2021

CENTRAL ELGIN

BRIDGE & CULVERT

DETAILED ASSET MANAGEMENT PLAN

MAY 10 2021

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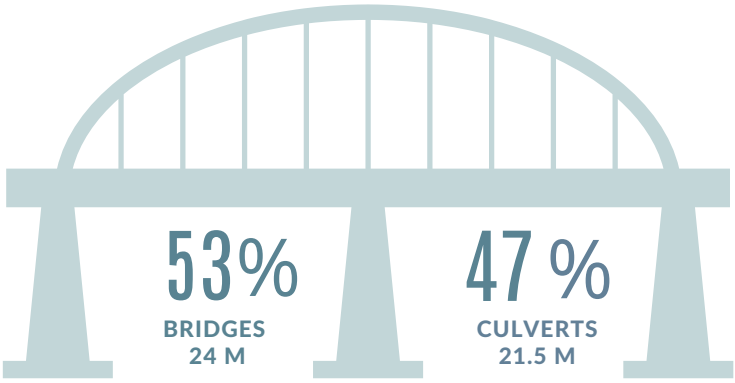
BRIDGE & CULVERT ASSET REPORT CARD

45.5 M

$$$$$$$$$$
$$$$$$$$$$

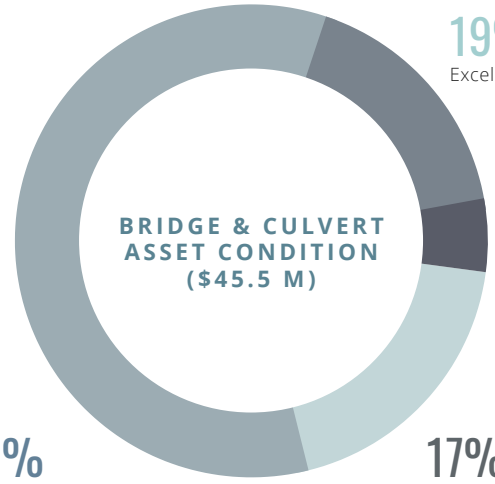
TOTAL REPLACEMENT VALUE



REPLACEMENT VALUE BY ASSET TYPE

DATA QUALITY INDEX

NETWORK CONDITION	71.6 /100
FUTURE CONDITION (10 YRS)	63.6 /100



19%
Excellent: $8, 645, 000

5%
Poor: $2, 275, 000

59%
Good: $26, 845, 000

17%
Fair: $7, 735, 000

Bridges and culverts are considered to be part of the overall road network which represents a considerable portion of Central Elgin's total assets. Collectively, 78% of the bridge and culvert assets are considered to be either in excellent or good condition and 5% are considered in poor or failing condition.

Bridges and culverts are nearly identical in total replacement value with bridges equating to 53% of the replacement value and culverts representing the remaining 47%.

ASSESTS INCLUDED: BRIDGES, CULVERTS >3m

1. WHY DOES CENTRAL ELGIN OWN BRIDGES & CULVERTS?

Bridge and culverts are structures built to enable transportation within Central Elgin. These assets support broad community benefits such as agriculture, education, healthcare, and the economy. Central Elgin bridges serve the various needs of pedestrians, drivers, emergency vehicles, agricultural vehicles and heavy transportation.

The oldest structure is the Brouwers Line bridge which is a metal truss style bridge and was constructed in approximately 1920. This demonstrates how infrastructure assets are often multigenerational and can have significant life spans. These assets have been acquired by Central Elgin over multiple decades and they all vary greatly in expected life, construction materials, design and purpose. These assets have been accumulated over time to serve customers' various needs.

Customers have the expectation that the transportation system is considered safe and kept in good condition. Central Elgin wishes to ensure that all service level expectations will be met at a price that is affordable and considered value for money over the life of the asset. Central Elgin will maximize the use of existing assets and only build new assets at the right time, in the right place and for the right reasons to ensure these services are sustainable and fit for the future.

To ensure customers can expect safe transport throughout the road network means that when something does go wrong they can depend on the municipality to be responsive and accountable. The reliability of Central Elgin's transportation network comes from ongoing operational and maintenance practices as well as the continued replacement of failing or failed infrastructure. Residents wish for the levels of service to be maintained into the future, which requires the municipality to be committed to making the best use of assets and resources.

2. WHAT DOES CENTRAL ELGIN OWN?

2.1 BRIDGES

Bridges are structures built to span a physical obstacle, such as a body of water, valley or road, without closing the way underneath. The construction type of the bridge is invariably linked to its purpose and often the year the bridge was built. Central Elgin categorizes its bridges into three construction types:

- Truss Style Bridge
- I-Beam & Girder Bridge
- Rigid Frame Bridge

All bridges have an estimated service life of 100 years.

TRUSS STYLE BRIDGE

Load bearing structure composed of a series of wooden or metal triangles to provide a stable form capable of supporting considerable external loads of large span.

Replacement Cost	$ 8.6 Million
Average Age	79 Years
Average Condition	64 / 100

I-BEAM & GIRDER BRIDGE

Main horizontal structure that is supported by smaller support beams.

Replacement Cost	$ 3.9 Million
Average Age	41 Years
Average Condition	80 / 100

RIGID FRAME BRIDGE

Both the super structure and the substructure are rigidly connected to act as a single unit.

Replacement Cost	$ 11.3 Million
Average Age	44 Years
Average Condition	73 / 100

2.2 CULVERTS

Tunnel structure that allows running water to pass under a roadway, trail, railway or similar obstruction. It has two essential purposes:

1. To allow enough water to pass without overtopping the roadway
2. To hold up the weight of the traffic passing over it without collapsing

For the purposes of this detailed asset management plan the municipality will only be including culverts that have a span of 3 meters and greater. Central Elgin organizes its culverts based on their purpose and construction design.

All culverts have an estimated service life of 75 years.

CONCRETE BOX CULVERTS

Generally box structures provide a larger open area permitting greater flow volumes.

