ASSET MANAGEMENT PLAN 2024

Asset Management Plan 2024

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Executive Summary

Infrastructure plays an integral role in the economic, social and environmental advancement of a community. As the backbone of the region, infrastructure supports the municipal services relied on by local municipalities, residents, businesses and other stakeholders. Municipalities own and manage nearly 60% of the public infrastructure stock in Canada.

The County of Essex (the "County") is an upper-tier municipality that support the economies of 7 local municipalities, over 192,000 residents and various local businesses and industries. In accordance with Ontario Regulation 588/17 ("O.Reg 588/17"), the scope of this Asset Management Plan ("AMP") includes all capital assets owned by the County. This includes core infrastructure such as the County's road network, bridges, culverts and stormwater network, as well as non-core infrastructure such as buildings, land improvements, fleet and equipment. Together, these assets have a total replacement cost of $1,123,799,000 as of December 31, 2022. Core assets represent 75.4% of the total portfolio cost. Non-core assets are categorized by operational department and represent the following percentage of total replacement costs:

- Infrastructure Services 2.9%
- Sun Parlor Home 8.9%
- Emergency Medical Services 5.8%
- General Government 3.2%
- Essex County Library 0.6%
- Essex Windsor Solid Waste Authority 3.1%

As a Board of Management established by agreement between the County of Essex and the City of Windsor, the Essex Windsor Solid Waste Authority has been 50% consolidated in this report.

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

Strategic asset management is critical to delivering the highest total value from public assets at the lowest lifecycle cost. This AMP details the current state of the County's asset portfolio for all service departments and provides

asset management and financial strategies designed to balance the desired levels of service with a cost-effective strategy that mitigates long-term funding gaps. In order for an AMP to be effective, it must be integrated with financial planning and long-term budgeting. The development of the County's comprehensive financial plan allows the municipality to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service and projected growth requirements.

Based on current replacement cost of core infrastructure and non-core assets and a combination of age-based and assessed conditions, just over 70% of assets, with a valuation of $1.12 billion, are in Good to Very Good condition. Only 6.2% are identified as in Poor to Very Poor condition or in use beyond their useful life.

The average annual investment requirement for all asset categories is $46,207,800. Annual revenue currently allocated for the replacement of these assets is $18,924,700 leaving an annual deficit of $27.3 million. In other words, investment in municipal infrastructure is currently at 41.0% of the long-term requirements.

The strategy proposed in this plan addresses the current infrastructure gap, while balancing the affordability factor of municipal taxes. Failure to address the infrastructure needs of the region will negatively impact the County's ability to provide a reliable level of service in the future and will directly impact the quality of life of our residents and future of our businesses. This AMP seeks to manage our assets in a way that ensures investments are optimized, timely and meet the needs of the community at large.

The updating of the County's AMP at this time complies with new regulatory reporting requirements and may impact the award of certain provincial grant programs that are directly linked to asset replacement values (i.e. OCIF).

1.0 Scope & Objectives

This AMP is part of Essex County's overarching corporate strategy. It was developed to support the County's vision for asset management practices and programs. In compliance with Ontario Regulation 588/17, this updated AMP provides key asset attribute data, including the current composition of the asset portfolio, an estimation of its current replacement value and an assessment of the current capital spending framework. The long-term objective is to continue to reduce funding gaps, while providing a level of service that customers expect, at a price they are willing to pay. This AMP will also identify the maintenance and renewal strategies for all County assets, including the lifecycle costs associated with core infrastructure assets and outline the current Levels of Service measured for each asset category. This scope of this report does not include the costs associated with any proposed changes to these levels of service, nor does it consider any financing strategies to fund the current or proposed levels of service. Those items will be addressed in a future AMP as part of the O. Reg 588/17 requirements for July 1, 2025.

This iteration of the plan continues to improve the level of data accuracy and relevance to today's economic, social and political environment. While the previous AMP focused on core infrastructure assets, such as road networks, bridges, culverts and stormwater networks, this plan broadens the scope and brings the quality of data for all County assets to the standards of the core infrastructure assets. Quality of data was a key focus in the early stages of development of this plan and continues to be improved as new information is obtained.

Included in this AMP is a detailed discussion of the state of local infrastructure and assets for each category; an outline of the County's current levels of service and key performance indicators (KPIs); the strategy used to guide the County's lifecycle management for all portfolio assets; and the framework that establishes the risk associated with each asset in order to aid in decision making. The data presented in this report, except where otherwise stated, is limited to assets in service on December 31, 2022 and requiring replacement at the end of their anticipated useful life. Assets required for expansion of service capacity will be addressed in a future version of this plan.

1.1 Data and Methodology

The County's asset inventory is maintained in PSD's CityWide® Asset Manager module. This database records asset data in accordance with Public Sector Accounting Board (PSAB) Standard 3150, as well as other key asset attributes that facilitate reporting and decision making: historical costs, in-

service dates, asset life (for amortization as well as lifecycle useful life), field inspection data (as available), condition assessments, replacement costs, risk assessments, etc.

Core infrastructure assets, such as the road network, bridges and culverts and stormwater network, are categorized similar to the previous AMP. The non-core assets, such as buildings, land improvements, fleet, equipment and other assets, have been categorized by the service departments in which responsibility lies. This facilitates a greater understanding of the impact these assets have on the level of service provided by each service department. The departments include Infrastructure and Planning Services, Sun Parlor Home (SPH), Emergency Medical Services (EMS), General Government Services, Essex County Library (Library) and the Essex Windsor Solid Waste Authority (EWSWA). Within each department, the assets are further broken down by segment, such as building, land improvement, fleet, equipment or "other". "Other" assets include, but are not limited to, furniture and fixtures, aerial photography and information technology (IT) equipment.

This segmentation allows for the AMP to report on the overall state of the assets by service department, yet provide a deeper level of detail and highlight any areas of importance relevant to the unique operations of each department.

Policy Statement

Capital asset data is recorded in the tangible capital asset database upon acquisition of the asset. This data is reviewed and verified annually as part of the year-end audit process to ensure accuracy and completeness.

1.2 Condition Data

For accounting purposes, municipalities implement a straight-line amortization approach to depreciate their capital assets. In general, this approach may not be reflective of an asset's actual condition and the true nature of its deterioration, which tends to accelerate toward the end of the asset's lifecycle. However, it is often a useful approximation in the absence of actual field condition data and can provide a benchmark for future requirements. As in prior plans, each asset is analyzed individually; therefore, while deficiencies may be present at the individual level, imprecisions are minimized at the asset-class level when the data is aggregated. A condition scale utilized by Canada's Core Public Infrastructure Survey is used to assist in determining asset condition and is outlined in the Figure on the following page. While this condition rating scale was utilized for assessing the condition of core infrastructure assets in the previous AMP,

it remains a relevant scale to assess the condition of non-core assets as well. The condition assessment of buildings is determined using a calculated deterioration curve, on the premise, as stated above, that an asset's actual condition tends to deteriorate at a faster rate toward the end of the asset's lifecycle. The condition assessment of all other assets assumes a straight-line of deterioration over time.

Figure 1-1: Condition Ratings

Unless otherwise stated, the following condition rating is applied to all assets with an assessed condition:

Table 1-1: Condition Rating Scale

Condition Value Rating	Condition Index Rating
Very Good	80 - 100
Good	60 - 80
Fair	40 - 60
Poor	20 - 40
Very Poor	0 – 20

1.3 Condition Assessment Approach

The following Table summarizes the source of condition data used for each asset category/segment.

Table 1-2: Source of Condition Data

Asset Component	Source of Condition Data
Road Network	Assessed 2023 Pavement Condition Index
Bridges	Assessed 2022 Bridge Condition Index
Culverts	Assessed 2023 Culvert Condition Index
Stormwater Network	Age-based
Buildings	Age-based / User-Defined
Land Improvements	Age-based / User-Defined
Fleet	Age-based / User-Defined
Equipment	Age-based / User-Defined
Other	Age-based / User-Defined

Policy Statement

Pursuant to the Public Transportation and Highway Improvement Act, bridges and culverts shall be inspected every two years under the direction of a professional engineer using the Ontario Structure Inspection Manual. Pavement condition indexing shall be performed every two years under the direction of a professional engineer. All other assets shall have condition assessments reviewed every 3 years and updated as necessary.

For non-core assets, observed data generally provides the most accurate indication of an asset's physical health. Where possible, actual field condition data combined with professional judgement is used to reasonably assess the overall condition of the asset. This includes knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life. In the absence of such information, the age of the asset is used as a meaningful approximation of the asset's condition.

The County is currently pursuing third-party condition assessments for all County buildings, including those owned by EWSWA, in order to provide a more comprehensive report for use in future AMPs. The information being sought will also be used to determine any potential for legislated obligations relating to asset retirement and in the development and/or enhancement of preventative maintenance strategies for the County's non-core assets.

1.4 Lifecycle Management Strategy

The Lifecycle Management Strategy is the set of planned activities that will enable an asset to maintain its current level of service in a sustainable way, while managing risk, at the lowest lifecycle cost. These activities are often funded through the operating budget or, where the cost of the activity is significant, through the capital budget. Each asset category may have different activities executed at different times, the objective of which is to ensure an asset meets its estimated useful life in the most cost-effective manner possible. Activities include actions such as inspection, repairs, maintenance, preventative maintenance, rehabilitation and eventual full replacement of an asset.

1.5 Levels of Service

The Levels of Service framework is built on the following structure:

Core Value - the service attribute that is being measured. Core values are established based on consultation with the operating Department and aligned with stakeholder expectations. The following Table provides an overview of core values used in this report that are commonly held by the public.

Table 1-3: Overview of Core Values

Core Values	Description
Available	Services are accessible and available for customers who require them
Efficient	Services are delivered in a manner that achieves the best value for money; that is, maximum efficiency for minimum cost
Quality	The standard of service level that is provided to customers is satisfactory

Core Values	Description
Reliable	Services are provided with minimal service disruption and are available to customers in line with needs and expectations
Safe	Services are delivered such that they minimize health, safety and security risks
Scope	The extent of the area to which services are being provided is adequate.
Sustainable	Services are designed to be used efficiently and long-term plans are in place to ensure that they are available to all customers in the future.
Environmental Stewardship	Services are provided in a manner that has a minimal impact on the environment

Level of Service Statement – a high-level statement that describes the desired service outcome. This statement is guided by the selected core value with consideration given to the alignment with strategic goals and operational mandates.

Community Level of Service – a simple, plain language description of what the resident receives. The service being provided is described using language that is easily understood by the average person.

Technical Level of Service – a key performance indicator measured internally that indicates how an organization is performing in relation to the level of service. This is a reliable and quantifiable measurement of the service being provided and its alignment with the Level of Service statement and is based on the collection of asset data.

1.6 Financial Data

The average annual capital requirement is the amount, based on current replacement costs, that municipalities should set aside annually for the replacement of assets when they reach the end of their lifecycle. A municipality that plans for the sufficient funding of capital costs will ensure its reliance on external funding sources is minimized and strengthen its ability to maintain service levels. Determining the appropriate amount of annual funding is complicated by changes in economic conditions affecting replacement cost volatility and the affordability capacity of taxpayers. The reality of asset useful lives may also afford a municipality more or less time

to raise replacement funds. Climate change, growth pressures and the availability and quality of raw materials used to construct or manufacture assets can alter the timing of when funding is needed to replace aged assets. While achievement of 100% funding would be ideal, few, if any municipalities have achieved this level. It is often more realistic to aim for year-over-year increases in the overall capital requirement funding percentage. A strong commitment to asset management planning ensures the necessary resources will be available to maintain a consistent level of service for the residents of Essex County.

1.7 Replacement Cost

Replacement cost valuation is based on one of the following methods:

- historical costs inflated to today's dollars using the Consumer Price Index (CPI) tables for Ontario; or
- an estimate of current costs for non-linear assets, based on a combination of historical cost trends, current market pricing and professional judgement; or
- an estimate of current costs per unit for linear assets, based on an average of costs from the prior year and tenders awarded in the last 12 months.

1.8 Risk Management Strategies

Risk Management is key to determining how to efficiently and effectively prioritize capital spending on municipal infrastructure assets. The Risk Assessment can be quantified by multiplying the probability of failure of an asset by the consequences of failure of that asset. The assessment of risk starts by categorizing the type of asset, followed by an in-depth analysis of its significance to departmental operations, its current condition and its estimated replacement cost. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The lower the condition assessment, the higher the probability of failure of the asset. In most cases, unless otherwise stated, the consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences. Generally speaking, the higher the replacement cost of the asset, the greater the impact on operations, should that failure occur.

Figure 1-2: Risk Rating Scale

1.9 Estimated Useful Life

The estimated useful life (EUL) of an asset represents the average number of years it is expected to be available for use and remain in service before its value is fully depreciated. The EUL for each asset is determined by considering industry standards, practical experience and consulting with knowledgeable staff. Many assets will continue to have their EUL extended due to the comprehensive preventative maintenance schedules in place. By monitoring the overall cost of repairs & maintenance for each asset, Administration has been generally successful in extending the EUL of most assets and therefore the value obtained from those assets, by scheduling their replacement at an optimal point in the asset's life.

1.10 Population and Employment Forecasts

Ontario Regulation 588/17 requires the disclosure of population and employment forecasts as set out in the County's Official Plan. These forecasts are important in understanding the impact on future infrastructure requirements in the region and ensuring that the asset management plan is aligned with the Official Plan.

The purpose of the County of Essex Official Plan is to establish a policy framework for managing growth, protecting resources and providing direction on land use decisions during the current planning period. The current Official Plan was last updated and approved by the Ministry of Municipal Affairs and Housing in April 2014. In accordance with the Planning Act, municipalities are required to update their Official Plans within 10 years. The development of the new Official Plan was based on the Growth Analysis Report, as finalized by Watson and Associates in October of 2022. The results are also intended to guide decision-making and policy development specifically related to long-term growth planning and growth management, municipal finance and infrastructure planning carried out for the County.

Phase 1 of the Official Plan review exercise provides an update to the County's long-term population, household and employment growth forecasts and allocations by Area Municipality to the year 2051. The results of this

Phase 1 analysis have been used as part of second phase of the Official Plan Review to assess long-term urban land needs County-wide.

The draft Growth Analysis Background Report identified that between 2016 and 2021, the County's annual population increased at a rate of 1.2%, fueling steady demand for new housing construction throughout the County. According to the draft report *"looking forward over the next five to 10 years, housing demand across Windsor-Essex Area is anticipated to remain strong relative to recent historical levels fueled by steady immigration as well as positive net migration from elsewhere in Ontario and Canada".*

In contrast to the period between 2016 and 2021, which provided an annual population increase at a rate of 1.2%, the new draft Growth Analysis Report provides a range of low, medium and high population growth scenarios for the planning period to 2051, at 1.0%, 1.3% and 1.5%. By 2051, the County's total population base is forecast to grow to approximately 268,000 to 315,000. This represents an increase of between approximately 69,000 to 116,000 persons between 2021 and 2051. The Watson Report did not provide a recommended scenario as part of the Phase 1 Official Plan Review analysis to allow a detailed assessment of the corresponding urban land needs over the next 25 years associated with each growth scenario.

According to the growth analysis, all of the area municipalities within the County are anticipated to experience higher levels of annual population and housing growth over the 2021 to 2051 forecast period relative to the past 20 years. Under each of the long-term range growth scenarios, the share of population and employment growth by area municipality is anticipated to remain relatively consistent.

It is important to recognize that future population and employment growth within the County strongly correlate with the growth outlook and competitiveness of the broader Windsor-Essex area and surrounding region, specifically the surrounding municipalities which fall within the County's commuter-shed.

Employment growth in the regional economy represents a key driver of population growth to the County. Similar to historical population trends, the County has experienced periods of employment growth and decline over the past 20 years resulting from occasions of economic expansion and contraction across the broader Windsor-Essex Area economy during this time.

Given the competitive position of existing and planned Employment Areas across the County, as measured in terms of location/access to major North American employment markets and large population centres, parcel size,

price per acre and competitive development costs, etc. The County is anticipated to achieve a relatively stronger rate of industrial absorption over the long-term planning horizon under all three growth scenarios.

The three long-term employment forecast scenarios for the County over the 2021 to 2051 forecast period relative to historical employment trends between 2001 to 2021 identify a projected increase under all three growth scenarios. By 2051, the County's employment base is forecast to grow between approximately 108,000 and 124,000. This represents an increase of approximately 36,000 to 52,000 jobs between 2021 and 2051. Under the low scenario the employment annual growth rate is 1.3%, while under the medium and high scenario the employment growth rates are 1.6% and 1.8%.

Steady future economic growth is anticipated across the County, most notably associated with the need for local supply chains to support the planned Stellantis N.V and LG Energy Solution (L.G.E.S) electric vehicle battery manufacturing facility. The joint venture will invest over $5 billon CAD to create approximately 3,200 direct new jobs and an additional 15,000 indirect jobs within the regional supply chain.

The Growth Management Report prepared by NPG Planning Solutions Inc. analyzed land needs based on four growth scenarios: status quo, no settlement area expansion, balanced growth and higher density housing and higher density employment areas as noted above under the low, medium and high scenarios. Based on the analysis regarding housing land supply needs as part of the County's Municipal Comprehensive Review, Leamington requires 87 ha of additional land. Kingsville was identified as having approximately 90 ha of land in Secondary Settlement Areas to be added to the Primary Settlement Area. Pertaining to employment land needs, Amherstburg, Essex, Kingsville, Lakeshore and LaSalle were identified to require additional land supply. The Local Comprehensive Reviews will address the preferred location for the lands to be added to the Primary Settlement Area.

2.0 Asset Portfolio Overview

2.1 Asset Management Report Card

This report focuses on both core municipal infrastructure assets as well as all other municipal infrastructure assets, as required by O.Reg 588/17. Unless disclosed separately, Road Network data is inclusive of road surfaces of all types, as well as roundabouts and County-Wide Active Transportation System ("CWATS") routes. Other assets including furniture, aerial photography and IT equipment have been aggregated due to their nominal value. The assets included in this report are those in service as at December 31, 2022.

As outlined in the Table below, assets are generally in good overall condition, however there is an annual funding deficit of $27.3 million that, if not addressed, could lead to decreased levels of service and a deteriorating asset base. The County has successfully implemented several preventative maintenance strategies and takes a proactive approach to maintaining and repairing assets, which has directly resulted in an overall favourable condition assessment. However, maintenance and repairs only go so far and eventual replacement of assets is inevitable.

Table 2-1: Asset Portfolio Summary

Category	Replacement Cost (million)	Weighted Average Condition	Average Annual Requirement	Average Annual Deficit
Road Network	$568.4	68.9% (Good)	$24,890,900	$14,369,300
Bridges & Culverts	$274.2	63.0% (Good)	$8,163,500	$5,007,600
Stormwater Network	$5.1	72.0% (Good)	$127,000	$127,000
Infrastructure and Planning Services	$33.0	56.2% (Fair)	$1,973,700	$614,100
Sun Parlor Home	$99.9	77.8% (Good)	$2,185,200	$2,016,600

Category	Replacement Cost (million)	Weighted Average Condition	Average Annual Requirement	Average Annual Deficit
Emergency Medical Services	$65.4	74.8% (Good)	$4,768,300	$2,934,100
General Government Services	$36.5	77.4% (Good)	$482,400	($17,200)
Essex County Library	$6.3	45.1% (Fair)	$720,500	$156,800
Essex Windsor Solid Waste Authority	$35.0	63.8% (Good)	$2,896,300	$2,074,800
Total	**$1,123.8**	**68.1% (Good)**	**$46,207,800**	**$27,283,100**

2.2 Total Replacement Cost of Asset Portfolio

The total replacement cost of all assets owned by the County is currently estimated at just over $1.12 billion.

The replacement cost of linear asses, such as asphalt, concrete and tar & chip roads as well as CWATS routes were calculated in 2022 based on an estimate of current cost per lane kilometre as determined internally by professional engineers in the Infrastructure and Planning Services department. These figures were then inflated 5% per year to approximate the current cost in today's dollars. These costs, reviewed internally by the Infrastructure and Planning Services department, are based on an average of historical cost, recently awarded tenders, professional judgement and knowledge of current market pricing.

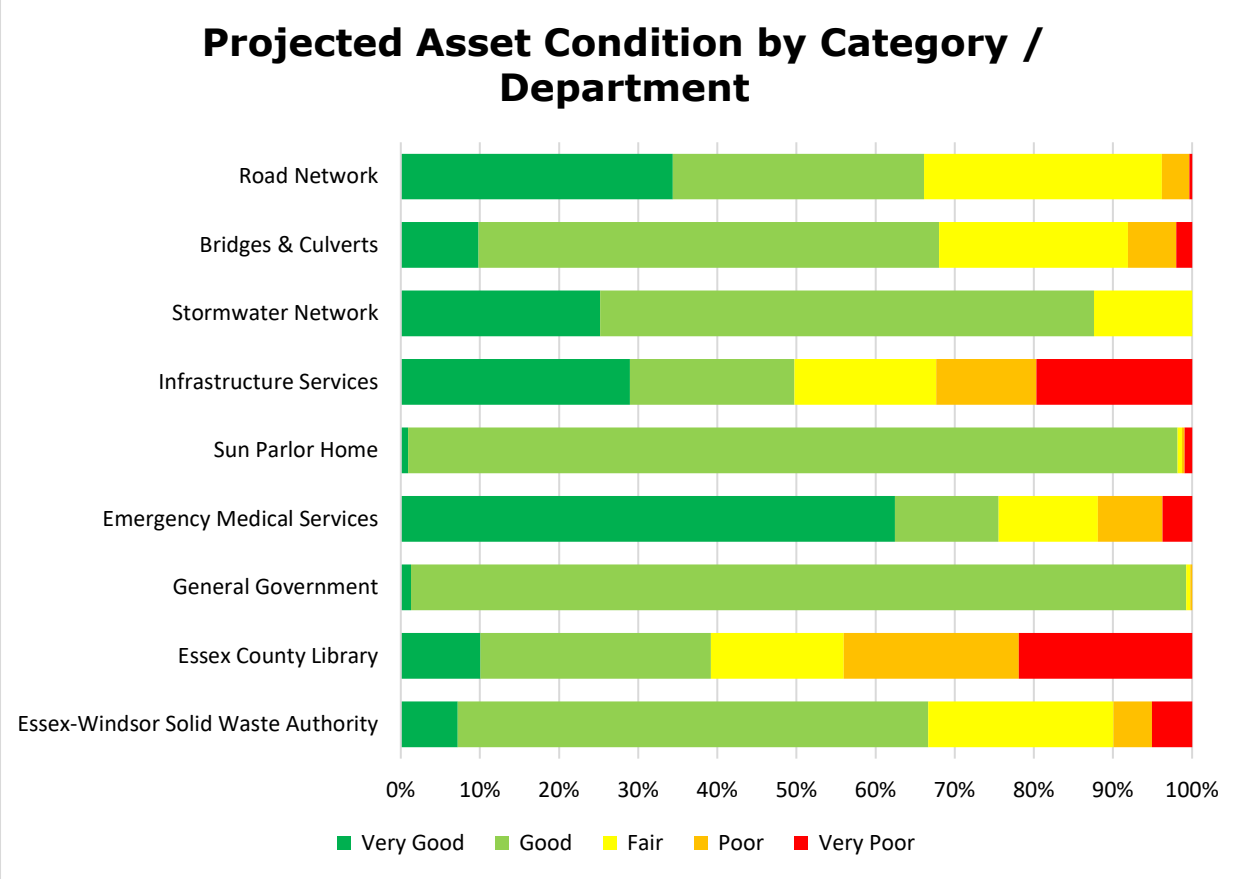
The replacement cost of the roundabout intersections is determined using historical cost inflated quarterly to today's dollars using the Consumer Price Index (CPI) tables for Non-Residential Business Consumer Price Index (NRBCPI) (Toronto). This formula is deemed to be a reasonable approach given the recent age of the intersections, complex design and construction, and low quantity of these assets.

The replacement cost of all other municipal assets is determined using either historical cost inflated monthly to today's dollars using the Consumer Price Index (CPI) tables for Ontario, or using an estimate of the current replacement value. This estimate is established through consultation with industry professionals, departmental managers, reviewing historical price trends and evaluation of current market prices.

2.3 Condition of Asset Portfolio

The overall condition of County assets is integral to achieving and maintaining desired levels of service. The portfolio consists of 94.8% of core assets and 90.6% of non-core assets that are in Fair or better condition. Further, 66.9% of core assets and 81.8% of non-core assets are in Good to Very Good condition. Core infrastructure assets continue to be formally assessed on a regular basis, with the exception of the stormwater network, which currently relies on an aged based condition assessment. The County continues to refine its' inspection and maintenance strategies in order to provide better information on asset condition and proactively forecast necessary repairs or replacement of assets.

