The City of Owen Sound

Asset Management Plan

December 2013

Adopted by Council March 24, 2014

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1 EXECUTIVE SUMMARY

The ability for the City of Owen Sound to provide services to the community relies on the existence of a network of assets and is restricted by the condition that those assets are in. Choosing a financially sustainable level of service and maintaining, rehabilitating and replacing assets in order to meet that level of service in the most efficient and effective manner is important for the fiscal health of the community.

The creation of and adherence to a detailed asset management plan will be instrumental in ensuring that the City is able to meet the financing needs associated with keeping assets in the condition they need to be in now and in the future. The asset management plan is a living document that will be updated annually as new information is obtained and refined as capital work is undertaken. This asset management plan for the City of Owen Sound meets the requirements set out in the Building Together Guide for Municipal Asset Management Plan published by the Province in 2013. The plan will be a resource for staff and Council when making decisions that impact how funds are raised, allocated and ultimately how projects are prioritized as those funds are spent.

There are currently five asset classes included in the financial plan being Roads (including curbs, sidewalks and guiderails), Bridges and Culverts, Stormwater network, Water network (not including plants and other equipment), and the Wastewater network (not including plants and other equipment). The scope of the plan will grow in the coming years to include other asset classes such as facilities and plants, traffic and streetlighting infrastructure, fleets, parks and park amenities, information technology and so on…

The following table summarizes the information documented within the plan.

Asset Class	2013 Replacement Value (,000's)	Value per Household	Overall Rating	Current Annual Deficit
Roads	$ 115,890	$ 11,589	D	$ 2,125,800
Bridges	$ 21,700	$ 2,170	A	$ 26,700
Stormwater	$ 81,986	$ 8,199	C	$ 477,300
Water	$ 70,008	$ 7,001	C	$ 247,000
Wastewater	$ 68,528	$ 6,853	D	$ 255,000
	$ 358,112	$ 35,811		$ 3,131,800

In current dollars, the total value of the assets included is close to $360 million. Using the data obtained from MPAC in 2012, this can be translated to a value of $35,811 per household. All households being equal this could be expressed as a homeowner's "equity" or investment in the City paid for through tax levies and utility rates as those services are used.

The plan highlights the impact that dedicated changes to tax levies and user fees may have on the total funding deficit related to these assets. Future years' budgets will be tied directly to the asset management plan highlighting the impact that spending decisions have on the condition, useful life and future funding needs.

2 INTRODUCTION

2.1 Vision

The services provided by a municipality are central to the experience of both residents and visitors alike. Physical assets owned and maintained by the municipality are essential for providing those services. An issue facing all levels of Government across Canada is aging infrastructure and the related financing needs associated with maintaining those assets.

The purpose of an Asset Management Plan is to help preserve, protect and enhance the quality of life within a municipality by systematically managing assets in an efficient, effective and sustainable manner. The objective of the City of Owen Sound Asset Management Plan is to:

- Provide levels of service that meet the needs of the community;
- Provide an asset management process that is effective, achievable, and efficient;
- Develop operating, maintenance, and capital financial plans that support the defined levels of service;
- Manage the assets in a sustainable manner; and
- Enable the collection, coordination, sharing, and communication of information in support of all the above

2.2 What is Asset Management?

Asset management is the coordinated activity in place to manage the way in which the City realizes value from its assets in order to provide services effectively and in a financially sustainable manner.

An asset management plan is a strategic document that states how a group of assets is to be managed over a period of time. The plan describes the characteristics and condition of infrastructure assets, the level of service expected from them, planned actions to ensure the assets are providing the expected level of service, and financing strategies to implement the planned actions.

Asset management takes more of a long-term perspective which results in more informed strategic decisions that optimize investments to better manage risk of infrastructure while taking into consideration other important factors, such as official plans, strategic initiatives, and climate change. Good asset management does not only maximize the benefits provided by the infrastructure, but also affords the opportunity to achieve cost savings by spotting deterioration early on and taking action to rehabilitate or renew the asset.

Asset management represents a way of doing business that bases decisions on quality data. The goal of an asset management program is to build, maintain and operate infrastructure cost effectively, provide value to the customer, and improve the credibility and accountability of the municipality. Asset management is a move away from the current infrastructure management system to managing a network of interrelated assets with interdependent programs and services so that scarce resources ($) are properly allocated amongst competing asset needs.

Some of the benefits of asset management include:

- Providing the ability to show how, when, and why resources need to be committed by knowing the total investment required to maintain infrastructure assets at acceptable levels to support sound decision making;

- Decisions can be made between competing assets needs to ensure that the priorities of each asset type are being met, reducing the amount of unplanned or high priority maintenance/emergency activities that require response before the next budgeting cycle;

- Monitoring the performance of assets over the long term to ensure an adequate level of service is maintained and the ability to measure the progress made in achieving the performance targets;

- Lifecycle costing to identify the investment required to operate, maintain, renew, and replace an asset. Determining how much it will cost enhances financial planning and helps decision makers to select the most cost effective options; and

- Funding decisions can be made with a view of the total cost to be incurred over the useful life of an asset.

To implement a successful asset management plan the following seven major questions will need to be answered for each network of assets:

1. What do we own? (*Inventory*)
2. What is it worth? (*Valuation*)
3. What condition is it in? (*Condition & Performance*)
4. What do we need to do to it? (*Lifecycle Activities*)
5. When do we need to do it? (*Useful Life*)
6. How much money do we need? (*Replacement Profile*)
7. How do we reach sustainability? (*Investment Profile*)

2.3 Link to Strategic Plan

In 2012 Owen Sound City Council approved a new strategic plan. An asset management program supports the strategic plan in several focus areas.

Proper asset management promotes *Fiscal Responsibility* through a plan that helps Council prioritize projects on a risk assessed needs basis and allocate funding sources to meet those needs in a way that is financially sustainable. The timing of spending on maintenance and renewal is such that the Municipality will maximize the benefit of its assets and their associated useful lives.

The asset management program supports *Community Building* by taking the needs of the community into consideration when determining service level goals and ensuring that assets are in place and functioning appropriately in order to provide the services essential in supporting Owen Sound's vision of being "Where you want to live".

Having the asset management plan as a reference will assist Council in making decisions regarding *Economic Development* as it is a tool that can be used to visualize the future costs associated with new infrastructure ensuring that growth is sustainable and responsible.

Closing the funding deficit on existing assets and ensuring that financial resources are in place to support new growth infrastructure are the main objectives of the asset management plan. The City's progress towards meeting this objective is a metric that will be used going forward to ensure that Council is following the strategic plan and the City is meeting its goals.

2.4 The Plan

While asset management is not a new concept to the City of Owen Sound, up until now there has not been a documented asset management plan in place. In 2012 through the Municipal Infrastructure Investment Initiative Program the Province of Ontario tied future infrastructure funding assistance to a requirement that municipalities must demonstrate that a full range of available financing and revenue generation tools have been explored and applied prior to requesting financial support from the

Government. In addition, projects selected for provincial funding must be compared against other projects in order to prove their priority based on their condition and the need for investment. By having an asset management plan in place the City will meet this requirement. The plan will not only assist the City to qualify for future Provincial funding programs, but will also be a tool to allocate other funding sources to renewal projects in the most efficient and cost effective manner.

The elements of an asset management plan include a state of local infrastructure report; documentation of desired levels of service; a strategy for meeting those levels of services; and the financing requirements of that strategy including timing and dollar amounts.

The state of local infrastructure summarizes the *"who, what and where"* of the City's assets. It inventories the City's assets, provides historical cost information, replacement cost valuation as well as other attributes such as age, condition and expected useful life. This component of the plan is updated annually to ensure that inventories are complete and accurate. Condition assessments will be performed on a rotating schedule to ensure that the physical attribute information does not get out of date.

Documentation of desired levels of service will include targets for services that take into account community expectations, strategic and corporate goals, legislative requirements and expected asset performance. Levels of service will be measured in several ways for each type of asset including operational indicators such as number of breaks in a water main or the pavement condition index on road segments. Strategic indicators could include the percentage of reinvestment over the total value of the asset category while tactical indicators may be the operating cost per asset unit of measure.

The asset management strategy will include the activities that will be required in order to meet the desired levels of service. These actions may include regular maintenance and renewal activities, timing the replacement of assets that have reached the end of their useful lives as well as non infrastructure solutions such as implementing policies and using land use planning to lower costs and maximize the useful lives of assets. The management strategy will take risk assessments into consideration in prioritizing projects and maintenance activities.

Finally the financing strategy will use the information generated in the preceding components of the plan to calculate what the cost of annual planned activities will be. The financing strategy will consider all available funding sources including but not limited to reserves, debt instruments, user fees and the tax levy as well as known contributions from third parties. The ultimate result will be a deficit or surplus that is the difference between expenditure requirements and available financing. Closing this gap is the ultimate objective of the Asset Management Plan.

An asset management committee was formed to develop a work plan in order to meet the Provincial requirements of having a plan in place that addresses roads, bridges, water, and wastewater systems. By the end of 2013 these assets will be covered by each element of the plan. The initial plan will also include sidewalk and storm sewer infrastructure although these asset classes are not yet mandated to be included by the Province. Other assets making up the total asset inventory will be added to the plan in stages as identified in **Appendix A**. Recreation and administration facilities, fleets and machinery, traffic and street lighting were identified as a high priority. Parks amenities, trails, paved areas, information technology and other equipment will also be added.

The asset management plan will cover a period of 50 years and will require rotating updates every 5 years in order to ensure that condition assessments are up to date and that the inventory of assets is complete. Asset data will be stored in enterprise wide systems such as the Geographical Information System (GIS), the City's financial system and in the capital planning software of CityWide.

2.5 Next Steps

As the plan is completed and asset classes are added, the Asset Management Plan will be an integral part of the City's Operations. The asset management plan will feed the long range financial plan of the City and assist the City in achieving its strategic goals. With the knowledge and support of the community, Council and staff will make decisions that ensure the long-term sustainability of the City.

3 STATE OF LOCAL INFRASTRUCTURE

3.1 Summary Report Card

City of Owen Sound Infrastructure Report Card				
Asset Network	Condition vs. Performance Rating	Funding vs. Need Rating	Overall Rating	Comments
All Linear Assets	**Fair (59%)**	**Fair (63%)**	**C**	**Approximately 11% of all linear assets have less than 20% of their service life remaining or have exceeded their estimated service life entirely.**
Roads	Good (61%)	Very Poor (20%)	D	While 50% of the road network is in good to fair condition nearly 20% is in poor to very poor condition
Bridges	Good (69%)	Very Good (100%)	A	History of investment has been very good including replacement of 9th St Bridge and pedestrian bridge at Harrison Park.
Water Distribution	Good (66%)	Good (70%)	C	About 40% of the water distribution network is in good to fair condition however 15% is in poor to very poor condition.
Wastewater Collection	Fair (52%)	Good (75%)	C	While 50% of the wastewater collection is in good to fair condition nearly 30% is in poor or very poor condition.
Stormwater Collection	Fair (48%)	Poor (40%)	D	Only 45% of the stormwater collection system is in very good to good condition with 30% in poor to very poor condition.

1. Each asset network is rated on two key, equally weighted (50/50) dimensions: Condition vs. Performance, and Funding vs. Need.
2. The 'Overall Rating' is the average of the two dimensions converted to letter grades.

3.2 Base Data

In order to understand the full inventory of linear infrastructure assets the City retained the services of a consultant to review and extract asset information from various incomplete asset databases, dated inventory maps, and over 3,500 as-built drawings. The consultant also conducted limited in-field data collection and assessment for the entire road network including the guiderail, curb and sidewalk components as well as 3D-Imaging for almost all sanitary manholes. This data forms the basis for analysis and the entire Asset Management Plan. The methodology, process and assumptions made to develop the asset inventory for Roads, Bridges, Water, Wastewater and Stormwater networks can be found in **Appendix B to F** respectively.

3.3 Asset Rating Criteria

Each asset network will ultimately be evaluated based on two key dimensions, Condition vs. Performance and Funding vs. Need.

3.3.1 Condition vs. Performance

A combination of the Estimated Service Life (ESL) and known asset condition (where available) was used to estimate the Percentage of Remaining Service life (%RSL) for each asset. The %RSL for each asset was then weighted (based on replacement value), and used to provide the weighted average %RSL for the asset. Assets are then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 1** below. Individual infrastructure asset scores were then aggregated up to the Component level and then to the Network level in order to provide an overall system Condition vs. Performance rating.

3.3.1.1 Asset Estimated Service Life

An asset's ESL is the period of time that it is expected to be of use and fully functional to the City. Once an asset reaches the end of its service life, it will be deemed to have deteriorated to a point that necessitates replacement. The ESL for each asset component will be established by using a combination of the City staff's knowledge and experience, as well as industry standards. Individual ESL's will be used in conjunction with the original construction dates to determine the theoretical Remaining Service Life (RSL) of each asset.