Replacement Cost	$ 12.1 Million
Average Age	34 Years
Average Condition	75 / 100

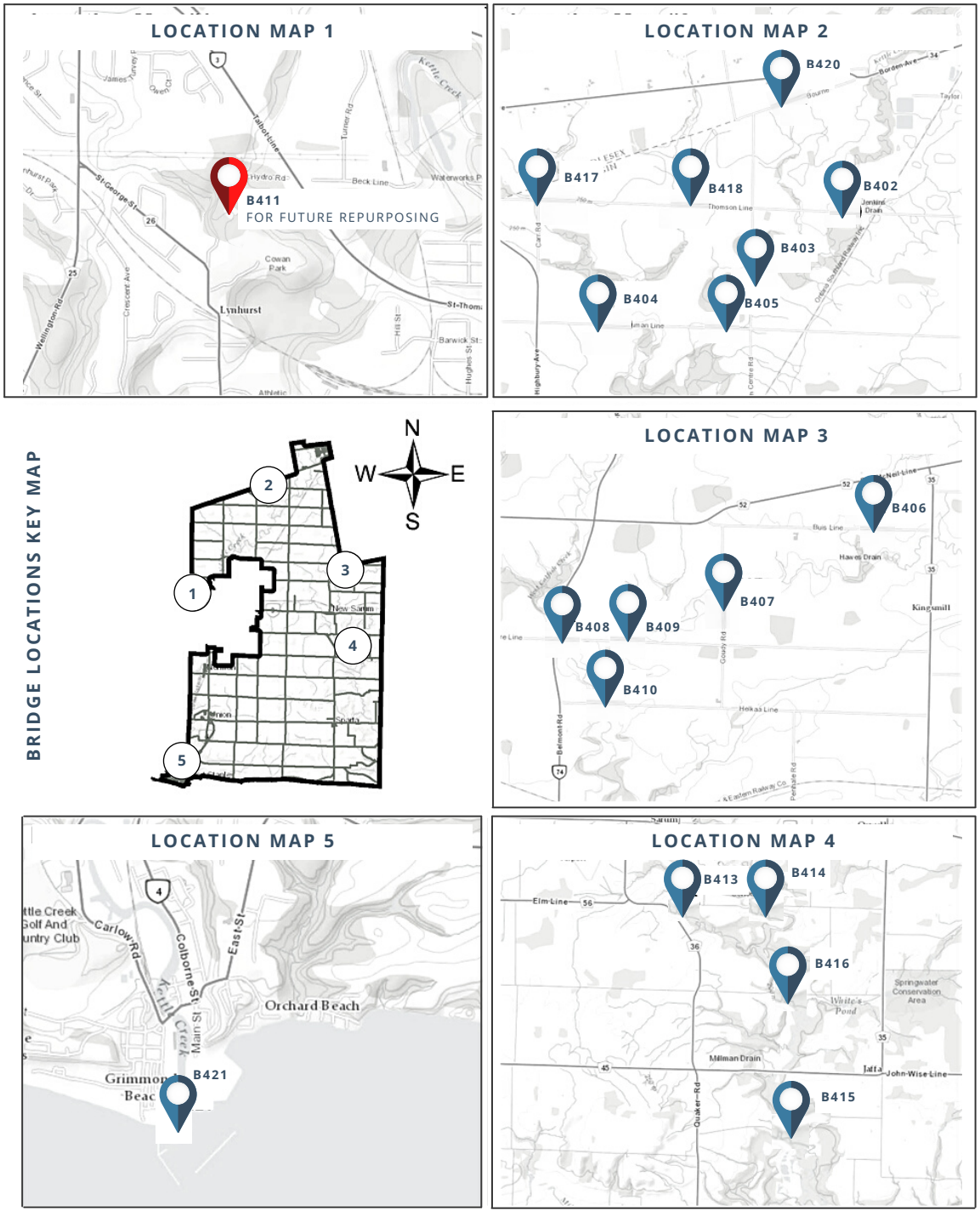
CORRUGATED STEEL CULVERTS

These culverts are low profile and are generally installed under roadways and span the entire drainage width.

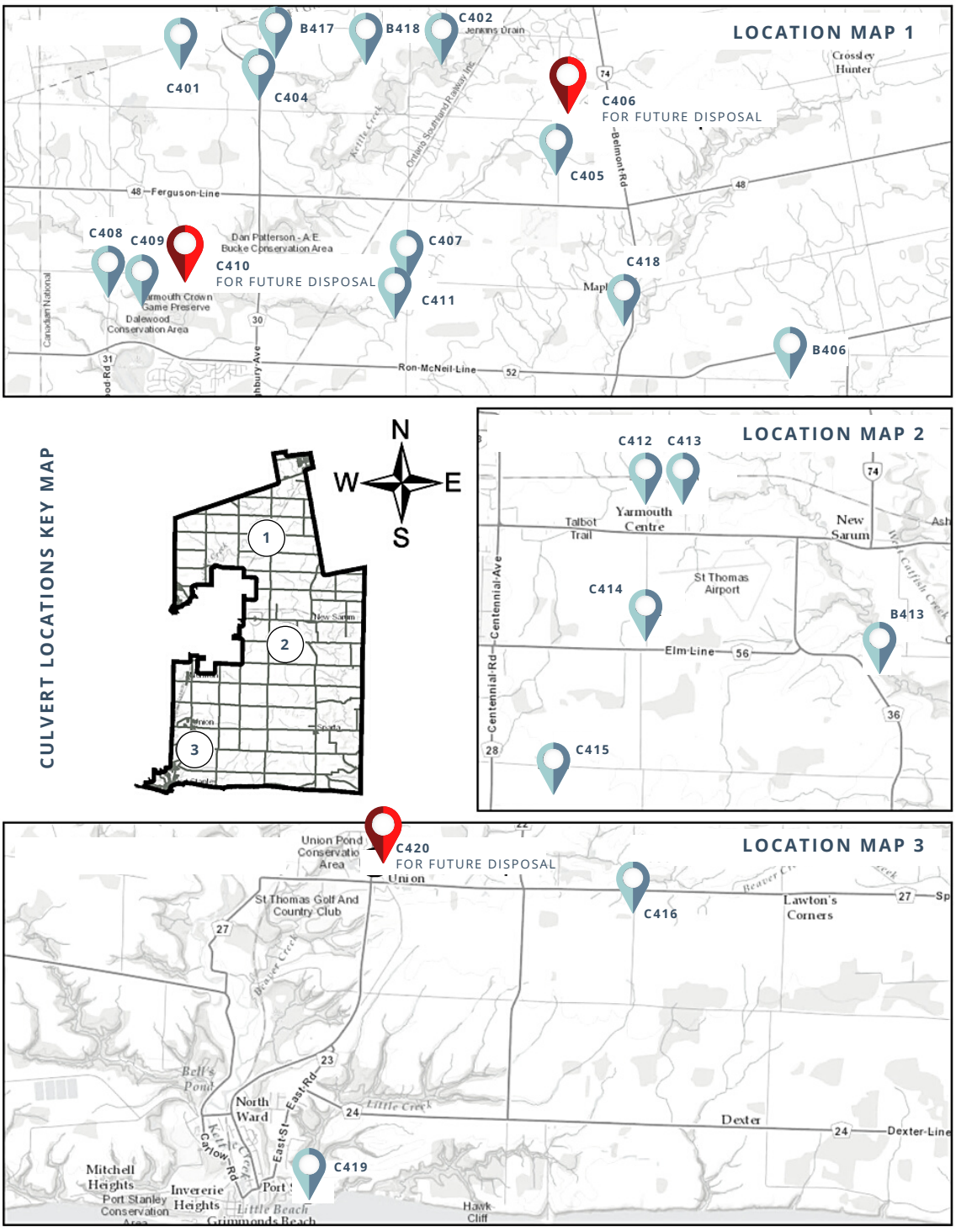
Replacement Cost	$ 9.6 Million
Average Age	41 Years
Average Condition	67 / 100

3. WHERE ARE THE ASSETS?

BRIDGES



CULVERTS


LOCATION MAP 1
C401
B417
B418
C402
Jennins Drain
C404
C406
FOR FUTURE DISPOSAL
C405
C408
C409
C410
FOR FUTURE DISPOSAL
Dan Patterson - A.E. Bucke Conservation Area
C407
C411
C418
B406
Ferguson-Line
Ron-McNeil-Line
Belmont Rd
Crossley Hunter
Yarmouth Crown Game Preserve
Dalewood Conservation Area
CULVERT LOCATIONS KEY MAP
N
W
E
S
1
2
3
LOCATION MAP 2
C412
C413
Yarmouth Centre
Talbot Trail
New Sarum
St Thomas Airport
C414
B413
Elm-Line
Centennial-Ave
Centennial-Rd
C415
LOCATION MAP 3
C420
FOR FUTURE DISPOSAL
Union Pond Conservation Area
Union
C416
Lawton's Corners
St Thomas Golf And Country Club
Beaver Creek
Bell's Pond
North Ward
East-Rd
East-St
Carlow-Rd
Little Creek
Dexter
Dexter-Line
C419
Mitchell Heights
Port Stanley Conservation Area
Invererie Heights
Port
Little Beach
Grimmonds Beach
Hawk Cliff

4. ASSET MANAGEMENT APPROACH

Central Elgin is adopting a lifecycle driven approach to effectively managing its bridge and culvert assets. Central Elgin considers the impacts of costs, risks and performance over their whole life and ensures the services are delivered sustainability. Central Elgin's Detailed Asset Management Plans will be guided by the principles and objectives outlined in the Strategic Asset Management Policy.

