

County of Grey

2021 Corporate Asset Management Plan

Released June 2022



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Executive Summary

Asset management enables an organization to realize value from assets in the achievement of its organizational objectives. What constitutes as value depends on these objectives, the nature and purpose of the organization and the needs and expectations of its stakeholders. Asset management supports the realization of value while balancing financial, environmental, social costs, risk, quality of service and performance related to assets.¹ Simply put, asset management is the art of doing the right thing to the right asset at the right time.



In the context of the County of Grey, asset management can be applied to ensure that County assets are being optimally utilized to provide beneficial services at the lowest possible cost for the constituents of Grey. Currently, the County is at the intermediate level of asset management maturity.² As this discipline continues to evolve at the County, benefits will be realized by all relevant stakeholders.

The County's infrastructure portfolio consists of eight asset categories including roads, bridges and culverts, stormwater, buildings and facilities, machinery and equipment, land improvements, vehicles, and housing. Based on costing data available in 2021, the eight asset categories analyzed in this report had a total replacement cost of \$1.6 billion. Overall, 88% of the County's assets are currently in fair or better condition, and the remaining 12% are in poor or very poor condition.

Like most municipalities in Canada, Grey County has an existing infrastructure backlog of assets requiring replacement that has been deferred. The County's current backlog is estimated to be \$44.6 million, which is only 2.7% of the portfolio's total 2021 replacement cost. The annual average requirement calculated is \$49.4 million. Annual capital requirements represent the amount the County should allocate annually to each asset category to meet replacement needs as they arise, prevent further accumulation of infrastructure backlogs, and achieve long-term sustainability. Based upon the best replacement costs available in 2021, it is recommended that an annual tax levy increase of 1.57% be dedicated to funding infrastructure for the next 15 years to fully fund the County's assets. Compared to the 1.21% increase recommended in the County's 2020

¹ (ISO, ISO 55000 Asset Management - Overview, principles and terminology, 2014, pp. 1-2)

² Based on the PSDCitywide Asset Management Maturity Scale used in the 2020 Grey County Asset Management Strategy (presented to Grey County Council April 8, 2021).

AM Strategy that was endorsed by Grey County council in 2021, this would be an incremental increase of \$228,600 based on the 2022 budget.

Introduction and Context

Grey County is an upper-tier municipal government that serves nine distinct lower-tier municipalities in Southwestern Ontario. As an upper-tier municipality, Grey County delivers many important social and community health services, including:

- Providing 316 long-term care beds in 3 long-term care homes
- Maintaining 996 units of safe and attainable housing across the County
- Responding to more than 28,000 annual calls through Paramedic Services
- Delivering income support and employment assistance
- Helping families access affordable childcare
- Maintaining over 869km of roads and 206 bridges and structures spanning over 3m

Grey County maintains a large portfolio of assets with a total replacement cost over \$1.6 billion, and a historical cost of \$488 million, in order to deliver this array of services. This asset portfolio includes roads, bridges, culverts, land, various buildings, information technology infrastructure and components, and a vast fleet of vehicles and equipment.

Grey County's Vision

"To be the place where people feel genuinely at home and naturally inspired – enjoying an exceptional blend of active healthy living and economic opportunity."

Grey County's Purpose (Mission)

"Grey County is committed to the coordinated delivery of responsive and cost-effective services that strengthen the economic, social, environmental, and cultural wellbeing of the diverse communities we serve."

Grey County's Strategic Goals & Related Outcomes

Goal 1 – Grow the Grey County Economy

- a) Updated County Official Plan and supporting policies
- b) Growth in business innovation and access to broadband
- c) Partnerships with key stakeholders to provide coordinated support for economic development and tourism initiatives
- d) Improved prosperity and quality of life

- e) Population and assessment growth

Goal 2 – Support Healthy, Connected Communities

- a) Improved Health and well-being of our residents
- b) Improved sustainability of services and service delivery for Grey County communities

Goal 3 – Deliver Excellence in Governance and Service

- c) Enhanced asset management and long-term financial planning
- d) Implementation of County communications strategy
- e) Governance model for the future
- f) Open data, access to expanded GIS-based information
- g) Greater operational efficiency

Asset Management Plan Objectives and Content

The Asset Management Plan (AMP) is a critical component of the County of Grey's corporate strategy. It provides a current snapshot of the state of the County's infrastructure and a plan for optimal management of this infrastructure to meet the County's vision, mission, and strategic goals as listed above going forward.

It is important to note that asset management is a continuous process, and factors and variables change each and every day the County operates. Maintenance strategies, lifespan estimates, required assets and their associated replacement and maintenance costs are all constantly changing based on strategic decision making and the best information available at a point in time. The data presented in this plan are the best available at a point in time and will continue to evolve and improve over time.

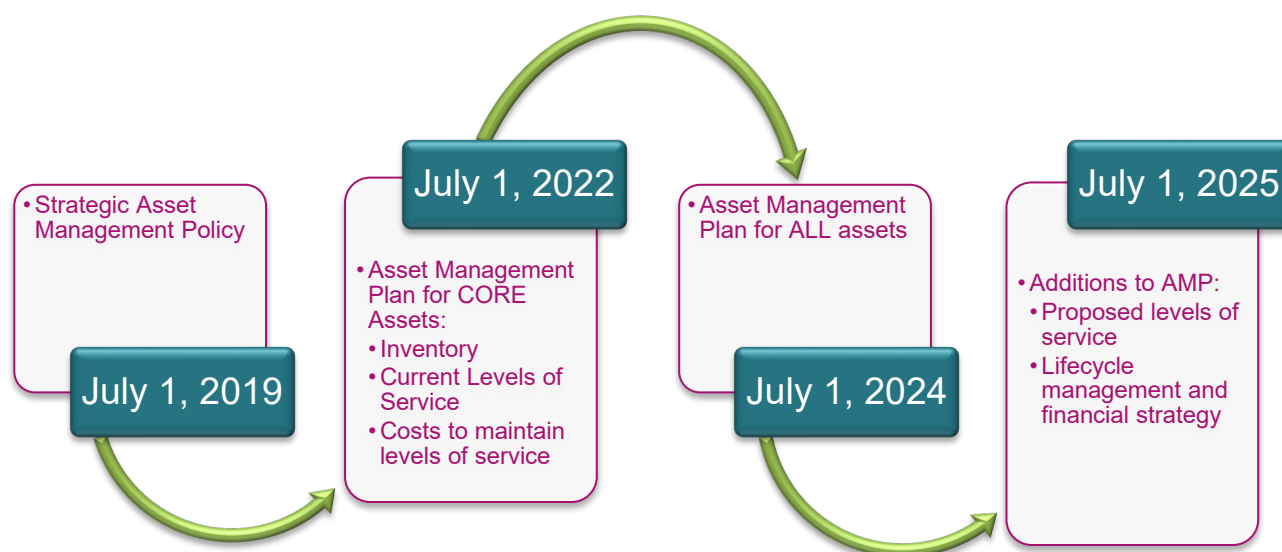
Ultimately, the goal of Grey County's asset management program is to manage existing and new assets so that they are able to provide continuous services to residents at the service level required, all while balancing the associated costs and risks to constituents.

Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure

Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure, enacted under the Infrastructure for Jobs and Prosperity Act, 2015, became effective on January 1, 2018. This regulation and the Act required all municipalities in Ontario to first develop an Asset Management Policy by July 1, 2019, and then Asset Management Plans by July 1, 2021, 2023, and again in 2024, with increasing levels of detail on

municipal infrastructure assets. On March 15, 2021, the regulation was revised to extend each of these deadlines by an additional year. Figure 1: O. Reg. 588/17 Updated Timelines outlines the current deadlines for each of the requirements of this regulation.

Figure 1: O. Reg. 588/17 Updated Timelines



Levels of Service Analysis

Levels of service (LOS) indicate the quality, function, and capacity of an asset class and its related service area. LOS should balance performance, risk, and overall program costs for an asset class. They include both technical and community (or customer) oriented metrics and key performance indicators (KPIs).

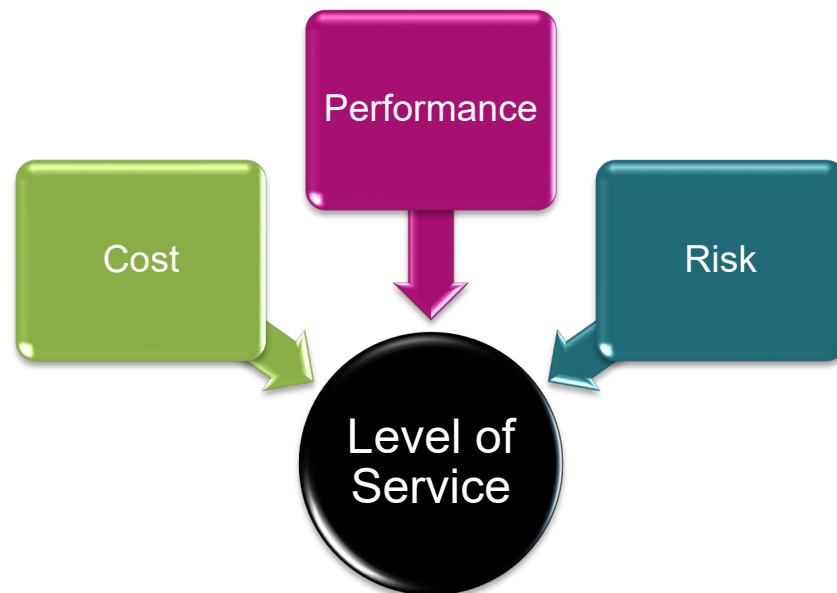
Community levels of service are designed to measure or approximate the end-user experience with the service. For transparency and reporting, they should be understandable to the general public. Technical levels of service used by staff are designed to measure the various activities and steps (inputs) that the organization takes to deliver the customer levels of service.

Grey County staff typically rely on a combination of ministry standards and informal metrics. O. Reg. 588/17 requires municipalities to report on specific community and technical levels of service for core infrastructure assets, and for all other municipal infrastructure assets, the qualitative and technical metrics are to be established by the municipality. Grey County's road, bridge, culvert, and stormwater assets are core infrastructure assets.

The Three Elements of Levels of Service

To develop a practical methodology of reporting on levels of service, three elements should be considered; the cost associated with delivering infrastructure services, the performance or condition of the assets within the portfolio, and the risk associated with those assets.

Figure 2: The Three Elements of Level of Service



Level of service is an internationally recognized concept, used across a wide range of sectors, including public infrastructure. The International Standards Organization's ISO 55000 defines level of service as the “parameters, or combination of parameters, which reflect social, political, environmental, and economic outcomes that the organization delivers”.

Cost, Performance, and Risk

Levels of service are fundamentally about balancing three key parameters: cost, performance, and risk. An adjustment to one of these parameters will have a direct impact on the other two. For example, if higher asset performance is desired, additional funds will be needed as a higher quality asset and/or more regular maintenance may be required, increasing the cost of service delivery. This more enhanced, but costlier lifecycle program may also reduce the asset's risk profile.

The cost and performance of Grey County's assets are thoroughly examined in the State of the Infrastructure section of this plan, and the risks associated with County assets are analyzed in the Risk Analysis section.

State of the Infrastructure

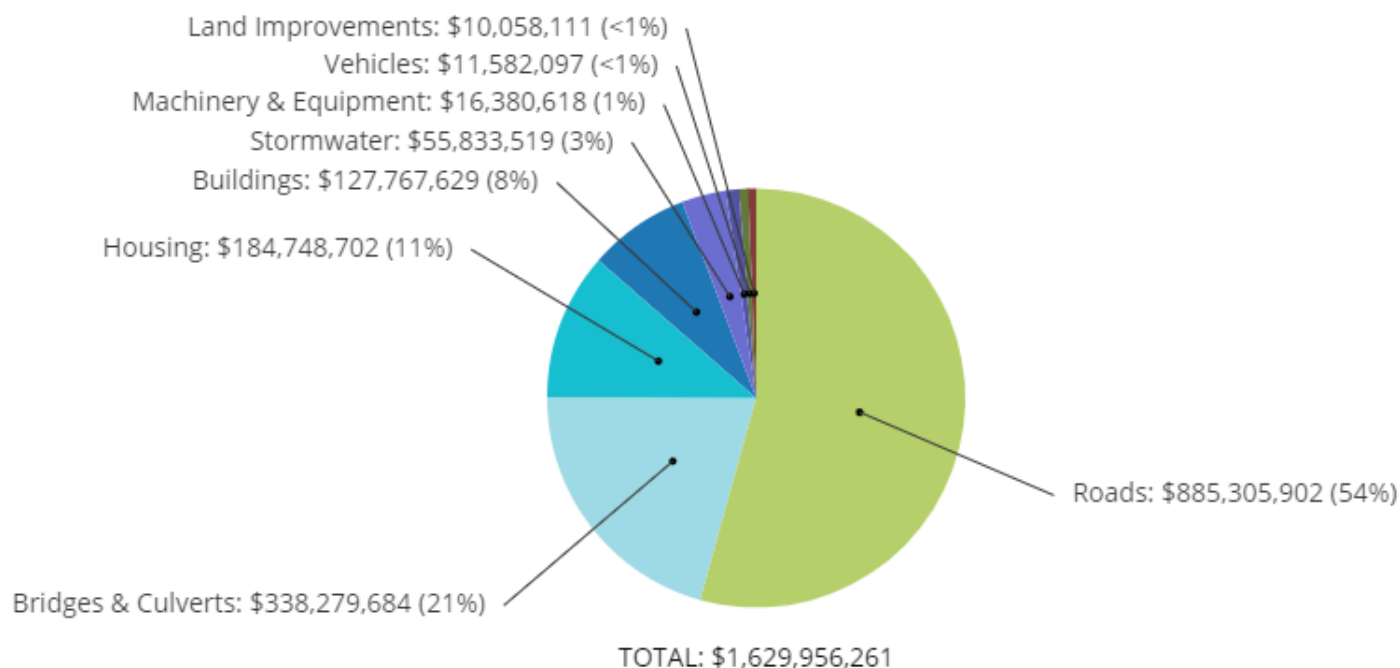
Portfolio Overview

This section provides an overview of Grey County's asset portfolio. The portfolio overview provides high-level analytics, including total current replacement cost of the County's assets, overall condition for all assets, asset age profiles including average age and estimated service life remaining, and upcoming replacement projections. In subsequent sections, further detail will be provided on each individual asset category.

Total Replacement Cost of Portfolio

Based on costing data available in 2021, the eight asset categories analyzed in this report had a total replacement cost of \$1.6 billion. The road network comprises 54% of the County's total asset portfolio.

Figure 3: Overall Asset Portfolio - Replacement Costs



Between 2020 and 2021, the replacement value of the County's asset portfolio increased by \$222.3 million. This represents an increase of 16% from the 2020 Asset Management Strategy, as summarized in *Table 1: Overall Asset Portfolio - Comparison of 2021 vs. 2020 Replacement Costs*.

Table 1: Overall Asset Portfolio - Comparison of 2021 vs. 2020 Replacement Costs

Asset Category	Replacement Cost 2021	Replacement Cost 2020	Change in Value	Percentage Change
Roads	\$885,305,902	\$885,375,708	-\$69,806	0%
Bridges and Culverts	\$338,279,684	\$289,336,247	\$48,943,437	17%
Stormwater	\$55,833,519	Unknown	\$55,833,519	N/A
Buildings and Facilities	\$127,767,629	\$129,298,018	-\$1,530,389	-1%
Machinery and Equipment	\$16,380,618	\$15,632,476	\$748,142	5%
Land Improvements	\$10,058,111	\$3,320,034	\$6,738,077	203%
Vehicles	\$11,582,097	\$11,759,701	-\$177,604	-2%
Housing	\$184,748,701	\$72,957,685	\$111,791,017	153%
Total	\$1,629,956,261	\$1,407,679,869	\$222,276,392	16%

Much of this increase is due to the improved data from the recent building condition assessments now being used to calculate the total replacement cost of housing, building, and land improvement assets. Specifically, the housing calculated replacement cost has significantly increased since in the past the replacement costs calculated for housing assets did not consider the components within the housing properties individually. Instead, the approximate cost to replace entire buildings once every 75 years was used since that was the best data available at the time. Additionally, stormwater asset data has been added in 2021; this information was not previously available. Several additional factors also contribute to this increase, including inflation, new assets that were put into service, variations in asset quantity, increases in service standards requiring additional infrastructure, and improved methods of calculating replacement costs as better data continues to be gathered. It should be noted that the calculated replacement costs are those for existing assets (i.e., replacing assets “like for like”) and do not consider changes that may be made upon the asset’s actual replacement (i.e., replacing assets with a more environmentally friendly option or advanced technology, etc.).

The building componentization work that was done in 2021 based upon the recent building condition assessments (BCAs) is another major factor that has significantly improved the accuracy of the replacement costing and lifespan data for land improvement and building and facility assets. The replacement cost of roads has slightly decreased due to some of the actual replacement costs experienced during 2021 projects being lower than anticipated. The estimated replacement costs of buildings and facilities appear to have decreased, but this is due to a more accurate allocation of land improvement assets that were previously included as buildings and

facilities to the land improvement category based on the BCA componentization work. The replacement cost of vehicles has decreased due to the cost savings of internally transferring vehicles; for example, an ambulance being sold by Paramedic Services has been repurposed for the Transportation Services Bridge Crew instead of buying a new truck for this use. Going forward estimates will continue to be revised to be as accurate as possible. As with the 2020 Asset Management Strategy, various approaches were used to approximate current asset replacement costs. These included unit costing, user-defined costing, and inflating historical or previously adjusted costs.

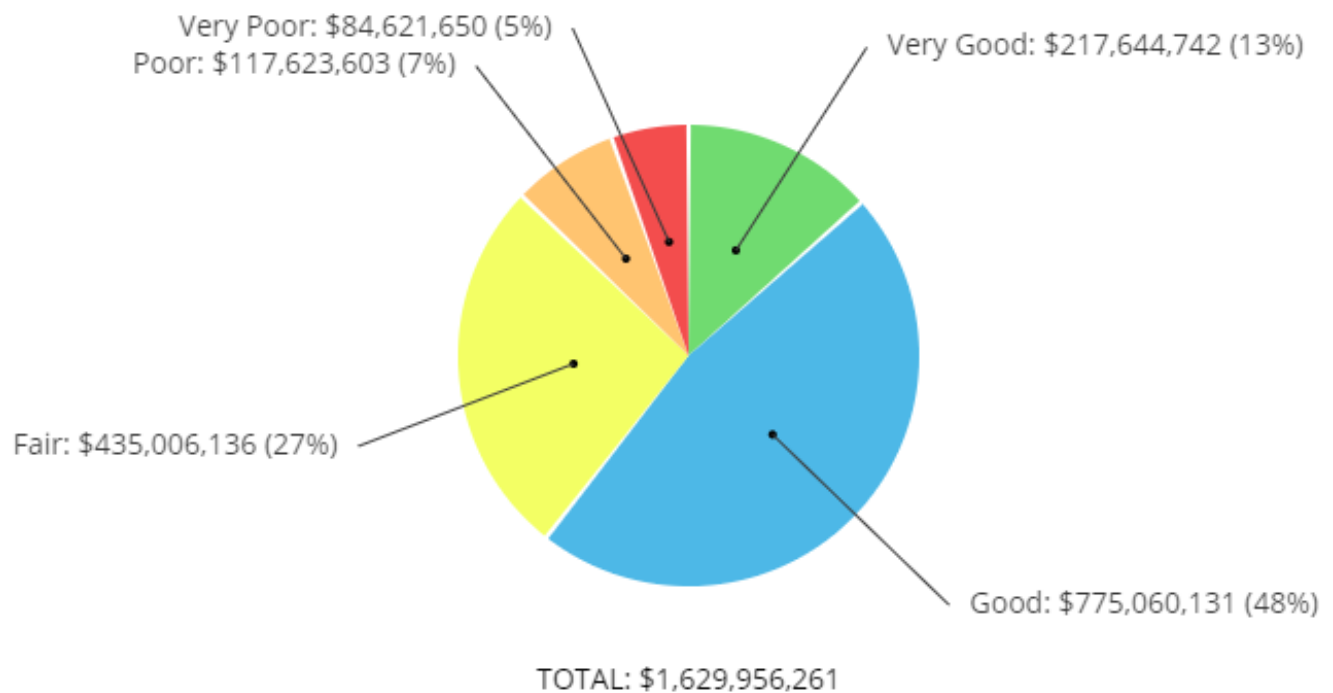
Replacement costs should reflect the total costs associated with the full replacement or reconstruction of an asset. They should include the combined cost of materials, labour, use of equipment, engineering, and administrative costs. They should reflect the actual cost of the new asset where the desired level of service performed by the asset has changed, and the asset is not being replaced “like for like”; the consideration of these cost changes allows for more accurate financial planning.

Historical cost inflation is typically used in the absence of unit cost data. It can be a reliable method for recently purchased and/or constructed assets where the cost is reflective of the total capital costs that the municipality incurred. As assets age, and new products and technologies impact procurement costs and construction methods, cost inflation becomes a less reliable technique to determine replacement cost.

Portfolio Condition

The current condition of the assets provides critical information on asset performance, forecasted spending, and any risks to public health and safety. Collectively, 88% of the County’s assets are in fair or better condition, with the remaining 12% being in poor or very poor condition. This analysis relies on both age data and assessed condition data as available. The assets that have a poor or worse condition rating are generally either assets that are run to failure and are operating effectively beyond their expected useful life, and/or have an age-based condition rating that projects the condition as being worse than it is in reality. This is discussed in further detail within each specific asset category.

Figure 4: Overall Asset Portfolio – Condition Ratings

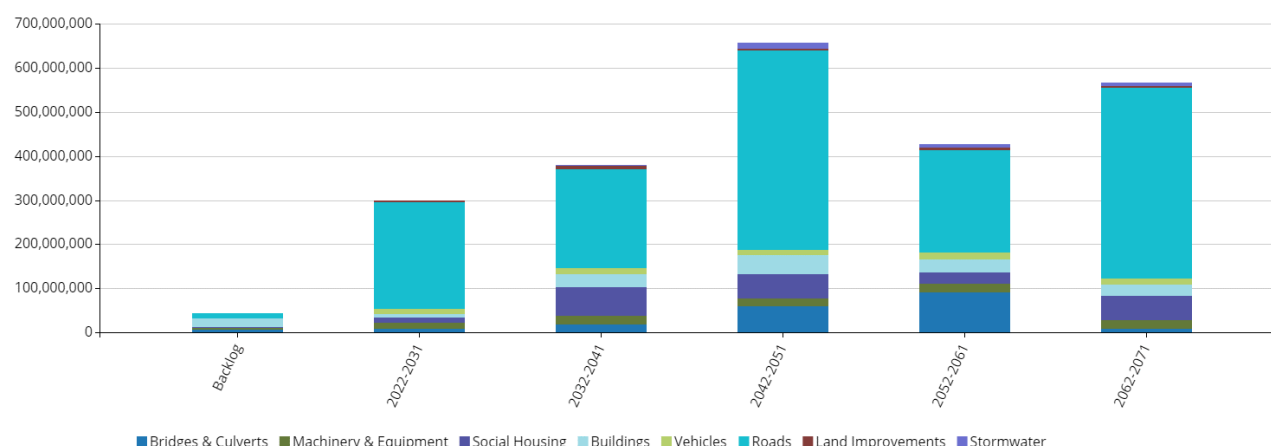


Projected Capital Replacement Needs

Given that many infrastructure assets have a lifespan of several decades, understanding upcoming replacement needs is essential for long-term capital planning. *Figure 5: Projected Capital Replacement Needs 2022-2071* summarizes how capital investments will fluctuate over the next 50 years by asset category. These estimates rely on asset age and condition to determine when replacements will need to occur.

The County's 2020 AM Strategy projected the two largest spikes in total projected required capital investments between 2042-2051 and 2062-2071. The 2021 AMP estimates are consistent with this projection, with the largest projected spike being between 2042-2051.

Figure 5: Projected Capital Replacement Needs 2022-2071



Infrastructure Backlog

The backlog is an estimate of investments in infrastructure that have been deferred over many years. The estimated backlog relies on a combination of asset age and field condition to determine investments that are needed. As assets age, their performance typically declines, and as they reach the end of their useful life, they must be replaced. When these replacements are deferred, assets begin to accumulate backlogs. However, sometimes field condition assessments identify additional years of service life remaining, and considerably reduce backlogs that have been predicted based solely upon the age of an asset.

As summarized in *Table 2: Overall Asset Portfolio - Infrastructure Backlog*, the County's total infrastructure backlog as of 2021 was estimated at \$44.6 million, or 2.7% of the total portfolio's replacement value. Buildings and facilities comprise the largest share at \$19.8 million. As a percentage of replacement cost, roads, and housing had the lowest backlog, at 1.2% and 0.7% respectively.

Table 2: Overall Asset Portfolio - Infrastructure Backlog

Asset Category	Estimated Backlog	Replacement Cost 2021	As a Percentage of Replacement Cost
Roads	\$10,572,785	\$885,305,902	1.2%
Bridges & Culverts	\$5,438,898	\$338,279,684	1.6%
Stormwater	\$943,616	\$55,833,519	1.7%
Buildings & Facilities	\$19,758,468	\$127,767,629	15.5%
Machinery & Equipment	\$4,783,614	\$16,380,618	29.2%
Land Improvements	\$679,516	\$10,058,111	6.8%
Vehicles	\$1,070,978	\$11,582,097	9.2%
Housing	\$1,320,631	\$184,748,701	0.7%
Total	\$44,568,506	\$1,629,956,261	2.7%

Average Annual Requirements

Annual capital requirements represent the amount the County should allocate annually to each asset category to meet replacement needs as they arise, prevent further accumulation of infrastructure backlogs, and achieve long-term sustainability. These figures are a function of the replacement cost of an asset and its estimated useful life.

As illustrated in *Table 3: Average Annual Requirements 2021 vs. 2020*, the County's average annual requirements increased from \$44.9 million to \$49.4 million, or by 10%. This change is mostly attributed to the improved replacement modelling for housing, building and facility, and land improvement assets based on the recent building condition assessments, as well as the 2021 inclusion of stormwater assets.

Table 3: Average Annual Requirements 2021 vs. 2020

Asset Category	Annual Requirements 2021	Annual Requirements 2020	Change in Value	Percentage Change
Roads	\$29,482,081	\$29,738,846	-\$256,765	-0.9%
Bridges and Culverts	\$5,266,743	\$6,126,317	-\$859,574	-14.0%
Stormwater	\$1,000,251	N/A	\$1,000,251	100.0%
Buildings and Facilities	\$3,971,163	\$4,342,098	-\$370,935	-8.5%
Machinery and Equipment	\$1,854,995	\$1,753,937	\$101,058	5.8%
Land Improvements	\$495,253	\$171,236	\$324,017	189.2%
Vehicles	\$1,397,986	\$1,459,672	-\$61,686	-4.2%
Housing	\$5,885,035	\$1,287,079	\$4,597,956	357.2%
Total	\$49,353,507	\$44,879,185	\$4,474,322	10.0%

It is important to note that most municipalities across Canada struggle with allocating sufficient funding each year to infrastructure, leading to much discussed infrastructure deficits. Closing these annual funding shortages and eliminating accumulated deferred maintenance needs are decades-long endeavours and involve a critical and objective review of service levels.

Benchmarking Reinvestment Rates

The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment is a measure of available (actual) or required (target) funding relative to the total replacement cost of the asset. By comparing the actual versus the target reinvestment rate, the County can determine funding gaps.

The target reinvestment rate is calculated by dividing the average annual capital requirements by the asset's replacement cost; similarly, the actual reinvestment rate is determined by using current available funding as a percentage of the asset's replacement cost.

The Canadian Infrastructure Report Card (CIRC) provides an assessment of the health of municipal infrastructure as reported by cities and communities across Canada. It is a joint project produced by several organizations, including the Federation of Canadian Municipalities (FCM), the Canadian Society of Civil Engineers (CSCE), the Canadian Network of Asset Managers (CNAM), and the Canadian Public Works Association (CPWA).

The Report Card contains recommended reinvestment rates that can serve as a benchmark for municipalities. The CIRC suggests that if increased, these reinvestment rates can “stop the deterioration of municipal infrastructure”. The Report Card contains both a range for reinvestment rates that outlines the lower and upper recommended levels, as well as current municipal averages.

Figure 6: Comparing Grey County's Actual Infrastructure Reinvestment Rates Against CIRC Recommended Rates from the Grey County 2020 Asset Management Strategy shows how the County's actual own-source reinvestment compares with the CIRC's 2016 recommended target ranges (light green shaded areas) for each asset category. As CIRC does not identify housing as an asset category, the reinvestment rates for buildings have been used. For machinery, equipment, and vehicles, the CIRC does not provide a reinvestment range; as such a standard 1% to 4% range was used.

Grey County's actual, own-source reinvestment rate falls below the CIRC recommended ranges for the core asset groups, roads and bridges. For buildings, including Housing, Grey's reinvestment is consistent with recommended ranges.

In addition, the figure also demonstrates that senior government support is essential for supplementing the County's own fiscal capacity, helping to substantially increase reinvestment rate for roads and buildings through various funding sources including the federal Canadian Community Building Fund (CCBF, formerly Gas Tax Fund), the Ontario Community Infrastructure Fund (OCIF), and grants for long-term care facilities.

Figure 6: Comparing Grey County's Actual Infrastructure Reinvestment Rates Against CIRC Recommended Rates

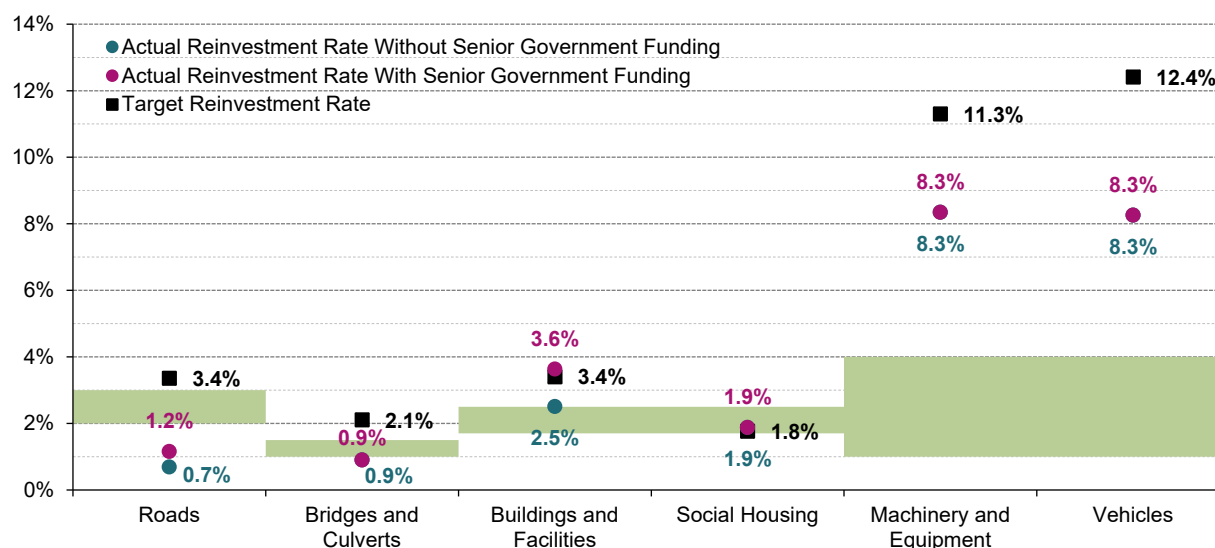
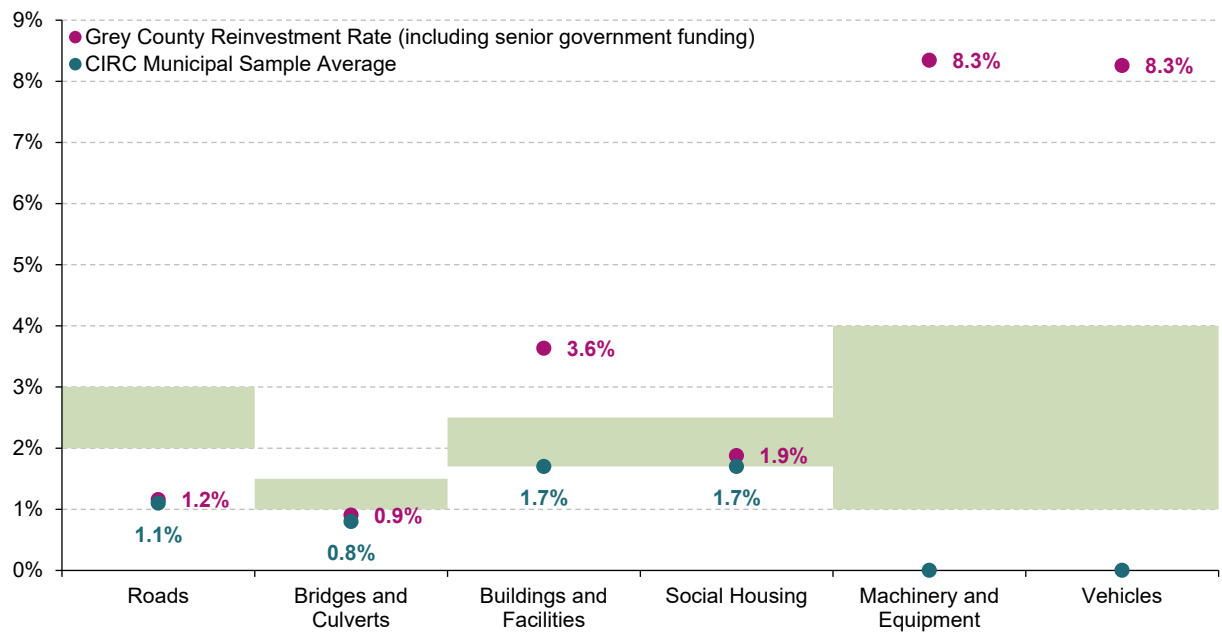


Figure 7: Comparing Grey County's Actual Total Infrastructure Reinvestment Against CIRC Municipal Average Rates below shows the current reinvestment rate of municipalities in the CIRC sample in various asset categories. Although Grey County's actual, total reinvestment rate of 1.2% for its roads infrastructure falls below the CIRC recommended range and the target reinvestment rate, it is slightly higher than the municipal sample average of 1.1%. Similarly, the County's reinvestment rate of 0.9% for bridges is also higher than the CIRC average of 0.8%. No CIRC data was available for machinery, equipment, and vehicles.