Figure 2-1: Projected Asset Condition by Category / Department



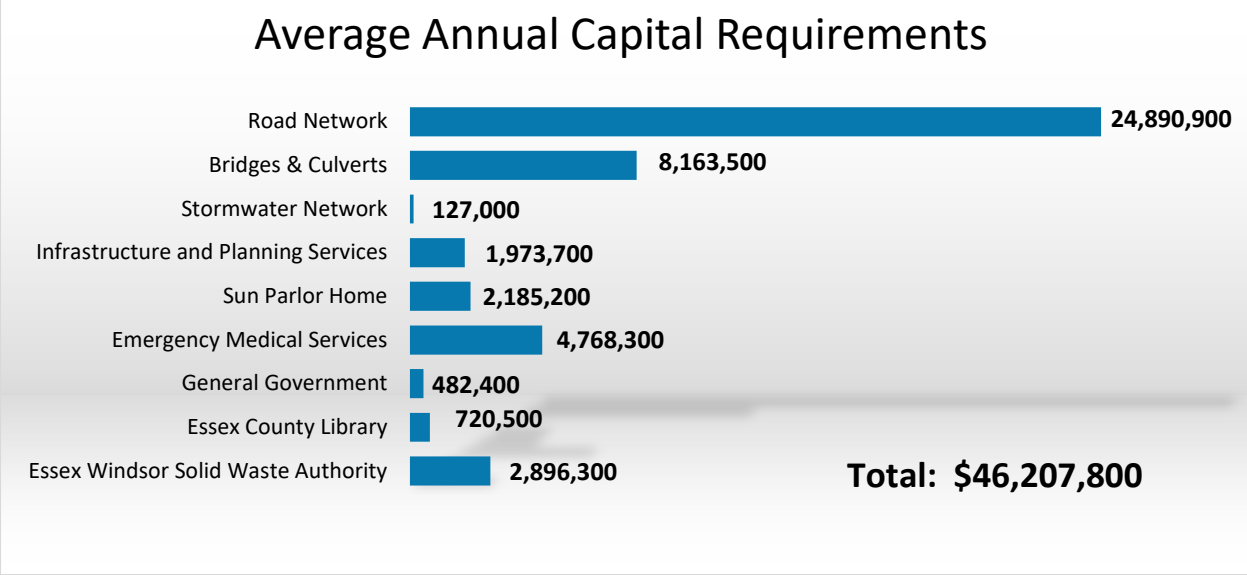
For linear assets, Pavement Condition Indexes are generally calculated annually, while the assessments for Bridges and Culverts are completed every 2 years, in accordance with Ontario Structure Inspection Manual (OSIM) regulations. These are generally performed internally by professional engineers in the Infrastructure and Planning Services department. The County is in the process of contracting with a third-party vendor to perform a condition assessment of its road network every 5 years. This would allow the County to compare our internal assessment procedures and recalibrate as necessary.

Condition assessments are an invaluable measure of the true condition of an asset and its ability to function effectively. The majority of assets have been assessed within the last few years, primarily by internal staff with appropriate knowledge and expertise. An age-based approach has been taken on all non-core assets and a review of the expected service life remaining was conducted in order to extended the EUL and provide a reasonably accurate projected condition assessment.

2.4 Capital Requirements

The annual capital requirement represents the amount of funding that should be allocated for lifecycle management and future replacement of an asset category. This allocation is essential to ensuring sustainable service levels. This calculation does not consider amounts required for ongoing operating or maintenance associated with the assets but reflects the total replacement cost required over the estimated useful life of the asset.

Figure 2-2: Average Annual Capital Requirements

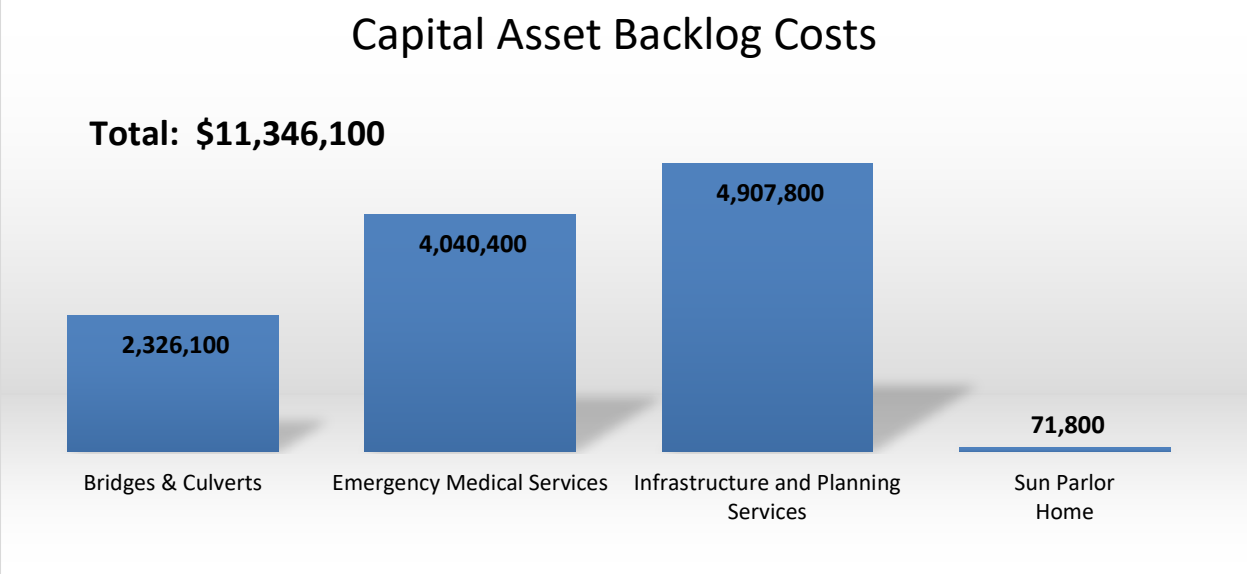


The County must allocate $46 million annually in order to address the ongoing capital requirements for all assets. The annual requirements, however, do not include any costs to address backlog.

2.5 Backlog

Backlog costs represent the replacement cost of assets which have reached the end of their useful life by the end of 2022 but have not been rehabilitated or replaced. The assets included in this category are sometimes shared with local or neighbouring municipalities who, under agreement, are responsible for performing the condition assessments and establishing a rehabilitation or replacement schedule. Backlog also occurs where assets are unable to be replaced, for example, due to lack of funding or manufacturer delivery delays. Where backlog is within the County's control, these assets usually have lower risk rating and are often scheduled for replacement within a few years of their original estimated replacement date. As the risk assessment grows, the County proactively seeks to take alternate actions to mitigate the risk associated with a potential failure. Further details are provided throughout the Plan.

Figure 2-3: Capital Asset Backlog Costs



2.6 Reinvestment Rate

Reinvestment rates are a calculation of the actual and targeted annual expenditures relative to the annual capital expenditures required to meet the plan. Based on an annual capital requirement of $46 million and a total replacement cost of just over $1.12 billion, the overall target reinvestment rate is 4.11%. As of 2022, the current annual capital expenditure level is approximately $18.9 million, which translates to an actual reinvestment rate of just 1.68%. The current funding gap for all assets is $27.3 million per year.

3.0 Road Network

3.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Infrastructure and Planning Services Department maintains 1,356 lane kilometres of various classes of roads, plus an additional 127 lane kilometres of connecting links. A connecting link is a road segment that is owned by a local municipality but maintained by the County through a cost-sharing agreement. See Section 3.5 In the previous AMP, it was estimated that the application of a Mill and Pave rehabilitation strategy would extend the useful life of the road segment by approximately 8 years and the CIREAM and Pave strategy would extend it by 15 years. On further review, the professional engineers in Infrastructure and Planning Services felt that performing these strategies would actually serve to "reset" the condition of the road, rather than just add a fixed amount of time to it. The concept is that two different segments would be assessed with similar conditions after applying the same strategy, regardless of their age or condition before the event. This revision ultimately impacts the timing and therefore future cost of these lifecycle events when compared to the previous approach.

Shared Structures for a complete listing of Connecting Links. Connecting Link assets have been included in this report only to the extent of the County's responsibility.

The following Table illustrates the types of segments in the County's road network and summarizes their quantity, current replacement cost and the method used to estimate replacement cost by segment. Since County assets act as arterial roads to link transportation routes across the region, the majority of the segments are constructed to an asphalt or concrete standard.

Table 3-1: Road Network Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Asphalt	1,284.5 lane km	$486,446,600	Cost / Lane km
Concrete	39.7 lane km	$20,326,400	Cost / Lane km
Tar & Chip	32.0 lane km	$4,512,000	Cost / Lane km
CWATS	282.4 lane km	$46,660,800	Cost / Lane km
Roundabouts	4	$10,453,700	CPI Tables

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Total		**$568,399,500**	

The replacement cost of roads is presented as a 'worst-case scenario' and is used to illustrate the value of regular maintenance and rehabilitation. Unless a severe natural disaster occurred or a road segment required upgrading to a higher standard, full replacement is unlikely. The County's approach to road network assets is to perform maintenance and rehabilitation work at various points throughout the road asset's life to optimize its longevity.

Replacement costs per lane kilometre are based on 2022 AMP data plus an additional 5% per year inflationary factor.

3.2 State of the Local Infrastructure

The following Table outlines the current state of the road network, including the average age (weighted average by replacement cost), useful life and average condition by surface type.

Table 3-2: Road Network Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Asphalt	9.2 years	12 years	67.7% (Good)
Concrete	14.6 years	40 years	79.2% (Good)
Tar & Chip	12.0 years	12 years	66.5% (Good)
CWATS	5.2 years	12 years	73.8% (Good)
Roundabouts	6.4 years	12-40 years	81.3% (Very Good)

Pavement Condition Indices are updated annually as part of a regular inspection process conducted by internal staff. A third-party consultant will be contracted every 5 years to confirm the results of these internal assessments and recalibrate our grades.

As expected, the tar & chip roads are generally at end of their useful life and are planned to be resurfaced with asphalt within the next four years. Three of the four roundabouts have a concrete surface, which provides for a longer

useful life and addresses the increasing daily volume of traffic at these intersections. CWATS assets continue to be added annually with the expansion of the active transportation network and as a result are maintaining their Good condition rating overall.

The Charts on the following page outline the overall condition of the County road network and the condition of the road segments by surface type (concrete, asphalt and tar & chip). These charts exclude CWATS and roundabouts.

Figure 3-1: Projected Road Segment Condition Summary

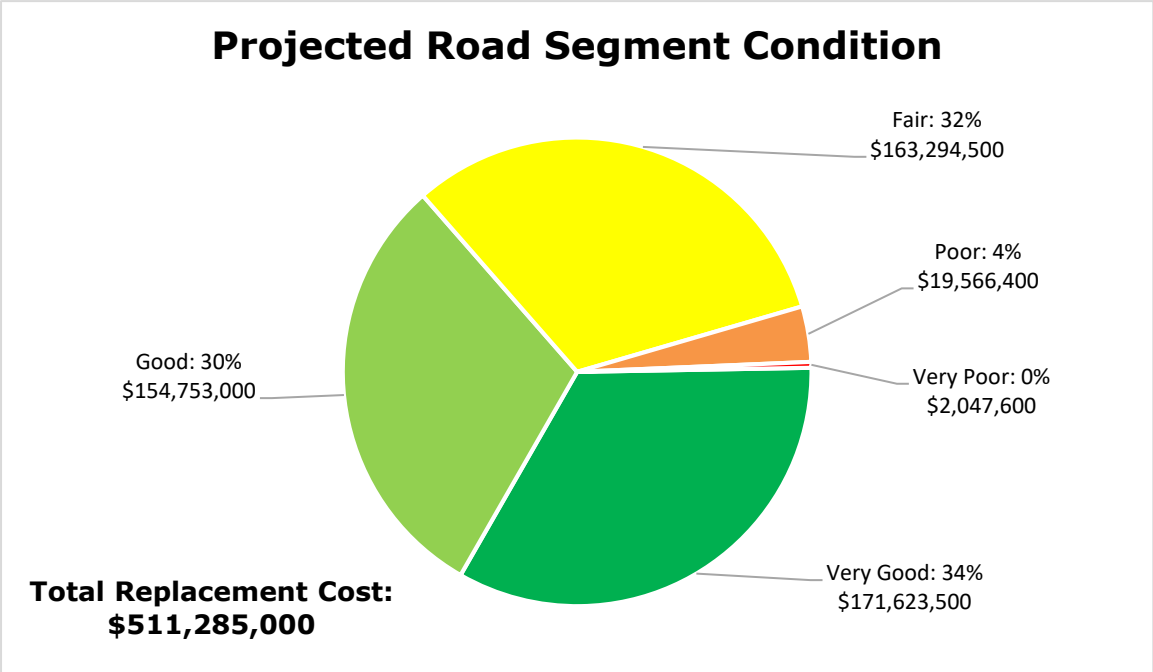
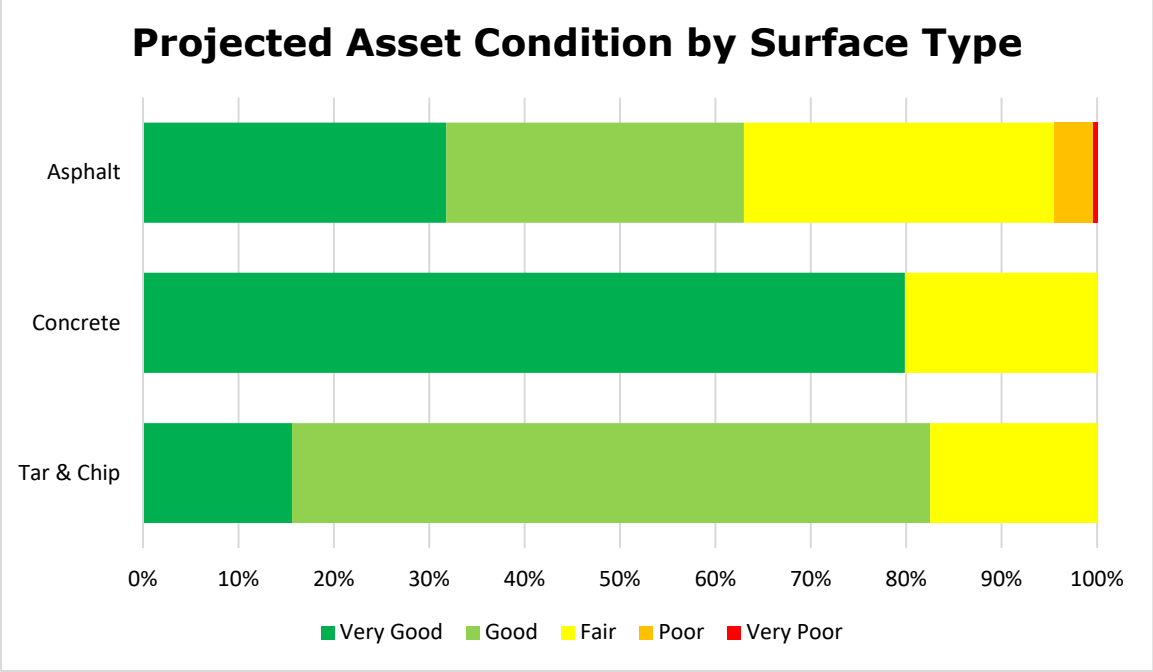


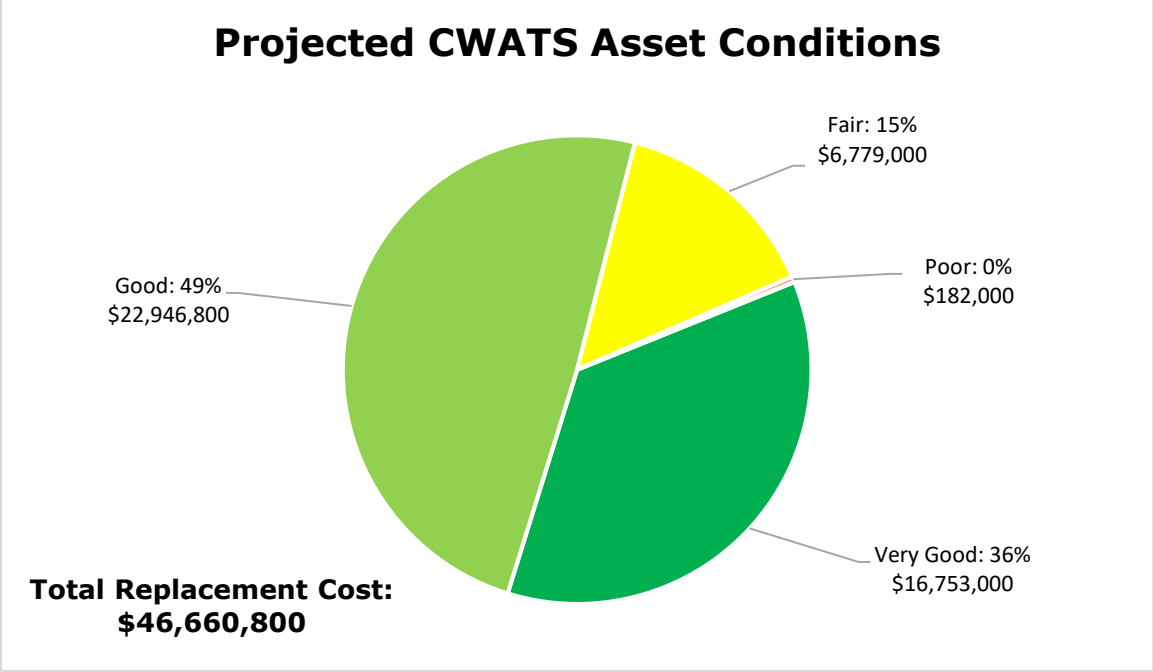
Figure 3-2: Projected Road Segment Condition by Surface Type



Overall, 63.8% of County roads are in Good to Very Good condition. Results of this level are only possible by adhering to a timely maintenance and rehabilitation program. Four road segments, totaling 7.58 lane km, are in very poor condition. These segments are part of the road rehabilitation plan within the following 5 years.

The Charts below outline the overall condition of the CWATS and Roundabout assets managed by Infrastructure and Planning Services.

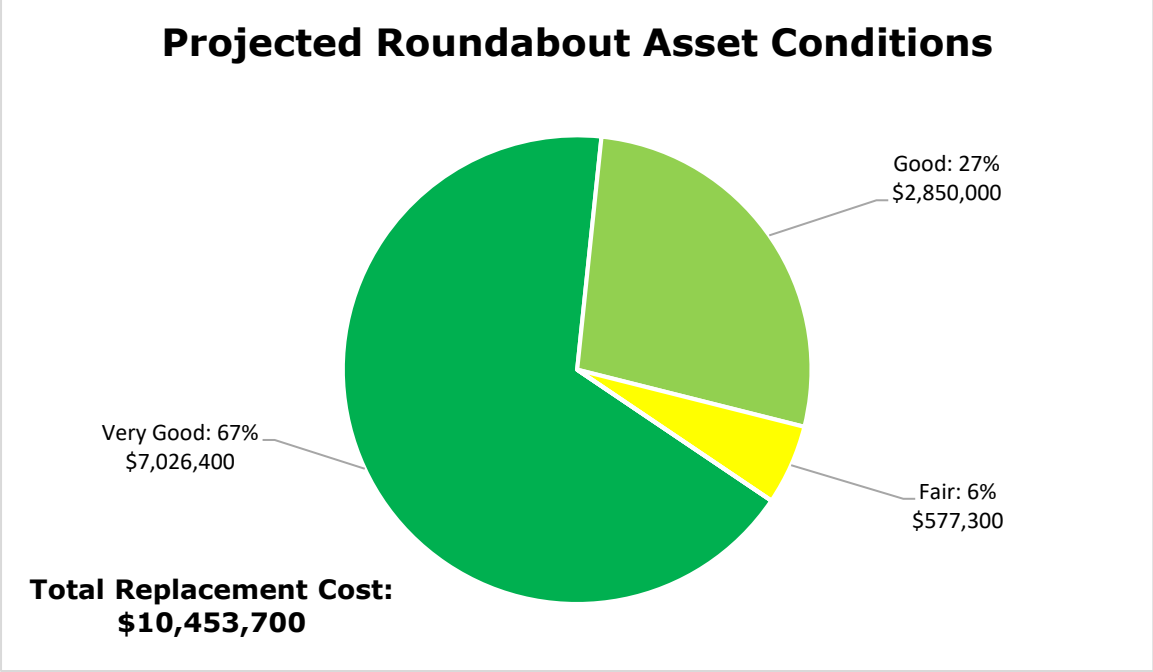
Figure 3-3: Projected CWATS Asset Condition Summary



Overall, 85.1% of the CWATS network is in Good to Very Good condition. The condition assessment reflects the program's focus on expansion activities, while rehabilitation of the existing network has not yet commenced. Since 2011, the network has grown to over 280km of paved shoulders, cycle paths and multi-use trails.

The creation of CWATS assets is governed by the CWATS Master Plan with initial costs for construction shared with the local municipality in which the trail/path is located. The regional CWATS Committee continues to meet to discuss the responsibility for ownership, maintenance and future replacement of the network. As no agreement has been reached, the County has incorporated 100% of the future replacement cost of CWATS assets that are adjacent to County-owned roads (excluding connecting links) into its AMP. This approach ensures CWATS assets are captured at a regional level. Once responsibility for the financial obligation for future rehabilitation has been agreed upon, the County will transfer the appropriate data to the various local municipalities and this will be reflected in future AMPs.

Figure 3-4: Projected Roundabout Asset Condition Summary



The overall condition of County roundabouts also continues to reflect their relatively new construction. Three of the four roundabouts were constructed with a concrete surface, which supports a longer useful life and withstands a heavier volume and class of traffic.

3.3 Levels of Service

The following tables illustrate the current level of service for the County's road network. These metrics include the community and technical level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures the County selected for this AMP. The County is committed to maintaining a safe, reliable and efficient road network that facilitates the movement of people and goods between our local municipalities and our neighbouring municipalities.

3.3.1 Community Levels of Service

The Table on the following page outlines the qualitative descriptions that determine the community levels of service provided by the road network structures.

Table 3-3: Road Network Community Levels of Service

Core Value	Qualitative Description	Current LOS
Scope	Description of the road network that facilitates the flow of traffic across the region	See Appendix B: Map of Road Segments
Quality	Description or images that illustrate the different levels of road class pavement condition	See Appendix F: Condition Indexes

3.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service provided by the road network structures.

Table 3-4: Road Network Technical Levels of Service

Core Value	Qualitative Description	Current LOS
Scope	Number of lane-kilometres of roads as a proportion of square kilometres of land area of the municipality	0.74
Quality	Average pavement condition index value of paved roads	68.2%

3.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost. Note: tar & chip roads will be replaced with asphalt at their next scheduled rehabilitation. Refer to the Rehabilitation Schedule included in Appendix G: 5-Year Rehabilitation Program.

Table 3-5: Road Network Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspections of road segments occur on a weekly basis as part of a routine maintenance program conducted in accordance with the Minimum Maintenance Standards.
Crack Sealing	Preventative maintenance measures are implemented where inspection results show initial signs of deterioration. This program reduces erosion of the base caused by poor drainage and protects the pavement from accelerated deterioration due to freeze/thaw cycles.
Shouldering	Road shouldering is performed on an annual basis to maintain the structural integrity of the road and prevent cracks originating from the sides.
Seasonal maintenance	Summer roadside maintenance includes regular ditching, mowing, tree trimming, road sign installation and maintenance, and line painting. Winter maintenance includes salting, snow plowing and snow removal.
Rehabilitation: Overlay	Rehabilitation strategies are applied on a case-by-case basis and are dependent on the current thickness of road, condition of the base and rate of deterioration of the surface. Overlay consists of applying a thin layer of asphalt over the existing road surface and extends the useful life of the road by approximately 5 years.
Rehabilitation: Mill & Pave	Mill & pave strategies are utilized when road conditions deteriorate to a PCI of 60 or less. This strategy strips a layer of the existing asphalt surface and relays new asphalt to restore the thickness of the road. The condition of the segment is restored to a PCI of 90.
Rehabilitation: CIREAM & Pave	The most expensive strategy, CIREAM (Cold In-Place Recycling with Expanded Asphalt Material) and pave program is utilized when sufficient asphalt thickness is

Activity Type	Description of Strategy
	present and surface conditions are likely to affect the longevity of a new asphalt surface. This strategy is applied once the PCI falls below 40 and is estimated to restore the condition of the segment to a PCI of 95.
Rehabilitation: Concrete Panel Repairs	Concrete roads require a much different maintenance and rehabilitation strategy than asphalt roads. Designed to last much longer than asphalt, concrete roads will rarely be rehabilitated or replaced in their entirety. Instead, an approach to repair or replace concrete panels (sections of the road) as necessary is taken. Given the relatively young age of the concrete road network, a routine panel replacement strategy is still under development. It is estimated that panel repairs would be required when the PCI falls below 40 and that, on average, 3.6% of the road network may be subject to panel replacement.

In the previous AMP, it was estimated that the application of a Mill and Pave rehabilitation strategy would extend the useful life of the road segment by approximately 8 years and the CIREAM and Pave strategy would extend it by 15 years. On further review, the professional engineers in Infrastructure and Planning Services felt that performing these strategies would actually serve to "reset" the condition of the road, rather than just add a fixed amount of time to it. The concept is that two different segments would be assessed with similar conditions after applying the same strategy, regardless of their age or condition before the event. This revision ultimately impacts the timing and therefore future cost of these lifecycle events when compared to the previous approach.

3.5 Shared Structures

The following road segments are shared under separate Connecting Link agreements with each local municipality. The length is indicated in centerline kilometres.