5. STRATEGIC PERSPECTIVE & EXPECTATIONS

Central Elgin intends to ensure bridges and culverts are safe, reliable and considered in good condition, by maximizing the use of existing assets and only building new assets at the right time, in the right place and for the right reasons. Central Elgin's strategy is critical to ensuring it can continue to deliver sustainable, cost affordable bridge and culvert assets. By considering the whole-life of the assets the municipality can inform and develop plans to ensure the municipality is responsive to customer expectations and providing safe travel across the road network 24 hours a day. Where possible the municipality will ensure structures will not impair emergency vehicle access either by the size of the structure or weight restrictions.

6. UNDERSTANDING THE CUSTOMER

6.1 RESILIENCY

To deliver a reliable transportation network 24 hours a day Central Elgin must ensure the network is designed to be resilient to changing conditions and needs. In practical terms, this means analyzing the network to minimize the number of interruptions and the impacts of interruptions on users. Planned activities are required to ensure that changes in either weather or safety are addressed to minimize asset down time and reduce the risk to public safety.

6.2 ASSET RELATED GROWTH

As Central Elgin's population continues to increase it has a direct impact on the ability to acquire, operate and maintain assets. Approximately 14,000 people call Central Elgin home and over the next ten years it is anticipated for that number to grow to 15,700. Growth will be analyzed annually to ensure the municipality has an accurate understanding of where and when investment in infrastructure will be made. Increased population often leads to increased asset inventory to accommodate the growth. Once built, these growth related assets require operations, maintenance and then their eventual replacement.

Currently, it is not anticipated that a new bridge will have to be constructed as a result of population growth. When single lane bridges are renewed in the future they will be expanded to provide a minimum of two lanes of traffic. Currently the municipality has three structures that are single lane structures (Pleasant Valley Line, Southdale Line and Brouwers Line).

6.3 SUSTAINABILITY

Bridge and culvert assets will be managed in a sustainable fashion. Customers need to be confident that service levels can be maintained on a go forward basis while ensuring they are future friendly.

6.4 CLIMATE CHANGE

Climate change is a reality and the frequency of extreme weather impacts will increase over time. Due to the significant impact of climate change Central Elgin will integrate environmental considerations into all decisions surrounding the bridge and culvert assets to demonstrate good stewardship and to ensure regulatory compliance.

6.5 UNDERSTANDING STAKEHOLDERS

Below are common issues from the various perspectives of those most impacted by the assets. These will be monitored and updated through the level of service survey annually.

TABLE 1 - COMMON STAKEHOLDER ISSUES

RESIDENTIAL, COMMERCIAL & OTHER CUSTOMERS

- Want a safe and reliable road network
- Expect responsiveness to issues (winter storms, icing, conditional deterioration)
- Timing, location and replacement schedule for infrastructure
- Ensure there is adequate funding for the desired level of service

CENTRAL ELGIN COUNCIL

- Support and approve long term plans and initiatives based on level of service and total system needs
- Support asset management initiatives necessary to improve knowledge and inform choices
- Fund the level of service desired over the whole-life of the asset class

STAFF

- Support for data collection and improving fact based method
- Competitive pay
- Supportive work culture employing asset management principals
- Regulatory educational support
- Build capacity and resilience through knowledge sharing and improved asset Information

7. OPERATIONAL PROGRAMS & INITIATIVES

Central Elgin's operational activities are centered on ensuring bridges and culverts are consistently considered in good working order. Daily, weekly, seasonal and yearly activities are undertaken by staff to ensure the assets perform within acceptable parameters and to monitor the condition of the asset. These are the current major operational activities associated with these assets.

TABLE 2 - OPERATIONAL PROGRAMS & INITIATIVES

ASSET GROUP	OPERATIONAL ACTIVITIES	OUTCOMES & STANDARDS
	Winter Road Maintenance	• Ensure roads meet maintenance expectations for safe driving • Provincial Legislation (O. Reg. 292/02) • Central Elgin internal standards
	Bridge Cleaning	• Industry maintenance best practice
	Monitor Climate Events	• Provincial legislation • Central Elgin internal standards
	Regulatory Compliance & Continuous Monitoring	• Provincial Legislation (mandatory) • Biennial bridge inspection • Update condition and maintenance
	Winter Road Maintenance	• Ensure roads meet maintenance expectations for safe driving • Provincial Legislation (O. Reg. 292/02) • Central Elgin internal standards
	Monitor Climate Events	• Provincial Legislation • Central Elgin internal standards
	Regulatory Compliance & Continuous Monitoring	• Central Elgin internal standards • Biennial bridge & culvert Inspection

7.1 BRIDGE OPERATIONAL PROGRAMS

WINTER ROAD NETWORK MAINTENANCE

The Province provides a minimum standard for winter operations such as snow plowing, mitigation efforts (salt, ice prevention and treatment), monitoring for closure events and posting temporary warning signs when necessary. Winter maintenance for bridges and culverts are integrated with all other road networks assets as the system is considered to be part of the road network.

BRIDGE CLEANING

Bridge cleaning occurs in April/May every year after winter maintenance activities such as salting / sanding / spraying have ceased for the season. The winter maintenance treatments (chlorides) need to be cleaned from the roadway surfaces, expansion joints, bearing seats and other components to minimize the deterioration of these structural elements and maximize the useful service life of bridges.

MONITOR CLIMATE EVENTS

As part of Central Elgin's road network, these assets are monitored on a consistent basis for events that can affect the use of the assets. Central Elgin regularly monitors weather/climate risks that may require the public to be updated as to the condition and usability of the assets. Staff will respond to events such as washouts, flooding, extreme freezing and regular seasonal weather conditions.

REGULATORY COMPLIANCE & CONTINUOUS MONITORING

Through legislation, the Province provides standards of care for bridge and culvert assets as well as the timing for a mandatory biennial inspection to be performed by qualified engineers. The biennial inspection informs the detailed asset management plan with bridge and culvert renewal data and itemizes minor and major planned maintenance requirements. Bridges are visually inspected weekly by staff as well as an annual internal condition inspection to identify current and future maintenance activities.

7.2 CULVERT OPERATIONAL PROGRAMS

WINTER ROAD NETWORK MAINTENANCE

Culverts are monitored as part of the weekly road network patrol. Visual checks are preformed on a weekly and ongoing basis as well as during extreme weather occurrences.

MONITOR CLIMATE EVENTS

As part of Central Elgin's road network, these assets are monitored on a consistent basis for events that can affect the use of the assets. Central Elgin regularly monitors weather/climate risks that may require the public to be updated as to the condition and usability of the assets. Staff will respond to events such as washouts, flooding, extreme freezing and regular seasonal weather conditions.

REGULATORY COMPLIANCE & CONTINUOUS MONITORING

Through legislation, the Province provides standards of care for culvert assets as well as the timing for a mandatory biennial inspection to be performed by qualified engineers. The biennial inspection informs the detailed asset management plan with culvert renewal data and itemizes minor and major planned maintenance requirements. Box culverts are visually inspected twice a week by staff and corrugated steel culverts are inspected as needed and as part of the biennial inspection.

