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Bega Valley Shire Council
Asset Management Review
Part 1 - Review of Asset Portfolio
January 2011



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1. Executive Summary

1.1 General

With **\$1.1** billion in assets (including, bulk earthworks and, water and sewer assets), Bega Valley Shire Council (Council) has a significant portfolio of infrastructure to replace and maintain. This places considerable pressure on Council resources with a demand for increased funding each year to keep up with ageing and degraded assets.

Funding for infrastructure Maintenance, Rehabilitation and Renewal has been described as the biggest management challenge in local government (Allan 2006, Inquiry into financial sustainability of NSW local government). Council is making positive steps towards addressing this challenge and commissioned Review Today to assist Council in ascertaining an up-to-date view of their financial status and the condition of the infrastructure portfolio for the purpose of identifying future funding requirements.

This report is concerned with GHD's review of the annual Rehabilitation, Renewal and Maintenance expenditure requirements to sustain the Council's Total Asset Portfolio (including both civic and water/sewerage infrastructure), as at June 2010.

It should be noted that all values within this report are estimated at today's (2010) prices and do not take account of future inflation.

1.2 Civil Infrastructure Excluding Bulk Earthworks, Water, Sewerage & Reuse

Council's civil infrastructure excluding bulk earthworks, water, sewerage and reuse assets has an estimated replacement value of **\$764M**¹.

Based on GHD analysis we have concluded that Council has a present Renewals and Maintenance Backlog of approximately **\$5.0M** and is proposing to further **under-invest** (in Rehabilitation, Renewals and Maintenance) going forward at an average rate of **\$4.2M** per year under the Existing Spending Policy (against the Preferred Spending Scenario). Adopting this strategy would result in a further decline in the condition of assets, and have a negative effect on service performance. In financial terms, under the "Existing Spending Policy Council"² would experience a rise in Maintenance costs and a potential future Renewals and Maintenance Backlog of approximately **\$112M**, 20 years from now.

1.3 Water, Sewerage & Reuse Infrastructure

Council's water, sewerage and water reuse infrastructure has a replacement value of **\$356M**³.

The analysis shows that, if Council were to continue the "Existing Spending Policy", the estimated Renewals and Maintenance Backlog in 20 years' time would be of the order of **\$128.6.M**. This is an increase of **\$114.2 M** on the present backlog of **\$14.8 M**.

¹ Information provided by Council.

² As defined in Section 2.2.

³ Information provided by Council.



A. Analysis and Results (excluding Water and Sewer)



2. Review of Infrastructure Asset Portfolio (excluding Water and Sewer)

2.1 Introduction

The purpose of this assessment is to obtain an understanding of the required level of spending on Council's major infrastructure assets to sustain the specified levels of service going forward. The forecast generated from the study are based on data supplied by Council staff. The results obtained are influenced by this, but should be sufficiently accurate to be used for long-term strategic planning and management decision making. The results are not intended to be used to support the short-term tactical management of assets.

The major asset groups dealt with in this report include: Roads, Bridges & Culverts, Stormwater, Buildings, Recreation, Natural Assets, Commercial Businesses, Cultural Assets and Parks & Reserves.

This report on the Council asset portfolio is written at the asset group level (e.g. Road Assets) to support the high level summary that is required for illustrative purposes. However in order to improve the reliability and validity of our conclusions, our analysis has been completed at the individual Asset Set level (e.g. Pavement). Once completed the results are aggregated in order to provide an overall summary.

GHD data analysis is carried out using a dynamic model, which has the ability to simulate the changing condition of assets over time and the interrelationships between:

- ▶ Condition;
- ▶ Number of assets;
- ▶ Level of treatment (i.e. Maintenance and Renewal);
- ▶ Performance; and
- ▶ Asset life.

This is a distinct advantage over static forecasting models that do not:

- ▶ Track the behaviour of assets over time;
- ▶ Account for the effects of decay in condition;
- ▶ Account for a rise in costs to maintain the assets over time; and
- ▶ Account for the benefits of investment in Rehabilitation, Renewal and Enhancements.