Table 3-6: Road Network Shared Structures

County Road	Local Name	Location	Length (km)	County share
CR5	Meloche Rd.	CR16 (Alma St.) - CR18 (Simcoe St.)	1.18	100%
CR16	Alma St.	CR20 (Sandwich St.) – CR5 (Meloche Rd.)	2.40	92.3%
CR18	Simcoe St.	CR20 (Sandwich St.) – CR5 (Meloche Rd.)	2.13	97.4%
CR20	Sandwich St.	Former North Limit of Amherstburg – Former South Limit of Amherstburg	3.61	59.9%
CR8	Maidstone Ave.	Former West Limit of Essex – Former East Limit of Essex	1.92	91.8%
CR23	Gosfield Townline	Former North Limit of Essex – Former South Limit of Essex	0.74	98.0%
CR34	Talbot Rd.	Former Northwest Limit of Essex – Former Southeast Limit of Essex	3.10	69.5%
CR11	Queen St.	Former North Limit of Harrow (3rd Conc.) – CR20 EP	1.17	80.3%
CR13	Erie St.	CR20 EP – Shepley Drain	0.45	100%
CR20	King St.	Former West Limit of Harrow – Former East Limit of Harrow	1.60	63.7%
CR20	Main St.	Former West Limit of Kingsville – 201m east of centreline of Kratz Road	3.01	70.4%
CR29	Division Rd.	210m North of Kingsville – Road 2 CR 20 (Main St.) EP	1.83	75.7%
CR50	Heritage Rd.	CR20 (Main St.) EP – Former Southwest Limit of Kingsville	0.48	80.6%

County Road	Local Name	Location	Length (km)	County share
CR2	First St. / Broadway St. / Tecumseh Rd.	CR 22 (Notre Dame St.) – Former East Limit of Belle River (Duck Creek)	1.98	95.9%
CR22	Notre Dame St.	Former West Limit of Belle River – Former East Limit of Belle River (Duck Creek)	2.51	60.8%
CR25	East Puce River Rd.	Former East ROW Limit of CR25 – North ROW Limit of CPR	0.15	46.3%
CR27	Belle River Rd./South St.	CR22 EP – Former South Limit of Belle River (CP Railway NPL)	0.93	97.0%
CR6	Todd Lane	CR3 (Malden Rd.) – Highway 3	2.09	86.8%
CR40	Sprucewood Ave.	Matchette Rd (Windsor City Limits) – CR2 (Malden Rd.)	1.45	90.4%
CR7	Huron Church Line	Highway 3 – Sandwich W. Parkway	1.71	84.9%
CR20	Front Rd.	Morton Dr. (Windsor City Limits) – Gary Ave.	3.23	49.3%
CR3	Malden Rd.	Windsor City Limits – Reaume Ave	2.07	60.8%
CR2	Tecumseh Rd.	Windsor City Limits – Former East Limit of St. Clair Beach (Pike Creek CL)	4.33	61.4%
CR19	Manning Rd.	Riverside Dr. – Former South Limit of Tecumseh & St. Clair Beach (Via Railway ROW)	1.68	56.7%
CR21	Brighton Rd.	Former South Limit of St. Clair Beach (Via Railway ROW) – CR2 (Tecumseh Rd.) EP	.33	100%

County Road	Local Name	Location	Length (km)	County share
CR20	Seacliff Dr.	Mun. No. 71 – 432m East of CR33 (Bevel Line Rd)(Mun. No. 929)	2.25	82.9%
CR33	Bevel Line Rd.	CR20 (Seacliff Dr.) to Former Limit of Leamington	.96	100%
CR34	Talbot St.	Former West Limit of Leamington to Former East Limit of Leamington	2.70	56.4%
CR48	Oak St.	Former West Line of Leamington to Erie St.	.77	68.3%

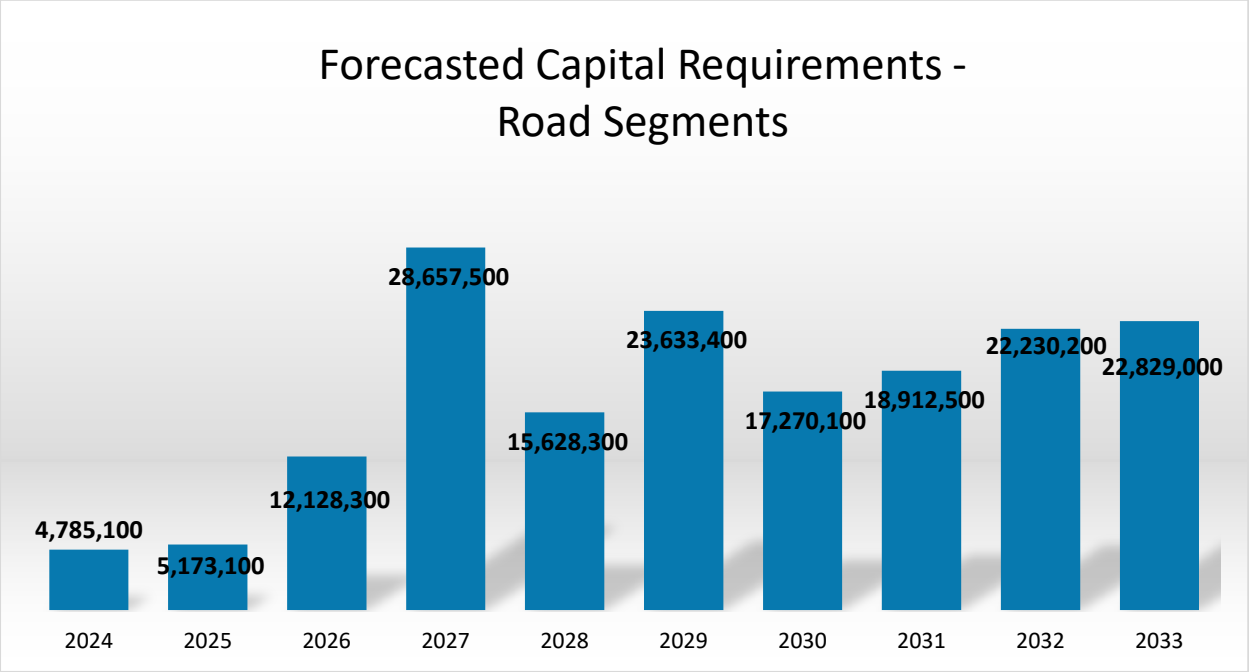
Ownership of Connecting Links is held with the local municipality; therefore, the replacement cost and condition of such assets are considered beyond the scope of this AMP. The individual agreements allow only for cost sharing of operating maintenance activities as per the schedule above. The annual requirement for County contributions to Connecting Links has not been included in the figures presented in this report and instead is factored into the County's annual operating budget requirement.

3.6 Forecasted Capital Requirements

3.6.1 Road Segments

The forecasted capital requirements for road segments for the next 10 years are outlined in the Chart on the next page. The annual capital requirements represent the average amount of funding per year that the County should allocate towards future rehabilitation and lifecycle management activities to sustain the existing level of service. This does not include capital requirements for CWATS or roundabouts, which are reported on separately.

Figure 3-5: 10-year Forecasted Capital Requirements – Road Segments



Annual Capital Requirement – Road Segments: $22,956,400

Target Reinvestment Rate: 4.49%

Actual Reinvestment Rate: 2.06%

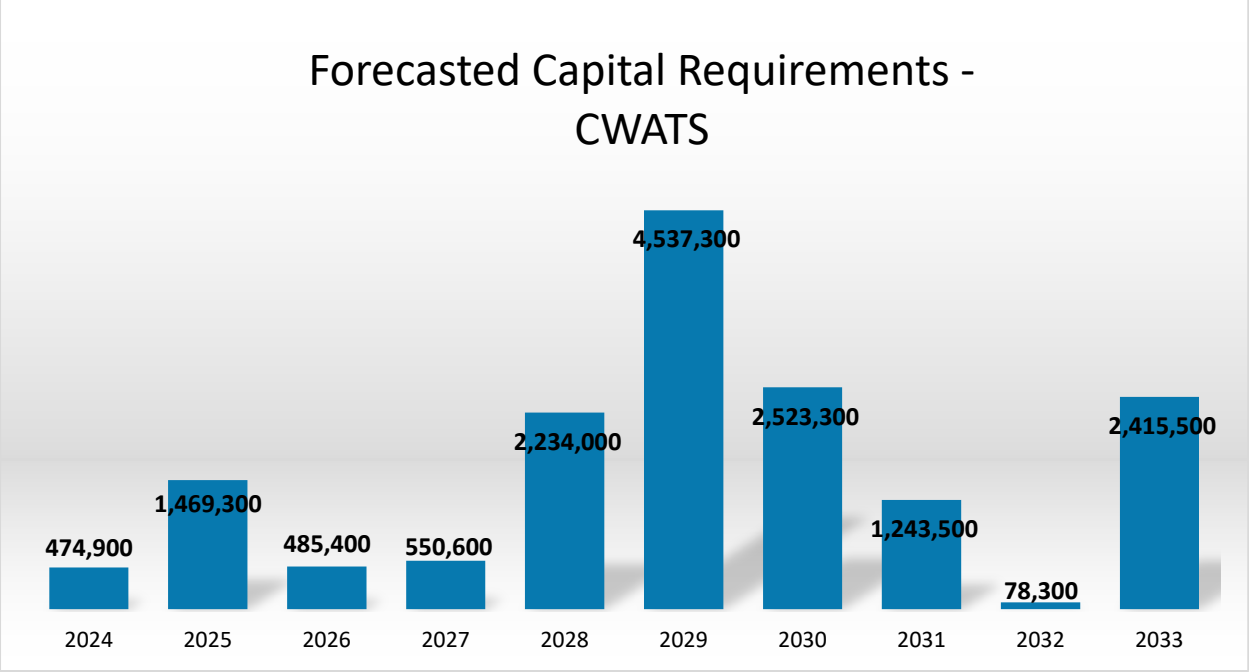
Funding Shortfall: $12,434,800 per year

In addition, it is forecasted that $70,961,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 3.4. This estimate assumes an annual inflation rate of 3%.

3.6.2 CWATS

Currently, CWATS spending is focused entirely on expansion. As the network is still relatively young, rehabilitation of existing segments has not been necessary. The focus remains on the future requirements needed to sustain the current CWATS network; expansion of the network is beyond the scope of the current report. The Chart on the following page identifies the capital requirement to maintain existing CWATS assets over the next 10 years.

Figure 3-6: 10-year Forecasted Capital Requirements - CWATS



Annual Capital Requirements – CWATS: $1,801,500

Target Reinvestment Rate: 3.86%

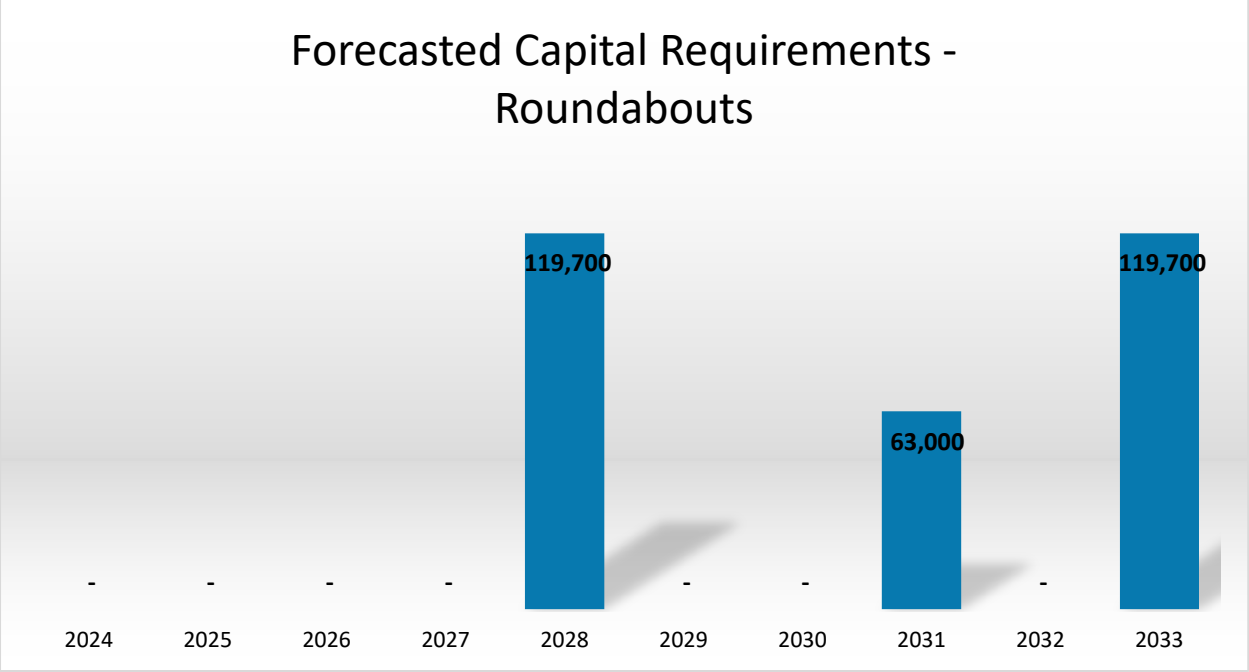
Actual Reinvestment Rate: 0.00%

Funding Shortfall: $1,801,500

3.6.3 Roundabouts

The roundabout network is still relatively new and therefore the requirement for significant capital financing needs are still well into the future. Most roundabouts will only require panel repairs throughout their expected lifespan. The forecasted capital requirements for the roundabouts for the next 10 years are outlined in the Chart on the following page. The annual capital requirement represents the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

Figure 3-7: 10-year Forecasted Capital Requirements - Roundabouts



Annual Capital Requirements – Roundabouts: $133,000

Target Reinvestment Rate: 1.41%

Actual Reinvestment Rate: 0.00%

Funding Shortfall: $133,000

3.7 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition (PCI) of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the Road Classification using a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences. A Class 1 road, which is more heavily travelled, would have a severe impact on the levels of service provided if it were to fail, more so than a Class 3 road which sees a lower volume of traffic. The County has deemed that the failure of any road is not insignificant in consequence, therefore even the lowest Class of road still carries a minor consequence of failure.

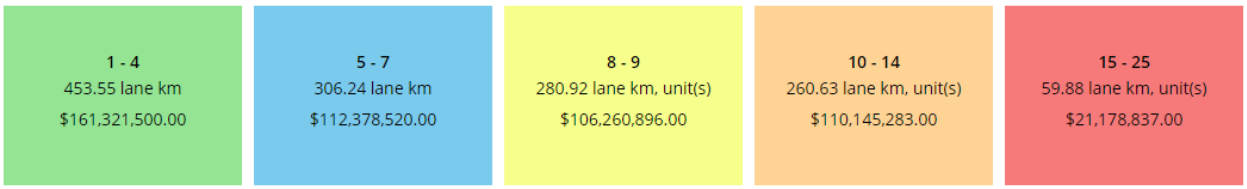
Table 3-7: Road Network Risk Management Assessment

Condition Range	Probability of Failure Score
0 – 20	5
20 – 40	4
40 – 60	3
60 – 80	2
80 – 100	1

Road Class	Consequence of Failure Score
Class 1	5 (Severe)
Class 2	4 (Major)
Class 3	3 (Moderate)
Class 4	2 (Minor)
	1 (Insignificant)

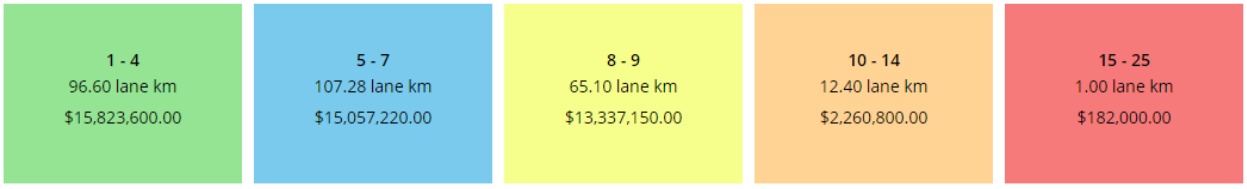
The Figures below summarize the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 3-8: Road Segments Risk Matrix (All Surface Types)



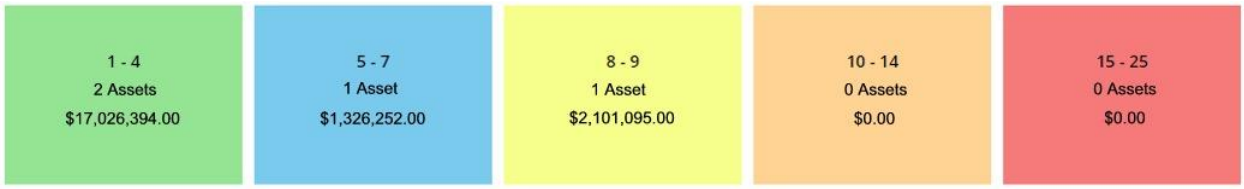
Road segments assessed with the highest risk rating include 2 Class 1 roads, 2 Class 2 roads and 2 Class 3 roads. Each of these segments falls into this category based on their Poor / Very Poor projected condition, their Major to Severe consequence of failure, or a combination of both.

Figure 3-9: CWATS Risk Matrix



The sole paved shoulder segment in the highest risk category has been given this status due to it being one of the first CWATS assets constructed and its location on a Class 2 road.

Figure 3-10: Roundabouts Risk Matrix



There are no roundabouts which pose a high or very high risk of failure or disruption to the levels of service provided.

3.8 Recommendations

The County's road network plays a critical role in the day to day lives of all residents and businesses. An accurate and clear understanding of the function, condition and replacement cost of these links will ensure the network meets the transportation needs of our region.

In addition to being able to improve core data and update scorecard results, this iteration of the AMP also provided an opportunity for Administration to look ahead to further refinements. The following list summarizes Administration's observations and recommendations arising from this version of the AMP.

- A review of the communication channels and documentation levels in place to ensure information about shared assets with other municipalities is adequate. Within the County, regular touch points with local municipalities is improving. For assets shared with regional neighbours and lower tier municipalities, more work could be done to raise the level of awareness with respect to condition assessments and plans for rehabilitation of shared assets.

- To strengthen the principles of the County's Strategic Asset Management Policy, key personnel outside of Financial Services should have greater access and training on the use of the asset management database. Integrating asset management practices and philosophies will be achieved more efficiently if staff directly responsible for linear assets take a more active role in inputting, tracking and managing the data.

- Develop a more robust system of tracking level of service indicators to improve strategic decision making and long-term planning. Examples of additional indicators include: the average time between rehabilitation events, the number of service complaints and comparison of operating and maintenance costs as a percentage of replacement value. Leveraging the functionality or

investing in customizing the existing asset management software platform is recommended to eliminate managing multiple information systems and duplicating effort.

- Consider quantifying and summarizing the annual requirements for funding the County's share of Connecting Links and including that figure in the AMP. Identification of connecting link financial obligations will also support ongoing communications between the two levels of government and strengthen coordinated capital planning efforts.

4.0 Bridges & Culverts

4.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The County of Essex owns 84 bridges and 126 culverts with spans greater than 3m. The Table below illustrates the key asset attributes for these structures, including quantity, current replacement cost and the method used to estimate replacement cost by segment. Bridges are further broken down into three components: deck, structure and foundation. Each of these components has a different EUL and therefore the timing of the replacement cost varies.

Table 4-1: Bridges & Culverts Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Bridges - Deck	84	$90,283,000	Cost / Unit
Bridges - Structure	84	$61,888,100	Cost / Unit
Bridges - Foundation	84	$49,760,700	Cost / Unit
Culverts	126	$72,301,300	Cost / Unit
Total		**$274,233,100**	

An engineering estimate of the replacement cost of bridges and culverts was developed in 2022, along with an allocation of cost to each bridge component. For 2024, the replacement cost is based on these estimates plus a 5% per year inflationary factor. The allocation of cost by component remains the same as previously reported: 45% for the deck, 30% for the structure and 25% for the foundation.

The replacement cost of culverts is also based on the 2022 engineering estimate and has been inflated 5% per year. Where the deck area is unknown, CPI tables were used to estimate the current replacement cost.

4.2 State of the Local Infrastructure

The Table below outlines the current state of the County's bridge and culvert infrastructure, including the average age (weighted average by replacement cost), useful life and average condition of assets by segment.

Table 4-2: Bridges & Culverts Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Bridges - Deck	14.0 years	20 years	64.1% (Good)
Bridges - Structure	21.2 years	40 years	65.3% (Good)
Bridges - Foundation	28.0 years	80 years	65.1% (Good)
Culverts	37.4 years	60 years	58.2% (Fair)

The majority of the County's bridges, 98.9%, are assessed in Fair or better condition. Of these, 75.0% are assessed as Good to Very Good condition. Of the County's culverts, 72.4% are assessed in Fair or better condition. Of these, 48.6% are assessed as Good to Very Good condition.

Bridges and culverts that are in Very Poor condition are either scheduled for replacement within the current 5-year Rehabilitation Program or will continue to be monitored to ensure repairs are made before failure becomes imminent. Similar to the challenges with shared road network assets, information relating to the planned rehabilitation of shared bridges and culverts is increasing the risk that improvements to these assets may not be optimally planned and executed.

The Charts on the following page outline the overall condition of the bridge and culvert infrastructure assets.

Figure 4-1: Projected Bridge Condition Summary

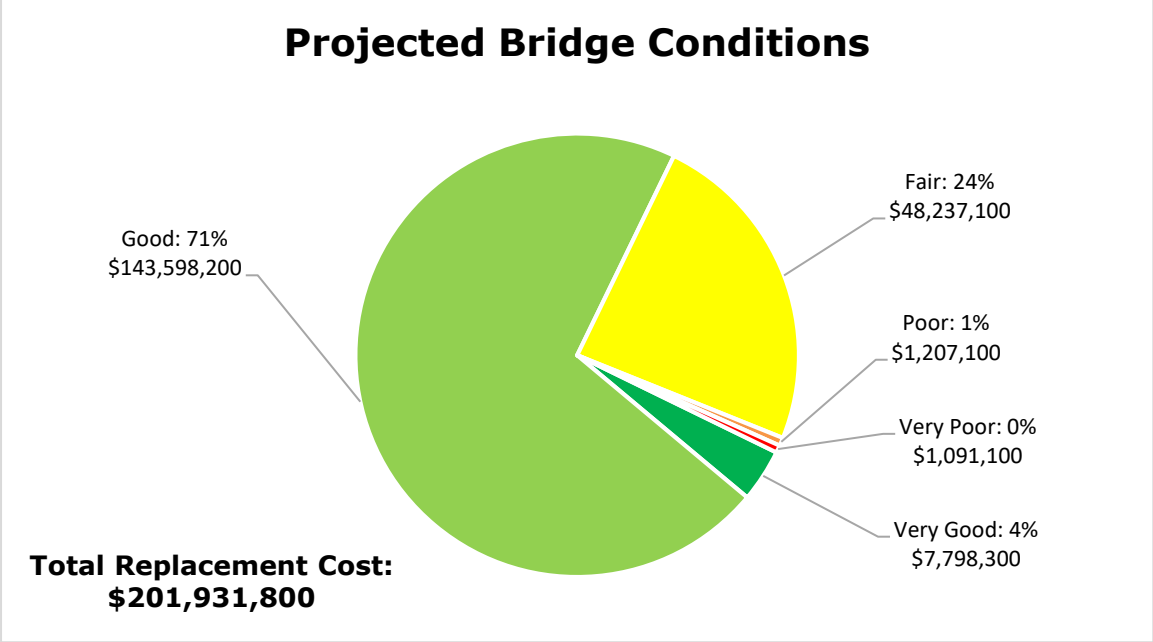
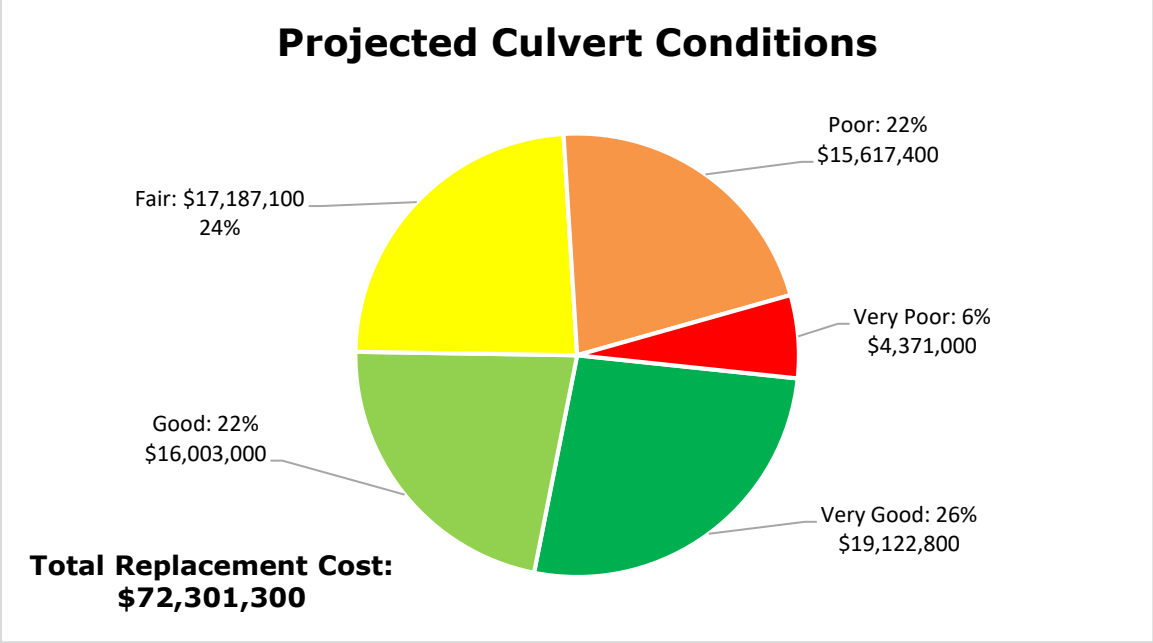


Figure 4-2: Projected Culvert Condition Summary



Condition assessments are conducted every two years in accordance with the OSIM. Average conditions presented are based on the weighted average replacement cost of the segment. All structures receive a Condition Index ranging from 0 to 100. Bridge structures were inspected in 2022, while structural culverts greater than 3 metres were inspected in 2023.

4.3 Levels of Service

The following tables illustrate the current level of service for the County's bridges and culverts. These metrics include the community and technical level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures the County selected for this AMP. As with the road network, bridges and culverts also play an integral part in the movement of people and goods between our local municipalities. The County is committed to maintaining safe and reliable bridges and culverts that facilitate this goal.

4.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service provided by the bridge and culvert structures.

Table 4-3: Bridges & Culverts Community Levels of Service

Core Value	Qualitative Description	Current LOS
Scope	Description of the bridge network which facilitates the flow of traffic across the region while managing stormwater	See Appendix C: Map of Bridges
Scope	Description of the culvert network which facilitates the flow of traffic across the region while managing stormwater	See Appendix D: Map of Culverts
Quality	Description or images that illustrate the different levels of bridge condition	See Appendix F: Condition Indexes
Quality	Description or images that illustrate the different levels of culvert condition	See Appendix F: Condition Indexes
Sustainable	Current infrastructure is designed to meet the long-term needs of the community	

Appendix C: Map of Bridges shows the geographic location of each of the County bridges, including those located on Connecting Links with local municipalities and shared structures with neighbouring municipalities. Refer to Section 4.5 *Shared Structures* for a complete listing of shared structures.

