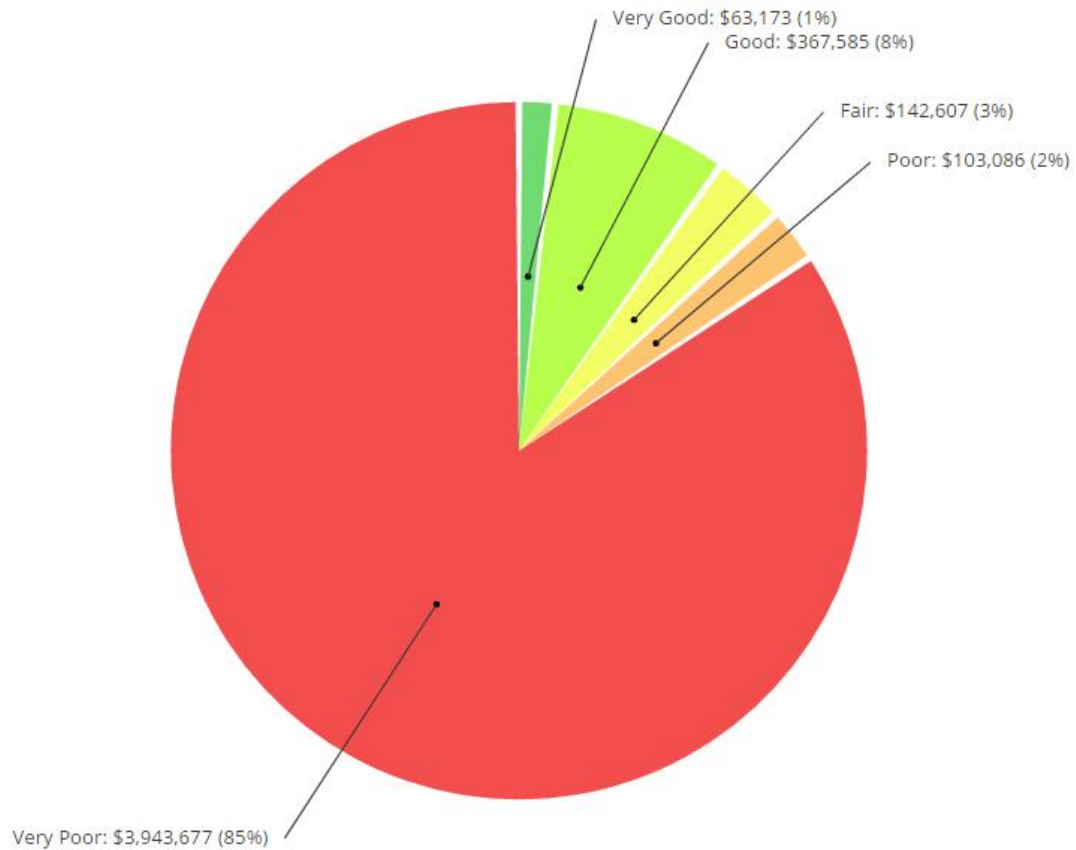
Based on age data, 85% of assets are in very poor condition valued at $3.9 million with only 9% of the assets being in good to very good condition.

8.5   Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town'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 42 FORECASTING REPLACEMENT NEEDS - LAND IMPROVEMENTS
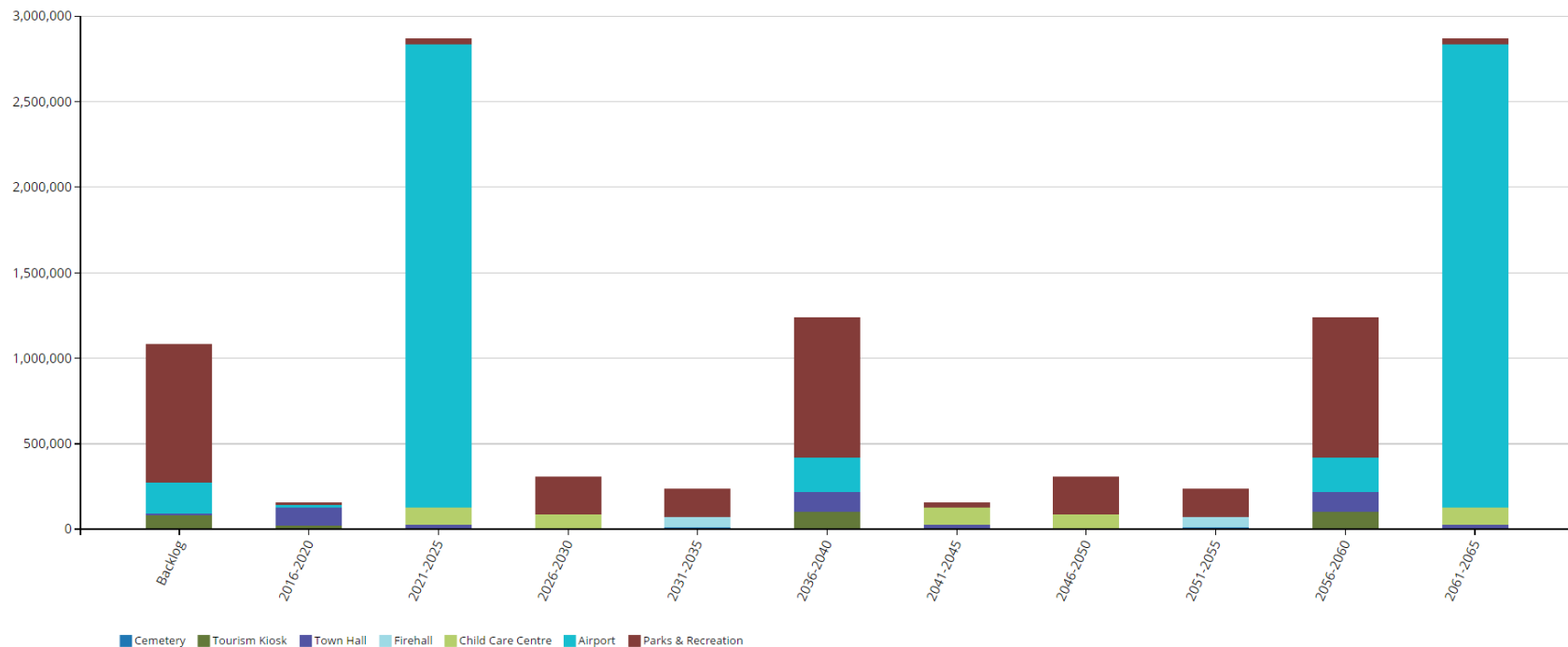
Based on age data, the backlog for land improvements totaled $1.1 million. The 10 year replacement needs total $3 million with the majority of the requirements needed at the airport. The town's annual requirements for its land improvement assets total $164,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. The town is allocating $51,000, leaving an annual deficit of $113,000.

8.6   Recommendations – Land Improvements

- Age-based data shows that vast majority of the town's land improvement assets are in poor to very poor condition. The town should establish a condition assessment program and dedicate a portion of its capital funding to this initiative. Observed data will provide a more accurate estimate of asset condition and the minimum sustainable funding level required. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- Age-based data indicates an infrastructure backlog of $1.1 million. Comprehensive condition assessment data, once gathered, should be used to provide better estimate of this pent-up demand, and to guide the prioritization of capital projects required to eliminate the backlog.

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

9 Vehicles

9.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 14 illustrates key asset attributes for the town's vehicles 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 town's vehicles assets are valued at $2.3 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 14 KEY ASSET ATTRIBUTES - VEHICLES

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Vehicles	Fire	8	20	CPI	$996,858
	Public Works	14	10/20	CPI	$1,246,599
	Parks & Recreation	2	10	CPI	$79,962
				Total	**$2,323,419**

9.2   Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. The chart below illustrates the historical levels of investment in the town's vehicles.

FIGURE 43 HISTORICAL INVESTMENT – VEHICLES
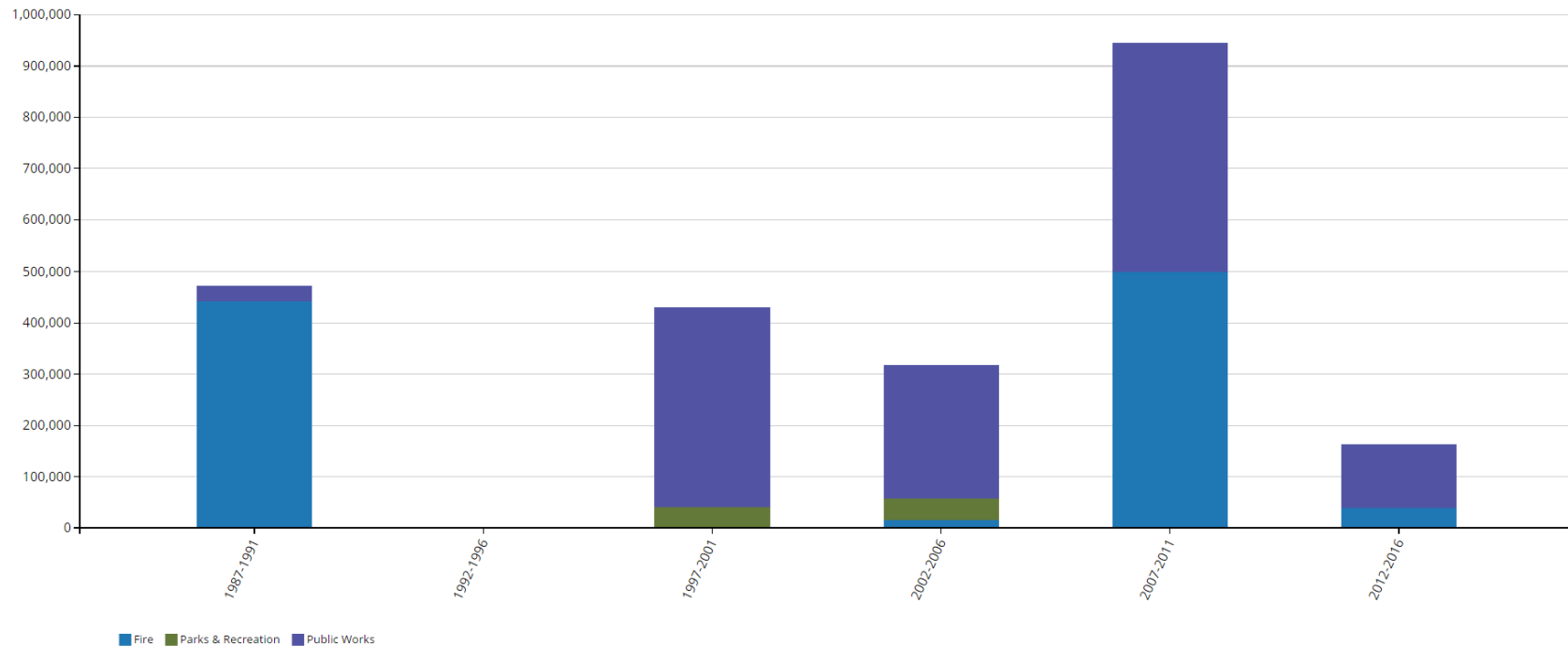
The town began major investments in fleet in the late 1980s primarily for fire vehicles. The second major peak occurred in the late 2000s with an investment of $944,000 split between fire and public works vehicles. Since 2012 investments in fleet have totaled $162,000.