3.3.1.2 Asset Condition

The City can undertake numerous investigative techniques in order to determine and track the physical condition of its infrastructure. For instance, the interior of sanitary and stormwater pipes can be routinely inspected using CCTV (closed circuit television) inspection. These inspections are guided by standard principals of defect coding and condition rating that allow for a physical condition "score" for the infrastructure to be developed. For infrastructure without a standardized approach to condition assessment scoring, information such as visual inspections, bridge audits, annual pavement inspections, watermain break records and other maintenance related observations can be used in establishing the condition of the asset.

Table 1: Rating Categories based on Service Life and Condition

Rating Category	% of Remaining Service Life (RSL)	Definition
Very Good	81% - 100%	**Fit for the Future** - The infrastructure in the system or network is generally in very good condition, typically new or recently rehabilitated. A few elements show general signs of deterioration that require attention.
Good	61% - 80%	**Adequate for Now** - Some infrastructure elements show general signs of deterioration that require attention. A few elements exhibit significant deficiencies.
Fair	41% - 60%	**Requires Attention** - The infrastructure in the system or network shows general signs of deterioration and requires attention with some elements exhibiting significant deficiencies.
Poor	21% - 40%	**At Risk** - The infrastructure in the system or network is in poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration.
Very Poor	< 20%	**Unfit for Sustained Service** - The infrastructure in the system or network is in unacceptable condition with widespread signs of advanced deterioration. Many components in the system exhibit signs of imminent failure, which is affecting service or has effectively exceeded its theoretical service life.

3.3.2 Funding vs. Need

The second evaluation criterion reflects the status of funding dedicated to maintain, rehabilitate, replace, and improve the current condition of existing infrastructure. Infrastructure systems need funding that is dedicated, indexed, and long-term. The primary measure is the actual amount of funding provided versus the estimated investment required to meet or maintain the desired levels of service. The calculated ratio is then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 2** below.

To determine the current level of funding, the plan uses the most recent five year average of budgeted spending, funded by traditional sources of municipal funds and committed senior government grants. Traditional sources of municipal funds include taxation, user fees, reserves and debt. Development charges are not typically used for asset management as by definition, projects funded by these levies are new growth projects and do not include the rehabilitation and maintenance of pre existing infrastructure. Dedicated funds such as user fees and debt issued need to be applied only to infrastructure systems for which they are raised. Committed senior government grants include programs such as the federal and provincial gas tax where an ongoing agreement has been executed. Funding received as part of a onetime grant program is not included as the Provincial requirements for asset management plan specifically excludes these types of grants. While the funding versus need ratio is expressed as a percentage of dollars it is important to recognize that dollars are not the only scarce resource that limits annual spending. Time is a major factor as well. Even if there were revenue sources available to completely fund annual needs requirements, consideration must be made for available staff time that is required to manage the projects undertaken.

When calculating need, replacement costs are entered onto a timeline over the next 50 years using the condition and age information for each asset. Maintenance and construction costs also need to be considered in the evaluation of need. Steady funding provides for maintenance that extends the life of infrastructure. Once the replacement profile is determined, the average annual spending requirement can be calculated. This is the measure of a steady annual investment that would be required to meet future needs completely. This measure is provided in current year dollars and does not take inflation into account.

Table 2: Rating Categories based on Funding Levels

Rating Category	Description
Very Good	91% - 100% of the Funding need is supported.
Good	76% - 90% of the Funding need is supported.
Fair	61% - 75% of the Funding need is supported.
Poor	46% - 60% of the Funding need is supported.
Very Poor	< 45% of the Funding need is supported.

3.3.3 Blended Rating

The overall rating for each asset network should be based on the consolidation of the Condition vs. Performance rating and the Funding vs. Need rating. At some point the City may want to consider Capacity vs. Need as an additional asset evaluation criterion that relates the demand on a system, such as volume or use, to its design capacity.

For the initial State of Local Infrastructure assessment each factor will contribute equally to the overall rating as indicated in **Table 3** below.

Table 3: Overall Rating Contribution

Rating Category	Weighting Factor	Overall Rating
Condition vs. Performance	50%	} A to F
Funding vs. Need	50%	

In the future the City may want to adjust the contribution of each factor to better reflect their relative impact on sustainability. The Funding vs. Need criterion appears to be the most critical for most municipalities in terms of sustainability. For example, quite often new infrastructure assets are built through grants, development charges, or other external sources of funding with little or no consideration of its proper maintenance, rehabilitation, and ultimate replacement. In these cases, the newer asset may have received a very favourable Condition vs. Performance rating, but it will receive a low rating in the Funding vs. Need category due to the lack of financial investment and planning that compromise the long-term sustainability of the asset.

The overall rating ratio is then placed into one of five rating categories ranging from Very Good to Very Poor as shown in **Table 4** below to provide a letter grade for the asset network.

Table 4: Overall Letter Grade

Letter Grade	Rating Category	Description
A	Very Good	≥ 80%
B	Good	70% - 79%
C	Fair	60% - 69%
D	Poor	50% - 59%
F	Very Poor	< 50%

3.4 Road Network

3.4.1 Inventory

The road network that serves the City of Owen Sound consists of various types of arterial, collector, and local roadways as well as other associated asset components such as curbs, guiderails and sidewalks. These components have been identified within **Table 4** below.

Table 4: Road Network Inventory

Asset Type	Asset Component	Quantity (km)	Lane (km)
Road Network	Arterial	27.2	69.6
	Collector	20.7	42.1
	Local	67.5	134.1
	Total Roads	**115.5**	**245.7**
	Sidewalks	104.0	
	Curb	126.0	
	Guiderail	6.5	

The information used to compile the above inventory was determined by conducting in-field data collection using the assessment and appraisal forms contained within the document of assumptions in **Appendix B**.

3.4.2 Valuation

The replacement cost for the road network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the road network and associated components, based upon current dollar value (2013) is **$115.9 Million**. The following table (**Table 5**) and associated pie-chart (**Figure 1**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 5: Road Network Replacement Value

Asset Type	Asset Component	Quantity (km)	Replacement Value (2013)
Road Network	Arterial	27.2	$ 29,469,573
	Collector	20.7	$ 14,732,719
	Local	67.5	$ 42,096,256
	Sidewalks	104.0	$ 16,637,777
	Curb	126.0	$ 11,969,072
	Guiderail	6.5	$ 984,706
		TOTAL	**$ 115,890,102**

As can be seen from the pie chart of **Figure 1**, the City's local roadways by themselves make up nearly 40% of the network based on replacement value.

If this total asset value is translated to an average value per household assuming 10,000 dwellings, then the average household would have an investment of approximately $11,600 in road network assets.

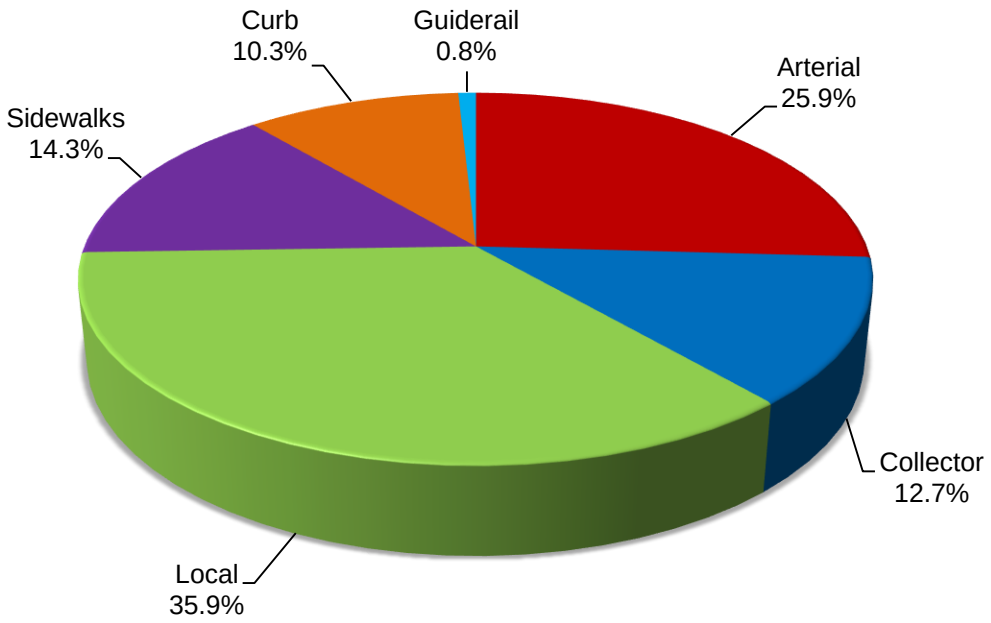

Figure 1: Breakdown of Road Network Components by Value

3.4.3 Condition vs. Performance

Figure 2 below demonstrates that about 50% of the road network is in good to fair condition, but that nearly 20% is in poor or very poor condition representing approximately $22.1 Million.

The overall Condition & Performance rating for the entire road network and associated assets is Good (61%), meaning that on average, the road network assets are 39% into their weighted average estimated service life of 32 years, and have 61% of their service life remaining (i.e. the weighted average estimated age of the road network is 12 years old).

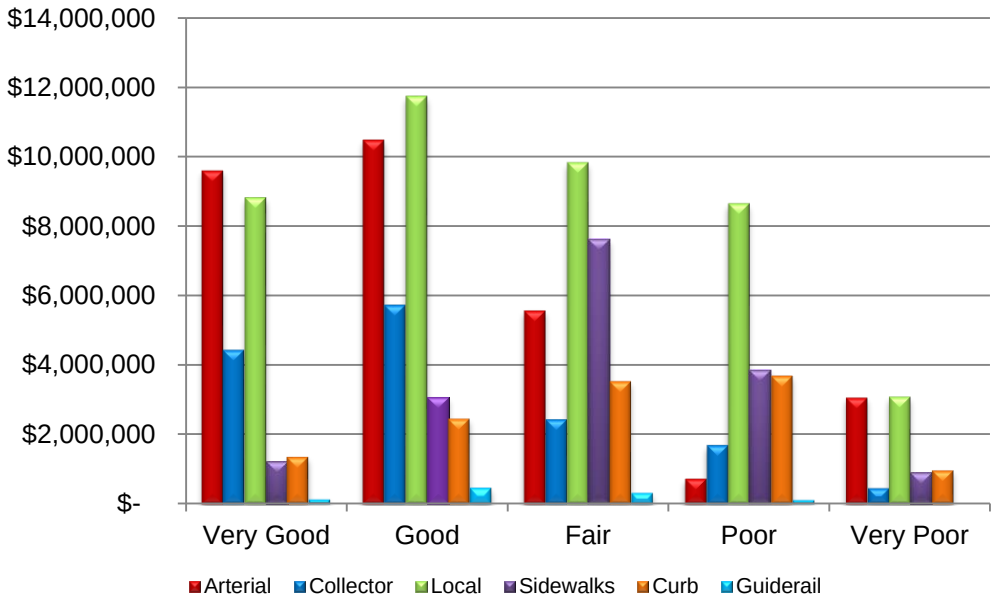

Figure 2: Road Network Condition by Replacement Value

3.4.4 Funding vs. Need

Figure 3 plots on a timeline the expected replacement cost in current year dollars for all road assets including sidewalks, curbs and guiderails. The replacement years are determined based on the current condition of the asset and the asset's expected remaining useful life given that condition. The top horizontal line represents the average annual spending required to meet all current and future financial obligations. The bottom horizontal line represents the average of five years budgeted spending (2010 to 2014). Based on the above assumptions and data known at this time, Owen Sound's average annual funding requirement is approximately $2.7 Million. Based on the current five year average annual funding of $575,000, the roads annual deficit is **$2.125 Million** with a funding vs. need ratio of just over 20.0%.

