Township of Strong
Asset Management Plan 2016

Eastern Infrastructure Services Inc.

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EXECUTIVE SUMMARY

The Township of Strong has set aside approximately $700,000 maintenance and operations activities with about $300,000 left over for replacements or rehabilitations. Because of this plan, an additional $50,000 is being budgeted for renewal and rehabilitation activities. The annual road expenditure will then be augmented to $1,050,000 total.

The levels of service for the municipality are in line with the Provincial Minimum Maintenance Standards and other provincially accepted minimums currently in place. The Municipality has been providing the most affordable level of service possible in keeping with their annual budget.

This plan update has included in it, a set of benchmarks that can be used to measure progress. The key goal is to spend the right amount of money at the right time to enable the asset to last the longest possible time in an acceptable condition.

The municipality has a small population of about 1350 that provides modest tax receipts to carry out the job of “community”. Over the next ten years while following the Asset Management Plan the Township should be able to go from partially unsustainable to a self-sustaining municipality that is looking ahead and making timely decisions.

This updated plan includes all required elements to comply with both the provincial and federal governments for funding assistance and grants broadly including Roads, Bridges, Fleet, and Facilities. The wish of the Township Council is to comply with the upper tier mandates to provide strong sustainable local governance while working with the other levels of government in a cooperative and mutually beneficial way.

The Township of Strong will follow the asset management plan as a best effort and will monitor the provincial and federal governments to determine the best use of its spending to maintain and improve their results.

The Township of Strong has an inventory of assets that includes:

1.	Roads	151.9 km
2.	Bridges	10 Units
3.	Fleet	15 Units
4.	Facilities	14 Units

The current budget for Repair and Replacement is approximately $300,000 per year.

The replacement, rehabilitation and reserve estimates are as follows:

ASSET CLASS	QUANTITY	2016 REPLACEMENT ESTIMATE	IMPROVEMENT PER YEAR FOR 10 YEARS	MAINTENANCE	10 YEAR RESERVE FUND PER YEAR
ROADS- PAVED	40.84KM	$12,929,150.00	$446,674.00	$11,751.00	$10,655.00
GRAVEL	111.16KM	$18,341,400.00	$175,150.00	$167,337.00	$12,172.00
TOTAL:	**152.00KM**	**$31,270,550.00**	**$621,624.00**	**$179,088.00**	**$22,827.00**
BRIDGES AND CULVERTS	10 UNITS	$6,962,666.00	$159,625.00		$37,500.00
TOTAL:	**10 UNITS**	**$6,962,666.00**	**$159,625.00**		**$37,500.00**
FLEET	15 UNITS	$736,083.00	$130,346.00		$37,467.00
TOTAL:	**15 UNITS**	**$736,083.00**	**$130,346.00**		**$37,467.00**
FACILITIES	14 UNITS	$7,959,500.00	$76,810.00		$82,240.00
TOTAL:	**14 UNITS**	**$7,959,500.00**	**$76,810.00**		**$82,240.00**
TOTAL OF ALL:		**$46,928,799.00**	**$988,405.00**	**$179,088.00**	**$180,034.00**

Asset Management and Civil Engineering industry standards were employed to complete the inspections and conduct the analysis of data. Estimated costs for replacement and rehabilitation have been included to give a general estimate of the anticipated work required and should not be construed as a final price estimate.

SECTION 1:

INTRODUCTION

Without properly working and maintained infrastructure the Township of Strong would cease to exist as it is today. Roads and bridges provide a way for people and products to get where they are to where they need to go. Each municipality generally has a desire to grow to a more sustainable level in terms of residential and commercial members of the community. To enable growth to happen changes and improvements need to be made to the way the Township deals with its infrastructure. Through the Municipal Strategic Plan priorities have been laid out for the municipality to move ahead and make the changes and improvements necessary for the future sustainable progress of the Township.

The Asset Management Plan (AMP) was intended to work in harmony with the municipal budget to advise the Council in terms of what they can do and when. The Council will need to accept a plan to get the community to where it needs to be for present and future success.

The plan will be a gauge for Residents, Administration, Council, and the Upper Tiers to use to evaluate the municipality's success or shortcomings in terms of accomplishing the changes and improvements that the majority need and wishes to accomplish. The AMP is the best way to determine the state of repair and performance of the infrastructure and guide the way to realize the desired standards. The plan includes roads, bridges, waste water system, fleet and facilities and will be internally updated with anticipated periodic reviews.

The Plan will guide the work of the Township's Council, Management, and Departments in bring into line priorities and strategy. The AMP is a summary document that provides a complete reference for all those concerned with the wise management of the Township. The AMP is a planned approach to the long-term management of assets, by providing a framework for enhancing future spending that will mirror the municipality's desired levels of service along with the most cost efficient allocation of resources.

The plan will be consulted regularly to provide the Council, residents, staff and other stakeholders with the assurance that the infrastructure that the Township is responsible for is being managed efficiently and sustainably. The AMP covers the 10-year period from 2016 to the end of 2026 along with the ability to project to the end of life of the asset with periodic reviews done by the public works and treasurer's department and reported back to the administration. This Asset Management Plan is written in accordance with the Ministry of Infrastructure's Building Together: Guide for Municipal Asset

Management Plans. In shortest possible point form Asset Management consists of gathering the following information and planning accordingly.

1. What do we have and where is it?
2. What is it worth?
3. What is its condition and expected remaining service life?
4. What is the service level expectation and what needs to be done to get to that level?
5. When do we need to do it?
6. How much will it cost?
7. How do we make it sustainable?

Explanation of Rating System

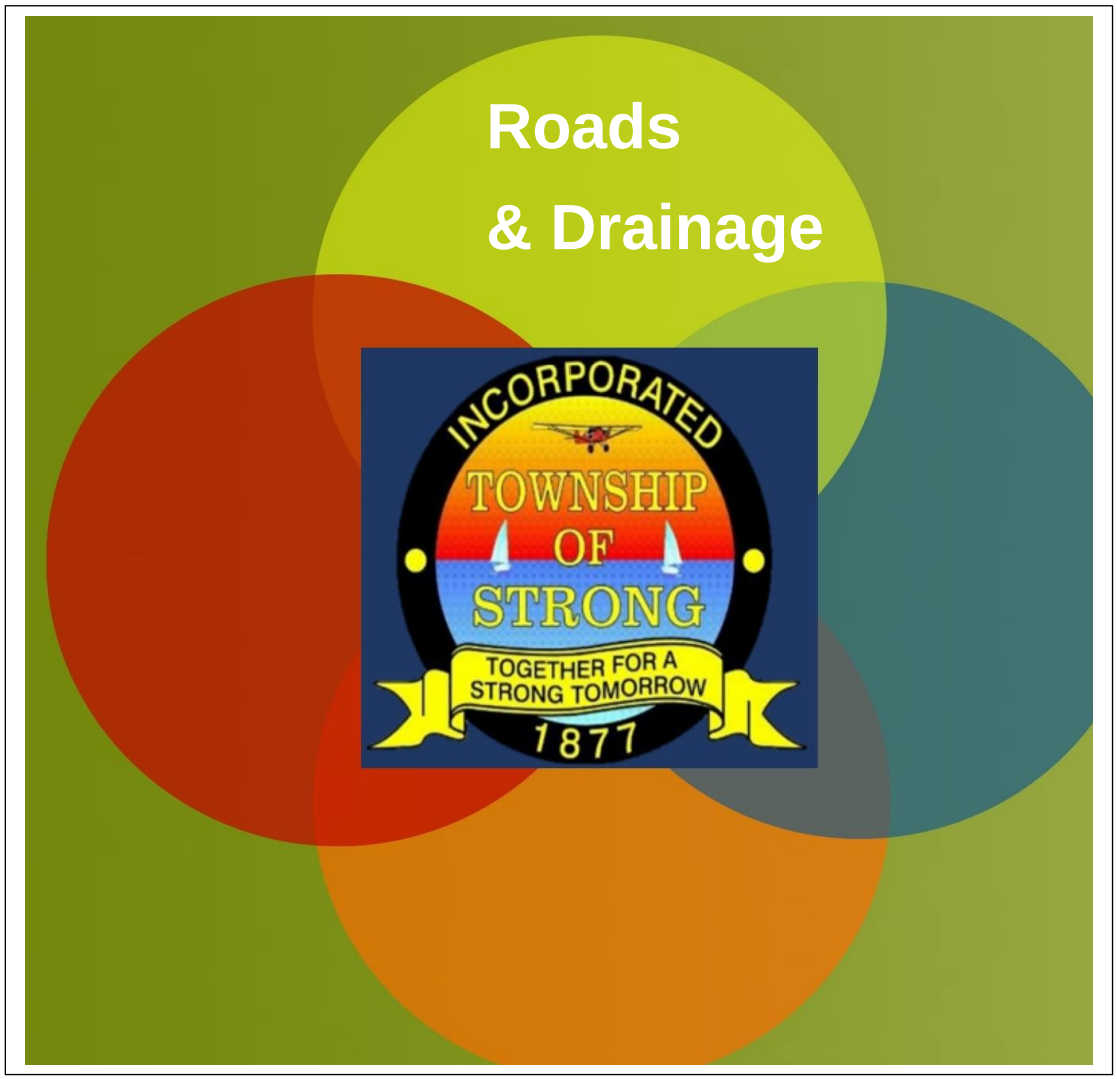
Ratings were completed using industry and engineering standards professionally accepted in Ontario as appropriate techniques in ascertaining condition, value, and remedy methods.
For each component in the condition assessments values were assigned according to the condition for normal use in common situations.
The rating system below is commonly used for asset management and infrastructure and equipment condition assessments; it is based on a score out of 100:

Condition ratings above 85 -	VERY GOOD	VERY GOOD
between 60 and 85 -	GOOD	GOOD
between 45 and 60 -	FAIR	FAIR
between 30 and 45 -	POOR	POOR
between 0 and 30 -	VERY POOR	VERY POOR

SECTION 2:

STATE OF THE LOCAL INFRASTRUCTURE

- **ROADS AND DRAINAGE**
- **BRIDGES AND LARGE CULVERTS**
- **FLEET**
- **FACILITIES**


Roads
& Drainage
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ROADS

The Township of Strong maintains a network of roads of 151.9km and a replacement value of $31.27M. The road system is approximately 300 lane kilometres of 2 lane road to serve the residents and businesses of the municipality. The Township, through agreements with abutting municipalities, shares service on 24.48 kilometres of road in exchange for the service by the same municipalities on other adjoining roads.

HARDTOP ROADS

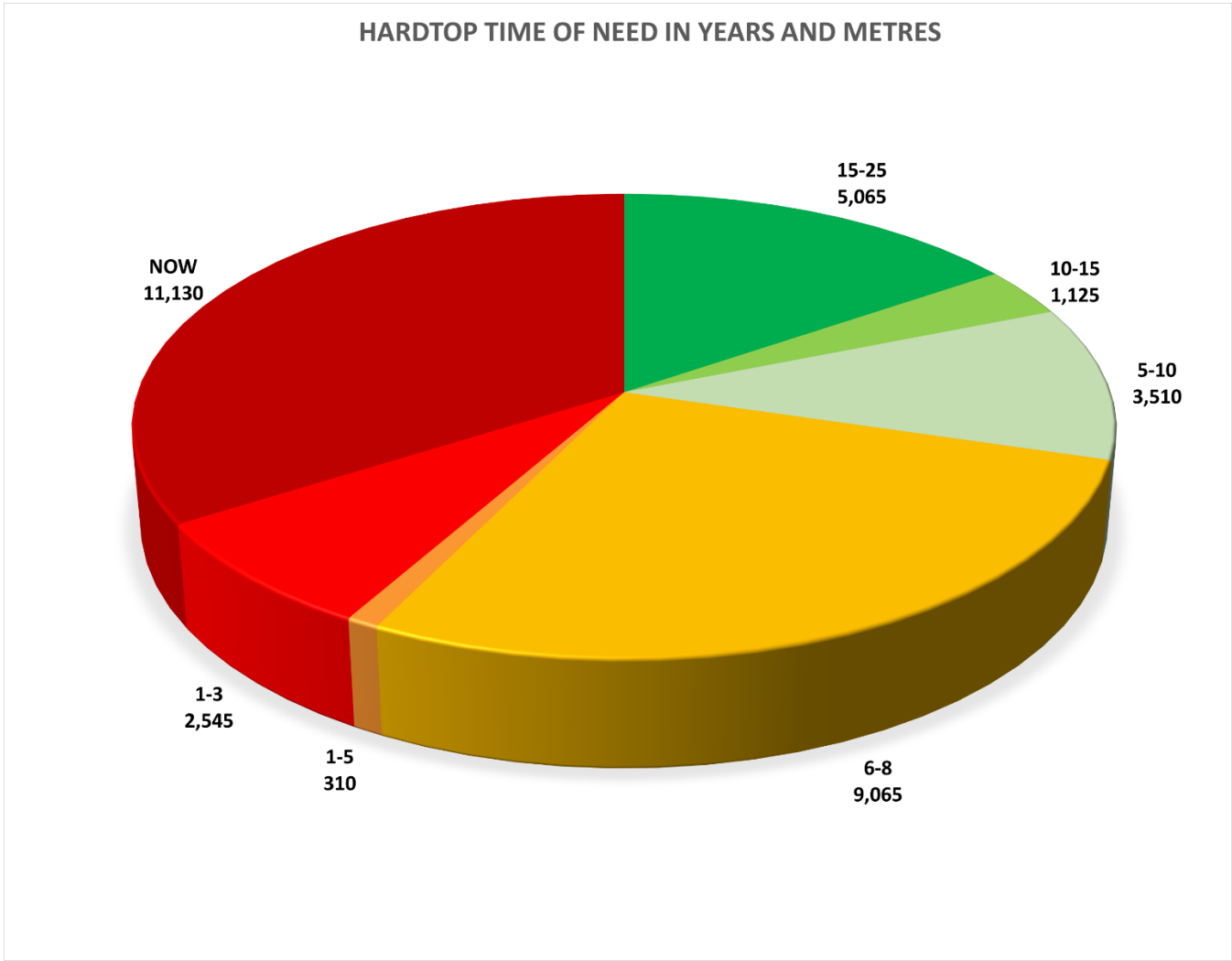


Figure 1: Time of Need in Years and Metres

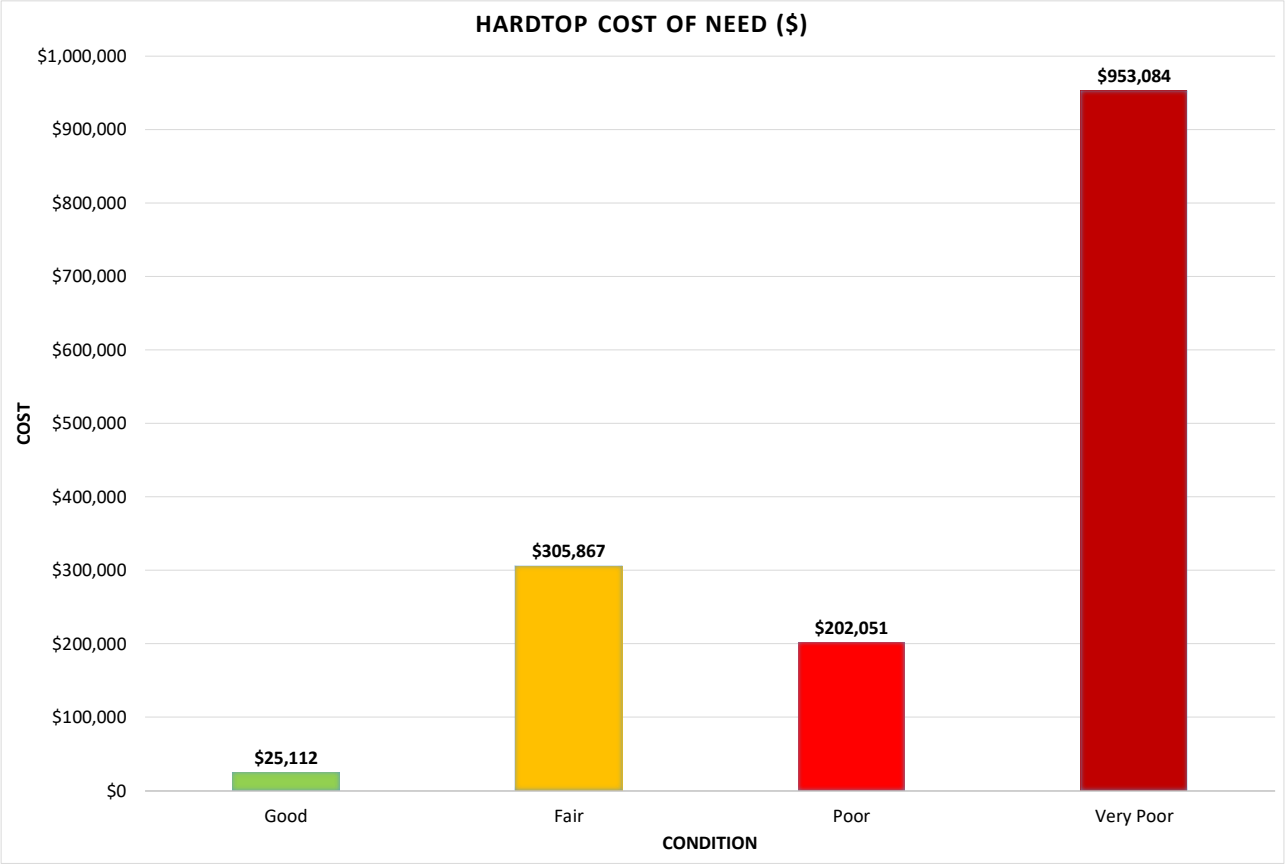


Figure 2: Hardtop – Cost of Need

A Cost of Need over 10 years of $1,486,114, which is $1,776,044 with 10 year + 2% inflation added, is the one-time cost outlay to bring the sections of road back to good-to-excellent condition. Once that is accomplished there will be periodic maintenance costs and a longer-term reserve fund cost that will help to put the municipal hardtop roads into a better position for the future.