9.3 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 town's vehicles assets.

FIGURE 44 USEFUL LIFE CONSUMPTION – VEHICLES
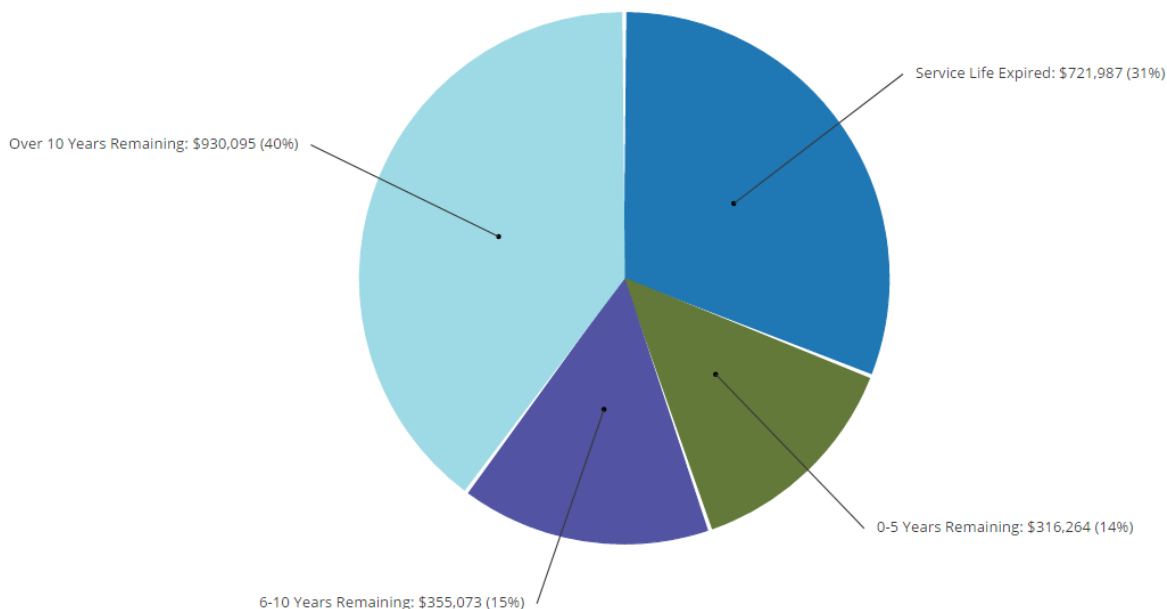
Approximately 40% of the town's fleet have at least 10 years of useful life remaining, 14%, valued at $316,000, will reach the end of their useful life in the next five years. Further, 31% remain in service beyond their useful life.

9.4   Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's vehicles assets. In the absence of such information, age-based data is used as a proxy.

FIGURE 45 ASSET CONDITION – VEHICLES (AGE-BASED)

Very Good: $72,968 (3%)

Good: $751,248 (32%)

Very Poor: $1,009,901 (43%)

Poor: $0 (0%)

Fair: $489,302 (21%)
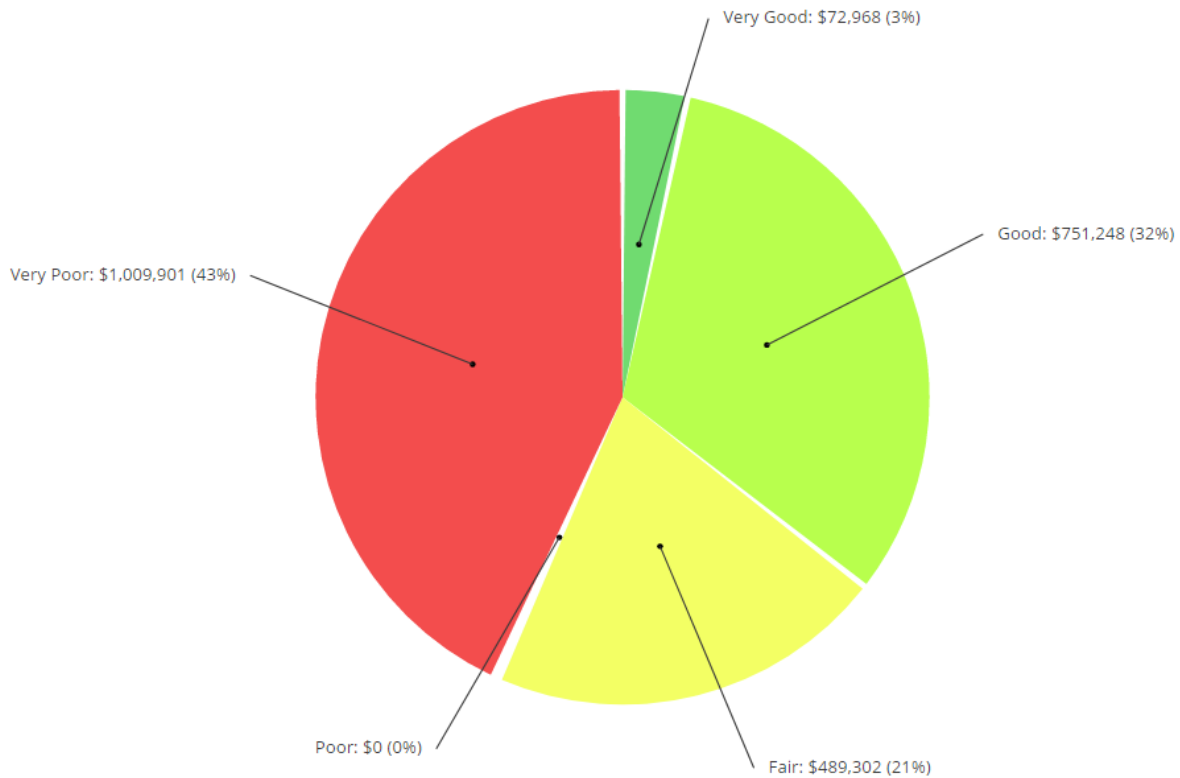
While 35% of the assets are in good to very good condition, 43%, valued at more than $1 million, are in poor to very poor condition.

9.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town'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 46 FORECASTING REPLACEMENT NEEDS - VEHICLES
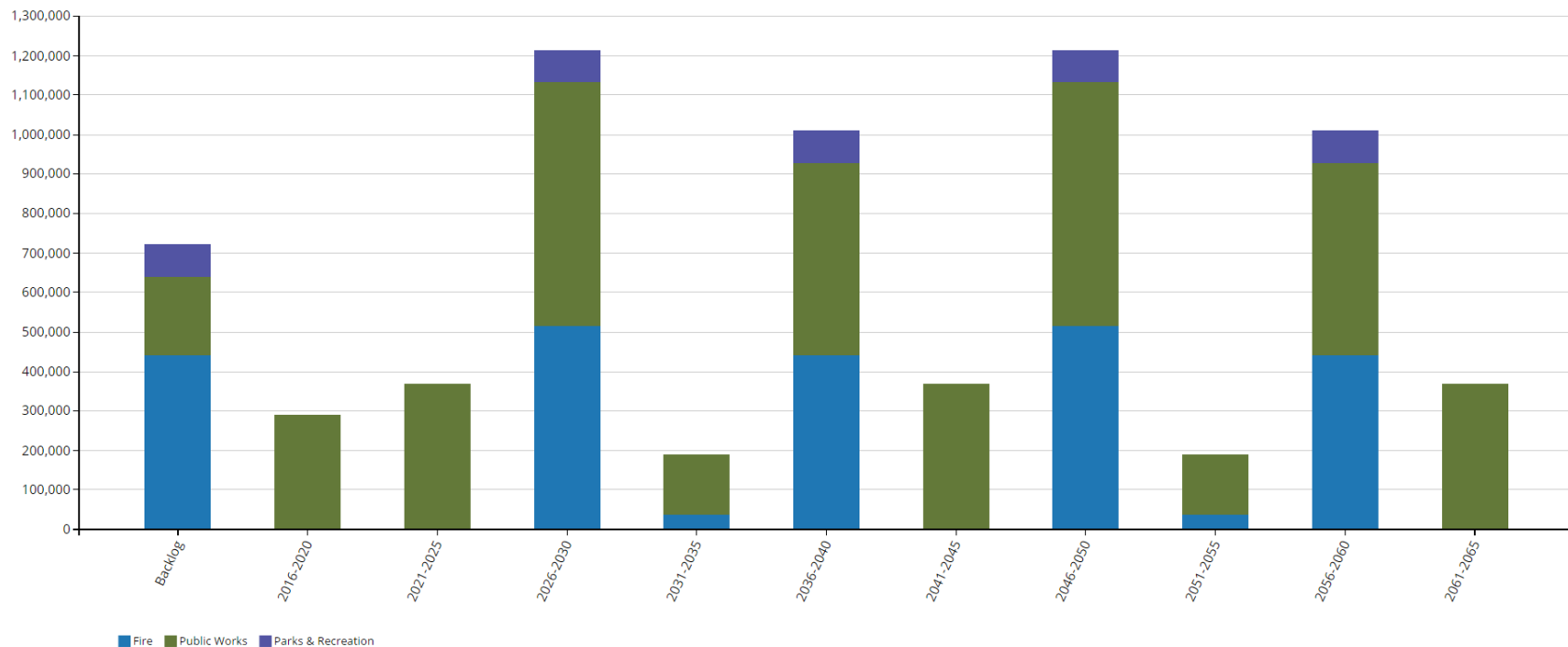
In addition to a backlog of $722,000, the town's replacements needs will continue to escalate over the next several decades. Five year replacement needs total $288,000 as indicated by age-based data. Between 2021 and 2025, replacement expenditures will total $366,000 and then peaking at $1.2 million between 2026-2030. The town's annual requirements for its vehicles total $139,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. The town is allocating $70,000, leaving an annual deficit of $69,000.