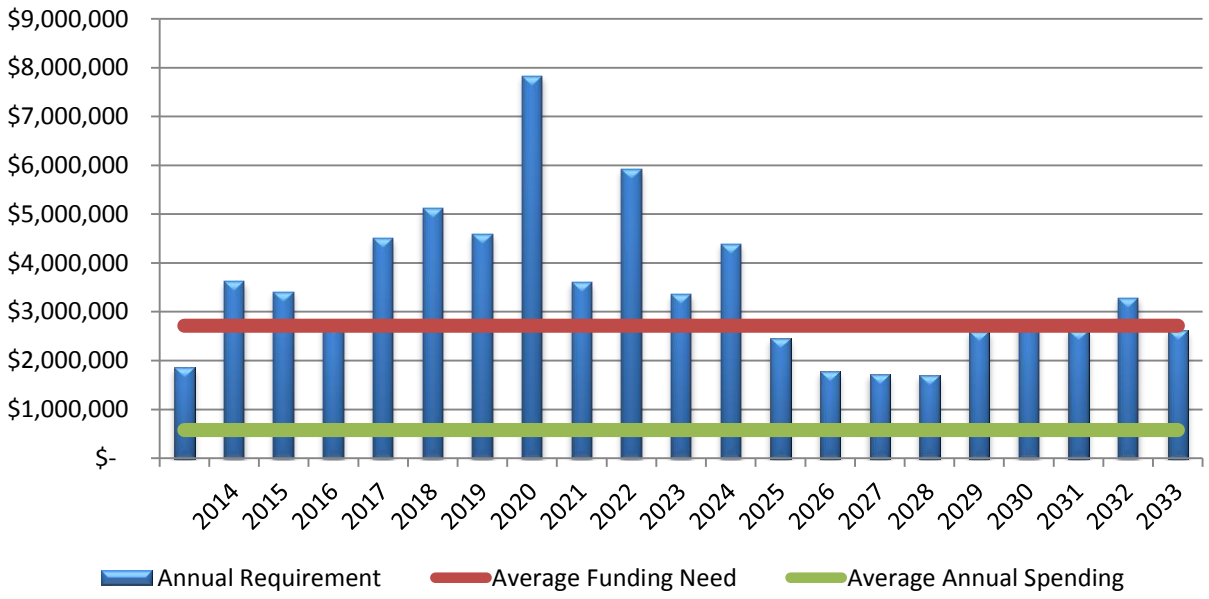

Figure 3: Road Network Funding Requirement

3.5 Bridge Network

3.5.1 Inventory

The bridge network that serves the City of Owen Sound consists of various types of bridge structures and culverts. These components have been identified within **Table 6** below.

Table 6: Bridge Network Inventory

Asset Type	Asset Component	Quantity (m^2)	Count (ea)
Bridge Network	Bridges	2249	10
	Culverts	1452	15
	Total	**3701**	**25**

The information used to compile the above inventory was determined from the 2012 bi-annual OSIM bridge inspection reports. The document of assumptions for the bridge network can be found in **Appendix C**.

3.5.2 Valuation

The replacement cost for the bridge network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the bridge network and associated components, based upon current dollar value (2013) is **$21.7 Million**. The following table (**Table 7**) and associated pie-chart (**Figure 3**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 7: Bridge Network Replacement Value

Asset Type	Asset Component	Count (ea)	Replacement Value (2013)
Bridge Network	Bridges	10	$ 13,950,000
	Culverts	15	$ 7,750,000
		TOTAL	**$ 21,700,000**

As can be seen from the pie chart of **Figure 4**, the City's bridges make up over 60% of the network based on replacement value.

If this total asset value is translated to an average value per household assuming 10,000 dwellings, then the average household would have an investment of approximately $2,200 in bridge network assets.

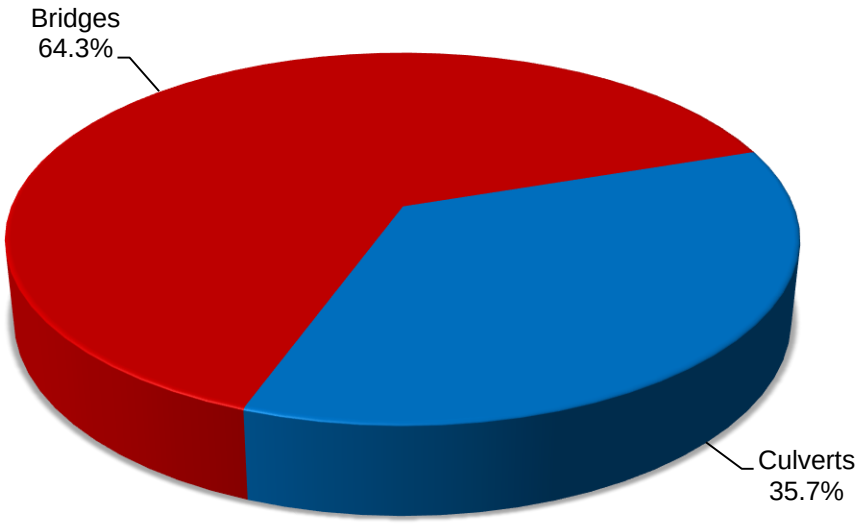

Figure 4: Breakdown of Bridge Network Components by Value

3.5.3 Condition vs. Performance

Figure 5 below demonstrates that about 70% of the bridge network is in good to fair condition, but that 5% is also in poor or very poor condition representing approximately $1.0 Million.

The overall Condition & Performance rating for the entire bridge network and associated assets is Good (69%), meaning that on average, the bridge network assets are 31% into their weighted average estimated service life of 70 years, and have 69% of their service life remaining

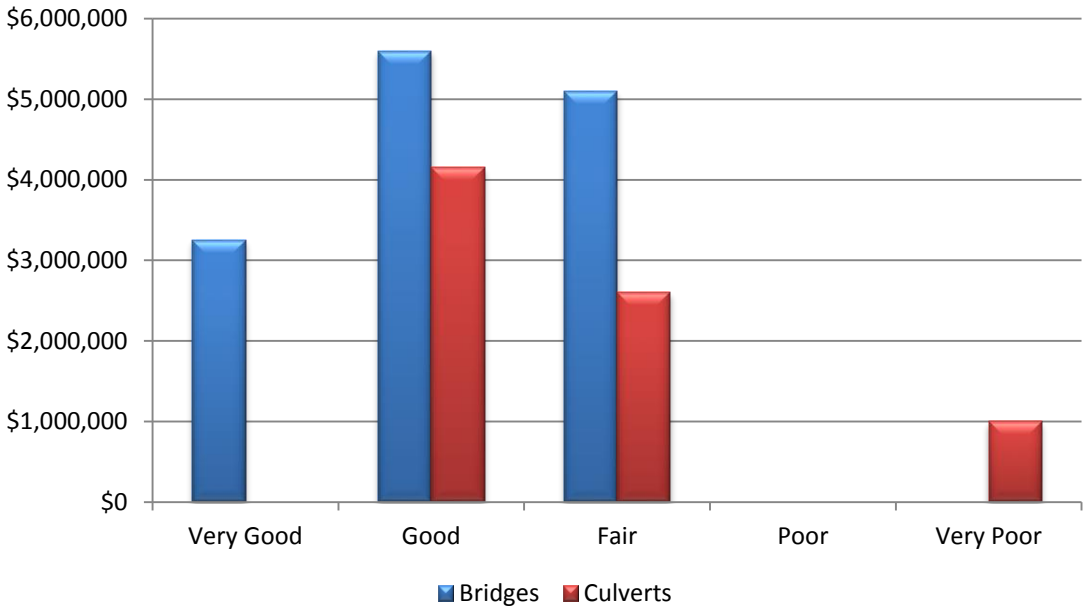

Figure 5: Bridge Network Condition by Replacement Value

3.5.4 Funding vs. Need

In **Figure 6** the annual financial requirements for the Bridge and Culvert assets are shown on the timeline. The average annual funding requirement is $360,000 and the five year average funding is just below that at $333,300. As a result there is no funding deficit in bridges. So long as the annual funding to bridge and culvert capital rehabilitation and maintenance remains at the same level, this asset class will remain fully funded.

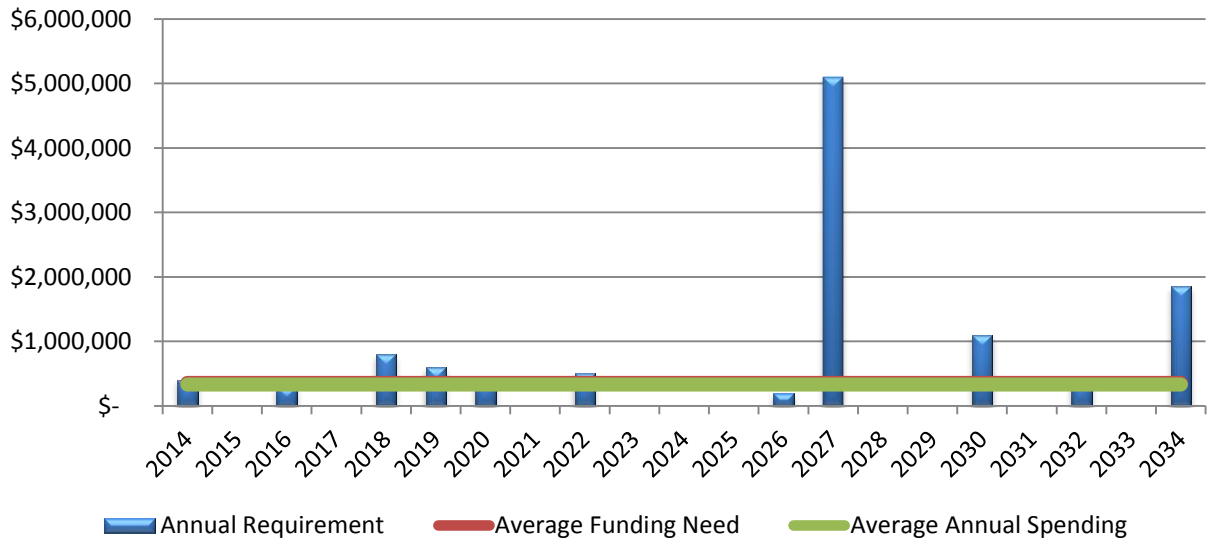

Figure 6: Bridge and Culvert Funding Requirement

3.6 Water Distribution Network

3.6.1 Inventory

The water distribution network that serves the City of Owen Sound consists of various types and diameter of watermain, valves, and fire hydrants. These components have been identified within **Table 8** below.

Table 8: Water Distribution Network Inventory

Asset Type	Asset Component	Quantity
Water Distribution	Watermain	142.3 (km)
	Valves	1530 (ea)
	Fire Hydrants	653 (ea)

The information used to compile the above inventory was determined from various incomplete databases, dated inventory maps, and as-built drawings. The document of assumptions for the water distribution network can be found in **Appendix D**.

3.6.2 Valuation

The replacement cost for the water distribution network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the water distribution network and associated components, based upon current dollar value (2013) is **$69.1 Million**. The following table (**Table 9**) and associated pie-chart (**Figure 7**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 9: Water Distribution Network Replacement Value

Asset Type	Asset Component	Quantity	Replacement Value (2013)
Water Distribution	Watermain *	142.3 (km)	$ 61,915,345
	Valves	1530 (ea)	$ 3,528,800
	Fire Hydrants	653 (ea)	$ 4,564,000
		TOTAL	**$ 70,008,145**

* includes replacement of water service laterals

As can be seen from the pie chart of **Figure 7**, the City's water mains make up 90% of the water distribution network based on replacement value.

If this total asset value is translated to an average value per household assuming 10,000 dwellings, then the average household would have an investment of approximately $6,900 in water network assets.

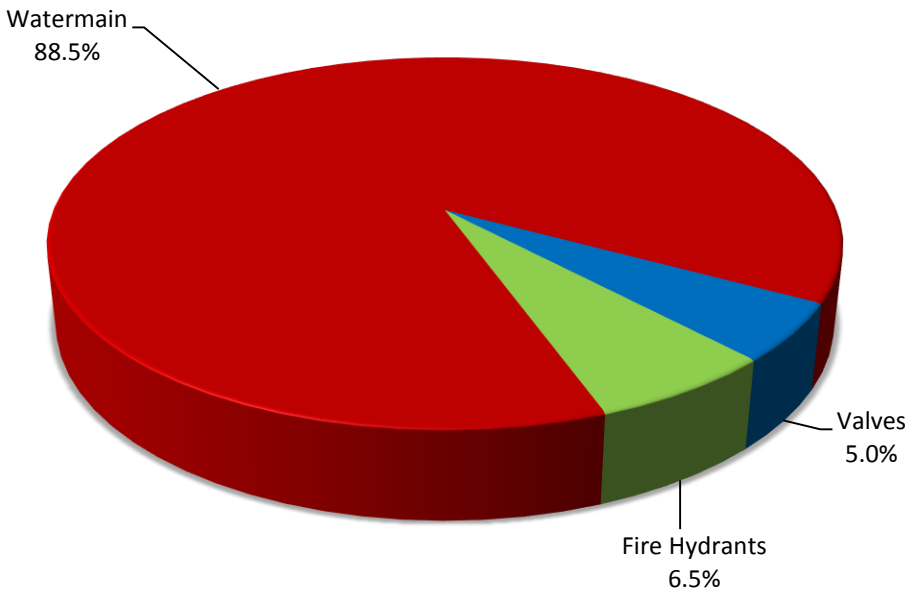

Figure 7: Breakdown of the Water Distribution Network Components by Value

3.6.3 Condition vs. Performance

Figure 8 below demonstrates that about 40% of the water distribution network is in good to fair condition, however approximately 15% is in poor or very poor condition representing about $11.3 Million.

The overall Condition & Performance rating for the entire water distribution network and associated assets is Good (66%), meaning that on average, the water distribution network assets are 34% into their weighted average estimated service life of 79 years, and have 66% of their service life remaining (i.e. the weighted average estimated age of the water distribution network is 27 years old).