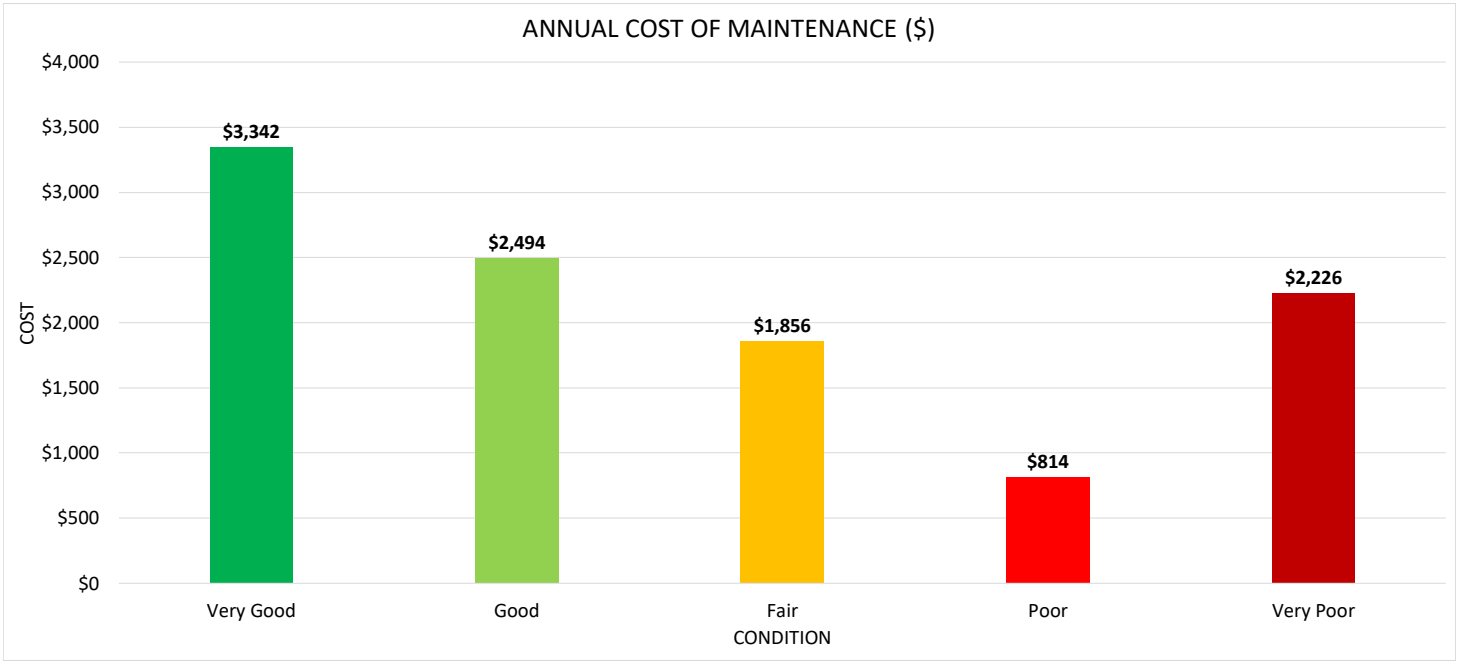


Figure 3: Annual Cost of Maintenance

The annual maintenance costs estimate of $10,732, which is $11,751 with 10-year + 2% inflation added, represent money spent to keep the hardtop road from falling back into a worse state once it is improved. These costs do not include snow plowing or other periodic actions that do not improve the road or slow down deterioration.

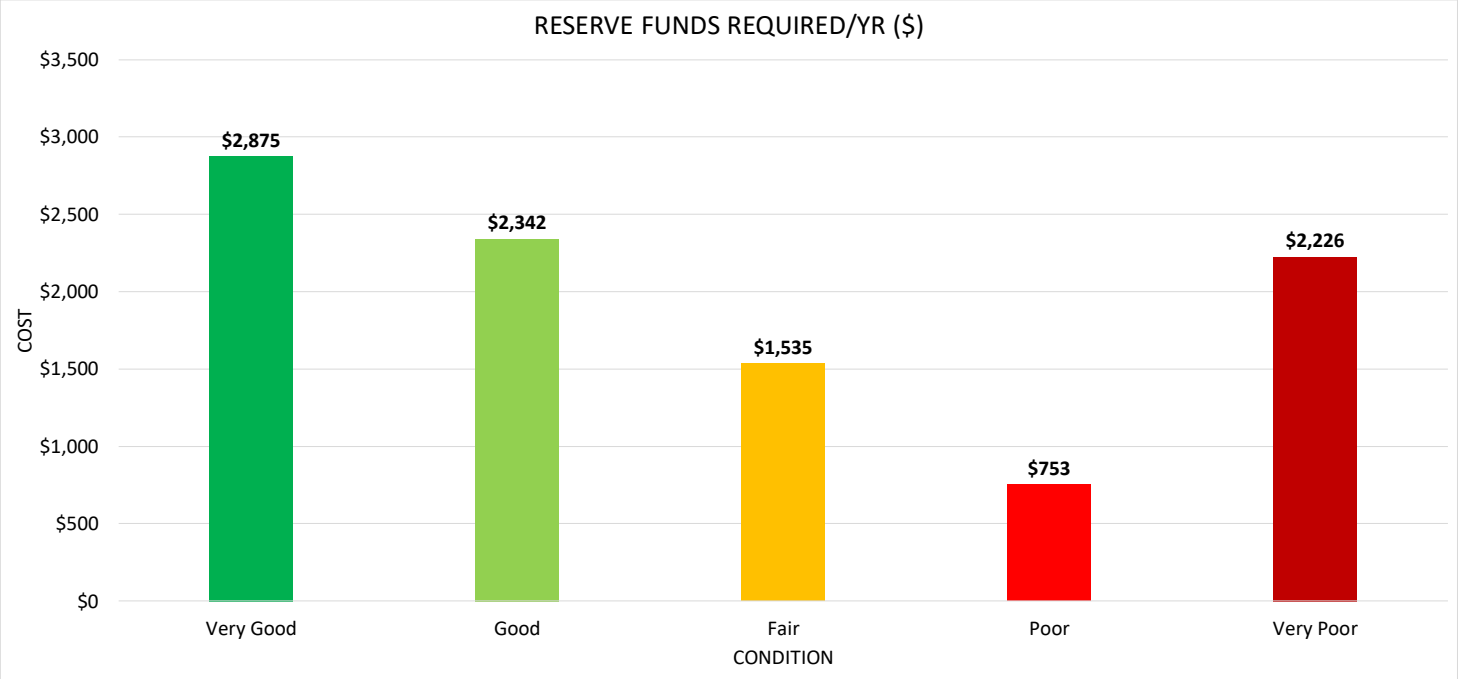


Figure 4: Reserve Funds Required Per Year

The hardtop reserve fund of $9,731, which is $10,655, with 10-year + 2% inflation added, this is less than the needed short term reserve funds but in the future, if continued, will be enough to take care of upcoming costs of need.

RATING OF HARDTOP

THE OVERALL CONDITION OF THE HARDTOP ROAD SYSTEM IS: 64.29% or GOOD

HARDTOP ROADS – COST ANALYSIS

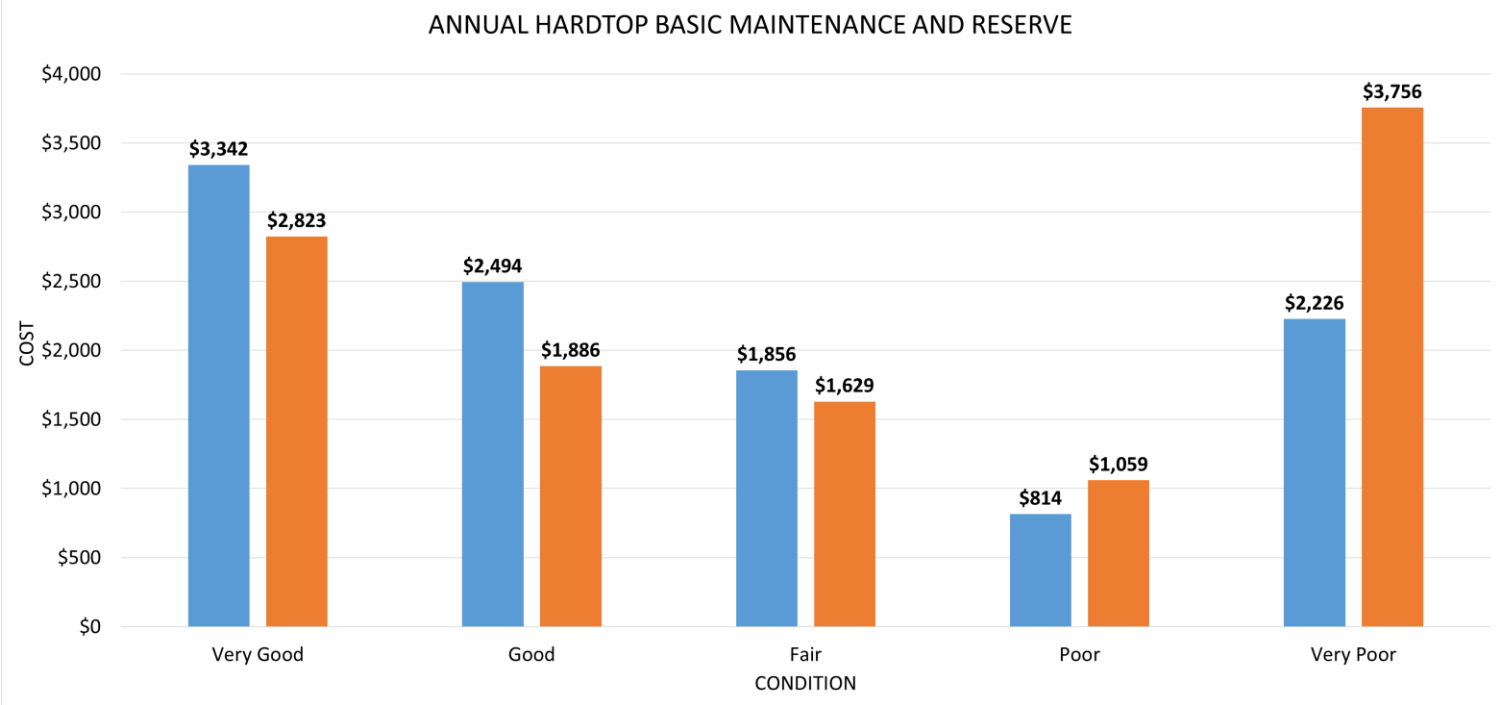


Figure 5: Annual Hardtop Basic Maintenance and Reserve

Figure 5 shows basic maintenance work along with a reserve fund for future capital work.

The total Maintenance and Reserve for a year is estimated to be $10,732 + $9,731 = $20,463.

The costs with inflation factored in is **$11,751** + **$10,655 = $22,406.**

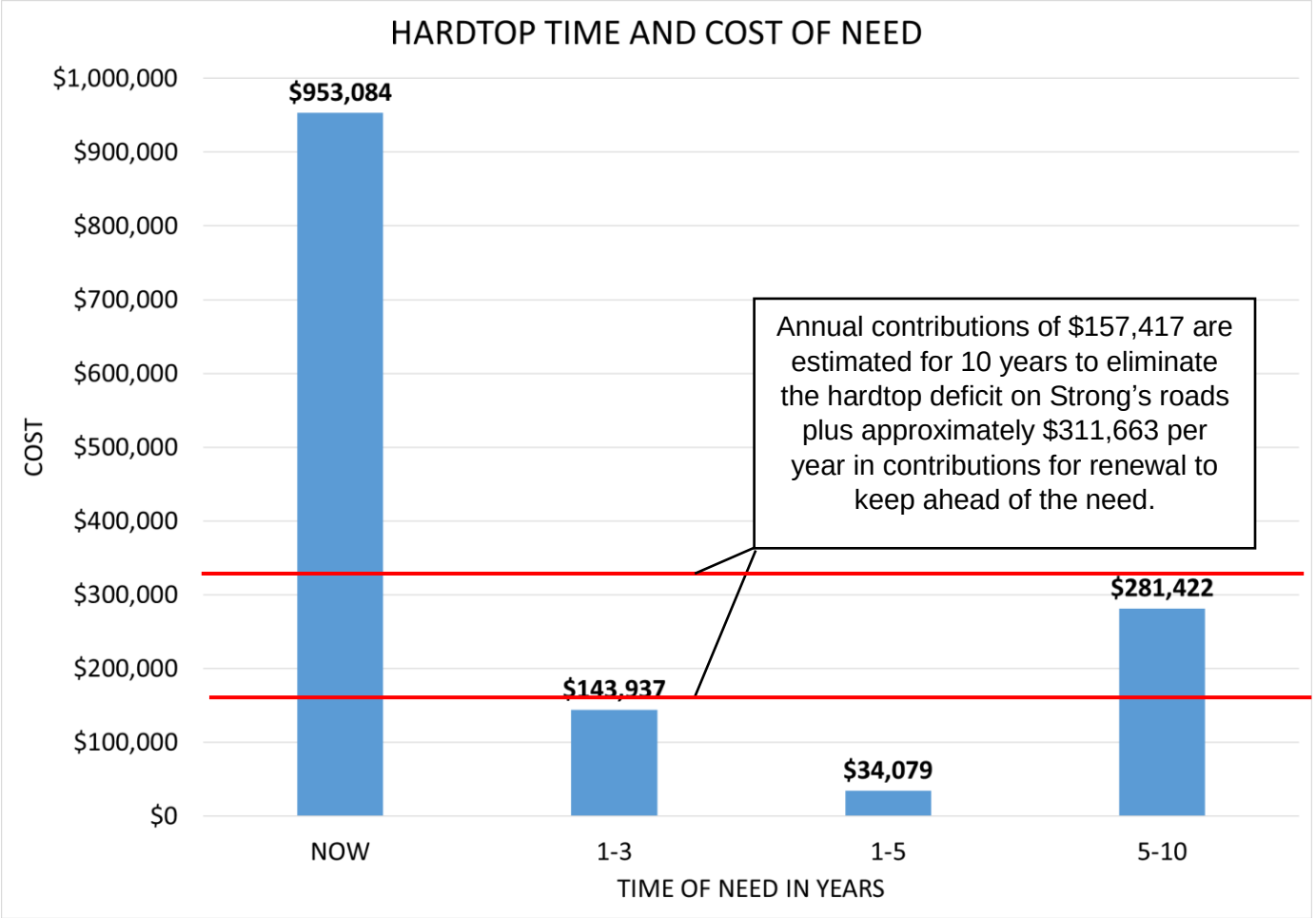


Figure 6: Hardtop Time and Cost of Need

Figure 6 shows the total cost broken down over 10 years for the renewal and eliminating the deficit of road sections as listed in the Appendices.