9.6   Recommendations – Vehicles

- Currently, town staff do maintenance and circle checks on vehicle assets. It is recommended that assessed condition data based on these checks are gathered and put into CityWide Tangible Assets for use in future analysis. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The town 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 town's operations and maintenance requirements.

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

10 Furniture & Fixtures

10.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 15 illustrates key asset attributes for the town's furniture & fixtures 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 town's furniture & fixture assets are valued at $2.8 million based on 2016 replacement costs. The useful life indicated for the asset types below was assigned by the town and obtained from the town's accounting data.

TABLE 15 KEY ASSET ATTRIBUTES – FURNITURE & FIXTURES

Asset Type	Asset Component	Quantity	Useful Life in Years	Valuation Method	2016 Overall Replacement Cost
Furniture and Fixtures	Town Hall	Various	5, 10	CPI	$385,722
	Firehall	Various	5, 10	CPI	$552,002
	Day Care Centre	Various	5, 10	CPI	$269,380
	Parks & Recreation	Various	5, 10	CPI	$528,297
	Public Works Garage	Various	5, 10	CPI	$395,682
	Technology	Various	5	CPI	$479,291
	Tourism Centre	Various	5, 10	CPI	$186,410
				Total	**$2,796,784**

10.2 Historical Investment in Infrastructure

In this section, we provide the installation profile and useful life consumption levels using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at the town. The chart below illustrates the historical levels of investment in the town's furniture & fixtures.

FIGURE 47 HISTORICAL INVESTMENT – FURNITURE & FIXTURES
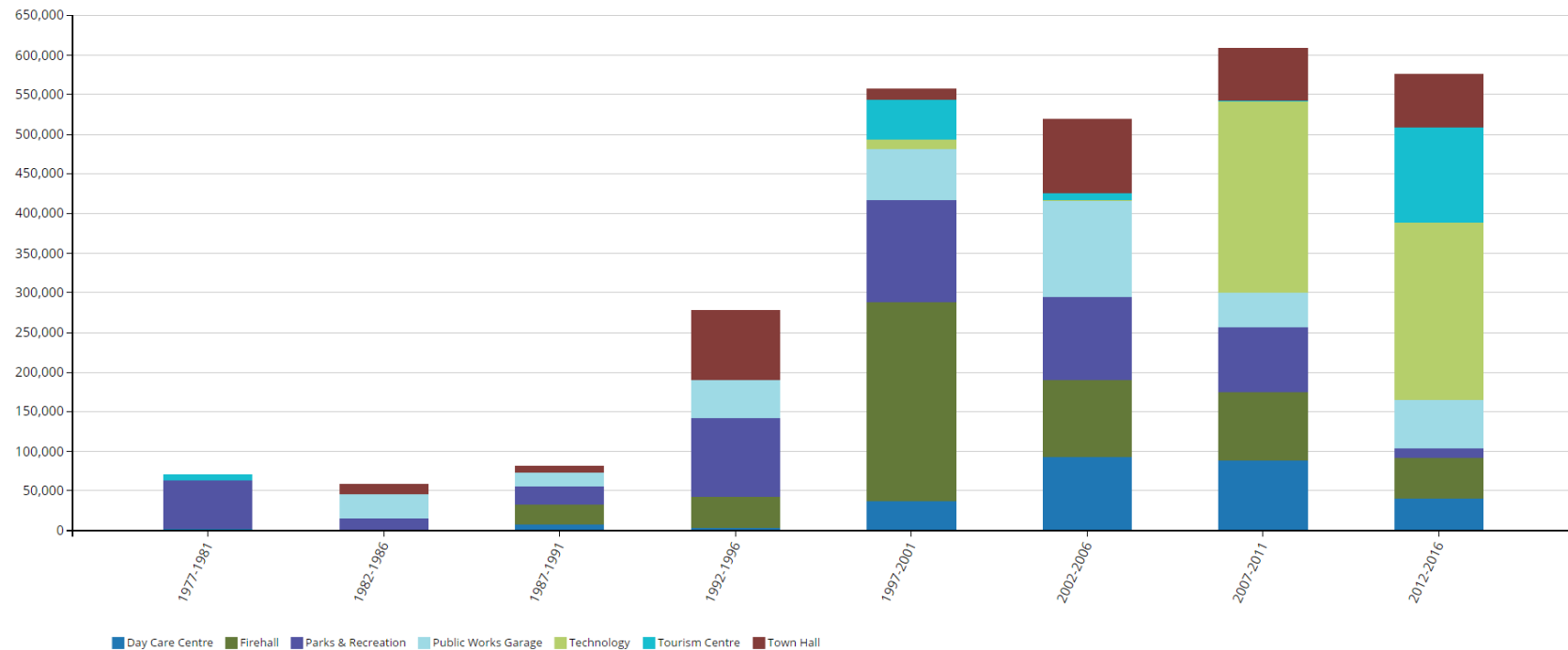
The town's investments increased consistently from 1992 until 2011. Expenditures for furniture & fixtures assets have totaled over $2 million over the last 15 years.

10.3 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 town's furniture & fixture assets.

FIGURE 48 USEFUL LIFE CONSUMPTION – FURNITURE & FIXTURES
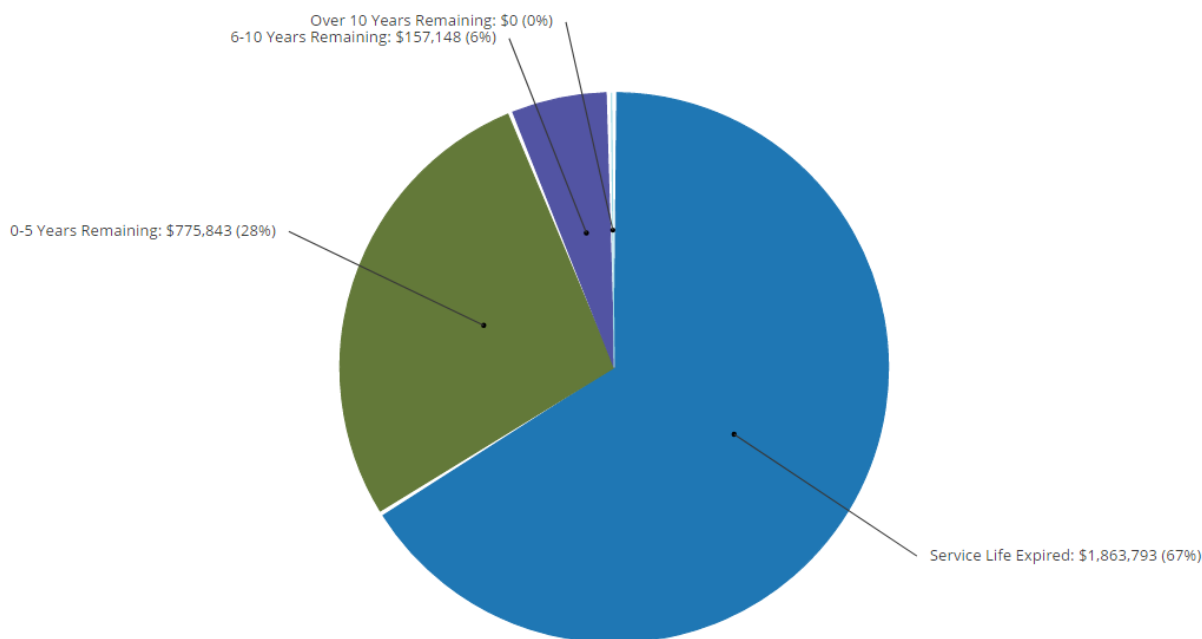
67% of the town's furniture & fixtures remain in service beyond their useful life valued at over $1.8 million. An additional 28% will reach the end of their useful life within the next five years.

10.4 Current Asset Condition

Using replacement cost, in this section, we summarize the condition of the town's furniture & fixture assets. In the absence of such information, age-based data is used as a proxy.

FIGURE 49 ASSET CONDITION – FURNITURE & FIXTURES
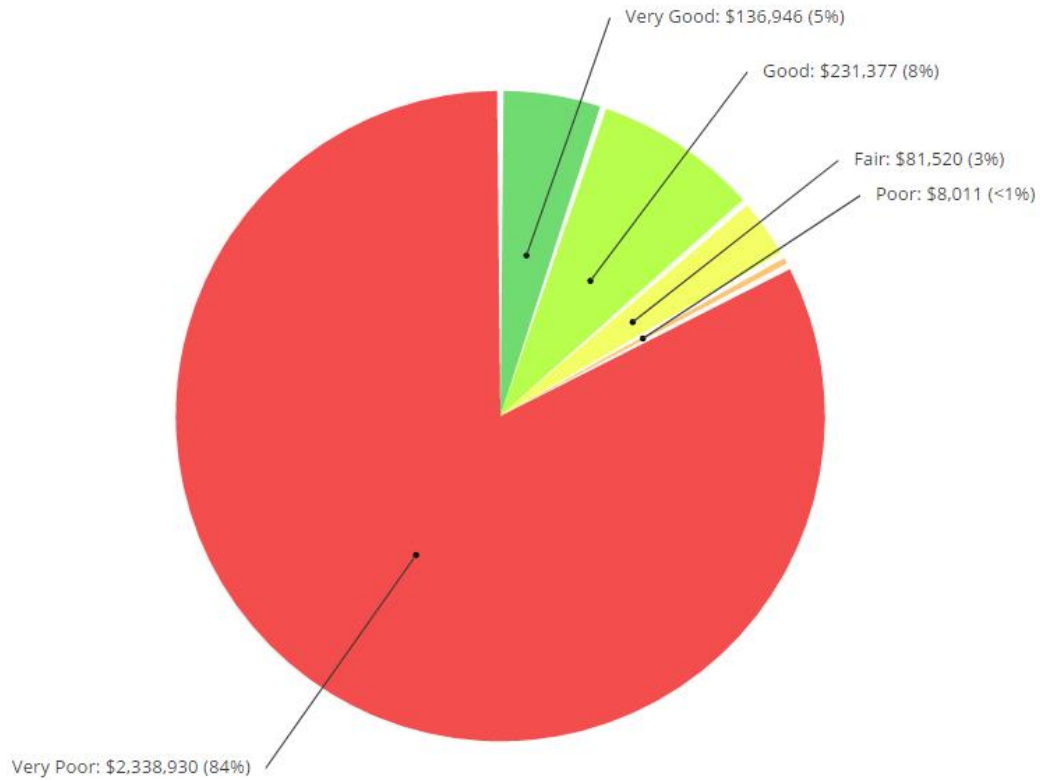
84% of the assets are in very poor condition valued at over $2.3 million, with only 13% of the assets being in good to very good condition.