TABLE 3 - OPERATIONAL CONTINUOUS IMPROVEMENT INTIATIVES

INITIATIVE	INTIATIVE PLAN	ANTICIPATED OUTCOME	GOAL DATE
NEW ASSETS DATA COLLECTION	• Develop methodology/policy for new bridge and culvert requirements • Evaluate Transportation Master Plan • Trails Master Plan • Cycling Master Plan	• Improve level of service • Financial sustainability	March 31, 2022
BRIDGE 10 YEAR CAPITAL STRATEGY	• Complete focused lifecycle analysis for operations, maintenance and replacement	• Improve Data Quality Index Asset Program • Data confidence • Improve financial planning	August 31, 2022
CULVERT DATA IMPROVEMENT	• Capture missing culvert data • Update condition assessment requirements • Lifecycle/Whole Life Cost	• Improve Data Quality Index Asset Program • Data confidence • Improve financial planning	August 31, 2023

8. MAINTENANCE PLANNING

Maintenance is 'the ongoing management of deterioration'. The purpose of planned maintenance is to ensure that the correct interventions are applied to an asset in a proactive manner to ensure it reaches its useful life. Proactively planned maintenance significantly reduces the occurrence of reactive maintenance which is always linked to a higher risk to human safety and significantly higher financial costs. Central Elgin will plan its maintenance to ensure the bridges and culverts are reliable and achieve their desired level of service.

TABLE 4 - PLANNED MAINTENANCE ACTIVITIES

ASSET GROUP	MAINTENANCE CATEGORY	MAINTENANCE ACTIVITIY
	Planned Major & Minor Rehabilitations	• Repair approach roadway (paving, guiderails) • Bridge deck water proofing and joint repair
	General Maintenance	• Regrading approach roadways • Bridge deck drainage • Clearing vegetation from approach guiderails • Surface sealing of exposed concrete surfaces (decks, curbs, sidewalks, and barrier walls) • Erosion control • Handrail maintenance
	Planned Maintenance	• Items identified within bridge and culvert condition report
	Planned Major & Minor Rehabilitations	• Items identified within bridge and culvert condition report • Culvert rehabilitation (relining barrel, inlet repairs)
	General Maintenance	• Clean out and obstruction removal
	Planned Maintenance	• Items identified within bridge and culvert condition report • Clean out and obstruction removal

CONTINOUS IMPROVEMENT INTIATIVES FOR MAINTENANCE

Annually Central Elgin will review the detailed asset management plan and seek improvement initiatives. By setting annual improvement goals supported by a review and reporting process, it will ensure Central Elgin embraces a culture of continuous improvement.

TABLE 5 - CONTINUOUS IMPROVEMENT INITIATIVES FOR MAINTENANCE

INITIATIVE	INTIATIVE PLAN	ANTICIPATED OUTCOME	GOAL DATE
DOCUMENT MAINTENANCE PROGRAM	• Complete focused lifecycle analysis identify activities • Resources and impacts to levels of service	• Improve data quality and asset program • Improve costs through planning • Clearly defined level of service	August 31, 2022

9. CURRENT CONDITION ASSESSMENT PRACTICES

Condition is the measurement of Central Elgin's bridges and culverts health and informs their ability to perform their intended function. Condition information is critical to actively managing the preservation of bridges and culverts as it informs the renewal schedule and maintenance activities. Continuously monitoring the condition allows Central Elgin to proactively plan maintenance activities over the long term and ensure that bridge and culverts are resilient to ever changing conditions.

Due to the significant risk and fiscal responsibilities undertaken with the ownership of bridges and culverts Central Elgin has a variety of inspection routines, to ensure bridge and culvert condition is monitored regularly. These are often undertaken as part of the regular road patrol, however there is also an annual internal condition assessment performed as well as a provincially mandated biennial inspection. These activities are all undertaken to ensure Central Elgin has sufficient information to plan for and react to maintenance needs and to ensure compliance with provincial regulation.

TABLE 6 - REGULAR CONDITION ASSESSMENT PRACTICES

ASSET GROUP	CONDITION ASSESSMENT PRACTICES	CURRENT/FUTURE
	• Routine visual inspections in conjunction with maintenance • Routine monitoring during weather/climate events • Biennial independent inspection of each bridge to report on its safety, performance and condition and compliant with regulatory requirements	Current
	• Routine visual inspections in conjunction with maintenance • Routine monitoring during weather/climate events • Biennial independent inspection of each culvert to report on its safety, performance and condition and complied with regulatory requirements	Current

10. RISK MANAGEMENT

Risk is defined as 'the effect of uncertainty on bridges and culverts'. Proactively measuring and considering risk allows Central Elgin to make informed decisions to either mitigate these risks or to accept ownership of them. Central Elgin will proactively and explicitly consider risk associated with ownership of the bridges and culverts to determine what risks should either be accepted, avoided or mitigated.

The concept of risk is dynamic, iterative and responsive to change. To effectively manage risk Central Elgin must continuously consider its impact on its bridges and culverts to make informed asset decisions. The types of risks considered are human safety, climate, environmental, financial, social and functional. Annually reviewing assets inventory and the bridge and culvert detailed asset management plan, will continually ensure that risk is being considered, and that the most effective mitigation plan is being applied to the risk. The risk model Central Elgin follows can be found in the Strategic Asset Management Policy.

ASSESSED RISKS & MITIGATION EFFORTS

TABLE 7 - RISK ASSESSMENT - OPERATIONAL ACTIVITIES

ASSET CLASS	ASSESSED RISK (IDENTIFIED RISKS)	CURRENT MITIGATION STRATEGY
BRIDGES	Seasonal Weather Conditions (human safety, climate, financial, legal)	Proactive winter controls pre salting, pre spraying, regular weather monitoring, on call staffing, staff training programs, review water course to ensure free flow conditions
BRIDGES & CULVERTS	Meeting Regulatory Requirement	Weekly visual inspection, hazard sign replacement, annual internal staff condition assessment , mandatory biannual inspection
CULVERT	Obstruction Impacts	Removal of significant sediment or brush, environmental assessments

TABLE 8 - CURRENT RISK MITIGATION EFFORTS

REVIEWED ROADS SYSTEM RISKS	CONSEQUENCES	EFFECTS TO	MITIGATION STRATEGY
HEALTH AND SAFETY OPERATIONAL HAZARDS Road works involves significant operational hazards, which include: confined spaces, working at height trenching and excavations	• Workers exposed to serious harm	• Human safety • Reputation • Financial	• Clear standards for work with significant operational hazards • Training of staff to industry standards
MAJOR ASSET EVENT Collapse of structure	• Significant impact to road network serviceability • Increased costs • Reputation damaged	• Human safety • Reputation • Financial • Social	• Operate within Provincial Bridge Code • Weekly roads monitoring • Fund necessary maintenance • Ensure proper warning signs posted
AVAILABILITY OF TRAINED STAFF, CONTRACTORS AND SUPPLIERS Failure to attract and retain sufficient direct or supporting skilled and qualified resources	• Road Network employees • Contractors • Suppliers • Consultants not resourced to deliver objectives	• Financial • Intellectual	• Operational succession planning • Ensure sufficient staffing numbers and qualified resources are available • Review capacity annually

11. LEVELS OF SERVICES

Levels of service are a communication tool between Central Elgin and its customers. Levels of service are intended to inform Central Elgin of the communities desired levels of service from its bridges and culverts. Annually Central Elgin will seek community input for these assets through a Community Level of Service Survey. These surveys will seek to understand how the community perceives aspects of the bridges and culverts such as how safe they feel driving over them or how the wearing surface feels driving on them.

Central Elgin will use these surveys to inform options when managing the bridges and culverts. The Detailed Asset Management Plan will outline the level of effort required for Central Elgin to achieve and deliver the communities desired level of service. The Technical Level of Service helps to inform what resources are required to achieve a level of service or inform the limitations of a bridge or culvert service capability. For bridges and culverts the current Provincial mandatory levels of service's are as follows:

TABLE 9 - PROVINCIALLY REQUIRED LEVEL OF SERVICE

SERVICE ATTRIBUTE	LEVEL OF SERVICE	DESCRIPTION OF REQUIREMENT	DAMP PAGE
SCOPE	Community (qualitative)	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cycles)	See page 1
SCOPE	Technical	Percentage of bridge in the municipality with loading or dimensional restrictions	25 %

12. ASSET RENEWAL STRATEGY

Renewal is a term to indicates that Central Elgin is replacing an existing asset with a similar asset of equivalent size, capacity or performance capability. These can include activities such as replacement, major rehabilitations and reconstructions.