The total Need (Deficit), Hardtop Renewal Program, Maintenance, and Reserve for Hardtop roads each year over 10 years is $157,417+$289,257($446,674 once deficit is finished) **+$11,751+$10,655 = $469,080.** The Hardtop Road Infrastructure Deficit is approximately 1.2 years into deficit when an average of 7.94 kms of

road renewal should be expected each year. **The annual total of $469,080 is inclusive of 2% inflation but does not include interest on any potential loan for improvements.**

The total estimated Cost of Need for hardtop roads over 10 years is $1,437,634. This amount represents the Hardtop Road Infrastructure Deficit. The Hardtop Road Infrastructure Schedule is approximately 3.1 years into deficit when an average of 2.96 kms (2,960m) of road renewal should be expected as a mix of asphalt and surface treatment each year costing around $446,674 per year.

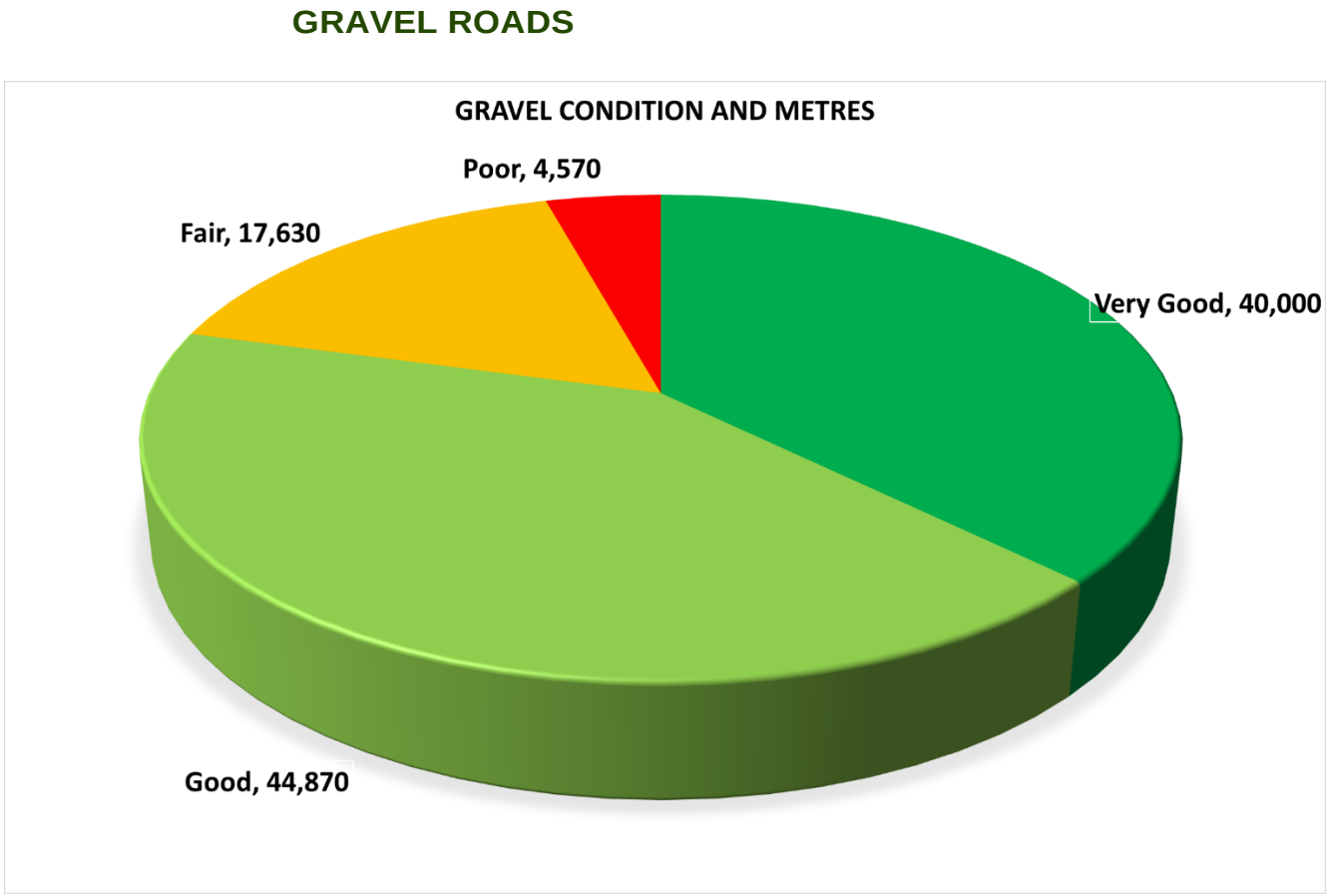


Figure 7: Gravel – Condition and Metres

Gravel roads need to be continually improved by grading, adding gravel, dust control, and berm removal. The evaluations of gravel sections are a snapshot in time and can be completely different if the Public Works Department spends a short amount of time on them. It is important to have a program for the upkeep of gravel roads.

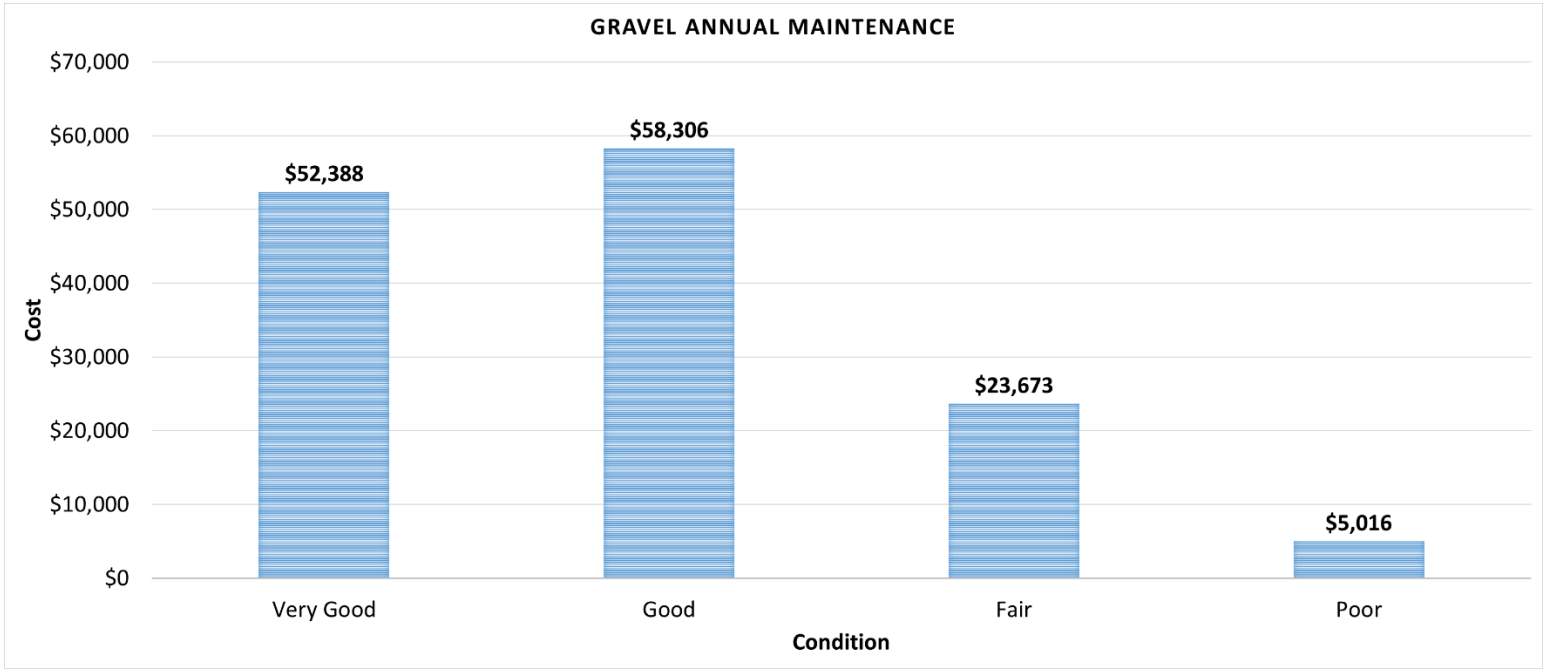


Figure 8: Gravel – Cost of Annual Maintenance

The estimated annual cost of maintenance of $152,809, which is $167,322 with 10-year - 2% inflation, for Year-Round roads is for 6 cycles of grading and as needed gravel (1 load/km), and grading to keep the road sections in good condition. The cost does not include full new gravel application, dust suppressant, or additional work.

Figure 9: Year-Round Gravel Reserve Funds/Yr.

The Gravel Road Reserve Fund total of $11,115 is not equal to the application of 0.1m (4”) of new gravel on average over the 14-year life cycle of the road as it should be in the future. The reserve fund is set to be increased at the end of the 10-year asset management plan. The Township has been carrying out an aggressive (for a small rural municipality) road improvement program which is evident by the absence of “Very Poor” road sections in their gravel road inventory. Once 2% inflation is added the total becomes $12,172 per year.

GRAVEL ROADS – COST ANALYSIS

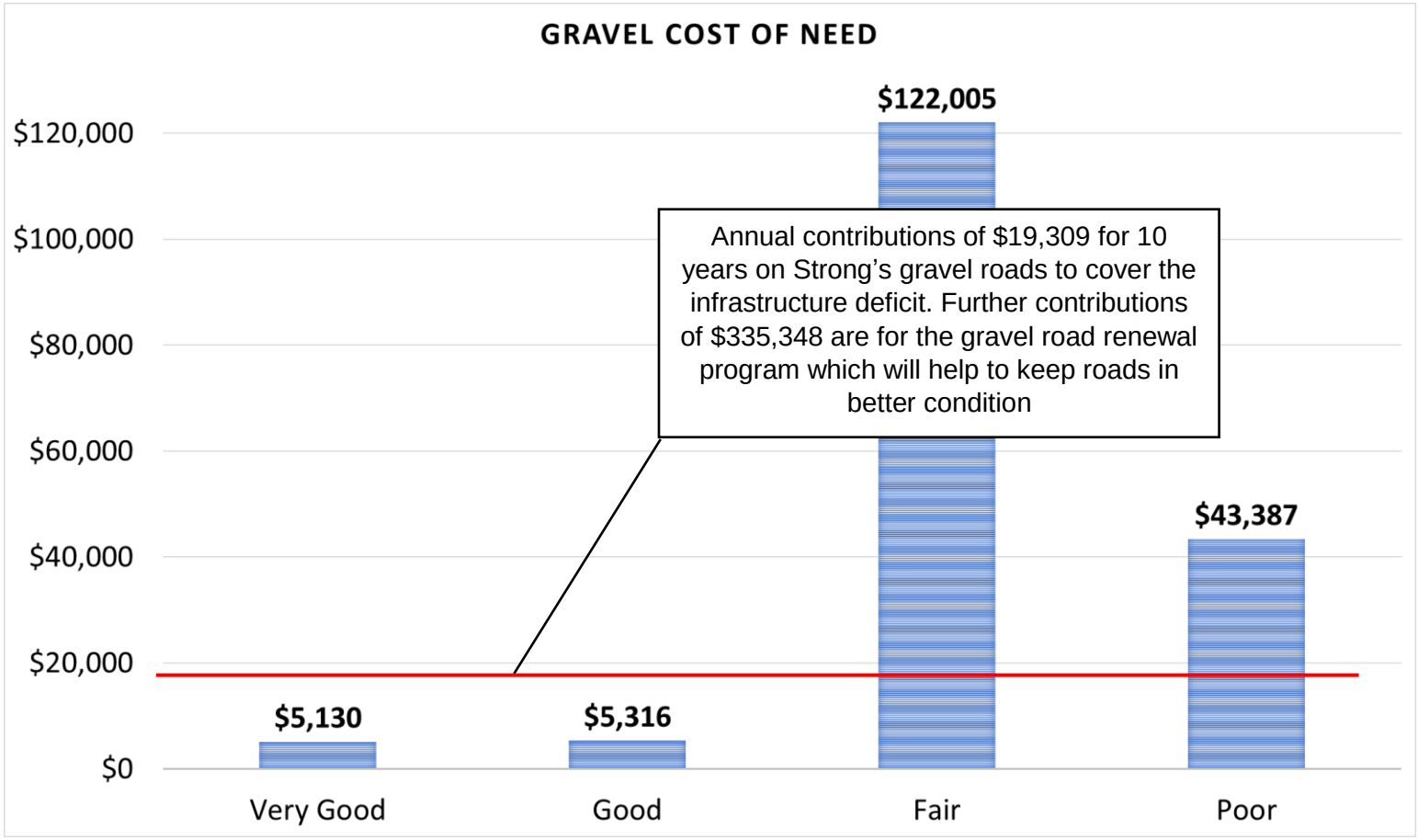


Figure 10: Year-Round Gravel – Cost of Need

Figure 10 shows the total cost broken down over 10 years for the renewal of road sections as listed in the Appendices. The annual total of $142,325, or $155,841 inclusive of a 2% inflation, does not include interest on any potential loan for improvements.

The total estimated Need (Deficit), Gravel Renewal Program, Maintenance, and Reserve for Gravel roads over 10 years is $19,309 + $155,841 + $167,337 + $12,172 = $354,659. The Gravel Road Infrastructure Deficit is approximately 1.2 years into deficit when an average of 7.94 kms of road renewal should be expected each year.

RATING OF GRAVEL ROADS

THE OVERALL CONDITION OF THE YEAR-ROUND GRAVEL ROADS IS: 81.78% or GOOD

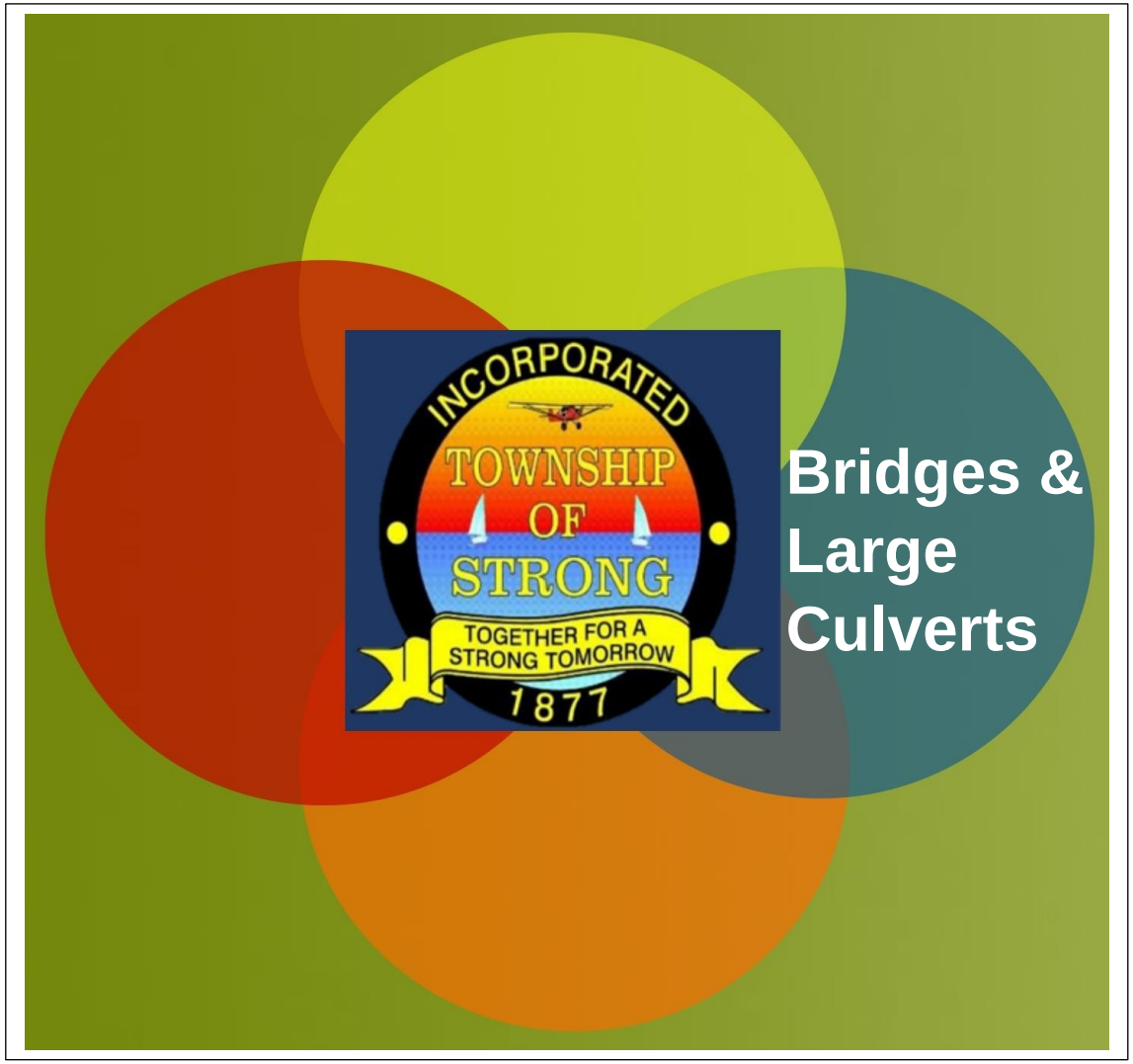
The gravel roads in Strong are in good condition and represent the majority of the total road system**.**

All municipal roads have been evaluated according to provincially recognized road engineering principles. The condition ratings assigned are based on accepted condition indexing. The locally accepted levels of service are in line with Ontario Minimum Maintenance Standards. The MMS is also used for timely response to less-than-acceptable road conditions.