10.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for the town's furniture & fixture 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 50 FORECASTING REPLACEMENT NEEDS – FURNITURE & FIXTURES
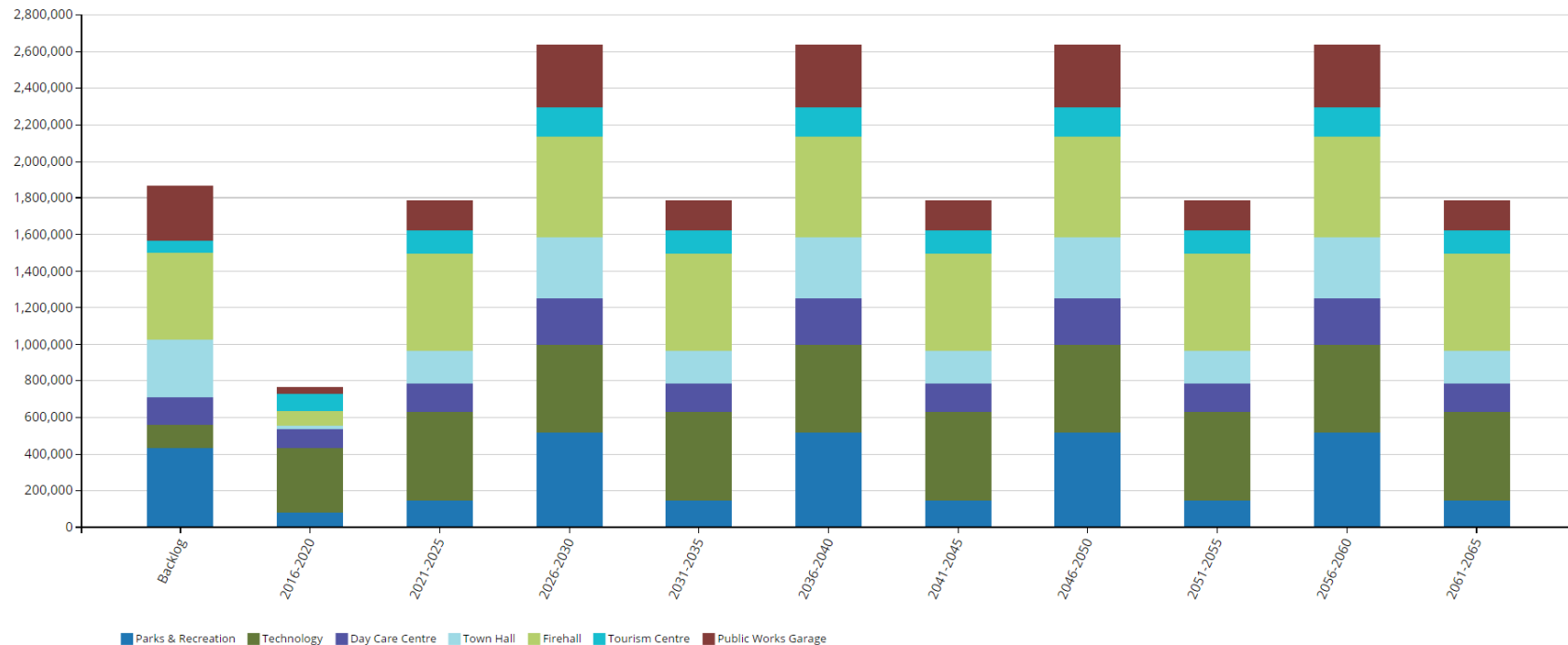
In addition to a backlog of $1.8 million, the town's replacements needs will continue to escalate over the next several decades. Five year replacement needs total $769,000 as indicated by age-based data. Between 2021 and 2025, replacement expenditures will total $1.8 million and continuing on a cyclical basis. The town's annual requirements for its furniture & fixtures total $442,000. At this level, funding is sustainable and replacement needs can be met as they arise without the need for deferring projects. The town is allocating $39,000, leaving an annual deficit of $403,000.

10.6 Recommendations – Furniture & Fixtures

- The majority of the town's furniture & fixtures lack observed condition data. A preventative maintenance and life cycle assessment program should be established to gain a better understanding of current condition and performance, and to prioritize the short and long term budget. See Section 2, 'Condition Assessment Programs' in the 'Asset Management Strategies' chapter.

- The town 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 town's operations and maintenance requirements.

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

VII. Levels of Service

The two primary risks to a town'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 level of detail 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 town.

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 town. 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 town. The following levels of service categories are established as guiding principles for the LOS that each service area in The town should strive to provide internally to the town 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 town remains committed 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 town can incorporate into its performance measurement and for tracking its progress over future iterations of its AMPs. The town should develop appropriate and achievable targets that reflect evolving demand on infrastructure, its fiscal capacity and the overall corporate objectives.

TABLE 16 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 operations and maintenance • 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 17 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 18 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 replacement value depreciation compared to annual expenditures • 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 19 KEY PERFORMANCE INDICATORS – WATER, WASTEWATER AND STORM NETWORKS

Level	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related water / wastewater / storm)
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
Tactical	• Percentage of water / wastewater / storm network rehabilitated / reconstructed • Overall water / wastewater / storm network condition index as a percentage of desired condition index • Annual adjustment in condition indexes • Annual percentage of growth in water / wastewater / storm network • Percentage of mains where the condition is rated poor or critical for each network • Percentage of water / wastewater / storm network replacement value spent on operations and maintenance
Operational Indicators	• Percentage of water / wastewater / storm 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 / wastewater / storm networks • Percentage of customer requests responded to within 24 hours per water / wastewater / storm 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 town's overarching mission as an organization, the current state of its infrastructure, and the town's financial capacity.

Strategic Objectives and Corporate Goals
The town'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 town 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 town can also serve as infrastructure demand drivers, and as a result, can change how a town 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 town 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 town should collect data on its current performance against the KPIs listed and establish targets that reflect the current fiscal capacity of the town, 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 town 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 town'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 town 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 town 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 town 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 specialised 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. A road patrol software solution can be used to 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 town continue to implement its 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 metres or more, according to the OSIM (Ontario Structure Inspection Manual).

Structure inspections must be performed by, or under the guidance of, a professional 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 town's structure portfolio would be to have the professional 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 professional 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

It is recommended that through the results of the OSIM inspections and additional detailed investigations, a 10-year needs list should be developed for the town's structures.

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 an 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 town establish a facilities condition assessment program and 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.

The town relies on age, mileage and hours consumed to gauge the condition of its fleet. It is recommended that the municipality continue its preventative maintenance routine for all fleet vehicles and that the condition information be incorporated into CityWide Tangible Assets for future analysis.

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 town 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 (Wastewater and Storm)

The most popular and practical type of wastewater and storm sewer assessment is the use of Closed Circuit Television Video (CCTV). 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 metres of each manhole

The town has indicated it conducts video inspections of its sanitary sewers on an as-needed basis. It is recommended that the town continue this program and establish a sewer condition assessment program, capturing the data and overall pipe condition scores within a database, for its sanitary and storm sewers, and that a portion of capital funding is dedicated to this.

2.7   Parks and open spaces

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 town 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 town 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 town may wish to run the same analysis with a detailed review of town 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 51 PAVED ROAD GENERAL DETERIORATION PROFILE
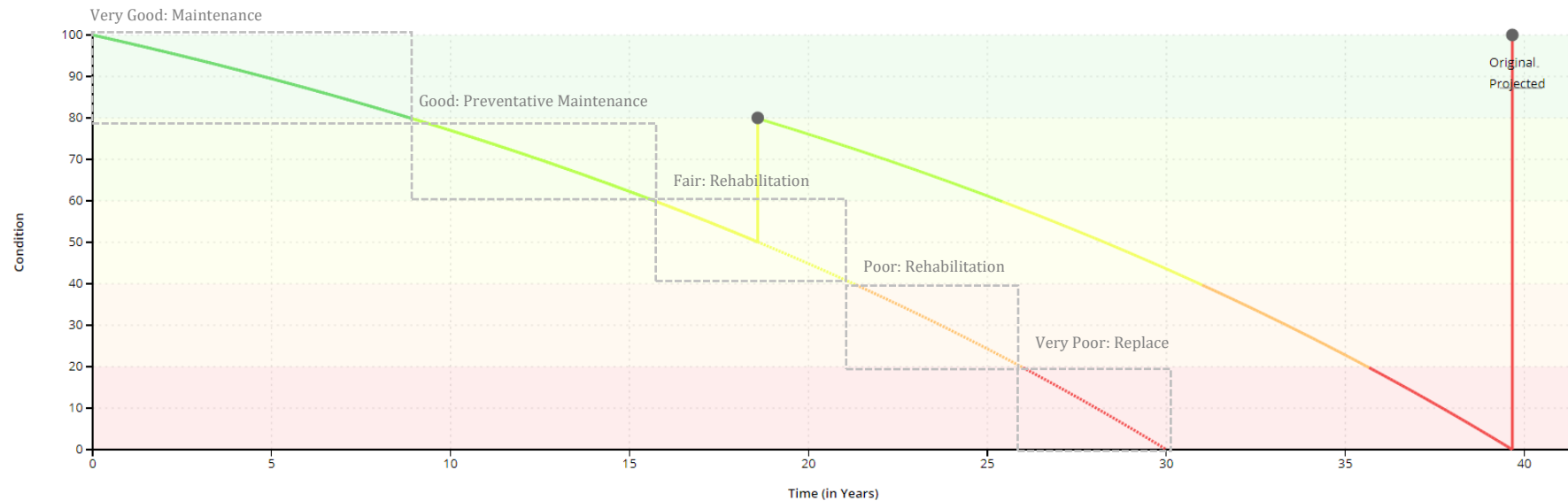
As shown above, during the road's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; preventative maintenance; rehabilitation; and replacement or reconstruction. Undertaking different activities during these windows can extend the life of the asset. The graph above illustrates the example of a rehabilitation event being done when the asset is 18 years old which results in extending the useful life of the asset.