Figure 7: Comparing Grey County's Actual Total Infrastructure Reinvestment Against CIRC Municipal Average Rates



Road Network

Category Overview

Grey County's road infrastructure is comprised of 869 kilometres of road throughout the County's transportation network, as measured along its centerline in place. The purpose of this infrastructure is to move people and goods throughout the County as safely and effectively as possible via cars, transport trucks, bicycles, agricultural vehicles, etc.

Table 4: Roads - Category Overview summarizes the quantity and current replacement cost of the County's road network by segment. The total replacement cost of the County's entire road network is approximately \$885.3 million as of 2021.

Table 4: Roads - Category Overview

Category	Segment	Quantity	Replacement Cost	% Of Seg. Sub-Total	Costing Method
Roads	Rural Base	756 km	\$453,863,852	60%	Cost Per Unit
	Rural Surface	756 km	\$296,471,534	40%	Cost Per Unit
	Sub-Total Rural		\$750,335,386	100%	
	Semi-Urban Base	66 km	\$39,618,848	52%	Cost Per Unit
	Semi-Urban Surface	66 km	\$36,178,942	48%	Cost Per Unit
	Sub-Total Semi-Urban		\$75,797,790	100%	
	Urban Base	47 km	\$28,125,679	50%	Cost Per Unit
	Urban Surface	47 km	\$27,683,724	50%	Cost Per Unit
	Sub-Total Urban		\$55,809,403	100%	
	Traffic Signal	33 units	\$3,363,322	100%	Cost Per Unit
	Roads Total		\$885,305,901		

Asset Condition

The County undertakes recurring visual inspections annually to determine and update the condition of the road network. These inspections are carried out by County staff and calculate a Pavement Condition Index (PCI) value for each road section surface.

The current condition of the assets provides critical information on asset performance, forecasted spending, and any risks to public health and safety. *Figure 8: Roads - Condition Ratings* summarizes the average condition of the County's road network assets. Overall, 90% of the road network assets are in fair or better condition, with the remaining 10% being in poor or very poor condition. Age was used as a proxy for estimating the conditions of the road section base and traffic signal assets.

Figure 8: Roads - Condition Ratings

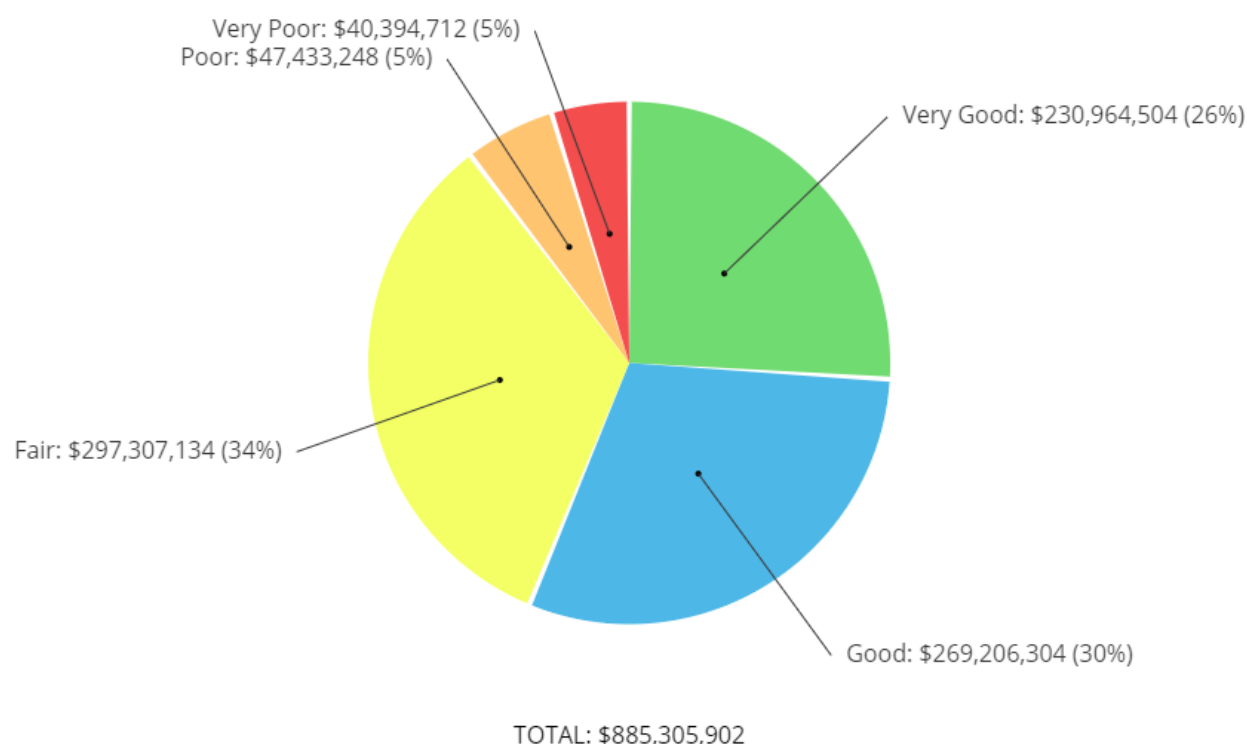


Table 5: Average PCI Values 2014-2020 summarizes the average PCI for the County's road surfaces, and how it has evolved since 2014. The average PCI was 65.9 for 2020; this value has declined consistently since 2014. The 2020 median value suggests that half of all roads assessed have a PCI of greater than 68.8, while the remainder fell below.

Table 5: Average PCI Values 2014-2020

PCI	2020	2019	2018	2017	2016	2015	2014	6-Year trend
Average	65.9	66.39	68.83	70.47	72.25	74.18	78.13	↘
Median	68.8	70.23	73.69	75.24	76.43	78.68	81.63	↘

Appendix A – 2020 Pavement Condition Index Map provides a visualization of the current condition of the County's roads based on the 2020 PCI values.

Approach to Condition Assessments

The County uses *SP-24 manual for condition rating of flexible pavements* developed by the Ministry of Transportation Ontario to determine the condition of road assets as part of the annual road needs study conducted by engineering staff. The use of this manual is considered one of the best practices for determining road condition. Staff conducting

the inspections have completed thorough training courses provided by the Ontario Good Roads Association.

Pavement Condition Index (PCI):

Each year, staff conduct inspections on the entire County road network to determine the Pavement Condition Index (PCI) for each respective road section. The PCI calculations are based on the SP-24 manual and consist of a numerical formula that combines the following two separate factors associated with the road:

- **Ride Condition Rating (RCR):** The riding quality of the pavement surface.

The RCR is determined by driving the road section in both directions and assigning a rating between 0 and 10 based on the following table:

RCR	Uniform Description of Ride Condition at Posted Speed	Guidelines
8 – 10	Excellent	Very smooth ride.
6 - 8	Good	Smooth ride with just a few bumps or depressions.
4 - 6	Fair	Still comfortable ride with intermittent bumps or depressions.
2 - 4	Poor	Uncomfortable ride with frequent bumps or depressions.
0 - 2	Very Poor	Uncomfortable ride with constant bumps or depressions resulting in rattle and shake of rating vehicle. Cannot maintain posted speed and must steer constantly to avoid bumps or depressions. Dangerous at 80 km/h.

- **Distress Manifestations Index (DMI):** A rating determined by measuring both the severity and the density of distresses (surface defects, deformation, cracking, rutting, etc.) found in the asphalt surface.

This measure is conducted by evaluating all the various cracking patterns and distresses associated with the road section. The evaluator determines a severity for each crack or distress type ranging from very slight to very severe. The evaluator will also approximate the density of those types of cracks within the road section ranging from few (less than 10% of the road section) to throughout (between 80% and 100% of the road section).

These two ratings are utilized as part of a calculation to determine the Pavement Condition Index (PCI) for a road section. The PCI is a rating from 0 to 100 where 100

represents what would be considered a brand-new road in perfect condition. *Appendix B – Pavement Condition Index Sample Images* illustrates the different PCI and includes representative photos for each range of PCI.

Most County road surfaces are paved, with a small minority still being surface treated. A condition value has been assigned by trained staff to all County road surfaces considering the surface material for data consistency. Where data was not available, age was used as a proxy for estimating the conditions of the road base and traffic signal assets.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to safely and efficiently fulfill its intended purpose and provide value to users. The EULs used throughout this AMP are those included in the Grey County Tangible Capital Asset Policy, which were set by staff based upon their best knowledge of the lifespans actually being realized by County assets.

As assets age, their performance diminishes, often more rapidly as they approach the end of their design life. EULs can vary significantly within an asset category, from several years to many decades. *Table 6: Roads - Estimated Useful Life (EUL)* shows the EULs that are used for the County's various road network assets, based upon the performance of County road assets historically.

Table 6: Roads - Estimated Useful Life (EUL)

Asset Category	Segment	Estimated Useful Life (EUL) in Years
Roads	Base	
	Rural	75
	Urban	50
	Surface	
	Hot Mix Asphalt	18
	Surface Treatment	7
	Rubberized Asphalt	15
	Warm Mix	18
	Traffic Signals	25

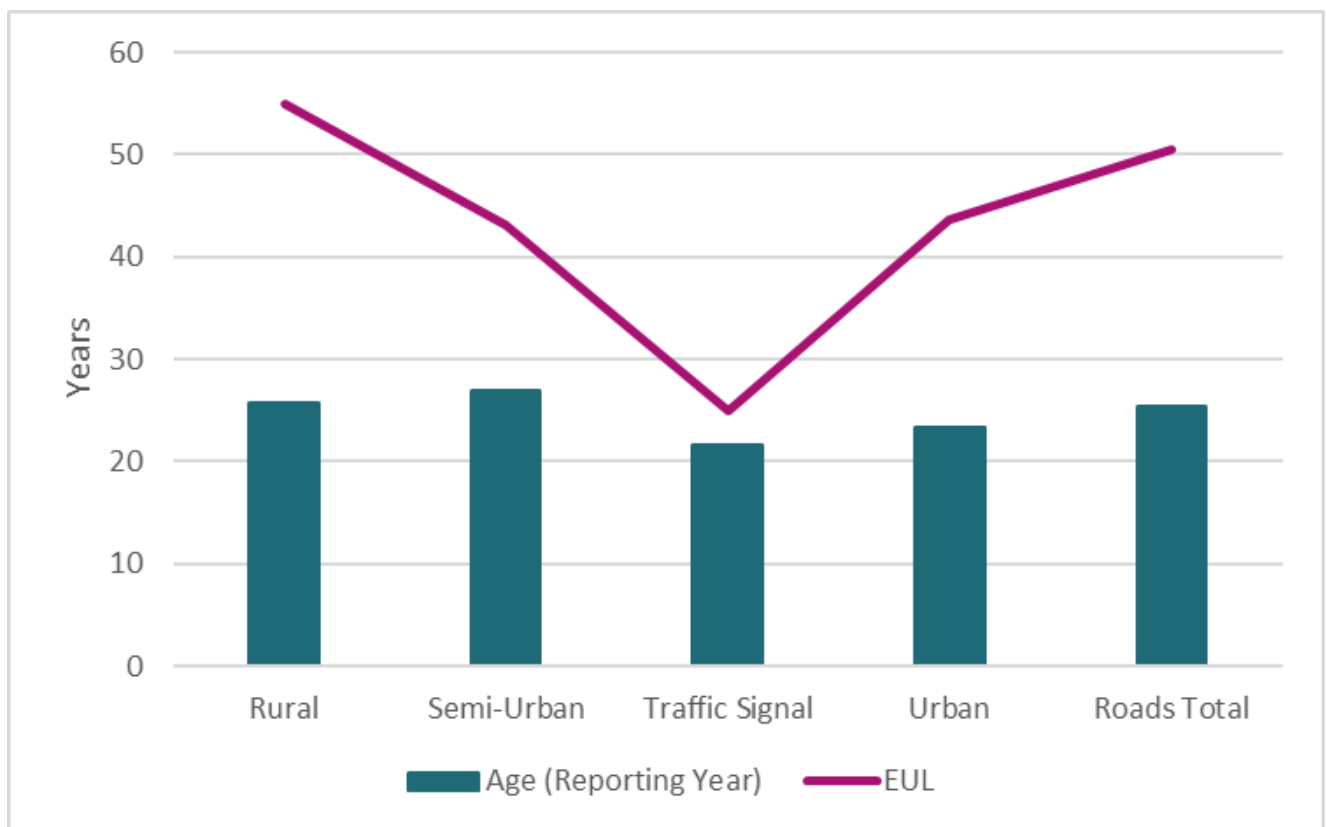
However, EUL is as titled merely an estimate that can be used as a predictor of the asset's approximate lifespan, and pavement condition index (PCI) data must be continuously considered throughout the road's life to more accurately determine the

road's actual remaining service life. The County has adjusted the end of service life date of road assets where condition information indicates an asset will not meet its estimated useful life date.

Average Age

Figure 9: Roads - Average Age of the surface and base compares the average age of each road asset category to the average estimated useful life of that category. This demonstrates that the County's road assets on average have a significant portion of their useful life remaining. This is not uncommon for road assets, since their total expected useful lifespan considers maintenance activities to reach these lifespans. The estimated useful life for each road type was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 9: Roads - Average Age



Levels of Service – O. Reg. 588/17

O. Reg. 588/17 defines specific levels of service to be addressed in every municipality's AMP pertaining to roads. Table 4 of the regulation has been included below for reference.

TABLE 4
ROADS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality.
Quality	Description or images that illustrate the different levels of road class pavement condition.	1. For paved roads in the municipality, the average pavement condition index value. 2. For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).

A map of the County's current and proposed road network and level of connectivity can be found in *Appendix C – Functional Road Classification and Planned Corridors*.

As required by O. Reg. 588/17, the number of lane-kilometres of each of arterial roads, collector roads, and local roads as a proportion of square kilometres of land area of the municipality can be found below in *Table 7: Lane-Kilometres of Roads*.

Table 7: Lane-Kilometres of Roads

	Road Length (km)	Lane Length (lane-km)	# Of Lane-km as a Proportion of Land Area (4,513 km ²)
Local	382.8	770.7	0.17
Collector	141.0	282.8	0.06
Arterial	345.5	701.5	0.16
Total	869.3	1,755.0	0.39

Given the County's large primarily rural land area, the County's road network provides a high level of connectivity throughout.

Lifecycle Analysis

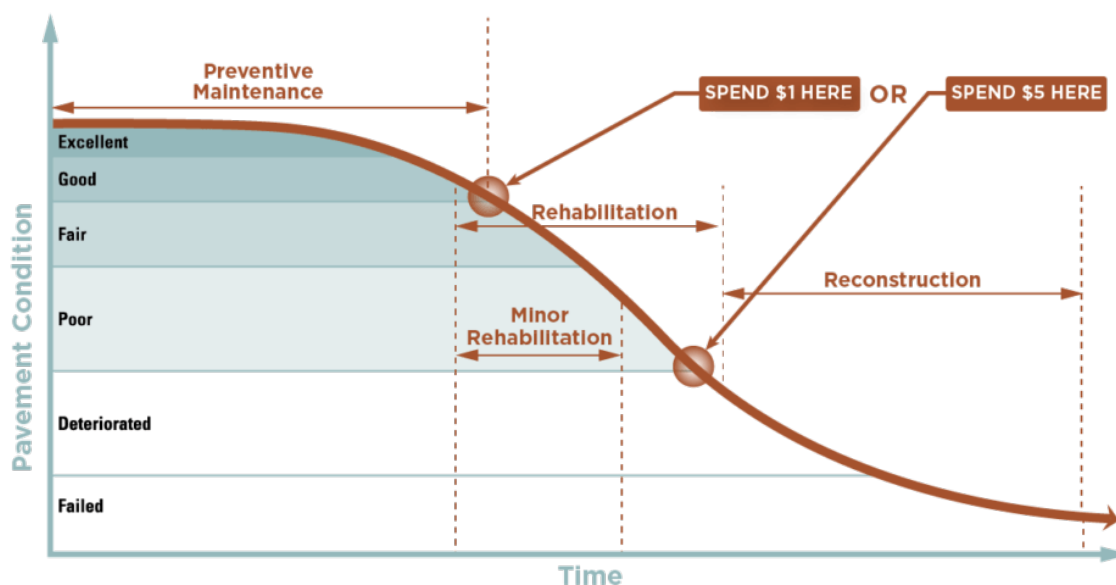
To ensure the road assets function as originally intended, several maintenance and capital investments are required. Through road needs analysis, the appropriate application of preventative maintenance techniques can be applied to roads to assist them in meeting the prescribed estimated useful life (EUL) duration and in some cases surpass the EUL. When a road asset has reached its EUL, or where a failure or imminent failure is present in an asset and the EUL is not going to be achieved,

appropriate application of capital techniques will be applied to the asset's replacement throughout its lifecycle.

Once an asset has reached its EUL or its condition rating reflects the need for replacement, disposal and replacement of the subject asset will be carried out. The EUL for road assets range from 7-75 years.

Figure 10: Roads - Lifecycle Activities shows an approximation of the activities that are considered over the lifecycle of a road asset. As can be seen on the axes, the pavement condition and age of the asset are critical factors in determining the most cost-effective activity.

Figure 10: Roads - Lifecycle Activities



Ideally, road assets are replaced in a manner that is synchronized with the EULs of other associated or dependent assets. For example, it would be inefficient to replace a road asset with a remaining EUL of 12 years in a member municipality when that municipality intends to replace the watermain directly below the road in 8 years. Although complex, strategic asset management practices can be used to coordinate optimal lifecycle strategies even when considering multiple asset categories managed by multiple parties.

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. This section outlines the County's lifecycle frameworks and general approaches for its road network.

Staff rely on many factors to guide the selection of optimal lifecycle activities and treatment options, including asset condition, criticality, previous work completed, and opportunities to economize through project bundling or coordination. As such, the data contained in this section is illustrative and intended to provide a broad overview of roads lifecycle management.

Paved Roads Lifecycle Approach

The County's general approach to its paved roads network is detailed below in *Table 8: Roads - Lifecycle Approach*.

Table 8: Roads - Lifecycle Approach

Event Class	Description
Maintenance	<ul style="list-style-type: none"> Patching is applied on an as-needed basis to repair and prevent pothole formations.
Preventative Maintenance	<ul style="list-style-type: none"> Primarily consists of grout sealing applications to ensure that moisture is prevented from infiltrating beneath the asphalt surface layer. Micro-surfacing is applied to select asphalt road surfaces in order to preserve and protect the underlying pavement structure and provide a new driving surface. Roads chosen for micro-surfacing application generally have low to moderate distress and narrow crack width.
Rehabilitation	<ul style="list-style-type: none"> Rehabilitation is prioritized using Pavement Condition Index (PCI) and cost. A grind and pave application is considered mid-life when the urban road surface exhibits significant deterioration. Rehabilitating the top asphalt layer ensures the life of the base and sub-base are extended. Pulverize and pave is applied mid-life to deteriorating road surfaces in an effort to extend the life of road assets and prevent the need for full road reconstruction. Cold in-place recycling with expanded asphalt mix (CIREAM) is applied to rural roads as a cost effective, mid-life rehabilitation strategy.
Replacement	<ul style="list-style-type: none"> Full road reconstruction projects are coordinated in conjunction with underground infrastructure, sharing costs between the two services.

Urban Roads

The County's current lifecycle framework for urban roads consists of two mid-life rehabilitation events, which provide savings over the life of the assets when contrasted with an end-of-life replacement only strategy. In addition, these events can maintain higher condition levels throughout the life of the road than a full end-of-life replacement- or reconstruction-only strategy.

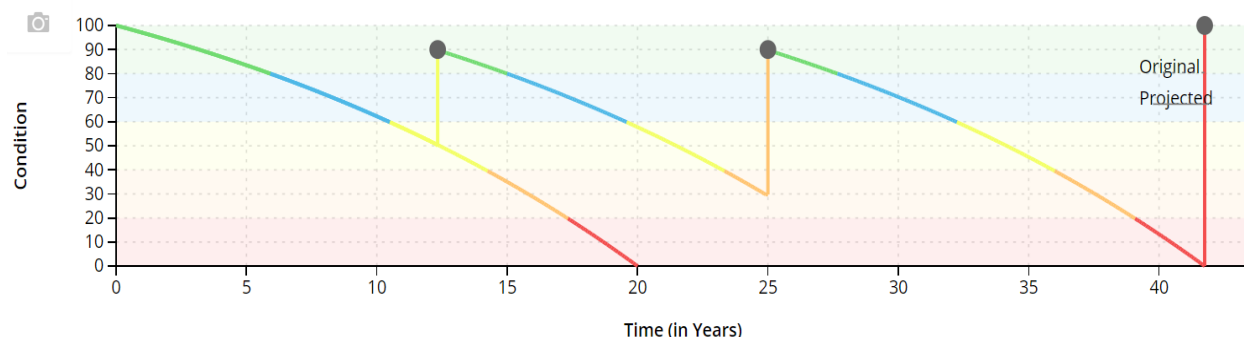
Fewer defects in the road provide a better riding surface, reduce financial, economic, and health and safety risks, and offer consistent and higher levels of service to the public. Surface level interventions, such as grind and pave, are also less disruptive than a full reconstruction.

Under this strategy, a grind and pave event is triggered when condition reaches 50%. The event increases the condition of the road segment to 90% at a 2021 cost of \$235,000 per kilometre. The costs, event triggers, and forecasted impact of these lifecycle events on the condition of the County's urban road network are outlined in *Table 9: Urban Roads - Lifecycle Strategy*.

Table 9: Urban Roads - Lifecycle Strategy

Event Name	Event Class	Event Range / Trigger	Impact	Cost/km
Grind and pave (10m)	Rehabilitation	50% Condition	90% Condition	\$235,000
Pulverize and pave (16.5m)	Rehabilitation	Year 25	90% Condition	\$550,000
Full reconstruction		End of life	100%	

Figure 11: Urban Roads - Sample Lifecycle Strategy



Developed in the County's asset manager software, CityWide, *Figure 11: Urban Roads - Sample Lifecycle Strategy* above illustrates a sample lifecycle strategy for urban roads over a standard deterioration curve, with green representing Very Good, blue representing Good, yellow representing Fair, orange representing Poor, and red representing Very Poor condition.

Rural Roads

The County's current strategy for its rural roads network comprises two rehabilitation events and a preventative maintenance event. Similar to its strategy for urban roads, these interventions can improve the performance of the treated segments, providing a smoother riding surface and higher ride comfort rating. Full traffic volumes can be accommodated over the majority of the life of rural roads, critically important to local economic and industrial activity.

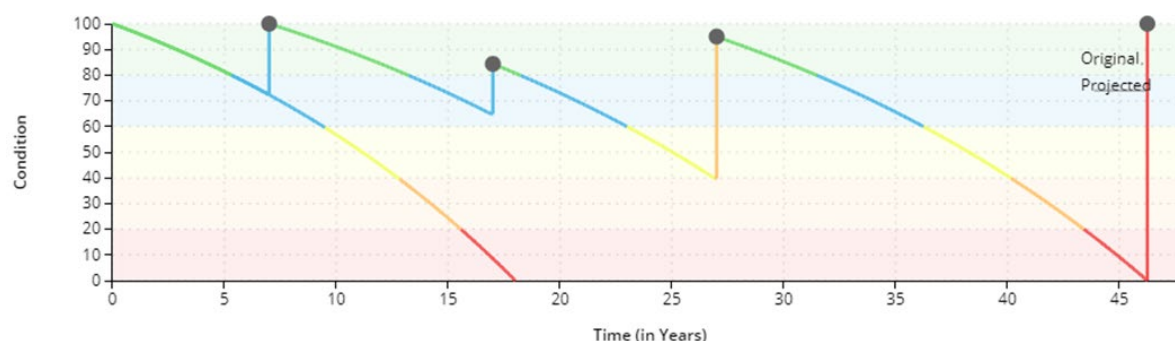
Under this strategy, a single overlay occurs in Year 7, and is expected to add 10 years to the service life of the treated road segment, at a cost of \$130,000 per kilometre. The costs, event triggers, and forecasted impact of these lifecycle events on the condition of the County's rural road network are outlined in *Table 10: Rural Roads - Lifecycle Strategy*.

Table 10: Rural Roads - Lifecycle Strategy

Event Name	Event Class	Event Range / Trigger	Impact	Cost/Km
Single Overlay	Rehabilitation	Year 7	Adds 10 years	\$130,000
Micro-surface	Preventative Maintenance	Year 17	Adds 5 years	\$85,000
Recycling (CIREAM, CIP)	Rehabilitation	Year 27-32	95% Condition	\$350,000

Also developed in CityWide, *Figure 12: Rural Roads - Sample Lifecycle Strategy* illustrates the above strategy for rural roads on a standard deterioration curve.

Figure 12: Rural Roads - Sample Lifecycle Strategy



10-Year Capital Requirements

The 10-year capital cost requirements for the County's road network as generated by CityWide are included in *Table 11: Roads - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the road infrastructure in a good state of repair and able to continue providing the current level of service.

Table 11: Roads - 10-Year Annual Capital Requirements

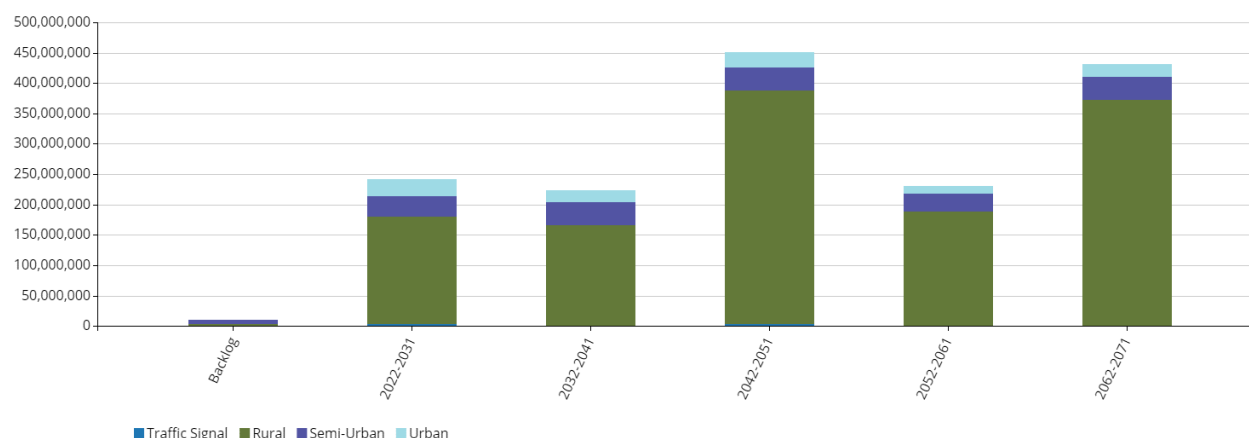
Roads	Rural	Semi-Urban	Traffic Signal	Urban	Roads Total
2022	\$21,522,904	\$5,216,699	\$0	\$853,773	\$27,593,376
2023	\$16,236,820	\$5,692,984	\$2,839,506	\$3,516,685	\$28,285,995
2024	\$22,557,930	\$5,234,644	\$0	\$3,701,649	\$31,494,223
2025	\$17,054,818	\$3,496,347	\$0	\$1,896,426	\$22,447,591
2026	\$24,471,628	\$4,174,730	\$0	\$14,130,893	\$42,777,251
2027	\$20,590,341	\$1,920,621	\$0	\$1,865,326	\$24,376,288
2028	\$26,721,161	\$818,166	\$0	\$1,745,024	\$29,284,351
2029	\$30,069,472	\$482,136	\$0	\$634,244	\$31,185,852
2030	\$24,886,612	\$2,950,737	\$0	\$173,364	\$28,010,713
2031	\$29,701,099	\$2,785,624	\$87,751	\$2,190,146	\$34,764,620
Average	\$23,381,279	\$3,277,269	\$292,726	\$3,070,753	\$30,022,026

Projected Capital Replacement Needs

Figure 13: Roads - Projected Replacement Needs summarizes the current estimated capital replacement requirements for the County's roads and related assets from 2022 to 2071. The chart also illustrates a relatively small backlog of approximately \$10.6 million, found primarily in the semi-urban segment. The largest forecasted spike in

capital spending is expected to take place in 2042-2051, totalling approximately \$451.5 million.

Figure 13: Roads - Projected Replacement Needs



With proper lifecycle strategies and project prioritization, an asset's service life can be extended significantly, and these spikes can be mitigated and smoothed out over a longer time frame. Staff consider these requirements when drafting the County's 10 Year Capital Plan.

Summary

Grey County's road assets are designed to facilitate the movement of people and goods throughout the area. These assets are very expensive to maintain and replace, making lifecycle decisions pertaining to roads important to the County's AMP and taxpayers. The County will strive to continuously improve road asset management practices and data quality.

Bridges and Culverts

Category Overview

Table 12: Bridges & Culverts - Category Overview summarizes the quantity and current replacement cost of the County's bridges and culverts. In total, bridges and culverts were valued at approximately \$338.3 million as of 2021. The County owns and manages a total of 206 structures spanning more than three metres; 140 of these being bridges and 66 being structural culverts. There are an additional 4 culverts spanning less than three metres but are of significant dollar value and have been included in the AMP.

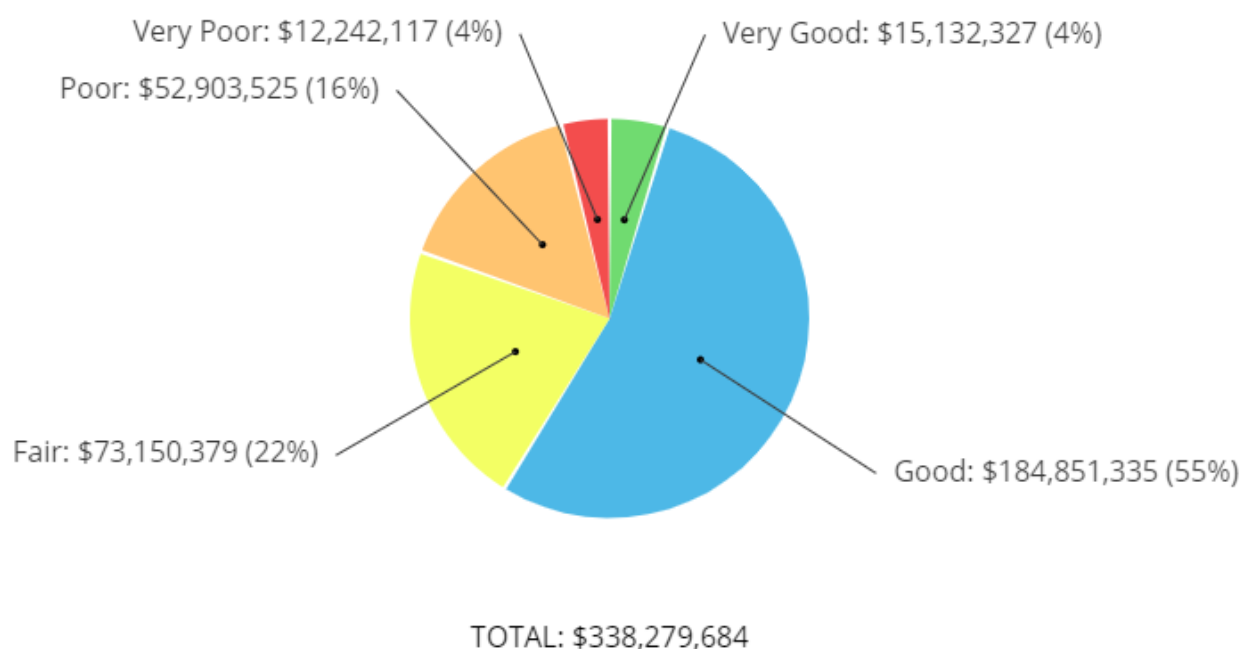
Table 12: Bridges & Culverts - Category Overview

Category	Segment	Quantity	Replacement Cost	Costing Method
Bridges & Culverts	Transportation Bridge Decks	130	\$7,465,511	OSIM Replacement Cost
	Transportation Bridge Structures	130	\$266,196,046	OSIM Replacement Cost
	Pedestrian Only Bridge	2	\$4,008,020	OSIM Replacement Cost
	Rail Trail Bridges	8	\$1,386,065	OSIM Replacement Cost
	Sub-Total Bridges	140	\$279,055,642	
	Culverts	58	\$57,757,734	OSIM Replacement Cost
	Rail Trail Culverts	8	\$1,082,648	OSIM Replacement Cost
	Significant Culverts < 3m	4	\$383,660	CPI
	Sub-Total Culverts	70	\$59,224,042	
	Bridges & Culverts Total	210	\$338,279,684	

Asset Condition

Figure 14: Bridges & Culverts - Condition Ratings summarizes the average condition of the County's bridges and culverts. Overall, 81% of the County's bridges and culverts are in fair or better condition. This data is based on the County's 2020 and 2021 Ontario Structure Inspection Manual (OSIM) reports.