Inspections of the roads were carried out according to Pavement Condition Indexing (PCI) for hardtop, and gravel road condition evaluations for loose-top, and both focused on the following attributes:

- Drainage
- Structural Integrity
- Surface Type
- Surface Condition
- Base and Surface Widths
- Individual Section Needs

Improvement and Replacement costs were established for various types of improvements identified based on current 2016 unit rates and are found in the Appendices.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Bridges &
Large
Culverts

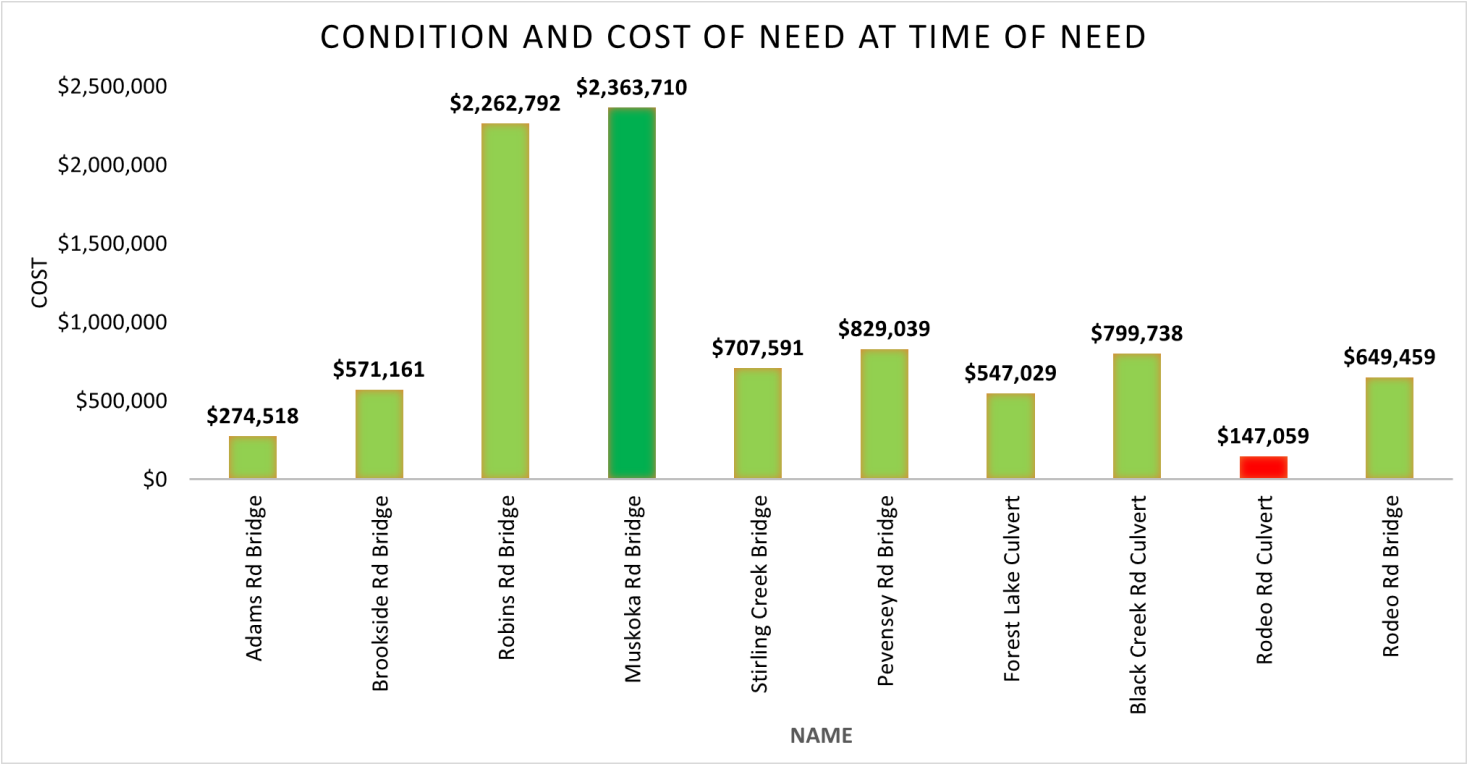


Figure 11: Bridges - Cost of Need at Time of Need

Rodeo Road steel plate culvert needs replacement right away while the other structures need maintenance and repair right away.

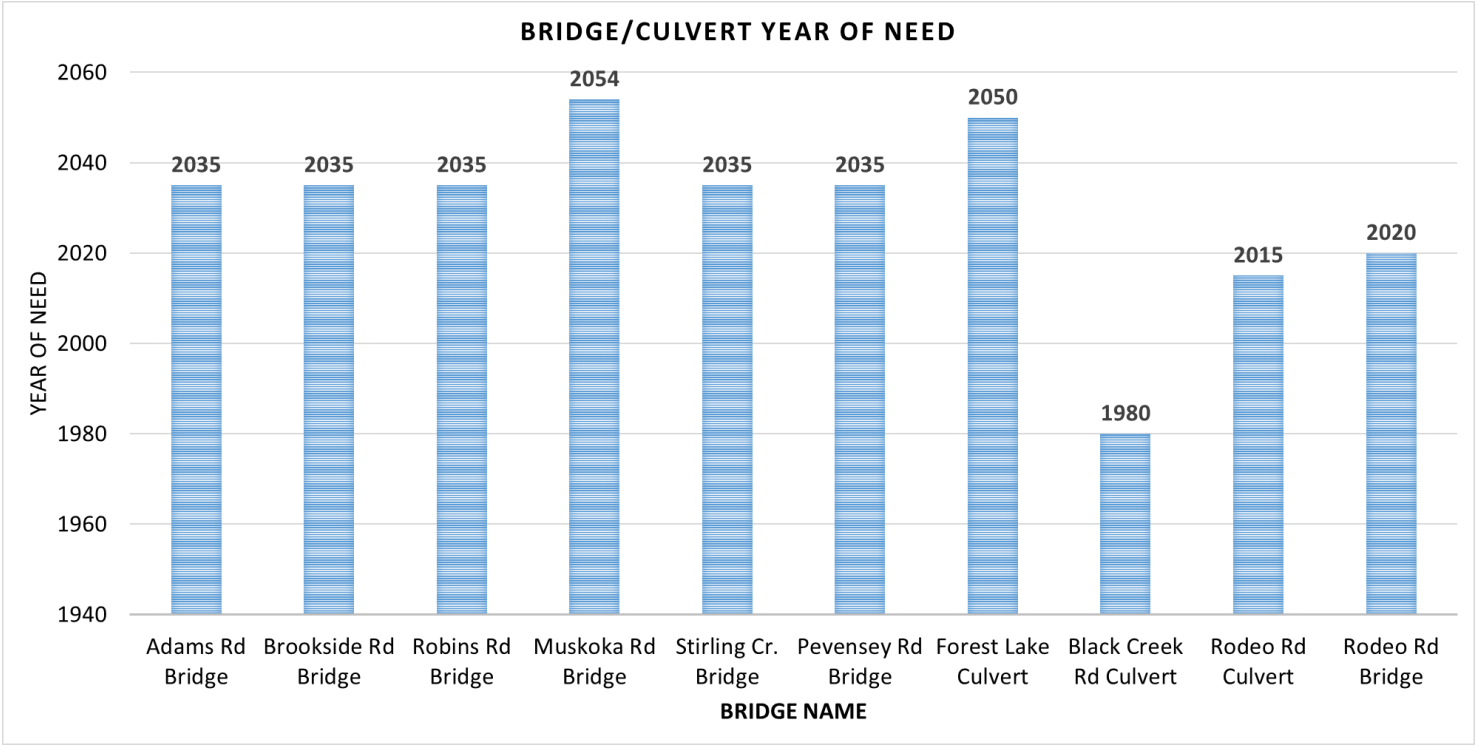


Figure 12: Bridges - Year of Need

Data taken from the 2014 OSIM report completed by D.M. Wills of Peterborough.

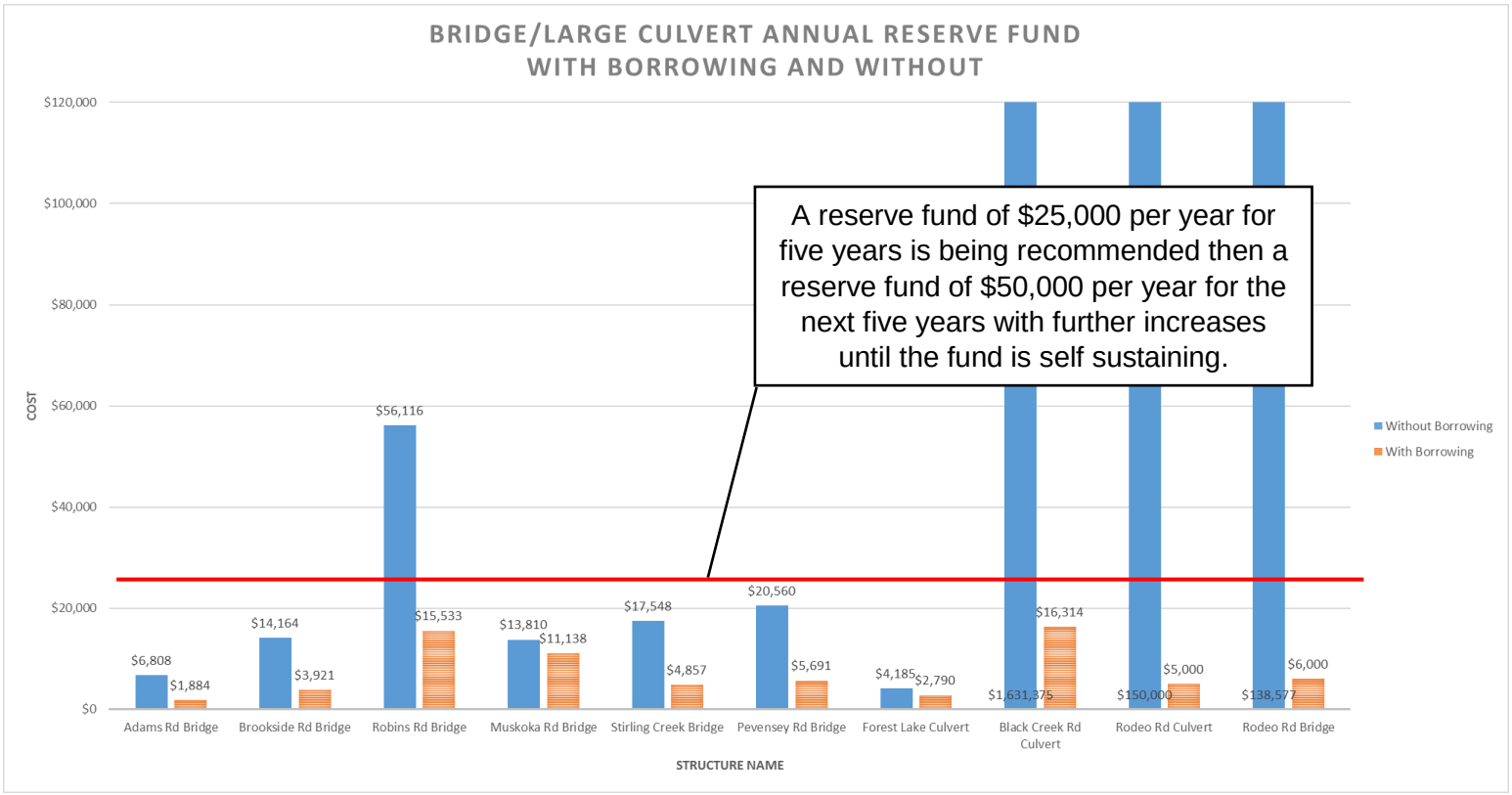


Figure 13: Bridges – Reserve Fund Borrowing

Reserve funding for bridges and large culverts will have to be revised upward at the end of this plan as realistic funding levels (greater than $50,000/year) are unachievable at this time.

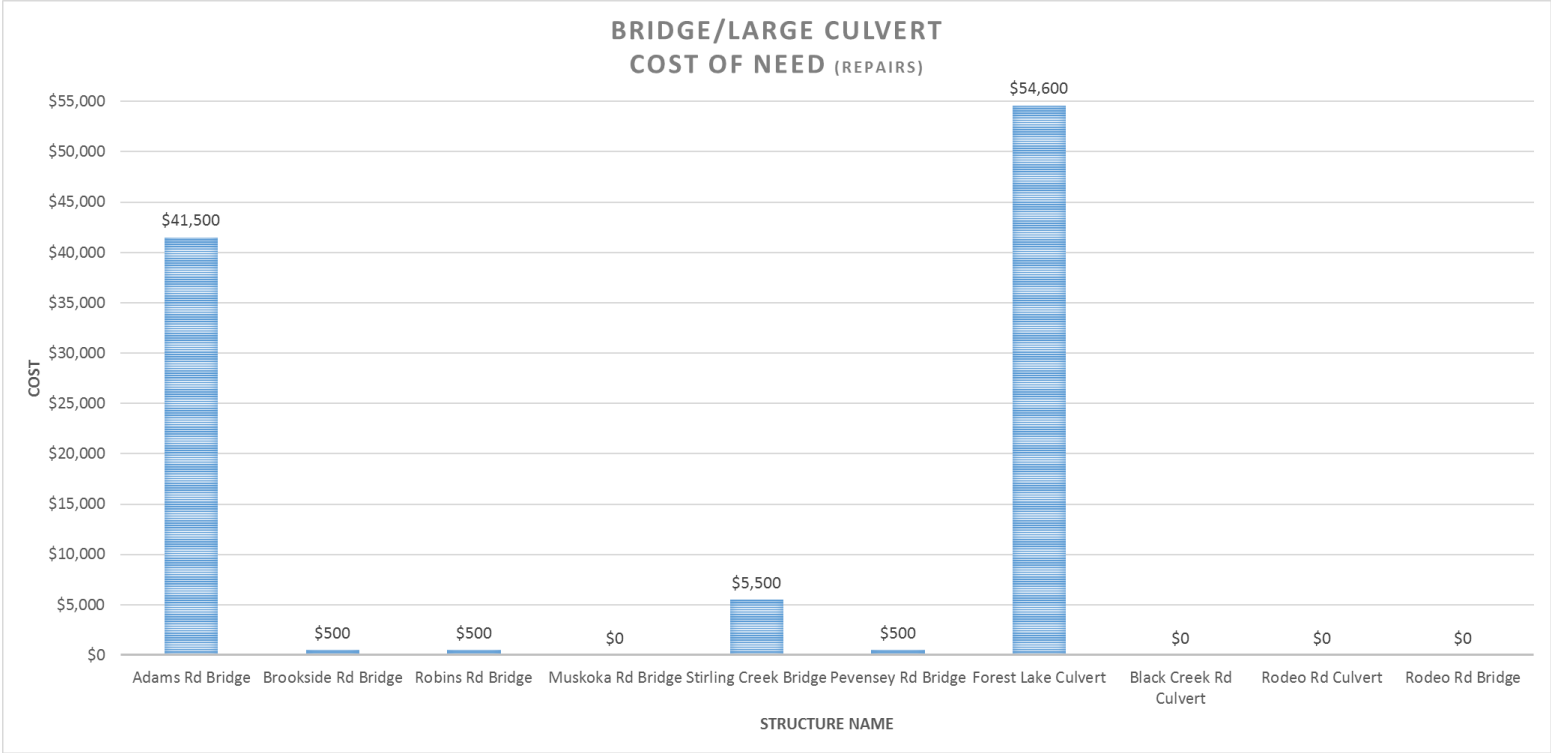


Figure 14: Bridges – Cost of Need

There is approximately a 3.0-year deficit for bridge Time of Need.