12.1 BRIDGES

These are accessible assets and have inspections and planned maintenance programs. Renewal of bridge assets are planned based on the observed performance of the asset in operation and as a result of regular inspection.

12.2 CULVERTS

These are accessible assets and have regular inspections and planned maintenance programs. Renewal of culvert assets are planned based on the observed performance of the asset in operation and as a result of regular inspection.

12.3 ASSET DISPOSALS

Currently, Central Elgin has identified four (4) assets that would not be recommended for replacement or rehabilitation once they have reached the end of their service lives. These assets will be operated and maintained in a regular fashion until they reach a condition that will require significant investment. Designating these assets for disposal in the future will allow Central Elgin to minimize its future investment requirements with minimal impact to the availability of service.

TABLE 10 - DISPOSAL SCHEDULE

BRIDGE OR CULVERT	RECOMMENDED ACTION	FUTURE WHOLE LIFE COST SAVINGS
MUDGES MUNICIPAL BRIDGE	Future Repurposing	$ 728, 500
MORTENSON CULVERT	Future Disposal	$ 250, 000
SHORLEA EAST CULVERT	Future Disposal	$ 250, 000
STONE CHURCH ROAD CULVERT	Future Disposal	$ 839, 750

13. FINANCIAL PROJECTIONS & OBLIGATIONS

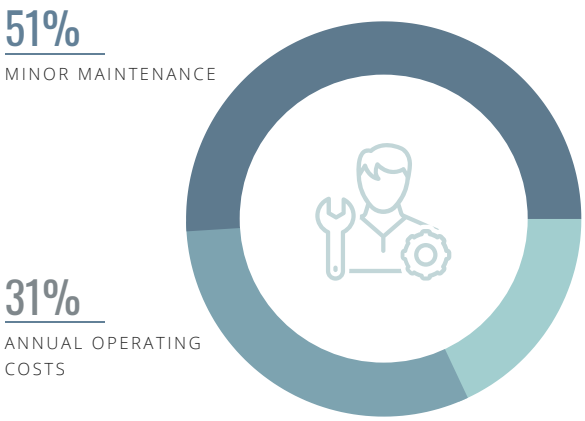
Good stewardship of Central Elgin's assets requires planning accordingly for the long term financial impacts of asset ownership. This includes considering all of the obligations of an assets construction, operation, maintenance (reactive and planned) and ultimately the disposal and replacement plans. These impacts can be significant over the whole life of the asset and this planning will ensure Central Elgin is considering the long term responsibilities of an asset's whole life. This is done through continued lifecycle assessments to achieve the highest level of service possible by balancing the asset's costs with the asset's performance while managing the risks of ownership to an acceptable level.

Table 13 provides a high level breakdown of planned operational and capital expenditures over the next ten years to deliver reliable bridge and culvert assets across Central Elgin and how that will be funded.

PLANNED OPERATIONAL & CAPITAL EXPENDITURES

10 Year Forecast

TABLE 11 - ANNUAL OPERATING & MAINTENANCE EXPENDITURES



OPERATIONAL EXPENSES

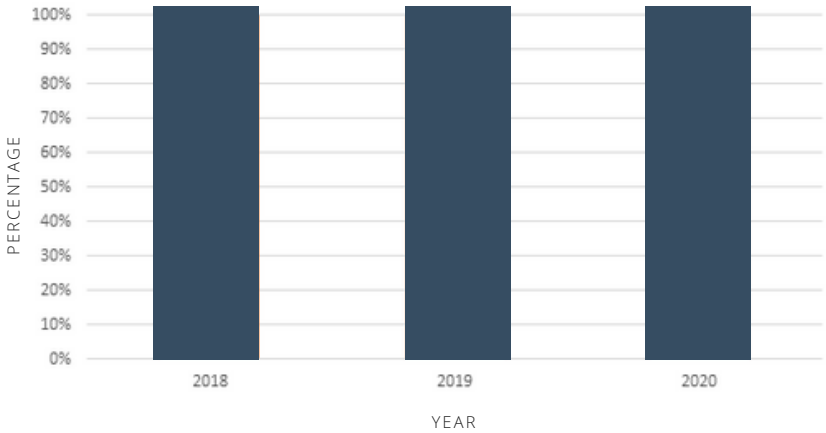
2018 - 2020

Operations
Winter Maintenance, Monitoring, Bridge Washing etc.

Maintenance
Waterproofing, Clearing Vegetation, Deck Drains

Other
Biennial Condition and Risk Assessment

TABLE 12 - PLANNED MAJOR MAINTENANCE EXPENDITURES



MAJOR MAINTENANCE

2018 - 2020

These projects are high cost major interventions to ensure assets reach their useful lives.

Activities Include;
Approach repair, relining barrel, inlet repairs, joint repairs, sealing decks

- Renewal
- Growth
- Level of Service

13.1 RECOMMENDED PLANNED PROJECTS

Planned maintenance and renewal projects are required to ensure bridges and culverts are kept in good working order. Biennially, Central Elgin undertakes an engineer approved bridge and culvert inspection to provide an impartial fact based review of the condition of the assets and recommend maintenance and renewal activities. These major projects are intended to;

- Slow the assets deterioration
- Keep the assets in good operating condition
- Ensure the assets reach their intended life expectancy

The initial detailed asset management plan (this one) is unique in that council has not approved funding due to the circumstances involved in creating the plan. Council will utilize the initial draft plan to inform their funding decisions and this will allow all future detailed asset management plans to forecast the impacts and prioritize projects to achieve the desired level of service. The initial staff recommendations consider various phases of the lifecycle to optimize the current plan. It involves the consideration of three initial options:

- Renewal & maintenance obligations
- Disposal considerations
- Funding impacts of renewal & disposals

13.2 RECOMMENDED RENEWAL & MAINTENANCE

Timely investment in infrastructure is required to ensure costs, risk and performance can be managed and ensure that services are sustainable. The legislatively required biennial condition inspections inform the renewal and maintenance recommendations as these projects have been identified by engineers as necessary to ensure assets are safe for use and that they reach their intended useful life. The risk of project deferrals are:

- Increased costs due to reactive maintenance
- Increased costs as a result of premature failure
- Threat to public safety as a result of failed or collapsed bridge or culvert
- Significant condition erosion results in high cost for replacement
- Impacts to reputation and customer confidence
- Possible reduction of the level of service

Table 13 provides the listing of recommended projects, their timing and the required funding to complete the project in current dollars (2021).