2.2 Definitions

Table 1 Table of Definitions

Term	Definition
Asset	A physical component of a facility that has a value, enables services to be provided and has an economic life of greater than 12 months.



Term	Definition
Asset Degradation Curve	The rate at which an asset degrades over its total life against the 10-point condition rating scale (refer to Figure 3).
Asset Group	A group of asset sets with similar behaviours (eg Roads, Stormwater Network, etc).
Asset Portfolio	All of Council's infrastructure assets.
Asset Set	The particular asset type (eg wearing surfaces or pavements within the Roads asset group).
Backlog	<p>The total level of overdue Renewal and Maintenance based upon asset condition and the Council adopted service/intervention levels.</p> <p>The action taken to reduce the Backlog is referred to as Rehabilitation, within the context of this report.</p>
Condition	The condition of the asset against the 10-point condition rating scale (refer to Figure 2).
Consequential Maintenance	The routine Maintenance cost plus the cost of the resultant level of Maintenance required to support a given Rehabilitation / Renewals strategy. Depending on the selected strategy this may be more or less than the maintenance costs.
Enhancements	The cost associated with increasing a physical asset's service level beyond that which existed originally (eg road widening).
Existing Spending Policy	<p>Covers Council's proposed infrastructure expenditure inclusive of:</p> <ul style="list-style-type: none"> ▶ Enhancements limited to the Council's existing Plan to the end of 2019/2020; ▶ Council proposed Rehabilitation and Renewal expenditure; and ▶ The Consequential Maintenance expenditure.
Expenditure Gap	The difference under the Existing Spending Policy between Council's proposed expenditure and the level of expenditure required to sustain Council's specified Intervention Condition Levels.
Growth	The cost associated with increasing the quantum of physical assets, resulting in a larger asset portfolio.
Intervention Condition Level (ICL)	<p>The condition level at which Council intervenes to renew an asset to the defined Return Condition Level.</p> <p>The ICL is the most degraded (worst) asset condition acceptable, as defined by Council (refer to Section 3.2.3).</p>



Term	Definition
Maintenance	The annual cost of routine repairs and regular upkeep of a physical asset to ensure that it provides service levels consistent with its expected lifecycle degradation path.
Preferred Spending Scenario	<p>An analysis of the Total Expenditure requirements to achieve:</p> <ul style="list-style-type: none"> ▶ Enhancements limited to the Council's existing plan to the end of 2019/20; ▶ The estimated required Renewal expenditure accounting for these Enhancements (as calculated by GHD); ▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 5-year period; and ▶ The estimated Consequential Maintenance expenditure accounting for Enhancements, Renewals and Rehabilitation (as calculated by GHD).
Present Condition Distribution	The current percentage of assets within each of the 10 condition ratings.
Present Condition Rating	The current condition of the asset against the 10-point condition rating scale.
Quantity	The number of units of a particular asset.
Rehabilitation	The total cost of clearing up any Backlog of Renewal and Maintenance.
Renewal	The total cost of restoring a physical asset's service level to that which existed originally (near new), applying current standards and technology.
Responsive Spending Scenario	<p>An analysis of the Total Expenditure requirements to achieve:</p> <ul style="list-style-type: none"> ▶ Enhancements driven by projected municipal population growth of 1.1% per annum from 2010/11 to 2029/30; ▶ The estimated required Renewal expenditure after accounting for these Enhancements (as calculated by GHD); ▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 5-year period; and ▶ The estimated Consequential Maintenance



Term	Definition
	expenditure after accounting for Enhancements, Renewal and Rehabilitation (as calculated by GHD).
Restrained Spending	An analysis of the Total Expenditure requirements to achieve ⁴ : <ul style="list-style-type: none">▶ Nil enhancements⁵▶ The estimated required Renewal expenditure (as calculated by GHD), after accounting for limited Enhancements already committed by Council⁶;▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 10-year period; and▶ The estimated Consequential Maintenance expenditure (as calculated by GHD), after accounting for limited Enhancements, Renewal and Rehabilitation.
Return Condition Level	The condition at which the asset set is returned to service after its renewal.
Treatment	Treatment of the assets to effect a desired outcome. In this case; Maintenance, Rehabilitation, Renewal and Enhancements.
Treatment Strategy	The adopted strategy for dealing with Maintenance, Rehabilitation, Renewal and Enhancement obligations.