Appendix D: Map of Culverts shows the geographic location of each of the County culverts, including those located on Connecting Links with local municipalities and shared structures with neighbouring municipalities. Refer to Section 4.5 *Shared Structures* for a complete listing of shared structures.

4.3.2 Technical Levels of Service

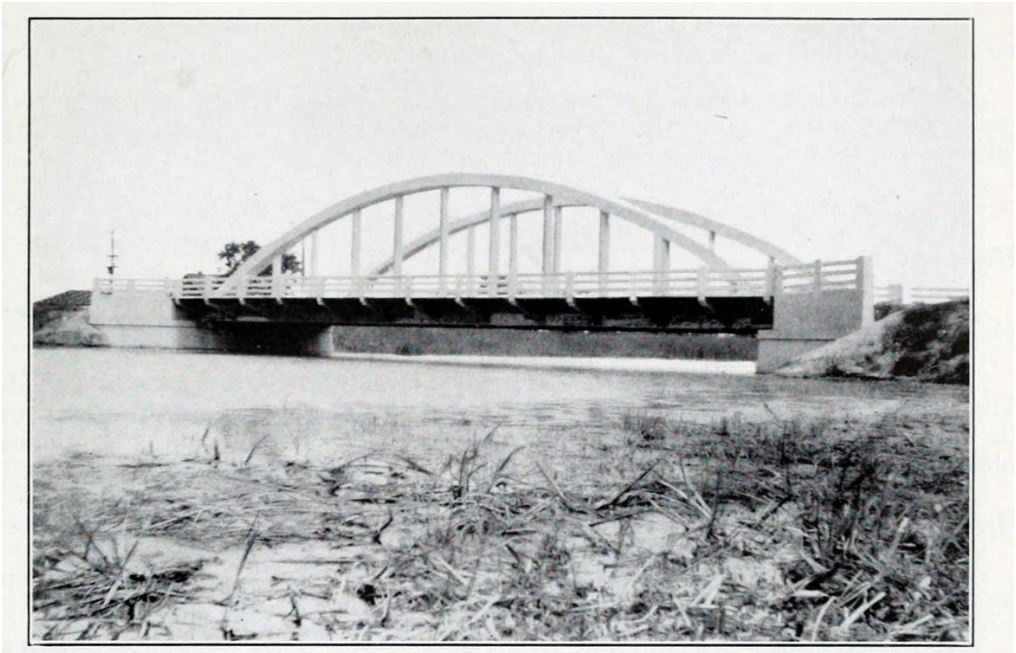
The following Table outlines the qualitative descriptions that determine the technical levels of service provided by the bridge and culvert structures.

Table 4-4: Bridges & Culverts Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Scope	Number of bridges in the municipality with loading or dimensional restrictions	1
Quality	Average bridge condition index value	64.7%
Quality	Average culvert condition index value	58.2%
Sustainable	Annual capital reinvestment rate – Bridges	0.70%
Sustainable	Annual capital reinvestment rate – Culverts	2.42%

There is only one bridge that has load and/or dimension restrictions: the bowstring arch bridge on County Road 8 crossing Canard River. Due to its heritage designation and the fact that it continues to be the most photographed structure in the region, there are no plans to rehabilitate or replace this bridge to mitigate these restrictions.

Photo courtesy of www.historicbridges.org
Photographer credit: Nathan Holth & Rick McOmber



Bridge over River Canard at Loiselleville, Essex County, Road No. 20. Built in 1937; 120-foot span.

Newly Completed Bridge
Source: Ontario Sessional Papers, Highway Report, 1937
Digitized by Internet Archive and Enhanced By HistoricBridges.org

4.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

Table 4-5: Bridges & Culverts Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspections of bridge and culvert structures are conducted on alternate years, in compliance with the OSIM.
Maintenance, rehabilitation and replacement	Maintenance, rehabilitation and replacement of structures are scheduled according to the results of the OSIM inspections.

4.5 Shared Structures

The following structures are shared between the County and other municipalities and are governed by an agreement with each municipality.

Table 4-6: Bridges & Culverts Shared Structures

Asset ID	Bridge Name	Other Owner	Share
B-01-09	Tilbury Creek	Municipality of Chatham-Kent	50%
B-01-12A	Government Drain #4	Municipality of Chatham-Kent	50%
B-01-25	West Two Creek	Municipality of Chatham-Kent	50%
B-01-19	Two Creeks Drain	Municipality of Chatham-Kent	50%
B-01-13	Campbell Sideroad Drain	Municipality of Chatham-Kent	50%
B-01-14	Cottingham Drain	Municipality of Chatham-Kent	50%
B-03-01	Grand Marais Drain	Town of Lasalle	50%
B-03-02	Cahill Drain	Town of Lasalle	50%

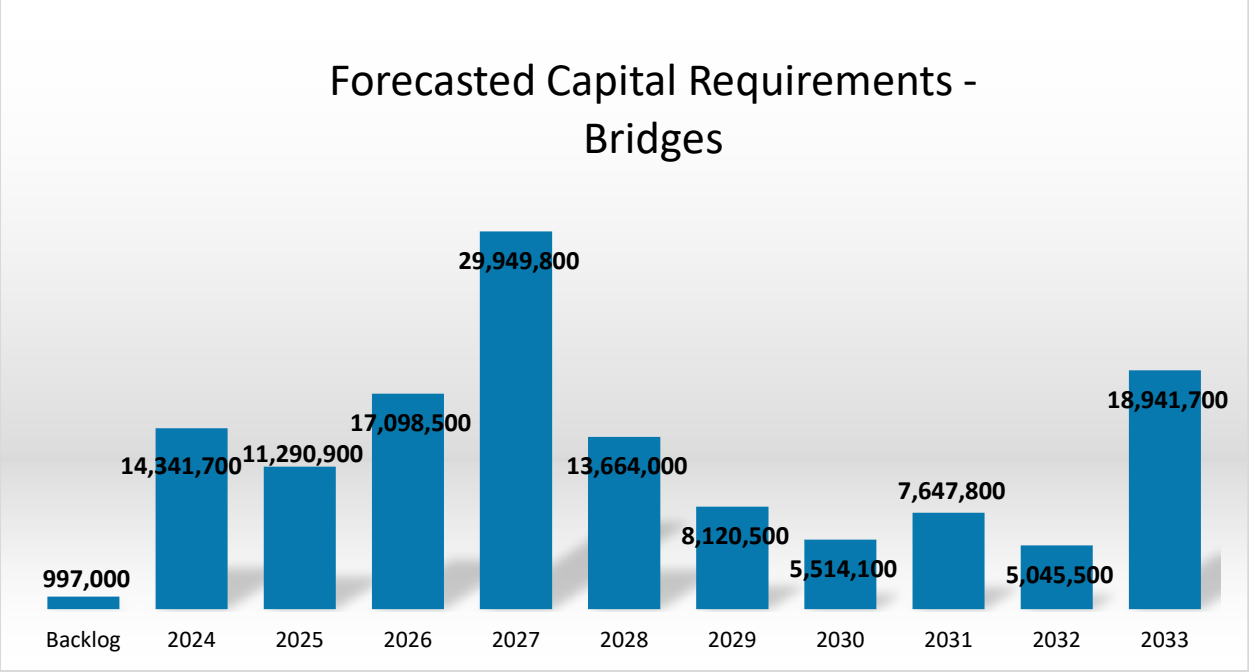
Asset ID	Bridge Name	Other Owner	Share
B-05-04	Big Creek	Town of Amherstburg	50%
B-06-01	Grand Marais Drain	Town of Lasalle	50%
B-16-01	Big Creek	Town of Amherstburg	50%
B-20-01	Turkey Creek	Town of Lasalle	50%
B-22-16	Belle River	Municipality of Lakeshore	50%
B-40-01	South Branch Turkey Creek	Town of Lasalle	50%
C-01-216	South Dales Drain Extension	Municipality of Chatham-Kent	50%
C-29-086	Mill Creek	Town of Kingsville	50%

The County's portion of the shared structures was used to determine the replacement cost of the assets included in this Plan.

4.6 Forecasted Capital Requirements

The forecasted capital requirements for bridges for the next 10 years are outlined in the Chart on the following page. The annual capital requirements represent the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs. Projects may include partial rehabilitation of the deck and/or structure, or may require complete replacement including foundation. Due to the complex and varying engineering designs of bridge structures, it is difficult to establish a lifecycle management strategy that applies to all assets. Minor rehabilitation which may fall below the threshold for capitalization, is often undertaken as part of a regular maintenance plan until the eventual full replacement of the bridge component is performed.

Figure 4-3: 10-year Forecasted Capital Requirements - Bridges



Backlog at the end of 2022 is comprised of one bridge, which is currently being replaced as part of the 2024 Rehabilitation Program.

Annual Capital Requirement - Bridges: $6,954,100 per year

Target Reinvestment Rate: 3.44%

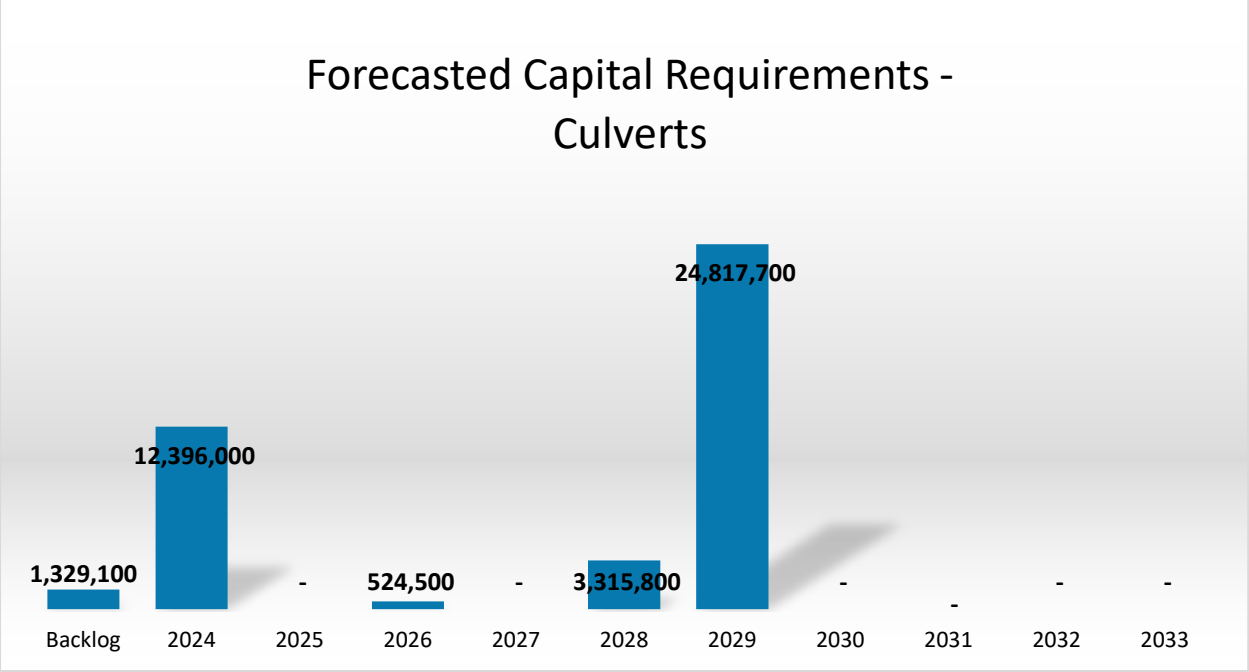
Actual Reinvestment Rate: 0.70%

Funding Shortfall: $5,550,300 per year

Due to the challenges associated with the rehabilitation, culverts are more often replaced at the end of their useful life. Due to their inferior quality, Corrugated Steel Pipe culverts are now being replaced with concrete culverts in higher-risk environments to provide increased capacity, safety and reliability. The forecasted capital requirements for culverts for the next 10 years are outlined in the Chart on the following page. The annual capital requirement represents the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

In addition, it is forecasted that $2,063,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 4.4. This estimate assumes an annual inflation rate of 3%.

Figure 4-4: 10-year Forecasted Capital Requirements - Culverts



Backlog at the end of 2022 includes 3 culverts. Of these, one is a shared structure under the responsibility of the other municipality, one is now an enclosed culvert and ownership of one is being confirmed. All 3 culverts will continue to be monitored to ensure repairs are made before failure becomes imminent.

Annual Capital Requirement – Culverts: $1,209,400 per year

Target Reinvestment Rate: 1.67%

Actual Reinvestment Rate: 2.42%

Funding Surplus: $542,700 per year

4.7 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition (BCI or CCI) of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the Road Classification where the bridge or culvert is located, using

a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences. The County has deemed that the failure of any bridge or culvert is not insignificant in consequence, therefore even those located on the lowest Class of road still carry a minor consequence of failure.

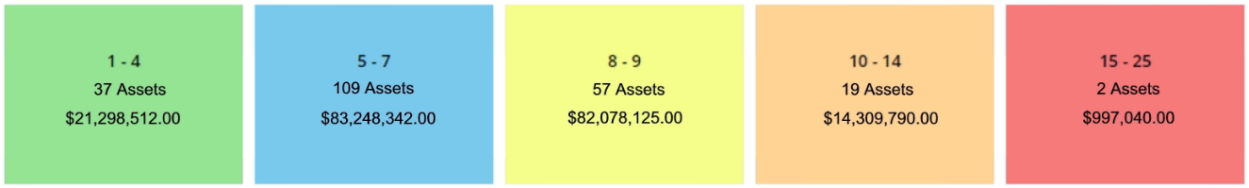
Table 4-7: Bridges & Culverts Risk Management Assessment

Condition Range	Probability of Failure Score
0 – 20	5
20 – 40	4
40 – 60	3
60 – 80	2
80 – 100	1

Road Class	Consequence of Failure Score
Class 1	5 (Severe)
Class 2	4 (Major)
Class 3	3 (Moderate)
Class 4	2 (Minor)
	1 (Insignificant)

The Figures below summarize the overall risk assessment for each asset and categorizes them according to the level of risk they carry. For bridges, the risk matrix is applied to each component of the bridge (i.e. deck, structure & foundation). For culverts, the risk matrix is applied to the whole asset. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 4-5: Bridges Risk Matrix



One bridge assessed with a very high-risk rating is currently funded for replacement in the 2024 Budget.

Figure 4-6: Culverts Risk Matrix

Many of the culverts in the highest risk category have been downloaded from the Province and are assessed in Poor condition. Some of them are shared structures, in which the County is not directly responsible for the timing of their replacement. All culverts will continue to be inspected regularly and repairs performed to ensure that failure does not occur before full replacement can take place.

4.8 Recommendations

The County's bridges and culverts play a critical role in the day to day lives of all residents and businesses. An accurate and clear understanding of the function, condition and replacement cost of these assets will ensure bridges and culverts meet the transportation needs of our region.

In addition to being able to improve core data and update scorecard results, this iteration of the AMP also provided an opportunity for Administration to look ahead to further refinements. The following list summarizes Administration's observations and recommendations arising from this version of the AMP.

- A review of the accuracy of bridge deck area, a key factor in estimating replacement cost, should be undertaken to ensure area data reflects actual field data. As bridges are rehabilitated, there may be instances where the overall deck area increases and the asset management database isn't accurately updated.

- A review of the communication channels and documentation levels in place to ensure information about shared assets with other municipalities is adequate. Within the County, regular touch points with local municipalities is improving. For assets shared with regional neighbours and lower tier municipalities, more work could be done to raise the level of awareness with respect to condition assessments and plans for rehabilitation of shared assets.

- To strengthen the principles of the County's Strategic Asset Management Policy, key personnel outside of Financial Services should have greater access and training on the use of the asset management database. Integrating asset management practices and philosophies will be achieved more efficiently if staff directly responsible for linear assets take a more active role in inputting, tracking and managing the data.

5.0 Stormwater Network

5.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The County of Essex owns and maintains 4.8km of stormwater mains. The Table below illustrates the key asset attributes for the County's stormwater network, including quantity, current replacement cost and the method used to estimate replacement cost by segment.

Table 5-1: Stormwater Network Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Stormwater Mains	4.8km	$5,080,400	CPI Tables

The replacement cost of the stormwater network was determined using the historical cost inflated to present value using CPI tables. As the stormwater network is still relatively new and not extensive, this approach was deemed most appropriate.

In addition to stormwater mains, which are located in more urban areas, the County also owns and maintains 3,170km of open drains and ditches which aid in drainage and stormwater management. Municipal drains have not historically formed part of the capital asset inventory and as a land feature, do not have a replacement cost associated with them. An annual operating budget contributes to the maintenance of these drains. Billings to the County to repair and maintain drains constructed under the Drainage Act are received from local municipalities upon completion of the repair/maintenance work. The County is charged a percentage of costs relating to its share of the benefit of the drain (often referred to as the road authority benefit). All other abutting property owners are billed their share. Drainage works are often undertaken at the request of a benefitting landowner adding uncertainty to the County's ability to budget/forecast long-term asset management costs.

5.2 State of the Local Infrastructure

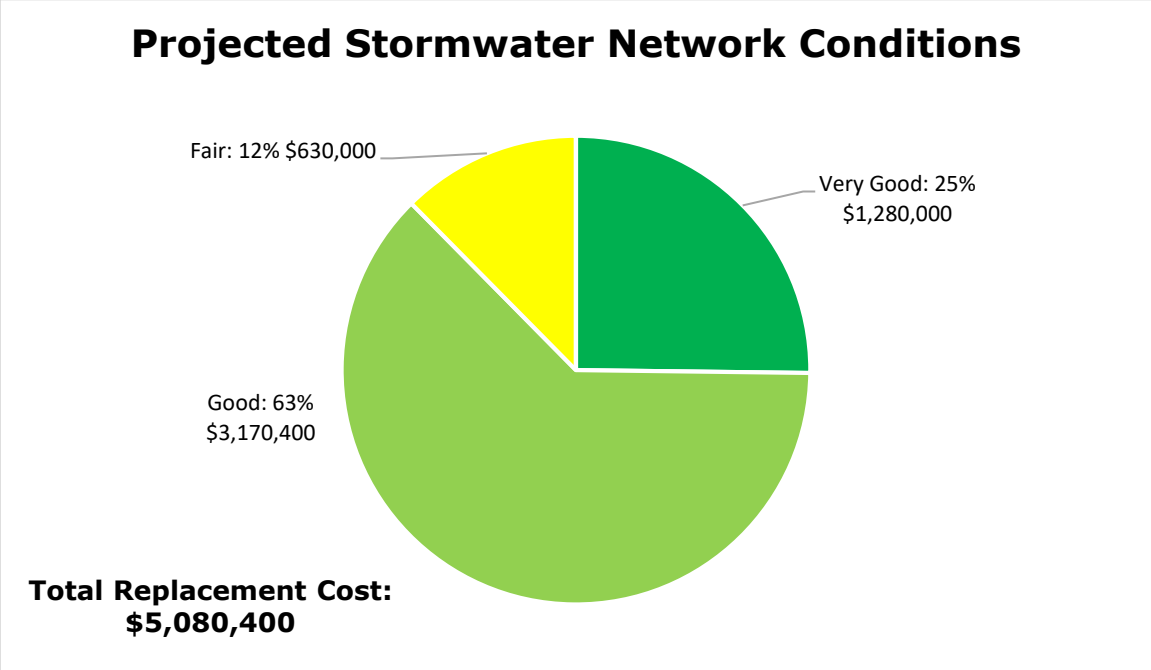
The Table on the following page identifies the average age (weighted average by replacement cost), useful life and the average condition of the stormwater network.

Table 5-2: Stormwater Network Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Stormwater Mains	12.2 years	40 years	69.5% (Good)

The network of stormwater mains is relatively small and, as such, the County does not currently have a formal inspection process to assess condition. Funds have been included in the approved 2024 Budget to pursue a more enhanced approach to flushing and cleaning of the network and assess condition. The average condition is currently assessed using an age-based approach, which remains appropriate given the relatively young age of the network.

Figure 5-1: Projected Stormwater Network Condition Summary



5.3 Levels of Service

The County is committed to maintaining its infrastructure in a state of good repair to minimize safety risks associated with the failure of the stormwater network and ensure the network is reliable.

The tables on the following page illustrate the current level of service for the County's stormwater network. These metrics include the community and

technical level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures the County selected for this AMP.

5.3.1 Community Levels of Service

The following Table outlines the qualitative description that determines the community levels of service provided by the stormwater network.

Table 5-3: Stormwater Network Community Levels of Service

Core Value	Community Level of Service
Reliable	The stormwater network will be maintained to ensure that it can effectively manage a 5-10 year storm event with no significant flooding.

Appendix E: Map of Stormwater Network shows the geographic location of the stormwater mains. As an upper tier municipality, the network is relatively small. Local municipalities are primarily responsible for stormwater management in urban areas and are responsible for responding to construction, repair and maintenance of drains constructed under the Drainage Act in rural areas.

5.3.2 Technical Levels of Service

The following Table outlines the quantitative description that determines the technical levels of service provided by the stormwater network.

Table 5-4: Stormwater Network Technical Levels of Service

Core Value	Key Performance Indicator	Current LOS
Reliable	% of assets in Good or Very Good condition	87.6%

Due to the relatively good condition of the stormwater management network, there have been few complaints from residents, most of which are resolved in a timely manner with simple maintenance procedures.

5.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

Table 5-5: Stormwater Network Lifecycle Activities

Activity	Description of Current Strategy
Inspection and Maintenance	Drive-by visual inspections are done weekly; catch basins are cleaned regularly and repaired or replaced as needed.
Rehabilitation and Replacement	Capital repairs and replacement are scheduled based on the results of visual inspection.

5.5 Forecasted Capital Requirements

As a result of the relatively young age of the stormwater network, there are no capital requirements forecasted in the next 10 years. The annual capital requirements represent the average amount of funding per year that the County should allocate towards future rehabilitation and replacement of the current stormwater network.

Annual Capital Requirement: $127,000

Target Reinvestment Rate: 2.50%

Actual Reinvestment Rate: 0%

Funding Shortfall: $127,000 per year

Included in the approved 2024 Budget is funding for annual inspection and preventative maintenance strategies which will support a more proactive approach.

5.6 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an

almost certain failure. The consequence of failure is based 100% on the Road Classification where the stormwater main is located, using a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences. The County has deemed that the failure of any length of the stormwater network is not insignificant in consequence, therefore even those located on the lowest Class of road still carried a minor consequence of failure.

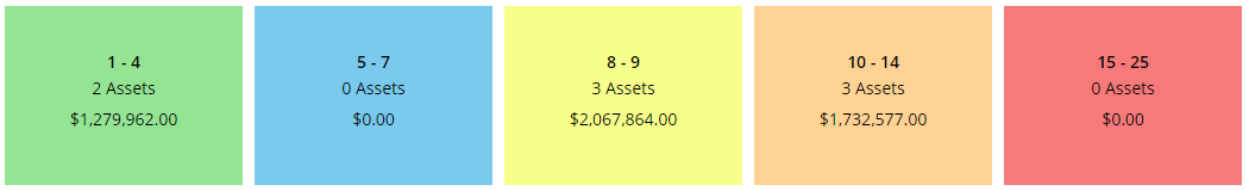
Table 5-6: Stormwater Network Risk Management Assessment

Condition Range	Probability of Failure Score
0 – 20	5
20 – 40	4
40 – 60	3
60 – 80	2
80 – 100	1

Road Class	Consequence of Failure Score
Class 1	5 (Severe)
Class 2	4 (Major)
Class 3	3 (Moderate)
Class 4	2 (Minor)
	1 (Insignificant)

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 5-2: Stormwater Network Risk Matrix



5.7 Recommendations

The County's stormwater network plays a critical role in the flood mitigation strategy for the region and keeping adjacent roadways free of standing water. An accurate and clear understanding of the function, condition and replacement cost of these assets will ensure the stormwater network meets the drainage needs of our region.

The following list summarizes Administration's observations and recommendations arising from this version of the AMP.

- As budgeted in 2024, a comprehensive maintenance strategy should be finalized to provide a clearer picture of the future maintenance and capital needs of the stormwater network. Periodic inspections using CCTV technology are recommended in order to proactively safeguard against unforeseen deterioration or unanticipated failure.

- The effect of climate change should be considered when developing a comprehensive maintenance strategy. The intensity and frequency of severe storm events will continue to put pressure on the reliability and effectiveness of stormwater assets. Consultation and collaboration with the local level to better understand these pressures is recommended.

- Consider hiring a consultant to assess the current status of the existing stormwater network, provide an enhanced inventory of the components within the network and make recommendations for an operational and maintenance strategy.

6.0 Infrastructure and Planning Services

6.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Infrastructure and Planning Services department ("IPS") oversees the construction, maintenance and rehabilitation of the County's core infrastructure (road network, bridges, culverts and stormwater network) as well as non-core assets including the various maintenance depots, vehicle fleet and heavy machinery and equipment used in these activities.

The following Table outlines the key attributes for these assets, including quantity, current replacement cost and the method used to estimate replacement cost by segment. Fleet is further broken down into 2 sub-segments: Pickups and Heavy Trucks. Each of these sub-segments has a different EUL and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as traffic signal cameras and other technological devices.

Table 6-1: IPS Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	20	$13,044,500	User-Defined / Cost per Unit / CPI Tables
Equipment	83	$5,891,200	User-Defined / CPI Tables
Fleet - Pickups	35	$2,464,600	User-Defined
Fleet - Heavy Trucks	28	$9,840,200	User-Defined
Land Improvements	4	$873,300	CPI Tables
Other	30	$882,400	CPI Tables
Total		**$32,996,200**	

Replacement costs of the Infrastructure assets were determined using various methods. Replacement cost of salt storage facilities, which are generally uniform in nature and size, was determined using an estimate of the cost per square foot based on current market data. Where buildings are less consistent in size, construction and nature, or where recent market data

is unavailable, the replacement cost estimate is based on historical cost inflated to present value using CPI tables. In some cases, the cost of recent acquisitions has outpaced the rate of inflation due to other factors, resulting in the need to use to use professional judgement and industry knowledge in determining the relevant replacement cost.