RATING OF BRIDGES AND CULVERTS >3 m Diameter

THE OVERALL CONDITION OF BRIDGES AND LARGE CULVERTS IS: 75% or GOOD

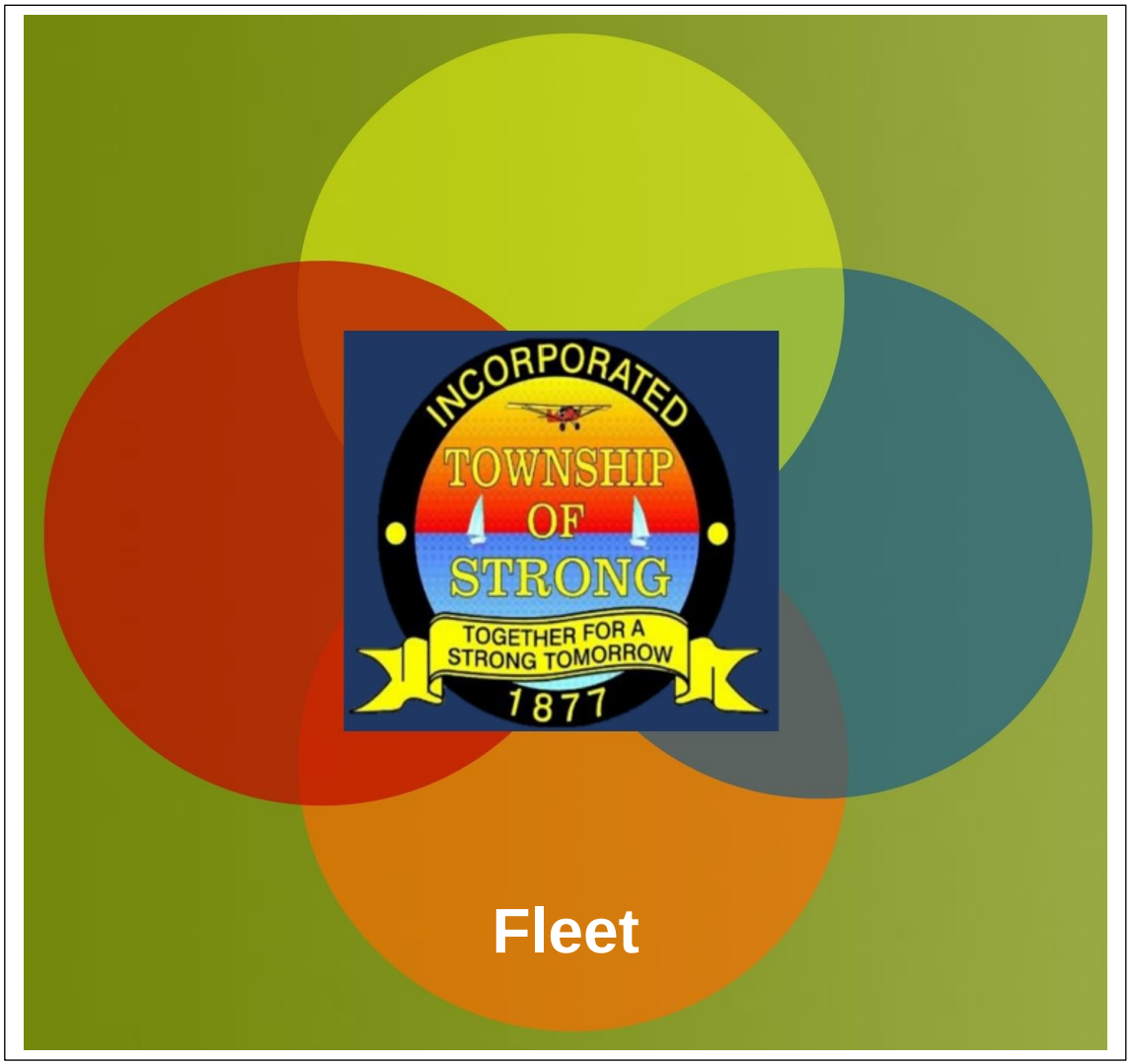
BRIDGES AND LARGE CULVERTS – COST ANALYSIS

The inflation adjusted analysis of Bridges and Large Culverts for:
10-year Need + 10-year Reserve = 10-year Total
$1,596,253 + $375,000 = **$1,971,253** for Bridges and Large Culverts;

Annual Need + Annual Reserve = Annual Total
$159,625 + $37,500 = **$197,125** for Bridges and Large Culverts;

The total required for Bridges and Large Culverts over the period between 2017- 2026 is $1,971,253.

Over the next 10 years, expenditures of approximately $197,1225 per year (including inflation) should cover all Bridges and Large Culvert Capital, and adjusted Reserve costs.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Fleet

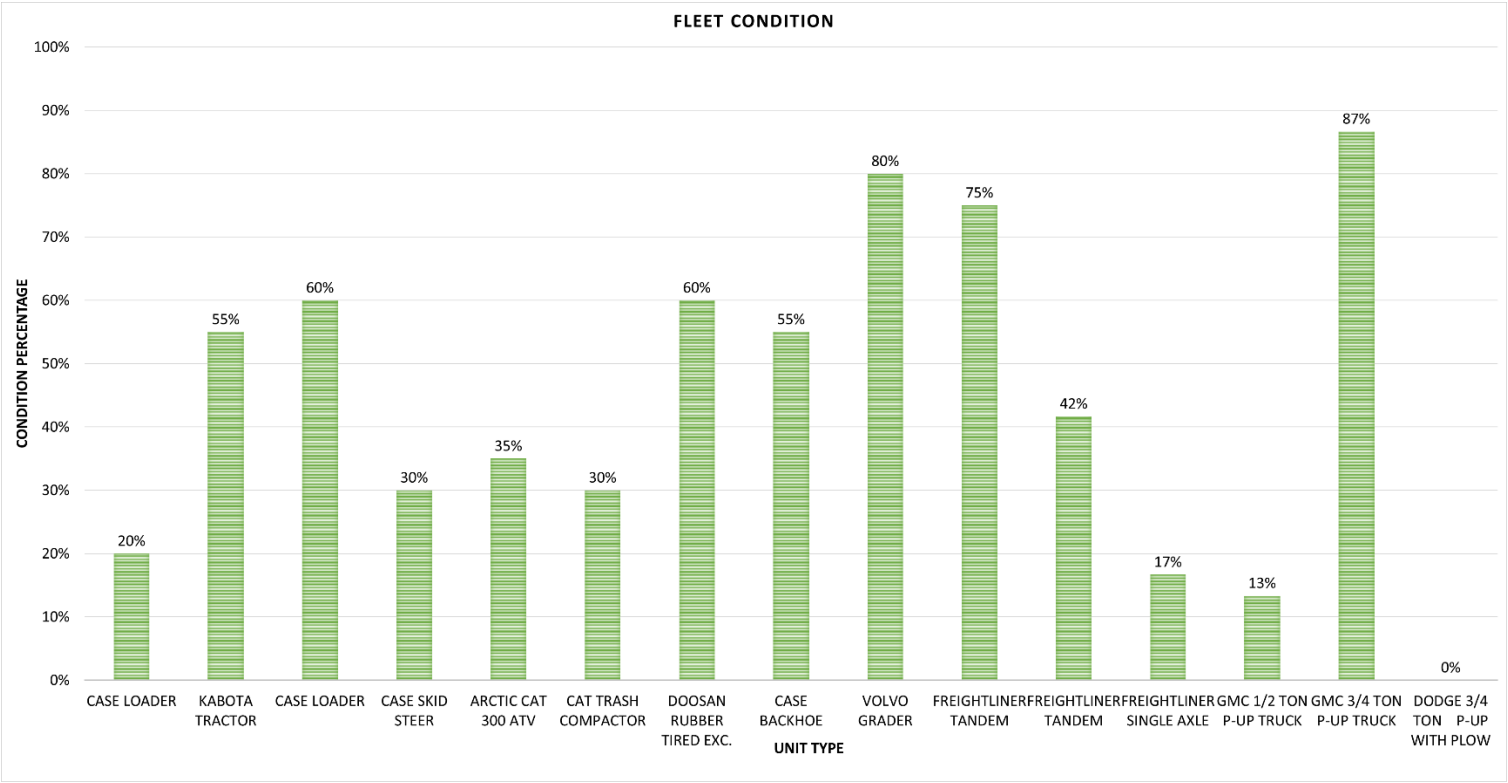

Figure 15: Fleet – Condition

The condition of the fleet of vehicles overall is good and the age range is a good mixture of older and newer. The units on the older side of age requires extra caution in use to avoid unnecessary break-downs.

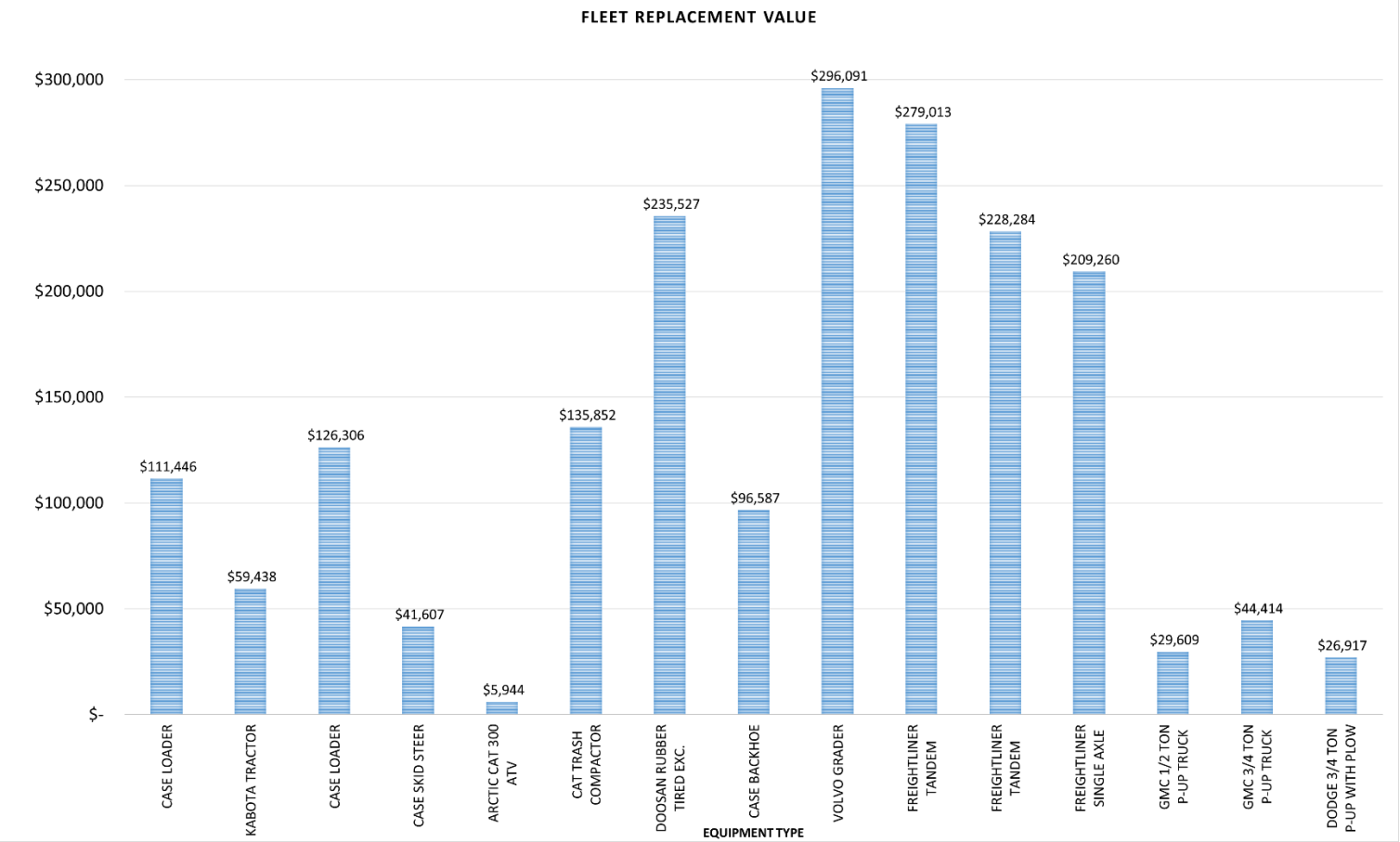

Figure 16: Fleet - Replacement Value

The total value of the fleet in 2016 is $736,083. The total replacement value in the year each piece is scheduled to be replaced is $1,926,293.

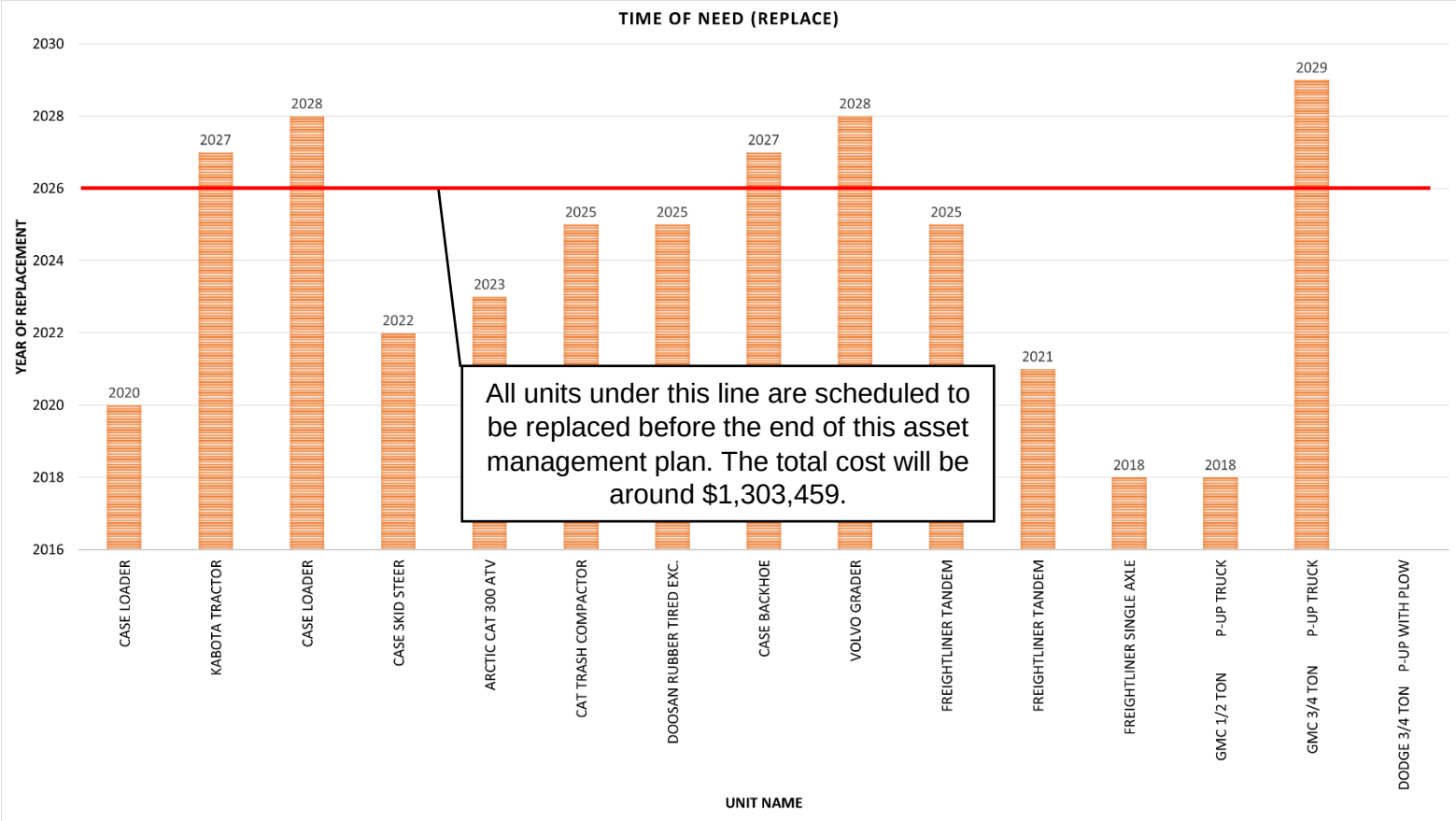

Figure 17: Fleet – Time of Need

The average age of the fleet is 10 years old and about midway in the lifecycle for most equipment. The condition of each piece of equipment is fairly good and if need be could be kept for a year or two longer if their condition stays good.