2.3 Major Infrastructure Asset Groups

The asset groups modelled (eg Roads Assets) and subsequently the Asset Sets (eg Pavement (Urban)) that make up a particular asset group are displayed in Figure 1.

⁴ This means a change to a council's spending policies so that any infrastructure backlog is eliminated within 10 years, future renewals and maintenance are undertaken when they fall due, there are no increases in the non-financial asset base (i.e., enhancement capex is zero).

⁵ That is, no allowance is made for an increase in population

⁶ That is, a contract has already been let and/or physical works have commenced



Figure 1 Major Asset Groups (Total Asset Group Cost)⁷



⁷ Figures provided are rounded to nearest million. Figures are based on the replacement or original construction cost.

⁸ Bulk earthworks are a non-depreciating asset

⁹ No assigned asset value



2.4 GHD Outputs

On behalf of Review Today, GHD carried out the following assessments:

- ▶ A consolidated overview of the condition of existing physical assets based upon condition data submitted by Council;
- ▶ The estimated extent of the current Renewals and Maintenance Backlog, in the form of required Rehabilitation expenditure;
- ▶ The impact of Council's Existing Spending Policy on the future Asset stock condition over time;
- ▶ The annual level of spending required for Renewals and Maintenance over a 20-year period to sustain Council's assets at Intervention Condition Levels specified by Council and endorsed by GHD as being reasonable;
- ▶ The expenditure gap (if any) between Council's Existing Spending Policy and the level of spending required to sustain Council's assets at the specified Intervention Condition Levels.
- ▶ A summary of the estimated Total Expenditure requirements as a result of 4 conceptual scenarios defined by Review Today:
 - ▶ Existing Spending Policy:
 - ▶ Enhancements driven by Council's existing plan to the end of 2018/19;
 - ▶ Council proposed Rehabilitation and Renewal expenditure; and
 - ▶ Council proposed Maintenance expenditure.
 - ▶ Preferred Spending Scenario:
 - ▶ Enhancements driven by Council's existing plan to the end of 2018/19;
 - ▶ The estimated Renewal expenditure required after accounting for these Enhancements (as calculated by GHD);
 - ▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 5-year period; and
 - ▶ The estimated Consequential Maintenance expenditure after accounting for above Enhancements, Renewals and Rehabilitation (as calculated by GHD).
 - ▶ Restrained Spending Scenario;
 - ▶ Nil enhancements
 - ▶ The estimated required Renewal expenditure (as calculated by GHD) required, accounting for limited Enhancements;
 - ▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 10-year period; and
 - ▶ The estimated Consequential Maintenance expenditure (as calculated by GHD) after accounting for above Enhancements, Rehabilitation and Renewal.
 - ▶ Responsive Spending Scenario;
 - ▶ Estimated enhancements driven by a projected municipal population growth of 1.1% per annum from 2010/11 to 2029/30;



- ▶ The estimated Renewal expenditure required after accounting for these Enhancements (as calculated by GHD);
- ▶ The estimated Rehabilitation expenditure required for clearance of the present Backlog over a 5-year period; and
- ▶ The estimated Consequential Maintenance expenditure after accounting for above Enhancements, Rehabilitation and Renewals (as calculated by GHD).

The estimates made in this report are based on Council provided data and knowledge, tested against GHD's knowledge of the life-cycle performance of local government assets.