6.2 State of the Local Infrastructure

The Table below identifies the average age (weighted average by replacement cost), useful life and the average condition of the Infrastructure Services assets by segment.

Table 6-2: IPS Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Buildings	17.0 years	25-50 years	73.9% (Good)
Equipment	11.6 years	12 years	33.0% (Poor)
Fleet - Pickups	7.2 years	12 years	30.1% (Poor)
Fleet - Heavy Trucks	7.1 years	12 years	49.0% (Fair)
Land Improvements	5.8 years	15 years	68.1% (Good)
Other	1.3 years	5-15 years	90.1% (Very Good)

Asset conditions are assessed by management and based on professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life. Despite having the same EUL for accounting purposes, the Heavy Trucks are in slightly better condition than the Pickups of similar age due to a lower utilization rate which provides for a longer EUL.

Most equipment, used mainly in roads maintenance operations and summer maintenance activities, is nearing the end of its useful life. Despite repeated requests for funds to replace, budgetary pressures have required the prioritization of Infrastructure and Planning Services spending and, as such, the department continues to repair and maintain equipment to the best of their ability in the short-term. Full replacement of this equipment is inevitable, however, and a plan to address the backlog will be proposed in a future Budget.

The Charts below outline the overall condition of the SPH assets and the asset conditions by segment.

Figure 6-1: Projected IPS Asset Condition Summary

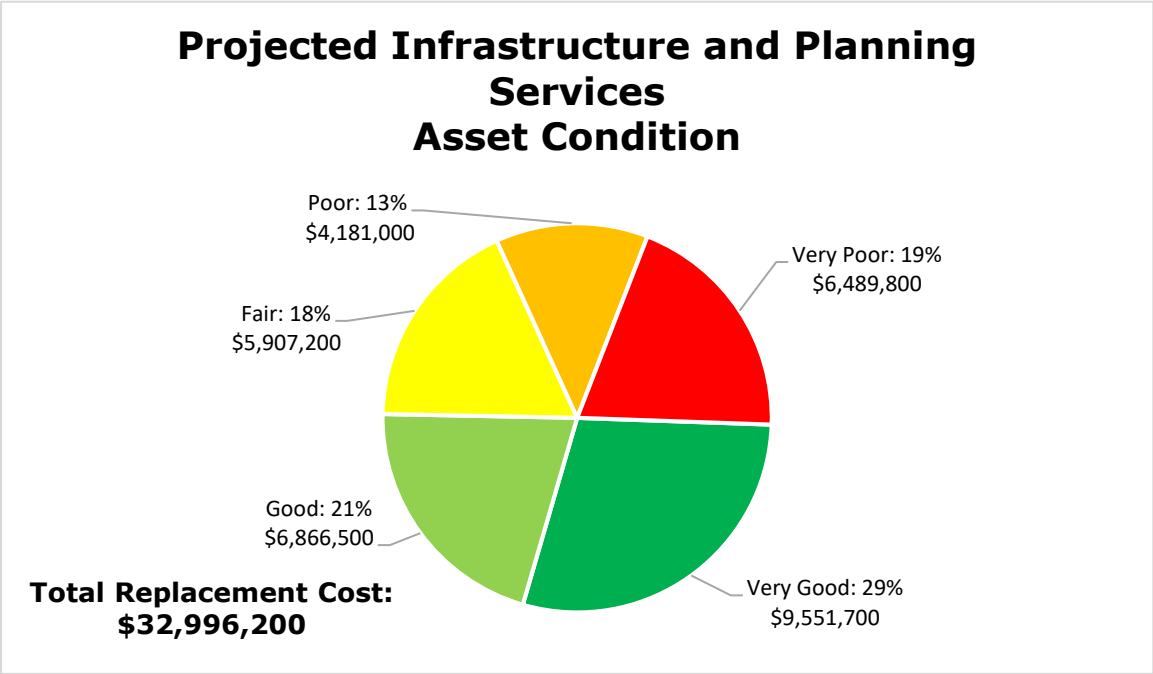
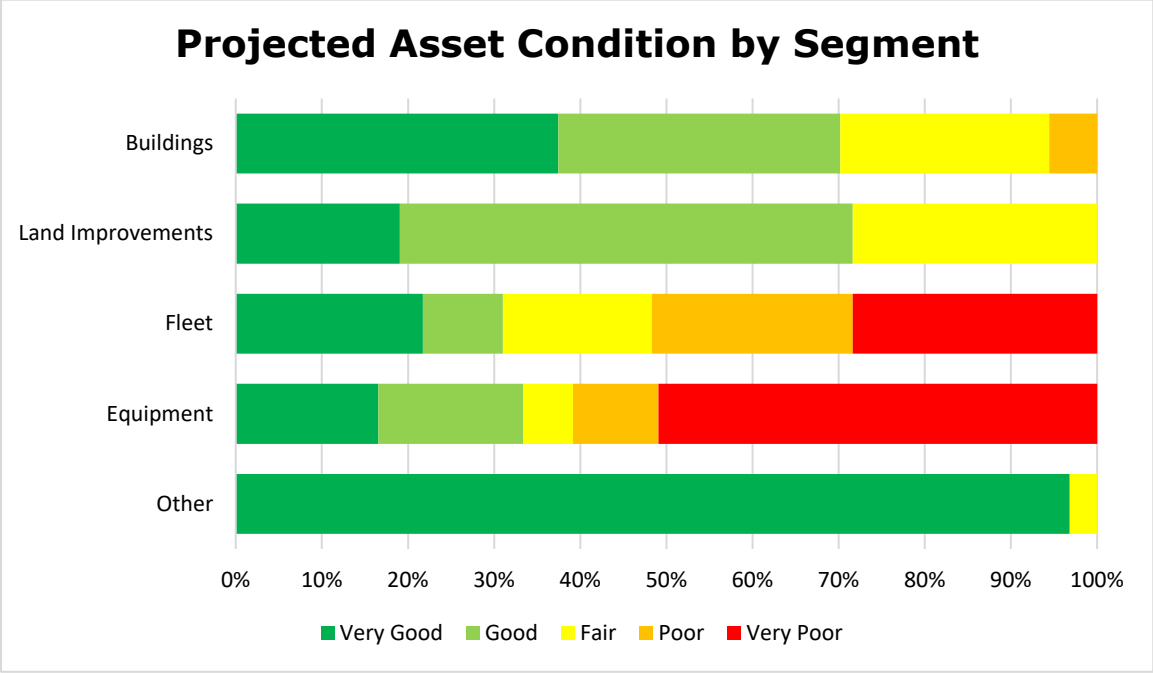


Figure 6-2: Projected IPS Asset Condition by Segment



Overall, 49.8% of the Infrastructure and Planning Services assets are in Good to Very Good condition. The average condition rating of the assets is a result of significant investments in new technology for traffic signals, contrasted with continued deterioration of the heavy trucks and equipment necessary to maintain levels of service.

6.3 Levels of Service

The County is committed to maintaining a safe, reliable and efficient infrastructure network that facilitates the movement of people and goods between our local municipalities and our neighbouring municipalities.

The following tables illustrate the current level of service for the non-core assets within the Infrastructure Services department. These metrics include performance measures established by the County that are relevant and reflective of the risk associated with the assets.

6.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service for non-core assets provided by Infrastructure and Planning Services.

Table 6-3: IPS Community Levels of Service

Core Value	Community Levels of Service
Reliable	Fleet and buildings are in adequate condition to ensure core assets meet minimum provincial standards. Appropriate actions and interventions are taken to ensure the regular use of machinery & equipment assets.
Efficient	Equipment is maintained at the lowest cost possible while maintaining current levels of service
Sustainable	Services are designed to be delivered efficiently and long-term plans are in place to ensure that they are available to serve the public into the future

6.3.2 Technical Levels of Service

The Table on the following page outlines the qualitative descriptions that determine the technical levels of service for non-core assets provided by Infrastructure and Planning Services.

Table 6-4: IPS Technical Levels of Service

Core Value	Key Performance Indicator	Current LOS
Reliable	% of fleet in Good or Very Good condition	31.0%
Reliable	Average % of service life remaining on Heavy Trucks	37.7%
Efficient	Average cost of repairs & maintenance per piece of equipment (excluding heavy trucks) with a replacement cost in excess of $100,000	$6,040 / year
Efficient	Average cost of repairs & maintenance per Heavy Truck	$13,150 / year
Sustainable	Current Reinvestment Rate	4.12%

The key performance indicators selected are focused on assets which contain the highest risk to maintaining current levels of service. Equipment with a significant replacement cost includes assets such as excavators, graders, loaders and tractors. These assets are critical to maintaining current levels of service, especially when compared to their lower-value counterparts such as pressure washers, hoists and trailers.

6.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

Table 6-5: IPS Lifecycle Activities

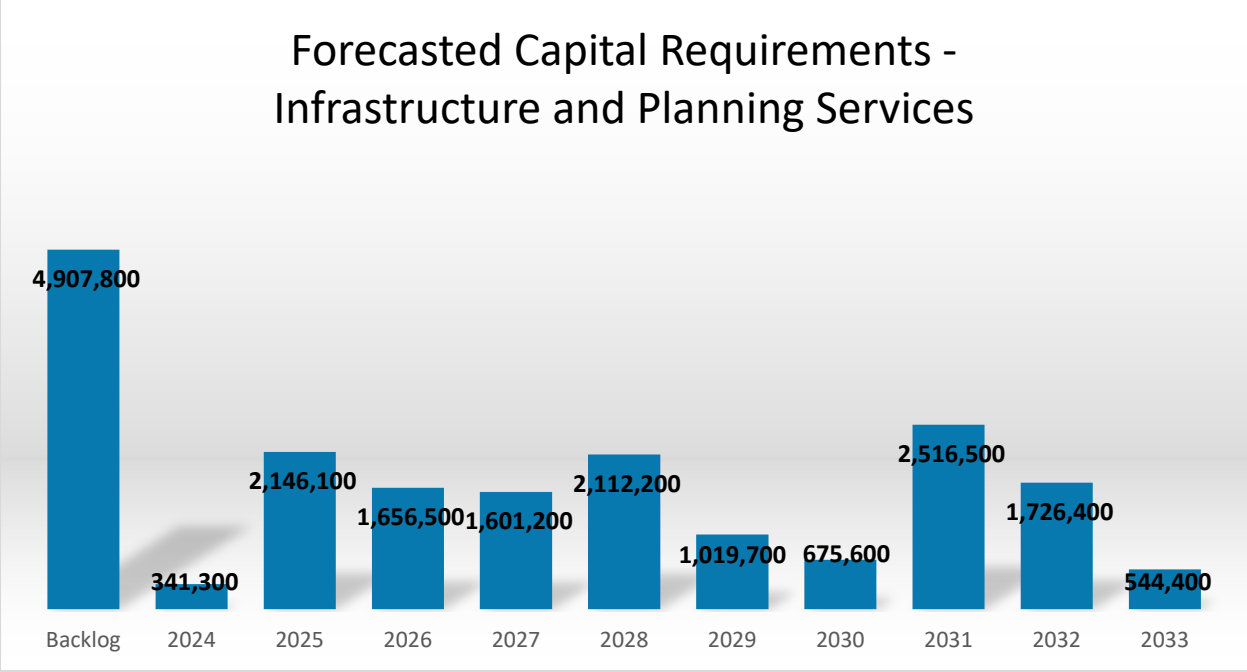
Activity Type	Description of Strategy
Inspection	Inspection of buildings, fleet and equipment are conducted regularly by Infrastructure and Planning Services staff and/or third-party contractors. Buildings and their components are also subject to a regular

Activity Type	Description of Strategy
	inspection program, with many components part of a regular service plan.
Repairs & Maintenance	A comprehensive preventative maintenance program is in place with scheduled maintenance of buildings, fleet and equipment performed by licensed staff, equipment manufacturers or third-party trained professionals. Repairs and maintenance duties are performed as part of the inspection process or as needed. Fleet and equipment are generally maintained in a good state of repair, well beyond their EUL.
Replacement	When an asset is nearing the end of its EUL and the cost of repairs and maintenance becomes non-value-adding, the asset is disposed of, often by public auction where some residual value may be present and fully replaced.

6.5 Forecasted Capital Requirements

The forecasted capital requirements for Infrastructure and Planning Services non-core assets for the next 10 years are outlined in the following Chart. The annual capital requirements represent the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

Figure 6-3: 10-year Forecasted Capital Requirements – IPS



Backlog represents assets which have been in service beyond their estimated useful life. As reported in Section 6.2, these assets pose a high probability of failure due to their very poor condition and will be included for replacement in a future Budget. Included in this group are 2 graders, 2 loaders, several smaller pieces of equipment, 5 tandem trucks and several pickups. Some of these assets have subsequently been or are budgeted to be replaced while others will be included in future Budget requests.

Annual Capital Requirement: $1,973,700 per year

Target Reinvestment Rate: 5.98%

Actual Reinvestment Rate: 4.12%

Funding Shortfall: $614,100 per year

In addition, it is forecasted that $11,418,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 6.4. This estimate assumes an annual inflation rate of 3%.

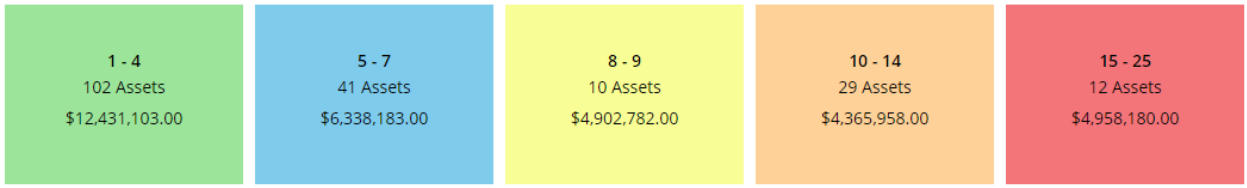
6.6 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The Figure on the following page summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 6-4: IPS Asset Risk Matrix



Assets identified as carrying the most risk include 7 heavy trucks and 5 pieces of equipment used in the Roads maintenance operations. All equipment included in this risk assessment category are in very poor condition and have either failed while in use, or pose a health and safety risk to staff. These assets will be included for replacement in a future budget.

6.7 Recommendations

The County recommends the development of a long-term capital replacement plan for heavy trucks and equipment used in Roads Maintenance operations, which would include a financing strategy to ensure these assets are replaced before failure occurs in the future.

The County also recommends that a Building Condition Assessment be performed by a third-party on all County buildings at regular intervals. This report will provide a comprehensive review of each building's condition and allow Administration to adequately plan for future capital repairs at each facility.

7.0 Sun Parlor Home

7.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Sun Parlor Home ("SPH") is a municipal long-term care home, owned and operated by the County of Essex and located in the Municipality of Leamington. SPH provides a safe and secure home for 206 residents, operating 24 hours per day, 365 days per year.

The following Table outlines the key attributes for the assets at SPH, including quantity, current replacement cost and the method used to estimate replacement cost by segment. Equipment is further broken down into 3 sub-segments: Appliances, Medical Equipment and Other. Each of these sub-segments has a different EUL and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as furniture and information technology equipment.

Table 7-1: SPH Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	2	$95,186,000	User-Defined
Land Improvements	11	$1,238,600	CPI Tables
Equipment – Appliances	48	$671,800	CPI Tables / User-Defined
Equipment – Medical Equipment	56	$850,700	CPI Tables / User-Defined
Equipment - Other	12	$634,500	CPI Tables
Other	4	$1,327,900	CPI Tables
Total		**$99,909,500**	

Replacement costs are determined using industry knowledge and professional judgment based on recent market pricing where available. Where recent market data is not available, historical costs are inflated to present value using current inflation rates to reasonably estimate future replacement costs.

7.2 State of the Local Infrastructure

The following Table outlines the current state of the SPH assets, including the average age (weighted average by replacement cost), useful life and average condition of assets by segment.

Table 7-2: SPH Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Building	30+ years	50 years	78.9% (Good)
Equipment – Appliances	9.8 years	10 years	55.0% (Fair)
Equipment – Medical Equipment	7.0 years	10 years	57.7% (Fair)
Equipment – Other	6.6 years	10 years	62.9% (Good)
Land Improvements	13.0 years	15-30 years	62.8% (Good)
Other	11.9 years	3-15 years	51.1% (Fair)

Asset conditions are assessed by management and based on either age or professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life.

The original Long-Term Care Home residence was built in 1901, consisting of 296 beds. In the 1960's, the Home was renovated and in 1992, a portion of this building was demolished and a new building was erected, creating a capacity of 206 beds. Both the remaining original building and the new building are in Good condition, but continue to show signs of aging and have been in use well beyond their useful life. Significant repairs will be needed in the next 10 years to replace major components such as windows, roof and HVAC systems. While the current Home is classified as an "A" Bed home, the specifications do not meet the current Long-Term Care Home Design standards which were updated in 2015. A Feasibility Study prepared by a consultant in early 2024 outlines the significant investment needed to update the Home to these standards and compares this with the option of rebuilding a new Long-Term Care Home.

The Charts below outline the overall condition of the SPH assets and the asset condition by segment.

Figure 7-1: Projected SPH Asset Condition Summary

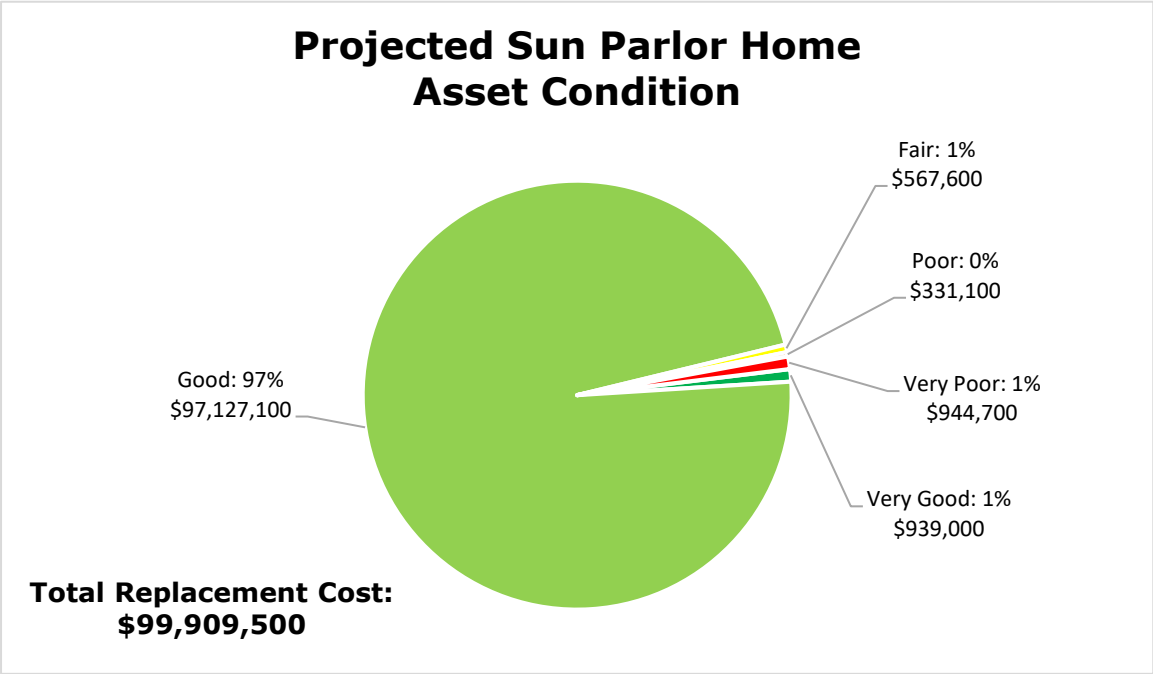
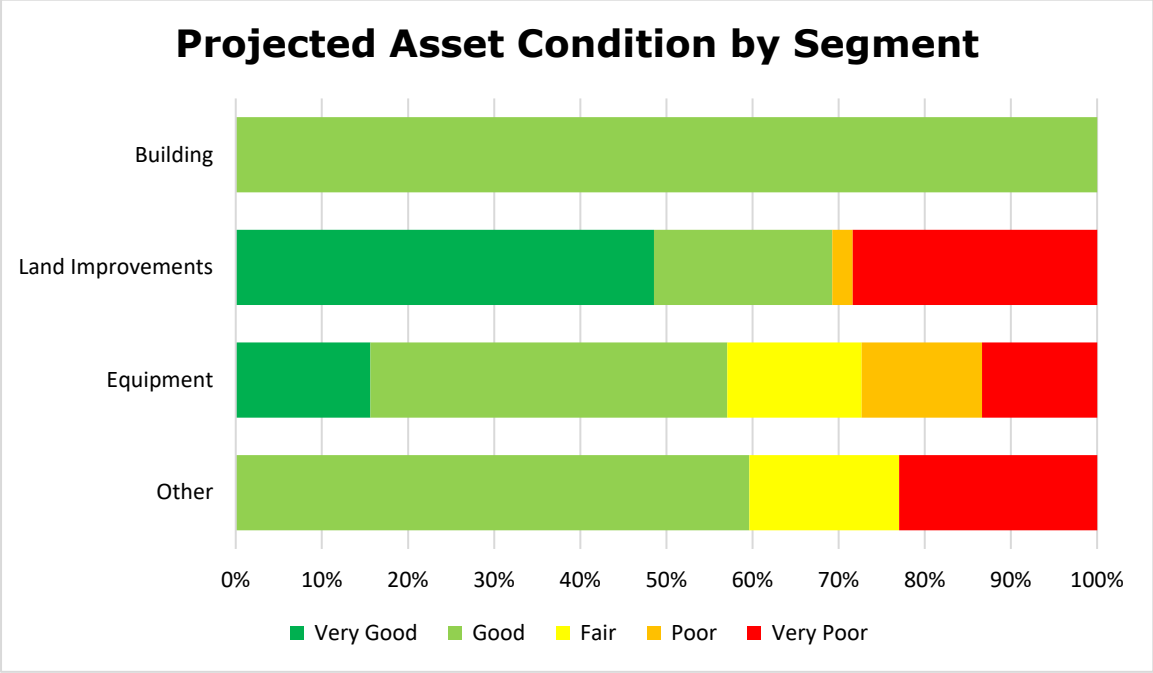


Figure 7-2: Projected SPH Asset Condition by Segment



Overall, 98.2% of the Sun Parlor Home's assets are in Good to Very Good condition. Excluding the buildings, 61.0% of the remainder of the Home's assets are in Good to Very Good condition. The favourable condition rating of the assets is a result of a comprehensive preventative maintenance strategy and a proactive approach to making SPH a warm and inviting place to live. While the overall condition of the Long-Term Care Home is Good, it is important to note that the building does not meet the current standards as set out in the Long-term Care Home Design Manual 2015. The existing structure and configuration of the Home does not meet all of the requirements of the Ontario Long Term Care Home Design manual. Remediation would be required to meet some of the design standards, such as widening doorways, replacement of every window and improving lighting systems. It should be noted that many other deficits such as inadequate square footage in dining rooms, resident lounge spaces, activity rooms and resident washrooms cannot be addressed without significant retrofits to these spaces and home areas.

Assets in Poor or Very Poor condition include the front driveway and visitor parking lot, and some appliances, equipment and information technology equipment that are nearing end of life. Appliances and equipment, such as bathtubs and resident lifts, are inspected annually to ensure safe operation. In addition, equipment used to maintain the property will also be considered for replacement in future budgets.

7.3 Levels of Service

Sun Parlor Home is a vibrant, diverse home where residents, families and team members foster meaningful relationships based on equality, empowerment and mutual respect; where people want to live and work; where residents experience excellent quality of life and care built on our shared values.

The following tables illustrate the current level of service for the non-core assets at SPH. These metrics include performance measures established by the County that are relevant and reflective of the risk associated with the asset.

7.3.1 Community Levels of Service

The Table on the following page outlines the qualitative descriptions that determine the community levels of service provided by SPH.

Table 7-3: SPH Community Levels of Service

Core Values	Community Levels of Service
Quality	Residents want to live in an environment that meets their personal, healthcare and social needs
Accessible	Residents want to live in an accessible and well-maintained Home
Efficient	Stakeholders want to ensure best value for dollar spent
Safe	Residents expect to live in a safe environment

7.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service for non-core assets in use at the Sun Parlor Home.