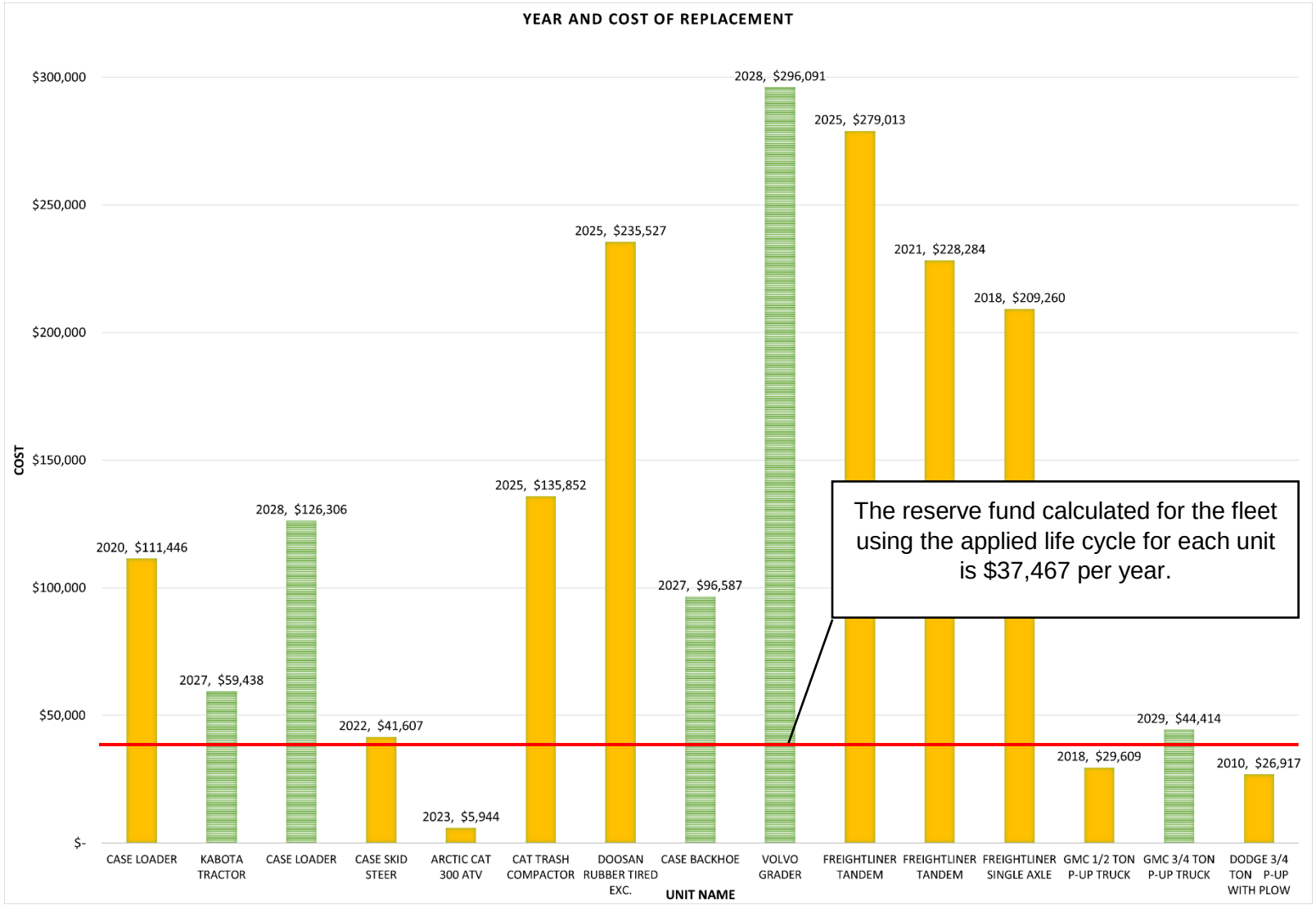

Figure 18: Fleet – Year/Cost of Replacement

The units highlighted orange are scheduled to be replaced by the end of this plan's term.

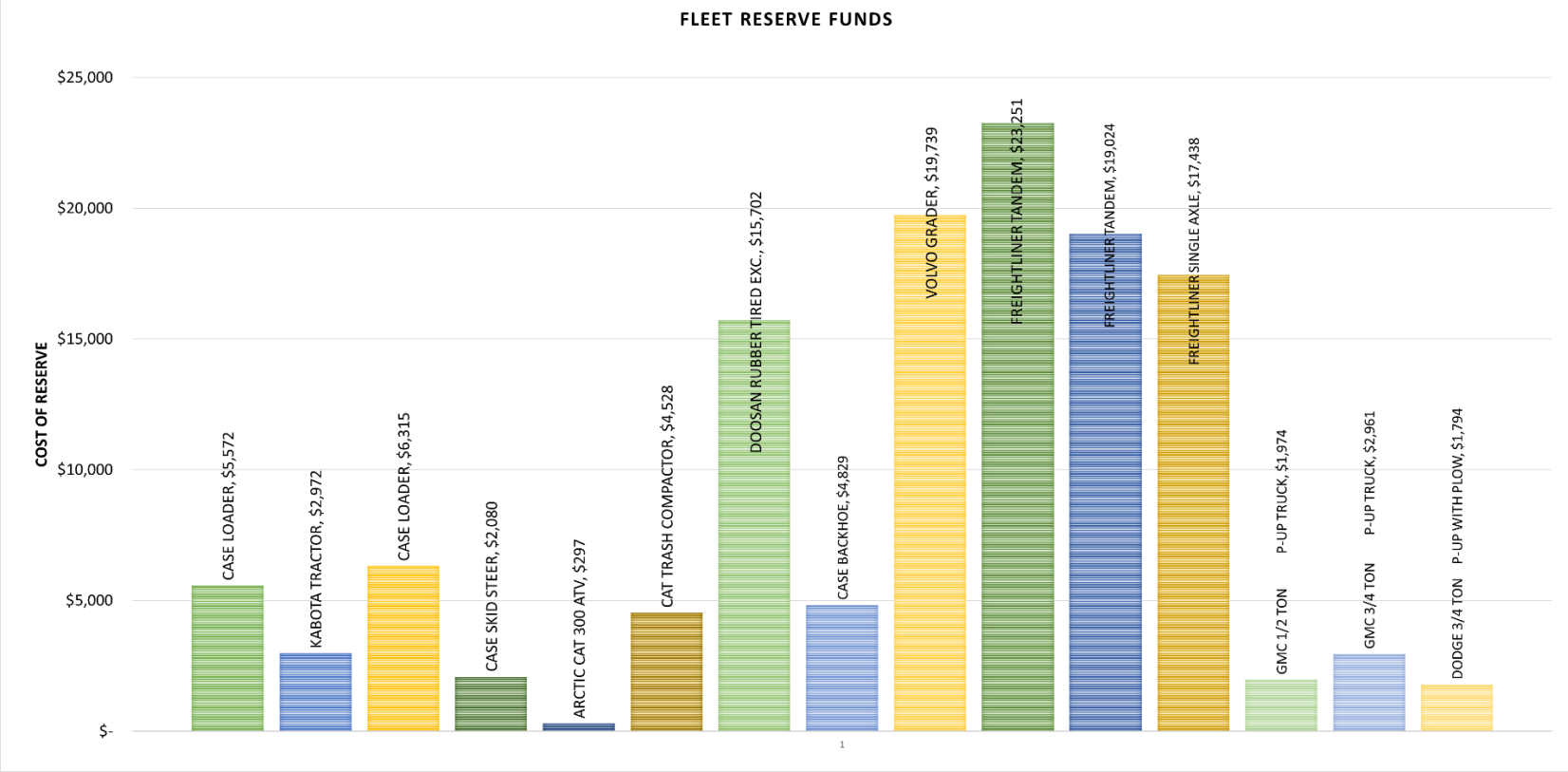

Figure 19: Fleet - Reserve Fund

FLEET – COST ANALYSIS

The need analysis of the fleet for the next ten years is $1,303,459 or $130,346 per year.

With the reserve funding added in, it is estimated that over the next 10 years $167,813 per year will cover all fleet capital, and reserve costs for current and future replacements.


Facilities
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FACILITIES

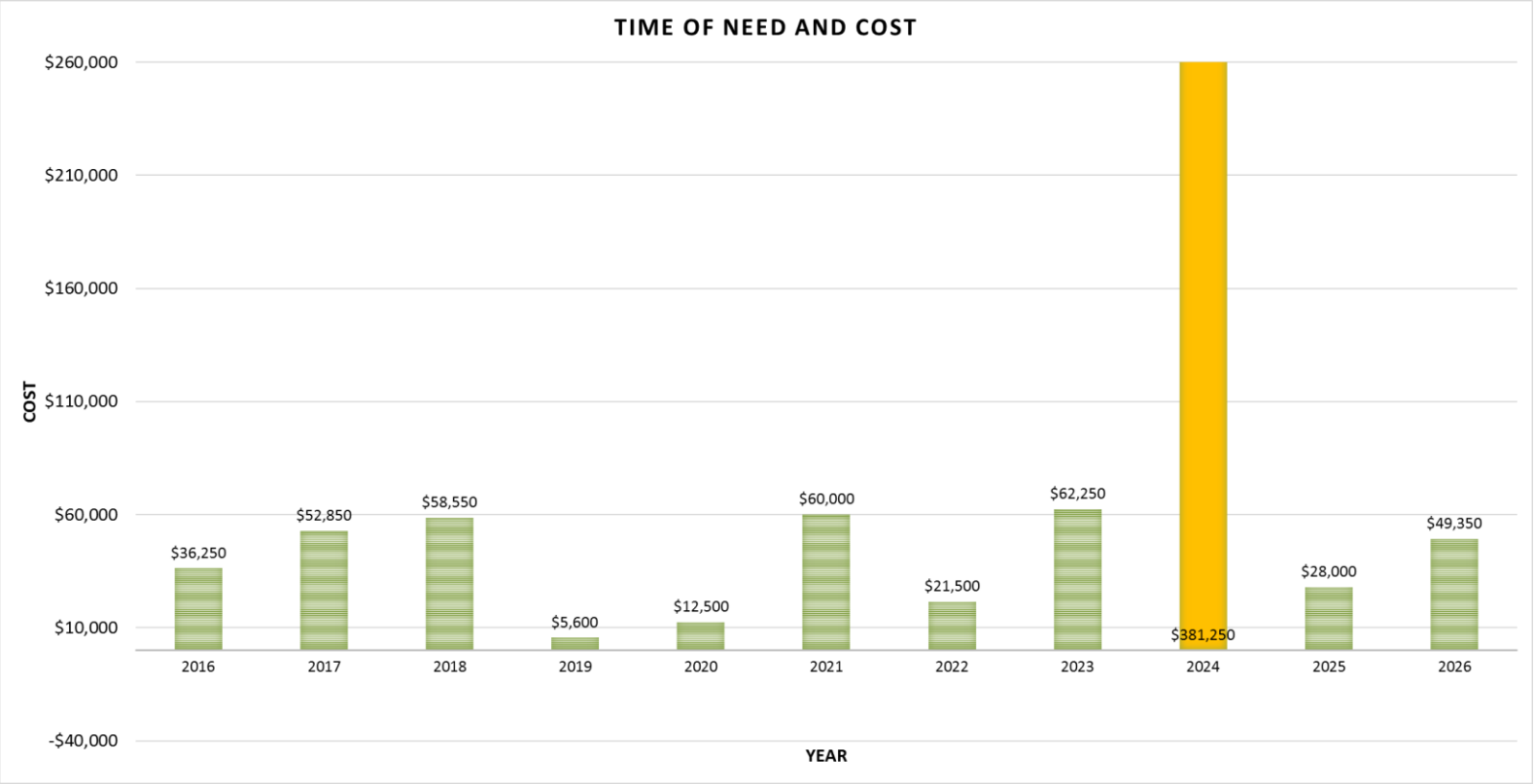

Figure 20: Facilities – Time of Need and Cost

Asset evaluations were conducted on a total of 9 individual sites owned by the Township of Strong plus 5 sites with joint ownership. The column that is highlighted orange represents charges that are mostly for the arena ($380,000).

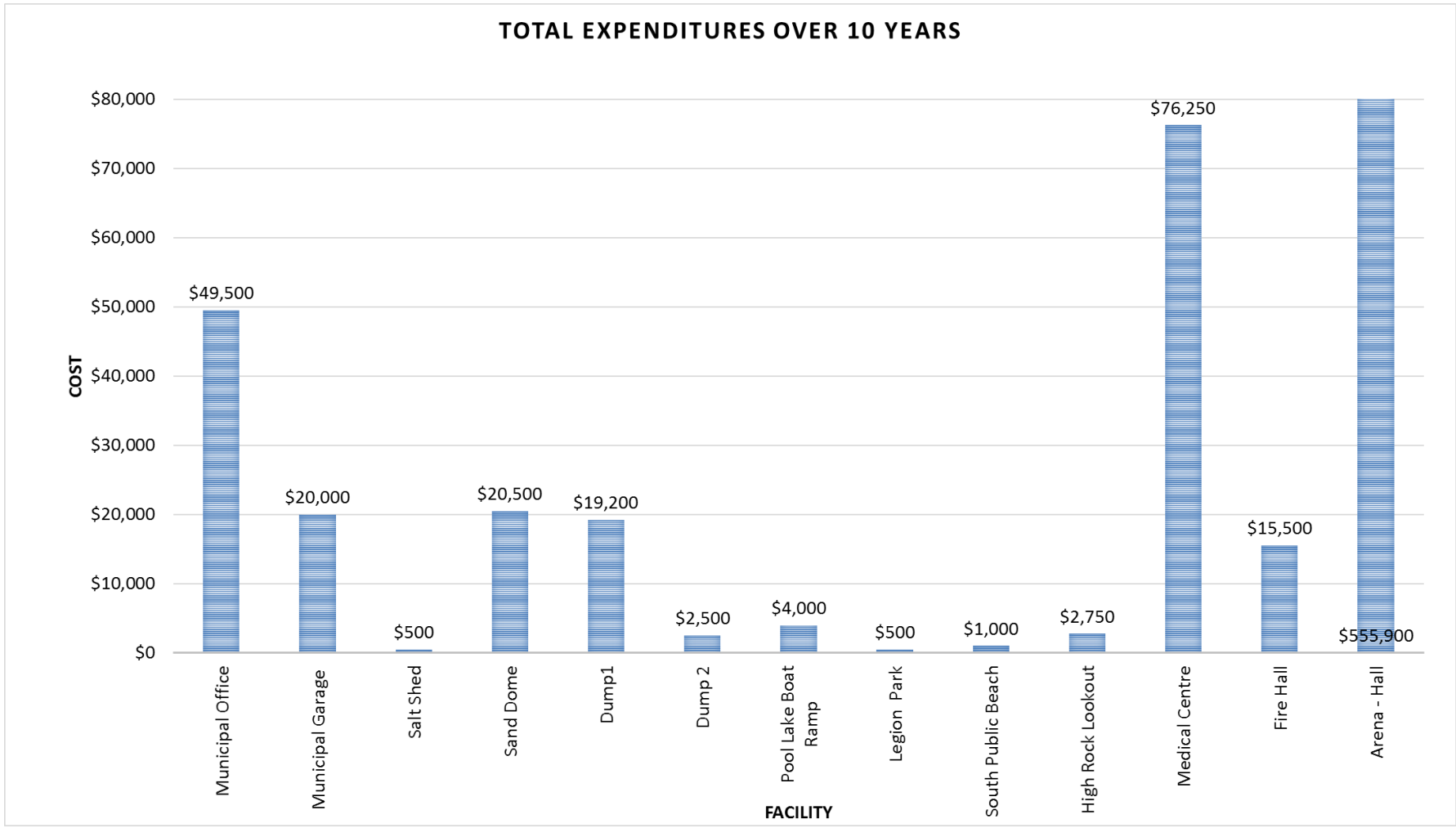

Figure 21: Facilities – Total Expenditures over 10 Years

The higher cost for this plan will be near the end of the cycle but an annual contribution of $66,603 will cover the cost of need including 2% inflation. This graph includes the arena costs.

The annual cost of need for facilities without the arena facility is $26,027.