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 20 ASSET CONDITION AND RELATED WORK ACTIVITY - PAVED ROADS

Condition	Condition Range	Work Activity
Excellent condition (Maintenance only phase)	81-100	■ maintenance only
Good Condition (Preventative maintenance phase)	61-80	■ crack sealing ■ emulsions
Fair Condition (Rehabilitation phase)	41-60	■ resurface - mill & pave ■ resurface - asphalt overlay ■ single & double surface treatment (for rural roads)
Poor Condition (Reconstruction phase)	21-40	■ reconstruct - pulverize and pave ■ reconstruct - full surface and base reconstruction
Critical Condition (Reconstruction phase)	0-20	■ 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 town may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the town'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 town to present various management options within the financing plan. It is recommended that the town 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 town's bridge structure portfolio would be to have the professional 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 town'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 town 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 town'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 town establish a prioritization framework for the fleet asset class that incorporates the key components outlined above.

3.5   Wastewater and storm sewers

The following analysis has been conducted at a fairly high level, using industry standard activities and costs for wastewater and storm sewer rehabilitation and replacement. With future updates of this asset management strategy, the town may wish to run the same analysis with a detailed review of town 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 an example deterioration profile of a sewer main with a 100 year life. As repairs are completed at different points in the lifecycle, the deterioration curve will adjust accordingly to reflect the increased life.

FIGURE 52 SEWER MAIN GENERAL DETERIORATION
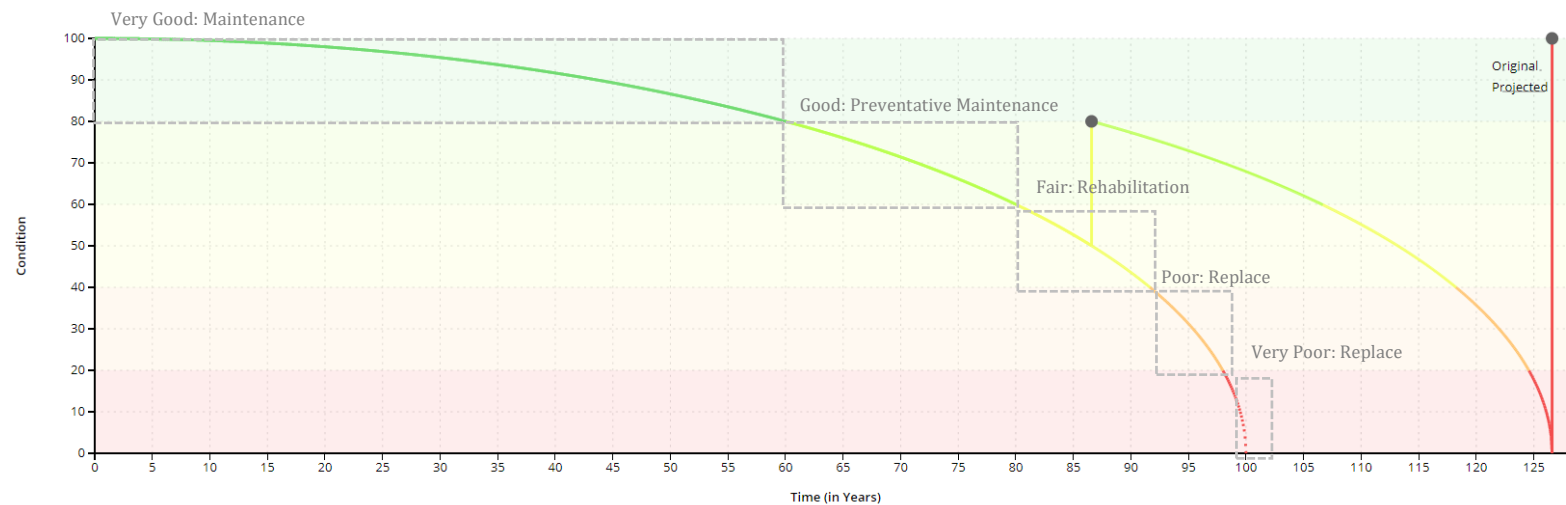
As shown above, during the sewer main's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; major maintenance; rehabilitation; and replacement or reconstruction. The graph above illustrates the example of a rehabilitation activity being done within the correct window that acts to extend the life of the asset.

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 SEWER MAINS

Condition	Condition Range	Work Activity
Very Good condition (Maintenance only phase)	81-100	■ maintenance only (cleaning & flushing etc.)
Good Condition (Preventative maintenance phase)	61-80	■ mahhole repairs ■ small pipe section repairs
Fair Condition (Rehabilitation phase)	41-60	■ structural relining
Poor Condition (Reconstruction phase)	21-40	■ pipe replacement
Very Poor Condition (Reconstruction phase)	0-20	■ 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 town may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the town'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 adjustments will be an important component of future Asset Management Plans, as the province requires each town 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 an example deterioration profile of a water main with an 80-year life. As repairs are completed at different points in the lifecycle, the deterioration curve will adjust accordingly to reflect the increased life.

FIGURE 53 WATER MAIN GENERAL DETERIORATION
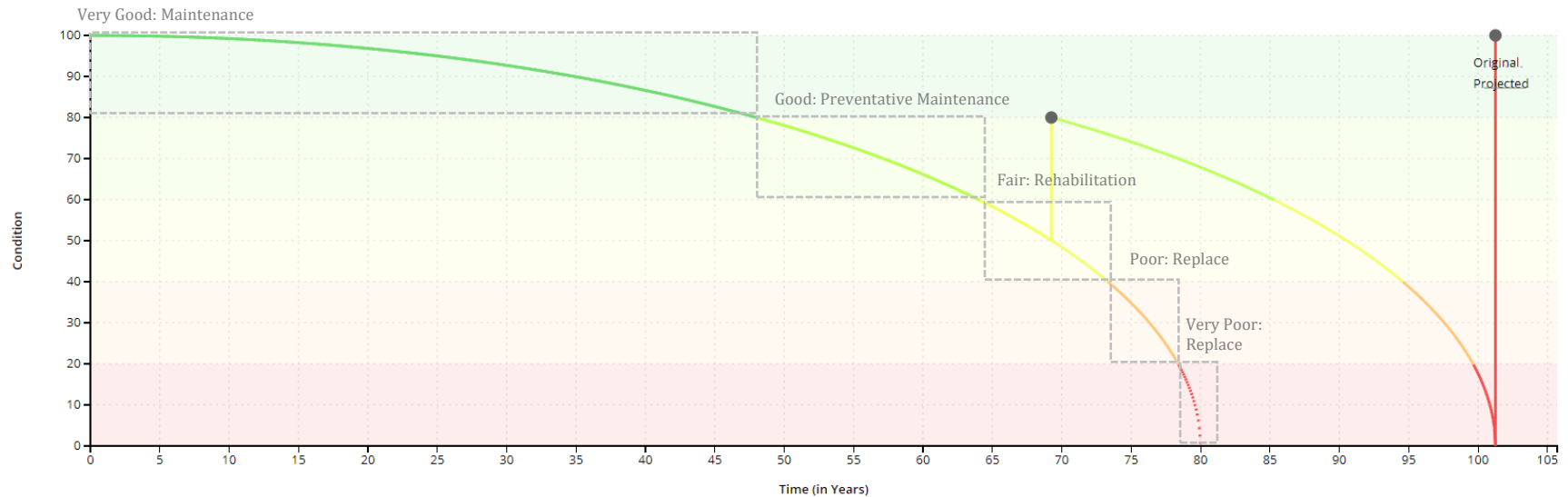
As shown above, during the water main's life cycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows are: maintenance; major maintenance; rehabilitation; and replacement or reconstruction. The graph above illustrates the example of a rehabilitation activity being done within the correct window that acts to extend the life of the asset.

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 22 ASSET CONDITION AND RELATED WORK ACTIVITY FOR WATER MAINS

Condition	Condition Range	Work Activity
Very Good condition (Maintenance only phase)	81-100	■ maintenance only (cleaning & flushing etc.)
Good Condition (Preventative maintenance phase)	61-80	■ water main break repairs ■ small pipe section repairs
Fair Condition (Rehabilitation phase)	41-60	■ structural water main relining
Poor Condition (Reconstruction phase)	21-40	■ pipe replacement
Very Poor Condition (Reconstruction phase)	0-20	■ 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 town 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. According to the 2016 census, Hearst's population is 5,070, a decline of 0.4% from its 2011 population of 5,090.

Declining or stagnating populations present a catch-22, placing less demand on infrastructure services, but also reducing existing streams of revenues, which can compromise the capacity of the town to maintain existing LOS.

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.

5.1.1 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 town'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 town'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

5.1.2 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 tables 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 54 BOW TIE RISK MODEL
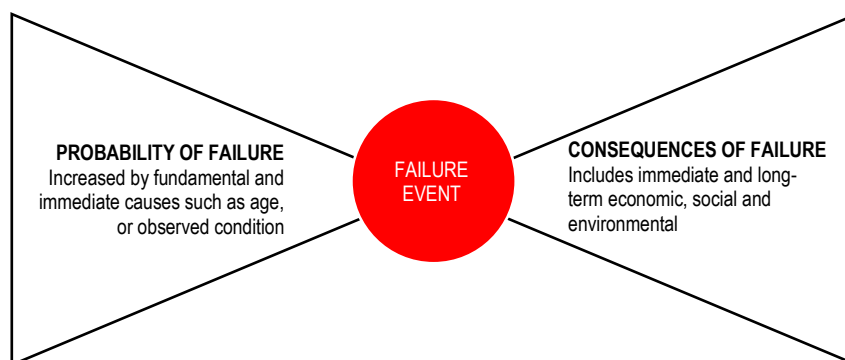
The risk matrices that follow categorize the town's nine asset classes as analyzed in this document based on their consequence of failure and the likelihood of failure events.