Figure 14: Bridges & Culverts - Condition Ratings



Approach to Condition Assessments

Bridges and culverts inspections are regulated and are required to be conducted every two years by qualified engineers in compliance with the Ontario Structure Inspection Manual (OSIM). Grey County conducts its inspections on a biennial rotating cycle, with half of the County's structures being inspected in each alternating year. The County's entire bridges and structural culverts portfolio was assessed between the 2020 and 2021 OSIM inspection cycles.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to fulfill its intended purpose and provide value to users, safely and efficiently. *Table 13: Bridges & Culverts - Estimated Useful Life (EUL)* shows the EULs that are used for the County's various bridge and culvert assets, based upon the performance of County bridge and structural culvert assets historically. The EUL of each specific asset component is based upon the material type from which the structure is made but falls between the range provided in the table.

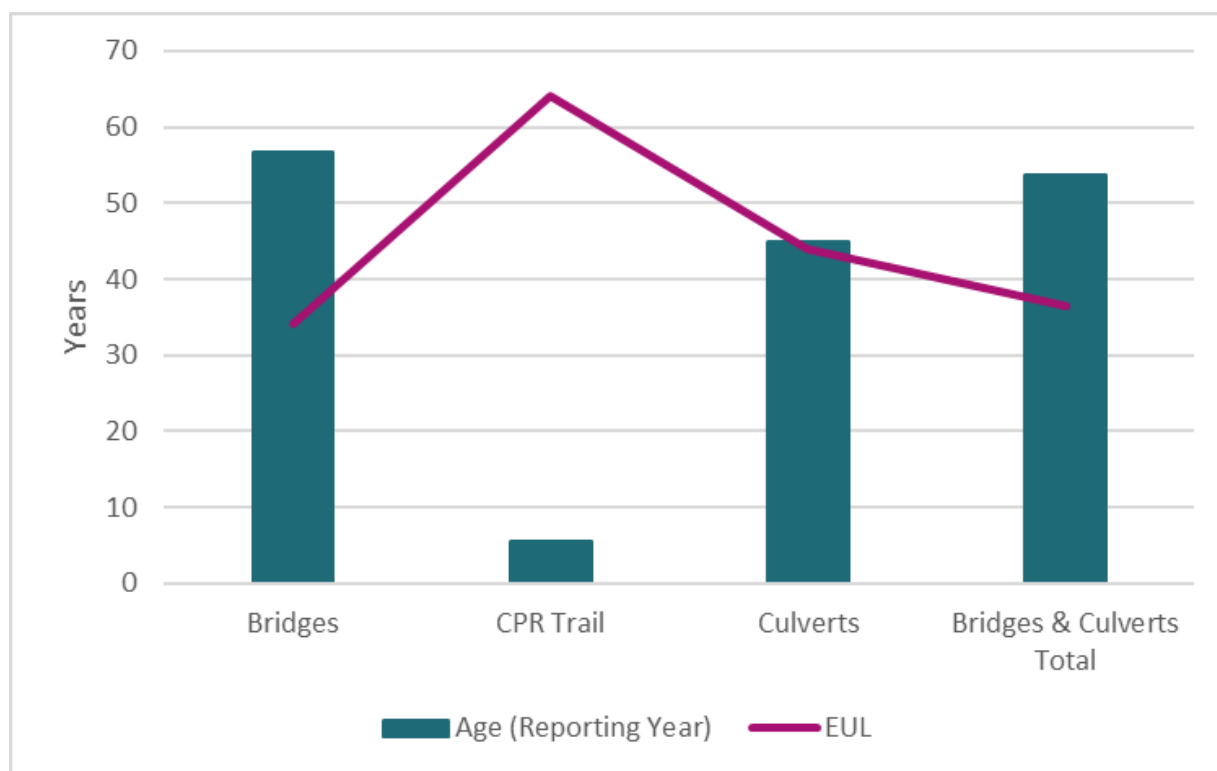
Table 13: Bridges & Culverts - Estimated Useful Life (EUL)

Asset Category	Segment	Estimated Useful Life (EUL) in Years
Bridges & Culverts	Bridges	
	Wearing Surface	15-25
	Superstructure	35-75
	Culverts	40-50

Average Age

Figure 15: Bridges & Culverts - Average Age compares the average age of each bridge and culvert asset category to the average estimated useful life of that category. This demonstrates that County bridges and culverts are often exceeding their estimated useful lives as a result of effective maintenance routines, since these assets are still generally in good condition as can be seen the Asset Condition section above. The estimated useful life for each bridge and culvert type was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide. It should be noted that the CPR Trail structures appear to currently have a low age due to replacements of many major structures in recent years, and also since the in-service date in Citywide is 2004 when the rail trail was acquired by the County, as the actual in-service date of most of these structures is unknown.

Figure 15: Bridges & Culverts - Average Age



Levels of Service – O. Reg. 588/17

O. Reg. 588/17 defines specific levels of service to be addressed in every municipality's AMP pertaining to bridges and culverts. Table 5 of the regulation has been included below for reference.

TABLE 5
BRIDGES AND CULVERTS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.
Quality	<ol style="list-style-type: none"> 1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts. 	<ol style="list-style-type: none"> 1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.

User Types

Grey County bridges and structural culverts are used by a wide variety of user types, including heavy transport trucks, motor vehicles, emergency vehicles, farm equipment, horse-drawn buggies, cyclists, and occasionally pedestrians.

Restrictions

As listed in Table 14: Bridges & Culverts - Load Restrictions below, Grey County has a total of eight road bridges with load limit restrictions, making up 6% of its road bridge inventory:

Table 14: Bridges & Culverts - Load Restrictions

#	Structure ID	Structure Location
1	023-350	Lot 15/16, Concession 21 Egremont
2	900-114	Lot 43, Concession 2/3E, Holland
3	900-188	Lot 12, Concession 18, Normanby
4	900-226	Lot 54, Concession 1N, Genelg
5	900-271	Lot 16, Concession 1W/1E, Normanby
6	900-307	Lot 23, Concession 4, Normanby
7	900-336	Lot 42, Concession 1, Proton
8	900-363	Lot 1, Concession 1, St. Vincent

A structure ID containing “900” as the first three digits indicates that the structure is a County-owned structure on a local municipality road (not on a Grey County road), and so as can be seen by the locations listed in the above chart the County’s restricted structures are located on local concession roads. These structures are currently providing the level of service required by users of these local roads.

Appendix D – Bridge Condition Index Sample Images and *Appendix E – Culvert Condition Index Sample Images* respectively provide example photos of bridge and culvert conditions.

Average Bridge Condition Index (BCI) Values

As per the most recent BCI values assigned during the 2020 and 2021 OSIM reporting, the County’s bridges have an average BCI of 61, and culverts have an average BCI of 58.

Lifecycle Analysis

All lifecycle strategies for the County’s bridges and structural culverts are driven by its biennial OSIM inspections and the phase of the asset’s lifecycle. *Table 15: Transportation Bridges & Culverts - Lifecycle Activities* and *Table 16: Trail Assets - Lifecycle Activities* outline the County’s current lifecycle strategies for its Transportation and Trails bridges and culverts respectively.

Bridge condition indices (BCI) are used to rate the condition of each structure and identify structures requiring immediate or short-term maintenance activities. Structures

identified as candidates for replacement also undergo load testing to determine if and when they should be replaced. Depending on the results of load tests, replacements can be deferred for up to five years, at which point a second load test is conducted.

Table 15: Transportation Bridges & Culverts - Lifecycle Activities

Event Name	Event Class	Event Range/ Trigger	Impact (e.g., New Condition)	Cost (\$/m ²)
Replacement (short span)	End-of-life replacement	BCI less than 30	New Condition: 100%	\$4.5k - \$5k
Replacement (long span)	End-of-life replacement	BCI less than 30	New Condition: 100%	\$3.5k
Replacement (CSP culverts)	End-of-life replacement	BCI less than 30	New Condition: 100%	\$3.5k
Replacement (CIP / pre-cast culverts)	End-of-life replacement	BCI less than 30	New Condition: 100%	\$3.5k - \$4k
Chip patch and seal	Maintenance	5 years	Change in Condition: 10%	\$5k-\$25k
Detailed deck condition survey	Maintenance/Rehab	Every 20-25 years	Inspection only	\$30K-\$100k
Soffit and Fascia repair	Maintenance/Rehab	20-25 years as needed	New Condition: 100%	\$5k-\$25k
Handrail/Barrier	Maintenance	7-10 years	Change in condition: 50%	\$5k-\$15k
Deck rehab	Rehabilitation	Every 20-25 years	New Condition: 100%	\$50-\$100k
Bridge washing	Maintenance	Annually	Change in Condition: 5%	\$60K for all structures
Reconstruction	Replacement	10-20% condition	New Condition: 100%	\$400k-\$5m

Table 16: Trail Assets - Lifecycle Activities

Event Name	Component	Event Range/ Trigger	Impact (e.g., New Condition)	Cost
Grading/Stone Dusting	All	As needed	100% condition	\$22k- \$25k
Grading	No surface replacement	20 km / year	100% condition	NA
Improvement (e.g., grading, tree clearing, new trails)	Forest Trails	1 / year	Varies	NA
General maintenance (e.g., grass cutting)	CP-Rail	As needed	Varies	\$25k
Inspection ³	CP-Rail (non- winter season)	Quarterly	None	NA
Inspection	Forest (railings, benches, and stairs)	As needed	None	NA
Consultant inspection	Bridges & culverts (<3m)	Every 5 years	None	NA
Consultant inspection (OSIM)	Bridges & culverts (>3m)	Every 2 years	None	\$15k
Structure replacement	Forest & CP-Rail (railings, benches, and stairs)	As needed	100% condition	\$500- \$400k

10-Year Capital Requirements

The 10-year capital cost requirements for the County's bridges and structural culverts as generated by CityWide are included in *Table 17: Bridges and Culverts - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the bridge and culvert infrastructure in a good state of repair and able to continue providing the current level of service.

³ Generally performed by ATV club

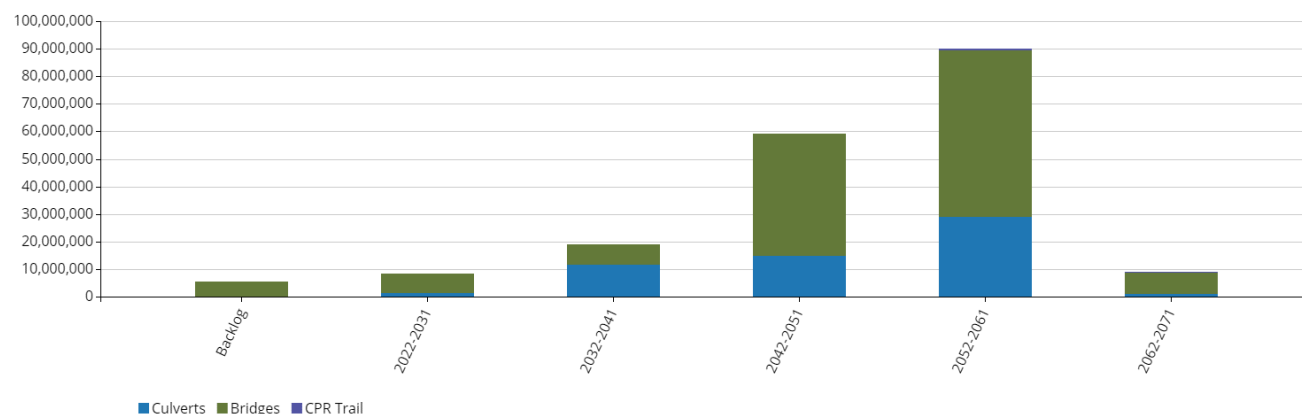
Table 17: Bridges and Culverts - 10-Year Annual Capital Requirements

Bridges & Culverts	Bridges	Culverts	Bridges & Culverts Total
2022	\$0	\$0	\$0
2023	\$0	\$0	\$0
2024	\$6,312	\$1,440,575	\$1,446,887
2025	\$12,799	\$0	\$12,799
2026	\$5,795	\$0	\$5,795
2027	\$5,957,768	\$0	\$5,957,768
2028	\$421,346	\$0	\$421,346
2029	\$298,755	\$0	\$298,755
2030	\$121,408	\$0	\$121,408
2031	\$10,435	\$0	\$10,435
Average	\$683,462	\$144,058	\$827,519

Projected Capital Replacement Needs

Figure 16: Bridges & Culverts - Projected Replacement Needs summarizes the capital replacement requirements for the County's bridge and culvert assets from 2022 to 2071. The chart also illustrates a backlog of approximately \$5.4 million, due to bridges and culverts that are functioning beyond their expected lifespans. The largest forecasted spike in capital spending is expected to take place in 2052-2061, totalling more than \$90.1 million.

Figure 16: Bridges & Culverts - Projected Replacement Needs



Summary

Grey County's bridge and culvert assets are designed to facilitate the movement of people and goods throughout the area. These assets are expensive to maintain

and replace and can have catastrophic consequences if failure occurs. The County will strive to continuously improve bridge and culvert asset management practices.

Stormwater

Category Overview

Grey County's stormwater infrastructure is in place along and across its transportation network. The purpose of this infrastructure is to control runoff created by wet weather events such as rain or snow melt. In rural environments stormwater is generally managed via roadside ditches and road crossing culverts. In urban environments the collection of runoff is through catch basins connected to conveyance pipes. Both types of systems carry the flow to outlets such as ditches, rivers, or lakes. The primary focus of County stormwater management infrastructure is to make the transportation network as safe as possible by shedding water from its surface and conveying it to a safe outlet.

Table 18: Stormwater – Category Overview summarizes the quantity and current replacement cost of the County's stormwater network by segment. The County has a total of 2,865m of stormwater sewers ranging in size from 150mm to 1500mm in diameter for round pipe, and as large as 2,800mm x 2,100mm for crossing culverts. In addition, the County has many other contributing minor stormwater components, such as catch basins, manholes, ditch inlets, and roadside ditching. As of 2021, the replacement value of the County's stormwater management system is estimated at approximately \$55.8 million.

Table 18: Stormwater – Category Overview

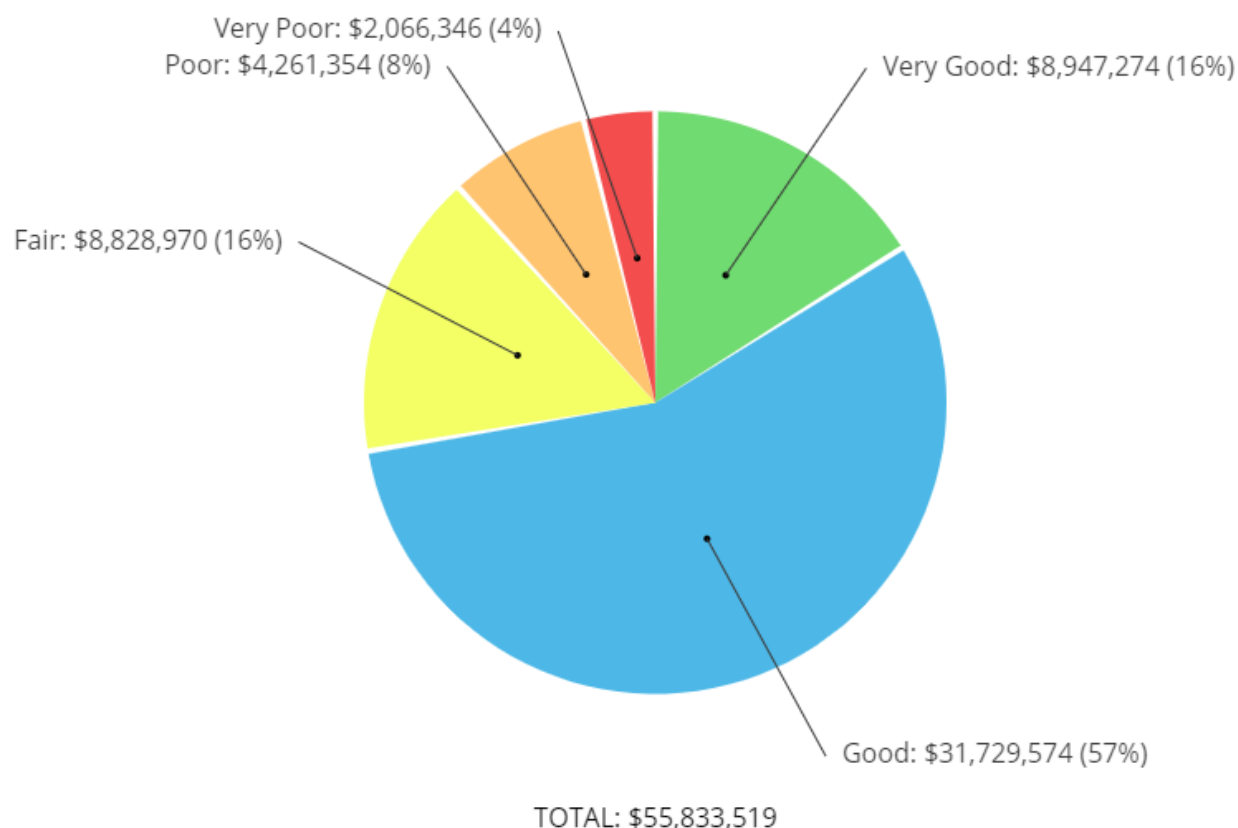
Category	Segment	Quantity	Replacement Cost	Costing Method
Stormwater	Minor Culverts	1,196 m	\$35,040,557	2018-2021 Stormwater Inspections
	Storm Sewers	1,669 m	\$20,792,962	2018-2021 Stormwater Inspections
	Stormwater Total	2,865 m	\$55,833,519	

Asset Condition

Figure 17: Stormwater - Condition Ratings summarizes the average condition of the County's stormwater assets that have been inspected to date (some are inaccessible due to high water levels or debris and have not yet been inspected). Overall, 89% of

the County's inspected stormwater assets are in fair or better condition. This data is based on the County's 2018-2021 stormwater inspection reports.

Figure 17: Stormwater - Condition Ratings



Approach to Condition Assessments

The County has undertaken a recurring visual inspection plan to determine and update the condition of stormwater infrastructure. These are carried out by County staff where assets are easily accessed, and a CCTV (Closed Circuit Television) contractor where access is restricted.

The County uses tools created by staff to determine the condition of storm assets as part of the annual review conducted by maintenance staff. These tools use best practices and are only used by staff that understand how they are used and what they are looking for to determine a condition rating. Generally, County staff collect condition data for crossing culverts and ditches.

Regarding storm sewers and storm structures, generally, the condition assessments for these assets are carried out by a CCTV contractor. The method used for determining the condition rating is by the National Association of Sewer Service Companies'

(NASSCO), Pipeline Assessment Certification Program (PACP). This program is well established as the standard for assessing gravity sewers.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to fulfill its intended purpose and provide value to users, safely and efficiently.

However, EUL must consider condition data to remain relevant. The County has adjusted the end of service life date of storm assets where condition information indicates an asset will not meet its estimated useful life date.

Table 19: Stormwater - Estimated Useful Life (EUL) shows the EULs that are used for the County's stormwater assets, based upon the performance of County stormwater assets historically. The EUL of each specific asset component is based upon the material type from which the structure is made but falls between the range provided in the table.

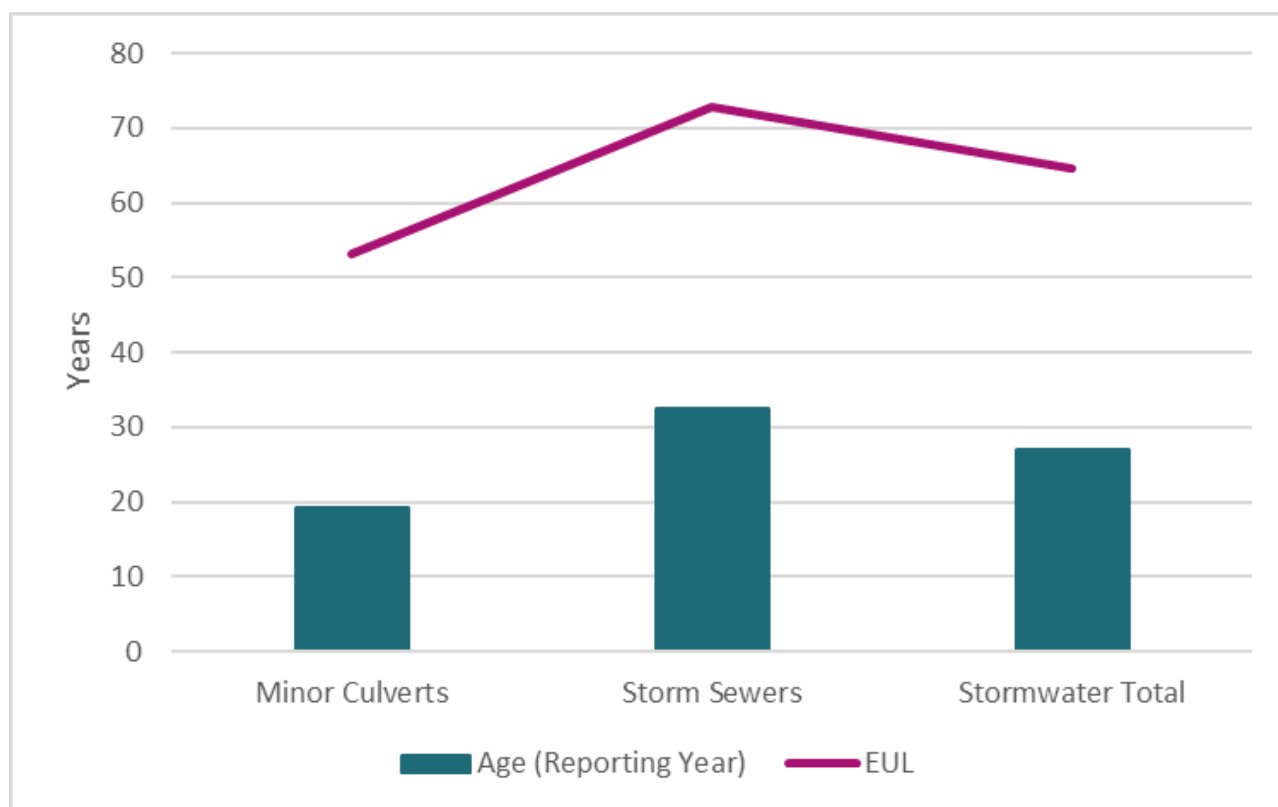
Table 19: Stormwater - Estimated Useful Life (EUL)

Asset Category	Segment	Estimated Useful Life (EUL) in Years
Stormwater	Minor Culverts	40-80
	Storm Sewers	50-80

Average Age

Figure 18: Stormwater - Average Age compares the average age of each stormwater category to the average estimated useful of that category. This appears to show that most County stormwater assets are significantly younger than their expected useful life, but it should be noted that many in-service dates for older County stormwater assets are best estimates informed by the 2018-2021 stormwater inspections. The estimated useful life for each stormwater type is determined based upon staff experience with each of the various stormwater material types within each category, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 18: Stormwater - Average Age



Levels of Service – O. Reg. 588/17

O. Reg. 588/17 defines specific levels of service to be addressed in every municipality's AMP pertaining to stormwater management assets. Table 3 of the regulation has been included below for reference.

TABLE 3
STORMWATER MANAGEMENT ASSETS

Column 1 Service attribute	Column 2 Community levels of service (qualitative descriptions)	Column 3 Technical levels of service (technical metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	1. Percentage of properties in municipality resilient to a 100-year storm. 2. Percentage of the municipal stormwater management system resilient to a 5-year storm.

As shown in the table above, O. Reg. 588/17 specifies community and technical levels of service in regard to municipal stormwater assets, which for many municipalities consists of an overall system of stormwater assets that work together to prevent flooding in the community. However, the purpose of County owned stormwater assets is to divert stormwater from County roadways to prevent flooding and washouts on County roadways, and to work in conjunction with the stormwater systems of member municipalities within the County to mitigate flooding elsewhere. Through partnership

with the 4 conservation authorities (Grand River CA, Grey Sauble CA, Nottawasaga Valley CA, and Saugeen Valley CA), the County attempted to gather data indicating the regulatory floodplain (greater of the regional or 100-year storm), but at this time this data is unavailable. The County cannot determine the extent of protection provided throughout the entire County area, as this level of stormwater management is completed by each lower tier municipality within the County using their respective independent systems.

Considering only the County owned stormwater management system with respect to the goal of protecting County roadways, at this time it is estimated that 100% would be resilient to a 5-year storm, and 0% could confidently be said to be resilient to a 100-year storm, especially when considering the increasing intensity and unpredictability of a “100-year storm” as the climate continues to rapidly change.

Lifecycle Analysis

To ensure the stormwater assets function as originally intended several maintenance and capital investments are made annually. Pipe flushing is undertaken every 2-3 years and catch basins are cleaned every year. Techniques such as slip lining and cured in place pipe can be executed to extend the useful life of an asset; these techniques can be used where an asset has reached its EUL and it is determined to be cost prohibitive to replace the asset, or where a failure or imminent failure is present in an asset and the EUL is not going to be achieved.

Once an asset has reached its EUL or its condition rating reflects the need for replacement, the subject asset is removed and replaced. The EUL for stormwater assets range from 40-80 years.

Where possible, storm assets are planned to be replaced during the reconstruction of the transportation network above them. There is a financial benefit to both types of work being completed together, and the finished product is more likely to be able to meet its EUL as an expedited deterioration of the road asset when works are undertaken independently of road work is avoided.

10-Year Capital Requirements

The 10-year capital cost requirements for the County’s stormwater assets as generated by CityWide are included in *Table 20: Stormwater - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the stormwater infrastructure in a good state of repair and able to continue providing the current level of service.

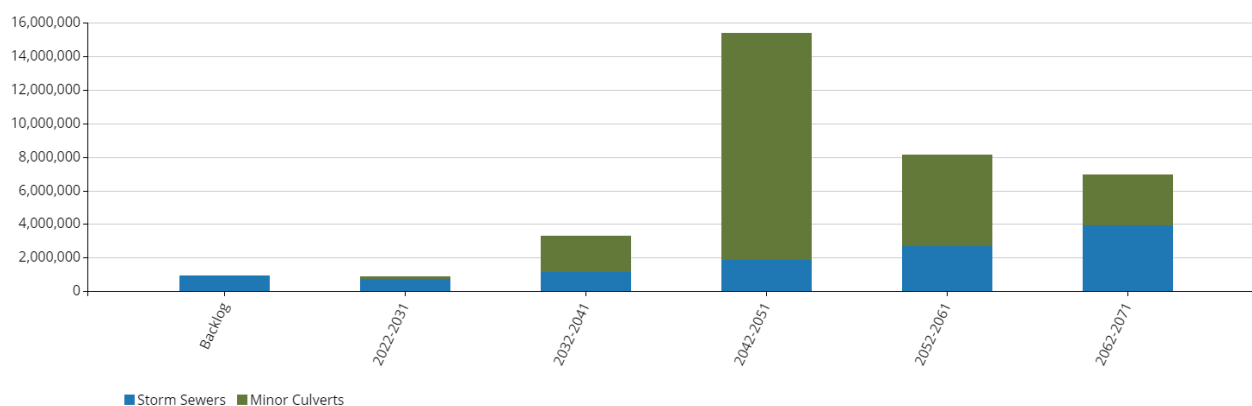
Table 20: Stormwater - 10-Year Annual Capital Requirements

Stormwater	Minor Culverts	Storm Sewers	Stormwater Total
2022	\$0	\$47,727	\$47,727
2023	\$0	\$0	\$0
2024	\$18,649	\$63,533	\$82,182
2025	\$0	\$16,667	\$16,667
2026	\$0	\$252,005	\$252,005
2027	\$0	\$158,491	\$158,491
2028	\$0	\$0	\$0
2029	\$0	\$76,483	\$76,483
2030	\$9,195	\$94,797	\$103,992
2031	\$100,643	\$21,275	\$121,918
Average	\$12,849	\$73,098	\$85,946

Projected Capital Replacement Needs

Figure 19: Stormwater - Projected Replacement Needs summarizes the capital replacement requirements for the County's stormwater assets from 2022 to 2071. The chart also illustrates a small backlog of approximately \$0.9 million, due primarily to storm sewers that are functioning beyond their expected lifespans. The largest forecasted spike in capital spending is expected to take place in 2042-2051, totalling approximately \$15.4 million, primarily consisting of replacements of minor culverts.

Figure 19: Stormwater - Projected Replacement Needs



Summary

The County's stormwater assets are designed to facilitate the transportation network in moving people and goods throughout the area, while providing flood proofing for adjacent properties. The storm network in its current state is expected to be able to

withstand a 5-year storm, and the majority of these assets are presently in good condition. A caveat to this is that the extreme weather witnessed recently may require augmentation of the existing systems to mitigate such storms. These changes would not be done under the prescription of EUL, making the financial management of these assets less predictable. The County will continue to strive to continue to maintain a resilient stormwater network and to close the existing data gaps within this asset class.

Buildings and Facilities

Category Overview

Table 21: Buildings & Facilities - Category Overview summarizes the quantity and current replacement cost of the County's buildings and facilities portfolio by segment with Affordable Housing shown as a separate category. In total, buildings and facilities had a current replacement cost of approximately \$127.8 million as of 2021. These replacement costs were determined by WalterFedy during the 2021 building condition assessments, and are best estimates based upon RS Means construction cost estimating data and the consultant's recent experiences with component costing. The County's buildings and facility assets are broken down into their respective components (i.e., windows, flooring, HVAC, etc.) in accordance with the Uniformat Level II standard. This breakdown allows for more accurate asset management planning for buildings by considering the useful life, condition, and replacement cost of individual components instead of that of the building as a whole.

Table 21: Buildings & Facilities - Category Overview

Category	Segment	# of Buildings	Replacement Cost	Costing Method
Buildings	Child Care	1	\$1,516,720	2021 BCAs / CPI
	General Government	6	\$30,430,864	2021 BCAs / CPI
	Grey Roots	14	\$15,099,475	2021 BCAs / CPI
	Long Term Care - Grey Gables	2	\$18,352,140	2021 BCAs / CPI
	Long Term Care - Lee Manor	1	\$20,394,882	2021 BCAs / CPI
	Long Term Care - Rockwood Terrace	1	\$20,375,464	2021 BCAs / CPI
	Paramedic Services	3	\$3,947,350	2021 BCAs / CPI
	Transportation	21	\$17,650,734	2021 BCAs / CPI
	Buildings Total	49	\$127,767,629	

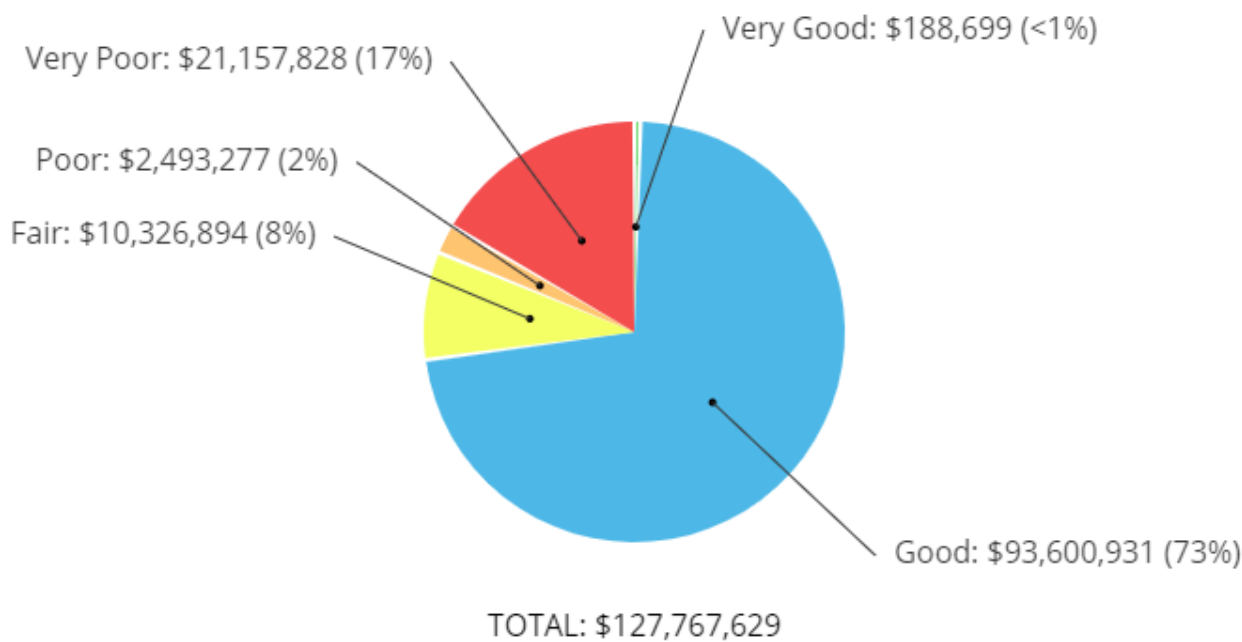
It should be noted that the replacement cost calculated for Rockwood Terrace in the above chart and for the purposes of this AMP is the historical cost of the building inflated by the NRBCPI. The rebuild of Rockwood Terrace is currently in initial planning

stages, but since no set cost has yet been determined the best available data has been used at this time. It is expected however that the actual rebuild cost will be significantly more than the inflated historical cost.