TABLE 13 - PLANNED MAINTENANCE PROJECTS (2022-2031)

YEAR	BRIDGE OR CULVERT	10 YEAR PROJECT PRIORITIZATION	REQUIRED FUNDING
2022	Southdale Line	Bridge Painting	$ 400,000
2023	Truman East Municipal Bridge	Barrier, Abutments, Expansion Joints, Overlay	$ 576,000
2024	Wilsie Bourne Bridge	Waterproofing, Repave Deck, Drains & Soffits	$ 247,000
2024	Centennial Culvert	Renew Asset (Replace)	$ 250,000
2025	Yarmouth Centre North Culvert	Concrete Repairs, Expansion Joints, Barriers	$ 210,000
2025	Tower Road Culvert	Waterproofing, Repave Deck	$ 196,000
2026	Truman Culvert	Waterproofing, Repave Deck, Barrel Repairs	$ 196,000
2026	Edgeware East Municipal Bridge	Epoxy overlay, Surface Repairs	$ 359,000
2027	Edgeware West Municipal Bridge	Epoxy overlay, Surface Repairs	$ 422,000
2028	Truman West Municipal Bridge	Waterproofing, Paving, Erosion Control	$ 249,000
2029	Goudy Municipal Bridge	Epoxy Overlay, Surface Repairs	$ 483,000
2030	Pleasant Valley Municipal Bridge	Resurfacing and Members	$ 375,000
2031	Thomson Municipal Bridge	Waterproof, Decking & Concrete Repairs	$ 343,000
2031	Yarmouth Centre Municipal Bridge	Road Surface, Barriers, Expansion Joints	$ 350,000
		10 Year Planned Project Required Funding	**$ 4,656,000**
		Required Sustainability Funding	**$ 465,000**

Note: All projects listed in Table 13 are required to allow for bridge and culverts to reach their intended life expectancy. By not undertaking these projects, assets may fail prematurely.

13.3 RECOMMENDED PLANNED DISPOSALS

Currently, Central Elgin has identified four (4) bridge and culvert assets that would not be renewed once they have reached the end of their useful lives. The disposals have been recommended as the assets meet one or more of the criteria;

- Assets duplicate existing services and/or services can be achieved with minimal impact to customers
- Assets represent a significant medium term investment which will compete with other funding priorities
- Assets are of low criticality

TABLE 14 - PLANNED DISPOSALS

BRIDGE OR CULVERT	RECOMMENDED ACTION	FUTURE PROJECTED WHOLE LIFE COST SAVINGS
Mudges Municipal Bridge	Future Repurposing	$ 728, 500
Mortenson Culvert - C406	Future Disposal	$ 250, 000
Shorlea East Culvert - C410	Future Disposal	$ 250, 000
Stone Church Road Culvert - C420	Future Disposal	$ 839, 750

Note: For geographical location of structures noted in Table 14 please refer to maps on both pages 5 and 6.

The recommended disposals would reduce the future funding requirement by $115,000 annually or $1,150,000 over the ten year horizon. The disposals would also reduce future renewal demands by approximately $2,000,000 as the assets would not be replaced.

13.4 PROPOSED FINANCIAL OPTIONS

To achieve sustainability for the bridge and culvert assets, Central Elgin must adopt a financial plan with a ten year horizon. This critical aspect of the detailed asset management plan indicates the resources required to manage the assets. Without sufficient resources to complete the necessary work in a timely fashion Central Elgin will see an increased need for costly reactive maintenance, reduced level of service or even asset failure.

13.5 FUNDING OPTIONS

There are a variety of strategies to possibly reach financial sustainability which can include;

- Reduction of level of service
- Increased funding
- Reallocating resources from another service

Each financial strategy is a tool Central Elgin can utilize to achieve its goals and each have varied impacts and risks associated with it. Table 13 illustrates the funding requirements for the recommended projects and their timing over the next ten years.

THE ORANGE LINE

Indicates the average annual funding amount required to fund the recommended projects if the recommendations for disposals or repurposing are not adopted.

THE GREY LINE

Indicates the required average annual funding if a reduction of level of service is accepted through the recommendations for disposals and repurposing.

THE YELLOW LINE

Indicates the current plan for funding the bridge and culvert needs.

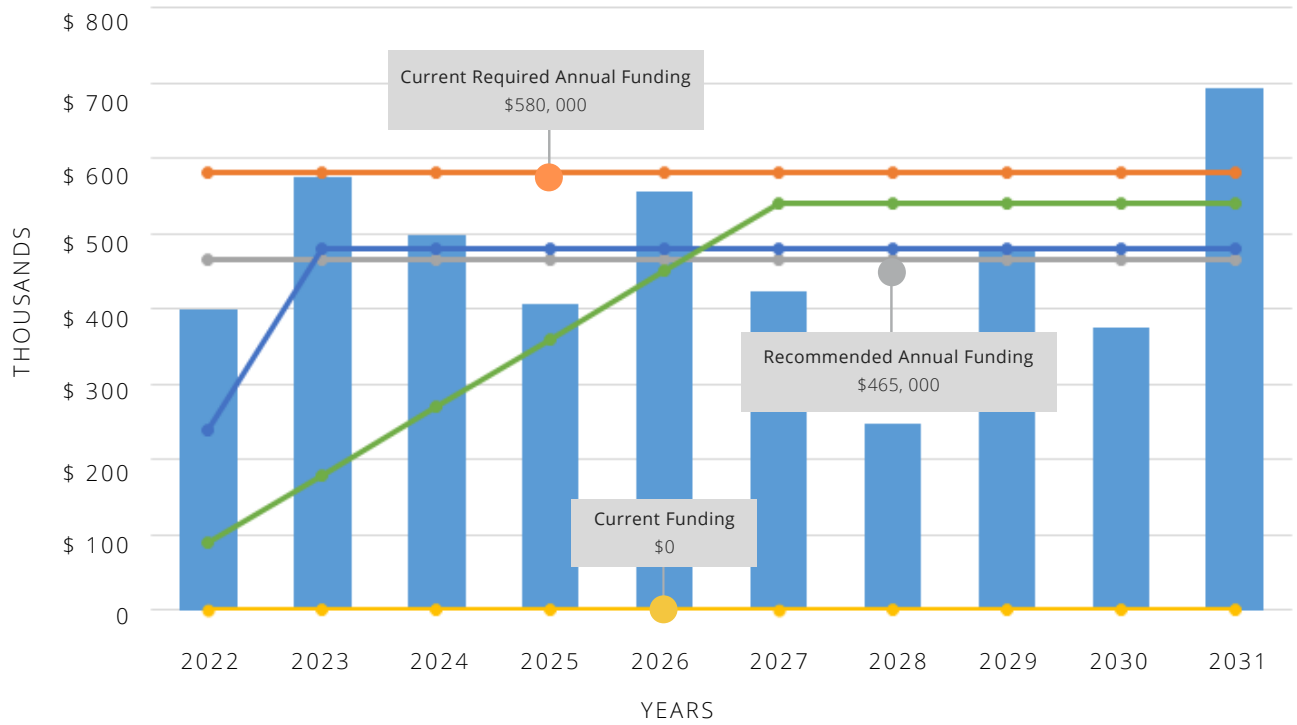
THE BLUE LINE

Indicates funding option two (2). Please see page 23.

THE GREEN LINE

Indicates funding option three (3). Please see page 24.

TABLE 15 - MAINTENANCE AND RENEWAL FUNDING REQUIREMENTS (10 YEAR HORIZON - 2022-2031)



13.6 FUNDING OPTION 1 - NO CHANGE

Without funding allocation Central Elgin will defer projects. The consequences of deferring projects are;

1. Assets continually deteriorate. Each year of deferral will create cumulative impacts to funding pressures as future needs move forward into the planning horizon.
2. Increased risk to human safety and of asset failure
3. Increased future costs required to restore the asset to an acceptable condition