Probability of Failure

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

TABLE 23 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

Roads (based on classification):
The consequence of failure score for this initial AMP is based upon the road classification as this will reflect traffic volumes and number of people affected. Currently Hearst does not capture road classification within a database, it is therefore recommended this is added in the future.

TABLE 24 CONSEQUENCE OF FAILURE - ROADS

Road Classification	Consequence of failure
Gravel	Score of 1
Surface Treated (Rural)	Score of 2
Paved (Local)	Score of 3
Paved (Collector)	Score of 4
Paved (Arterial)	Score of 5
Road Base	Score of 2
Sidewalks	Score of 3
Curbs	Score of 2
Streetlights	Score of 3

Bridges (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the structure. The higher the value, probably the larger the structure and therefore probably the higher the consequential risk of failure:

TABLE 25 CONSEQUENCE OF FAILURE – BRIDGES & CULVERTS

Replacement Value	Consequence of failure
Up to $250k	Score of 1
$251 to $500k	Score of 2
$501 to $750k	Score of 3
$751 to $1.5 million	Score of 4
$1.5 million and over	Score of 5

Water (based on diameter):
The consequence of failure score for this initial AMP is based upon pipe diameter as this will reflect potential service area affected.

TABLE 26 CONSEQUENCE OF FAILURE – WATER MAINS

Pipe Diameter	Consequence of Failure
Less than 100mm	Score of 1
101–150mm	Score of 2
151–200mm	Score of 3
201–299mm	Score of 4
300 and over	Score of 5
Water Filtration Plant	Score of 5
Water Tower	Score of 4
Water Meters	Score of 2

Sanitary Sewer (based on diameter):
We recommend the consequence of failure score for this AMP is based upon pipe diameter as this will reflect potential upstream service area affected. Currently Hearst's inventory of this asset class is pooled, therefore it is recommended that individual pipes are listed separately in the database with the appropriate diameter listings in the future.

TABLE 27 CONSEQUENCE OF FAILURE – SANITARY SEWERS

Pipe Diameter	Consequence of failure
Less than 199mm	Score of 1
200-249mm	Score of 2
250-299mm	Score of 3
300-349mm	Score of 4
350mm and over	Score of 5
Lagoon	Score of 5
Pumping Stations	Score of 5

Storm Sewer (based on diameter):
The consequence of failure score for this initial AMP is based upon pipe diameter as this will reflect potential upstream service area affected. Currently Hearst's inventory of this asset class does not include diameter of pipe, therefore it is recommended that individual pipes are listed separately in the database with the appropriate diameter listings in the future.

TABLE 28 CONSEQUENCE OF FAILURE – STORM SEWERS

Replacement Value	Consequence of failure
Less than 250mm	Score of 1
251-500mm	Score of 2
501-749mm	Score of 3
750-999mm	Score of 4
1,000mm and over	Score of 5

Facilities: (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the facility component. The higher the value, probably the larger and more important the component to the overall function of the facility and therefore probably the higher the consequential risk of failure:

TABLE 29 CONSEQUENCE OF FAILURE - FACILITIES

Replacement Value	**Consequence of failure**
Up to $50k	Score of 1
$51k to $250k	Score of 2
$251k to $500k	Score of 3
$501k to $1 million	Score of 4
Over $1 million	Score of 5

Equipment: (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the asset or component. The higher the value, probably the larger and more important the component and therefore probably the higher the consequential risk of failure:

TABLE 30 CONSEQUENCE OF FAILURE - EQUIPMENT

Consequence of Failure: Equipment	
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 $200k	Score of 4
Over $200k	Score of 5

Land Improvements: (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the asset or component. The higher the value, probably the larger and more important the component and therefore probably the higher the consequential risk of failure:

TABLE 31 CONSEQUENCE OF FAILURE – LAND IMPROVEMENTS

Replacement Value	Consequence of failure
Up to $25k	Score of 1
$26k to $100k	Score of 2
$101k to $250k	Score of 3
$251k to $500k	Score of 4
Over $500k	Score of 5

Vehicles: (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the asset or component. The higher the value, probably the larger and more important the component and therefore probably the higher the consequential risk of failure:

TABLE 32 CONSEQUENCE OF FAILURE – VEHICLES

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 $200k	Score of 4
Over $200k	Score of 5

Furniture & Fixtures: (based on valuation):
The consequence of failure score for this initial AMP is based upon the replacement value of the asset or component. The higher the value, probably the larger and more important the component and therefore probably the higher the consequential risk of failure:

TABLE 33 CONSEQUENCE OF FAILURE – FURNITURE & FIXTURES

Replacement Value	Consequence of failure
Up to $2,500k	Score of 1
$2,501k to $7,500k	Score of 2
$7,501k to $15k	Score of 3
$15,001k to $25k	Score of 4
Over $25k	Score of 5

FIGURE 55 DISTRIBUTION OF ASSETS BASED ON RISK – ALL ASSETS

Consequence	Probability 1	Probability 2	Probability 3	Probability 4	Probability 5
5	66 Assets $12,431,682	78 Assets $12,067,844	87 Assets $5,816,114	72 Assets $15,270,112	77 Assets $22,159,206
4	8 Assets $4,158,763	75 Assets $6,293,772	39 Assets $3,527,585	41 Assets $2,564,922	145 Assets $8,030,795
3	22 Assets $1,362,736	106 Assets $4,470,845	141 Assets $5,778,605	83 Assets $2,532,124	146 Assets $4,439,271
2	255 Assets $2,767,172	687 Assets $9,461,050	447 Assets $8,632,724	187 Assets $5,789,164	470 Assets $12,502,035
1	42 Assets $1,385,854	73 Assets $957,662	68 Assets $677,209	33 Assets $387,473	351 Assets $1,148,608

FIGURE 56 DISTRIBUTION OF ASSETS BASED ON RISK – ROAD NETWORK

Consequence	Probability 1	Probability 2	Probability 3	Probability 4	Probability 5
5	13 Assets $837,885	42 Assets $2,874,935	20 Assets $1,433,531	6 Assets $626,691	0 Assets $0
4	0 Assets $0	29 Assets $1,899,368	16 Assets $2,166,994	6 Assets $431,002	2 Assets $117,221
3	36 Assets $1,012,806	64 Assets $2,720,535	42 Assets $2,878,270	24 Assets $982,441	104 Assets $3,676,596
2	46 Assets $1,685,036	90 Assets $6,894,948	98 Assets $5,073,792	88 Assets $3,460,696	244 Assets $17,929,832
1	7 Assets $435,738	3 Assets $139,588	4 Assets $188,765	1 Assets $25,208	4 Assets $114,346

FIGURE 57 DISTRIBUTION OF ASSETS BASED ON RISK – BRIDGES & CULVERTS

Consequence	1	2	3	4	5
5	1 Assets $6,000,000.00	1 Assets $1,800,000.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00
4	0 Assets $0.00	1 Assets $1,300,000.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00
3	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00
2	0 Assets $0.00	2 Assets $900,000.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00
1	3 Assets $490,752.64	2 Assets $350,000.00	0 Assets $0.00	0 Assets $0.00	0 Assets $0.00

Probability

FIGURE 58 DISTRIBUTION OF ASSETS BASED ON RISK – WATER

Consequence	1	2	3	4	5
5	37 Assets $2,331,278	10 Assets $4,871,407	15 Assets $1,669,573	32 Assets $6,114,708	26 Assets $6,866,620
4	6 Assets $3,264,380	3 Assets $114,164	0 Assets $0	5 Assets $167,687	53 Assets $2,413,728
3	8 Assets $440,865	18 Assets $933,901	37 Assets $1,292,836	36 Assets $838,959	77 Assets $1,834,960
2	53 Assets $899,612	56 Assets $1,814,317	56 Assets $2,444,433	49 Assets $2,781,270	108 Assets $3,037,376
1	3 Assets $158,105	0 Assets $0	0 Assets $0	0 Assets $0	2 Assets $16,320

Probability

FIGURE 59 DISTRIBUTION OF ASSETS BASED ON RISK – WASTEWATER

Consequence	1	2	3	4	5
5	13 Assets $637,580	4 Assets $912,964	10 Assets $694,850	26 Assets $2,512,798	32 Assets $1,787,737
4	1 Assets $47,368	21 Assets $759,940	16 Assets $761,235	1 Assets $47,379	52 Assets $2,408,828
3	1 Assets $34,710	0 Assets $0	8 Assets $472,304	11 Assets $361,313	13 Assets $315,848
2	26 Assets $721,000	58 Assets $2,043,881	67 Assets $2,901,555	25 Assets $991,165	128 Assets $4,835,803
1	0 Assets $0	0 Assets $0	1 Assets $80,115	1 Assets $2,868	10 Assets $154,366

Probability

FIGURE 60 DISTRIBUTION OF ASSETS BASED ON RISK – STORM

Consequence	1	2	3	4	5
5	0 Assets $0	18 Assets $909,390	39 Assets $1,509,341	5 Assets $282,326	0 Assets $0
4	0 Assets $0	19 Assets $599,165	7 Assets $599,356	28 Assets $964,864	20 Assets $481,508
3	0 Assets $0	37 Assets $816,417	67 Assets $1,222,044	28 Assets $445,659	9 Assets $168,186
2	170 Assets $740,612	543 Assets $3,786,786	300 Assets $2,035,444	97 Assets $643,317	14 Assets $56,873
1	0 Assets $0	4 Assets $14,064	0 Assets $0	4 Assets $8,522	3 Assets $3,913

Probability

111

FIGURE 61 DISTRIBUTION OF ASSETS BASED ON RISK – BUILDINGS

Consequence	1	2	3	4	5
5	2 Assets $2,624,939	0 Assets $0	0 Assets $0	3 Assets $5,733,589	2 Assets $10,271,883
4	1 Assets $847,015	2 Assets $1,621,135	0 Assets $0	1 Assets $953,990	3 Assets $1,999,935
3	1 Assets $483,675	1 Assets $349,178	2 Assets $554,225	1 Assets $361,337	2 Assets $807,731
2	4 Assets $361,480	2 Assets $287,920	9 Assets $1,055,090	15 Assets $1,369,888	5 Assets $628,325
1	19 Assets $266,152	31 Assets $368,992	22 Assets $327,394	18 Assets $325,404	24 Assets $378,658