Asset Condition

Figure 20: Buildings & Facilities - Condition Ratings summarizes the average condition of the County’s buildings and facilities. Overall, based on age data, 81% of the County’s buildings and facilities assets are in fair or better condition. This data is based on the findings of the 2020-2021 Building Condition Assessments.

Figure 20: Buildings & Facilities - Condition Ratings



Approach to Condition Assessments

The County’s buildings and facilities portfolio, undergo standard building condition assessments (BCAs). Energy audits are also completed on all buildings and long-term care homes undergo monthly health and safety inspections in compliance with the Ministry of Health and Long-Term Care regulations.

Age Profile

An asset’s age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to safely and efficiently fulfill its intended purpose and provide value to users.

As assets age, their performance diminishes, often more rapidly as they approach the end of their design life. EULs can vary significantly within an asset category, from several years to many decades. The EULs currently used by the County for buildings and facilities and their components were determined by County staff based on actual lifespans regularly realized by each asset type and are summarized in Table 22:

Buildings & Facilities - Estimated Useful Life (EUL).

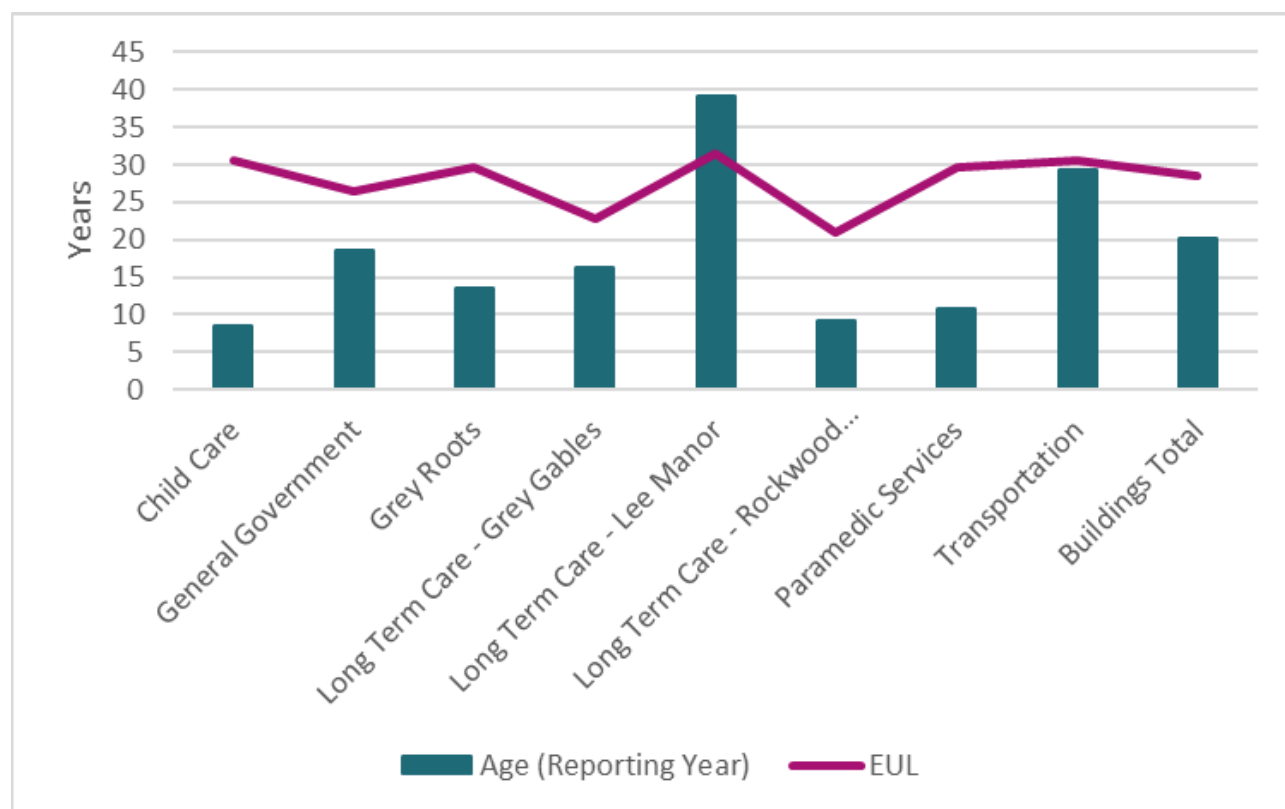
Table 22: Buildings & Facilities - Estimated Useful Life (EUL)

Asset Category	Segment	Estimated Useful Life (EUL) in Years
Buildings & Facilities	Buildings	
	Permanent Structures >5,000 sq. ft.	75
	Permanent Structures <5,000 sq. ft.	40
	Sand/Salt Domes & Sheds	40
	Long-Term Care Buildings	35
	Building Components	
	Structure	75
	Envelope	25
	Roof	15-40
	Electrical	75
	Mechanical	30
	HVAC	15
	Interior	15
	Lighting	25
	Exterior Signage	20

Average Age

Figure 21: Buildings & Facilities - Average Age compares the average age of the County's building asset components of each department to the average estimated useful of life of each department's building component assets. This demonstrates that some departments have building components that are currently still in service after exceeding their estimated useful life. This is not uncommon for building component assets, as some of these assets are only replaced once they have failed (i.e., window and envelope components are often only replaced upon failure). The estimated useful life for each asset was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 21: Buildings & Facilities - Average Age



Lifecycle Analysis

Lifecycle approaches to maintaining buildings and facilities in a state of good repair are component specific. The County's current lifecycle strategies include inspections of building envelope and mechanical systems. The BCAs include four distinct deliverables: the BCA itself, which identifies all physical, operating, and functional requirements of the buildings portfolio; a reserve fund study (RFS) which will provide an estimate of the reserve capital funding requirements for the next 30 years on an annual basis for major repairs, replacements, and renovations; the facility condition index (FCI), to be presented for each building; and an energy audit to assess the energy efficiency of buildings and identify conservation measures and capital projects.

Recommended lifecycle activities by major component type are illustrated in Table 23: *Buildings & Facilities - Lifecycle Activities* along with the event trigger and forecasted impact.

Table 23: Buildings & Facilities - Lifecycle Activities

Component Type	Component Sub-type	Treatment Option	Impact	Event Trigger (years)	
				Earliest	Latest
Sub-structure	N/A	Frost protection	Reduced deteriorate rate	25	30
		Drainage and Waterproofing	Reduced deterioration rate	25	50
Roof	Steel	Replacement	100% condition	50	60
	Membrane	Repair	20% condition added	13	20
		Replacement	100% condition	13	20
	Shingles	Replacement	100% condition	15	25
Exterior	Steel	Replacement	100% condition	50	60
	Brick	Replacement	100% condition	40	50
	Stone	Replacement	100% condition	40	50
Interior	All	Regular annual maintenance as identified through defects and regular inspections	Reduced deterioration rate	N/A	N/A
Services	Plumbing	Repair – annual maintenance cost per building	Variable life added	30	40
	Electrical	Repair-annual maintenance cost per building	Variable life added	30	40
	HVAC	Repair-annual maintenance cost per building	Variable life added	20	30
Commercial	Refrigeration	Replacement	100% condition	30	35
		Repair- preventative maintenance per service contract	Variable life added	1	1

10-Year Capital Requirements

The 10-year capital cost requirements for the County's buildings and facilities assets as generated by CityWide are included in *Table 24: Buildings & Facilities - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the building infrastructure in a good state of repair and able to continue providing the current level of service.

Table 24: Buildings & Facilities - 10-Year Annual Capital Requirements

Buildings	Child Care	General Government	Grey Roots	Grey Gables	Lee Manor
2022	\$0	\$0	\$0	\$8,739	\$0
2023	\$0	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$30,417	\$0
2025	\$0	\$120,000	\$7,000	\$132,000	\$0
2026	\$8,360	\$39,750	\$32,350	\$4,413	\$50,000
2027	\$0	\$56,500	\$24,200	\$34,239	\$0
2028	\$0	\$0	\$0	\$0	\$0
2029	\$63,600	\$1,186,100	\$1,302,735	\$1,075,800	\$752,410
2030	\$0	\$0	\$0	\$0	\$0
2031	\$0	\$2,500	\$715,360	\$20,000	\$15,000
Average	\$7,196	\$140,485	\$208,165	\$130,561	\$81,741

Buildings Cont.	Rockwood Terrace	Paramedic Services	Transportation	Buildings Total
2022	\$0	\$0	\$0	\$8,739
2023	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$30,417
2025	\$0	\$6,500	\$461,126	\$726,626
2026	\$0	\$18,000	\$0	\$152,873
2027	\$0	\$0	\$1,562,795	\$1,677,734
2028	\$24,045	\$0	\$0	\$24,045
2029	\$0	\$162,495	\$673,300	\$5,216,440
2030	\$77,982	\$0	\$25,523	\$103,505
2031	\$0	\$0	\$4,500	\$757,360
Average	\$10,203	\$18,700	\$272,724	\$869,774

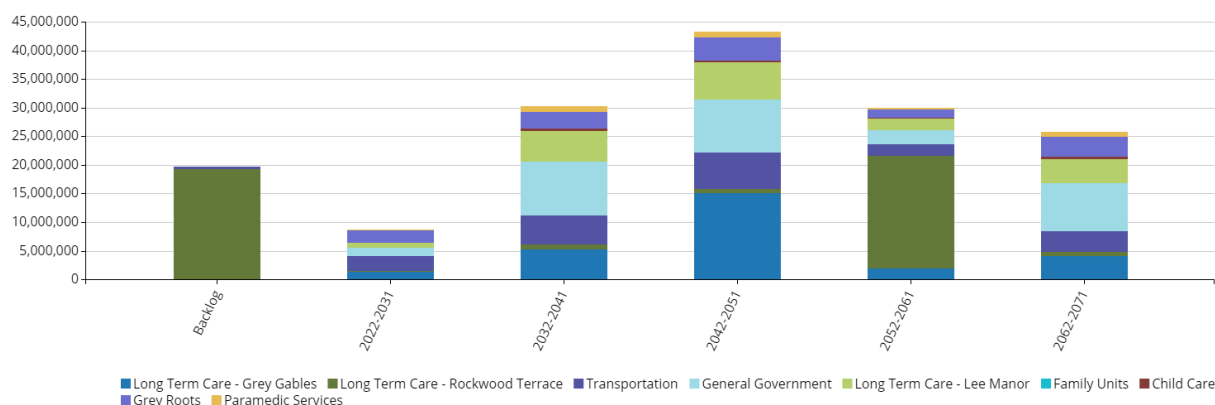
The capital requirements for Rockwood Terrace as listed above in *Table 24* are low because it is expected that most components of this existing building will not be replaced unless absolutely necessary given that it is planned for a complete rebuild in the next few years, and the cost of the new components that will be put in place upon rebuild will be factored into the total rebuild cost once available.

Projected Capital Replacement Needs

Figure 22: Buildings & Facilities - Projected Replacement Needs summarizes the capital replacement requirements for the County's building and facility assets from 2022 to 2071. The chart also illustrates a backlog of approximately \$19.8 million, due to primarily to Rockwood Terrace which is functioning beyond its expected lifespan. The

largest forecasted spike in capital spending is expected to take place in 2042-2051, totalling approximately \$43.2 million.

Figure 22: Buildings & Facilities - Projected Replacement Needs



Machinery and Equipment

Category Overview

Table 25: Machinery & Equipment - Category Overview summarizes the quantity and current replacement cost of the County's machinery and equipment portfolio. In total, machinery and equipment assets were valued at approximately \$16.4 million as of 2021.

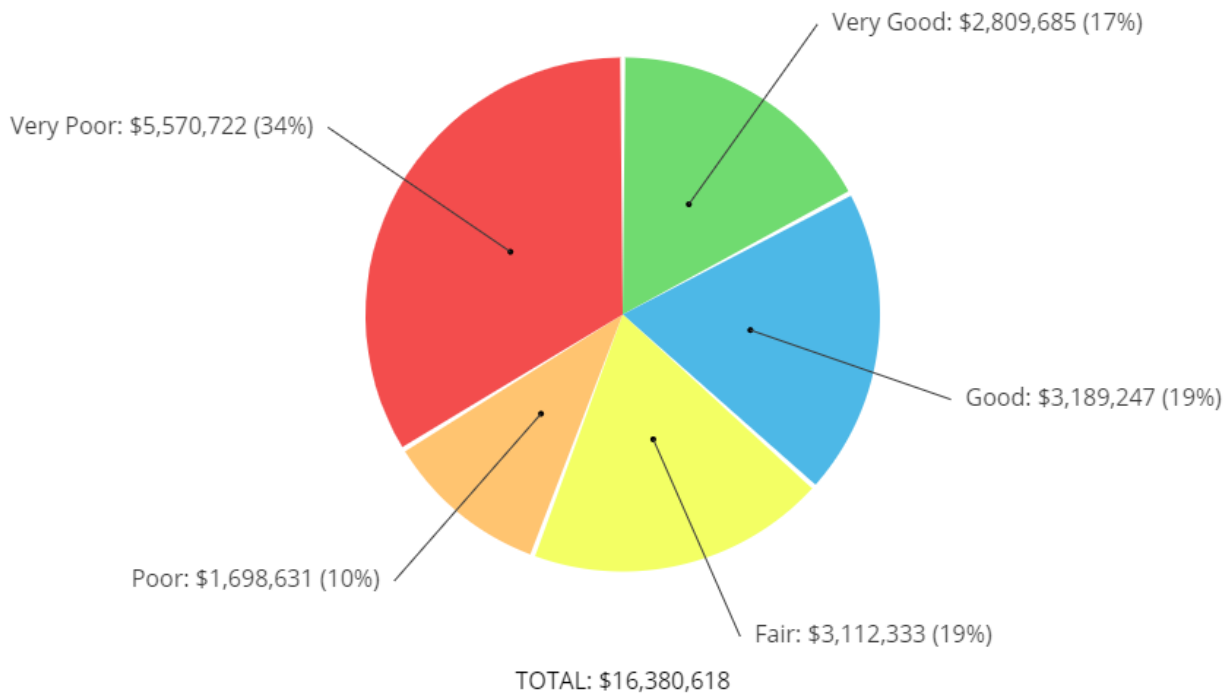
Table 25: Machinery & Equipment - Category Overview

Category	Segment	Quantity	Replacement Cost	Costing Method
Machinery & Equipment	Child Care	16	\$35,013	CPI
	General Government	162	\$837,419	CPI
	Grey Roots	78	\$3,054,875	CPI
	Information Technology	156	\$1,029,794	CPI
	Long Term Care - Grey Gables	147	\$1,113,610	CPI
	Long Term Care - Lee Manor	248	\$2,136,445	CPI
	Long Term Care - Rockwood Terrace	176	\$1,249,004	CPI
	Paramedic Services	127	\$1,624,521	CPI
	Planning	20	\$70,868	CPI
	Provincial Offences	31	\$63,268	CPI
	Sign Shop	5	\$47,914	CPI
	Social Services	88	\$219,868	CPI
	Transportation	133	\$4,898,019	CPI
	Machinery & Equipment Total	1,387	\$16,380,618	

Asset Condition

Figure 23: Machinery & Equipment - Condition Ratings summarizes the average condition of the County's machinery and equipment assets. Overall, 55% of the County's machinery and equipment assets are in fair or better condition. This data is based on the age-based condition assessment for most of these assets, as they typically decline linearly over their relatively short lifespans. It is important to consider that any asset that has exceeded its expected useful lifespan will appear as being in "poor" condition using age-based condition, and therefore this data is likely skewed this way at present. The County aims to utilize inspection-based assessments in the future to provide more accuracy on the condition of its machinery and equipment assets.

Figure 23: Machinery & Equipment - Condition Ratings



Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to safely and efficiently fulfill its intended purpose and provide value to users.

As assets age, their performance diminishes, often more rapidly as they approach the end of their design life. EULs can vary significantly within an asset category, from

several years to many decades. The County's machinery and equipment assets portfolio contains nearly 150 different components, or asset types, each with its own EUL. The data presented here is shown at the segment level. The EULs currently used by the County for machinery and equipment and their components were determined by County staff based on actual lifespans regularly realized by each asset type and are summarized in *Table 26: Machinery & Equipment - EUL*.

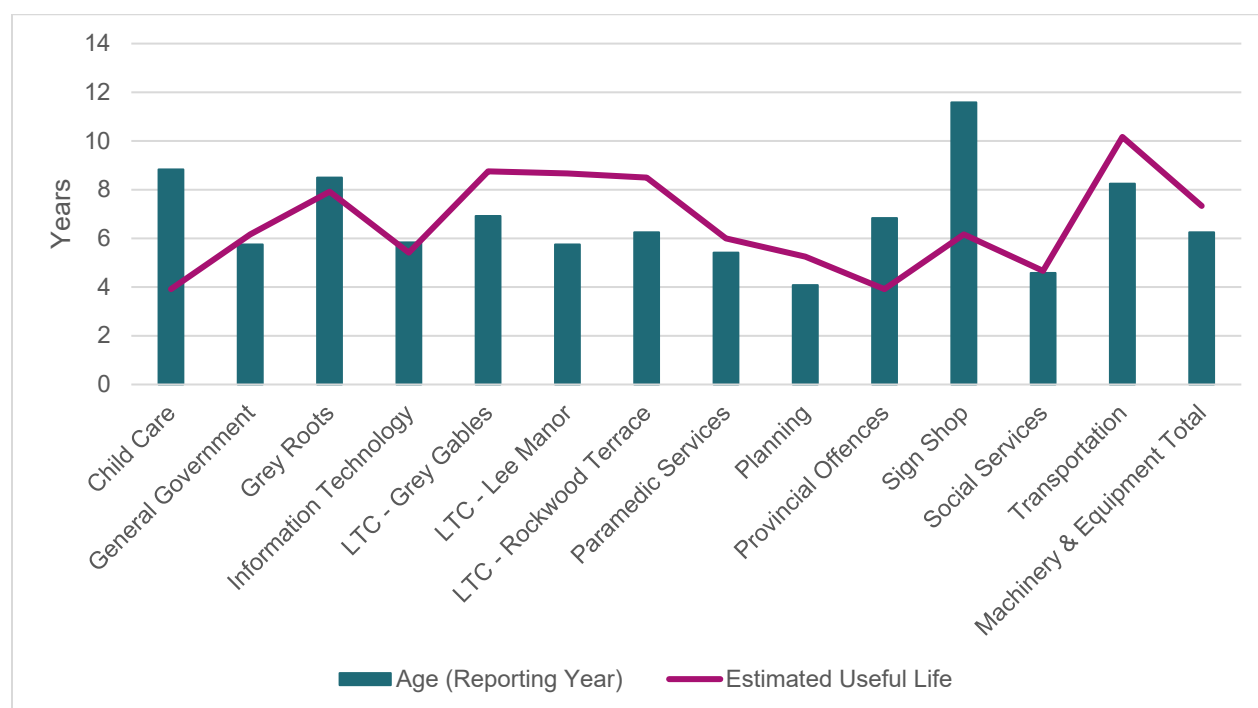
Table 26: Machinery & Equipment - EUL

Asset Category	Asset Segment	Estimated Useful Life (EUL) in Years
Machinery and Equipment	Child Care	3-5
	EMS	4-10
	General Government	3-20
	Grey Roots	3-40
	Housing	3
	Information Technology	3-15
	Long Term Care - Grey Gables	3-20
	Long Term Care - Lee Manor	3-30
	Long Term Care - Rockwood Terrace	3-30
	Planning	3-15
	Provincial Offences	3-15
	Sign Shop	3-10
	Social and Family Service	3-15
	Transportation	3-40

Average Age

Figure 24: Machinery & Equipment - Asset Average Ages compares the average age of each department's machinery and equipment assets to the average estimated useful of that department's machinery and equipment assets. This demonstrates that some department's assets are currently still in service after exceeding their estimated useful life. This is not uncommon for machinery and equipment assets, as some of these assets are only replaced upon failure. The estimated useful life for each asset was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 24: Machinery & Equipment - Asset Average Ages



Lifecycle Analysis

Small machinery and equipment typically do not require sophisticated lifecycle strategies. Manufacturers' recommendations on preventative maintenance are followed to maximize the lifespan of assets. Machinery and equipment strategies for the County's information technology assets have been provided as samples in *Table 27: Information Technology Equipment - Lifecycle Strategies* and *Table 28: Information Technology Communication Tower - Lifecycle Strategies*. Lifecycle strategies for major equipment and vehicles are outlined in the vehicles section of this report.

Regulated equipment, such as defibrillators, stair chairs, and stretchers follow their own replacement cycles. Defibrillators are replaced every seven years, and stair chairs and stretchers with a power load are disposed of after 10 years.

Table 27: Information Technology Equipment - Lifecycle Strategies

Event Name	Event Class	Event Range / Trigger	Impact	Cost
Computer / Server Replacement	Replacement	5 – 7 years	100% condition	Variable
Inspections	Maintenance	Variable	Performance check	N/A
Patching	Maintenance	Monthly - Quarterly	Improve performance	N/A
Software Base Monitoring	Maintenance	Continual	Improve performance	N/A

Table 28: Information Technology Communication Tower - Lifecycle Strategies

Event Name	Event Class	Event Range / Trigger	Impact	Cost
Inspections	Maintenance	Every 3 years	Performance check	N/A
Routine Maintenance (galvanizing, tension on guide wires, antennas, safety)	Maintenance	Dependent on Inspections	Improve performance	Varies
Structural Assessment (condition, loading, Geotech, etc.)	Maintenance	Every 5 years	Improve performance	Varies

The risks associated with these lifecycle activities are that an asset could fail between inspections, or before the expected end of useful life. This risk is mitigated by having spare or replacement assets readily available.

Current Level of Service

The current level of service being offered by the County's machinery and equipment assets can be assessed by using the Annual Reinvestment Rate key performance indicator (KPI). This metric is considered to be both a community and technical LOS. In 2021, the County's machinery and equipment annual reinvestment rate was 7.7%; calculated as the total cost of 2021 new machinery and equipment acquisitions and additions as a percentage of the opening cost of all machinery and equipment assets.

10-Year Capital Requirements

The 10-year capital cost requirements for the County's machinery and equipment assets as generated by CityWide are included in *Table 29: Machinery & Equipment - 10 Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the machinery and equipment in a good state of repair and able to continue providing the current level of service.

Table 29: Machinery & Equipment - 10 Year Annual Capital Requirements

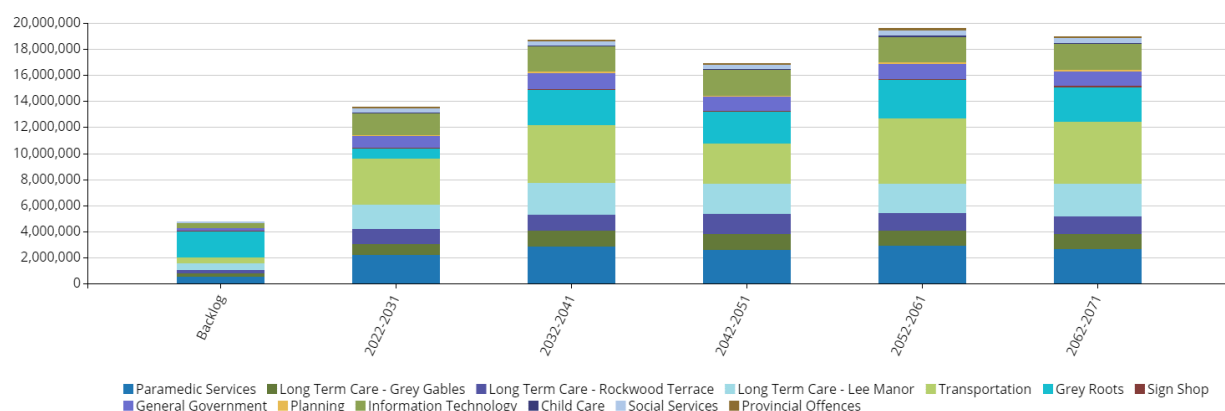
Machinery & Equipment	Child Care	General Government	Grey Roots	IT	Grey Gables	Lee Manor	Rockwood Terrace
2022	\$0	\$40,288	\$140,962	\$0	\$48,448	\$57,721	\$75,561
2023	\$4,108	\$75,370	\$5,528	\$562,050	\$112,557	\$87,666	\$49,028
2024	\$0	\$124,287	\$68,794	\$43,859	\$78,104	\$133,486	\$79,975
2025	\$19,134	\$106,267	\$50,794	\$59,123	\$95,710	\$403,531	\$139,981
2026	\$0	\$0	\$12,446	\$78,661	\$65,993	\$196,715	\$77,453
2027	\$0	\$96,504	\$70,186	\$148,417	\$113,819	\$144,044	\$114,581
2028	\$23,242	\$140,071	\$48,935	\$585,445	\$119,969	\$213,101	\$175,613
2029	\$0	\$196,741	\$334,995	\$43,859	\$100,508	\$143,980	\$181,931
2030	\$0	\$39,645	\$7,387	\$92,468	\$84,101	\$305,760	\$179,005
2031	\$19,134	\$64,701	\$43,407	\$23,395	\$41,787	\$151,029	\$93,599
Average	\$6,562	\$88,387	\$78,343	\$163,728	\$86,100	\$183,703	\$116,673

M&E Cont.	Paramedic Services	Planning	Prov. Offences	Sign Shop	Social Services	Transportation	M & E Total
2022	\$18,548	\$0	\$0	\$0	\$0	\$131,900	\$513,428
2023	\$1,100	\$6,312	\$3,658	\$0	\$3,560	\$5,155	\$916,092
2024	\$16,216	\$4,977	\$2,378	\$0	\$35,042	\$58,893	\$646,011
2025	\$72,025	\$21,922	\$36,143	\$1,647	\$95,617	\$74,990	\$1,176,884
2026	\$1,043,100	\$0	\$0	\$28,455	\$0	\$26,480	\$1,529,303
2027	\$32,571	\$0	\$0	\$0	\$6,961	\$101,218	\$828,301
2028	\$61,306	\$14,824	\$27,662	\$1,647	\$38,575	\$1,302,609	\$2,752,999
2029	\$193,957	\$26,842	\$2,378	\$0	\$68,393	\$962,154	\$2,255,738
2030	\$653,569	\$13,410	\$12,139	\$28,455	\$59,098	\$277,245	\$1,752,282
2031	\$92,024	\$8,512	\$24,004	\$1,647	\$36,519	\$578,657	\$1,178,415
Average	\$218,442	\$9,680	\$10,836	\$6,185	\$34,377	\$351,930	\$1,354,945

Projected Capital Replacement Needs

Figure 25: Machinery & Equipment - Projected Replacement Needs summarizes the capital replacement requirements for the County's machinery and equipment assets from 2022 to 2071. The chart also illustrates a small backlog of approximately \$4.8 million, which is caused by machinery and equipment assets currently in use past their expected lifespans, and that will be replaced upon failure or obsolescence. The largest forecasted spike in capital spending is expected to take place in 2052-2061, totalling approximately \$19.6 million.

Figure 25: Machinery & Equipment - Projected Replacement Needs



Land Improvements

Category Overview

Table 30: *Land Improvements - Category Overview* summarizes the quantity and current replacement cost of the County's land improvements portfolio by segment. In total, land improvements were valued at approximately \$10.1 million as of 2021.

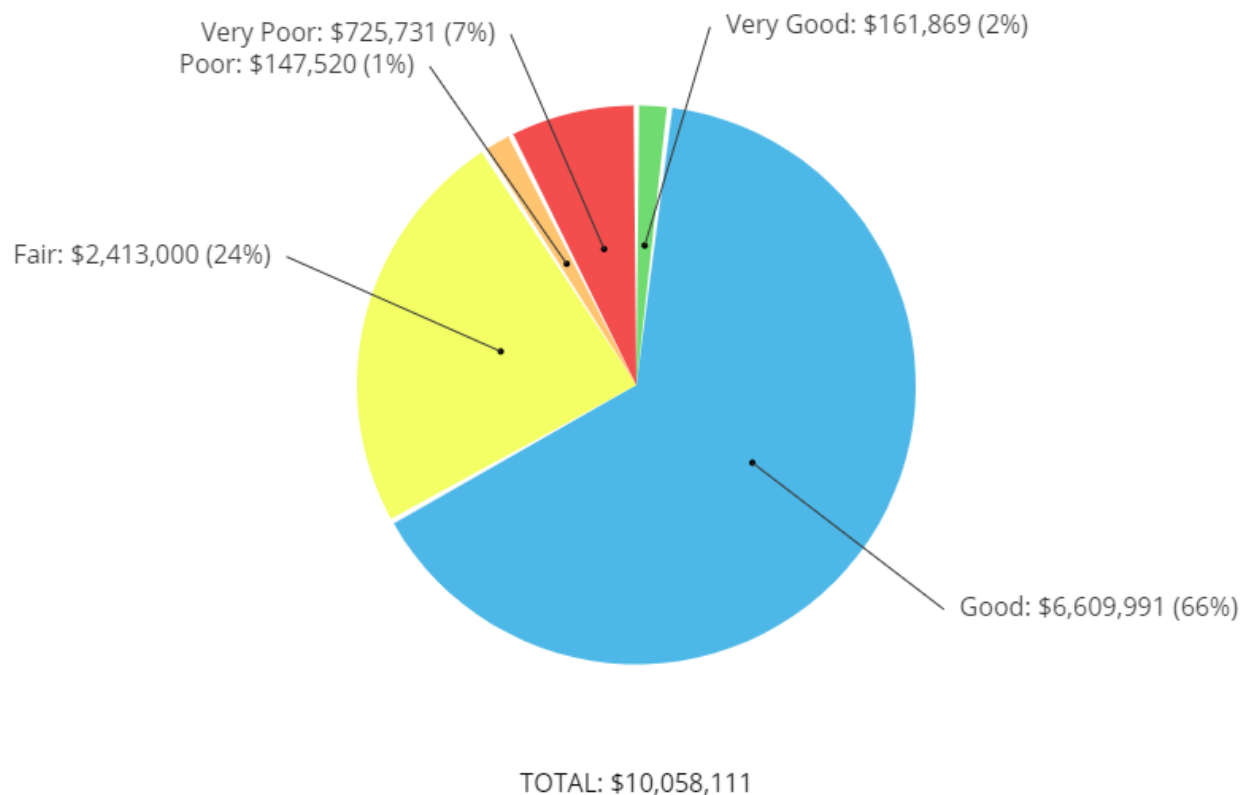
Table 30: *Land Improvements - Category Overview*

Category	Segment	Quantity	Replacement Cost	Costing Method
Land Improvements	Child Care	8	\$125,596	2021 BCAs / CPI
	General Government	24	\$2,631,710	2021 BCAs / CPI
	Grey Roots	12	\$2,198,915	2021 BCAs / CPI
	Long Term Care - Grey Gables	5	\$876,400	2021 BCAs / CPI
	Long Term Care - Lee Manor	14	\$961,032	2021 BCAs / CPI
	Long Term Care - Rockwood Terrace	1	\$212,240	2021 BCAs / CPI
	Paramedic Services	10	\$168,500	2021 BCAs / CPI
	Transportation	33	\$2,883,718	2021 BCAs / CPI
	Land Improvements Total	107	\$10,058,111	

Asset Condition

Figure 26: *Land Improvements - Condition Ratings* summarizes the average condition of the County's land improvement assets. Overall, based on age data, 92% of the County's land improvement assets are in fair or better condition. This data is based on the 2020-2021 Building Condition Assessments.

Figure 26: Land Improvements - Condition Ratings



Approach to Condition Assessments

The conditions of the County's land improvement assets are assessed in the same manner as the County's building assets, through the completion of standard building condition assessments (BCAs) every five years.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to fulfill its intended purpose and provide value to users, safely and efficiently. The EULs currently used by the County land improvements and their components were determined by County staff based on actual lifespans regularly realized by each asset type and are summarized in *Table 31: Land Improvements - Estimated Useful Life (EUL)*.