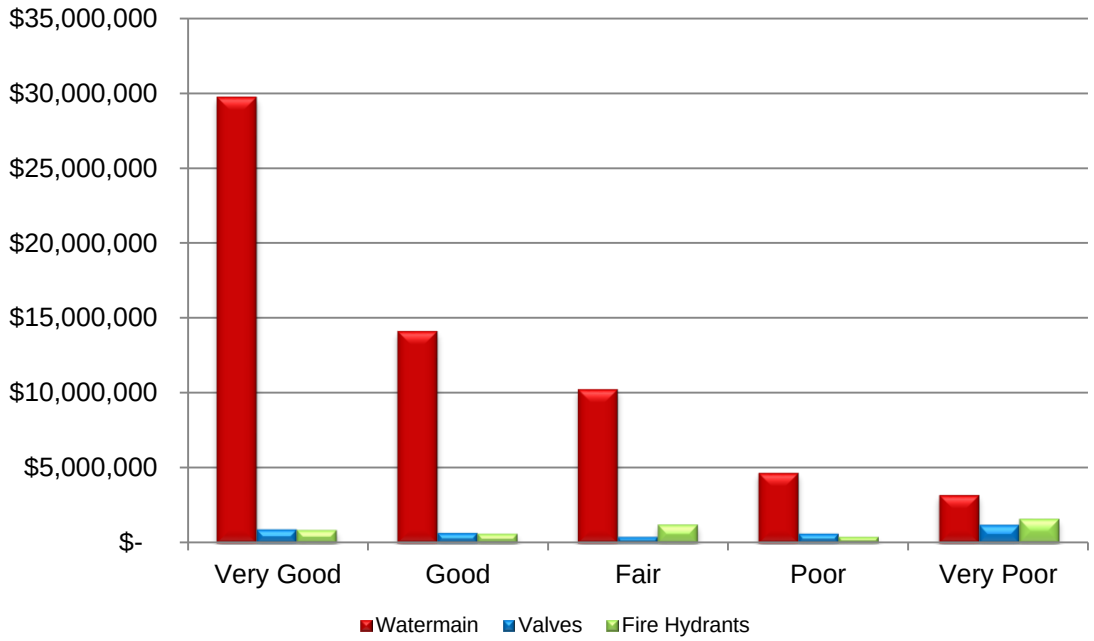

Figure 8: Water Distribution Network Condition by Replacement Value

3.6.4 Funding vs. Need

In **Figure 9** the funding deficit for the water network is shown to be **$247,000** with a funding versus need ration of 70%. This ratio reflects an annual funding need of $800,000 and average current spending at approximately $560,000.

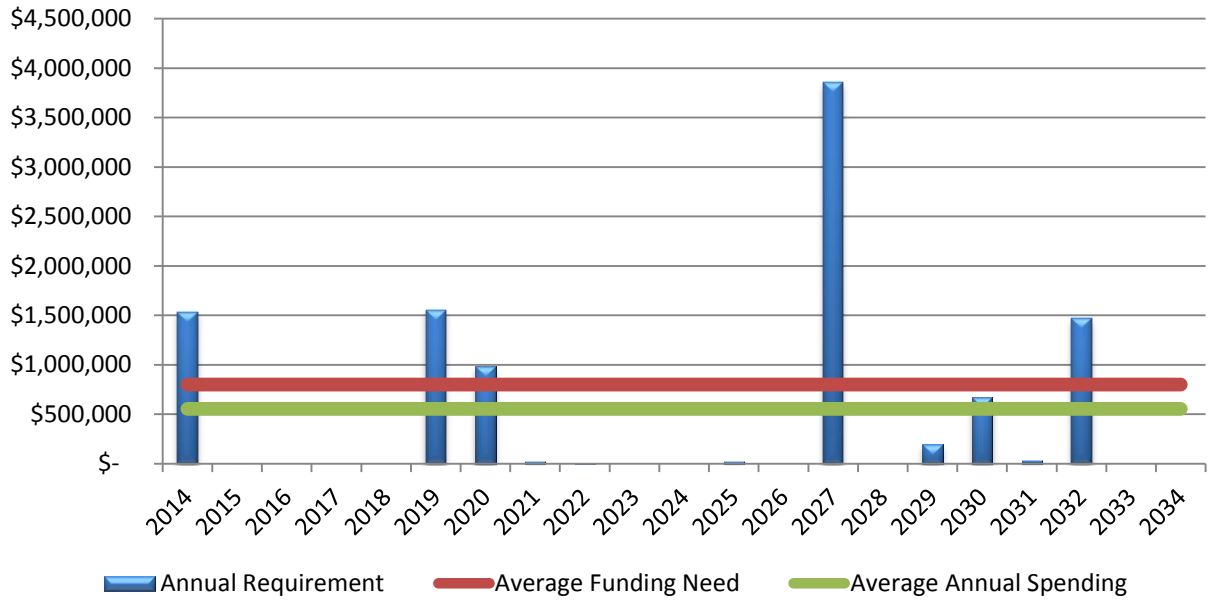

Figure 9: Water Network Funding Requirement

3.7 Wastewater Collection Network

3.7.1 Inventory

The wastewater collection network that serves the City of Owen Sound consists of various types and diameter of sanitary collection pipe and manholes. These components have been identified within **Table 10** below.

Table 10: Wastewater Collection Network Inventory

Asset Type	Asset Component	Quantity
Wastewater Collection	Collection Pipes	110.7 (km)
	Manholes	1526 (ea)

The information used to compile the above inventory was determined from 3D-Imaging of nearly all sanitary manholes. The document of assumptions for the wastewater collection network can be found in **Appendix E**.

3.7.2 Valuation

The replacement cost for the wastewater collection network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the wastewater collection network and associated components, based upon current dollar value (2013) is **$68.5 Million**. The following table (**Table 11**) and associated pie-chart (**Figure 10**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 11: Wastewater Collection Network Replacement Value

Asset Type	Asset Component	Quantity	Replacement Value (2013)
Wastewater Collection	Collection Pipes	110.7 (km)	$ 56,843,441
	Manholes	1526 (ea)	$ 11,684,250
		TOTAL	**$ 68,527,691**

* includes replacement of wastewater service laterals

As can be seen from the pie chart of **Figure 10**, the City's sanitary collection pipes make up over 80% of the wastewater collection network based on replacement value.

If this total asset value is translated to an average value per household assuming 10,000 dwellings, then the average household would have an investment of approximately $6,850 in wastewater network assets.

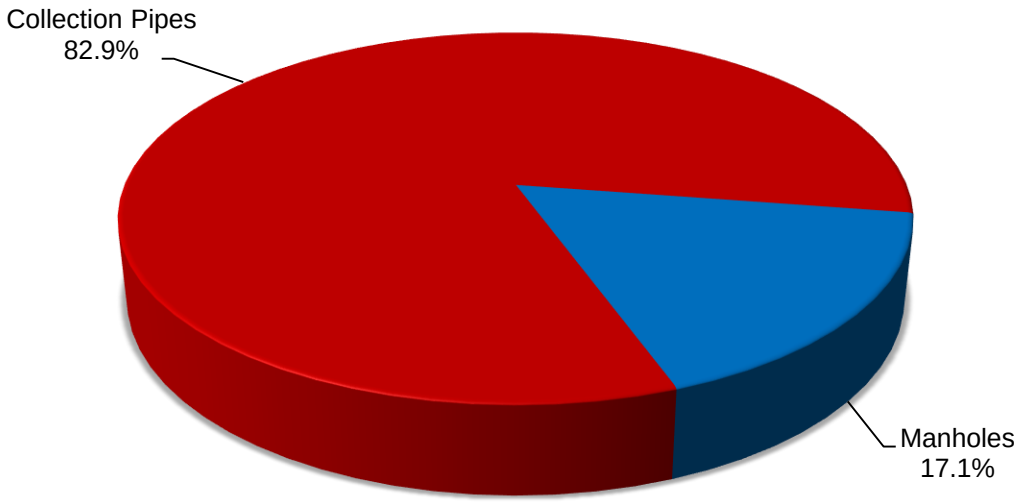

Figure 10: Breakdown of the Wastewater Collection Network Components by Value

3.7.3 Condition vs. Performance

Figure 11 below demonstrates that about 50% of the wastewater collection network is in good to fair condition, but that approximately 30% is in poor or very poor condition representing about $20.9 Million.

The overall Condition & Performance rating for the entire wastewater collection network and associated assets is Fair (52%), meaning that on average, the wastewater collection network assets are 48% into their weighted average estimated service life of 79 years, and have 52% of their service life remaining (i.e. the weighted average estimated age of the wastewater collection network is 38 years old).

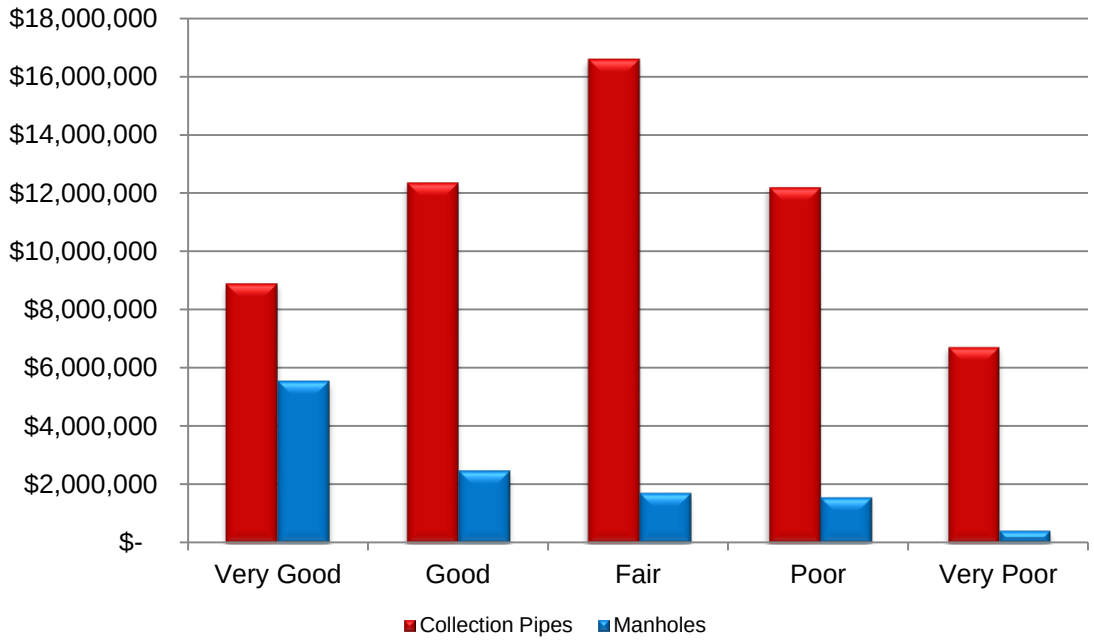

Figure 11: Wastewater Collection Network Condition by Replacement Value

3.7.4 Funding vs. Need

Figure 12 graphs the funding deficit for the waste water network which is **$255,000**. The average annual requirement is $990,000 and current average spending is $735,000, giving a funding vs. need ratio of approximately 75%.

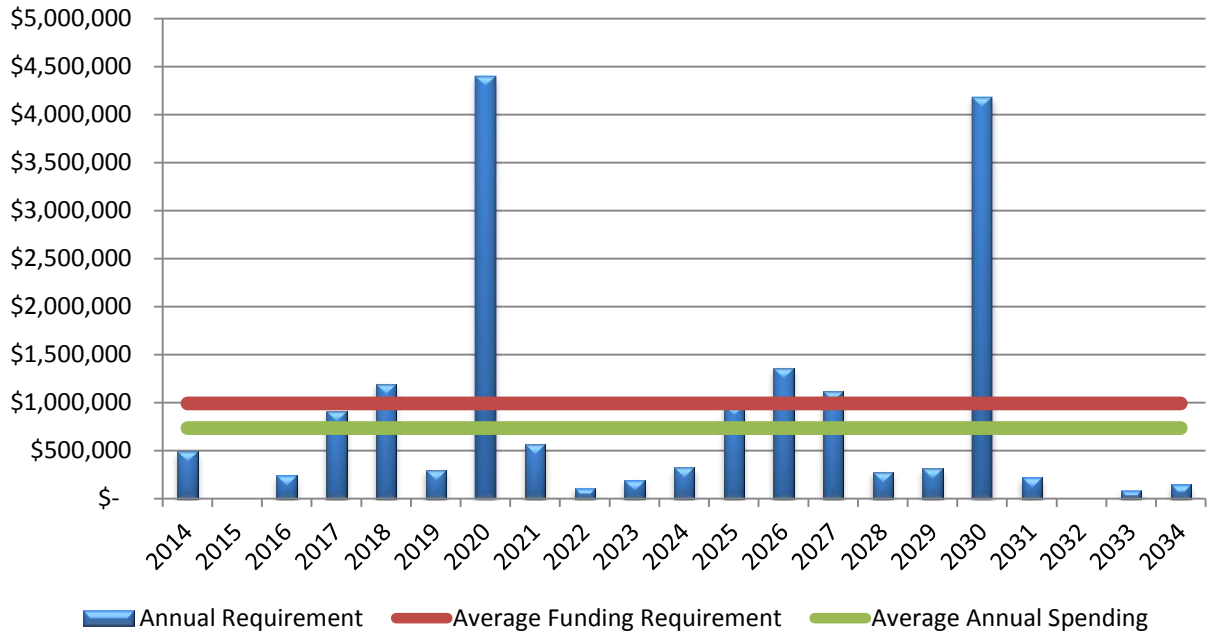

Figure 12: Waste Water Network Funding Requirement

3.8 Stormwater Collection Network

3.8.1 Inventory

The stormwater collection network that serves the City of Owen Sound consists of various types and diameter of stormwater collection pipes, manholes, leads, catch basins, and ditch inlets. These components have been identified within **Table 12** below.