Table 7-4: SPH Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Quality	% of residents who feel SPH is a good place to live	97%
Accessible	# of rooms equipped with a ceiling lift	28 / 206
Efficient	% of rooms occupied during the year	97%
Safe	# of security cameras monitoring for resident safety	5

7.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

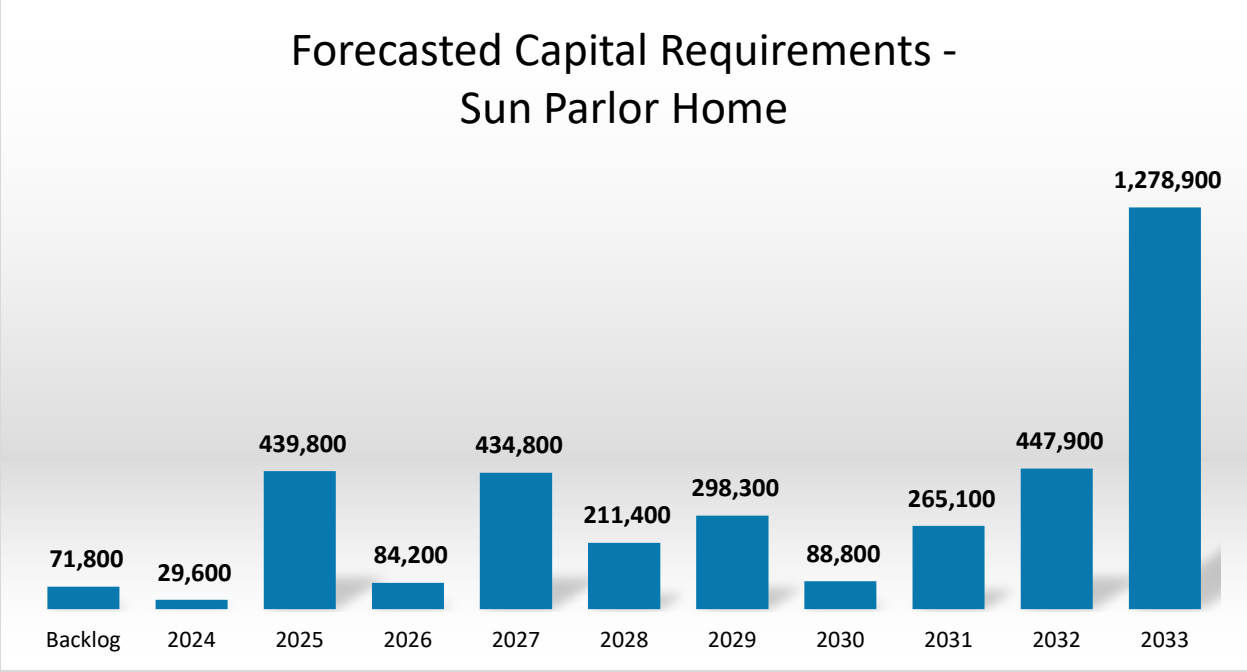
Table 7-5: SPH Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspections of key components of the building (i.e. fire system, elevators, HVAC, hot water boilers, etc.) are conducted on a regular basis by internal staff and/or third-party contractors. Equipment inspections are also conducted regularly to ensure vital equipment is in good working condition (i.e. kitchen exhaust fans, stoves, fridges, resident lifts, etc.)
Repairs & Maintenance	A comprehensive preventative maintenance program is in place with scheduled maintenance performed by internal staff or third-party contractors. Repairs and maintenance duties are performed as part of the inspection process or as needed.
Replacement	When an asset is nearing the end of its EUL and the cost of repairs and maintenance becomes non-value-adding, the asset is disposed of, sometimes by public auction where some residual value may be present and fully replaced.

7.5 Forecasted Capital Requirements

The forecasted capital requirements for the SPH assets for the next 10 years are outlined in the Chart on the following page. The annual capital requirement represents the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

Figure 7-3: 10-year Forecasted Capital Requirements – SPH



At the end of 2022, there was a backlog of assets including 2 appliances and 5 resident lifts, all of which have been replaced, or will be replaced in future budgets. These assets are at the end of their useful life, but are inspected annual to ensure they pose no safety risks.

Annual Capital Requirement: $2,185,200 per year

Target Reinvestment Rate: 2.19%

Actual Reinvestment Rate: 0.17%

Funding Shortfall: $2,016,600 per year

In addition, it is forecasted that $12,020,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 7.4, excluding full replacement of any major building components. This estimate assumes an annual inflation rate of 3%.

7.6 Risk Management

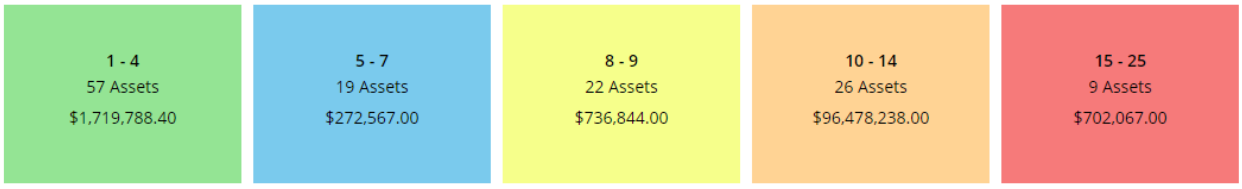
When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the

probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 7-4: SPH Asset Risk Matrix



Assets identified as carrying the most risk include resident dining room furniture, 4 kitchen appliances, 2 bathtubs and information technology equipment. All high-risk assets have either been replaced, or are being considered for replacement in a future budget.

7.7 Recommendations

It is recommended that the County identify immediate and short-term priorities for maintenance and repairs to ensure that the Sun Parlor Home continues to be a viable Long-Term Care Home that provides a safe and secure home that is welcoming. Several of these projects are quite large in scale, will occur over a span of years and will require significant planning to ensure minimal disruption to the residents' daily lives.

The County should also further explore the redevelopment of the Long-Term Care Home through a review of the findings and recommendations in the Feasibility Study and the assessment of various models. This will assist County Council in fulfilling its governance responsibilities with respect to the operation of the Home.

8.0 Emergency Medical Services

8.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Essex-Windsor Emergency Medical Services ("EMS") department is responsible for the provision of land ambulance services for the County of Essex, City of Windsor and Township of Pelee. In 2023, Essex-Windsor EMS deployed ambulance resources 112,000 times. This includes patient requests for service, as well as standby coverage to balance resources across the region. This service level is currently supported by 56 ambulances and first-response vehicles, staffed by trained paramedics who are equipped with the necessary medical equipment and devices. Additionally, 7 administrative and special events vehicles support the daily operations.

The following Table outlines the key attributes for these assets, including quantity, current replacement cost and the method used to estimate replacement cost by segment. Fleet is further broken down into 2 sub-segments: Ambulances and Other, while Equipment is further broken down into 2 sub-segments: Medical Equipment and Other. Each of these sub-segments has a different EUL and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as furniture, electronics and information technology equipment.

Table 8-1: EMS Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	8	$44,807,800	Cost / Unit
Land Improvements	5	$338,400	CPI Tables
Fleet – Ambulances	40	$10,294,600	User-Defined
Fleet - Other	22	$2,153,200	CPI Tables / User-Defined
Equipment – Medical Equipment	62	$6,074,300	CPI Tables / User-Defined
Equipment - Other	17	$886,100	CPI Tables
Other	9	$855,200	CPI Tables / User-Defined

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Total		**$65,409,600**	

As of 2022, the County of Essex owns EMS bases in 8 different locations. Services are also provided from 4 additional bases, located in the Towns of Essex, Lasalle, Kingsville and the Township of Pelee, operating under a lease agreement with the various local municipalities. In 2023, a new base was constructed in Kingsville and will be included in the next Asset Management Plan. Plans to construct a new base in Lasalle are also currently underway.

The replacement cost of buildings has been estimated using the actual construction costs of the new Kingsville base and pro-rated for the size of each individual base. Due to the rising costs of Ambulances and other non-emergency vehicles, the replacement costs are estimated using either current market price, or CPI Tables. Similarly, where recent purchase history is available, this data has been used in place of CPI Tables to estimate the replacement cost of equipment.

8.2 State of the Local Infrastructure

The following Table outlines the current state of the EMS assets, including the average age (weighted average by replacement cost), useful life and average condition of assets by segment.

Table 8-2: EMS Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Building	14.2 years	50 years	90.0% (Very Good)
Land Improvements	7.4 years	15-20 years	62.0% (Good)
Fleet – Ambulance	4.9 years	5 years	43.2% (Fair)
Fleet - Other	5.2 years	5 years	39.7% (Poor)
Equipment – Medical Equipment	4.8 years	5 years	33.6% (Poor)
Equipment - Other	10.5 years	5-20 years	54.2% (Fair)

Asset Segment	Average Age	Useful Life	Average Condition (%)
Other	5.2 years	3-15 years	70.0% (Good)

Asset conditions are assessed by management and based on either age or professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life.

In reality, ambulances and other fleet vehicles generally have a useful life of longer than 5 years. However, in order to provide the best quality service to our residents, we want to ensure our fleet are in prime condition and ready to respond. County of Essex ambulances are generally replaced on a 5-year cycle, before they require substantial repairs and maintenance. The typical ambulance has been driven approximately 350,000km when it is retired.

The scale used to assess the condition of ambulances and associated equipment is different than the scale used to assess all other assets. Ambulances with an age-based condition assessment of 80 or above are deemed to be in Very Good condition, while those with a condition assessment of 50 through 79 are in Good condition. Once the condition falls below 50, the ambulance is reported in Fair condition until the end of the 5-year lifecycle. Ambulances that are in service beyond 5-years are deemed in Poor condition; not because failure is imminent but because scheduled replacement is overdue. This generally occurs only due to delays in manufacturing and delivery, as was experienced recently as a result of the recent pandemic.

This adjusted condition assessment method is meant to reflect the fact that we do not wait until our ambulances are in Poor or Very Poor condition to replace them. There are still several years of service life remaining when these assets are disposed of; the risk and consequence of failure of one of these assets is simply too significant to operations to delay replacement.

The Charts on the following page outline the overall condition of the EMS assets and the asset condition by segment.

Figure 8-1: Projected EMS Asset Condition Summary

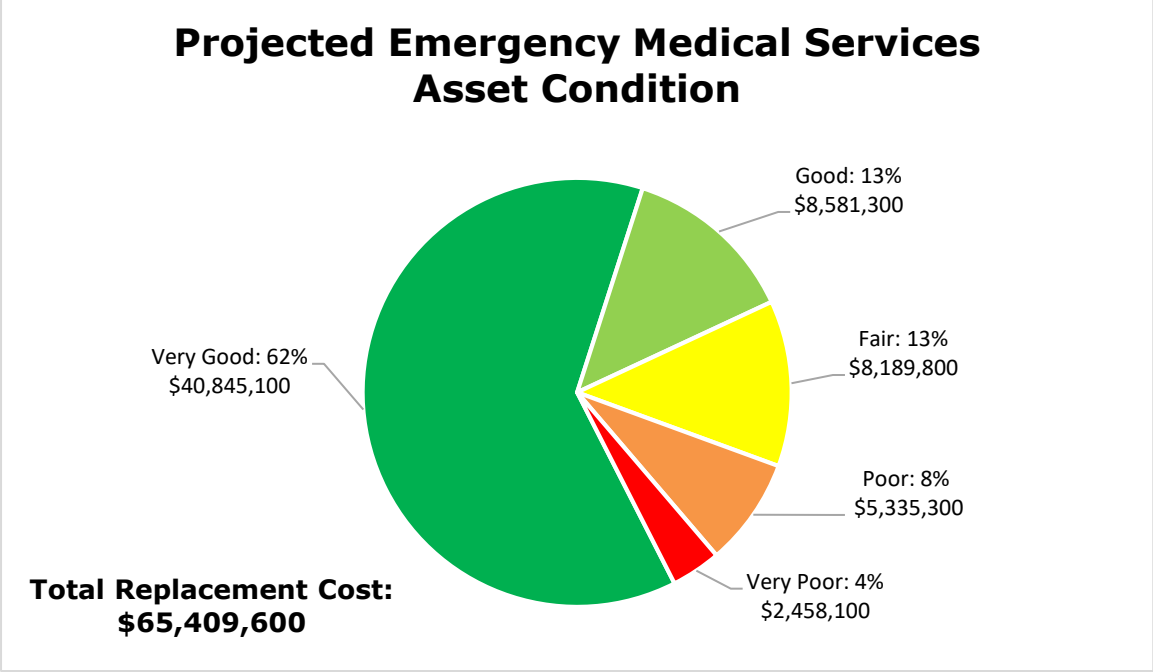
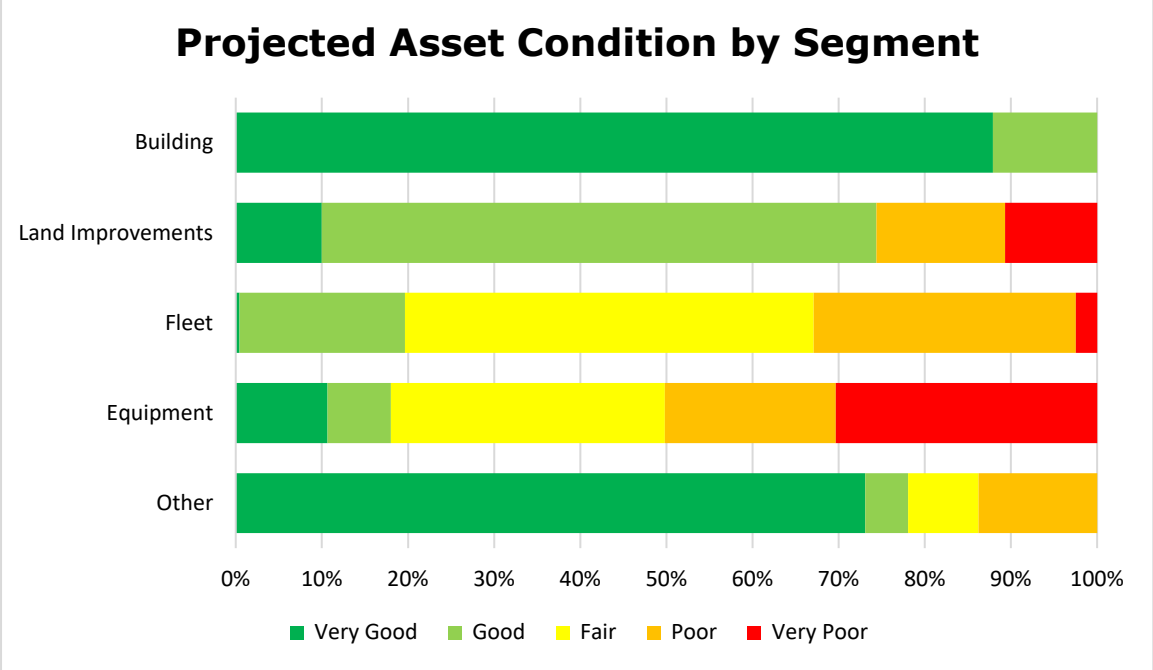


Figure 8-2: Projected EMS Asset Condition by Segment



Overall, 75.6% of the Emergency Medical Services' assets are in Good to Very Good condition. The condition rating of the assets, especially Fleet and Equipment, reflect the delays in manufacturer delivery which existed at the end of 2022, most of which have now been resolved due to Administration's

judicious efforts to secure orders earlier. These additional efforts ensure a timely and prudent capital replacement cycle that prioritizes the health and well-being of the residents of Essex County. Assets in Very Poor and Poor condition have either been replaced or are currently in the process of being replaced. Included in Equipment which have been replaced since 2022 are power load stretchers and cardiac monitors outfitted in every ambulance. In addition, equipment in Very Poor condition includes assets such as manikins and RTVs that are less critical to daily operations, but have surpassed their EUL.

Land improvements in need of significant repair or replacement include the parking lots at the Mercer, Jefferson and Amherstburg bases. These assets will be addressed for consideration in future budgets.

8.3 Levels of Service

EMS is committed to providing the highest quality services in a manner that is accessible, accountable, responsive, seamless and integrated. Ensuring our vehicles are in good working order through preventative maintenance programs and addressing repairs immediately ensures that we're ready to respond when it counts.

The following tables illustrate the current level of service for the assets used by EMS. These metrics include performance measures established by the County that are relevant and reflective of the risk associated with the asset.

8.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service provided by EMS.

Table 8-3: EMS Community Levels of Service

Core Values	Qualitative Description
Reliable	EMS uses the latest technology and specialized vehicles and equipment to provide the best patient care possible.
Available	EMS fleet are available to respond to calls in accordance with the legislated call response times
Efficient	Fleet is maintained at the lowest cost possible while maintaining current levels of service

8.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service for assets used by EMS.

Table 8-4: EMS Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Reliable	Average age of frontline fleet	3.9 years
Reliable	% of fleet in Good or Very Good condition	19.6%
Available	Readiness to respond to all types of emergencies	100%
Available	Percentage of time when response vehicles and equipment are available and operating properly	100%
Efficient	Average annual cost of repairs & maintenance	$10,641 / vehicle

Key Performance Indicators, such as the percentage of fleet in Good or Very Good condition are currently lower than normal levels due to delivery delays in procurement. Similarly, the average age of frontline fleet is currently higher than normal. EMS administration is mitigating the impact of these ongoing circumstances by requesting pre-budgetary approval so that orders can be placed well in advance, compensating for these market delays.

Ensuring response vehicles and equipment are ready and able to respond in an emergency is a direct result of having an adequate number of these assets in inventory combined with minimizing downtime when these assets need repairs or regular maintenance.

8.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

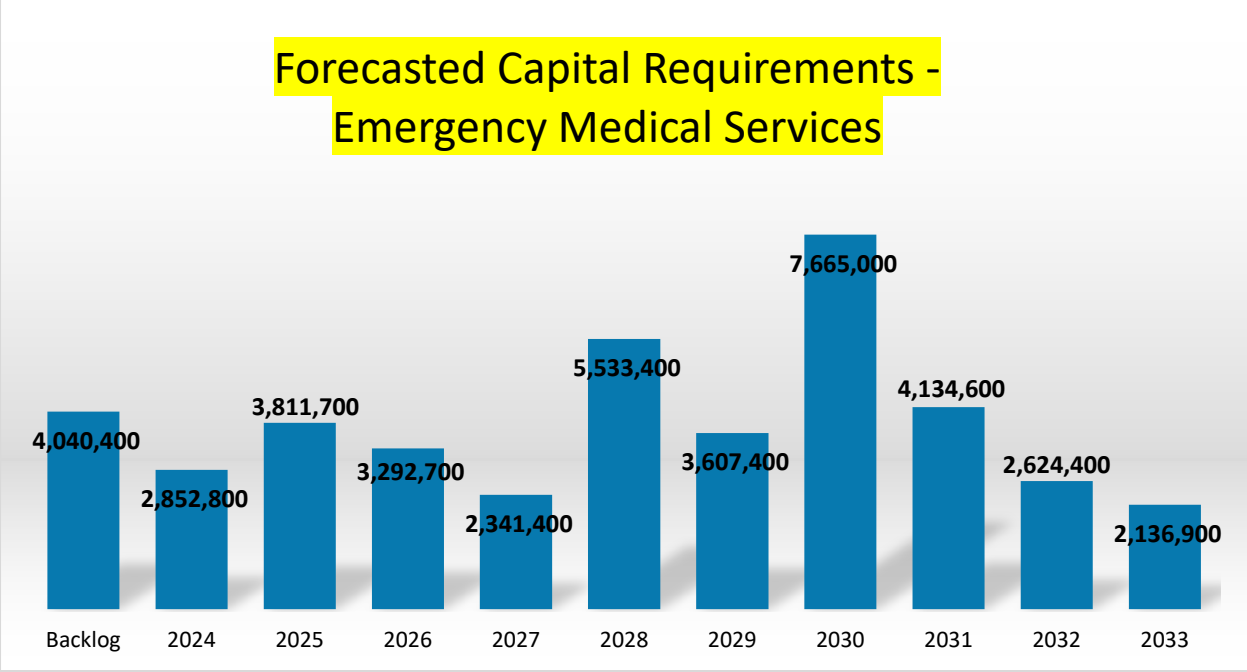
Table 8-5: EMS Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspections are completed during the procurement phase to ensure the acquisition of defect-free assets. Throughout deployment and utilization, internal staff and third-party contractors conduct regular inspections to detect any defects or failures. Scheduled inspections for maintenance and repair are completed to prevent asset downtime by promptly addressing wear, tear and malfunctions. Furthermore, completing inspections ensures compliance with regulations and standards, thereby enhancing safety and operational efficiency. Inspections of key components of the building (i.e. fire system, HVAC, plumbing, etc.) are conducted on a regular basis by internal staff and/or third-party contractors.
Repairs / Maintenance	A comprehensive preventative maintenance program is in place with scheduled maintenance provided by internal staff or third-party contractors. Repairs and maintenance duties are performed as part of the inspection process or as needed.
Replacement	When an asset is nearing the end of its EUL and the cost of repairs and maintenance becomes non-value-adding, the asset is disposed of, often by public auction where some residual value may be present, and fully replaced.

8.5 Forecasted Capital Requirements

The forecasted capital requirements for the EMS assets for the next 10 years are outlined in the Chart on the following page. The annual capital requirement represents the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

Figure 8-3: 10-year Forecasted Capital Requirements – EMS



At the end of 2022, there was a backlog of 7 ambulances and related service equipment – those ordered in 2022 were not received by the end of the year. Repairs continued to be made to existing fleet and equipment to maintain service levels until the new assets arrived in 2023. Currently, all backlogged assets have been replaced and it is anticipated that 2024 orders for fleet will be fulfilled by year-end.

Annual Capital Requirement: $4,768,300 per year

Target Reinvestment Rate: 7.29%

Actual Reinvestment Rate: 2.80%

Funding Shortfall: $2,934,100

In addition, it is forecasted that $17,480,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 8.4. This estimate assumes an annual inflation rate of 3%.

8.6 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In most cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. For ambulances in particular, the probability of failure is based on the number of service life years remaining – the fewer the years remaining, the higher the risk of failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences. The failure of an ambulance would have a severe impact on operations.

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 8-4: EMS Asset Risk Matrix

Assets identified as carrying the most risk include all 40 ambulances, as well as some of the older Emergency Response Units and medical equipment. A high-risk assessment doesn't always mean poor condition, but just recognizes the inherent risk that certain assets pose to operations should failure occur.

8.7 Recommendations

The County recommends that a Building Condition Assessment be performed by a third-party on all County buildings at regular intervals. This report will provide a comprehensive review of each building's condition and allow Administration to adequately plan for future capital repairs at each facility.

9.0 General Government Services

9.1 Asset Portfolio: Segment, Quantity and Replacement Cost

General Government Services oversees the administrative functions of the municipal government, including Corporate Management, Community & Legislative Services, Financial Services, Procurement, Information Technology and Human Resources.

The following Table outlines the key attributes for these assets, including quantity, current replacement cost and the method used to estimate replacement cost by segment. The "Other" segment includes assets such as information technology equipment. General Government Services is the host to the County's network infrastructure resources, providing connectivity and shared resources which support County-wide operations.

Table 9-1: General Government Services Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	1	$35,000,000	User-Defined
Land Improvements	3	$874,300	CPI Tables
Fleet	1	$53,000	User-Defined
Other	19	$572,600	CPI Tables / User-Defined
Total		**$36,499,900**	

Replacement costs are determined using industry knowledge and professional judgement based on recent market pricing where available. Where recent market data is not available, historical costs are inflated to preserve value using current inflation rates to reasonably estimate future replacement costs.

9.2 State of the Local Infrastructure

The Table on the following page outlines the current state of the General Government Services assets, including the average age (weighted average by replacement cost), useful life and average condition of assets by segment.

Table 9-2: General Government Services Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Building	46 years	100 years	77.7% (Good)
Land Improvements	5.5 years	25-40 years	79.6% (Good)
Fleet	1.5 years	10 years	83.3% (Very Good)
Other	3.4 years	3-5 years	53.1% (Fair)

Asset conditions are assessed by management and based on either age or professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life.

The building represented above is the Essex County Civic and Education Centre ("Civic Centre"), which houses the General Government Services, as well as Infrastructure Services, Emergency Medical Services Administration, Essex County Library Administration, as well as several third-party tenants. The Civic Centre has undergone a number of renovations in the last 10 years, including an update to the exterior façade and interior office redesigns to more than 40% of the building. The remaining spaces occupied by the County are currently under redevelopment, with completion expected in the next few years. This project also includes energy efficient upgrades including enhanced LED lighting and the modernization of building control systems.

The building, originally constructed in 1976, was previously owned as a joint venture between the County and the Essex Regional Conservation Authority, until 2017 when the County purchased the remainder of the building. The renovations and ongoing routine maintenance contribute to its' current condition and will help to ensure it meets its EUL.

Land improvements encompass a diverse array of enhancements, including curbs and sidewalks and parking lot lighting upgrades. These improvements significantly contribute to the aesthetic appeal and functionality of the facilities.

The fleet category is comprised of a vehicle essential for a variety of operational needs. The condition of this asset reflects recent acquisition and rigorous maintenance practices, ensuring its reliability and efficiency in supporting our operations.