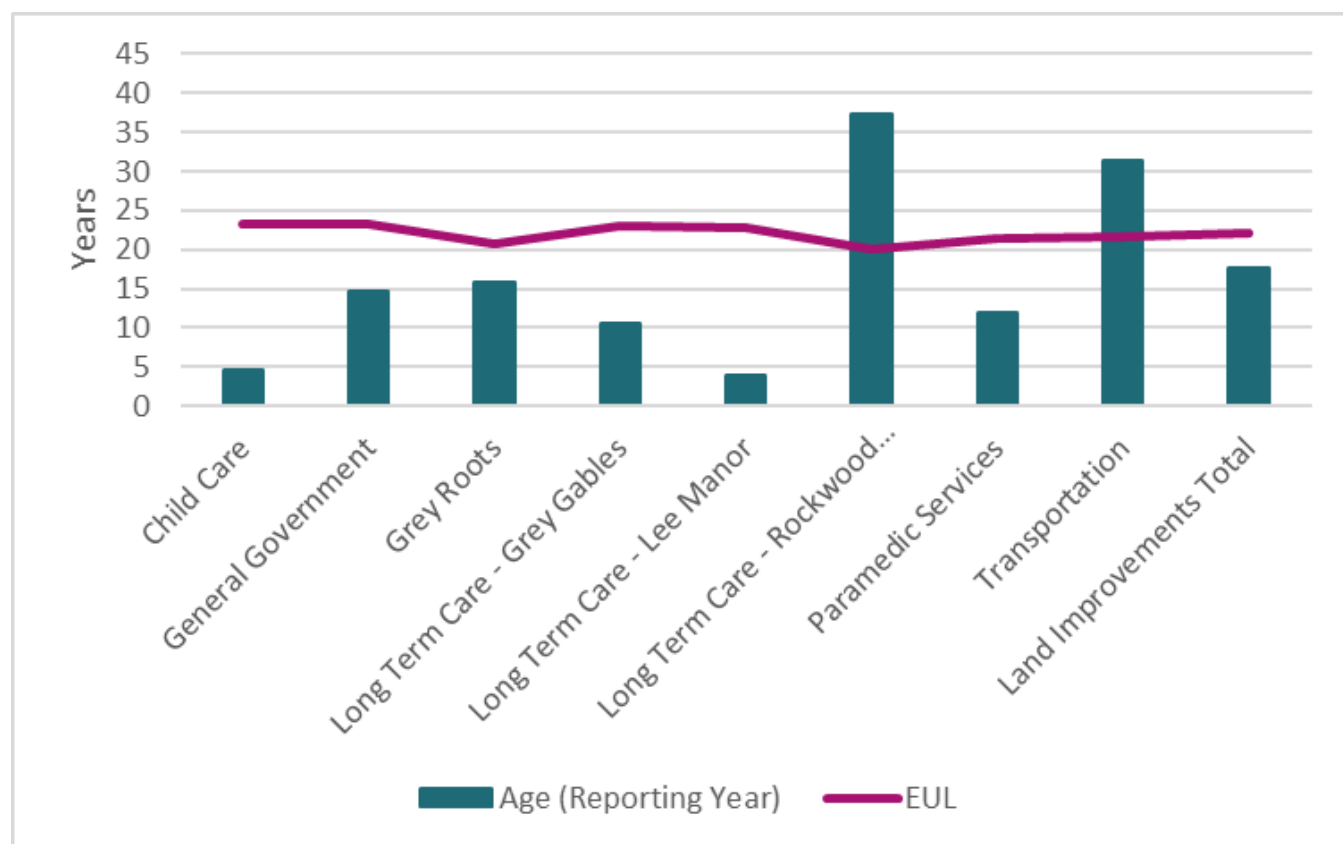
Table 31: Land Improvements - Estimated Useful Life (EUL)

Asset Category	Segment	Estimated Useful Life (EUL) in Years
Land Improvements	Fencing	20
	Landscaping	20
	Parking Lots	20
	Driveways	20
	Sidewalks	20
	Retaining Walls	20
	Lighting	25
	Sheds	40

Average Age

Figure 27: Land Improvements - Average Age compares the average age of the County's land improvement asset components of each department to the average estimated useful of life of each department's land improvement component assets. This demonstrates that some departments have land improvement components that are currently still in service after exceeding their estimated useful life. This is not uncommon for land improvement component assets, as these assets are generally only replaced when they are in or approaching poor condition (i.e., parking lots are only replaced once in poor condition). The estimated useful life for each asset was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 27: Land Improvements - Average Age



Lifecycle Analysis

Lifecycle approaches to maintaining land improvement in a state of good repair are component specific. The County's current lifecycle strategies include inspections of all land improvement assets within the Building Condition Assessments (BCAs) which include four major components; the BCA itself, which identifies all physical, operating, and functional requirements of land improvement assets, a reserve fund study (RFS) which provides an estimate of the reserve capital funding requirements for the next 30 years on an annual basis for major repairs, replacements, and renovations, and an assessment of the current condition of each of the components.

10-Year Capital Requirements

The 10-year capital cost requirements for the County's land improvement assets as generated by CityWide are included in *Table 32: Land Improvements - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the

next 10 years to keep the land improvement infrastructure in a good state of repair and able to continue providing the current level of service.

Table 32: Land Improvements - 10-Year Annual Capital Requirements

Land Improvements	Child Care	General Government	Grey Roots	Grey Gables
2022	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$46,215	\$0
2025	\$0	\$0	\$0	\$0
2026	\$0	\$10,000	\$0	\$0
2027	\$0	\$0	\$0	\$0
2028	\$0	\$0	\$0	\$0
2029	\$0	\$0	\$0	\$0
2030	\$0	\$0	\$0	\$0
2031	\$8,000	\$392,000	\$310,000	\$752,000
Average	\$800	\$40,200	\$35,622	\$75,200

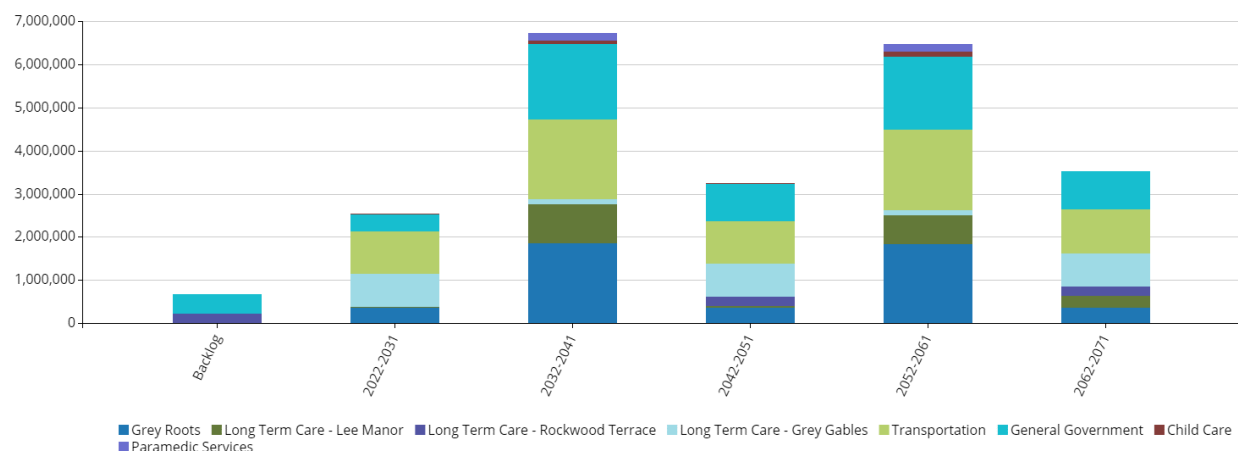
Land Improvements Continued	Lee Manor	Rockwood Terrace	Transportation	Land Improvements Total
2022	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0
2024	\$0	\$0	\$0	\$46,215
2025	\$0	\$0	\$0	\$0
2026	\$0	\$0	\$137,520	\$147,520
2027	\$0	\$0	\$0	\$0
2028	\$0	\$0	\$0	\$0
2029	\$0	\$0	\$0	\$0
2030	\$0	\$0	\$0	\$0
2031	\$30,000	\$0	\$844,500	\$2,336,500
Average	\$3,000	\$0	\$98,202	\$253,024

Projected Capital Replacement Needs

Figure 28: Land Improvements - Projected Replacement Needs summarizes the capital replacement requirements for the County's land improvement assets from 2022 to 2071. The chart also illustrates a backlog of approximately \$0.7 million, due primarily to the Administration Building parking lot that is currently functioning beyond its expected lifespan but is scheduled for replacement in 2022. The largest forecasted spike in

capital spending is expected to take place in 2032-2041, totalling more than \$6.7 million.

Figure 28: Land Improvements - Projected Replacement Needs



Vehicles

Category Overview

Table 33: *Vehicles - Category Overview* summarizes the quantity and the current replacement cost of the County's vehicle portfolio by segment. In total, vehicles were valued at \$11.6 million as of 2021.

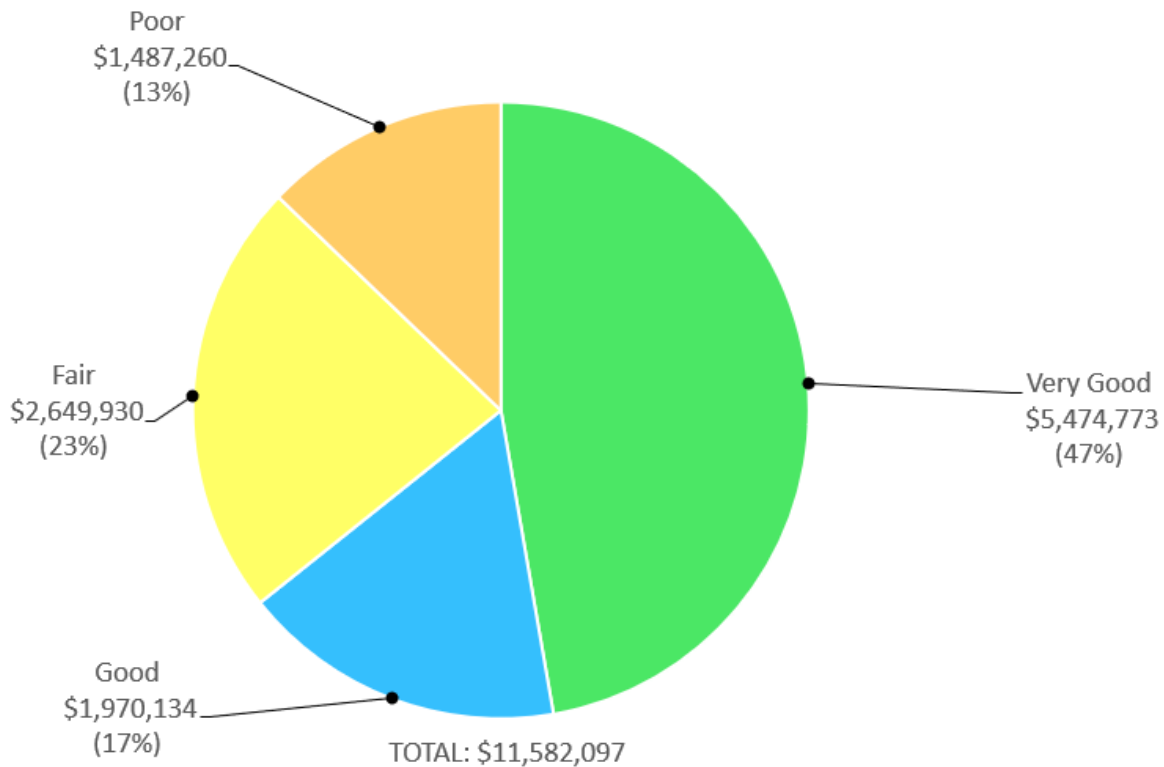
Table 33: Vehicles - Category Overview

Category	Segment	Quantity	Replacement Cost	Costing Method
Vehicles	General Government	1	\$25,004	CPI
	Paramedic Services	22	\$3,151,909	CPI
	Social Services	3	\$127,463	CPI
	Transportation	54	\$8,277,721	CPI
	Vehicles Total	80	\$11,582,097	

Asset Condition

Figure 29: *Vehicles - Condition Ratings* summarizes the average condition of the County's vehicles. Overall, based on a combination of condition rating and age data, 87% of the County's vehicle assets are in fair or better condition. Condition ratings are assigned by County mechanic staff using the Fleet Manual developed inhouse by staff.

Figure 29: Vehicles - Condition Ratings



Approach to Condition Assessments

The fleet of County vehicles undergo annual inspections completed by Transportation Services mechanic staff. The overall state and operability of each vehicle is assessed using a weighted point system as outlined in the Fleet Manual which considers hours, utilization, condition, age, and repair costs.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to fulfill its intended purpose and provide value to users, safely and efficiently. The EULs currently used by the County for vehicle assets were determined by County staff based on actual lifespans regularly realized by each asset type before being sold by the County to maximize residual value and are summarized in *Table 34: Vehicles - Estimated Useful Life (EUL)*.

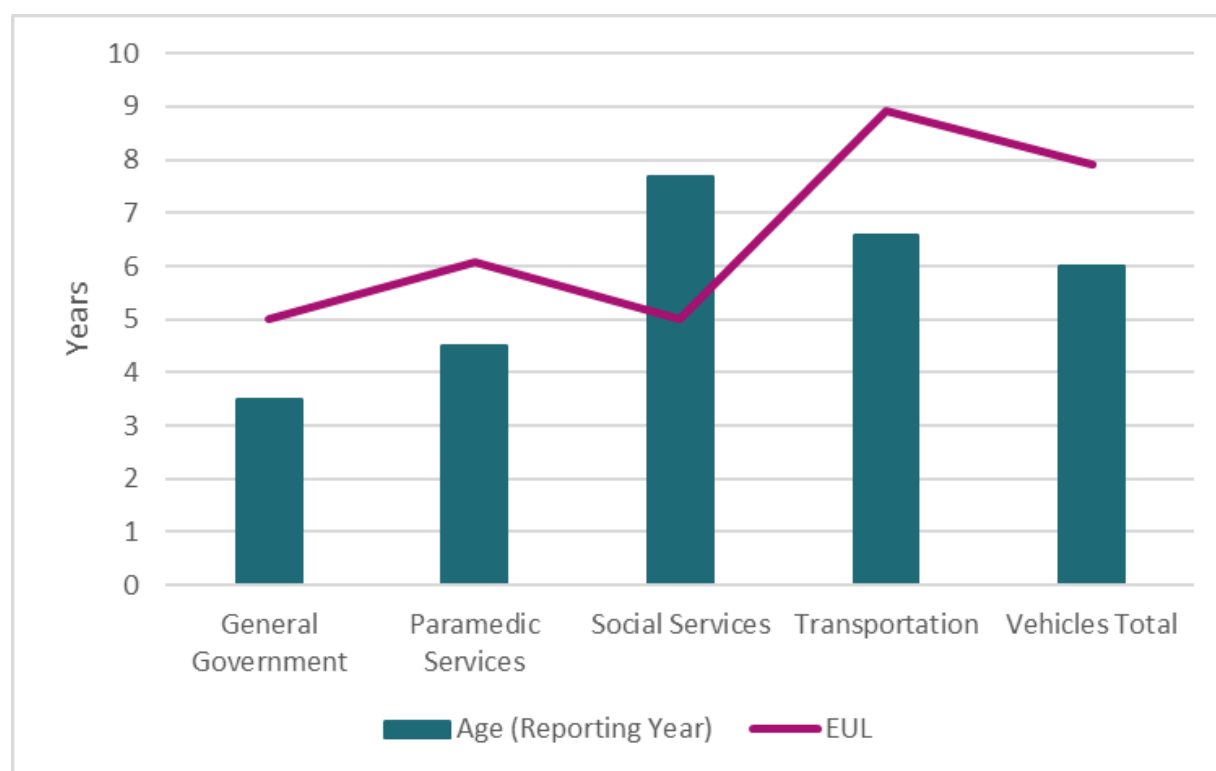
Table 34: Vehicles - Estimated Useful Life (EUL)

Asset Category	Asset Segment	Estimated Useful Life (EUL) in Years
Vehicles	Van	6-7
	Ambulance	6
	Mobile Command Centre	15
	Community Paramedicine Vehicle	7
	Duty Supervisor Vehicle	5
	Passenger Vehicle	7
	Half Ton Truck	7
	Three Quarter Ton Truck	7
	One Ton Truck	10
	Roll-Off Truck	12
	Tandem Truck	12
	Tri-Axle Truck	12
	Single Axle/Five Ton Truck	12
	Bridge Crew Utility Vehicle	3
	Anti-Ice Units	12
	Horizontal Tanks	20
	Float	20
	Forklift	40
	Skid Steer	12
	Backhoe	12
	Loader	14
	Grader	12
	Gradall	8
	Trailer	15
	Tractor	10-20

Average Age

Figure 30: Vehicles - Average Age compares the average age of each department's vehicle assets to the average estimated useful life of that department's vehicle assets. This demonstrates that the County's general practice is to resell vehicles to realize a larger resale value while they still have useful life remaining, with very few vehicles exceeding their EUL. The estimated useful life for each asset was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide.

Figure 30: Vehicles - Average Age



Lifecycle Analysis

Lifecycle strategies for the County's vehicles assets vary based on vehicle type. *Table 35: Lifecycle Strategies - Light Duty Vehicles*, *Table 36: Lifecycle Strategies - Medium Duty Vehicles*, and *Table 37: Lifecycle Strategies - Heavy Duty Vehicles* provide lifecycle activities for light duty, medium duty, and heavy duty vehicles respectively. Regulated vehicles such as ambulances are replaced on a six-year cycle.

The replacement of paramedic services vehicles is strictly guided by provincial regulations. Ambulances have a six-year lifespan, community paramedic vehicles are kept for seven years, and duty supervisor vehicles are replaced every five years. Paramedic vehicles also undergo routine maintenance at established intervals, i.e., the earlier of every 10,000 kilometers or every three months.

Table 35: Lifecycle Strategies - Light Duty Vehicles

Event Name	Event Class	Event Range / Trigger	Impact	Cost
Daily Inspections	Maintenance	Daily	None	NA
Annual Inspection	Maintenance	Annual	None	NA
Routine Maintenance	Maintenance	Every 7,000 km (non-Paramedic)	Maintains Condition	NA
Sandblasting / Painting / Coating	Preventative Maintenance	Annually	Maintains Condition	NA
Component Rebuild	Rehabilitation	Per findings of annual inspection	10% - 25% added condition	NA
Disposal & Replacement	Replacement	End of Life	100% condition	NA

Table 36: Lifecycle Strategies - Medium Duty Vehicles

Event Name	Event Class	Event Range / Trigger	Impact	Cost
Daily Inspections	Maintenance	Daily	None	NA
Annual Inspection	Maintenance	Annual	None	NA
Routine Maintenance	Maintenance	Every 400 hours	Maintains Condition	NA
Sandblasting / Painting / Coating	Preventative Maintenance	Annually	Maintains Condition	NA
Component Rebuild	Rehabilitation	Per findings of annual inspection	10% - 25% added condition	NA
Disposal & Replacement	Replacement	End of Life	100% condition	NA

Table 37: Lifecycle Strategies - Heavy Duty Vehicles

Event Name	Event Class	Event Range / Trigger	Impact	Cost
Daily Inspections	Maintenance	Daily	None	NA
Annual Inspection	Maintenance	Annual	None	NA
Routine Maintenance	Maintenance	Every 250 hours	Maintains Condition	NA
Sandblasting / Painting / Coating	Preventative Maintenance	Annually	Maintains Condition	NA
Component Rebuild	Rehabilitation	Based on inspection	10% - 25% added condition	NA
Disposal & Replacement	Replacement	End of Life	100% condition	NA

10-Year Capital Requirements

The 10-year capital cost requirements for the County's vehicle assets as generated by CityWide are included in *Table 38: Vehicles - 10-Year Annual Capital Requirements below*. These are the estimated investments required over the next 10 years to keep the vehicles in good working condition and able to continue providing the current level of service until lifecycle replacement occurs.

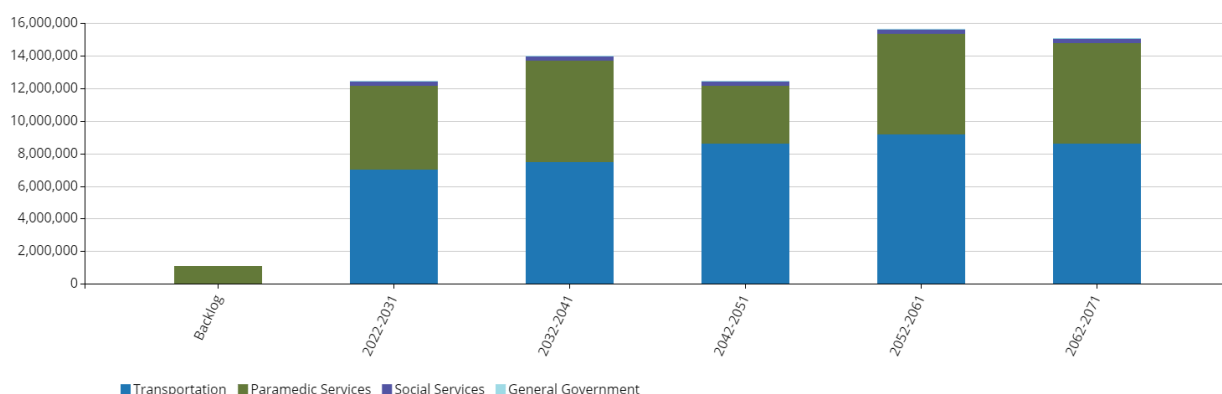
Table 38: Vehicles - 10-Year Annual Capital Requirements

Vehicles	General Government	Paramedic Services	Social Services	Transportation	Vehicles Total
2022	\$0	\$1,141,832	\$0	\$0	\$1,141,832
2023	\$25,004	\$939,099	\$0	\$305,365	\$1,269,468
2024	\$0	\$0	\$42,324	\$220,587	\$262,911
2025	\$0	\$0	\$85,139	\$1,092,609	\$1,177,748
2026	\$0	\$0	\$0	\$1,038,364	\$1,038,364
2027	\$0	\$327,858	\$0	\$461,906	\$789,764
2028	\$25,004	\$1,836,316	\$0	\$714,030	\$2,575,350
2029	\$0	\$873,399	\$42,324	\$607,999	\$1,523,722
2030	\$0	\$65,700	\$85,139	\$602,713	\$753,552
2031	\$0	\$0	\$0	\$1,940,793	\$1,940,793
Average	\$5,001	\$518,420	\$25,493	\$698,437	\$1,247,350

Projected Capital Replacement Needs

Figure 31: Vehicles - Projected Replacement Needs summarizes the capital replacement requirements for the County's vehicle assets from 2022 to 2071. The chart also illustrates a small backlog of approximately \$1.1 million, due primarily to vehicles that have been kept on as spares as well as those that have not been able to be replaced due to the current backlog of new vehicles available for purchase. The largest forecasted spike in capital spending is expected to take place in 2052-2061, totalling more than \$15.6 million.

Figure 31: Vehicles - Projected Replacement Needs



Housing

Category Overview

Table 39: *Housing - Category Overview* summarizes the quantity and current replacement cost of the County's existing housing portfolio by segment. In total, housing assets were valued at \$184.7 million as of 2021.

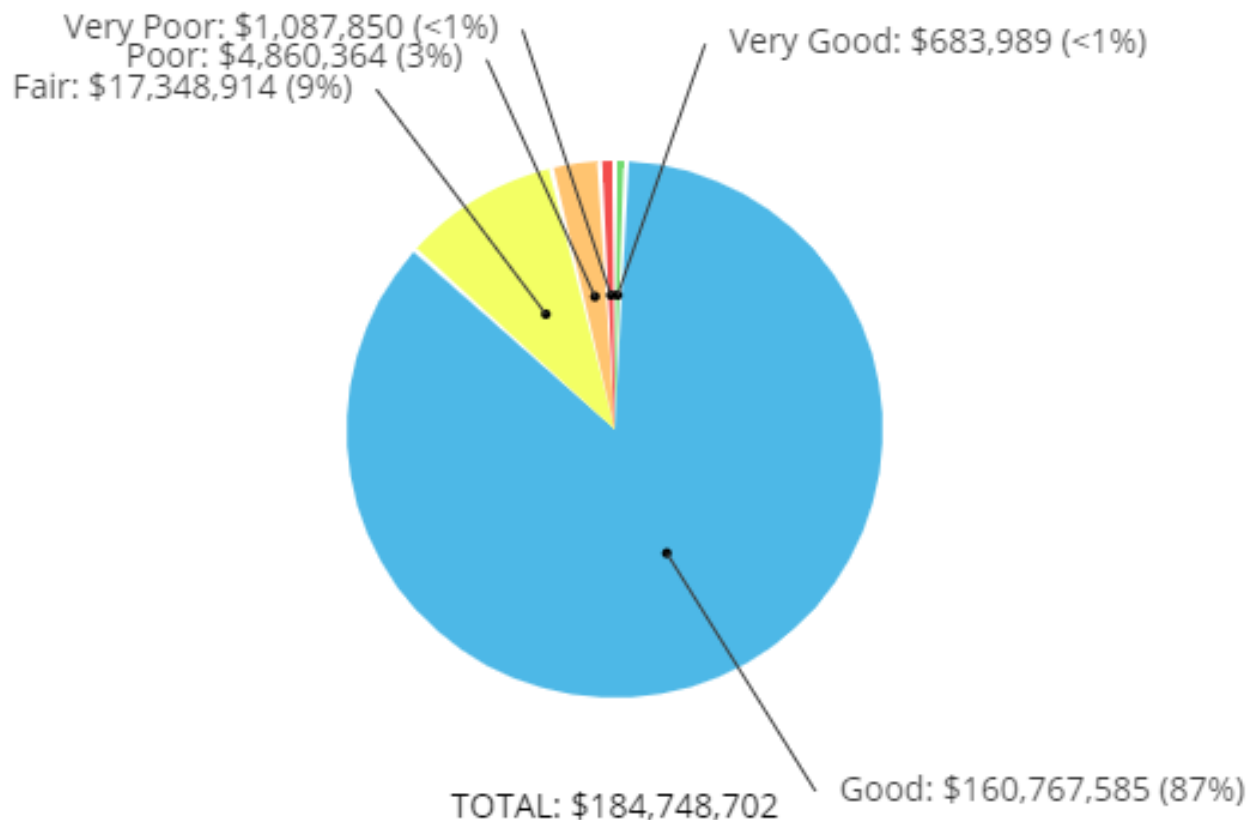
Table 39: *Housing - Category Overview*

Category	Segment	# of Units	Replacement Cost	Costing Method
Housing	Apartment Buildings	825	\$138,453,327	2021 BCAs / CPI
	Computers	33	\$35,420	CPI
	Dryers	59	\$78,887	CPI
	Family Units	171	\$44,501,628	2021 BCAs / CPI
	Furniture	12	\$38,213	CPI
	Lawn Tractors	17	\$313,430	CPI
	Refrigerators	774	\$515,030	CPI
	Stoves	741	\$689,947	CPI
	Vehicles	2	\$18,000	CPI
	Washing Machines	57	\$104,820	CPI
	Housing Total	2,691	\$184,748,702	

Asset Condition

Figure 32: *Housing - Condition Ratings* summarizes the average condition of the County's Housing assets. Overall, 96% of the County's Housing assets are in fair or better condition. This data is mainly based on the 2020-2021 Building Condition Assessments, with age-based conditions being used for Housing machinery and equipment assets.

Figure 32: Housing - Condition Ratings



Approach to Condition Assessments

The condition assessments undertaken for Housing assets depend upon the asset type. Please refer to the Approach to Condition Assessments sections of Building, Machinery and Equipment and Land Improvements for information on each asset type as the same approaches are taken with Housing assets, with a substantial reliance on the Building Condition Assessment to determine the condition of each component within Housing properties. Housing units are inspected every year for quality, functionality, condition, repair needs, and energy system efficiency.

Age Profile

An asset's age profile is comprised of the estimated useful life (EUL) or design life and the percentage of the EUL consumed at present. The EUL is the recommended or industry-standard serviceable lifespan of an asset during which it can continue to fulfill its intended purpose and provide value to users, safely and efficiently. The EULs currently used by the County for Housing assets and their components were determined by County staff based on actual lifespans regularly realized by each asset type and are summarized in *Table 40: Housing - Estimated Useful Life (EUL)*.

Table 40: Housing - Estimated Useful Life (EUL)

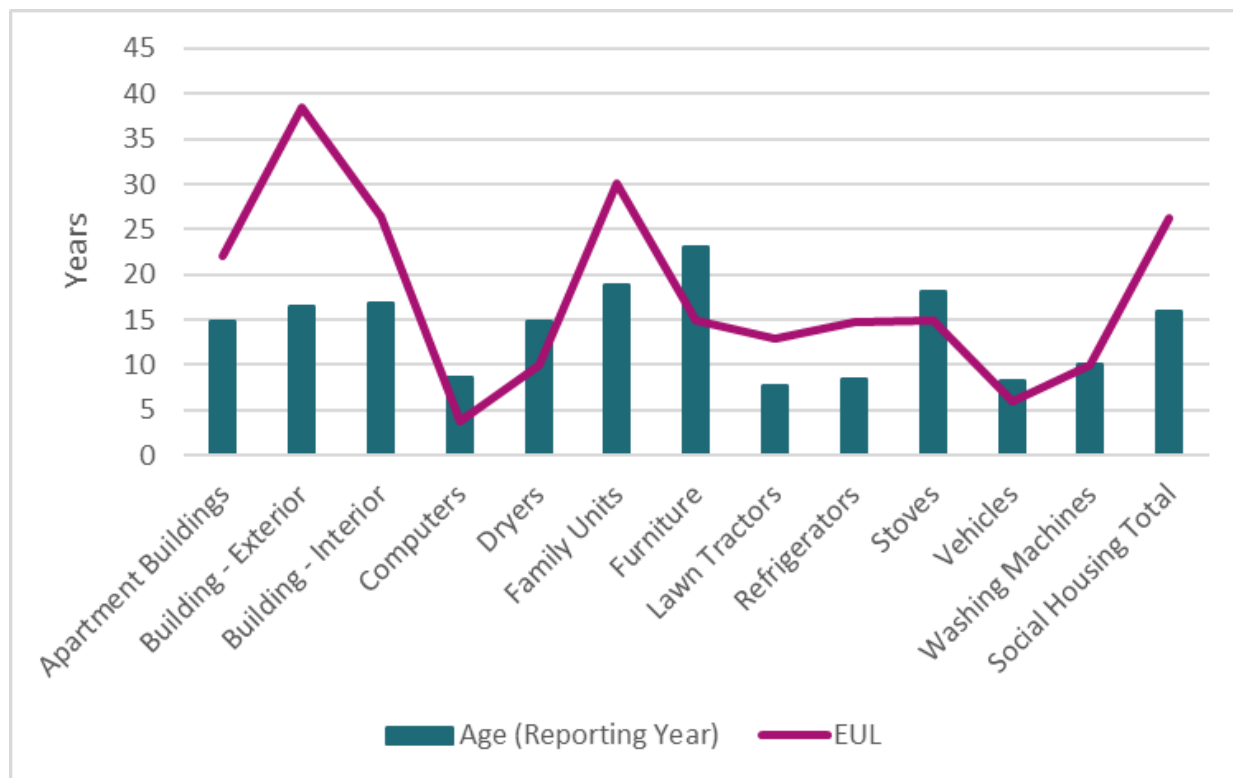
Asset Category	Segment	Estimated Useful Life (EUL) in Years
Housing	Buildings	
	Permanent Structures >5,000 sq. ft.	75
	Permanent Structures <5,000 sq. ft.	40
	Building Components	
	Structure	75
	Envelope	25
	Roof	15-40
	Electrical	75
	Mechanical	30
	HVAC	15
	Interior	15
	Lighting	25
	Exterior Signage	20
	Land Improvements	
	Fencing	20
	Landscaping	20
	Parking Lots	20
	Driveways	20
	Sidewalks	20
	Retaining Walls	20
	Lighting	25
	Sheds	40
	Appliances	
	Refrigerators	10
	Stoves	15
	Washing Machines	10
	Clothes Dryers	10
	Furnaces	15
	Hot Water Tanks	8

Average Age

Figure 33: Housing - Average Age compares the average age of each of the County's Housing asset categories to the average estimated useful of that asset category. This demonstrates that some Housing assets (particularly machinery and equipment assets) are currently still in service after exceeding their estimated useful life. This is not uncommon for machinery and equipment assets, as some of these assets are generally only replaced upon failure. The estimated useful life for each asset was determined based upon staff experience, and the asset age was determined based on the asset's in-service date in CityWide. It should be noted that some of the building assets appear

to be much younger in their estimated useful life than what they are in reality since the in-service date used in Citywide is the year the County acquired these buildings (generally 2001), not the actual year the building was built.

Figure 33: Housing - Average Age



Lifecycle Analysis

The lifecycle activities undertaken for Housing assets depend upon the asset type. Please refer to the Lifecycle Analysis sections of Building, Machinery and Equipment and Land Improvements for information on each asset type as the same approaches are taken with Housing assets, with a substantial reliance on the Building Condition Assessment to determine the lifecycle activities of each component within Housing properties.

10-Year Capital Requirements

The 10-year capital cost requirements for the County's Housing assets as generated by CityWide are included in *Table 41: Housing - 10-Year Annual Capital Requirements* below. These are the estimated investments required over the next 10 years to keep the Housing properties in a good state of repair and able to continue providing the current level of service.