Table 12: Stormwater Collection Network Inventory

Asset Type	Asset Component	Quantity
Stormwater Collection	Collection Pipes	76.0 (km)
	Manholes	1618 (ea)
	Catch Basin/Ditch Inlets	2410 (ea)
	Leads	11.9 (km)

The information used to compile the above inventory was determined from various incomplete databases, dated inventory maps, and as-built drawings. The document of assumptions for the stormwater collection network can be found in **Appendix F**.

3.8.2 Valuation

The replacement cost for the stormwater collection network was estimated using current standards, historical tender pricing, and current market replacement values. The estimated replacement value of the stormwater collection network and associated components, based upon current dollar value (2013) is **$82.0 Million**. The following table (**Table 13**) and associated pie-chart (**Figure 13**) provides a breakdown of the contribution of each of the network components to the overall system value.

Table 13: Stormwater Collection Network Replacement Value

Asset Type	Asset Component	Quantity	Replacement Value (2013)
Stormwater Collection	Collection Pipes	76.0 (km)	$ 47,536,952
	Manholes	1618 (ea)	$ 18,520,592
	Catch Basin/Ditch Inlets	2410 (ea)	$ 11,027,296
	Leads	11.9 (km)	$ 4,900,706
		TOTAL	**$ 81,985,547**

As can be seen from the pie chart of **Figure 13**, the City's stormwater collection pipes make up nearly 60% of the stormwater collection network based on replacement value.

If this total asset value is translated to an average value per household assuming 10,000 dwellings, then the average household would have an investment of approximately $8,200 in stormwater network assets.

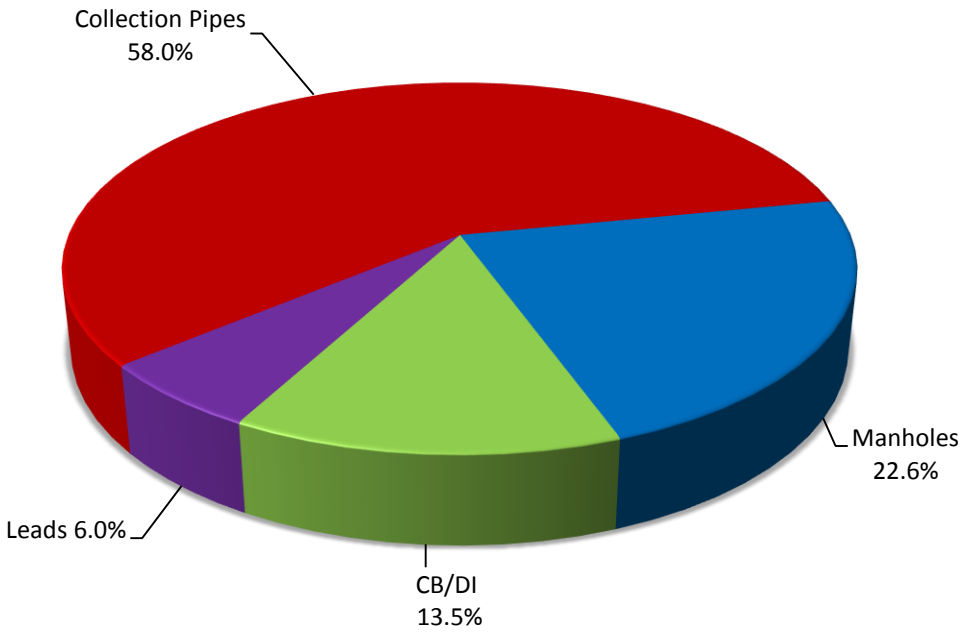

Figure 13: Breakdown of the Stormwater Collection Network Components by Value

3.8.3 Condition vs. Performance

Figure 10 below demonstrates that about 50% of the stormwater collection network is in good to fair condition, but that approximately 30% is in poor or very poor condition representing about $25.7 Million.

The overall Condition & Performance rating for the entire stormwater collection network and associated assets is Fair (48%), meaning that on average, the stormwater collection network assets are 52% into their weighted average estimated service life of 78 years, and have 48% of their service life remaining (i.e. the weighted average estimated age of the stormwater collection network is 41 years old).

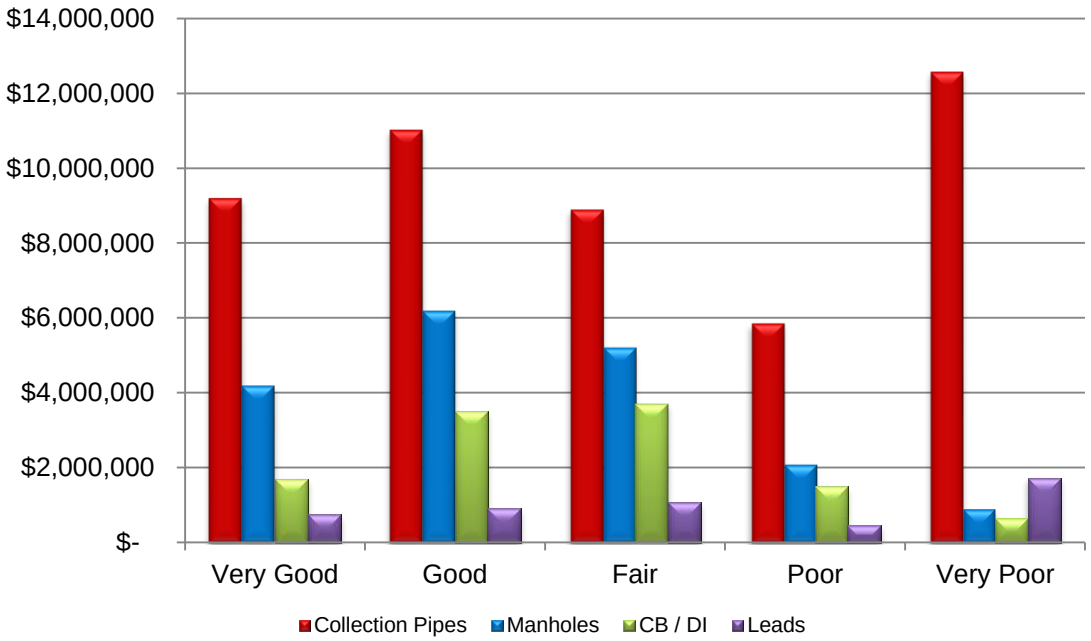

Figure 14: Stormwater Collection Network Condition by Replacement Value

3.8.4 Funding vs. Need

Figure 15 below demonstrates that the current funding vs. need ratio for the storm water network is approximately 40% with an average annual requirement of $800,000 and average spending of $320,000. This gives an annual funding deficit of **$480,000**.

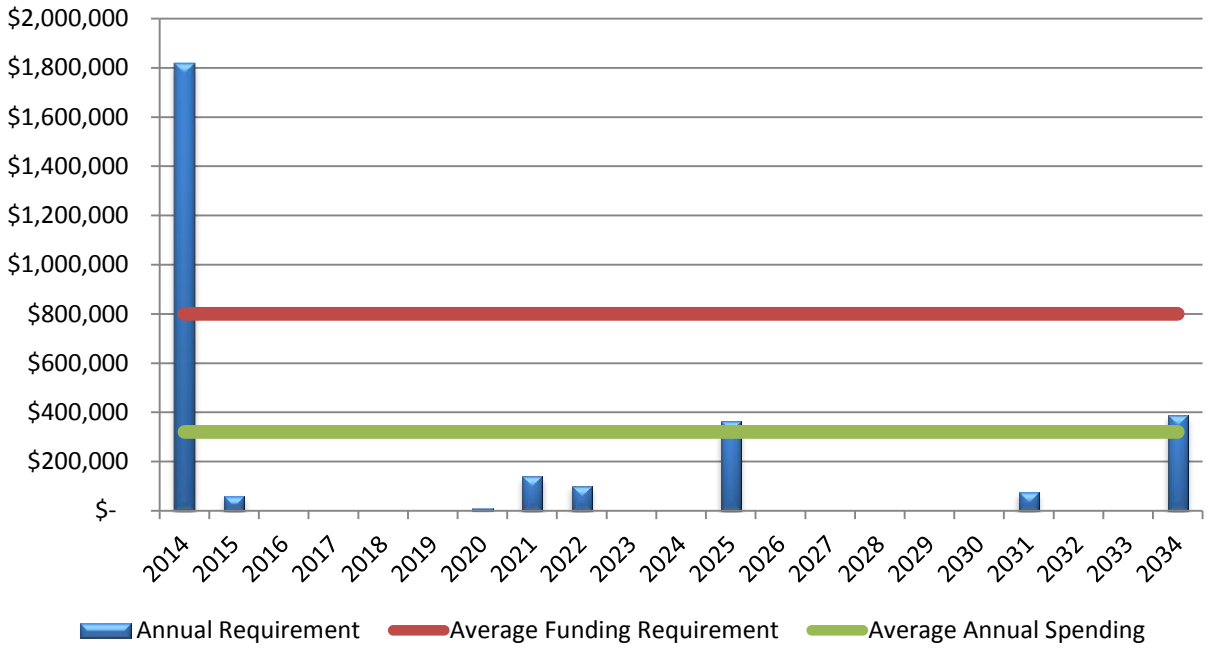

Figure 15: Storm Water Network Funding Requirement

4 DESIRED LEVELS OF SERVICE

4.1 Service Level Indicators and Benchmarks

The goal of every asset manager should be to move away from reactive and "worst first" planning to maintenance of assets in a "state of good repair". This is the most economical way to manage assets and to provide higher levels of service. The path to get there requires a long-term strategy and customer buy-in to assure change. To aid in the evaluation of this change three types of indicators and associated performance measures have been developed.

4.1.1 Strategic Level

Strategic indicators are the highest and most abstract type of indicators. They are set and reviewed by the highest level of municipal decision makers. Examples would include the percentage of reinvestment compared to the value of the system, or assessing deficit needs versus budget.

4.1.2 Tactical Level

Tactical indicators result from analyzing different but related operational indicators to obtain an overview of an asset's condition. A tactical indicator provides managerial-level municipal decision makers with an overview of an asset's condition, state, or value. Tactical indicators would include the percentage amount for operations and maintenance compared to the value of the system or the overall asset condition such as the Pavement Condition Index (PCI) for roads or Bridge Sufficiency Index (BSI) for bridges.

4.1.3 Operational Level

An operational indicator is generally raw data collected about an asset by work crews while performing their duties or as part of an asset inventory process. Operational indicators can be expressed as a dollar value per length of asset or simply by the number or breaks or backup occurrences per year.

4.2 Road Network

4.2.1 Goal

To preserve the roadway network with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements to move people, goods and services safely, efficiently, and effectively that will enable sustainable community growth and economic development.

4.2.2 Objective

- Maintain all arterial and collector roadways in a fair to good condition with a minimum pavement condition index (PCI) of 50
- Within 10 years remove all gravel surface roadways within the City
- Within 20 years improve all local asphalt paved roadways in poor condition to a minimum PCI of 30

4.2.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2013)	Desired (2023)
Strategic Level	Cost per 10,000 households per day	$0.22 /hh	$0.31 /hh
	Percentage of capital reinvestment compared to total road network replacement value	0.22%	0.34%
	Backlog value of road network shortfall (accumulated asset network deficit)	$3,836,361	$3,000,000
Tactical Level	Overall Condition vs. Performance rating	66%	70%
	Percentage of road network replacement value spent on operations and maintenance	0.47%	0.65%
	Percentage of road network replacement value spent on winter operations	1.17%	1.03%
Operational Level	Tonnes of cold mix patch repair per year	150 tonnes/yr	130 tonnes/yr
	Operating cost for paved roads per lane km	$2,090 /lane km	$2,940 /lane km
	Number of customer requests received annually	1,500	1,000

* Does not reflect amount required for sustainability or account for inflation, expressed in 2013 dollars.

4.3 Bridge Network

4.3.1 Goal

To preserve the existing bridge network with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements that will enable sustainable community growth and economic development.