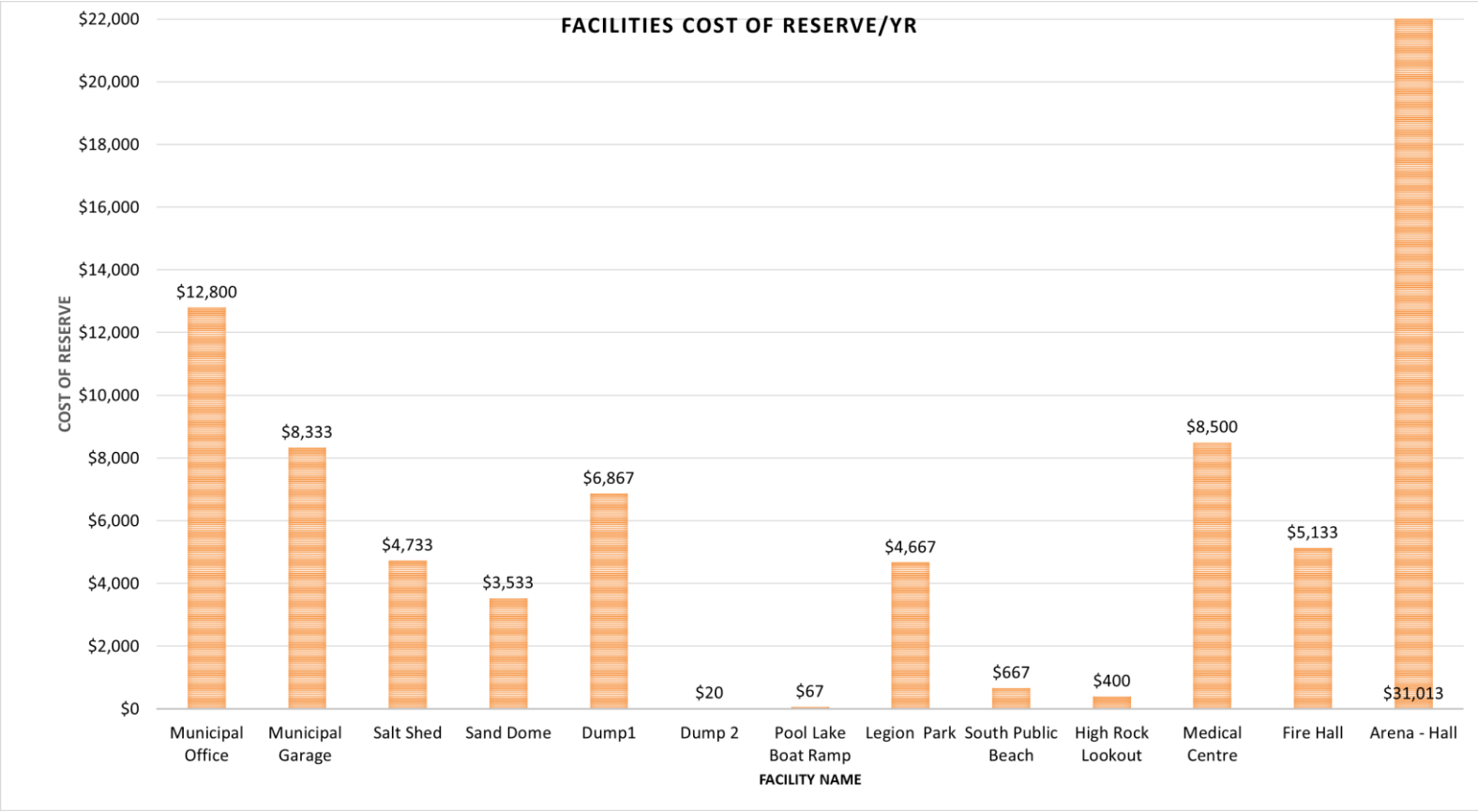

Figure 22: Facilities – Reserve Funding Per Year

The annual cost for reserve funding all facilities except the arena is $55,720, plus $31,013 for the arena totaling $86,733.

RATING OF FACILITIES

THE OVERALL CONDITION OF FACILITIES IS: 68.11% or GOOD

FACILITIES – COST ANALYSIS

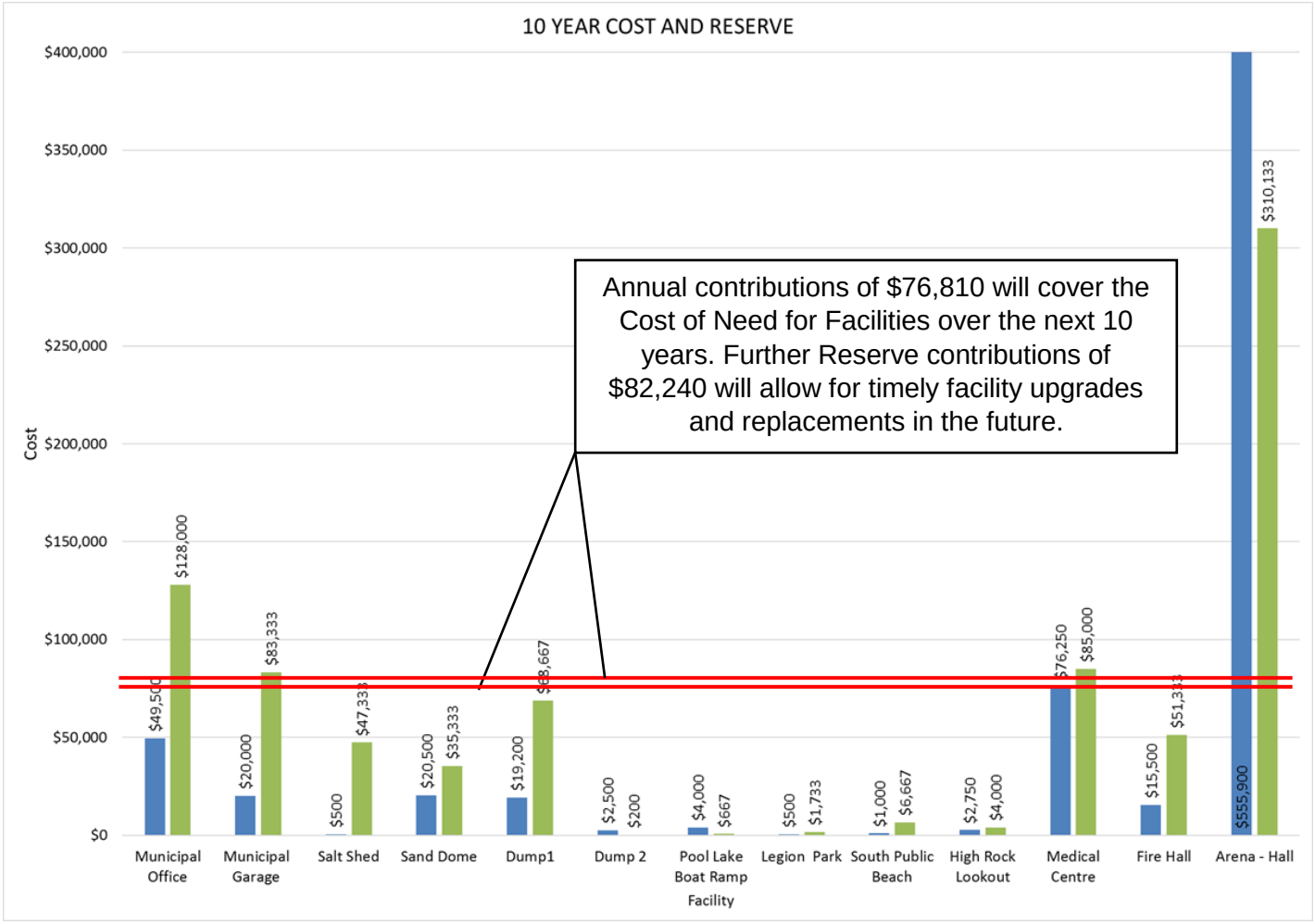

Figure 23: Culverts- Cost of Need and Reserve

The inflation adjusted analysis of Facilities for:
10-year Need + 10-year Reserve = 10-year Total
$768,100 + $822,400 = **$1,590,500** for Facilities;

Annual Need + Annual Reserve = Annual Total
$76,810 + $82,240 = **$159,050** for Facilities;

The total required for Facilities over the period between 2017- 2026 is $1,590,500.

Over the next 10 years, expenditures of approximately $159,050 per year (including inflation) should cover all Facilities Capital, and Reserve costs.

With the Arena Costs removed the expenditures per year are approximately $72,447.

SECTION 3:

Asset Management Strategy

1. DESIRED LEVELS OF SERVICE

OBJECTIVE

To institute a set of strategic actions based on best practice that will enable the assets of the Township of Strong to provide a desired and sustainable level of service, manage risk, and control costs. The Asset Management Plan Strategy will advance a process that can be applied to the needs identified, to prioritize maintenance, rehabilitation, and renewal activities. This section also contains an overview of condition assessment techniques for each asset class; the necessary interventions, including actions with the best return on investment; prioritization of techniques, including risk. These will assist in determining which priority projects should move forward into the budget first.

LEVELS OF SERVICE

Desired levels of service are quality and quantity indicators comprising many factors (as listed on the following pages), that establish clear quality thresholds at which municipal services should be delivered to the residents. They support the Township's strategic goals and are based on residents' expectations, statutory requirements and standards, and the financial capacity of the municipality to deliver those levels of service.

Levels of Service are used:

- to inform residents of the planned type and level of service to be offered;
- to identify the costs and benefits of the services offered;
- to assess suitability, affordability and equity of the services offered;
- as a measure of the effectives of the asset management plan;
- as a focus for the AMP strategy to deliver the required level of service.

For the municipality to establish a desired level of service, it is important to review the key factors involved in the delivery of that service. It is also important to establish some key performance indicators to gain a better understanding of the current level of service supplied.

Key factors that influence the level of service are:

- Strategic goals;
- Legislative requirements;
- Expected asset performance;
- Community expectations;
- Availability of finances

➢ Strategic Goals

Infrastructure levels of service can be influenced by strategic goals. Strategic plans spell out where an organization wants to go, how it`s going to get there, and helps decide how and where to allocate resources, ensuring alignment to the strategic priorities and objectives. It will help identify priorities and guide how municipal tax dollars and revenues are spent into the future. The level of importance that a community`s vision is dependent upon infrastructure, will ultimately affect the levels of service provided or those levels that it ultimately aspires to deliver.

➢ Legislative Requirements

Infrastructure levels of service are directly influenced by many legislative and regulatory requirements. For instance, the Safe Drinking Water Act, the Minimum Maintenance Standards for municipal highways, building codes, and the Accessibility for Ontarians with Disabilities Act are all legislative requirements that prevent levels of service from declining below a certain standard.

➢ Expected Asset Performance

A level of service will be affected by current asset condition, and performance and limitations in regards to safety, capacity, and the ability to meet regulatory and environmental requirements. In addition, the design life of the asset, the maintenance items required, the rehabilitation or replacement schedule of the asset, and the total costs, are all critical factors that will affect the level of service that can be provided

- **Community Expectations**

  Levels of services are directly related to the expectations that the public has from the infrastructure. For example, the public will have a qualitative opinion on what an acceptable road looks like, and a quantitative one on how long it should take to travel between two locations. Infrastructure costs are projected to increase dramatically in the future, therefore it is essential that the public is not only consulted, but also be educated, to ultimately make choices with respect to the service levels that they wish to pay for.

- **Availability of Finances**

  Availability of finances will ultimately control all aspects of a desired level of service. Ideally, these funds must be sufficient to achieve municipal goals, meet legislative requirements, address an asset's life cycle needs, and meet community expectations. Levels of service will be dictated by availability of funds - or by the elected officials` ability to increase funds - or the community's willingness to pay.

2. KEY PERFORMANCE INDICATORS

Performance measures - or key performance indicators (KPI) - that track levels of service should be specific, measurable, achievable, relevant, and time bound (SMART). Performance measures can be established and tracked through a systematic approach to inspection and documentation. In this way, through timely examination, results can be reviewed on an annual basis and adjustments can be made to the overall asset management plan, including the desired level of service targets. Keep in mind:

- Maintenance activities ensure the performance of an asset and prevent premature aging
- Rehabilitation activities extend the life of an asset.
- Replacement activities renew the life of an asset.

➢ Roads, Culverts and Drainage: Performance Indicators

Strategic Indicators	Target:4%	➢ Percentage of total reinvestment compared to asset replacement value ➢ Completion of strategic plan objectives (related to R, C, & D)
Financial Indicators	Target 90% Target -1% Max. 20% Less than 5%	➢ Annual revenues compared to annual expenditures ➢ Annual replacement value depreciation compared to annual expenditures ➢ Total cost of borrowing compared to total cost of service ➢ Revenue required to maintain annual network growth
Tactical Indicators	Target 4% Target 2% Target GOOD Target GOOD Less than 1%	➢ Percentage of network rehabilitated/reconstructed ➢ Value culvert or drainage structures rehabilitated or reconstructed ➢ Overall road condition index ➢ Overall bridge condition index as a percentage of desired condition index ➢ Annual percentage of network growth

Tactical Indicators (cont.)	Below 5%	➢ Percent of paved road lane km where the condition is rated poor or critical
	Less than 4	➢ Number of culvert and drainage structures where the rating rated poor or critical
	Target 7%	➢ Percentage of road network replacement value spent on operations and maint.
	Target 2.5%	➢ Percentage of bridge/large culvert structures replacement value spent on operations and maintenance
Operational Indicators	Target 25%	➢ Percentage of road network inspected each year
	Target 25%	➢ Percentage of culvert and drainage network inspected each year
	Below $2,500	➢ Operating costs for paved roads per lane km
	Below $2,000	➢ Operating costs for gravel roads per lane km
	Below $20	➢ Operating costs for culvert and drainage per metre
	Below 1%	➢ Number of resident requests received annually
	Above 95%	➢ Percentage of resident requests responded to within 24hrs

➢ Bridge and Large Culvert Performance Indicators

Bridge and Large Culvert performance indicators are included in the OSIM reports done by consulting engineering Companies. In general bridges and culverts must be kept in the Good to Very Good range for normal use or the municipality will be at greater risk of liability should any incident happen that leads to litigation. The Township has a history of timely replacements and repairs and should continue this pattern.

➢ Fleet Performance Indicators

Strategic Indicators	Target 2%	➢ Percentage of total reinvestment compared to asset replacement value ➢ Completion of strategic plan objective (Fleet)
Financial Indicators	Variable < 5%	➢ Annual replacement value depreciation compared to annual expenditures ➢ Total cost of borrowing compared to total cost of Fleet

	< 3%	➢ Lost service capacity from out of operation equipment
Tactical Indicators	Target 7.5%	➢ Percentage of fleet being replaced at any one time
Tactical Indicators (cont.)	Target 75%	➢ Overall fleet condition index as a percentage of desired condition index
	< 5%	➢ Annual adjustment in condition indexes (do we wait an extra year or two to replace)
	Target <10%	➢ Percentage of fleet where the condition is rated poor for the fleet
	< 50%	➢ Percentage of replacement value spent on repair
Operational Indicators	100%	➢ Percentage of fleet inspected in the last 1 year
	< 10%	➢ Operating costs for a piece of equipment compared to a replacement
	< 8/yr.	➢ Number of repairs being performed on a piece of equipment
	+/- 25%	➢ Operating costs for the fleet compared to an allowable limit
	< 0.5%	➢ Number of resident concerns not addressed because of breakdown
	< 0.25%	➢ Percentage of resident concerns not addressed in 24 hours because of breakdown

- **Facilities performance Indicators**

Strategic Indicators	+/- 5%	➢ Percentage of total reinvestment per year
		➢ Completion of strategic plan objective (waste water)
Financial Indicators	Target 100%	➢ Annual revenues compared to annual expenditures
	Avg. 2.5%	➢ Annual replacement value depreciation
	< 5%	➢ Total cost of borrowing compared to total cost of service

	+ > 10%	➢ Changed resident satisfaction if facility is added or reduced
Tactical Indicators Tactical Indicators (cont.)	> 2.5% Target 100% > 2% Target 3% < 5% +/- 5%	➢ Percentage of facilities renovated or replaced ➢ ➢ Overall portfolio condition index as a percentage of desired condition index ➢ Annual adjustment in condition index upward ➢ Annual percentage in growth – population ➢ Percentage of facilities where the condition is rated poor or worse for the total portfolio ➢ Percentage of replacement value spent on repairs, operations and maintenance
Operational Indicators	100% 1 to 1 < 4 Target: Sustainable > 5% > 50%	➢ Percentage of all facilities inspected in the last 1 year ➢ Operating costs as compared to use ➢ Number of repairs per facility ➢ Operating costs for the whole portfolio ➢ Number of resident requests received annually for facility use ➢ Percentage of residents using individual facilities

3. LIFE CYCLE ANALYSIS

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

Pavement Inspections

The evaluation that was completed included the whole roadway corridor including related culverts and road signs. The pavement evaluation was produced according to the Ontario Good Roads Association.