Figure 9-1: Projected General Government Services Asset Condition Summary

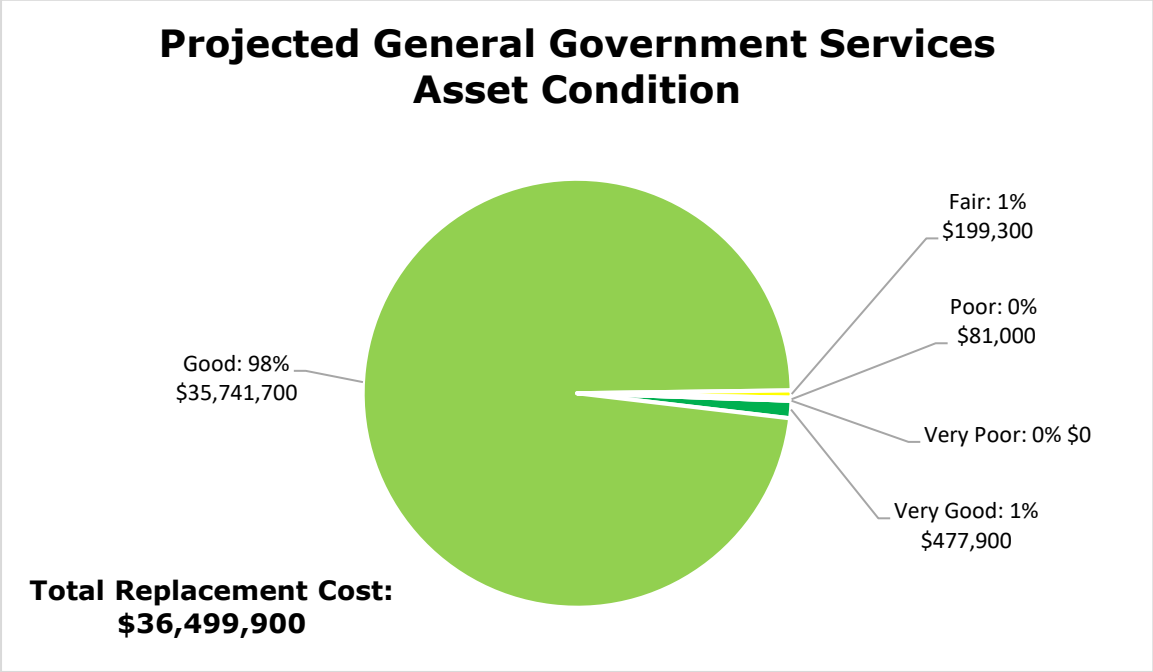
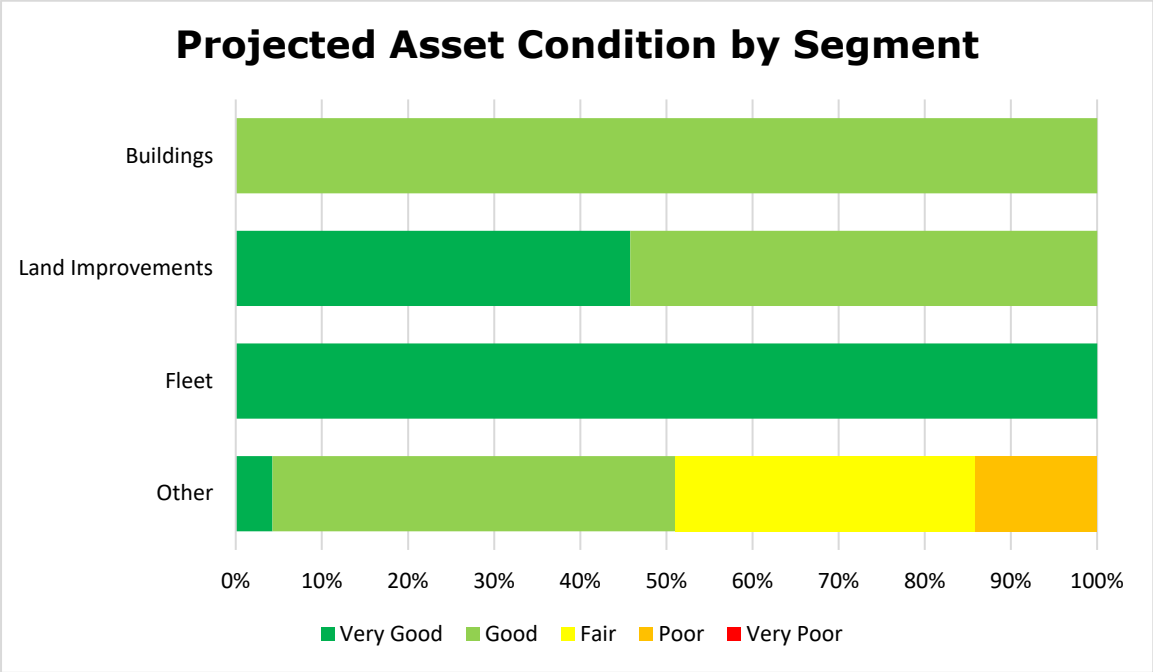


Figure 9-2: Projected General Government Services Asset Condition by Segment



Overall, 99.2% of assets are in Good to Very Good condition. Excluding the building, 81.3% of assets are in Good to Very Good condition. This condition

rating is the direct result of investments made to maintain the assets which support the remainder of the County's operations.

9.3 Levels of Services

General Government Services efficiently manage non-core assets, including buildings, land improvements, fleet and other assets such as IT equipment to support municipal administrative functions.

The following tables illustrate the current level of service for the non-core assets within the departments in General Government Services. These metrics include performance measures established by the County that are relevant and reflective of the risk associated with the assets.

9.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service for non-core assets within the departments in General Government Services.

Table 9-3: General Government Services Community Levels of Service

Core Values	Qualitative Description
Reliable	General Government Services non-core assets provide the necessary infrastructure, tools and resources to facilitate day to day operations, ensure compliance with regulatory requirements, support employee productivity and deliver services to the community.

9.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service for non-core assets within the departments in General Government Services.

Table 9-4: General Government Services Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Reliable	% of assets in Good to Very Good condition	99.2%

9.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

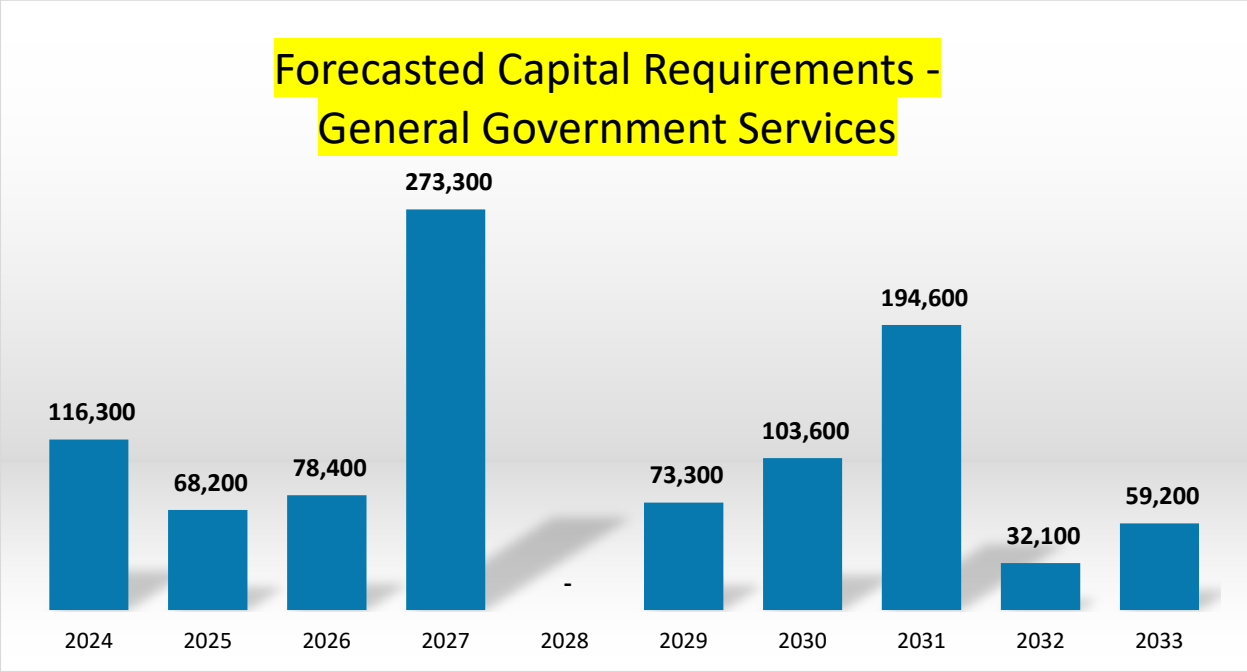
Table 9-5: General Government Services Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspections of key components of the building (i.e. fire system, elevators, HVAC, hot water boilers, etc.) are conducted on a regular basis by internal staff and/or third-party contractors. Fleet is also inspected high level on a regular basis by internal staff and on a more thorough basis by third-party professionals as needed.
Repairs & Maintenance	A comprehensive preventative maintenance program is in place with scheduled maintenance performed by internal staff or third-party contractors. Repairs and maintenance duties are performed as part of the inspection process or as needed. Fleet are generally maintained in a good state of repair, well beyond their EUL.
Replacement	When an asset is nearing the end of its EUL and the cost of repairs and maintenance becomes non-value-adding, the asset is disposed of, sometimes by public auction where some residual value may be present, and fully replaced.

9.5 Forecasted Capital Requirements

The forecasted capital requirements for the General Government Services departments are displayed in 5-year increments in the Chart on the following page. The annual capital requirements represent the average amount of funding per year that the County should allocate towards future rehabilitation and replacement needs.

Figure 9-3: 10-year Forecasted Capital Requirements – General Government Services



Annual Capital Requirement: $482,400 per year

Target Reinvestment Rate: 1.32%

Actual Reinvestment Rate: 1.37%

Funding Surplus: $17,200 per year

In addition, it is forecasted that $7,140,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 9.4. This estimate assumes an annual inflation rate of 3%.

9.6 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the

replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 9-4: General Government Services Asset Risk Matrix

Assets identified as carrying the most risk include information technology assets which form the backbone of the County's computer network and due to the rapid pace at which technology changes, have a very short useful life.

9.7 Recommendations

General Government Services plays an important, foundational role in supporting each of the County's operational departments. Based on observations made during the preparation of this report, Administration recommends the prioritization of efforts to mitigate the impact of those assets which carry the greatest risk. Specifically, resources should be allocated to address vulnerabilities associated with information technology assets, given their criticality to operations and rapid technological advancements. The sustainability of General Government Services' role in supporting County operations is highly dependent on the resiliency of these assets.

To further support this recommendation, Administration also suggests the development of a comprehensive maintenance schedule for high-risk assets to allow for better monitoring of their condition and to facilitate a proactive approach to addressing potential issues before they impact services. General Government Services should consider implementing regular upgrades or replacement of information technology assets to keep pace with technological advancements and minimize the risk of failure.

10.0 Essex County Library

10.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Essex County Library ("Library") provides information resources and services to the residents of Essex County by connecting through 14 community branch locations and through 24/7 online services and various mobile apps. While the physical branch buildings are owned by the local municipalities, the Library asset portfolio consists of the assets integral to the delivery of services.

The following Table outlines the key attributes for the assets at the Library, including quantity, current replacement cost and the method used to estimate replacement cost by segment. Equipment is further broken down into 2 sub-segments: AV Materials & Books and Other. Each of these sub-segments has a different EUL and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as furniture, shelving and information technology equipment.

Table 10-1: Library Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Fleet	2	$150,000	User-Defined
Equipment – AV Materials & Books	16	$4,233,500	CPI Tables
Equipment - Other	4	$64,600	CPI Tables
Other	27	$1,850,900	CPI Tables / User-Defined
Total		**$6,299,000**	

Equipment, such as Audio-Visual materials and books, are pooled each year, as the value of each book alone is insignificant, but collectively provides a material value to the level of service provided.

Replacement costs are determined using industry knowledge and professional judgment based on recent market pricing where available. Where recent market data is not available, historical costs are inflated to present value using current inflation rates to reasonably estimate future replacement costs.

10.2 State of the Local Infrastructure

The following Table outlines the current state of the Library assets, including the average age (weighted average by replacement cost), useful life and average condition of assets by segment.

Table 10-2: Library Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Fleet	5.5 years	6 years	41.0% (Fair)
Equipment – AV Materials & Books	4.2 years	7 years	41.2% (Fair)
Equipment - Other	7.1 years	5-12 years	36.3% (Poor)
Other	10.3 years	3-15 years	54.9% (Fair)

Asset conditions are assessed by management and based on professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life.

Fleet vehicles have been held longer than their expected end of life as all vehicles are still in fair condition due to regular preventative maintenance. One fleet vehicle has been identified for replacement in 2024, while the other is tentatively scheduled for 2026.

AV Materials and Books are cycled regularly, with new books and materials, both in print and electronic, being added to the collection annually. The determination to dispose of physical materials is based on condition, age, demand and space constraints.

Other Equipment has been assessed as Poor condition, mainly based on their age. This generally includes kiosks, copiers and printers in service at the various branches but also signs at a couple of branches. Although some pieces of equipment are nearing end of their original EUL, they are still functioning. Overall, the physical condition of most equipment is fair to good with signs of aging still within a reasonable margin. Since there is low risk associated with equipment failure, the determination has been made to wait until the very end of their useful life for replacement.

Figure 10-1: Projected Library Asset Condition Summary

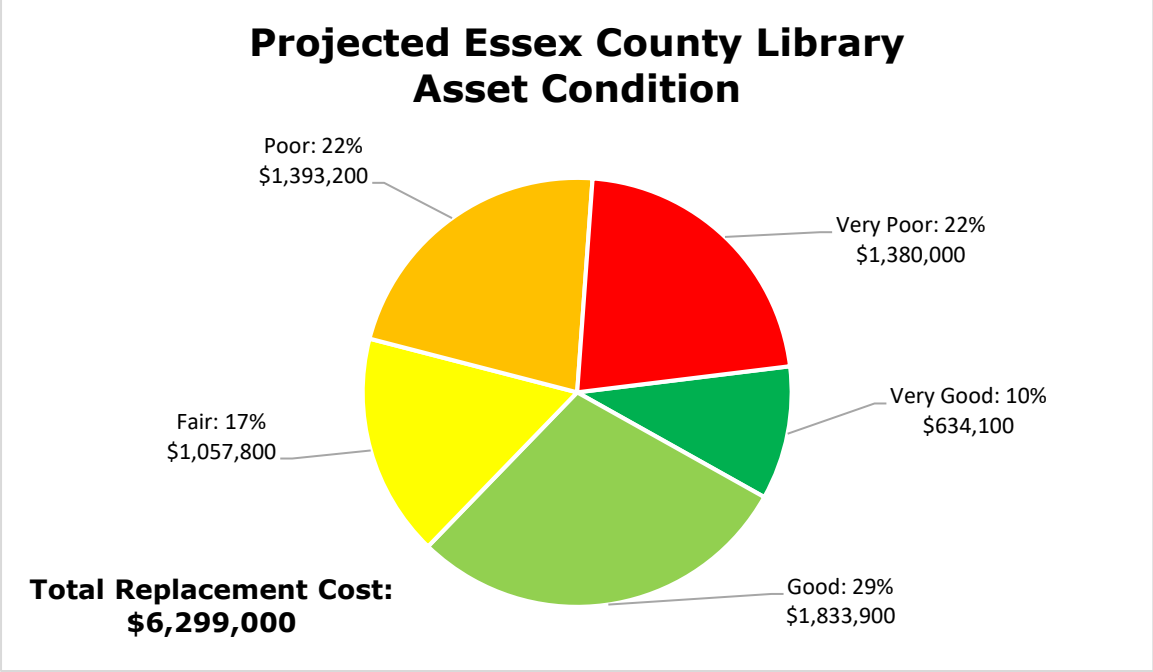
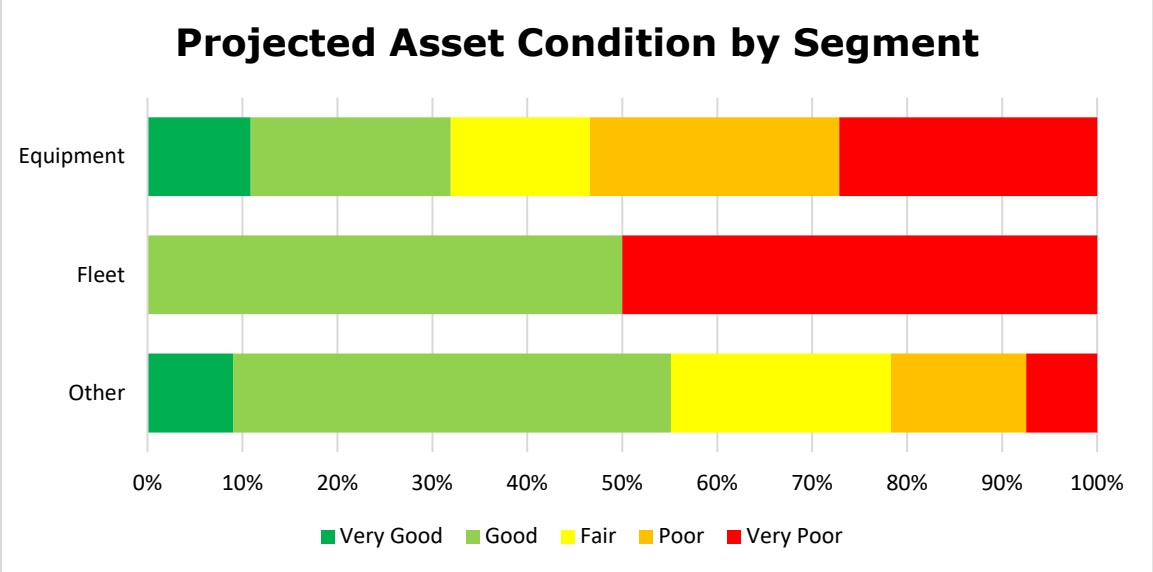


Figure 10-2: Projected Library Asset Condition by Segment



Overall, 56.0% of the Library's assets are in Fair to Very Good condition. Equipment in Poor or Very Poor condition such as AV materials and books will be replaced as part of the regular cycle. Other equipment, such as outdoor signs, are simply nearing the end of their useful life but have a low impact on the levels of service provided at the Library. Management will continue to monitor the condition of its assets and include a provision in future Budget requests for their eventual replacement.

10.3 Levels of Services

The Essex County Library strives to connect residents to resources through our community branch locations, 24/7 online service centre, and outreach, partnerships and programming services. The Library provides welcoming spaces for its membership where knowledgeable staff are sensitive to the needs and aspirations of the community; innovative ideas and cutting-edge technology are embraced; engaging programs and current comprehensive collections are created; and creative partnerships encourage social interaction and cultural vitality.

The following tables illustrate the current level of service for the non-core assets at the Library. These metrics include performance measures established by the Library that are relevant and reflective of the risk associated with the asset.

10.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service for non-core assets at the Library.

Table 10-3: Library Community Levels of Service

Core Values	Community Levels of Service
Quality / Available	Customers expect resources and materials to be current, relevant and available in a reasonable amount of time.

10.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service for non-core assets at the Library.

Table 10-4: Library Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Quality	Percentage change in annual circulation of tangible materials (2022 vs 2021)	8.8%
Available	Percentage change in annual holds on tangible materials (2022 vs 2021)	(6.1%)

10.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

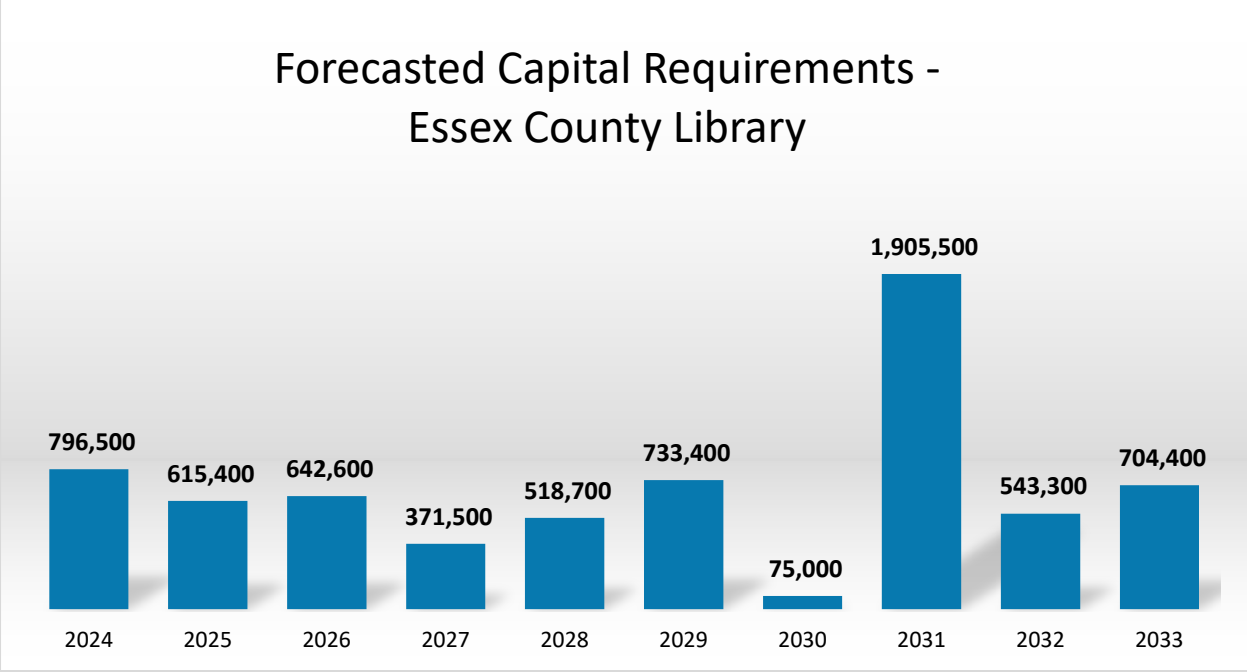
Table 10-5: Library Lifecycle Activities

Activity Type	Description of Strategy
Inspection	Inspection of library materials and equipment are performed regularly by staff to ensure resources are in good working condition. Inspection of fleet is carried out on a regular basis, with preventative maintenance and repairs performed by licensed staff, equipment manufacturers or third-party trained professionals.
Maintenance	Repairs to materials and equipment are made as appropriate, either by internal staff, or third-party specialists, depending on the nature of the repair. Fleet maintenance and repairs are performed by licensed staff, equipment manufacturers or third-party trained professionals.
Replacement	Materials that cannot be repaired to a reasonable condition are disposed and replaced with a new asset. Equipment that is at end of its EUL is budgeted for replacement. Fleet are generally maintained in a good state of repair, well beyond their EUL. When end of service life is approaching, the asset is disposed of, often by public auction where some residual value may be present, and fully replaced.

10.5 Forecasted Capital Requirements

The forecasted capital requirements for the Library assets for the next 10 years are outlined in the Chart on the following page. The annual capital requirements represent the average amount of funding per year that the Library should allocate towards future rehabilitation and replacement needs.

Figure 10-3: 10-year Forecasted Capital Requirements – Library



Annual Capital Requirement: $720,500 per year

Target Reinvestment Rate: 11.44%

Actual Reinvestment Rate: 8.95%

Funding Shortfall: $156,800

In addition, the Library has forecasted that $2,529,000 will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 10.4. This estimate assumes an annual inflation rate of 3%.

10.6 Risk Management

When determining the priority of attention to asset management, the County utilizes a risk-based approach focused on probability and consequence.

The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry. The assessment is determined by multiplying the probability of failure by the consequences of failure.

Figure 10-4: Library Asset Risk Matrix

Assets identified as carrying the highest risk include a fleet vehicle which is nearing the end of its useful life. This asset is scheduled for replacement in the 2024 Budget.

10.7 Recommendations

The services provided by the Library are an invaluable resource to the residents of the County. Much work has been done over the years to predict the tastes and demands of its customers and to maintain a collection of resources that is relevant and desirable. As such, Administration recommends the continual improvement of the selection and discard process currently in place to ensure best practices are aligned with the value for money objective of the County.

In addition, a long-term replacement strategy should be developed to support the information technology infrastructure that forms the backbone of the Library services. Ensuring servers and other IT equipment are regularly updated to keep pace with technological advances will ensure a sustainable and reliable delivery of services.

11.0 Essex Windsor Solid Waste Authority

The data contained herein represents 100% of the asset holdings of the Essex Windsor Solid Waste Authority, including full replacement cost. However, the responsibility for funding is shared 50/50 between The County of Essex and the City of Windsor.

11.1 Asset Portfolio: Segment, Quantity and Replacement Cost

The Essex-Windsor Solid Waste Authority ("EWSWA") is the governmental agency charged with the responsibility of providing an economical and environmentally conscious integrated solid waste management system for the seven local communities of the County of Essex and the City of Windsor. EWSWA provides programs to manage the solid non-hazardous waste generated in the County of Essex and the City of Windsor in an environmentally sound manner through processes which include, but are not necessarily limited to reduction, reuse, recycling, composting and landfilling.

The EWSWA owns and operates an array of solid waste disposal and diversion assets. The Table below illustrates the key attributes of the EWSWA assets, including quantity, current replacement cost and the method used to estimate replacement cost by segment.

The EWSWA owns and operates the Essex-Regional Landfill ("Landfill"). The Landfill is subdivided into 10 approximately equal-sized Cells. The Table below only includes the replacement costs of the 2 remaining unconstructed Cells (Cell 5 North & South). The replacement costs do not consider the costs of siting and building an entirely new Landfill, such as procuring land, constructing the leachate system, lagoons, cell development, etc.

Equipment is further broken down into 2 sub-segments: Heavy Machinery and Other. Each of these sub-segments has different estimated useful lives and therefore the timing of the replacement cost varies. The "Other" segment includes assets such as furniture, servers and information technology equipment.

Table 11-1: EWSWA Asset Portfolio Summary

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Building	13	$16,741,900	CPI Tables
Landfill	1	$37,294,200*	User-Defined

Asset Segment	Quantity	Replacement Cost	Replacement Cost Method
Land Improvements	18	$7,393,900	CPI Tables
Fleet	11	$706,300	CPI Tables
Equipment – Heavy Machinery	11	$5,376,500	CPI Tables
Equipment – Other	23	$2,257,600	CPI Tables
Other	9	$173,200	CPI Tables
Total		**$69,943,600**	

*The cost of the Landfill was calculated based on the EWSWA environmental consultants proposed estimate for the construction and engineering of Cell 5 North. The EWSWA management estimates that Cell 4 South and Cell 5 South will cost the same as Cell 5 North since the overall size is approximately the same.

11.2 State of the Local Infrastructure

The Table below identifies the average age (weighted average by replacement cost), useful life and the average condition of the EWSWA assets.

Table 11-2: EWSWA Asset Age, Useful Life and Average Condition

Asset Segment	Average Age	Useful Life	Average Condition (%)
Building	17 years	20 years	87% (Very Good)
Landfill	26 years	43 years	65% (Good)
Land Improvements	18 years	20 years	52% (Fair)
Fleet	11 years	10-25 years	51% (Fair)
Equipment – Heavy Machinery	4 years	5-10 years	67% (Good)
Equipment – Other	10 years	10 years	49% (Fair)

Asset Segment	Average Age	Useful Life	Average Condition (%)
Other	8 years	3 years	47.0% (Fair)

Asset conditions are assessed by management and based on professional judgement and knowledge of the asset's repair history, performance and reliability, regular maintenance activities and expectations for remaining service life. The Landfill's condition has been set to 65% (Good) based on professional judgement. The condition accounts for all assets which include but are not limited to: leachate management system, leachate lagoons, pumps, leachate aerators, gas management system & leachate land application systems.