Council has advised GHD as follows:

- ▶ The analysis is based on data inserted into GHD tables from asset and condition spreadsheets and databases from Council records;
- ▶ The current budgets for maintenance and rehabilitation are understated by the level contribution from volunteer hours and fundraising for halls, cemetery, sportsgrounds and facilities;
- ▶ The current budgets for maintenance and rehabilitation are understated for leased facilities undertaken by lessee (Visitor Information Centres, office), or grant reserves (childcare);
- ▶ Evidence of satisfactory level of maintenance & rehabilitation activity, based on the current condition of those assets; and
- ▶ Council will collect data on volunteer hours and fundraising maintenance & rehabilitation expenditure in future.



3. GHD's Methodology

3.1 Overview of Modelling Process

The modelling process takes a stepped approach by answering the following seven questions. Question 1 must be answered prior to commencement of the analysis. Once the base data generated by Question 1 is in place, Questions 2 to 7 can then be answered. These questions are subsequently addressed in later in the report. The questions to be answered by this report are as follows:

Question 1 - What are the characteristics of Council's assets and how do they behave over time and given a particular scenario?

Question 2 - What is the present actual condition of Council's assets?

Question 3 – What is Council's Existing Spending Policy for infrastructure?

Question 4 - If Council implements the Existing Spending Policy, what will be the condition of its assets in 20 years time?

Question 5 – What level of expenditure is required under the Preferred Spending Scenario?

Question 6 - What is the gap in Total Expenditure between the Existing Spending Policy and the Preferred Spending Scenario?

Question 7 - If we apply possible alternative spending scenarios, what will be the effect on the required level of expenditure?

3.1.1 Data Requirements

To support the modelling process GHD assisted Council staff to provide the following information regarding Council's assets (particular to each asset type):

- ▶ Quantity of assets;
- ▶ Present asset condition;
- ▶ Intervention Condition Levels;
- ▶ Return Condition Levels;
- ▶ Asset Degradation Rates in their particular setting;
- ▶ Maintenance / Asset Condition Relationship; and
- ▶ Proposed expenditure (Rehabilitation, Renewals, Maintenance and Enhancements).

3.2 Defining the characteristics of Council's Assets

To be able to complete a dynamic assessment of the financial expenditure requirements of assets into the future, there must be an understanding of how the asset set being modelled behaves and is treated in a particular situation. As this study is concerned with determining the financial expenditure requirements to renew and maintain Council's assets we must understand the following asset behaviours:

- ▶ The current condition of the asset;



- ▶ The life of the asset;
- ▶ The rate at which the asset degrades;
- ▶ The cost to renew the asset;
- ▶ The cost to maintain the asset; and
- ▶ The change in cost to maintain the asset as its condition degrades.

The requirement for Council treatments must also be understood, these are:

- ▶ The condition level at which Council will intervene and renew the asset to ensure the required service levels are sustained (the ICL); and
- ▶ The condition level to which Council will restore a particular asset when they intervene to renew it (the RCL).

In determining these behavioural characteristics, there are a number of influencing factors that need to be considered. The following points are an example of the typical considerations that should be taken into account in relation to a set of road assets:

- ▶ The level of service that the road must provide (e.g. the road may be for public use or could be simply a delivery route or access road);
- ▶ The particular environmental conditions that the asset is subject to (i.e. condition of the sub strata in the area and weather);
- ▶ The level of utilisation that the asset is subject to (e.g. volume of traffic);
- ▶ The purpose for which the asset is intended (e.g. heavy vehicles); and
- ▶ The quality, durability and design life of the materials from which the asset is constructed.

A more detailed analysis would require a thorough understanding of these factors to enable the potential effects to be built into the modelling process. However, as the aim of this study is to obtain a general understanding for the purpose of high-level strategic decision-making, they are factored in through a combination of:

- ▶ GHD's industry experience;
- ▶ Factual data taken from previous studies on similar assets; and most importantly; and
- ▶ Council's knowledge of these particular assets, the local environment and the services they support.

Please read these notes prior to moving onto the Methodology:

The graphs, tables and rating systems in this section relate to the methodology applied by GHD for this assessment and are therefore independent of Council's existing methodologies.