TABLE 16 - BRIDGE & CULVERT PROGRAM CURRENT FUNDING ALLOCATION

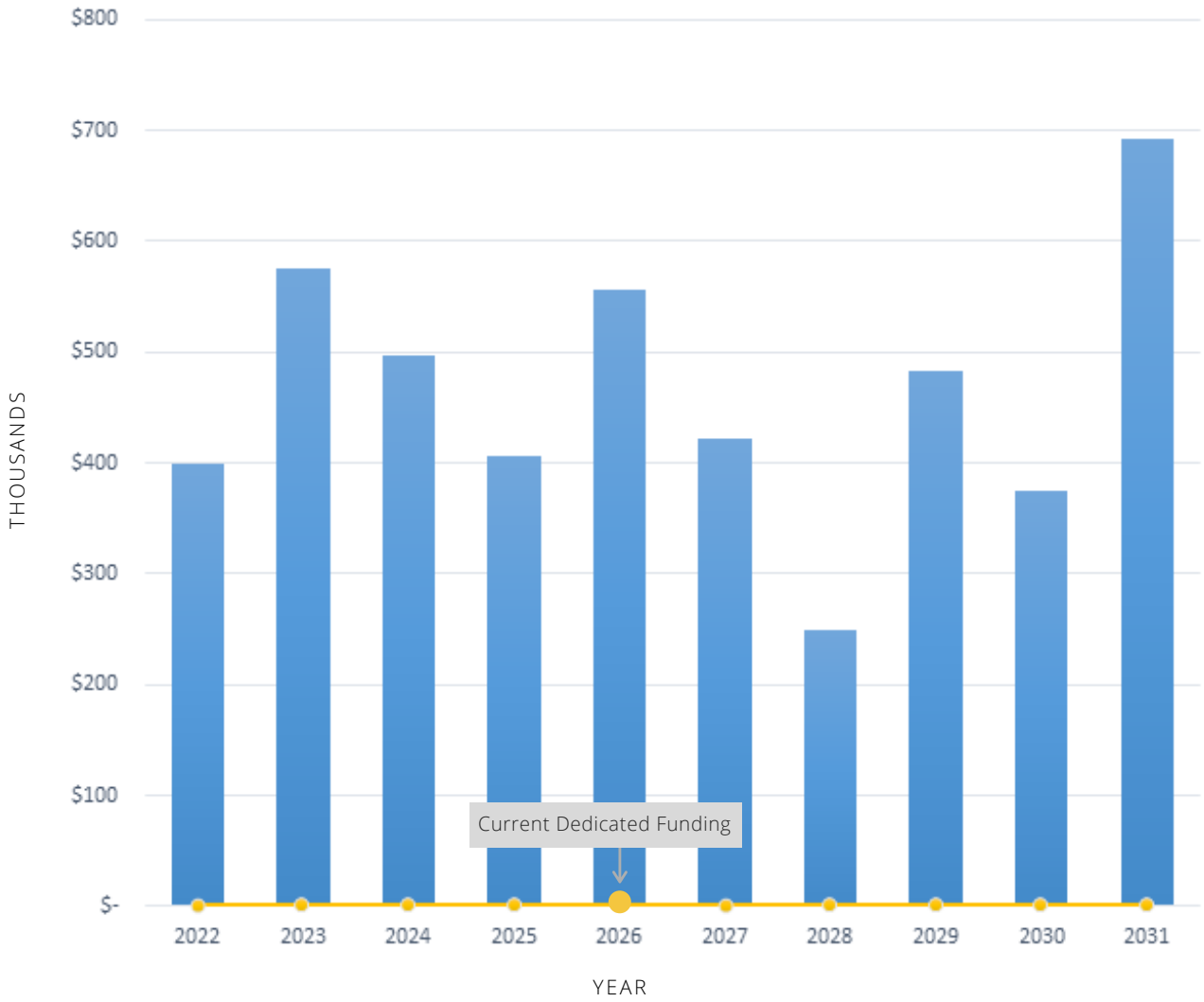
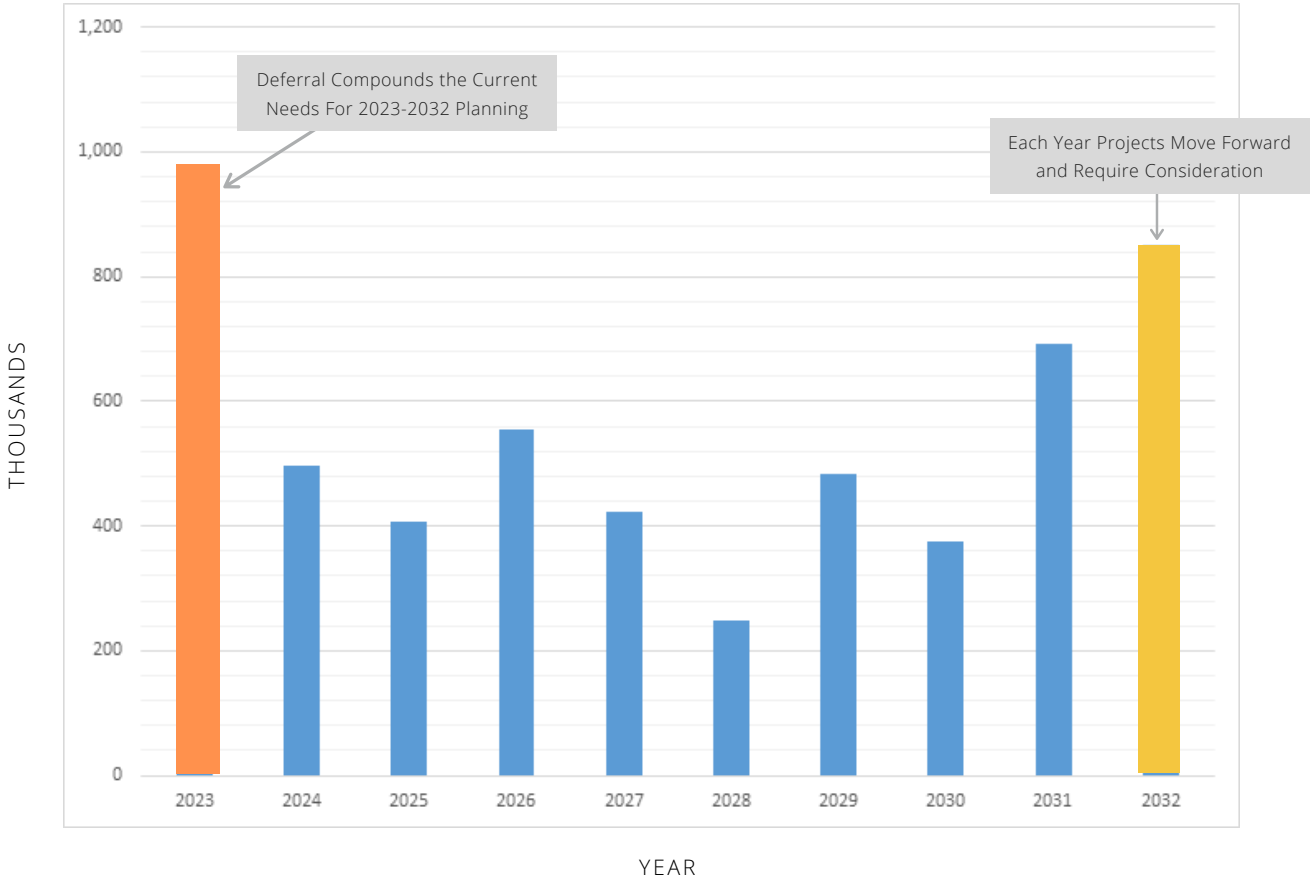


TABLE 17 - 2022 NO ADDITIONAL FUNDING PROJECTED IMPACTS ON 2023-2032



Deferring projects will increase the current year needs as well as compound the needs of future projects as they move forward into the 10 year planning horizon.

THE ORANGE BAR

Represents current needs. By deferring the 2022 project it increases the 2023 project list by nearly 40% from $576,000 to $976,000.