Table 41: Housing - 10-Year Annual Capital Requirements

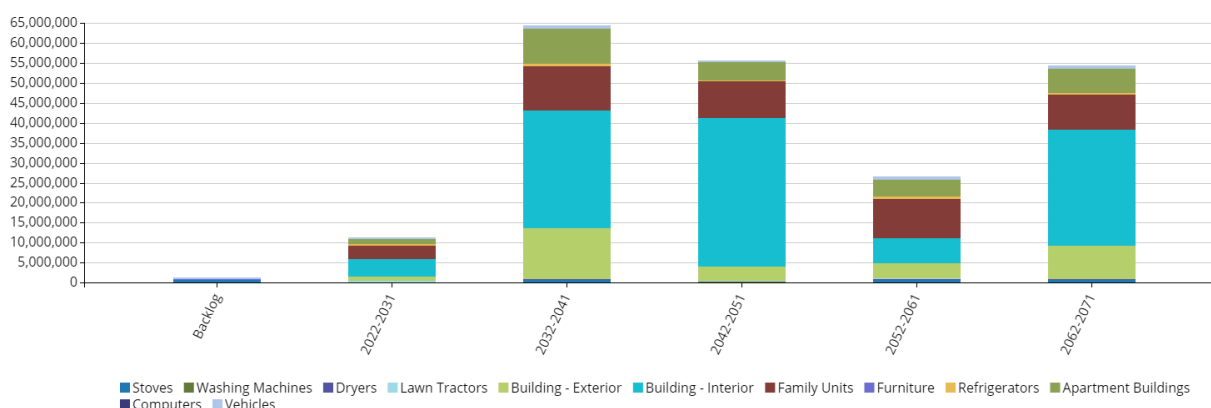
Housing	Apartment Buildings	Building - Exterior	Building - Interior	Computers	Dryers	Family Units
2022	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$0	\$0	\$4,326	\$0
2024	\$0	\$0	\$0	\$4,615	\$8,171	\$0
2025	\$0	\$246,600	\$202,300	\$18,205	\$0	\$0
2026	\$401,550	\$0	\$90,828	\$0	\$0	\$450,000
2027	\$193,800	\$219,800	\$241,617	\$0	\$0	\$446,576
2028	\$0	\$9,686	\$0	\$18,205	\$0	\$0
2029	\$0	\$675,000	\$3,859,587	\$17,215	\$0	\$2,063,200
2030	\$0	\$0	\$0	\$0	\$0	\$0
2031	\$766,160	\$40,000	\$0	\$18,205	\$0	\$294,800
Average	\$136,151	\$119,109	\$439,433	\$7,645	\$1,250	\$325,458

Housing Continued	Lawn Tractors	Refrigerators	Stoves	Vehicles	Washing Machines	Housing Total
2022	\$17,803	\$0	\$2,028	\$0	\$0	\$19,831
2023	\$0	\$0	\$585	\$0	\$11,411	\$16,322
2024	\$0	\$0	\$0	\$0	\$10,614	\$23,400
2025	\$2,780	\$250,322	\$0	\$0	\$13,615	\$733,822
2026	\$2,362	\$24,265	\$4,412	\$0	\$0	\$973,417
2027	\$26,609	\$9,959	\$15,064	\$0	\$0	\$1,153,425
2028	\$0	\$13,544	\$8,001	\$383,017	\$0	\$432,453
2029	\$71,238	\$32,647	\$14,246	\$0	\$11,947	\$6,745,080
2030	\$45,974	\$16,702	\$8,199	\$0	\$0	\$70,875
2031	\$78,739	\$0	\$16,814	\$0	\$0	\$1,214,718
Average	\$24,551	\$34,744	\$6,935	\$38,302	\$4,759	\$1,138,334

Projected Capital Replacement Needs

Figure 34: Housing - Projected Replacement Needs summarizes the capital replacement requirements for the County's Housing assets from 2022 to 2071. The chart also illustrates a backlog of approximately \$1.3 million, due to buildings and components that are functioning beyond their expected lifespans. The largest forecasted spike in capital spending is expected to take place in 2032-2041, totalling approximately \$64.3 million.

Figure 34: Housing - Projected Replacement Needs



Risk and Criticality Analysis

Why Risk and Criticality Assessments Matter

Risk or asset criticality is a product of two variables: the probability that an asset will fail, and the resulting consequences of that failure event. It can be a qualitative measurement, (low, medium, high) or quantitative measurement (1-5), that can be used to rank assets and projects, identify appropriate lifecycle strategies, optimize budgets, minimize service disruptions, and maintain public health and safety. The County's approach relies on a quantitative measurement of risk. The probability and consequence of failure are each scored from 1 to 5, producing a minimum risk index of 1 for the lowest risk assets, and a maximum risk index of 25 for the highest risk assets.

Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events, such as flooding.

Consequence of Failure

Estimating criticality also requires identifying the consequences that the organization and community may face from an asset's failure, and the magnitude of those consequences. Consequences of asset failure will vary across the infrastructure portfolio; the failure of some assets may result primarily in high direct financial costs but may pose limited risk to the community. Other assets may have a relatively minor financial value, but any downtime may pose significant health and safety hazards to the community.

Table 42: Asset Criticality - Consequences of Asset Failure illustrates the various types of consequences that were integrated in developing risk and criticality models for each asset category and the segments within. Please note that this list contains consequences are common, but not exhaustive.

Table 42: Asset Criticality - Consequences of Asset Failure

Type of Consequence	Description
Direct Financial	Direct financial consequences are typically measured as the replacement costs of the asset(s) affected by the failure event, including interdependent infrastructure.
Economic	Economic impacts of asset failure may include disruption to local economic activity and commerce, business closures, service disruptions, etc. Whereas direct financial impacts can be seen immediately or estimated within hours or days, economic impacts can take weeks, months, and years to emerge, and may persist for even longer.
Socio-political	Socio-political impacts are more difficult to quantify and may include inconvenience to the public and key community stakeholders, adverse media coverage, and reputational damage to the community and the municipality.
Environmental	Environmental consequences can include pollution, erosion, sedimentation, habitat damage, etc.
Public Health and Safety	Adverse health and safety impacts may include injury or death, or impeded access to critical services. The COVID-19 pandemic has also spotlighted the importance of maintaining essential equipment and facilities components to manage communicable diseases.
Strategic	These include the effects of an asset's failure on the community's long-term strategic objectives, including economic development, business attraction, etc.

Methodology

The County's current risk and criticality frameworks were developed during the Asset Management Strategy project completed in April of 2021 by PSD Citywide. The risk and criticality frameworks were created by using baseline models and then refining the models based on staff feedback. These frameworks were then integrated into the County's CityWide Asset Manager software. The models within Citywide will continue to be refined by County staff going forward as more insight and data is obtained.

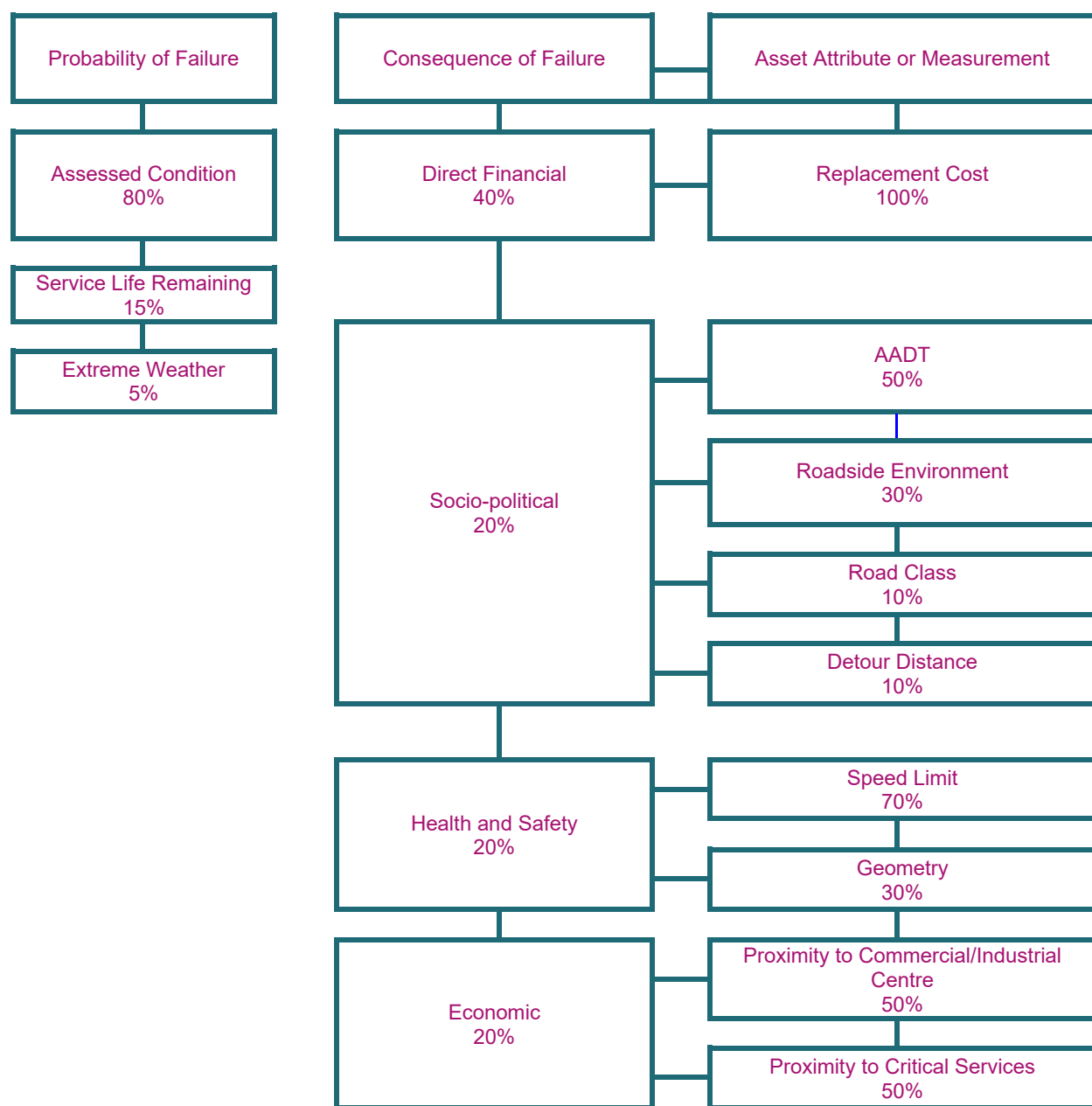
Roads

Risk Framework

Figure 35: Roads - Risk & Criticality Framework illustrates the risk and criticality framework developed for Grey County's road network. Three factors were identified as informative for estimating the probability of failure by Transportation staff. The direct

financial impact of asset failure was identified as the most critical consequence, followed by socio-political, health and safety, and economic impacts.

Figure 35: Roads - Risk & Criticality Framework



Probability of Failure Score

Table 43: Roads - Probability of Failure Factors shows how each factor influencing the probability of failure can be scored along a range of 1 to 5. This rating can then be assigned to individual road assets, or groups of road assets.

Table 43: Roads - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Pavement Condition Index (PCI)	75 – 100	1 – Rare
	55 – 75	2 – Unlikely
	30 – 55	3 – Possible
	10 – 30	4 – Likely
	0 – 10	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life	Greater than 20	1 – Rare
	10 – 20	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	0	5 – Almost Certain
Factor	Level	Probability of Failure Score
Extreme Weather Exposure	Minimal Exposure	1 – Rare
	Moderate Exposure	3 – Possible
	High Exposure	5 – Almost Certain

Consequence of Failure

Table 44: Roads - Consequence of Failure Factors shows how each factor influencing the consequence of failure can be scored along a range of 1 to 5. This rating can then be assigned to individual road assets, or groups of road assets.

Table 44: Roads - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost (\$/m)	\$0 - \$200	1 - Insignificant
	\$200 - \$400	2 – Minor
	\$400 - \$600	3 – Moderate
	\$600 - \$1,000	4 – Major
	Greater than \$1,000	5 – Severe

Socio-political	Type	Consequence of Failure Score
Roadside Environment	Rural	1 - Insignificant
	Semi-Urban	3 - Moderate
	Urban	5 - Severe
Socio-political	Type	Consequence of Failure Score
Average Annual Daily Traffic (AADT)	0 – 1,000	1 - Insignificant
	1,000 – 2,500	2 - Minor
	2,500 – 5,000	3 - Moderate
	5,000 – 10,000	4 - Major
	Greater than 10,000	5 - Severe
Socio-political	Type	Consequence of Failure Score
Road Class	Local	1 - Insignificant
	Local Commercial / Industrial	2 - Minor
	Collector	3 - Moderate
	Collector Commercial / Industrial	4 - Major
	Arterial	5 – Severe
Health and Safety	Type	Consequence of Failure Score
Speed Limit (km/hr)	Less than 50	1 - Insignificant
	50 - 59	2 - Minor
	60 - 79	3 - Moderate
	80 - 89	4 - Major
	90 and Greater	5 – Severe
Economic	Value	Consequence of Failure Score
Proximity to Commercial or Industrial Centres	More than 10km	1 - Insignificant
	5km – 10km	3 - Moderate
	Less than 5km	5 - Severe
Economic	Value	Consequence of Failure Score
Proximity to Critical Services	None	1 - Insignificant
	Schools & Long-term care (5 – 10 km)	2 - Minor
	Emergency – Hospitals, Police, Fire (5 – 10 km)	3 - Moderate
	Schools & Long-term care (0 – 5 km)	4 - Major
	Emergency – Hospitals, Police, Fire (0 – 5 km)	5 - Severe

Risk Matrix

Based on the above criteria and reflecting available data attribute data, *Figure 36: Roads - Risk Matrix* represents the risk matrix developed for the County's roads assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, approximately \$10.6 million of roads assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 36: Roads - Risk Matrix

Consequence	5	32 Assets 17.71 km \$10,623,239.26	49 Assets 23.02 km \$13,811,497.79	36 Assets 15.23 km \$9,135,389.02	24 Assets 10.21 km \$6,123,882.22	15 Assets 17.74 km \$10,643,036.77
	4	32 Assets 42.30 km \$22,319,585.86	38 Assets 33.26 km \$18,766,306.61	30 Assets 27.84 km \$15,499,631.15	10 Assets 5.18 km \$2,926,176.15	35 Assets 26.97 km \$15,718,499.11
	3	12 Assets 18.90 km, unit(s) \$7,633,368.88	5 Assets 12.19 km \$6,581,140.49	5 Assets 5.61 km \$2,981,469.26	0 Assets - \$0.00	0 Assets - \$0.00
	2	194 Assets 387.34 km, unit(s) \$183,802,288.69	211 Assets 407.07 km \$235,120,684.15	242 Assets 462.63 unit(s), km \$269,554,781.57	36 Assets - unit(s), km \$35,125,847.16	39 Assets 52.78 unit(s), km \$12,353,056.58
	1	1 Asset 0.49 km \$196,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
		1	2	3	4	5
		Probability				

Bridges and Culverts

Risk Framework

Figure 37: Transportation Bridges & Culverts - Risk & Criticality Framework illustrates the risk and criticality framework developed for Grey County's road bridges and structural culverts, and *Figure 38: Forestry & Trails Structures - Risk & Criticality Framework* shows the framework for forestry and trail bridges and culverts. Three factors were identified as informative for estimating the probability of failure by Transportation staff; the direct financial impact of asset failure was identified as the most critical consequence, followed by socio-political, health and safety, and economic

impacts. Four factors were identified for forestry and trail structures: primarily health and safety, then social-political, direct financial, and environmental.

Figure 37: Transportation Bridges & Culverts - Risk & Criticality Framework

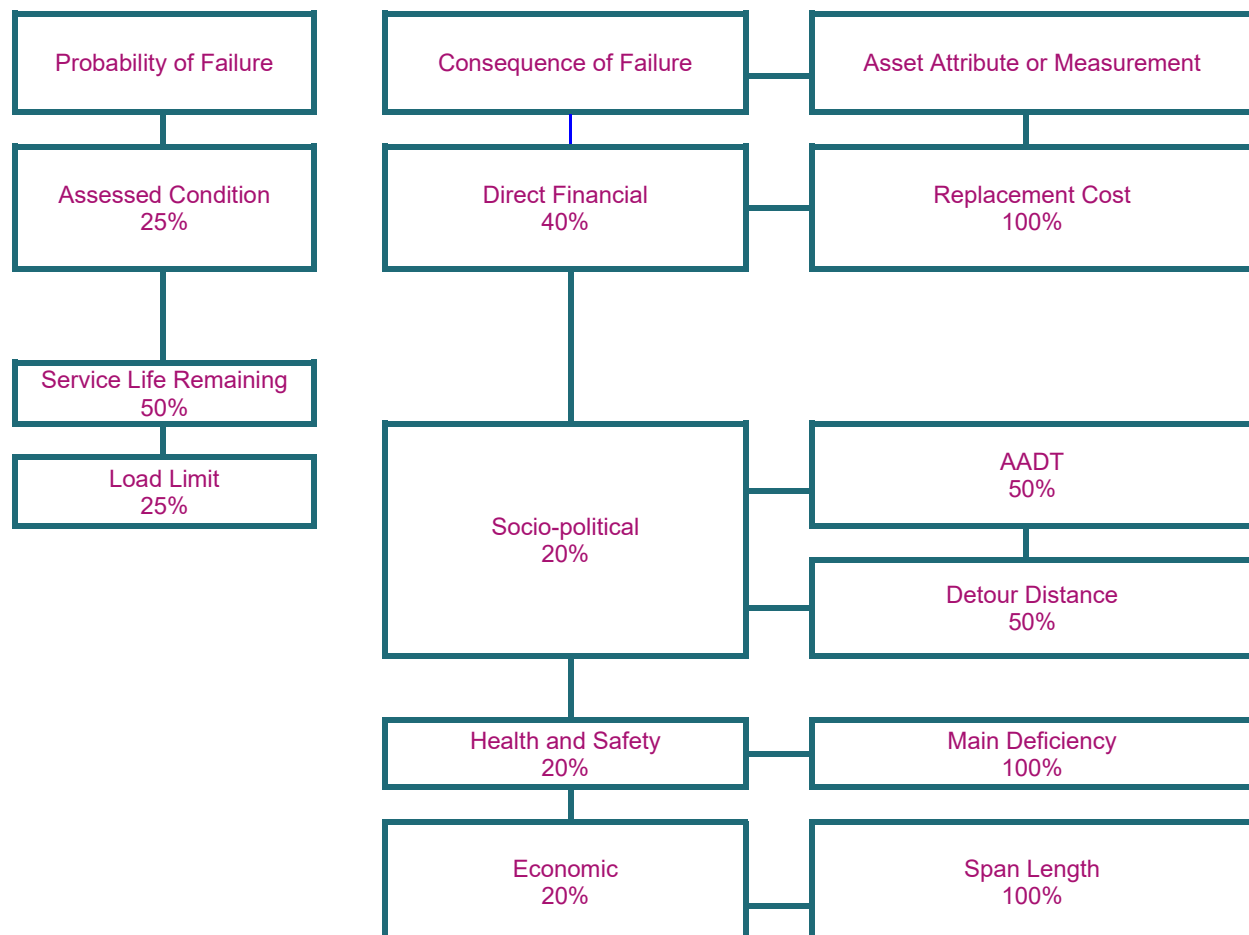
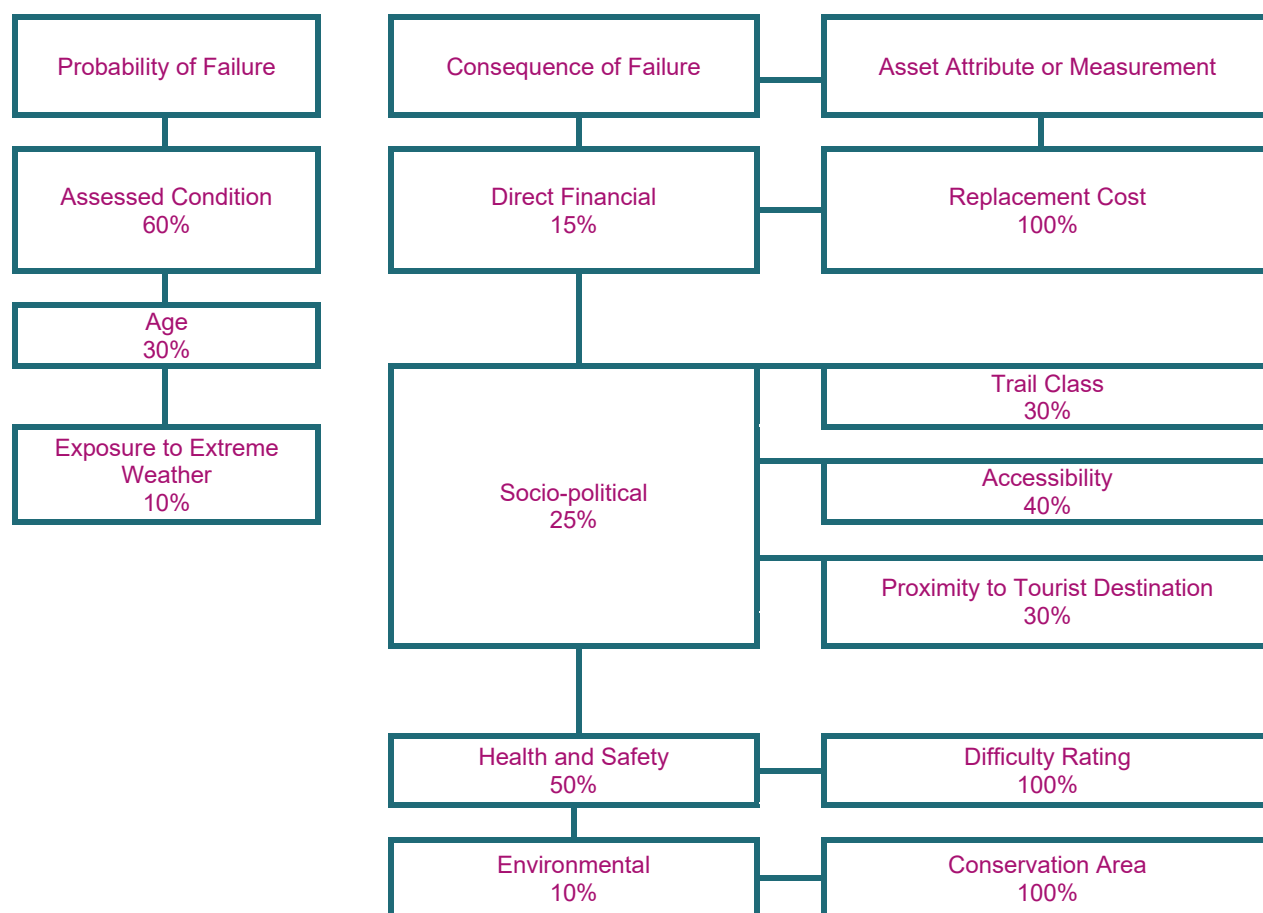


Figure 38: Forestry & Trails Structures - Risk & Criticality Framework



Probability of Failure

Table 45: Transportation Bridges & Culverts - Probability of Failure Factors and Table 46: Forestry & Trails Structures - Probability of Failure Factors show how each factor influencing the probability of failure can be scored along a range of 1 to 5. This rating can then be assigned to individual bridge and culvert assets, or groups of structure assets.

Table 45: Transportation Bridges & Culverts - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Bridge Condition Index (BCI)	80 – 100	1 – Rare
	60 – 80	2 – Unlikely
	40 – 60	3 – Possible
	20 – 40	4 – Likely
	0 – 20	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life	Greater than 40	1 – Rare
	10 – 40	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	0	5 – Almost Certain
Factor	Tonnes	Probability of Failure Score
Load Limit	Greater than 25	1 – Rare
	25 - 20	2 – Unlikely
	20 - 15	3 – Possible
	15 - 6	4 – Likely
	5 and Under	5 – Almost Certain

Table 46: Forestry & Trails Structures - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Condition	80 - 100	1 – Rare
	60 - 80	2 – Unlikely
	40 - 60	3 – Possible
	20 - 40	4 – Likely
	0 - 20	5 – Almost Certain
Factor	Years	Probability of Failure Score
Age	Less than 5	1 – Rare
	5 - 10	2 – Unlikely
	10 - 20	3 – Possible
	20 - 40	4 – Likely
	More than 40	5 – Almost Certain
Factor	Years	Probability of Failure Score
Exposure to Extreme Weather Events (e.g., washouts, ground movement, ice damage)	Minimal Exposure	1 – Rare
	Some Recorded Incidents	3 – Possible
	Recurring Issues	5 – Almost Certain

Consequence of Failure

Table 47: Bridges & Culverts - Consequence of Failure Factors and *Table 48: Forestry & Trails Structures - Consequence of Failure Factors* show how each factor influencing the consequence of failure can be scored along a range of 1 to 5. This rating can then be assigned to individual bridge and culvert assets, or groups of structure assets.

Table 47: Bridges & Culverts - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost (\$/m)	\$0 - \$100,000	1 - Insignificant
	\$100,000 - \$600,000	2 – Minor
	\$600,000 - \$1,000,000	3 – Moderate
	\$1,000,000 - \$3,000,000	4 – Major
	Greater than \$3,000,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Detour Distance (km)	Less than 1	1 - Insignificant
	1 - 5	2 - Minor
	5 - 10	3 - Moderate
	10 - 15	4 - Major
	Greater than 15	5 - Severe
Socio-political	Type	Consequence of Failure Score
Average Annual Daily Traffic (AADT)	0 – 1,000	1 - Insignificant
	1,000 – 2,500	2 - Minor
	2,500 – 5,000	3 - Moderate
	5,000 – 10,000	4 - Major
	Greater than 10,000	5 - Severe
Health and Safety	Type	Consequence of Failure Score
Main Deficiency	Rough Riding Surface	1 - Insignificant
	Minor Defect	2 - Minor
	Settlement / Movement	3 - Moderate
	Excessive Deformation	4 - Major
	Carrying Capacity or Pedestrian Vehicle Hazard	5 – Severe
Economic	Length	Score
Span Length (m)	Less than 2m	1 - Insignificant
	2m – 5m	2 - Minor
	5m – 8m	3 - Moderate
	8m – 10m	4 - Major
	Greater than 10m	5 – Severe

Table 48: Forestry & Trails Structures - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$20,000	1 – Insignificant
	\$20,000 - \$50,000	2 – Minor
	\$50,000 - \$75,000	3 – Moderate
	\$75,000 - \$100,000	4 – Major
	Greater than \$100,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Trail Class	Forest Trail	1 – Insignificant
	CP Rail-Trail	3 – Moderate
	Urban Sections of CP Rail-Trail	5 – Severe
Socio-political	User Type	Consequence of Failure Score
Accessibility	Pedestrian	1 - Insignificant
	Cycling / Cross-County	3 - Moderate
	ATV / Snowmobile / Equestrian	5 - Severe
Socio-political	Distance	Consequence of Failure Score
Proximity to Tourist Destinations (km)	10km	1 – Insignificant
	5km	3 – Moderate
	< 2km	4 - Major
Health and Safety	Rating	Consequence of Failure Score
IMBA Trail Difficulty Rating	Easy	1 – Insignificant
	Moderate	3 – Moderate
	Difficult	5 – Severe
Environmental	Status	Consequence of Failure Score
Conservation Area	Yes	1 – Insignificant
	No	5 – Severe

Risk Matrix

Based on the above criteria and available attribute data, *Figure 39: Bridges & Culverts - Risk Matrix* represents the risk matrix developed for the County's bridges and culverts assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, approximately \$4.6 million of bridges and culverts assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 39: Bridges & Culverts - Risk Matrix

Consequence	5	3 Assets 3.00 unit(s) \$16,915,151.74	7 Assets 7.00 unit(s) \$34,449,706.25	1 Asset 1.00 unit(s) \$1,276,851.68	6 Assets 6.00 unit(s) \$34,100,531.05	1 Asset 1.00 unit(s) \$4,588,058.06
	4	9 Assets 9.00 unit(s) \$19,018,563.34	16 Assets 16.00 unit(s) \$46,718,158.45	0 Assets - \$0.00	26 Assets 26.00 unit(s) \$80,051,771.26	0 Assets - \$0.00
	3	8 Assets 8.00 unit(s) \$12,591,925.02	18 Assets 18.00 unit(s) \$24,514,273.43	3 Assets 3.00 unit(s) \$3,832,980.03	61 Assets 61.00 unit(s) \$84,553,763.15	3 Assets 3.00 unit(s) \$4,384,169.39
	2	4 Assets 4.00 unit(s) \$817,985.82	7 Assets 7.00 unit(s) \$7,697,317.32	1 Asset 1.00 unit(s) \$4,220,848.18	27 Assets 27.00 unit(s) \$27,803,357.14	2 Assets 2.00 unit(s) \$3,213,054.43
	1	2 Assets 3.00 unit(s) \$1,359,515.30	10 Assets 11.00 unit(s) \$7,271,755.02	2 Assets 2.00 unit(s) \$90,999.43	93 Assets 93.00 unit(s) \$64,786,082.33	6 Assets 6.00 unit(s) \$56,835.04
		1	2	3	4	5
		Probability				

Stormwater

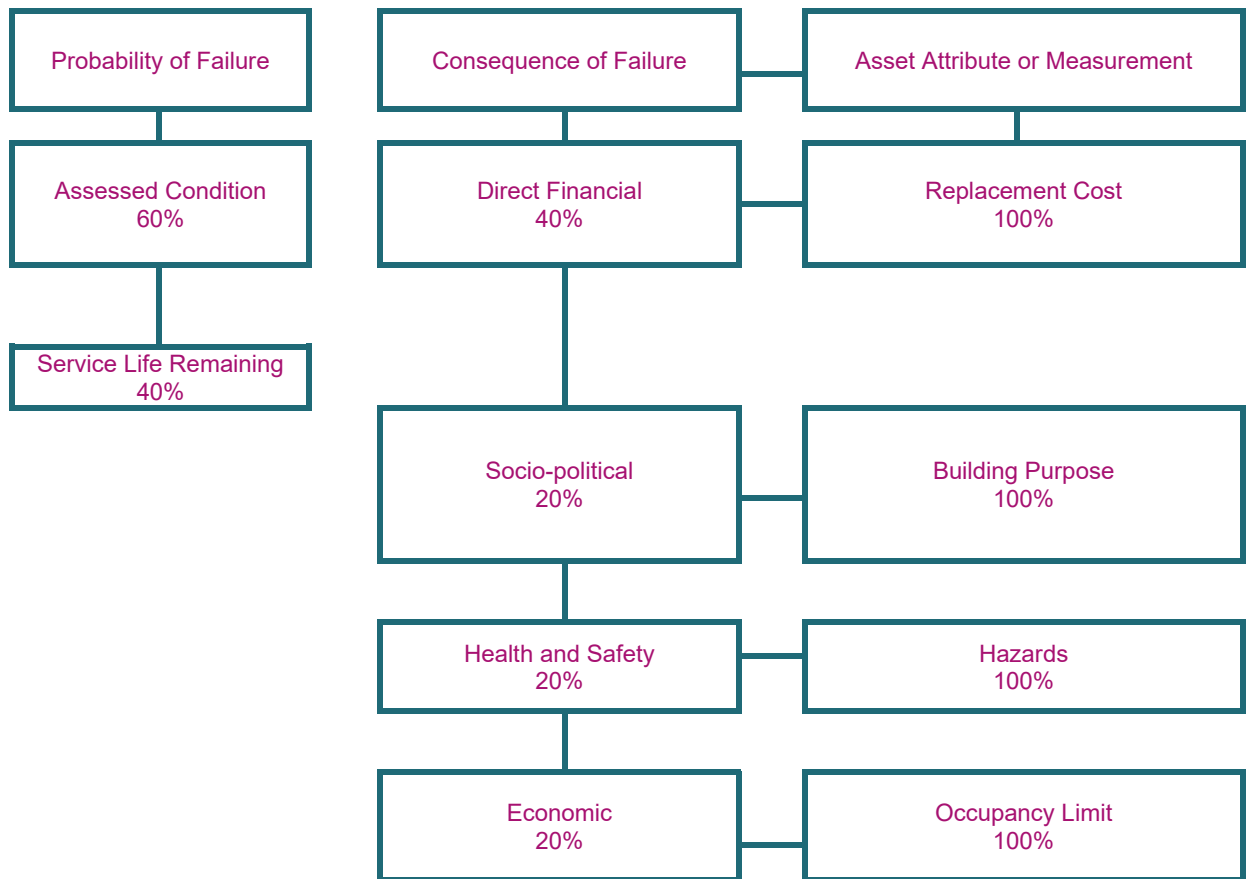
At this time, County staff are continuing to work with the stormwater data gathered during the 2018-2021 stormwater inspections, and it is planned to have a full risk framework analysis completed for the next iteration of the Grey County Asset Management Plan.

Buildings and Facilities

Risk Frameworks

Given the variety of buildings and facilities under the County's purview, several risk and criticality models have been developed. These include a generic one that applies to most facilities in the portfolio, including Housing as well as models specific to Grey Roots Museum and the County's long term care facilities (*Figures 40-42: Buildings & Facilities - Risk & Criticality Frameworks*).

Figure 40: General Buildings & Facilities - Risk & Criticality Framework



```
graph TD; A[Probability of Failure] --> B[Assessed Condition 70%]; A --> C[Service Life Remaining 10%]; A --> D[Exposure 10%]; A --> E[Operating Environment 10%]; B --> F[Direct Financial 20%]; B --> G[Socio-political 40%]; B --> H[Health and Safety 40%]; C --> I[Replacement Cost 100%]; D --> J[Building Component 100%]; E --> K[Hazards 100%]
```

The diagram illustrates the breakdown of Risk Assessment into three main categories, each with its own sub-factors and percentages:

- Probability of Failure**
 - Assessed Condition 70%
 - Service Life Remaining 10%
 - Exposure 10%
 - Operating Environment 10%
- Consequence of Failure**
 - Direct Financial 20%
 - Socio-political 40%
 - Health and Safety 40%
- Asset Attribute or Measurement**
 - Replacement Cost 100%
 - Building Component 100%
 - Hazards 100%

```
graph TD; A[Probability of Failure] --- B[Assessed Condition 60%]; A --- C[Service Life Remaining 40%]; D[Consequence of Failure] --- E[Direct Financial 40%]; D --- F[Socio-political 20%]; D --- G[Health and Safety 20%]; D --- H[Economic 20%]; I[Asset Attribute or Measurement] --- J[Replacement Cost 100%]; I --- K[Building/Unit 100%]; I --- L[Hazards 100%]; I --- M[Occupancy Limit 50%];
```

Probability of Failure

Assessed Condition
60%

Service Life Remaining
40%

Consequence of Failure

Direct Financial
40%

Socio-political
20%

Health and Safety
20%

Economic
20%

Asset Attribute or Measurement

Replacement Cost
100%

Building/Unit
100%

Hazards
100%

Occupancy Limit
50%

Probability of Failure

Tables 49-51: *Buildings & Facilities - Probability of Failure Factors* show how each factor influencing the probability of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual building components or a building overall.