4.3.2 Objective

- Maintain all bridge and culvert structures in a fair to good condition with a minimum bridge sufficiency index (BSI) of 40.
- Within 20 years improve all bridges and culverts to a good condition with a minimum BSI of 50

4.3.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2013)	Desired (2023)*
Strategic Level	Cost per 10,000 households per day	$0.04/hh	$0.08/hh
	Percentage of capital reinvestment compared to total bridge network replacement value	0.69%	1.15%
	Backlog value of bridge network shortfall (accumulated asset network deficit)	$1,600,000	$1,000,000
Tactical Level	Overall Condition vs. Performance Rating	53%	55%
	Percentage of bridge network replacement value compared to total OSIM identified improvements	8.56%	6.91%
	Percentage of bridge network replacement value spent on minor & major maintenance	0.03%	0.23%
Operational Level	Operating cost for bridges & culverts per sq.m.	$1.97/sq.m.	$13.51/sq.m.
	Number of structures with a posted load restriction	1	0
	Number of customer requests received annually	10	7

* Does not reflect amount required for sustainability or account for inflation, expressed in 2013 dollars.

4.4 Water Distribution Network

4.4.1 Goal

To preserve the existing drinking water distribution system with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements for drinking water quality that will enable sustainable community growth and economic development.

4.4.2 Objective

- Comply with the Ontario Drinking Water Standards and all other relevant legislation.
- Continue to maintain and improve the Drinking Water Quality Management system
- Replace and Rehabilitate watermain in accordance with the Financial Plan

4.4.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2013)	Desired (2023)*
Strategic Level	Cost per 10,000 households per day	$0.45/hh	$0.52/hh
	Percentage of capital reinvestment compared to total water network replacement value	0.96%	1.16%
	Backlog value of water network shortfall (accumulated asset network deficit)	$5,762,800	$5,000,000
Tactical Level	Overall Condition vs. Performance Rating	66%	68%
	Percentage of water network replacement value spent on minor & major maintenance	1.45%	1.59%
	Annual Unaccounted for Water Percentage	17.5%	15.0%
	Annual # of DWQMS Major & Minor Nonconformance's	3 - 6	0 - 1
Operational Level	Operating cost per km of watermain	$7,030/km	$7,740/km
	Total number of watermain breaks per year	20 - 40	< 10
	Total number of AWQI's per year	< 10	0
	Number of water quality complaints received annually	32	< 20
	Number of water pressure complaints received annually	18	< 10

* Does not reflect amount required for sustainability or account for inflation, expressed in 2013 dollars.

4.5 Wastewater Collection Network

4.5.1 Goal

To preserve the existing wastewater collection system with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements for wastewater quality that will enable sustainable community growth and economic development.

4.5.2 Objective

- Meet the Ministry of Environment Effluent Requirements
- Implement a Quality Management System for Wastewater
- Replace and Rehabilitate wastewater collection mains in accordance with the Financial Plan

4.5.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2013)	Desired (2023)*
Strategic Level	Cost per 10,000 households per day	$0.33/hh	$0.37/hh
	Percentage of capital reinvestment compared to total wastewater network replacement value	1.26%	1.31%
	Backlog value of wastewater network shortfall (accumulated asset network deficit)	$7,174,984	$6,500,000
Tactical Level	Overall Condition vs. Performance Rating	52%	55%
	Percentage of wastewater network replacement value spent on minor & major maintenance	0.51%	0.66%
	Number of Months WWTP effluent meets approval	12	12
Operational Level	Operating cost per km of wastewater main	$3,180/km	$4,070/km
	Total number of Bypass Incidents per year	10 or less	0
	Total number of Main Backups per year	5 or less	0
	Number of backlogged sewer repairs	10 +/-	< 5
	Frequency of Sewer Cleaning (excl. "Red Zones")	+/- 20 yrs	5 yrs
	Number of sanitary complaints received annually	66	< 50

* Does not reflect amount required for sustainability or account for inflation, expressed in 2013 dollars.

4.6 Stormwater Collection Network

4.6.1 Goal

To preserve the existing stormwater collection and land drainage system with the goal of protecting public safety, health, property, and the natural environment while meeting or exceeding all legislative requirements for stormwater quality and management that will enable sustainable community growth and economic development.

4.6.2 Objective

- Meet the Ministry of Environment quality requirements for surface water drainage with new developments and reconstruction projects.
- Reduce the number of emergency stormwater main projects

4.6.3 Performance Indicators

Decision Level	Performance Indicator	Measure	
		Current (2013)	Desired (2023)*
Strategic Level	Cost per 10,000 households per day	$0.12/hh	$0.20/hh
	Percentage of capital reinvestment compared to total stormwater network replacement value	0.24%	0.49%
	Backlog value of stormwater network shortfall (accumulated asset network deficit)	$15,846,122	$13,000,000
Tactical Level	Overall Condition vs. Performance Rating	48%	50%
	Percentage of stormwater network replacement value spent on minor & major maintenance	0.27%	0.43%
Operational Level	Operating cost per km of stormwater main	$2,950/km	$4,610/km
	Total number of public & private OGI's serviced annually	< 5	All
	Number of stormwater backup complaints received annually	15	< 10

* Does not reflect amount required for sustainability or account for inflation, expressed in 2013 dollars.

5 ASSET MANAGEMENT STRATEGY

5.1 Objective

An asset management strategy is a set of planned actions that will enable the asset to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost. Lifecycle activities of an asset can be viewed in the context of four phases; minor maintenance, major maintenance, rehabilitation, and replacement as detailed in **Table 14** below.

Table 14: Lifecycle Activities vs. Asset Age

Activity	Definition	Asset Age
Minor Maintenance	Planned activities such as bridge or pavement inspections, monitoring, cleaning and flushing sewers, hydrant flushing, pressure testing, visual inspections, etc.	0 - 25% of assets life
Major Maintenance	Maintenance and repair activities, generally unplanned, however they can be anticipated and would generally be account for with the City's annual operating budget. These would include such events as repairing water main breaks, replacing individual sections of sewer pipe, or repairing erosion from stormwater run-off.	25 - 50% of assets life
Rehabilitation	Are generally one-time events that rebuild or replace components of an asset to restore the asset to a required functional condition and extend the assets useful life. Typically involves repairing the asset to deliver its original level of service without resorting to significant upgrading or renewal, using available techniques and standards.	50 - 75% of assets life
Replacement	Assets will reach the end of their useful life and require replacement. The expected life of an asset is impacted by the natural properties of its materials and can vary greatly depending on a number of environmental factors that impact the degree of deterioration and performance.	75 - 100% of assets life

The asset management strategy will develop a process that can be applied to the lifecycle of an asset that will assist in the development of a 50-year plan to ensure the best overall health and performance of the City's infrastructure. **Figure 11** below illustrates the importance of timely investments and the effects on the overall cost of a typical asset.

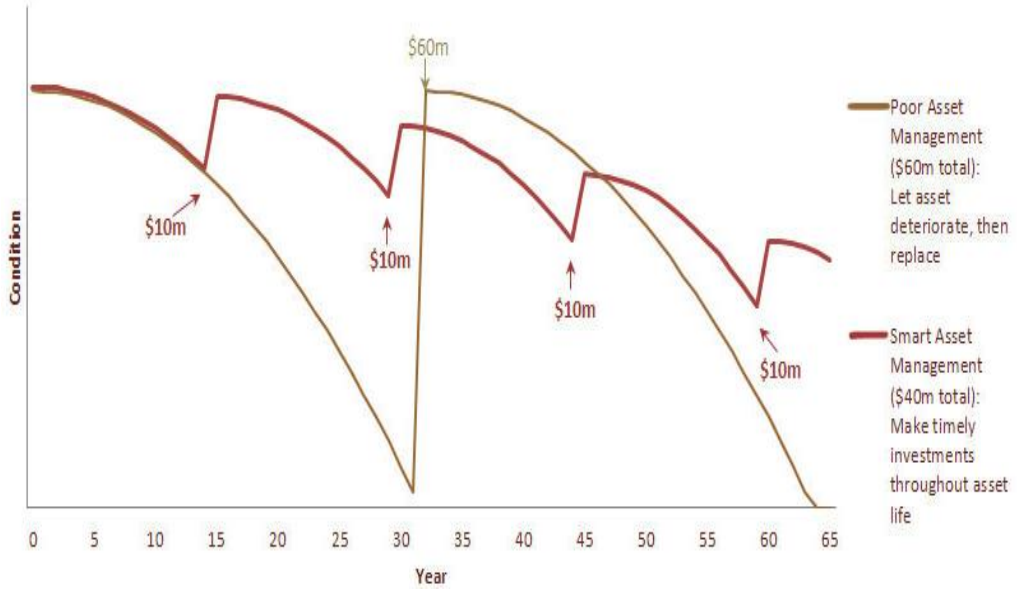

Figure 16: Timely Renewal Investments Save Money
(Source: Building Together: Guide for Municipal Asset Management Plans, Ministry of Infrastructure, 2012)

5.2 Road Network

5.2.1 Useful Life

The generalized values used for typical expected useful life of the road network assets are summarized in **Table 15** below. More specific asset useful life used in the analysis to account for different surface material types can be found in **Appendix B**. It should be recognized that the actual asset life is influenced by many variables such as installation, traffic patterns, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. City staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 15: Road Network Useful Life

Asset Component	Expected Useful Life (years)
Roads (Paved)	30
Roads (Base)	50
Sidewalks	40
Curbs	30
Guiderails	40

5.2.2 Lifecycle Activities

Pavement deterioration is non-linear such that initially in the first 5-8 years of service the rate of deterioration is slow. At mid service life the rate of deterioration increases and near the end of its 30 year service life the rate of deterioration is quite rapid, as shown in **Figure 12** below.

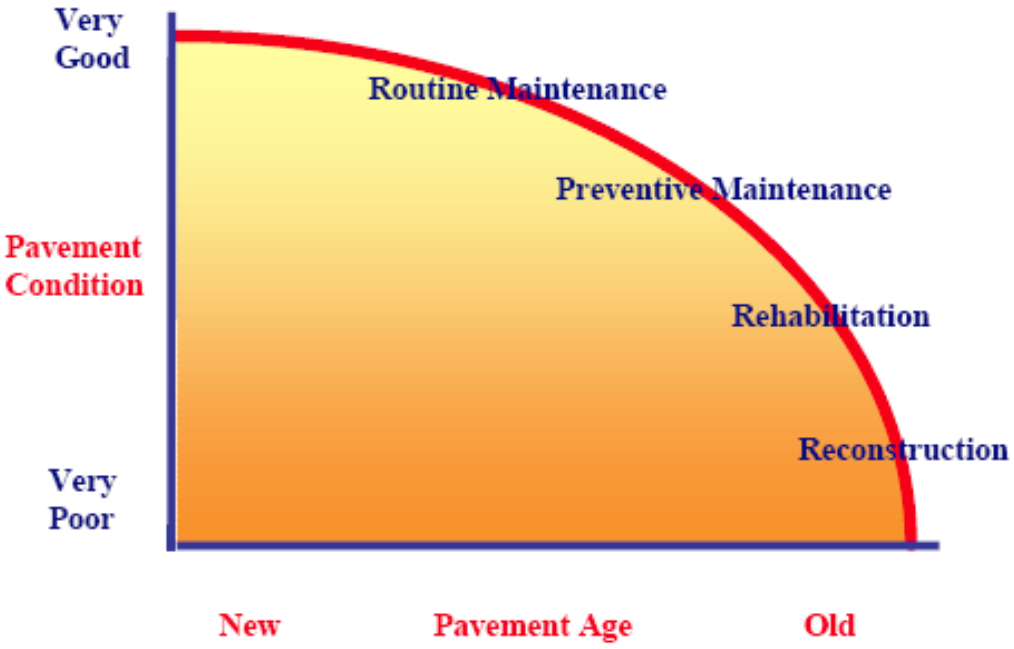

Figure 17: Typical Road Deterioration Curve
(Source: Pavement Management: A Guide for Local Officials p.1-5)

During a road's lifecycle there are various windows available for work activity that will maintain or extend the life of the asset. These windows of work activity generally coincide with the assets condition. A summary of available lifecycle work activities for the road network and an estimate of associated costs are provided in **Table 16** below.