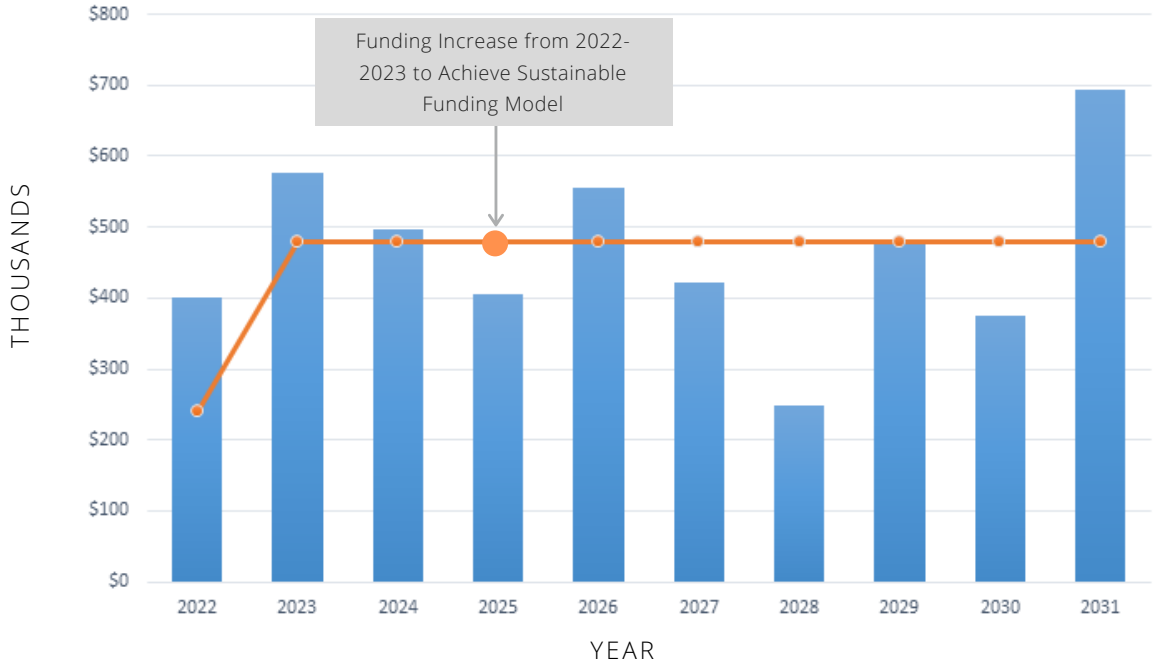
THE YELLOW BAR

Indicates projects that were scoped outside of 2022's 10 year planning horizon however the future projects become a reality for planning purposes in 2032 when $850,000 of projects will need to be considered and planned for. The result of deferring in this scenario is an increased need for annual funding from $465,000 annually to $550,000.

13.7 FUNDING OPTION 2 - INCREMENTAL TAX INCREASE

To sustainably fund the planned maintenance projects Central Elgin would require an annual funding level of $465,000. A suggested incremental tax increase of 2% for two (2) years would fund the bridge program in a sustainable manner over a ten (10) year horizon. There may be a need to utilize reserve allocations initially until sustainable funding is attainable. The program funding is intended to be permanent and requirements would be updated annually through the detailed asset management plan process.

TABLE 18 - PLANNED MAINTENANCE FUNDING REQUIREMENTS INCREMENTAL INCREASES TAX FUNDED(2022 - 2031)



Proposed Funding - Annual Funding (In Thousands)

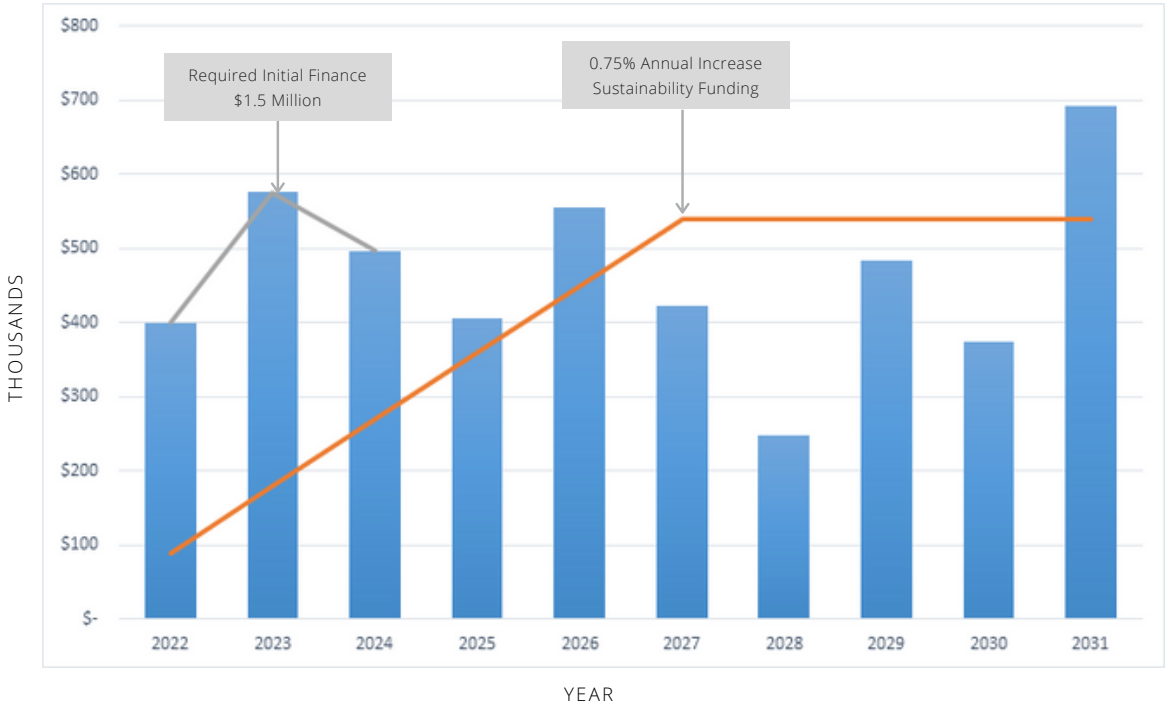
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LEVY INCREASE	2%	2%	0	0	0	0	0	0	0	0
ANNUAL FUNDING	$ 240	$ 480	$ 480	$ 480	$ 480	$ 480	$ 480	$ 480	$ 480	$ 480

(IN THOUSANDS)

13.8 FUNDING OPTION 3 - BLENDED INCREMENTAL TAX INCREASE AND BORROWING

To sustainably fund the bridge and culvert assets it may be preferable to utilize debt to mitigate the levy increase over a medium time frame. In this option Central Elgin would onboard 1.5 million dollars of debt in 2022 to fund the initial three years of projects (2022-2024) and would be repaid over twenty years. Implementing an incremental tax increase of 0.75% over six years combined with adopting 1.5 million of debt in 2022 would create a sustainable funding envelope and ensure all projects would be completed without deferrals.

TABLE 19 - HYBRID OF BORROWING SUPPORTED BY INCREMENTAL TAX INCREASE



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
LEVY INCREASE	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0%	0%	0%	0%
CUMULATIVE ANNUAL FUNDING (IN THOUSANDS)	$ 90	$ 180	$ 270	$ 360	$ 450	$ 550	$ 550	$ 550	$ 550	$ 550

The tax based funding would accumulate from 2022 - 2024 within the program reserve and be utilized to repay the initial debt and fully fund the remaining projects from (2025 – 2031)

FINANCIAL PLANNING CONTINOUS IMPROVEMENT INITIATIVES

INITIATIVE	INITIATIVE PLAN	ANTICIPATED OUTCOME	GOAL DATE
ESTABLISH CAPITAL RESERVE REQUIREMENTS	Complete 20 year horizon analysis to identify and establish sufficient reserves	Inform Long Term Financial Plan Stability Reduced Borrowing Costs	August 31, 2022