Table 49: *General Buildings & Facilities - Probability of Failure Factors*

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Assessed Condition	80 – 100	1 – Rare
	60 – 80	2 – Unlikely
	40 – 60	3 – Possible
	20 – 40	4 – Likely
	0 – 20	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life Remaining	Greater than 40	1 – Rare
	10 – 40	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	0	5 – Almost Certain

Table 50: Long Term Care Buildings & Facilities - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Assessed Condition	80 – 100	1 – Rare
	60 – 80	2 – Unlikely
	40 – 60	3 – Possible
	20 – 40	4 – Likely
	0 – 20	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life Remaining	Greater than 40	1 – Rare
	10 – 40	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	0	5 – Almost Certain
Factor	Component Type	Probability of Failure Score
Exposure to Elements	Interior	1 – Rare
	Rooftop Units, Windows, Chillers	5 – Almost Certain
Factor	Type	Probability of Failure Score
Operating Environment	Automated	1 – Rare
	Manual	5 – Almost Certain

Table 51: Grey Roots Buildings & Facilities - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Assessed Condition	80 – 100	1 – Rare
	60 – 80	2 – Unlikely
	40 – 60	3 – Possible
	20 – 40	4 – Likely
	0 – 20	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life Remaining	Greater than 40	1 – Rare
	10 – 40	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	0	5 – Almost Certain

Consequence of Failure

Tables 52-54: Buildings & Facilities - Consequence of Failure Factors show how each factor influencing the consequence of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual building components, or to a building overall.

Table 52: General Buildings & Facilities - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$100,000	1 - Insignificant
	\$100,000 - \$600,000	2 – Minor
	\$600,000 - \$1,000,000	3 – Moderate
	\$1,000,000 - \$5,000,000	4 – Major
	Greater than \$5,000,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Building Purpose	Storage	1 - Insignificant
	Community Centre / Tourism	2 - Minor
	Museum / Housing	3 - Moderate
	Transportation / Municipal Administration	4 - Major
	Ambulance & Health; Housing	5 - Severe
Health and Safety	Type	Consequence of Failure Score
Hazards	Minor Hazards	1 - Insignificant
	Trip/Height Hazards	2 - Minor
	Operating Machinery	3 - Moderate
	Hazardous Materials (e.g., asbestos, radon)	5 - Severe
Economic	Type	Consequence of Failure Score
Occupancy Limit	Less than 10	1 - Insignificant
	10 - 20	2 - Minor
	20 - 50	3 - Moderate
	50 - 100	4 - Major
	More than 100	5 – Severe

Table 53: Long Term Care Buildings & Facilities - Consequences of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$100,000	1 - Insignificant
	\$100,000 - \$600,000	2 – Minor
	\$600,000 - \$1,000,000	3 – Moderate
	\$1,000,000 - \$5,000,000	4 – Major
	Greater than \$5,000,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Building Component	Cosmetics	1 - Insignificant
	Ergonomics/Accessibility	2 - Minor
	Building Shell	3 - Moderate
	Climate Control	4 - Major
	Air Handling/Quality, Disinfection/Filtration	5 - Severe
Health and Safety	Type	Consequence of Failure Score
Hazards	Minor Hazards	1 - Insignificant
	Hazardous Materials (e.g., asbestos)	2 - Minor
	Room Spacing / Design	3 - Moderate
	Trip / Lighting	5 - Severe

Table 54: Grey Roots Buildings & Facilities - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$250,000	1 – Insignificant
	\$250,000 - \$1,000,000	2 – Minor
	\$1,000,000 - \$5,000,000	3 – Moderate
	\$5,000,000 - \$10,000,000	4 – Major
	Greater than \$10,000,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Building/Unit	Minor Exhibit	1 – Insignificant
	Administration	2 – Minor
	Storage	3 – Moderate
	Exhibit / Workshop	4 – Major
	Main Gallery Exhibit	5 – Severe
Health and Safety	Type	Consequence of Failure Score
Hazards	Minor Hazards	1 – Insignificant
	Trip / Height Hazards	2 – Minor
	Operating Machinery	3 – Moderate
	Steam	4 – Major
	Hazardous Materials (e.g., asbestos, radon)	5 – Severe
Economics	Range	Consequence of Failure Score
Average Visitors per day	Less than 50	1 – Insignificant
	50 - 100	2 – Minor
	100 - 150	3 – Moderate
	150 - 200	4 – Major
	More than 200	5 – Severe

Risk Matrix

Based on the above criteria and available attribute data, *Figure 43: Buildings & Facilities - Risk Matrix* represents the risk matrix developed for the County's building and facility assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, approximately \$19.2 million of building and facility assets are in the highest risk

classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 43: Buildings & Facilities - Risk Matrix

Consequence	5	35 Assets 36.00 unit(s) \$9,361,000.00	110 Assets 110.00 unit(s) \$34,018,770.00	2 Assets 2.00 unit(s) \$157,500.00	0 Assets - \$0.00	1 Asset 1.00 unit(s) \$19,171,863.00
	4	126 Assets - unit(s) \$16,489,695.00	116 Assets 116.00 unit(s) \$5,985,670.00	22 Assets 22.00 unit(s) \$2,850,000.00	6 Assets 6.00 unit(s) \$106,000.00	0 Assets - \$0.00
	3	53 Assets - unit(s) \$2,983,520.00	83 Assets - unit(s) \$8,356,782.00	32 Assets - unit(s) \$2,916,145.00	4 Assets 4.00 unit(s) \$533,263.00	0 Assets - \$0.00
	2	27 Assets 27.00 unit(s) \$473,455.00	147 Assets 154.00 unit(s) \$14,853,873.00	11 Assets 11.00 unit(s) \$1,437,675.00	1 Asset 1.00 unit(s) \$2,700.00	0 Assets - \$0.00
	1	5 Assets 58.00 unit(s) \$102,548.00	153 Assets 155.00 unit(s) \$5,504,090.00	25 Assets 25.00 unit(s) \$1,909,806.00	8 Assets 8.00 unit(s) \$437,443.00	5 Assets 5.00 unit(s) \$163,831.00
		1	2	3	4	5
		Probability				

Machinery and Equipment

Risk Frameworks

Similar to buildings and facilities, given the variety of machinery and equipment under the County's purview, individual risk and criticality models have been developed for information technology and paramedic services machinery and equipment assets (Figures 44-46: Machinery & Equipment - Risk & Criticality Frameworks).

Figure 44: Information Technology Machinery & Equipment - Risk & Criticality Framework

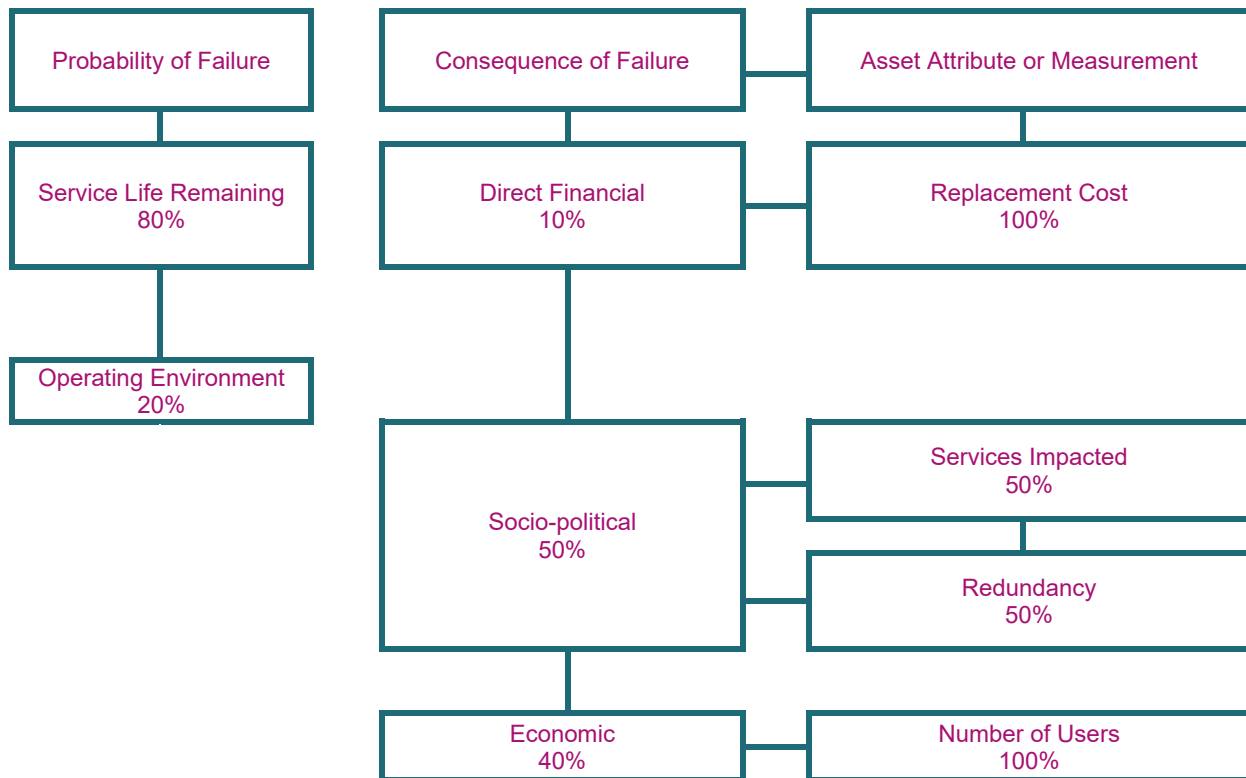


Figure 45: Communication Tower Machinery & Equipment - Risk & Criticality Frameworks

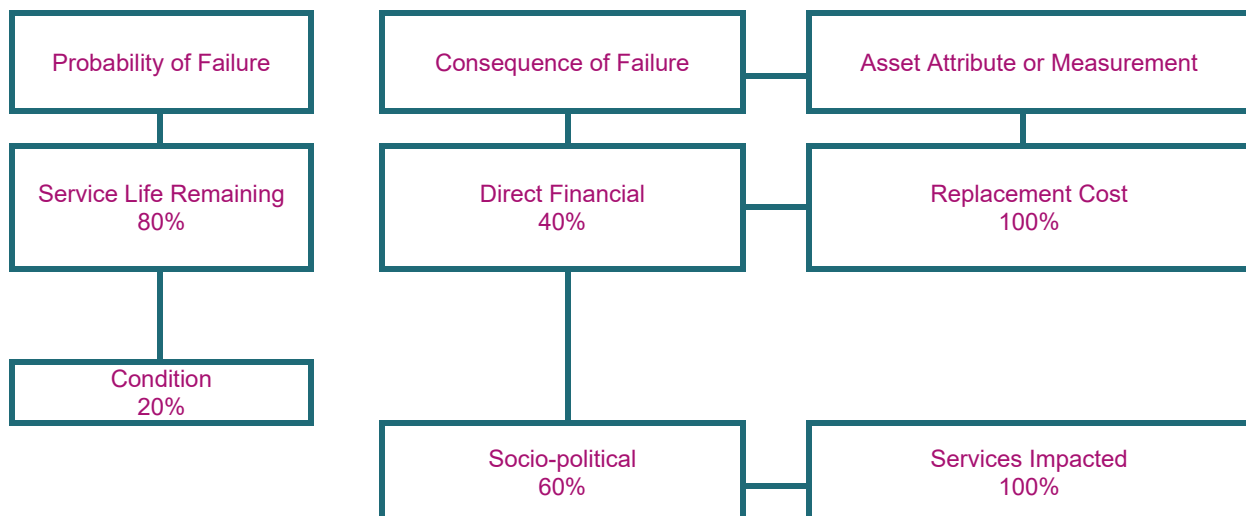
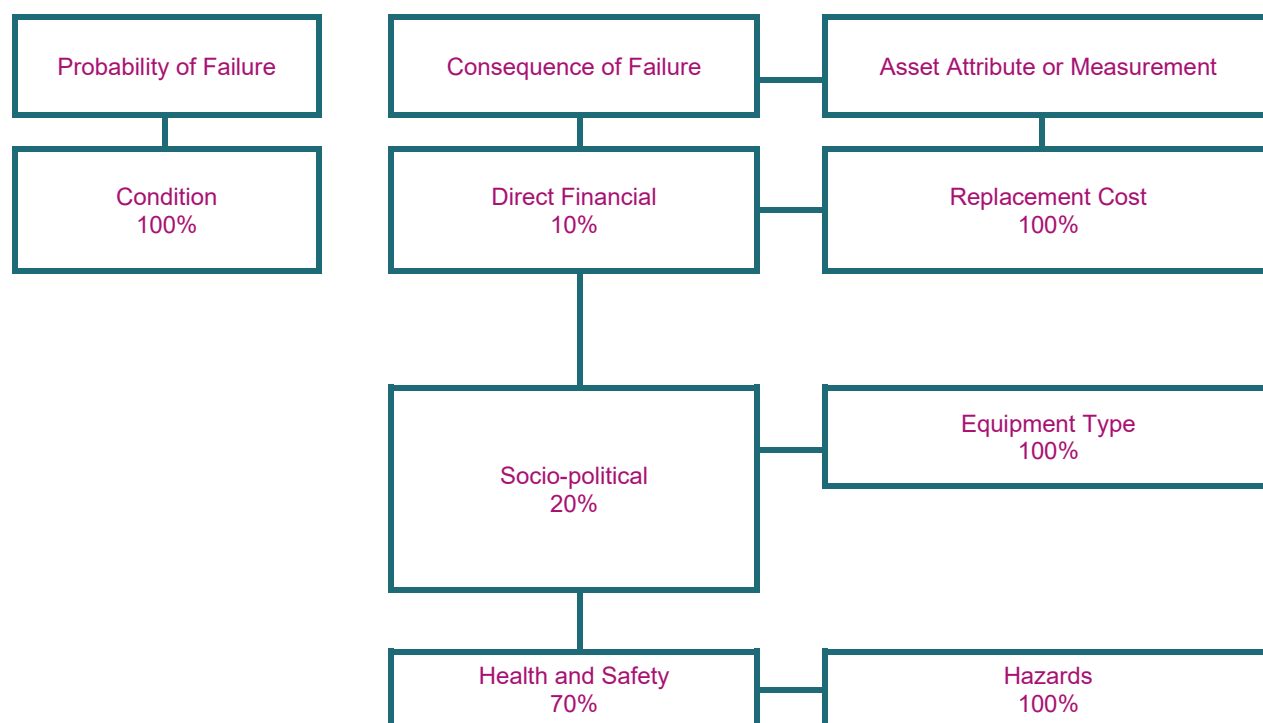


Figure 46: Paramedic Machinery & Equipment - Risk & Criticality Framework



Probability of Failure

Tables 55-56: Machinery & Equipment - Probability of Failure Factors show how each factor influencing the probability of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual pieces or groups of machinery and equipment.

Table 55: Information Technology Machinery & Equipment - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Type	Probability of Failure Score
Operating Environment	Optimal Environment	1 – Rare
	Poor Cleanliness	3 – Possible
	Poor Temperature Control	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life Remaining	Greater than 5	1 – Rare
	4 – 5	2 – Unlikely
	2 – 3	3 – Possible
	1 – 2	4 – Likely
	Less than 1	5 – Almost Certain

Table 56: Communication Tower Machinery & Equipment - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Operating Environment	80 - 100	1 – Rare
	60 - 80	2 – Unlikely
	40 - 60	3 – Possible
	20 - 40	4 – Likely
	0 - 20	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Projected Service Life Remaining	Greater than 40	1 – Rare
	10 – 40	2 – Unlikely
	5 – 10	3 – Possible
	1 – 5	4 – Likely
	Less than 1	5 – Almost Certain

Table 57: Paramedic Machinery & Equipment - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Assessed Condition	80 - 100	1 – Rare
	60 - 80	2 – Unlikely

Consequence of Failure

Tables 58-60: Machinery & Equipment - Consequence of Failure Factors show how each factor influencing the consequence of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual pieces or groups of machinery and equipment.

Table 58: Information Technology Machinery & Equipment - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$1,000	1 – Insignificant
	\$1,000 - \$5,000	2 – Minor
	\$5,000 - \$10,000	3 – Moderate
	\$10,000 - \$20,000	4 – Major
	Greater than \$20,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Services Impacted	Administration	1 – Insignificant
	Frontline Services – Roads, Bridges & Culverts	2 – Minor
	Community, Tourism and Recreation Services	3 – Moderate
	Internal Services	4 – Major
	Critical Services – Long Term Care & Paramedic Services	5 – Severe
Socio-political	Type	Consequence of Failure Score
Redundancy	Full Redundancy	1 – Insignificant
	No Redundancy	5 – Severe
Economics	Range	Consequence of Failure Score
Number of Users	Individual	1 – Insignificant
	Business Unit or Team	2 – Minor
	Department	3 – Moderate
	Several Departments	4 – Major
	County-Wide	5 – Severe

Table 59: Communication Towers Machinery & Equipment - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$10,000	1 – Insignificant
	\$10,000 - \$20,000	2 – Minor
	\$20,000 - \$50,000	3 – Moderate
	\$50,000 - \$100,000	4 – Major
	Greater than \$100,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Services Impacted	Administration	1 – Insignificant
	Frontline Services – Roads, Bridges & Culverts	2 – Minor
	Community, Tourism and Recreation Services	3 – Moderate
	Internal Services	4 – Major
	Critical Services – Long Term Care & Paramedic Services	5 – Severe

Table 60: Paramedic Services Machinery & Equipment - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$5,000	1 – Insignificant
	\$5,000 - \$10,000	2 – Minor
	\$10,000 - \$20,000	3 – Moderate
	\$20,000 - \$50,000	4 – Major
	Greater than \$50,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Equipment Type	Furniture / Appliances	1 – Insignificant
	Office Equipment	2 – Minor
	Computer Systems	3 – Moderate
	Health and Safety Equipment	4 – Major
	Patient Care Equipment	5 – Severe
Health and Safety	Type	Consequence of Failure Score
Hazards	No Hazards	1 – Insignificant
	Cutting / Crushing / Burning / Abrasion	3 – Moderate
	Compressed Gas / Poisonous Substance / Biohazard	5 – Severe

Risk Matrix

Based on the above criteria and available attribute data, *Figure 47: Machinery & Equipment - Risk Matrix* represents the risk matrix developed for the County's machinery and equipment assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, approximately \$1.8 million of machinery and equipment assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 47: Machinery & Equipment - Risk Matrix

Consequence	5	3 Assets 33.00 unit(s) \$689,771.00	0 Assets - \$0.00	3 Assets 3.00 unit(s) \$1,078,415.00	0 Assets - \$0.00	1 Asset 1.00 unit(s) \$1,773,764.00
	4	11 Assets 31.00 unit(s) \$1,063,744.00	2 Assets 2.00 unit(s) \$46,921.00	4 Assets 4.00 unit(s) \$364,678.00	8 Assets 11.00 unit(s) \$732,565.00	4 Assets 24.00 unit(s) \$176,995.00
	3	6 Assets 6.00 unit(s) \$673,965.00	4 Assets 4.00 unit(s) \$295,558.00	12 Assets 12.00 unit(s) \$385,610.00	49 Assets 73.00 unit(s) \$230,974.00	19 Assets 77.00 unit(s) \$177,713.00
	2	2 Assets 2.00 unit(s) \$188,229.00	17 Assets 84.00 unit(s) \$867,633.00	26 Assets 119.00 unit(s) \$538,077.00	17 Assets 19.00 unit(s) \$363,288.00	99 Assets 250.00 unit(s) \$1,801,474.00
	1	71 Assets 153.00 unit(s) \$936,404.00	240 Assets 550.00 unit(s) \$1,335,097.00	195 Assets 247.00 unit(s) \$650,145.00	145 Assets 404.00 unit(s) \$461,081.00	449 Assets 890.00 unit(s) \$1,548,517.00
		1	2	3	4	5
		Probability				

Land Improvements

Risk Frameworks, Probability and Consequence of Failure

At present, the same risk frameworks and probability and consequence of failure factors list above for building and facilities have been applied to land improvement assets as appropriate.

Risk Matrix

Based on the above criteria and available attribute data, *Figure 48: Land Improvements - Risk Matrix* represents the risk matrix developed for the County's machinery and equipment assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, approximately \$0.5 million of machinery and equipment assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 48: Land Improvements - Risk Matrix

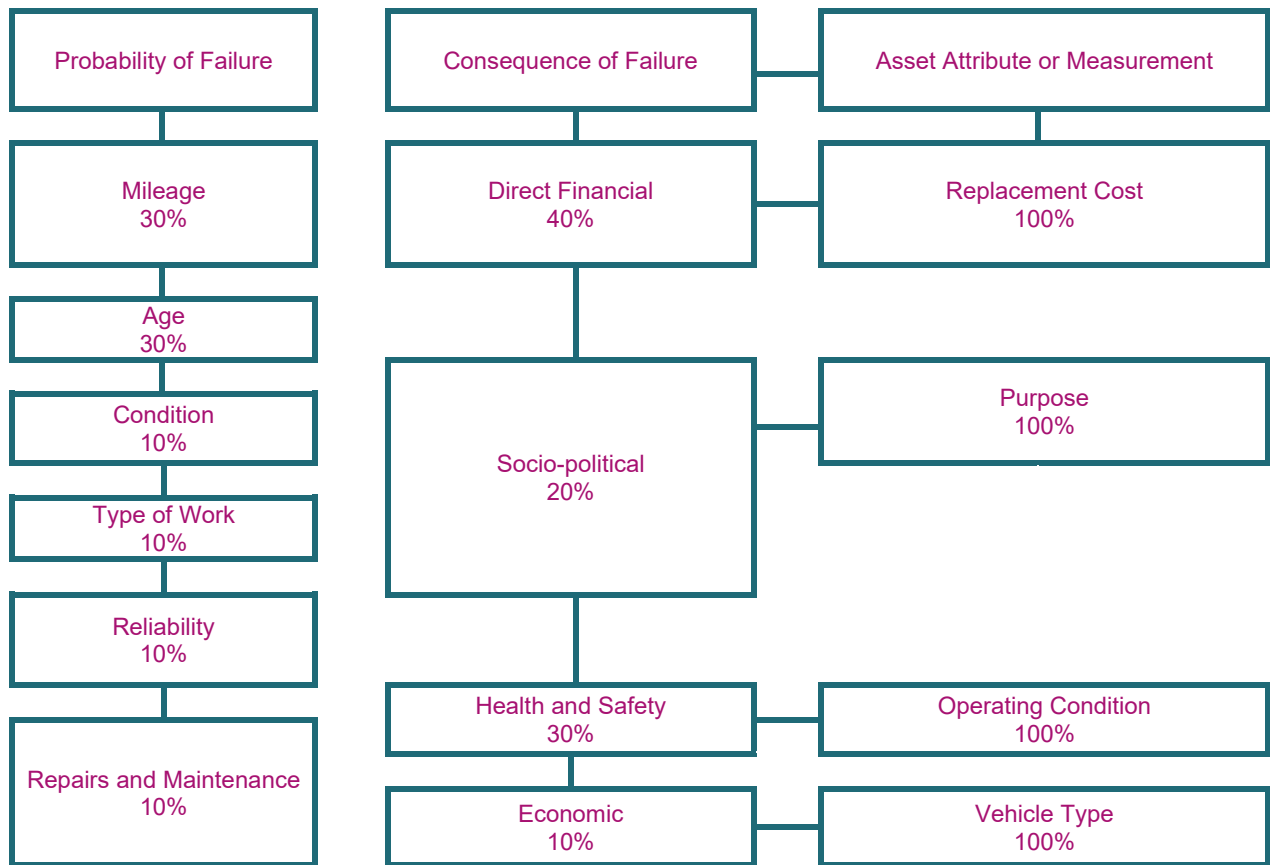
Consequence	5	2 Assets 2.00 unit(s) \$92,000.00	3 Assets 4.00 unit(s) \$1,435,500.00	1 Asset 1.00 unit(s) \$752,000.00	0 Assets - \$0.00	1 Asset 1.00 unit(s) \$467,276.00
	4	11 Assets 11.00 unit(s) \$483,500.00	15 Assets 1,574.70 unit(s) \$1,697,650.00	1 Asset 1.00 unit(s) \$10,000.00	0 Assets - \$0.00	0 Assets - \$0.00
	3	2 Assets 2.00 unit(s) \$9,000.00	12 Assets 12.00 unit(s) \$1,062,596.00	3 Assets 3.00 unit(s) \$347,300.00	1 Asset 1.00 unit(s) \$6,720.00	1 Asset 1.00 unit(s) \$212,240.00
	2	5 Assets 5.00 unit(s) \$249,689.00	16 Assets 16.00 unit(s) \$1,804,600.00	1 Asset 1.00 unit(s) \$2,700.00	0 Assets - \$0.00	1 Asset 1.00 unit(s) \$46,215.00
	1	2 Assets 2.00 unit(s) \$38,430.00	24 Assets 24.00 unit(s) \$1,208,795.00	5 Assets 5.00 unit(s) \$131,900.00	0 Assets - \$0.00	0 Assets - \$0.00
		1	2	3	4	5
		Probability				

Vehicles

Risk Framework

Similar to buildings and facilities as well as machinery and equipment, given the variety of vehicle types under the County's purview, individual risk and criticality models have been developed for general purpose and paramedic services vehicles (*Figures 49-50: General Purpose Vehicles - Risk & Criticality Frameworks*).

Figure 49: General Purpose Vehicles - Risk & Criticality Framework



```

graph TD
    A[Probability of Failure] --> B[Assessed Condition  
60%]
    A --> C[Service Life Remaining  
40%]
    B --> D[Direct Financial  
5%]
    B --> E[Socio-political  
5%]
    D --> F[Consequence of Failure]
    D --> G[Replacement Cost  
100%]
    E --> H[Health and Safety  
90%]
    E --> I[Functionality  
100%]
    F --> J[Asset Attribute or Measurement]
    F --> G
    H --> I
  
```

Tables 61-62: Vehicles - Probability of Failure Factors show how each factor influencing the probability of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual vehicles or groups of vehicles.

Table 61: General Purpose Vehicles - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Kilometers	Less than 50,000	1 – Rare
	50,000 – 100,000	2 – Unlikely
	100 – 150,000	3 – Possible
	150,000 – 200,000	4 – Likely
	More than 200,000	5 – Almost Certain
Factor	Number of Years	Probability of Failure Score
Age	Less than 5	1 – Rare
	5 - 8	2 – Unlikely
	8 - 12	3 – Possible
	12 - 15	4 – Likely
	More than 15	5 – Almost Certain
Factor	Value	Probability of Failure Score
Condition	80 - 100	1 – Rare
	60 - 80	2 – Unlikely
	40 - 60	3 – Possible
	20 - 40	4 – Likely
	0 - 20	5 – Almost Certain
Factor	Value	Probability of Failure Score
Type of Work	Light Duty	1 – Rare
	Medium Duty	3 – Possible
	Heavy Duty	5 – Almost Certain
Factor	History	Probability of Failure Score
Reliability	Very Reliable	1 – Rare
	Reliable	2 – Unlikely
	History of Minor Issues	3 – Possible
	History of Major Issues	4 – Likely
	Unreliable	5 – Almost Certain
Factor	Percentage of Replacement Cost	Probability of Failure Score
Repairs and Maintenance	Less than 5%	1 – Rare
	5% - 10%	2 – Unlikely
	10% - 20%	3 – Possible
	20% - 30%	4 – Likely
	Greater than 30%	5 – Almost Certain

Table 62: Paramedic Services Vehicles - Probability of Failure Factors

Explanatory Factor	Range, Value, Type, or Qualitative Description	Probability of Failure
Factor	Value	Probability of Failure Score
Condition	80 - 100	1 – Rare
	60 - 80	2 – Unlikely
	40 - 60	3 – Possible
	20 - 40	4 – Likely
	0 - 20	5 – Almost Certain
Factor	Percentage	Probability of Failure Score
Projected Service Life Remaining	Greater than 80%	1 – Rare
	61-80%	2 – Unlikely
	41 – 60%	3 – Possible
	21 – 60%	4 – Likely
	Less than 20%	5 – Almost Certain

Consequence of Failure

Tables 63-64: Vehicles - Consequence of Failure Factors show how each factor influencing the consequence of failure can be scored along a range of 1 to 5. These rating can then be assigned to individual vehicles or groups of vehicles.

Table 63: General Purpose Vehicles - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$40,000	1 – Insignificant
	\$40,000 - \$100,000	2 – Minor
	\$100,000 - \$175,000	3 – Moderate
	\$175,000 - \$250,000	4 – Major
	Greater than \$250,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Purpose	General Government	1 – Insignificant
	Social Services / Tourism	2 – Minor
	Transportation	3 – Moderate
	Paramedic Services	5 – Severe
Health and Safety	Type	Consequence of Failure Score
Operating Conditions	General Traffic	1 – Insignificant
	Construction Sites	3 – Moderate
	Emergency Driving	5 – Severe
Economic	Type	Consequence of Failure Score
Vehicle Type	Light Duty / Vans	1 – Insignificant
	Medium Duty / Trucks & Attachments	3 – Moderate
	Heavy Duty / Special Use	5 – Severe

Table 64: Paramedic Services Vehicles - Consequence of Failure Factors

Type of Consequence	Range, Value, Type, or Qualitative Description	Consequence of Failure
Direct Financial	Range	Consequence of Failure Score
Unit Replacement Cost	\$0 - \$25,000	1 – Insignificant
	\$25,000 - \$50,000	2 – Minor
	\$50,000 - \$100,000	3 – Moderate
	\$100,000 - \$150,000	4 – Major
	Greater than \$150,000	5 – Severe
Socio-political	Type	Consequence of Failure Score
Health and Safety		
Functionality	Non-patient Transport	4 – Major
	Patient Transport	5 – Severe

Risk Matrix

Based on the above criteria and available attribute data, *Figure 51: Vehicles - Risk Matrix* represents the risk matrix developed for the County's vehicle assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, none of the County's vehicle assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 51: Vehicles - Risk Matrix

Consequence	5	10 Assets 10.00 unit(s) \$1,837,232.67	2 Assets 2.00 unit(s) \$320,924.01	6 Assets 6.00 unit(s) \$1,670,214.58	3 Assets 3.00 unit(s) \$930,295.13	0 Assets - \$0.00
	4	15 Assets 15.00 unit(s) \$4,470,577.62	0 Assets - \$0.00	1 Asset 1.00 unit(s) \$159,639.31	0 Assets - \$0.00	0 Assets - \$0.00
	3	7 Assets 7.00 unit(s) \$555,442.42	4 Assets 4.00 unit(s) \$256,573.46	5 Assets 5.00 unit(s) \$474,222.99	0 Assets - \$0.00	0 Assets - \$0.00
	2	0 Assets - \$0.00	6 Assets 6.00 unit(s) \$206,000.78	4 Assets 4.00 unit(s) \$131,393.24	0 Assets - \$0.00	0 Assets - \$0.00
	1	14 Assets 14.00 unit(s) \$458,215.42	0 Assets - \$0.00	3 Assets 3.00 unit(s) \$111,365.04	0 Assets - \$0.00	0 Assets - \$0.00
		1	2	3	4	5
		Probability				

Housing

Risk Frameworks, Probability and Consequence of Failure

At present, the same risk frameworks and probability and consequence of failure factors list above for building and facilities and machinery and equipment have been applied to Housing assets as appropriate.

Risk Matrix

Based on the above criteria and available attribute data, *Figure 52: Housing - Risk Matrix* represents the risk matrix developed for the County's Housing assets. The x-axis represents the probability of failure, scored from 1 to 5 and the y-axis represents

the consequence of failure, also scored from 1 to 5. The matrix shows that based on age, assessed condition, and replacement costs, none of the County's Housing assets are in the highest risk classification. As staff continue to collect additional attribute data, assets may be reclassified and regrouped based on their new risk scores.