The graphs and supporting tables used throughout the methodology exist for the purpose of illustration and therefore they:

- ▶ Only exist to provide the reader with a view of the steps GHD work through and the consideration we make to enable us to present our results at a summarised level for the purpose of this report; and
- ▶ Should not be used to generate conclusions from this report.

It should be noted however, that the graphs shown in Figure 2 (Present Condition Distribution), Figure 3 (Degradation Curve), and Figure 7 (Maintenance Cost Condition Relationship) have been created for






each individual assets set in support of our analysis. They do not appear in the results section of this report due to the volume of graphs that this would generate.

3.2.1 Question 1a - Present Condition Distribution






Modelling commences by understanding the present condition of the particular asset set to determine the Present Condition Distribution. This is done by assessing the Asset Set against a 10-point condition rating scale and identifying the percentage of the total asset set that currently sits within in each condition rating. **For the purpose of illustration**, the Condition Distribution for a generic Pavement Sealed (Local-Urban) set of assets can be seen in Table 2.

Our analysis was based upon asset condition data from Council's Asset Management System. Hence the quality of our analysis is dependent upon by the reliability of this data. In a more detailed study, where timeframes and budget permit a further detailed analysis, GHD would prefer to assist Council in verifying condition data and also if necessary carry out independent survey work.



Table 2 Asset Condition Distribution Data Input Table - Pavement (Urban)

Condition Rating	Description	Example	% In condition
10	An asset that has failed and is no longer serviceable should not remain in service. There would be an extreme risk in leaving the asset in service.		0.62
9	An asset in extremely poor condition with severe serviceability problems and needing Rehabilitation immediately. Could be a risk to remain in service.		0.55
8	An asset in very poor overall condition with serviceability now being heavily impacted upon by the poor condition. Maintenance costs would be very high and the asset would be at a point where it would need to be Rehabilitated.		1.34



Condition Rating	Description	Example	% In condition
7	An asset in poor overall condition. The deterioration would be quite severe and starting to limit the serviceability of the asset. Maintenance costs would be high.		6.15
6	An asset in fair to poor overall condition. The deterioration condition would be quite obvious. Asset serviceability would now be affected and Maintenance costs would be rising.		11.51
5	An asset in fair overall condition. The deterioration in condition would be obvious and there would be some serviceability loss.		18.49
4	An asset in good overall condition, but with some obvious deterioration evident, serviceability would be impaired very slightly.		23.19
3	An asset in very good overall condition but with some early stages of deterioration evident. The deterioration could still be minor in nature and causing no serviceability problems.		21.99



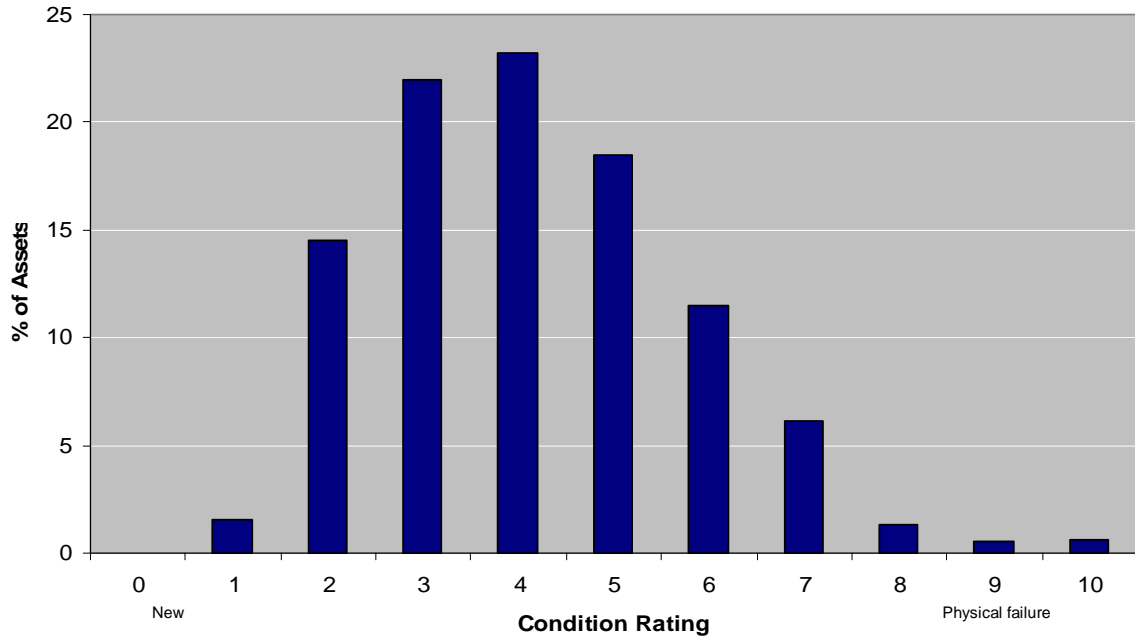
Condition Rating	Description	Example	% In condition
2	An asset in excellent overall condition. There would be only very slight condition decline but it would be obvious that the asset was no longer in new condition.		14.52
1	A near new asset with no visible signs of deterioration often moved to condition 1, based upon the time since construction rather than observed condition decline.		1.52
0	A new asset or an asset recently rehabilitated back to new condition.		0.00
Total			100