Table 16: Road Network Lifecycle Activities

Asset Component	Minor Maintenance Activity Options	Approximate Cost
Asphalt Surfaces	- Pavement Condition Assessments of entire road network once every 5 years.	- $125/centerline km
Sidewalks	- Sidewalk Inspection Program legislatively required once per year	- $100/km
Asset Component	**Major Maintenance Activity Options**	**Approximate Cost**
Asphalt Surfaces	- Pothole repairs - Crack Sealing	- $75 to $125 /location (depending on size) - $1.25/$m^2$
Gravel Surfaces	- Grading and leveling - Dust Control	- $150 to $175 per hour - $1,800 to $2,000 per centerline km
Sidewalks	- Grind down elevated edges	- $10/$m^2$
Asset Component	**Rehabilitation Activity Options**	**Approximate Cost**
Pavement Surfaces	- Fog Seal; light application of slow setting asphalt emulsion diluted with water. It is used to renew old asphalt surfaces and to seal small cracks and surface voids	- $1.50/$m^2$
	- Microsurfacing; a mixture of polymer modified asphalt emulsion, mineral aggregate, mineral filler, water, and other additives, properly proportioned, mixed and spread on a paved surface	- $5.00/$m^2$
	- Resurfacing; a process of removing pavement material from the surface of the pavement either to prepare the surface (by removing rutting and surface irregularities) to receive overlays, to restore pavement cross slopes and profile, or even to re-establish the pavement's surface friction characteristics	- $8.00/$m^2$
	- Slurry Seal Coating; a mixture of slow setting emulsified asphalt, well graded fine aggregate, mineral filler, and water. It is used to fill cracks and seal areas of old pavements, to restore a uniform surface	- $4.00/$m^2$

	texture, to seal the surface to prevent moisture and air intrusion into the pavement, and to provide skid resistance - Thin Overlay; An overlay course consisting of a mix of asphalt cement and a well graded (also called dense-graded) aggregate. A well graded aggregate is uniformly distributed throughout the full range of sieve sizes	- $6.00/m^2$
Gravel Surfaces	- Ditching and drainage improvements - Application of new gravel surface course	- $20 to $250 per hour - $8 to $10 per tonne
Sidewalks	- Panel Replacement	- $150 to $200/$m^2$ (premium paid due to limited quantity)
Asset Component	Replacement Activity Options	Approximate Cost
Pavement Surfaces	- Road replacement including excavation, Gran. A & B and asphalt base and surface coats	- $135 to $150/$m^2$ (depending on road class)
Sidewalks	- Replacement of sections of sidewalk panels	- $100 to $125/$m^2$
Curbs	- Deficient sections are typically removed and replaced	- $95 to $125/m
Guiderails	- Deficiencies typically addressed through replacement	- $90 to $170/m (depending on type)

5.3 Bridge Network

5.3.1 Useful Life

The generalized values used for typical expected useful life of the bridge network assets are summarized in **Table 17** below. More specific asset useful life used in the analysis to account for the various types of structures can be found in **Appendix C**. It should be recognized that the actual asset life is influenced by many variables such as material, installation, traffic patterns, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. City staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 17: Bridge Network Useful Life

Asset Component	Expected Useful Life (years)
Concrete Structures	70
CSP/MPPA	40
Steel Structures	80

5.3.2 Lifecycle Activities

For some bridges in Poor condition, a small holding strategy of repairs can be done to extend the life of the bridge by 6 to 10 years. This will defer the major expense of structure replacement, while still maintaining the bridge in a serviceable condition. Some other bridges that are still in Good condition can have work done ahead of other Poor condition bridges to help preserve the bridges before they require extensive repair.

A summary of available lifecycle activities for the bridge network and an estimate of associated costs are provided in **Table 18** below.

Table 18: Bridge Network Lifecycle Activities

Asset Component	Minor Maintenance Activity Options	Approximate Cost
All Structures	- OSIM Inspections legislatively required once every two years.	- $1,500 to $1,800 per structure
Asset Component	**Major Maintenance Activity Options**	**Approximate Cost**
All Structures	- Wearing Surface Crack Sealing - Painting - Washing & Cleaning of: o Wearing surface & deck o Sidewalk & railings o Tops of abutments & piers o Expansion joints o Seats & bearings o Lower chords of trusses o Deck drains	- $1.25/$m^2$ - $35/hour - $115/hour

Concrete Structures	- Crack Repairs ○ Bonding ○ Routing and sealing ○ Stitching	- $60/m^2
Steel Structures	- Rust removal and repainting - Sandblast and repainting	- $35/hour -$135/hour
Asset Component	Rehabilitation Activity Options	Approximate Cost
Concrete Structures	- Spall Repairs - Disintegration repairs (jacketing) - Delamination repairs	- $175/m^2 - $95/m^2 - $135/m^2
Steel Structures	- Member strengthening (plates) or replacement - Connection plating or replacement	- $400 to $1,000 per location depending on complexity
Asset Component	Replacement Activity Options	Approximate Cost
Concrete Structures	- Replacement of entire structure	- $5,000 to $6,000/m^2 (varies by location)
Steel Structures	- Replacement of entire structure	- $8,000 to $9,000/m^2 (varies by location)

5.4 Water Distribution Network

5.4.1 Useful Life

The generalized values used for the typical expected useful life of the water distribution network assets are summarized in **Table 19** below. More specific asset useful life information used in the analysis to account for the various types of pipe materials can be found in **Appendix D**. It should be recognized that the actual asset life is influenced by many variables such as installation practices, soil conditions, uneven manufacturing quality, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. City staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 19: Water Distribution Network Useful Life

Asset Component	Expected Useful Life (years)
Watermain	80
Valves	60
Fire Hydrants	75

5.4.2 Lifecycle Activities

A summary of available lifecycle activities for the water distribution network and an estimate of associated costs are provided in **Table 20** below.

Table 20: Water Distribution Network Lifecycle Activities

Asset Component	Minor Maintenance Activity Options	Approximate Cost
Hydrants (Fire Fighting and Flush Types)	- Provide visual inspection for damage, tampering, vandalism, missing parts, need for paint - Check for adequate water pressure and flow rates (may only be required on an as-needed basis if a change in use is proposed or problems are noted). - Check for operation, exercise valves, flush lead/barrel, verify that barrel has drained. Where the hydrant services a 'dead end' flushing should occur to clear the volume of water main with potentially stale water.	- $5/hydrant - $40/hour (as required) - $40/hydrant/visit
Hydrants (Winter Maintenance)	- Clear snow from access to fire hydrants. - Install and remove fire hydrant markers with the change in seasons - If valves are not non-freezing, there will be extra maintenance.	- $25/hydrant (twice/yr) - $5/hydrant maker/visit (twice/yr)
Main Line Valves	- Check valves for operation and exercise (Valve Maintenance Program).	- $100/valve

PRVs & other Specialty Valves	- Provide visual inspection for signs of wear, corrosion, build-up or any abnormal conditions	- $100/chamber (twice/yr)
Asset Component	Major Maintenance Activity Options	Approximate Cost
Main Line Valves	- Check valves for operation and exercise (Valve Maintenance Program).	- $100/valve
Mains and/or Services	- Traditional Replacement: water only (emergency)	- $550 to $1,300 varies by diameter & depth
PRVs & other Specialty Valves	- Check valves (including isolation valves) for operation and exercise. - Each valve on the system should be disassembled and inspected annually, diaphragm and discs to be replaced if they show any signs of wear. Manufacturer's recommendations for regular maintenance details should be referenced.	- $10/chamber - $500/chamber
Water Meters	- Water Meter maintenance activities undertaken by Water Distribution Coordinator.	- $150 per meter
Asset Component	Rehabilitation Activity Options	Approximate Cost
Mains	- Trenchless Lining	- $500/metre (varies on diameter, must replace valves, fire hydrant leads, & services)
Mains/ Services	- Spot repair of Main or Services	- $5,000 to $10,000 (incl. restoration)
Main Line Valves	- Significant repair or replacement of valves coming out of Valve Maintenance Program.	- $1,000 to $5,000 varies on size, depth & extent of repair (incl. restoration)
Trunk Line Valves in Chambers	- Maintenance needs specific to trunk valves.	- $2,000 to $3,000 more for extensive rebuilds.
Hydrants	- Hydrant Repair	- $100 to $200 more for extensive rebuilds.

Hydrants	- Hydrant Painting	- $80/hydrant - $20/hydrant for touchup
Asset Component	Replacement Activity Options	Approximate Cost
Mains and/or Services	- Traditional Replacement as part of full reconstruction (planned)	- $400 to $1,000 varies by diameter, depth & soil conditions
PRVs & other Specialty Valves	- Replace Valves and/or Chambers	- $10,000/valve - $50,000/chamber
Hydrants	- Hydrant Replacement	- $7,000/hydrant (incl. restoration)
Anodes	- Replace every 25 years to protect City's ductile iron trunk water mains.	- $250/anode (incl. restoration)
Water Meters	- Replacement of meters with upgraded units.	- $175/meter

5.5 Wastewater Collection Network

5.5.1 Useful Life

The generalized values used for the typical expected useful life of the wastewater collection network assets are summarized in **Table 21** below. More specific asset useful life information used in the analysis to account for the various types of pipe materials can be found in **Appendix E**. It should be recognized that the actual asset life is influenced by many variables such as installation practices, soil conditions, uneven manufacturing quality, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. City staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 21: Wastewater Collection Network Useful Life

Asset Component	Expected Useful Life (years)
Collection Pipes	80
Manholes	75

5.5.2 Lifecycle Activities

A summary of available lifecycle activities for the wastewater collection network and an estimate of associated costs are provided in **Table 22** below.

Table 22: Wastewater Collection Network Lifecycle Activities

Asset Component	Minor Maintenance Activity Options	Approximate Cost
Sewer Mains and Manholes	- Cleaning and Flushing sewers	- $3.00/m (excl. removal of debris from manholes)
Sewer Mains and Laterals	- TV Inspection (incl. cleaning) mains only and/or laterals	- $8/m for mains -$250/lateral
Asset Component	**Major Maintenance Activity Options**	**Approximate Cost**
Sewer Mains	- Cleaning with cutters to remove calcite and other debris, flushing debris	- $4.50/m
Sewer Mains and/or Laterals	- Traditional Replacement: sewer only (emergency)	- $450 to $1,200 varies by diameter & depth
Asset Component	**Rehabilitation Activity Options**	**Approximate Cost**
Sewer Mains	- Trenchless Sewer Lining	- $300 to $800/m varies by diameter
Sewer Mains/Laterals	- Trenchless Spot Repair of main or lateral	- $6,000 per location

Sewer Mains/Laterals	- Traditional Spot repair of main or lateral	- $5,000 to $10,000 (incl. restoration
Manholes	- Sealing Manholes	- $2,000/manhole
Manholes	- Manhole F&G, Modulock replacement	- $250/F&G -$300/m depth modulock
Manholes	- Manhole benching repair	- $1,000/manhole
Asset Component	Replacement Activity Options	Approximate Cost
Sewer Mains	- Pipe Bursting	- $300 to $400/m varies by diameter.
Sewer Mains and Laterals	- Traditional Replacement : as part of full reconstruction (planned)	- $300 to $850 varies by diameter, depth & soil conditions
Laterals	- Pipe Bursting	- $2,000/lateral
Manholes	- Manhole replacement alone or in combination with any of above.	- $8,000 to $16,000 varies by size & depth

5.6 Stormwater Collection Network

5.6.1 Useful Life

The generalized values used for the typical expected useful life of the stormwater collection network assets are summarized in **Table 23** below. More specific asset useful life information used in the analysis to account for the various types of pipe materials can be found in **Appendix F**. It should be recognized that the actual asset life is influenced by many variables such as installation practices, soil conditions, uneven manufacturing quality, local weather conditions, etc, and may be greater than the expected useful life in favourable conditions. City staff will continue to refine the asset's expected useful life as more specific data becomes available.

Table 23: Stormwater Collection Network Useful Life

Asset Component	Expected Useful Life (years)
Collection Pipes	80
Manholes	75
Catch Basins / Ditch Inlets	75
Leads	80

5.6.2 Lifecycle Activities

A summary of available lifecycle activities for the stormwater collection network and an estimate of associated costs are provided in **Table 24** below.

Table 24: Stormwater Collection Network Lifecycle Activities

Asset Component	Minor Maintenance Activity Options	Approximate Cost
Storm Sewer Mains	- Cleaning and Flushing sewers.	- $3.00/m (excl. removal of debris from manholes
Storm Sewer Mains	- TV Inspection mains only	- $8/m (incl. cleaning)
Asset Component	**Major Maintenance Activity Options**	**Approximate Cost**
Catch Basins, Catch Basin Manholes, and Ditch Inlets	- Vacuum removal of sediment in sumps of storm sewer structures. The frequency varies and dependent on sediment build-up	- $35/structure
Storm Sewers	- Traditional Replacement: sewer only (emergency)	- $450 to $1,200 varies by diameter & depth
Asset Component	**Rehabilitation Activity Options**	**Approximate Cost**
Storm Sewers	- Trenchless Sewer Lining	- $300 to $800/m varies by diameter

Storm Sewers	- Traditional Spot repair of main or leads	- $5,000 to $10,000 (incl. restoration)
Manholes	- Sealing Manholes ($2000 per manhole. Varies. Not as common as for sanitary)	- $2,000/manhole
Manholes/ Catch Basins	- Manhole/Catch Basin F&G, Modulock replacement	- $250/F&G -$300/m depth modulock
Manholes/ Catch Basins	- Manhole/Catch Basin benching repair	- $1,000/manhole
Asset Component	Replacement Activity Options	Approximate Cost
Storm Sewers	- Pipe Bursting	- $300 to $400/m varies by diameter.
Storm Sewers	- Traditional Replacement : as part of full reconstruction (planned)	- $300 to $850 varies by diameter, depth & soil conditions
Manholes	- Manhole replacement alone or in combination with any of above.	- $8,000 to $16,000 varies by size & depth
Catch Basins	- Catch Basin replacement alone or in combination with any of above.	- $4,000 to $6,000 varies by size & depth

6 FINANCING STRATEGY

6.1 Financial Planning Overview

The Asset Management Plan will be linked to the long term financial plan and future years' budgets. The next stage of asset management planning will be the development of a comprehensive financial plan that will allocate dedicated financial resources to meeting the funding needs identified in the Asset Management Plan.