Probability

FIGURE 62 DISTRIBUTION OF ASSETS BASED ON RISK – MACHINERY & EQUIPMENT

Consequence	1	2	3	4	5
5	1 Assets $230,237	0 Assets $0	0 Assets $0	0 Assets $0	3 Assets $933,983
4	1 Assets $147,390	2 Assets $288,372	1 Assets $184,073	1 Assets $116,192	4 Assets $595,020
3	0 Assets $0	1 Assets $96,951	1 Assets $50,427	0 Assets $0	2 Assets $185,221
2	3 Assets $96,785	0 Assets $0	1 Assets $28,700	1 Assets $38,125	0 Assets $0
1	3 Assets $33,861	6 Assets $67,553	4 Assets $65,198	1 Assets $16,457	2 Assets $16,733

Probability

112

FIGURE 63 DISTRIBUTION OF ASSETS BASED ON RISK – LAND IMPROVEMENTS

Consequence \ Probability	1	2	3	4	5
5	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	1 Assets $2,240,117
4	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0
3	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	4 Assets $779,251
2	0 Assets $0	6 Assets $340,685	1 Assets $84,566	0 Assets $0	15 Assets $861,553
1	3 Assets $29,039	5 Assets $61,034	10 Assets $42,144	3 Assets $19,589	14 Assets $162,150
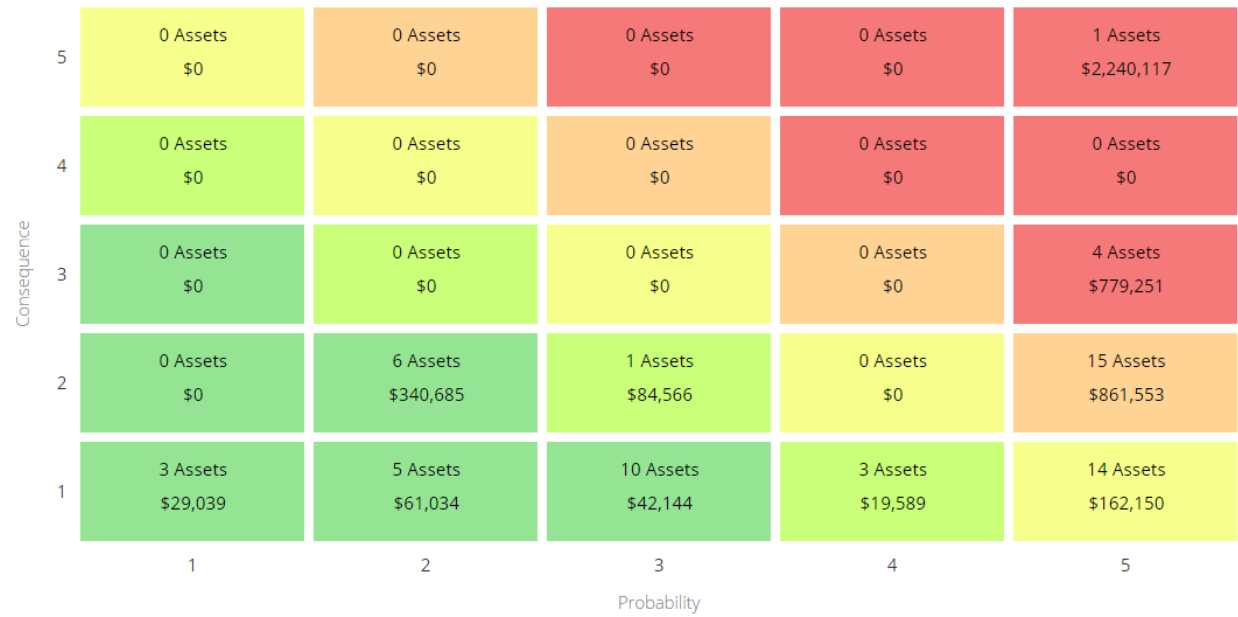
FIGURE 64 DISTRIBUTION OF ASSETS BASED ON RISK – VEHICLES

Consequence \ Probability	1	2	3	4	5
5	0 Assets $0	2 Assets $661,912	2 Assets $444,095	0 Assets $0	1 Assets $262,014
4	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	2 Assets $369,623
3	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	1 Assets $72,072
2	1 Assets $39,468	3 Assets $91,861	2 Assets $59,325	0 Assets $0	8 Assets $306,192
1	0 Assets $0	0 Assets $0	1 Assets $16,857	0 Assets $0	0 Assets $0

113

FIGURE 65 DISTRIBUTION OF ASSETS BASED ON RISK – FURNITURE & FIXTURES

Consequence \ Probability	1	2	3	4	5
5	0 Assets $0	1 Assets $37,236	1 Assets $64,724	0 Assets $0	15 Assets $730,835
4	0 Assets $0	0 Assets $0	0 Assets $0	0 Assets $0	13 Assets $239,952
3	0 Assets $0	5 Assets $56,954	4 Assets $38,386	1 Assets $7,817	39 Assets $392,661
2	1 Assets $5,000	16 Assets $69,051	12 Assets $52,311	1 Assets $3,524	168 Assets $721,611
1	7 Assets $6,067	28 Assets $23,984	30 Assets $21,934	6 Assets $5,882	294 Assets $318,855

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 town 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 66 COST ELEMENTS
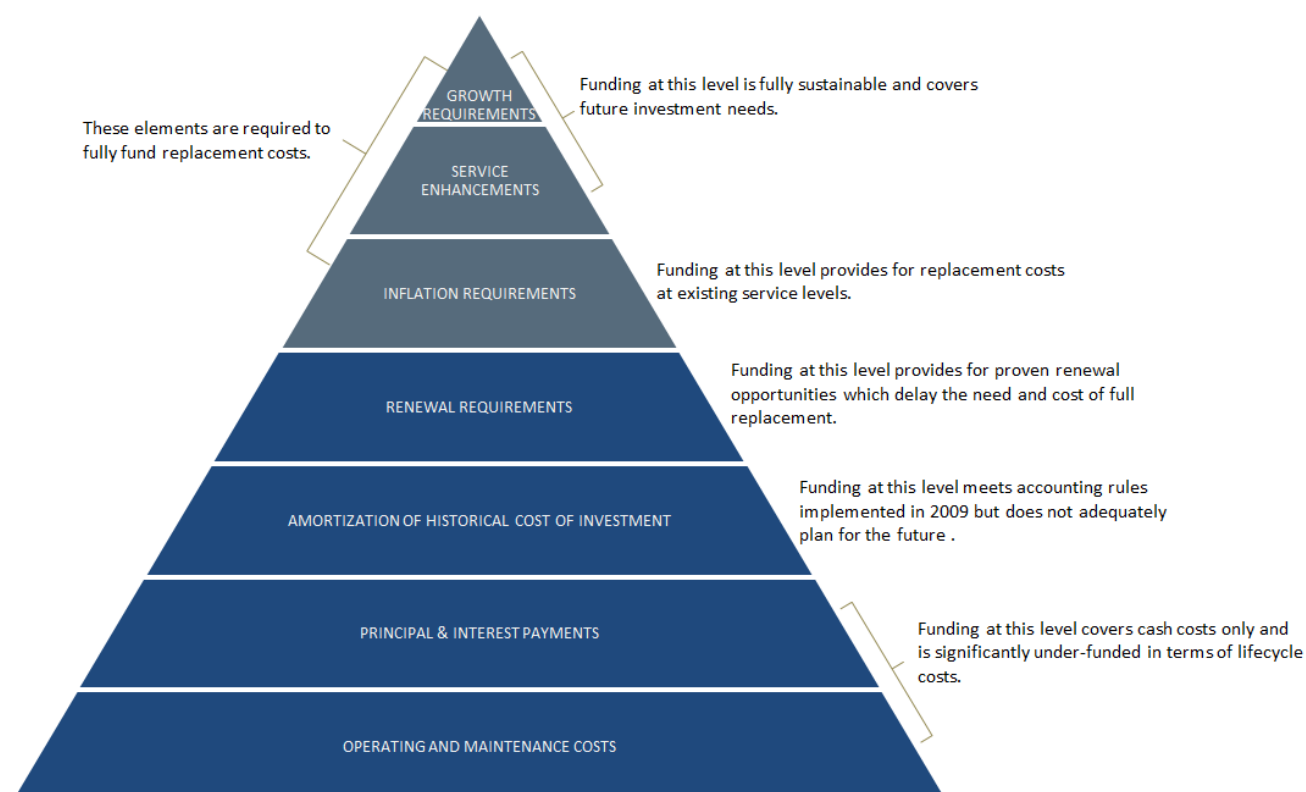
This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. the financial requirements (as documented in the SOTI 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 town'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 town to achieve full funding within 5 to 20 years for the following assets: roads; bridges & culverts; storm sewers; buildings; machinery & equipment; land improvements, vehicles; and furniture & fixtures. For each scenario developed we have included strategies, where applicable, regarding the use of tax revenues, user fees, reserves and debt.

2.2 Current funding position

Tables 34 and 35 outline, by asset category, the town's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

TABLE 34 SUMMARY OF INFRASTRUCTURE REQUIREMENTS AND CURRENT FUNDING AVAILABLE

| Asset Category | Average Annual Investment Required | 2016 Funding Available | | | | Total Funding Available | Annual Deficit |
		Taxes	Gas Tax	OCIF	Taxes to Reserves		
Road Network	2,465,000	86,000	248,000	84,000	0	418,000	2,047,000
Bridges & Culverts	154,000	0	0	0	0	0	154,000
Storm Sewer System	306,000	0	0	0	0	0	306,000
Buildings	963,000	23,000	32,000	0	0	55,000	908,000
Machinery & Equipment	171,000	65,000	0	0	0	65,000	106,000
Land Improvements	164,000	21,000	30,000	0	0	51,000	113,000
Vehicles	139,000	70,000	0	0	0	70,000	69,000
Furniture & Fixtures	442,000	39,000	0	0	0	39,000	403,000
Total	**4,804,000**	**304,000**	**310,000**	**84,000**	**0**	**698,000**	**4,106,000**

Note: In 2016, Hearst allocated $58,000 of their OCIF revenue to bridges and $26,000 to water. Based on actual deficit positions, the total of $84,000 was allocated to roads for AMP purposes.