Figure 11-1: Projected EWSWA Asset Condition Summary

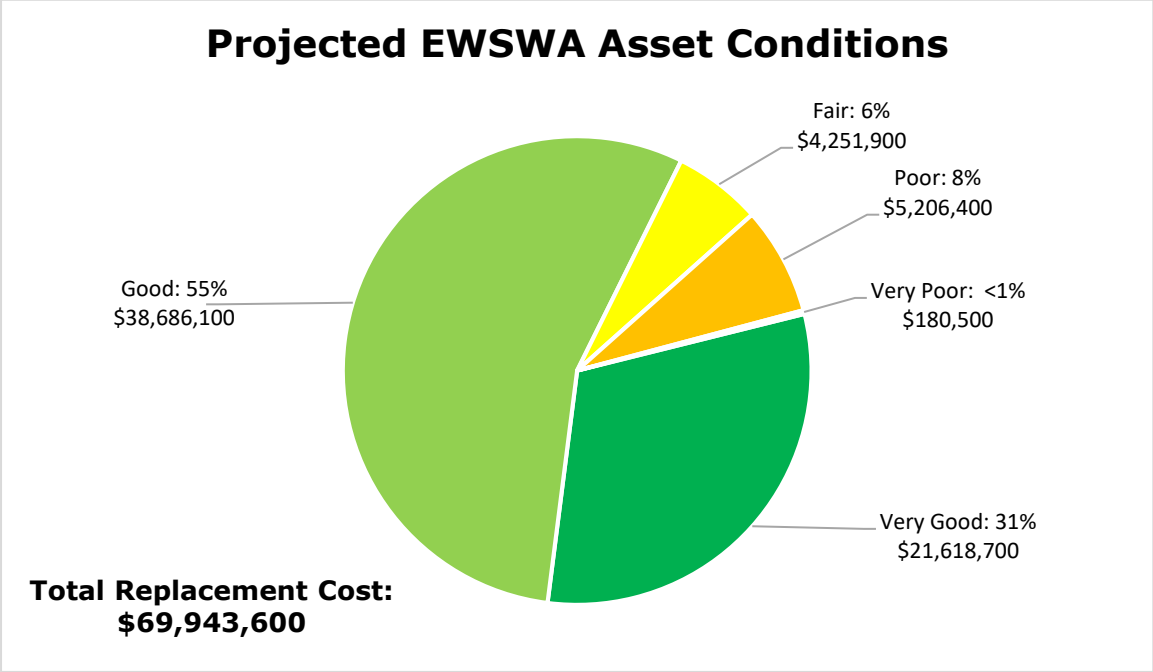
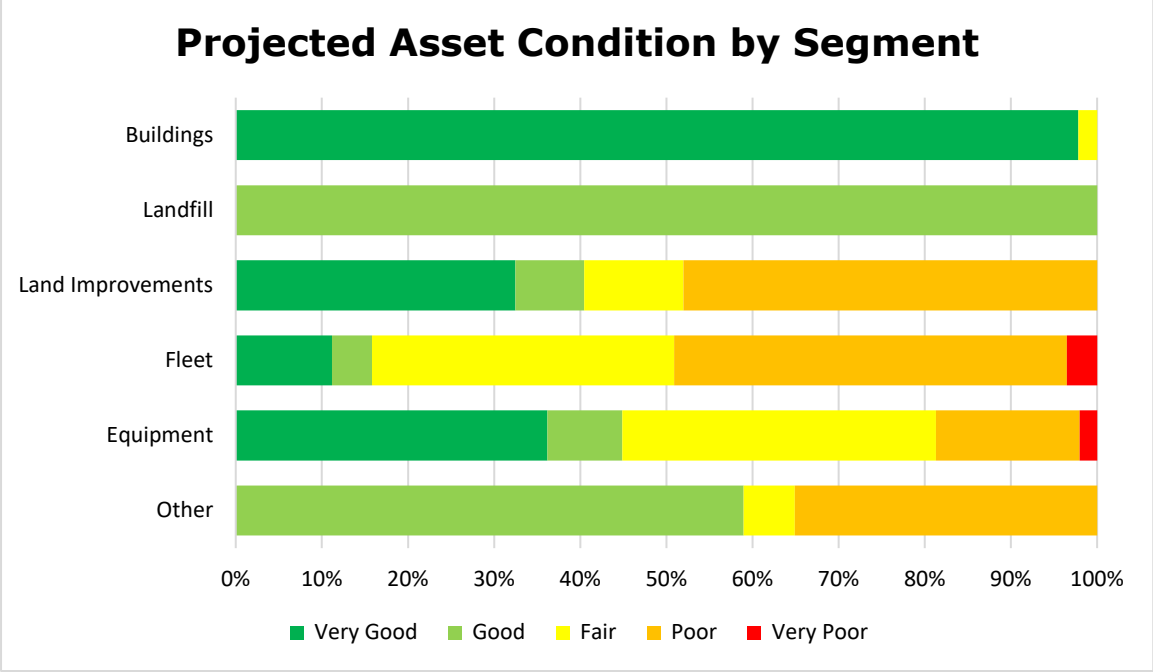


Figure 11-2: Projected EWSWA Asset Condition by Segment



Overall, 86% of EWSWA's assets are in Good to Very Good condition which includes the Landfill and 70% of EWSWA's assets are in Good to Very Good condition if the Landfill was exclude. The Good condition rating of the assets is a result of regular repairs and maintenance and periodic replacement.

11.3 Levels of Service Statement

The EWSWA is committed to operating an integrated solid waste management system in the most economical and environmentally-conscious manner possible.

The following tables illustrate the current level of services for the assets used by the EWSWA. These metrics include performance measures established by EWSWA that are relevant and reflective of the risk associated with the asset.

11.3.1 Community Levels of Service

The following Table outlines the qualitative descriptions that determine the community levels of service provided by EWSWA.

Table 11-3: EWSWA Community Levels of Service

Core Values	Community Levels of Service
Environmental Stewardship	Solid waste services are provided in a manner than has a minimal impact on the environment.
Reliable	The provision of solid waste disposal and recycling collection services are reliable and meet the public needs.
Efficient	Solid waste and diversion services are provided in a cost-efficient manner to maximize the value of the taxpayers' dollars.

11.3.2 Technical Levels of Service

The following Table outlines the qualitative descriptions that determine the technical levels of service provided by EWSWA.

Table 11-4: EWSWA Technical Levels of Service

Core Values	Key Performance Indicator	Current LOS
Environmental Stewardship	% of facilities operating within Environmental Compliance Approval ("ECA")	100%
Environmental Stewardship	% of residential waste diverted from the Landfill	32.4%
Reliable	% of assets in Good to Very Good condition	86%
Reliable	Average tonnes of per household waste landfilled	0.758

11.4 Lifecycle Management Strategy

In order to maximize the estimated useful life of an asset, a lifecycle management strategy must be adopted to proactively maintain an asset's condition and prevent accelerated deterioration. The following lifecycle strategy was developed to provide timely repairs and enhancements to the asset and extend its EUL at a lower total lifecycle cost.

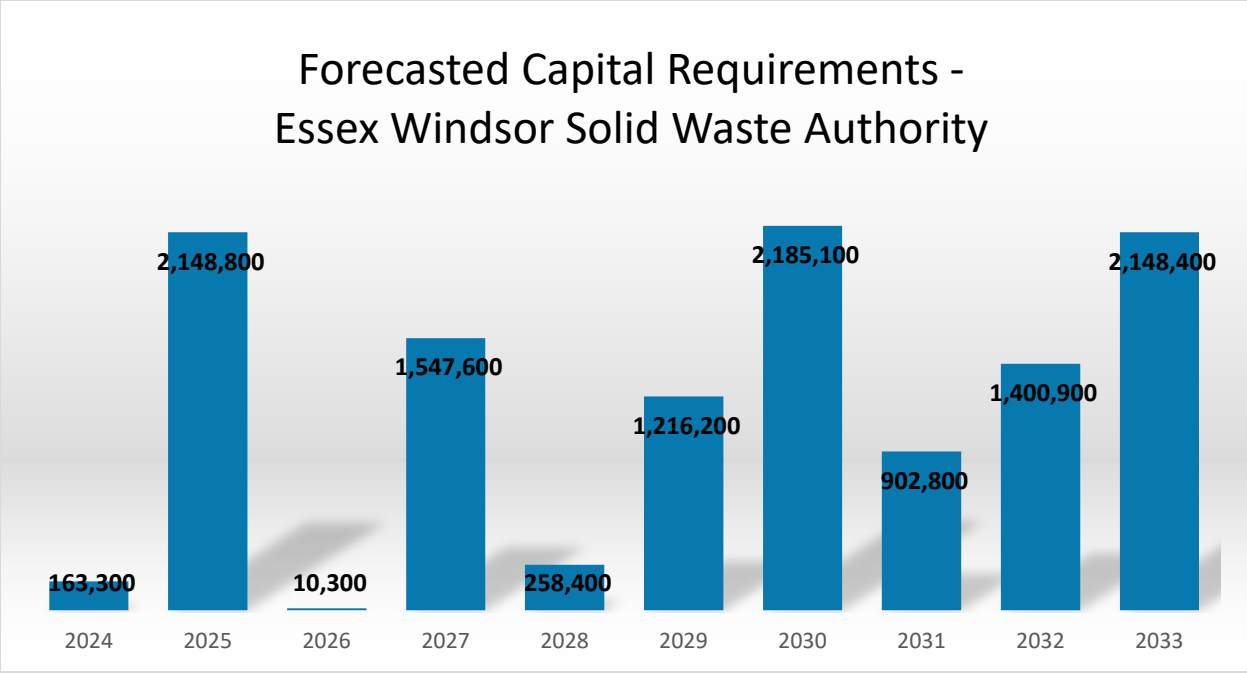
Table 11-5: EWSWA Lifecycle Activities

Activity Type	Description of Strategy
Inspection & Monitoring	Inspection of buildings and equipment are performed regularly by EWSWA staff. The EWSWA scales and fire suppression systems require regular inspection and are performed by licensed inspectors. The Landfill requires regular monitoring and maintenance per its ECA. The monitoring and reporting requirement of the Landfill are conducted by contracted environment engineers. Heavy equipment used at the Landfill are inspected daily by EWSWA's contracted operators. Fleet vehicles are inspected by EWSWA staff and major repairs are performed by their respective dealers.
Maintenance	General repairs and maintenance are completed as necessary by EWSWA staff or contracted staff while significant repairs are completed by equipment manufacturers, or third-party contractors. Maintenance procedures at the Landfill are conducted by third-party contractors which would be as a result of EWSWA's staff inspection processes or through the recommendations made by EWSWA's contracted environmental engineers. Some maintenance tasks performed at the Landfill include, but are not limited to, the cleaning and scraping of roads, performing litter and dust control and maintaining the leachate collection system. Fleet vehicles are serviced regularly by their EWSWA staff and major repairs are performed by their respective dealers.
Replacement / Construction Activities	Heavy equipment is generally held until end of its service maintenance contract and replaced with new equipment. The equipment manufacturers regularly service the heavy equipment and perform all major repairs per their contract. The Landfill Cells have a finite amount of space in which waste can be disposed. Once a Cell is nearing capacity, a new Cell is designed using EWSWA's environmental engineer and construction is conducted by a third-party contractor.

11.5 Forecasted Capital Requirements

The forecasted capital requirements for EWSWA assets, excluding the landfill, for the next 10 years are outlined in the following Chart. The annual capital requirements represent the average amount of funding per year that the EWSWA should allocate towards future rehabilitation and replacement needs. The figures presented do not consider any funds held in Reserve. In addition, the metrics do not include the forecasted capital requirements of the Landfill as it is addressed separately in the following section.

Figure 11-3: 10-year Forecasted Capital Requirements (excluding Landfill) – EWSWA



Annual Capital Requirement: $1,648,800 per year

Target Reinvestment Rate: 2.87%

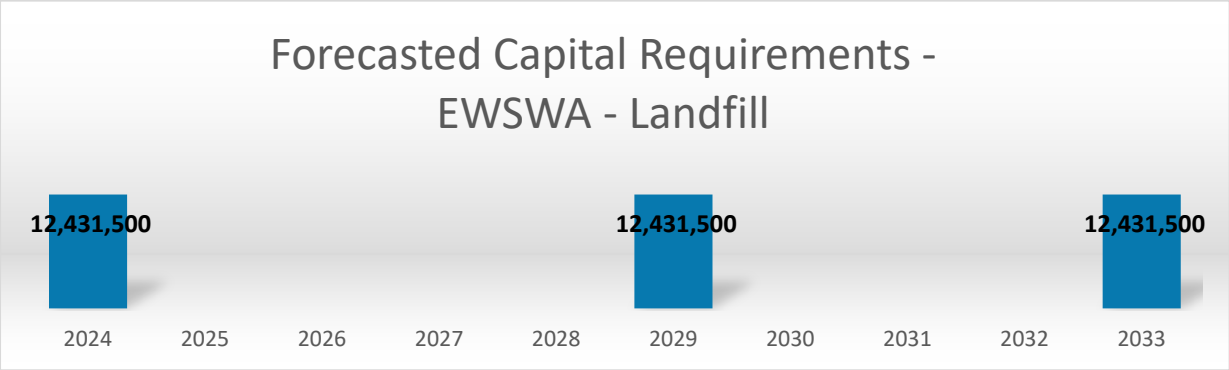
Actual Reinvestment Rate: 2.86%

Funding Shortfall: $5,700

The forecasted capital requirements for the Landfill are unique as unlike many other EWSWA assets, a new Cell construction is only required once the previous Cell reaches capacity. The funding requirements typically transpired over a 1 to 2-year period. The Table below illustrates the estimated funding requirements needed to build Cell 4 South, 5 North and 5 South using the estimated costs provided by EWSWA environmental engineers to build Cell 5

North. The EWSWA uses a combination of internally borrowed funds and reserves to fund the purchase of a new Cell.

Figure 11-4: 10-year Forecasted Capital Requirements – EWSWA Landfill



In addition, EWSWA has forecasted that $3,729,420 per year will be required over the next 10 years to finance the significant operating costs relating to the lifecycle activities identified in Section 11.4. This estimate assumes an annual inflation rate of 3% for R&M type activities and 1.5% for Fuel.

The post-closure costs have not been captured in the capital funding requirements as it is anticipated that the need for funds extends beyond 10 years as the anticipated Landfill closure date is set to be 2038.

11.6 Risk Management

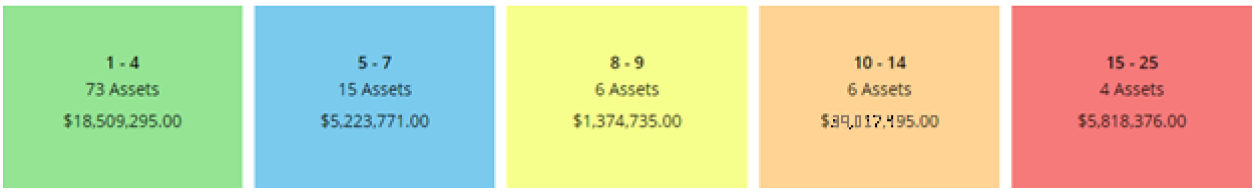
The assessment of risk is determined based on the asset segment, with consideration for the asset's criticality to operations. In all cases, the probability of failure is based 100% on the condition of the asset, on a scale of 1 to 5, where 1 is a rare likelihood of failure and 5 represents an almost certain failure. The consequence of failure is based 100% on the replacement cost of the asset, on a scale of 1 to 5, where 1 is an insignificant consequence of failure and 5 represents severe consequences.

The assessment is determined by multiplying the probability of failure by the consequences of failure.

The Figure below summarizes the overall risk assessment for each asset and categorizes them according to the level of risk they carry.

Assets identified as carrying the most risk include 4 pieces of heavy equipment used in Landfill and Transfer Station operations, the roadways at the Windsor Depot (due to their age) and the Landfill itself.

Figure 11-5: EWSWA Asset Risk Matrix



11.7 Recommendations

Administration's recommendation is to contract a third-party evaluator to assess the EWSWA's buildings in order to determine a replacement cost and provide a conditional assessment. The EWSWA Windsor Depot roadways should be reviewed as part of the EWSWA updated Master Site Plan to determine an optimal site design and determine future infrastructure needs.

Appendix A: Acronyms and Definitions

"AMP" means the Asset Management Plan of the Corporation of the County of Essex.

"BCI" means Bridge Condition Index, a quantitative valuation of the condition of a bridge.

"CCI" means Culvert Condition Index, a quantitative valuation of the condition of a culvert.

"CCTV" means Closed Circuit Television, a video surveillance network utilized to monitor the condition of underground infrastructure.

"County" means the Corporation of the County of Essex.

"CWATS" means the County Wide Active Transportation System, which consists of multi-use paths, multi-use trails, one-way and two-way cycle paths, paved shoulders and buffered paved shoulders.

"EMS" means the Essex-Windsor Emergency Medical Services department of the County of Essex.

"EUL" means Estimated Useful Life of an asset, or the length of time in which an asset is expected to be used in the ongoing activities of the County.

"EWSWA" means the Essex Windsor Solid Waste Authority, a Board of Management established in 1994 by the County of Essex and the City of Windsor through an agreement.

"Library" means the Essex County Library, an agency funded by Essex County Council and governed by the Essex County Library Board, members of whom are appointed every four years in accordance with the Public Libraries Act.

"LOS" means Level of Service provided by the asset.

"O.Reg 588/17" means Ontario Regulation 588/17 made under the Infrastructure for Jobs and Prosperity Act, 2015: Asset Management Planning for Municipal Infrastructure.

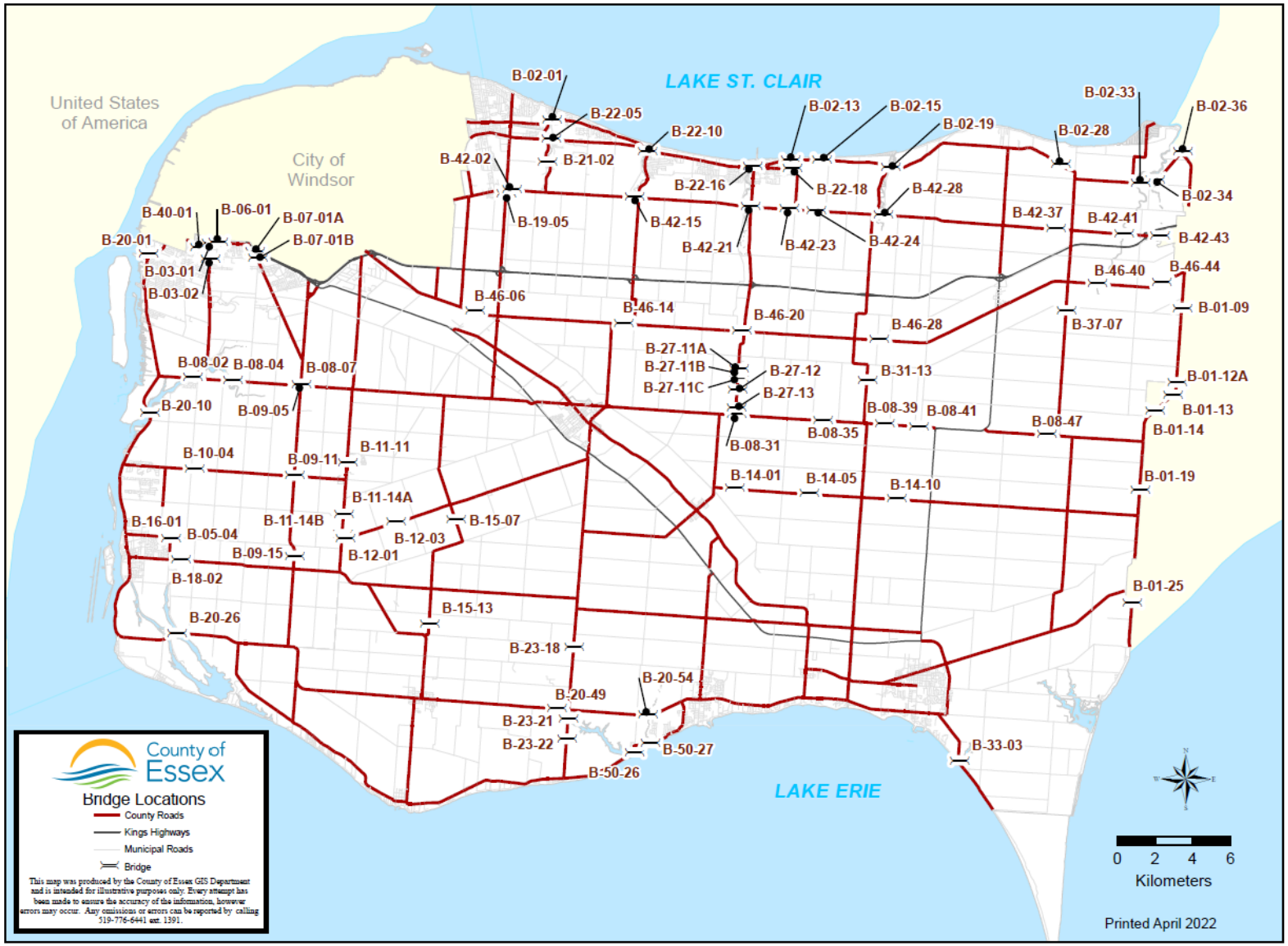
"PCI" means Pavement Condition Index, a quantitative valuation of the condition of a hard road surface based on several factors, including pavement distress and rideability.

"OSIM" means the Ontario Structure Inspection Manual, published by the Ministry of Transportation and dated October 2000 (revised November 2003 and April 2008).

"SPH" means the Sun Parlor Home for Senior Citizens, a Long-Term Care Home owned and operated by the County and located in the Municipality of Leamington.

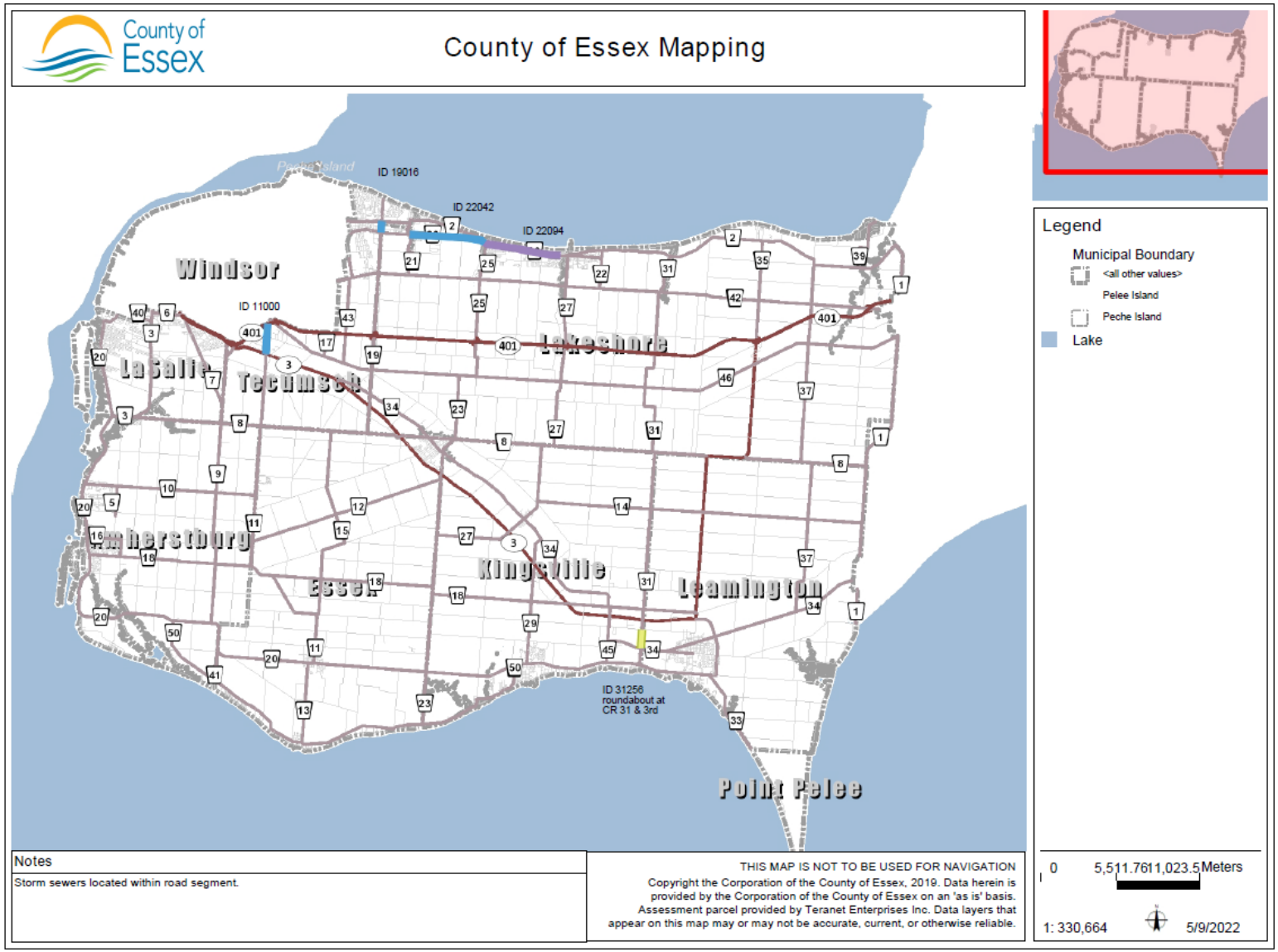
Appendix B: Map of Road Segments

Appendix C: Map of Bridges



Appendix D: Map of Culverts

Appendix E: Map of Stormwater Network



Appendix F: Condition Indexes

Images of various Road Network Condition Levels

Very Good	Good	Fair	Poor	Very Poor
				
PCI = 80-100	PCI = 60-79	PCI = 40-59	PCI = 20-39	PCI = 0-19

Images of various Bridge Condition Index Levels

Very Good	Good	Fair	Poor	Very Poor
				
BCI = 80-100	BCI = 60-79	BCI = 40-59	BCI = 20-39	BCI = 0-19

Image of various Culvert Condition Index Levels

Very Good	Good	Fair	Poor	Very Poor
				
CCI = 80-100	CCI = 60-79	CCI = 40-59	CCI = 20-39	CCI = 0-19

Appendix G: 5-Year Rehabilitation Program

Acknowledgements

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