The following figure depicts the various funding levels that will ultimately be incorporated into the asset management plan and long term financial plan. A fully funded scenario would include costs for regular operating and maintenance (operating budget), debt payments (operating budget), major capital rehabilitation (capital budget), and future replacement including amortization of historical costs and indexed to include inflation, growth of the network and changes in service levels.

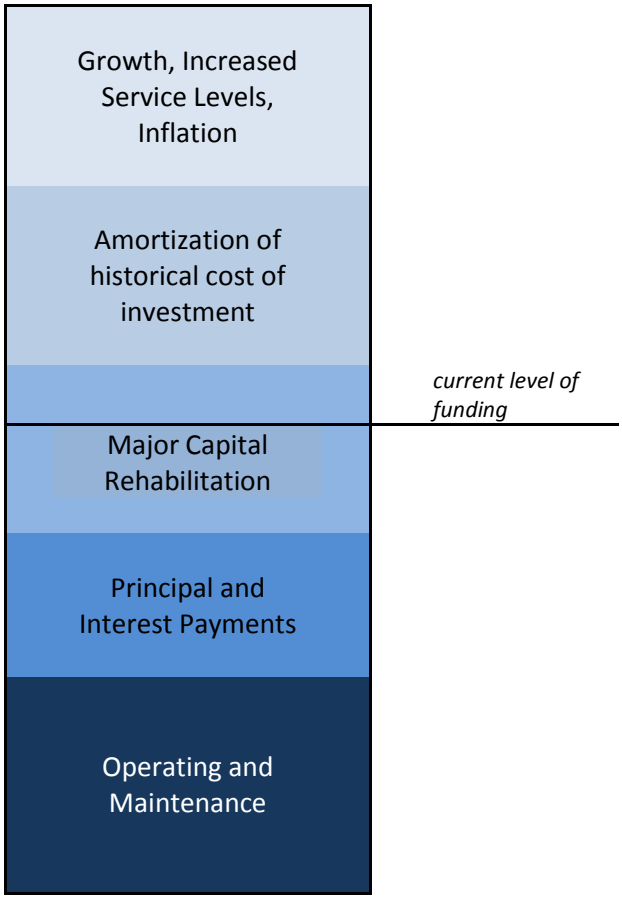

Figure 18: Levels of Funding

6.2 Sources of Financing

Financing sources available to the municipality to be applied in the long term financial plan include:

- Municipal Tax Levies
- User fees (including Water and Sewer charges)
- Reserve balances
- Debenture Issues
- Sale of assets
- Municipal partnerships
- Dedicated government grants (gas tax and other programs where there is an agreement in place that is expected to be ongoing and remain stable)

Financing sources specifically excluded from the plan include:

- Development Charges
  The nature of development charges are that they are available to fund new growth and therefore by definition are not available for the maintenance and renewal of existing infrastructure.

- Government Grants
  As uncommitted government grants cannot be determined the long term financial plan and asset management plan should not include this source of financing. The availability of future government grants may allow the City to close the funding deficit more quickly as they become available. However, for the purposes of financial planning, since these sources of funds are unknown and cannot be anticipated, it is not appropriate to consider them a future funding source.

6.3 Tax Funded Assets

Assets currently included in the plan that are funded from taxation are the Road Network, Bridges and Culverts and the Stormwater Network. Table 25 shows five years of budgeted spending and funding sources for these assets.

Table 25: Tax Funded Assets - Summary of five year average funding by source

Asset Class	Five Year Budgeted Inv. (2010 to 2014)	Taxes	Gas Tax	Reserves	Debenture	Average	Annual Requirement	Deficit
Roads	$ 2,871,000	$ 335,000	$ 2,000,000	$ 436,000	$ 100,000	$ 574,200	$ 2,700,000	$ (2,125,800)
Bridges	$ 1,666,500	$ 65,000	$ 401,500	$ 29,000	$ 1,171,000	$ 333,300	$ 360,000	$ (26,700)
Stormwater	$ 1,613,500	$ 1,299,664	$ -	$ 184,956	$ 128,880	$ 322,700	$ 800,000	$ (477,300)

There are two strategies that can be employed to reduce the funding deficit over time. The first would be to decrease the annual requirement. This could be achieved by reducing the number of assets to be maintained and ultimately replaced. While it is difficult to reduce the inventory of linear infrastructure due to its nature of being a network of assets it is possible to extend the useful lives of those assets using planned maintenance and rehabilitation. For example, rehabilitation activities

such as asphalt resurfacing will extend the useful life of a road pushing reconstruction further into the future. **Figure 16** compares the investment requirements for an asset that is regularly maintained versus an asset that is left to deteriorate with no maintenance and ultimately replaced at the end of its life. A strategy that includes regular maintenance is cheaper in the long run.

The second strategy to reduce the funding deficit is to increase annual investment. This is achieved by increasing the allocated sources of financing noted above. The dedicated tax increase in 2014 required to fully fund the tax funded assets included in the plan would be approximately **8.6%** or **$2.175M**. This is assuming that other funding sources such as gas tax and the reallocation of maturing debt remain constant.

As a onetime tax increase is not likely financially feasible, a strategy that applies a gradual phase is generally more realistic and acceptable. For example, assuming the average annual of tax increase is 4.0%, a dedicated 1.0% increase each year would fully fund the tax funded assets included in the plan by 2023. This also assumes that 100% of the annual gas tax is allocated to road and bridge projects and as well that the principal and interest payments on maturing tax funded debt is reallocated to fund only those assets included in the plan.

Asset Management reporting will be linked closely to the budget process in future years. Projects that are included in the asset management plan will be clearly identified. Revised estimates for funding versus need based on current five year averages will be provided. An expected date for the deficit to be eliminated based on current trends will be calculated and reported to council.

6.4 Rate Funded Assets

The water network and waste water network are funded through water rates and sewer surcharges respectively. Debentures issued to pay for water and waste water capital are also paid for from these user fees. **Table 26** details the five year funding for water and waste water assets.

Table 26: Rate Funded Assets - Summary of five year average funding by source

Asset Class	Five Year Budgeted Inv. (2010 to 2014)	User Fees	Gas Tax	Reserves	Debenture	Average	Annual Requirement	Deficit
Water	$ 553,000	$ 1,755,000	$ -	$ -	$ 1,010,000	$ 553,000	$ 800,000	$ (247,000)
Wastewater	$ 735,000	$ 2,185,000	$ -	$ -	$ 1,490,000	$ 735,000	$ 990,000	$ (255,000)

Ontario's Safe Drinking Water Act (2002) requires that licensed water providers have an approved Financial Plan for their related water system under the Financial Plan Regulations (O. Reg. 453/07). The City of Owen Sound received their water license on October 14th, 2010. The City of Owen Sound decided to implement a similar financial plan for the wastewater system in order to ensure financial sustainability of both networks.

The plan addresses ongoing operating costs, future debenture payments as well as approximately $1M per year for capital replacement. In their meeting on March 2, 2011 Council accepted the report detailing the financial plans for water and waste water and approved submitting those plans to the Ministry of Municipal Affairs. The rate structures included in those plans geared towards fully funding both networks considered increasing both water and waste water revenues by 10% (for water) and 11% (for wastewater) from 2011 to 2015 and by 5% (for water) and 6% (for waste water) in the years 2016 to 2020. Each year when setting water and waste water rates and surcharge structures,

Council is provided information about the year over year revenue increases from prior years. Historically, a 10% increase in water rates has not translated to a 10% increase in revenues due to changes in usage.

In 2014 the financial plans for both water and waste water will be updated taking actual revenue increases into consideration as well as adjusting for known capital projects and expected future costs. The information from these updated plans will be incorporated into the asset management plan upon their completion.

APPENDIX A

Asset Inventory Classification

Assets that ultimately are to be included in the City Asset Management Plan are listed in **Table 1** below. Assets with a priority ranking of 1 are identified in the Ministry of Infrastructure Investment Initiative Guide for Municipal Asset Management Plans that must be completed by the end of 2013 for future funding eligibility. All assets with a priority ranking of 2 will be completed prior to addressing priority ranking 3 assets and so forth.

Table 1: Asset Inventory Classification

Asset Class	Priority Ranking (1-5)	Asset Type
Road Network	1	Roads
	1	Bridges (Pedestrian & Vehicular)
	1	Culverts (>3m span)
	2	Retaining Walls
	1	Curbs
	1	Sidewalks
	1	Guard Rails
	3	Trees
	3	Benches
	5	Ornamental Waste receptacles
	3	Parking Meters
	3	Bollards
	3	Banner & Flag Poles
Traffic Systems	2	Traffic Signals & Controller Cabinets
	4	Regulatory Signs
	4	Warning Signs
	4	Information Signs
	2	Streetlights
Water Distribution	1	Water Mains
	1	Water Service Laterals
	1	Water Valves
	2	Water Meters
	1	Fire Hydrants
	1	Chambers
Water Facilities	2	Water Treatment Plant (major levels i.e. structural, electrical, mechanical, process piping, etc)
	2	Pumping Stations
	2	Reservoirs
Wastewater Collection	1	Sanitary Mains
	1	Sanitary Service Laterals
	1	Manholes
	1	Chambers
Wastewater Facilities	2	Waste Water Treatment Plant (major levels i.e. structural, electrical, mechanical, process piping, etc)
	2	Minor Pumping Stations
	2	West Side Sewage Pumping Station
	2	Combined Sewer Overflows
Stormwater Collection	1	Storm Mains
	1	Manholes
	1	Catch Basins
	1	Ditch Inlets
Stormwater Facilities	3	Detention Ponds
	2	Oil Grit Interceptors (OGI)

Facilities (major levels i.e. structural, electrical, mechanical, etc.)	2	City Hall
	2	Bayshore Community Centre
	2	Julie McArthur Recreational Centre
	2	Police Station
	2	Fire Hall
	2	Public Works Building
	2	Water Distribution Building
	2	Tom Thomson Art Gallery
	2	Courthouse
	2	CPR Building
	2	Tourism Building
	2	Market Building
	2	Jailhouse
	2	Library
	2	Airport Terminal
	2	Kiwanis Soccer Complex Building
	2	Harrison Park Community Hall
	2	Harrison Park Inn
	2	Harrison Park Parks Shop
	2	Harrison Park Campground Main Washroom
	2	Harrison Park Campground Pool Washroom
	2	Harrison Park Campground South Washroom
	2	Harrison Park Campground Laundry
	2	Harrison Park Campground Kitchen
	3	Harrison Park Picnic Shelter
	2	Harrison Park Island Washroom
	3	Harrison Park Band Stand
	2	Harrison Park Senior's Centre
	3	Harrison Park Bird Barn
	2	Harrison Park Pool & buildings
	3	Harrison Park Electrical Hut
	2	Greenwood Cemetery Office
	2	Greenwood Cemetery Maintenance
	2	Greenwood Cemetery Mausoleum
	2	Greenwood Cemetery Chapel
	2	Duncan McLellan Field House
	3	Duncan McLellan Shelter
	2	St. George's Washroom
	3	St. George's Equipment Shed
	2	Kinsmen Park Field House
	2	Tom William's Field House
	2	Kelso Beach Washrooms
	2	Kelso Beach Stage
	3	Kelso Beach Picnic Shelter
Corporate Fleets	2	Public Works
	2	Water & Wastewater
	2	Parks & Open Space
	4	Small Equipment
Parks & Open Space	3	Bench's
	3	Trees
	4	Playgrounds & Equipment
	4	Good Cheer Rink/Basketball Pad
	4	Sports Fields
	3	Bleachers
	3	Trails & Walkways
	3	Gates
	4	Splash Pad

	4 1 1 1 4 2 3 1	Skate Park Bridges Culverts Guiderails Signs Lamp posts Flag Poles Retaining Walls
Transit	2 2 4	Buses Transit Terminal Bus Shelters
Solid Waste	4 4 4	Genoe Landfill Derby Landfill East Hill Landfill
IT Division	4	
Fire Department	2	
Municipal Parking Lots	3	
Police Services	3	

APPENDIX B

Road Network Document of Assumptions

APPENDIX C

Bridge Network Document of Assumptions

APPENDIX D

Water Distribution Network Document of Assumptions

APPENDIX E

Wastewater Collection Network Document of Assumptions

APPENDIX F

Stormwater Collection Network Document of Assumptions