Figure 52: Housing - Risk Matrix

Consequence	5	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	4	2 Assets 2.00 unit(s) \$383,017.11	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	3	6 Assets 6.00 unit(s) \$9,208,680.00	5 Assets 349.00 unit(s) \$4,712,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	2	21 Assets 21.00 unit(s) \$5,728,108.00	27 Assets 53.00 unit(s) \$4,814,546.00	1 Asset 1.00 unit(s) \$58,000.00	28 Assets 76.00 unit(s) \$57,376.00	21 Assets 133.00 unit(s) \$128,151.00
	1	66 Assets 77.00 unit(s) \$1,824,011.00	1,427 Assets 2,298.00 unit(s) \$102,198,652.00	381 Assets 457.00 unit(s) \$54,138,441.00	47 Assets 194.00 unit(s) \$873,038.00	120 Assets 684.00 unit(s) \$828,686.00
		1	2	3	4	5
		Probability				

Integrating Climate Change

Adaption

Grey County has experienced many occurrences of infrastructure damage from weather events resulting in decreased levels of service being offered. It is vital that climate and weather risks be evaluated and addressed when considering each of the County's assets to ensure these assets are resilient to the changing climate. By assessing the climate related risks for each asset class, funds can be allocated to adaption initiatives to provide the optimal level of protection. Staff strive to continuously consider the ever-increasing effects of the changing climate on County infrastructure through both risk and financial analysis of all assets.

Mitigation

The Federation of Canadian Municipalities estimates that for every CAD \$1 billion invested in disaster mitigation, CAD \$6 billion in costs can be avoided.⁴ In addition to adaptive measures to preserve County assets, mitigative actions need to also be taken when making asset management decisions to ensure the County is doing its part to mitigate climate change. County staff endeavour to consider mitigative options wherever possible when proposing asset replacement and maintenance plans.

Financial Analysis

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

Infrastructure is expensive to build and even more expensive to maintain in a state of good repair. Grey County has made substantial investments over the years in building its current infrastructure portfolio, which has an estimated current replacement cost of over \$1.6 billion, and a historical cost of \$488 million.

Most municipalities across Canada face annual infrastructure funding shortages or deficits, as well as existing, long-term infrastructure backlogs that have accumulated over years and decades. Each year, this backlog grows, and the quality of infrastructure degrades as projects are deferred due to funding constraints. Infrastructure disrepair can restrict economic activity, jeopardize public safety, lower the quality of life of residents, and expose organizations to financial risk. The condition of a community's infrastructure can also create political and reputational damage.

Most local governments have limited options to raise additional funds for infrastructure, relying primarily on tax levies, debt, and user fees. Rural and small municipalities are also less attractive for public-private partnerships (P3s) that can leverage private sector funds to deliver major projects. This makes senior government support critical, whether through matching formulas for major capital projects, or through grants and subsidies that can make additional capital available for municipalities.

Given the level of investment required, it will take many years or decades for municipalities to reach fiscal sustainability. In this section, an analysis of Grey County's current fiscal framework for supporting its infrastructure portfolio is provided. Where

⁴ FCM. *Climate and Sustainability*. (<https://fcm.ca/en/focus-areas/climate-and-sustainability>, 2019.)

meaningful and practical, a comparison with the County's 2020 Asset Management Strategy is also provided.

The final version of the AM Strategy that was presented by PSD Citywide to County Council April 8, 2021, proposed a 1.21% tax levy increase over a 15-year phase in period to achieve full funding for the County's infrastructure program. This was a slight increase from the 1% per year tax increase that had been previously implemented as proposed in the 2016 Asset Management Plan, but was required given the many factors considered when calculating the increased funding requirements and replacement value of the County's assets, all of which were discussed within the AM Strategy. In 2022, the 1.21% tax levy increase equated to \$754,348; instead of an increase to the levy an increase in the Ontario Community Infrastructure Fund (OCIF) was received and was allocated to this purpose.

Recommendations in this plan are dependent upon access to necessary resources. Any financial implications of the plan will be included in future budgets for consideration and staff will pursue senior level government funding opportunities as they become available.

Annual Capital Requirements

Each year, investments must be made in infrastructure maintenance, renewal, rehabilitation, and replacement to ensure it remains in a state of good repair. The focus of this AMP, and that of most municipal AMPs, is typically annual capital expenditures. These target investment levels, or annual capital requirements, are dispersed across the lifecycle of the asset.

The objective is to ensure that when assets do reach the end of their useful life, sufficient funding is available to replace them to minimize service disruption. The annual requirements are directly proportional to the value of the infrastructure portfolio and the average useful life of assets contained within it.

Table 65: Average Annual Capital Requirements outlines current annual capital requirements by asset category. Based on the estimated asset portfolio's total replacement cost of \$1.6 billion, Grey County's annual requirements total approximately \$49.4 million for the eight asset categories analyzed in this document, an increase of \$4.5 million, or 10% since 2020. This increase is unsurprising given the Toronto non-residential building construction price index (NRBCPI) from Q4 2020 to Q4 2021 which was used as the basis for inflating replacement costs within the AMP where better data

was unavailable was 17.2%⁵. Roads comprise 59.7% of annual funding needs, consistent with their share of total replacement cost, at 54.3%.

Table 65: Average Annual Capital Requirements

Asset Category	Annual Requirements 2021	% Of Total Annual Requirements	Replacement Cost 2021	% Of Total Replacement Cost
Roads	\$29,482,081	59.7%	\$885,305,902	54.3%
Bridges and Culverts	\$5,266,743	10.8%	\$338,279,684	20.8%
Stormwater	\$1,000,251	2.0%	\$55,833,519	3.4%
Buildings and Facilities	\$3,971,163	8.0%	\$127,767,629	7.8%
Machinery and Equipment	\$1,854,995	3.8%	\$16,380,618	1.0%
Land Improvements	\$495,253	1.0%	\$10,058,111	0.6%
Vehicles	\$1,397,986	2.8%	\$11,582,097	0.7%
Housing	\$5,885,035	11.9%	\$184,748,701	11.3%
Total	\$49,353,507	100.0%	\$1,629,956,261	100.0%

Available Funding

Figure 53: Average Annual Funding Available - Taxation Only shows how historically funding available for infrastructure through tax revenue trended from 2018 to 2020. Overall funding levels have remained stable. On average, the County has approximately \$15.3 million of taxation revenue available annually for its infrastructure portfolio. Funding for land improvements has been included in the buildings and facilities category. These historical financial average values are used for further analysis and recommendations.

⁵ Statistics Canada. Table 18-10-0135-02 Building construction price indexes, percentage change, quarterly, <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810013502>.

Figure 53: Average Annual Funding Available - Taxation Only

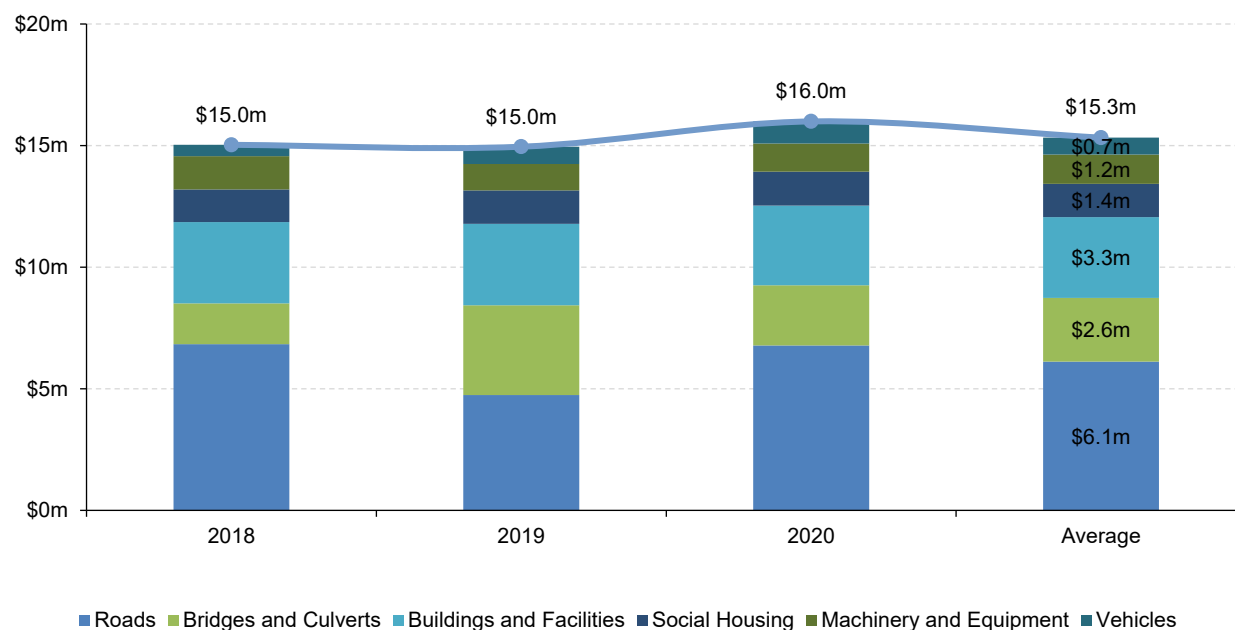


Table 66: Average Annual Funding Available summarizes all reliable and predictable sources of funding used by the County in 2020 for infrastructure purposes, including taxation, the Canada Community Building Fund (previously known as Federal Gas Tax Fund), the Ontario Community Infrastructure Fund (OCIF), long-term care grants, and proceeds from disposal of assets. For 2020, a total of \$21.3 million was available for capital purposes; tax revenues account for 71% of this funding. In the 2022 approved budget, \$15.9 million of tax levy has been attributed to capital purposes.

However, similar to other municipalities in Ontario, Grey County relies considerably on senior government support to supplement infrastructure investments; 26.4% of the available funding comes from senior government grants and transfers.

Table 66: Average Annual Funding Available

Asset Category	Average Funding Available					
	Taxes (Average 2018- 2020)	Gas Tax 2020 (now CCBF)	OCIF 2020	LTC Grants 2020	Disposal of Assets 2020	Total Funding Available
Roads	\$6,120,045	\$2,846,449	\$1,279,946	\$0	\$0	\$10,246,440
Bridges and Culverts	\$2,615,268	\$0	\$0	\$0	\$0	\$2,615,268
Buildings and Facilities	\$3,322,663	\$0	\$0	\$1,493,000	\$3,387	\$4,819,050
Housing	\$1,369,668	\$0	\$0	\$0	\$0	\$1,369,668
Machinery and Equipment	\$1,201,455	\$0	\$0	\$0	\$103,012	\$1,304,467
Vehicles	\$697,643	\$0	\$0	\$0	\$273,396	\$971,039
Total	\$15,326,742	\$2,846,449	\$1,279,946	\$1,493,000	\$379,795	\$21,325,932
Percentage of Total Funding	71.9%	13.3%	6.0%	7.0%	1.8%	100%

It should also be noted that the County is in the planning stages of potentially rebuilding the Rockwood Terrace long-term care home, as well as developing new Housing sites. These new facilities will offer higher levels of service, and given their higher replacement costs, the associated annual requirements or target reinvestment rates will also increase.

Annual Infrastructure Funding Deficits

Based on available funding data, *Table 67: Funding Levels by Asset Category* summarizes the current funding levels for each asset category and the resulting infrastructure deficits. At current levels based on recent years, the County is funding 43.2% of its long-term capital needs.

Current funding levels create a total annual infrastructure deficit of \$28.0 million for all asset categories. The County's overall funding has remained consistent since 2018.

Table 67: Funding Levels by Asset Category

Asset Category	Annual Average Requirement 2021	Average Annual Funding Available	Deficit / (Surplus)	% Funded
Roads/Stormwater	\$30,482,332	\$10,246,440	\$20,235,892	33.6%
Bridges and Culverts	\$5,266,743	\$2,615,268	\$2,651,475	49.7%
Buildings and Facilities/Land Improvements	\$4,466,416	\$4,819,050	-\$352,634	107.9%
Machinery and Equipment	\$1,854,995	\$1,304,467	\$550,528	70.3%
Vehicles	\$1,397,986	\$971,039	\$426,947	69.5%
Housing	\$5,885,035	\$1,369,668	\$4,515,367	23.3%
Total	\$49,353,507	\$21,325,932	\$28,027,575	43.2%

Target reinvestment rates were set in the 2020 AM Strategy to form a realistic funding plan to achieve sufficient funding for the replacement of County assets. These recommended target reinvestment rates are applied to the 2021 replacement costs in *Table 68: Annual Deficit Using Recommended Reinvestment Rates* to determine the funding needed to sustain County assets.

Table 68: Annual Deficit Using Recommended Reinvestment Rates

Asset Category	Replacement Cost 2021	Recommended Reinvestment Rate	Funding Needed	Funding Available	Adjusted Annual Deficit
Roads/Stormwater	\$941,139,421	2.0%	\$18,822,788	\$10,246,440	\$8,576,348
Bridges and Culverts	\$338,279,684	2.1%	\$7,103,873	\$2,615,268	\$4,488,605
Buildings and Facilities/Land Improvements	\$137,825,740	3.4%	\$4,686,075	\$4,819,050	-\$132,975
Machinery and Equipment	\$16,380,618	11.2%	\$1,834,629	\$1,304,467	\$530,162
Vehicles	\$11,582,097	12.4%	\$1,436,180	\$971,039	\$465,141
Housing	\$184,748,701	1.8%	\$3,325,477	\$1,369,668	\$1,955,809
Total	\$1,629,956,261		\$37,209,023	\$21,325,932	\$15,883,091

The above “Recommended Reinvestment Rates” and the “Adjusted Annual Deficit” are used for further analysis.

Eliminating the Annual Deficit

The approach to closing annual infrastructure gaps and reaching sustainability over the long-term relies primarily on instruments within the control of the County, namely taxation, debt, and use of existing reserves. Reliable sources of funding from the provincial and federal governments have been included in this analysis, please see the Senior Government Funding section below which discusses evolving provincial and federal funding streams for infrastructure and asset management.

In 2020, Grey County's revenue from taxation totalled \$60,392,506. As illustrated in *Table 69: Tax Increase Required to Achieve Full Funding*, based on a current available funding level of \$21.3 million and an adjusted annual infrastructure deficit of \$15.9 million, the County will need to increase its tax revenue by a total of 1.57% to eliminate this annual deficit.

Table 69: Tax Increase Required to Achieve Full Funding

		2020 Actual	2019 Actual	2016 Actual
Tax Revenues		\$60,392,506	\$58,254,078	\$52,760,353
Increase required to close annual deficit using 2021 replacement costs		\$15,883,091	\$11,521,921	\$8,997,000
Effective tax increase required		26.3%	19.8%	17.01%
Annual tax increase required over:				
	10 years	2.36%	1.82%	1.7%
	15 years	1.57%	1.21%	1.1%
	20 years	1.17%	0.91%	0.9%

In the 2020 AM Strategy, a tax increase of 19.8% was required to close the infrastructure gap. The 2020 AM Strategy recommended a 15-year phase-in period, which was first included as part of the 2022 annual budget. Prior to the 2022 budget, a 1.0% annual increase was implemented as per the 2016 AMP.

Current analysis shows that after considering the increased replacement costs for 2021, Grey County can close its annual infrastructure deficit by increasing its taxation revenues by 2.36% per year over 10 years; 1.57% per year over 15 years; or 1.17% per year over a 20-year phase-in period. All scenarios assume that the annual increase in available funding resulting from the increase in tax revenue is allocated entirely to the deficit, replacement value increases remain consistent and no new acquisitions such as building are made.

Based on the above analysis, staff recommend that council consider adopting a 1.57% increase in tax revenues is over a 15-year phase-in period going forward. The 2021

County of Grey Asset Management Strategy, completed by PSD Citywide, recommended a 1.21% increase of corporate tax revenues each year for 15 years starting in 2022 to close the existing infrastructure funding gap. In 2022 this equated to \$754,348; an increase to the Ontario Community Infrastructure Fund (OCIF) allocation was received and this funding was utilized instead of levy dollars. Compared to the 1.21% increase recommended in the County's 2020 AM Strategy that was endorsed by Grey County council in 2021, the new rate of 1.57% would be a theoretical incremental increase of \$228,600 based on the 2022 budget, had the 1.21% increase in funding been funded from levy for 2022.

Senior Government Funding

Federal and provincial governments provide supplementary funding to municipalities for infrastructure and asset management capacity building, as discussed below. While these are and/or have been consistent forms of funding for municipalities for many years, government funding structures and policy direction can change. As such, municipalities should be prepared for individual funding streams to change or disappear. However, although the structure of the transfers can evolve, both the province and federal government continue to provide reliable sources of funding for asset management and infrastructure programs.

Canada Community Building Fund – (Formerly Federal Gas Tax)

Gas tax funds have been a reliable source of funding for municipalities. Municipalities are provided a specific allocated amount each year, and the funding can be used for asset management capacity building.

Ontario Community Infrastructure Fund (OCIF)

OCIF has been available to municipalities through both a formula-based allocation and grant-based funding. However, the Ontario government ended the grant portion of the funding in 2020. They have continued the formula-based funding, maintaining the same approach that has been seen in past years.

Ontario Municipal Partnership Fund (OMPF)

This program primarily supports rural and northern communities across Ontario. There are five streams, which are renewed each year and provide communities with allocated funding. There have been cuts to this funding in the recent years, constraining some municipal budgets. While this funding is not explicitly for asset management capacity building and/or software systems, it can allow eligible municipalities to use the funds to better manage fluctuations in funding. Grey County is not eligible for this source of funding.

Investing in Canada Infrastructure Program (ICIP)

This program is based on agreements between the federal government and each province. It has four streams: Public Transit, Green Infrastructure, Community, Culture and Recreation, and Rural and Northern Communities. The Ontario government works with the federal government to determine how the funding will be distributed throughout each stream. The Public Transit stream is allocated funding, whereas the other streams are determined through a grant system.

Growth Projections

Under Regulation 588/17 growth projections presented in the AMP are to be the same as those reported in Grey County's Official Plan.

Grey County's latest Official Plan, which was approved by the Province of Ontario on June 6, 2019, forecasted that both the County's population and employment level are projected to grow.

Table 70: Permanent Population Growth Projections and Allocations to 2038 and Table 71: Employment Growth Projections and Allocations to 2038 from the Official Plan have been included below for reference.

Table 70: Permanent Population Growth Projections and Allocations to 2038

Forecast Total Population Growth – 2018 to 2038 (including 2016 Census Results and Census Net Undercoverage), County of Grey by Local Municipality								
Municipality	Total Population						2018-2038	
	2016	2018	2021	2031	2036	2038	Net Change	Compound Annual Growth Rate
Blue Mountains	7,190	7,260	7,660	8,600	8,980	9,100	1,840	1.1%
Chatsworth	6,790	6,800	6,880	7,120	7,220	7,260	460	0.3%
Georgian Bluffs	10,730	10,780	11,050	11,710	11,980	12,080	1,300	0.6%
Grey Highlands	10,040	10,110	10,520	11,450	11,820	11,940	1,830	0.8%
Hanover	7,870	7,890	7,980	8,320	8,450	8,490	600	0.4%
Meaford	11,250	11,290	11,530	12,180	12,440	12,520	1,230	0.5%
Owen Sound	21,850	21,910	22,250	23,330	23,810	23,950	2,040	0.4%
Southgate	7,530	7,620	8,090	9,100	9,500	9,620	2,000	1.2%
West Grey	12,820	12,870	13,140	13,850	14,130	14,230	1,360	0.5%
County of Grey	96,070	96,530	99,100	105,660	108,330	109,190	12,660	0.6%

Table 71: Employment Growth Projections and Allocations to 2038

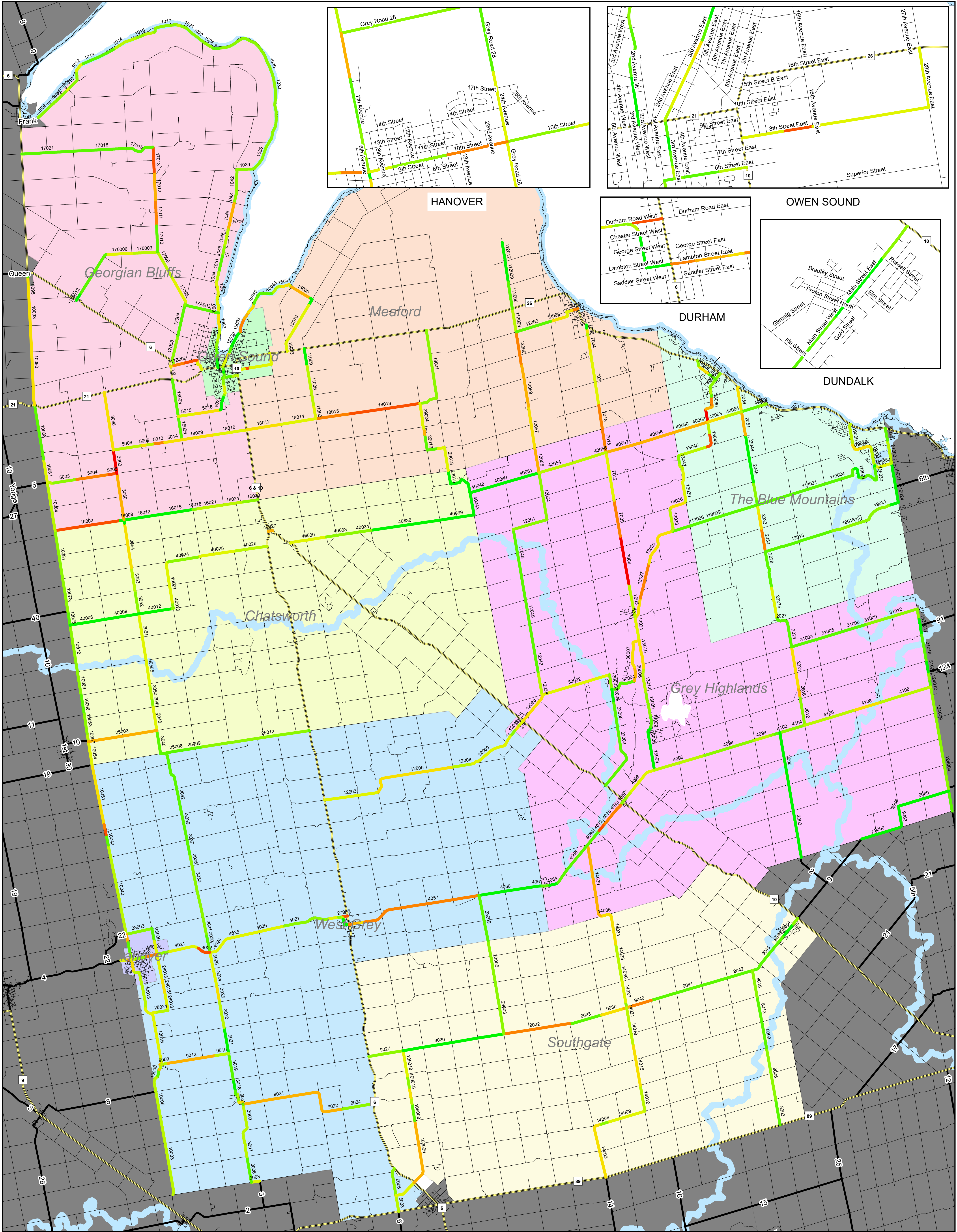
Forecast Total Employment Growth – 2018 to 2038 (including 2016 Census Results) County of Grey by Local Municipality								
Municipality	Total Employment						2018-2038	
	2016	2018	2021	2031	2036	2038	Net Change	Compound Annual Growth Rate
Blue Mountains	4,570	4,600	4,720	4,880	4,990	5,060	460	0.5%
Chatsworth	1,380	1,380	1,420	1,450	1,500	1,530	150	0.5%
Georgian Bluffs	3,350	3,370	3,480	3,560	3,680	3,720	350	0.5%
Grey Highlands	4,090	4,120	4,250	4,380	4,490	4,550	430	0.5%
Hanover	4,870	4,890	4,990	5,040	5,120	5,210	320	0.3%
Meaford	3,420	3,440	3,560	3,660	3,780	3,830	390	0.5%
Owen Sound	14,100	14,200	14,760	14,880	15,320	15,550	1,350	0.5%
Southgate	1,820	1,840	1,950	2,080	2,180	2,200	360	0.9%
West Grey	3,290	3,310	3,430	3,520	3,650	3,700	390	0.6%
County of Grey	40,890	41,150	42,560	43,450	44,710	45,350	4,200	0.5%

For further information on the County's growth projections, please refer to the "Recolour Grey" page at <https://www.grey.ca/programs-initiatives/recolour-grey> on the County's website.

For Additional Information

As per O. Reg 588/17, any of the background information and/reports upon which the information required by paragraph 3 of subsection (2) is based upon can be made available to the public by request. These requests can be made by making a general inquiry to the County of Grey through the "Contact Us" page at <https://www.grey.ca/contact-us>, or by calling 519-376-2205 (local) or 1-800-567-4739.

Appendix A: 2020 Pavement Condition Index Map



Pavement Condition Index


- 0 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100

Roads



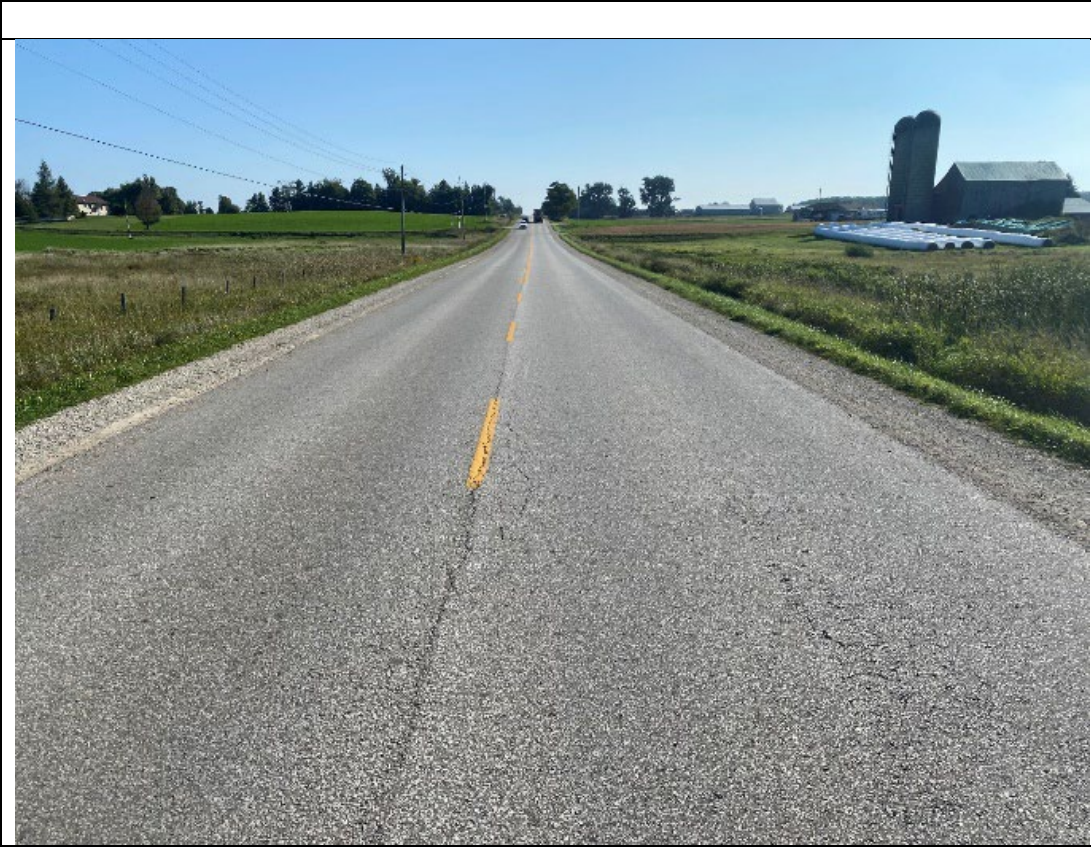

- County Roads
- MTO Highway
- Municipal Roads

0 2.5 5 10 15 20
Kilometers





Coordinate System: NAD 1983 UTM Zone 17N
Units: Meter



ISSUE	1	09/22/21	FIRST DRAFT	
No.		DATE		DESCRIPTION
 Grey County Colour It Your Way				2020 Pavement Condition Index Map
TRANSPORTATION SERVICES				SHEET 1 OF 1
SCALE: 1:130,000 DATE: 05/28/21				PCL Report

Appendix B: Pavement Condition Index Sample Images

PCI and Description	Sample Photos	
<p>90 – 100</p> <p>Pavement is in excellent condition with few cracks</p> <p>Rideability is excellent with few areas of slight distortion</p>		
<p>75 - 90</p> <p>Pavement is in good condition with frequent very slight or slight cracking</p> <p>Rideability is good with a few slightly rough and uneven cracks</p>		

PCI and Description	Sample Photos	
<p data-bbox="432 499 540 532">65 – 75</p> <p data-bbox="198 572 777 677">Pavement is in fairly good condition with slight cracking, slight or very slight dishing and a few areas of slight alligator cracking.</p> <p data-bbox="214 713 761 782">Rideability is fairly good with intermittent rough and uneven sections.</p>		
<p data-bbox="432 1272 540 1304">50 - 65</p> <p data-bbox="211 1344 764 1481">Pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligator cracking and dishing.</p> <p data-bbox="226 1518 749 1586">Rideability is fair and surface is slightly rough and uneven.</p>		

PCI and Description	Sample Photos	
<p data-bbox="438 479 537 512">40 - 50</p> <p data-bbox="211 552 764 693">Pavement is in fair to poor condition with frequent moderate cracking and dishing, and intermittent moderate alligator cracking.</p> <p data-bbox="223 727 752 798">Rideability is fair to poor and surface is moderately rough and uneven.</p>	 A photograph of a two-lane asphalt road with a yellow center line. The road surface shows significant longitudinal cracking and some transverse cracking. The road is flanked by green grass and trees in the distance.	 A photograph of a two-lane asphalt road with a yellow center line. The road surface shows significant longitudinal cracking and some transverse cracking. The road is flanked by green grass and trees in the distance.
<p data-bbox="438 1266 537 1298">30 - 40</p> <p data-bbox="195 1338 780 1479">Pavement is in poor condition with frequent moderate alligator cracking and extensive moderate cracking and dishing along with intermittent moderate potholing.</p> <p data-bbox="267 1514 708 1584">Rideability is poor and surface is moderately rough and uneven.</p>	 A photograph of a two-lane asphalt road with a yellow center line. The road surface shows extensive alligator cracking and some potholing. The road is flanked by green grass and trees in the distance.	 A photograph of a two-lane asphalt road with a yellow center line. The road surface shows extensive alligator cracking and some potholing. The road is flanked by green grass and trees in the distance.

PCI and Description	Sample Photos	
<p data-bbox="447 526 531 560">0 - 30</p> <p data-bbox="198 600 780 737">Pavement is in very poor condition with extensive severe cracking, severe alligator cracking, dishing, and moderate to severe potholing.</p> <p data-bbox="208 774 770 842">Rideability is very poor and the surface is very rough and uneven.</p>		

Appendix C: Functional Road Classification and Planned Corridors



APPENDIX C
Functional Road Classification
and Planned Corridors

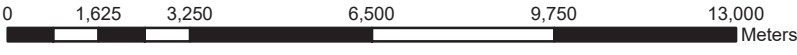
LEGEND

- Provincial Highway
- Provincial Highway Connecting Links
- County Arterial
- County Collector
- County Local
- Municipal Local

Potential Planned County Corridor

- Potential Planned County Arterial
- Potential Planned County Collector

SCALE 1: 135,000



AUTHOR: Grey County Planning and Development
FILE NAME: GR_OP_ApdxD_Map0X36.mxd
APPLICATION: ArcMap
DATE: June 7, 2019
PROJECTION: UTM zone 17N / NAD83
SOURCE: Teranet, Ministry of Natural Resources and Forestry

INTERACTIVE MAP: geo.grey.ca
DOWNLOAD PDF: grey.ca/planning-development

This map is for illustrative purposes only. Do not rely on this map as being a precise indicator of routes, location of features or surveying purposes. This map may contain cartographical errors or omissions.

Appendix D: Bridge Condition Index Sample Images

BCI and Description	Sample Photos	
<p data-bbox="428 425 547 459">70 – 100</p> <p data-bbox="220 499 752 600">Bridge is in good condition with maintenance work not usually required within the next 5 years</p>		
<p data-bbox="438 1145 537 1179">60 - 70</p> <p data-bbox="195 1215 777 1316">Bridge is in fair condition with maintenance work usually scheduled within the next 5 years</p>	 <p data-bbox="1454 1518 1724 1568">2021 Jun 03</p>	 <p data-bbox="2526 1518 2797 1568">2021 Jun 04</p>

BCI and Description	Sample Photos	
<p data-bbox="444 491 531 526">0 – 60</p> <p data-bbox="236 566 739 667">Bridge is in poor condition with maintenance work usually scheduled within one year</p>		

Appendix E: Culvert Condition Index Sample Images

BCI and Description	Sample Photos	
<p data-bbox="428 512 547 546">70 – 100</p> <p data-bbox="226 586 749 687">Culvert is in good condition with maintenance work not usually required within the next 5 years</p>	 <p data-bbox="1432 889 1712 939">2021 May 25</p>	 <p data-bbox="2604 903 2800 939">2021 Jun 11</p>
<p data-bbox="438 1318 537 1352">60 - 70</p> <p data-bbox="236 1393 739 1493">Culvert is in fair condition with maintenance work usually scheduled within the next 5 years</p>	 <p data-bbox="1442 1695 1728 1745">2021 May 25</p>	 <p data-bbox="2613 1709 2809 1745">2021 Jun 09</p>

BCI and Description	Sample Photos	
<p data-bbox="444 526 531 560">0 – 60</p> <p data-bbox="233 600 739 701">Culvert is in poor condition with maintenance work usually scheduled within one year</p>	 <p data-bbox="1516 889 1703 923">2021 Jun 28</p>	 <p data-bbox="2511 872 2790 923">2021 May 25</p>