2.3   Recommendations for full funding

The average annual investment requirement for the above categories is $4,804,000. Annual revenue currently allocated to these assets for capital purposes is $698,000 leaving an annual deficit of $4,106,000. To put it another way, these infrastructure categories are currently funded at 15% of their long-term requirements. In 2016, the town has annual tax revenues of $5,644,000. As illustrated in Table 35, without consideration of any other sources of revenue, full funding would require the following tax change over time:

TABLE 35 TAX CHANGE REQUIRED FOR FULL FUNDING

Asset Category	Tax Increase Required for Full Funding
Road Network	36.3%
Bridges & Culverts	2.7%
Storm Sewer Network	5.4%
Buildings	16.1%
Machinery & Equipment	1.9%
Land Improvements	2.0%
Vehicles	1.2%
Furniture & Fixtures	7.1%
Total	**72.7%**

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

a) Hearst's formula based OCIF grant is scheduled to grow from $84,000 in 2016 to $328,000 in 2019.
b) Normally our recommendations include allocating any decrease in debt costs to the infrastructure deficit. As illustrated in table 42, Hearst's debt payments for these asset categories is $0 so this option is not available.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. Table 35 outlines this concept and presents a number of options:

TABLE 36 EFFECT OF CHANGES IN OCIF FUNDING AND REALLOCATING TO DEFICIT

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	4,106,000	4,106,000	4,106,000	4,106,000	4,106,000	4,106,000	4,106,000	4,106,000
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Change in OCIF Grant	N/A	N/A	N/A	N/A	-244,000	-244,000	-244,000	-244,000
Resulting Infrastructure Deficit	4,106,000	4,106,000	4,106,000	4,106,000	3,862,000	3,862,000	3,862,000	3,862,000
Resulting Tax Increase Required:								
Total Over Time	**72.7%**	**72.7%**	**72.7%**	**72.7%**	**68.4%**	**68.4%**	**68.4%**	**68.4%**
Annually	**14.6%**	**7.3%**	**4.9%**	**3.6%**	**13.7%**	**6.8%**	**4.6%**	**3.4%**

Considering all of the above information, we recommend the 20 year option in Table 36 that includes the changes. This involves full funding being achieved over 20 years by:

- Increasing tax revenues by 3.4% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- Allocating the current gas tax and OCIF revenue as outlined in Table 34.
- Allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
- 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 may be difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent up investment demand of $16,605,000 for roads, $0 for bridges & culverts, $44,000 for storm sewers, $834,000 for machinery & equipment, $1,210,000 for buildings, $1,082,000 for land improvements, $722,000 for vehicles, and $1,864,000 for furniture & fixtures. 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.

3   Financial Profile: Rate Funded Assets

3.1   Funding objective

We have developed scenarios that would enable the town to achieve full funding within 5 to 20 years for the following assets: water, and wastewater. 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 37 and 38 outline, by asset category, the town's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates.

TABLE 37 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	
Water Services	1,354,000	935,000	-854,000	0	81,000	1,273,000
Wastewater Services	570,000	633,000	-434,000	0	199,000	371,000
Total	**1,924,000**	**1,568,000**	**-1,288,000**	**0**	**280,000**	**1,644,000**

Note: In 2016, Hearst allocated $58,000 of their OCIF revenue to bridges and $26,000 to water. Based on actual deficit positions, the total of $84,000 was allocated to roads for AMP purposes.

3.3   Recommendations for full funding

The average annual investment requirement for the above categories is $1,924,000. Annual revenue currently allocated to these assets for capital purposes is $280,000, leaving an annual deficit of $1,644,000. To put it another way, these infrastructure categories are currently funded at 15% of their long-term requirements.

In 2016, Hearst has annual wastewater revenues of $633,000 and annual water revenues of $935,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following increases over time:

TABLE 38 RATE CHANGE REQUIRED FOR FULL FUNDING

Asset Category	Rate Increase Required for Full Funding
Water Services	136.1%
Wastewater Services	58.6%

Through table 39, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 20 years.

TABLE 39 REVENUE OPTIONS FOR FULL FUNDING

	Sanitary Sewer Network				Water Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Annual Rate Increase Required	11.7%	5.9%	3.9%	2.9%	27.2%	13.6%	9.1%	6.8%

Considering all of the above information, we recommend the 20 year option in Table 39 which involves full funding being achieved over 20 years by:

- Increasing rate revenues by 2.9% for sanitary services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- Increasing rate revenues by 6.8% for water services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:
- 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.
- We realize that raising rate 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.
- Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent up investment demand of $1,780,000 for sanitary services and $1,782,000 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.

4   Use of Debt

For reference purposes, Table 40 outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[3] 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 40 TOTAL INTEREST PAID AS A % OF PROJECT COSTS

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

---

[3] 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 67 HISTORICAL PRIME BUSINESS INTEREST RATES
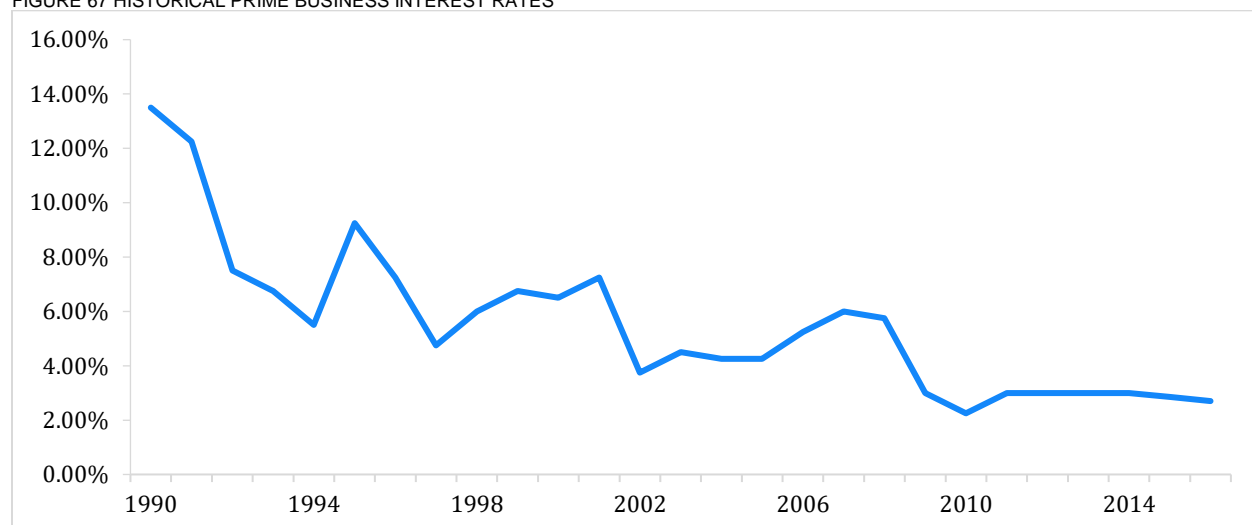
As illustrated in Table 40, a change in 15 year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

Tables 41 and 42 outline how Hearst has historically used debt for investing in the asset categories as listed. There is currently $0 of debt outstanding for the assets covered by this AMP. In terms of overall debt capacity, in 2016 Hearst had a provincially prescribed debt servicing limit of $2,305,705.

TABLE 41 OVERVIEW OF USE OF DEBT

Asset Category	Debt Outstanding	Use of Debt in Last Five Years				
		2011	2012	2013	2014	2015
Road Network	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Storm Sewer Network	0	0	0	0	0	0
Buildings	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Furniture & Fixtures	0	0	0	0	0	0
Total Tax Funded	0	0	0	0	0	0
Wastewater Services	0	0	0	0	0	0
Water Services	0	0	0	0	0	0
Total Rate Funded	0	0	0	0	0	0

TABLE 42 OVERVIEW OF DEBT COSTS

Asset Category	Principal & Interest Payments in Next Ten Years					
	2016	2017	2018	2019	2020	2021
Road Network	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Storm Sewer Network	0	0	0	0	0	0
Buildings	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Furniture & Fixtures	0	0	0	0	0	0
Total Tax Funded	0	0	0	0	0	0
Wastewater Services	0	0	0	0	0	0
Water Services	0	0	0	0	0	0
Total Rate Funded	0	0	0	0	0	0

The revenue options outlined in this plan allow Hearst to fully fund its long-term infrastructure requirements without further use of debt. However, as explained in sections 2.3 and 3.3 the recommended condition rating analysis may require otherwise.

5   Use of Reserves

4.1 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 43 outlines the details of the reserves currently available to Hearst.

TABLE 43 SUMMARY OF RESERVES AVAILABLE

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

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

- 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 43 are available for use by applicable asset categories during the phase-in period to full funding. This, coupled with Hearst'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.

4.2 Recommendation

As Hearst updates it's AMP and expands it to include other asset categories, 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 illustrates the town's performance on the two key factors: Asset Health and Financial Capacity. Appendix 1 provides the full grading scale and conversion chart, as well as detailed descriptions, for each grading level.

TABLE 44 2016 INFRASTRUCTURE REPORT CARD

Asset class	Asset Health Grade	Funding Percentage	Financial Capacity Grade	Average Asset class Grade	Comments
Roads	D	17%	F	F	Based on 2016 replacement cost, and a blend of age-based and observed data, 48% of the town's total asset portfolio as analysed in this AMP is in poor to very poor condition, 36% of the assets, with a valuation of $70 million, are in good to very good condition. The municipality is severely underfunding its assets. The average funding for tax funded categories is 15% and for rate funded categories is 15%.
Bridges & Culverts	C	0%	F	F	
Water	D	6%	F	F	
Wastewater	D	35%	F	F	
Storm Sewer	C	0%	F	F	
Buildings	D	6%	F	F	
Machinery & Equipment	D	38%	F	F	
Land Improvements	F	31%	F	F	
Vehicles	D	50%	D	D	
Average Asset Health Grade			D		
Average Financial Capacity Grade			F		
Overall Grade for the Town			F		

XI. Appendix: Grading and Conversion Scales

TABLE 45 ASSET HEALTH SCALE

Letter Grade	Rating	Description
A	Excellent	Asset is new or recently rehabilitated
B	Good	Asset is no longer new, but is fulfilling its function. Preventative maintenance is beneficial at this stage.
C	Fair	Deterioration is evident but asset continues to full its function. Preventative maintenance is beneficial at this stage.
D	Poor	Significant deterioration is evident and service is at risk.
F	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 46 FINANCIAL CAPACITY SCALE

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 underprepared 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.