Examples of surface distresses are:

- For asphalt surfaces - Alligator Cracking / Distortion / Excessive Crown / Flushing / Longitudinal Cracking / Map Cracking / Patching / Edge Cracking / Potholes / Ravelling / Rippling / Transverse Cracking / Wheel Track Rutting

Roughness data was gathered by driving the road section in both directions at the posted speed limit with a passenger and assigning a ride comfort score according to the driver and passenger comfort level feedback.

Although this method is not as sophisticated as using expensive evaluation vehicles the Township also had trained evaluators walk a representative section of each section of the roadway to gather information on cracking, distortions, potholes, raveling, rippling, and wheel rutting. Through ride comfort evaluations, walking representative sections of each road, and thorough windshield surveys of actual road defects; the overall evaluation of condition is complete and thorough. Another option for an ongoing level of condition assessment is for public works personnel to perform simple windshield surveys as part of their regular patrols.

Paved Roads

The following analysis has been conducted at a high level, using industry standard activities and costs for paved roads. With future updates of this Asset Management Strategy, the Township may wish to run the same analysis with a detailed review of Township activities used for roads and the associated local costs for those work activities.

The following diagram depicts a general deterioration profile of a road with a 30-year life:

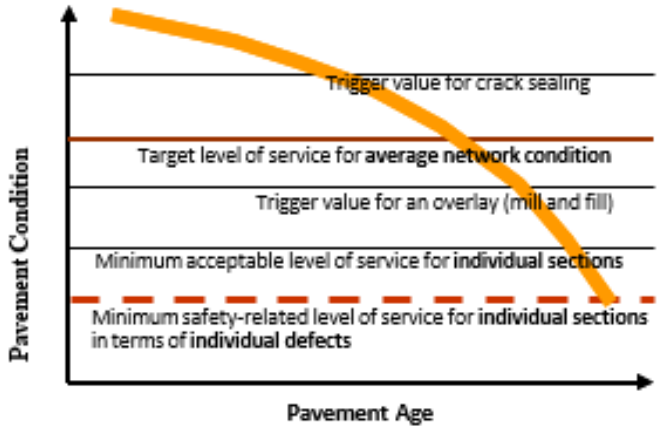

Figure 24: Asset Management Curve – Paved Road

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

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

Excellent Condition (Maintenance only phase)

Condition Range: l00 - 76

• Maintenance only

Good Condition (Preventative maintenance phase)

Condition Range: 75 - 51

• Crack Sealing

• Emulsions

Fair Condition (Rehabilitation phase)

Condition Range: 50-26

• Resurface - Mill & Pave

• Resurface - Asphalt Overlay

• Single & Double Surface Treatment (for rural roads)

With future updates of this Asset Management Strategy the Township may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the Township's work program. By adjusting these thresholds, it adjusts the level of service provided and ultimately changes the amount of money required. Adjustments will be an important component of future Asset Management Plans, as the Province requires each municipality to present various management options within the financing plan.

The table below outlines the costs for various road activities, the added life obtained for each, the condition range at which they should be applied, and the cost of 1 year added life for each (cost of activity/added life) to present an apples-to-apples comparison.

Treatment	***Est. Cost per m²***	***Additional Years of Life***	***Condition Range***	***Cost per Year of Added Life***
Urban Reconstruction	$190	35	25-0	$5.43
Urban Resurface	$85	20	50-26	$4.25
Rural Reconstruction	$140	35	25-0	$4.00
Rural Resurface	$50	18	50-26	$2.77
Crack Sealing	$2.50	4	75	$0.63

As in the table above, preventative maintenance activities such as crack sealing have the lowest associated cost (per sq. m) to obtain one year of added life. Unfortunately, preventative maintenance activities can only be applied to a road that is in a fairly low deterioration point in the life cycle. The Township should undertake a permanent preventative maintenance program for all paved roads and a portion of the maintenance budget could continuously be allocated to this.

Rehabilitation activities, such as resurfacing, single or double surface treatments for roads have a lower cost to obtain each year of added life than full reconstruction activities. The municipality engages in an active rehabilitation program for urban

and rural paved roads and a portion of the capital budget is dedicated to this. To implement the above programs, it is important to continually update a general condition score for each road segment, established through the assessment protocols as previously described. The "worst first" budget approach, where no life cycle activities other than reconstruction at the end of a roads life, will result in the costliest method of managing a road network overall.

Surface Treated Roads

The following analysis has been conducted at a high level, using industry standard activities and costs for surface treated roads. With future updates of this Asset Management Strategy, the Township may wish to run the same analysis with a detailed review of Township activities used for roads and the associated local costs for those work activities.

The following diagram depicts a general deterioration profile of a surface treated road with a 20-year total life:

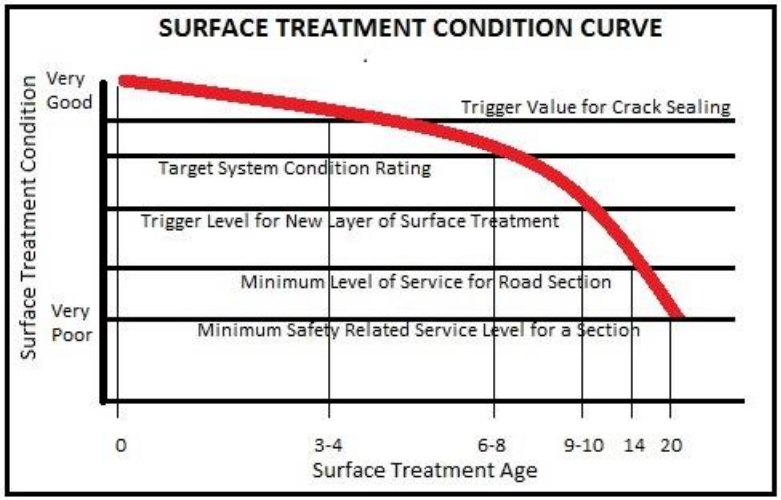

Figure 25: Surface Treatment Condition Curve

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

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

Excellent Condition (Maintenance only phase)

Condition Range: l00 - 76

• Maintenance only

Good Condition (Preventative maintenance phase)

Condition Range: 75 - 51

• Crack Sealing

• Early Single or Double Surface Treatment

Fair Condition (Rehabilitation phase)

Condition Range: 50-26

• Single & Double Surface Treatment

With future updates of this Asset Management Strategy the Township may wish to review the above condition ranges and thresholds for when certain types of work activity occur, and adjust to better suit the Township's work program. By adjusting these thresholds, it adjusts the level of service provided and ultimately changes the amount of money required. Adjustments will be an important component of future Asset Management Plans, as the Province requires each municipality to present various management options within the financing plan.

The table below outlines the costs for various road activities, the added life obtained for each, the condition range at which they should be applied, and the cost of 1 year added life for each (cost of activity/added life) to present an apples-to-apples comparison.

Treatment	***Est. Cost per m²***	***Additional Years of Life***	***Condition Range***	***Cost per Year of Added Life***
Rural Reconstruction	$110	25 -30	25-0	$4.40
Rural Resurface	$50	15 - 18	50-26	$3.33
Double Surface Treat	$36	10 -12	50-26	$3.60
Crack Sealing	$2.00	4	75	$0.50

Figure 38: Cost Benefit of Improvements

As in the table above, preventative maintenance activities such as crack sealing have the lowest associated cost (per m) to obtain one year of added life. Unfortunately, preventative maintenance activities can only be applied to a road that is in the early stages of degradation in the life cycle. The Township should undertake a permanent preventative maintenance program for its hard-topped road and a portion of the maintenance budget should continuously be allocated to this once roads are rehabilitated or rebuilt.

Rehabilitation activities, such as double surface treatments have a lower cost to obtain each year of added life than full reconstruction activities. Should the municipality engage in an active rehabilitation program for the road network and a large portion of the capital budget should be dedicated to this. To implement an effective program, it is important to continually update a general condition score for each road segment, established through the assessment protocols as previously described.

The "worst first" budget approach, where no life cycle activities other than reconstruction at the end of a roads life, will result in the costliest method of managing a road network overall.

Gravel Roads

As reported in the State of the Infrastructure section, the majority Strong's road network is comprised of gravel roads. The life cycle activities required for these roads are quite different from paved roads. Gravel roads require a cycle of perpetual maintenance, including re-grading, reshaping of the crown and cross section, gravel spot and section replacement, dust abatement as well as ditch clearing and cleaning.

Gravel roads can require frequent maintenance, especially after rainy periods, in the spring, and when accommodating increased traffic. Wheel motion shoves material to the outside as well as in-between travelled lanes, leading to rutting, reduced water-runoff, and eventual severe road deterioration. This deterioration process is prevented if interrupted early enough, simple re-grading and compaction is sufficient, with material being pushed back into the proper profile.

Similar studies elsewhere have found converting certain roadways to surface treated or paved surfaces can be very cost effective especially if frequent maintenance is required due to higher traffic volumes. There is also the option of converting

hardtops back to gravel if the needs of the Township do not warrant a costly new hardtop. Low traffic roads that were once hard topped don't always need to be re-hard topped when they are due.

Growth and Demand

A municipality should have specific plans associated with population growth. It is essential that the asset management strategy should address not only the existing infrastructure, as above, but must include the impact of projected growth on project schedules and funding requirements. Projects will include the funding of the introduction of new infrastructure, and/or the expansion of existing infrastructure to meet new demands.

SECTION 4:

Financial Strategy

General overview of financial plan requirements

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

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

The financial requirements for:

- Existing assets
- Exiting service levels
- Requirements of contemplated changes in service levels (in conjunction with resident surveys and public meetings)
- Requirements of anticipated growth

Use of traditional sources of municipal funds:

- Tax levies
- User fees

- Reserves
- Debt
- Development charges

Use of non-traditional sources of municipal funds:

- Reallocated budgets
- Partnerships
- Procurement methods

Use of senior government funds:

- Gas tax
- Grants (not included due to Provincial requirements for firm commitments)

If the financial plan component of an AMP results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the validity of a funding shortfall, the Province may evaluate a municipality's approach to the following:

All asset management and financial strategies have been considered. For example:

- If a zero-debt policy is in place, is it warranted? If not, the use of debt should be considered.
- Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.
- In order to reduce financial requirements, consideration has been given to revising services levels downward
- This AMP includes recommendations that avoid long-term funding deficits.

FINANCIAL INFORMATION for STRONG'S AMP

Funding Objective: To be fully sustainable in 10 years.

Funding scenarios have been formulated in such a way as to enable Strong to achieve full funding within 10 years for the following assets:

- Tax funded assets - roads, drainage and culverts, bridges, fleet, facilities (mixed)

- Rate funded assets - none

The scenario developed strategies have been included, where applicable, regarding the use of tax revenues and reserves.

STRATEGY FOR FULL FUNDING

An Example of the Thought Process

From the 2013 Asset Management Plan: “The present level of spending for maintenance activities is approximately $700,000 annually, funded from General Taxes. From the 2013 Asset Management Plan, there is around $300,000 set up for renewal/rehabilitation projects. The roads were identified as having current needs of $4.49M, Bridges at $0.3M.

An example of the process to determine the total annual infrastructure deficit:

The average annual investment requirement for:	Capital and Maintenance		Reserves
Roads and Drainage in 2017 and beyond is:	$800,912.00		$22,827.00
Bridges and Large Culverts require and annual investment of:	$159,625.00		$37,500.00
Fleet requires and annual investment of:	$130,346.00		$37,467.00
Facilities require and annual investment of:	$ 60,826.00		$78,727.00
TOTALS:	$1,151,509.00	+	$176,521.00 = **$1,328,230.00**

Revenue currently allocated to these assets is approximately $1,000,000 leaving an annual deficit of around $151,509 plus reserve.

To put it another way, these infrastructure categories are currently funded at 84.8% of their long-term requirements. The reserve funding for roads and drainage has been set at (expected life/cost of rehab) 14 or 25 years; which is not fully funded but is the first steps toward that goal. Bridges have been set at 30 and 100 years, while fleet is variable, and facilities are generally at 75 years. The total for full funding of these categories is $1,328,020.00 including inflation and reserve funding.

Full funding would require:

- An increase in revenue by around $328,000 for 2017 with further inflation increases in the following years

Current funding position

Strong's average annual asset investment requirements, current funding positions and funding increases required to achieve full funding on assets traditionally funded by taxes and user rates.

Revenue Requirements for Full Funding

A 10-year plan for full funding of assets is recommended. This involves full funding being achieved over 10 years by increasing expenditures in needed categories by an amount equal to the ten-year deficit plus inflation, divided by 10 for 10 years.
This plan if implemented over 10 years would achieve full funding in the 11th year by increasing taxes per the above tables to achieve full funding.
Although, increasing taxes immediately by the needed amount would alleviate the funding shortfalls, the Municipality over the previous number of years has not used progressive asset management strategies (as with most towns) to achieve the desired results. Therefore, the Township will need time to ramp up the required rates and percentages over several years to achieve financial sustainability. The plan requires prioritizing capital projects to fit the resulting annual funding envelopes but it does provide financial sustainability at the 10-year point.

Rate Funded Assets

The Strong Asset Management plan acknowledges the need for a full user pay system to fully fund the wastewater infrastructure.

When setting rates, the municipality takes the following factors into consideration:

- Conservation
- Fairness
- Rate and Revenue Stability
- Ease of Implementation
- Sustainability
- Economic Development

Funding through Debt

For reference purposes, Figure 40 outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0% over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed project

Interest Rates	***Number of Years Financed***					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.53%	2%	3%	4%	5%	7%	8%
0.03%	0%	0%	0%	0%	0%	0%

Figure 26: Interest Rates

Current interest rates are near all-time lows however, sustainable funding model includes short term debt and the risk of rising interest rates needs to be considered.

ADMINISTRATIVE ACTIONS

The Township will explore, as suggested through provincial requirements, which administrative solutions should be incorporated into the budgets for the road, drainage, bridges, fleet, and facility infrastructure programs. These solutions are such items as studies, policies, condition assessments, consultation exercises, etc., which could potentially extend the life of assets, lower total asset program costs in the future, or possibly remove the asset from municipal responsibility (closure).

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

Under this category of solutions, the Township should implement a complete condition assessment programs for their road, drainage, bridges, fleet, and facilities. An example of this is to look at the roads and determine what ones need attention, then look at the culvert pipes under the roads and determine what actions are necessary. Then look at the whole system of roads and drainage, and look for overlapping needs such as a road in need of repair and the culvert under the same road that needs to be replaced; then you have found a section that would be higher on the need scale than just a road in a similar condition without the culvert needs. This will lead to higher understanding of infrastructure needs, enhanced budget prioritization methodologies, and a clearer path of what is required to achieve sustainable infrastructure programs.

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

Some benefits of a complete condition programs within the overall asset management process are listed below:

- Understanding of overall condition leads to better management practices
- Allows for the establishment of rehabilitation programs
- Prevents future failures and provides liability protection
- Potential reduction in operation/maintenance costs
- Accurate current asset valuation
- Allows for the establishment of risk assessment programs

- Establishes proactive repair schedules and preventive maintenance programs
- Avoids unnecessary expenditures
- Extends asset service life therefore improving the level of service
- Improves financial transparency and accountability
- Enables accurate asset reporting which, in turn, enables better decision making

Condition assessment can involve different forms of analysis such as accepted opinion, failure prediction using engineering principles, materials testing, as well as other methods and can be completed through a very detailed or very cursory approach. When establishing the condition assessment of an entire asset class, the cursory approach (very good, good, fair, poor, very poor) is used. This will be a less-expensive approach when applied to dozens of assets, but will still provide up to date information, and will allow for detailed assessment or follow up inspections on those assets captured as fair, poor, or very poor condition later.

Council Comments

The Township of Strong Council agrees with this document, but would like to put on record that the funding currently available from the upper tiers of government is insufficient for the responsibilities undertaken from the municipality.The Council of the Township of Strong would welcome any funding assistance that could be provided by the upper tiers of government to help reduce our infrastructure deficit.

Thank You.