The information from Table 2 is displayed graphically in Figure 2.

This exercise is undertaken for each individual asset set.



Figure 2 Present Condition Distribution - Pavement (Urban)



3.2.2 Question 1b - Asset Degradation Rate

This asset degradation curve defines the rate of degradation for a particular asset's service capacity and is a behavioural characteristic. It is derived by inputting the total 'typical' life of the asset in years and then defining the percentage of the assets total life, spent within each of the 10 condition ratings. This is illustrated by the shaded column in Table 3 for a sealed urban pavement.



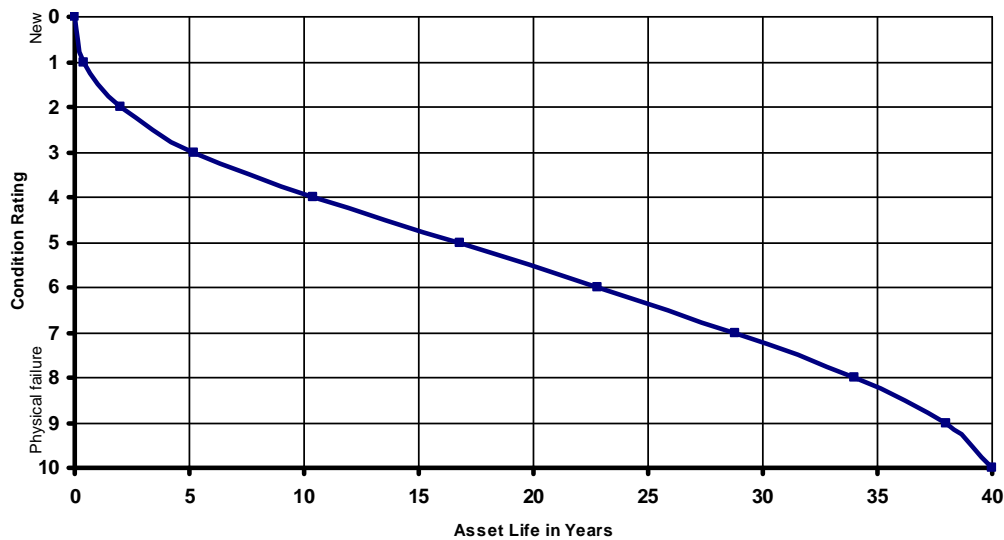
Table 3 Asset Degradation Rate Data Input Table - Pavement (Urban)

Condition Rating	Description	% Life Spent In condition
10	An asset that has failed and is no longer serviceable should not remain in service. There would be an extreme risk in leaving the asset in service.	0
9	An asset in extremely poor condition with severe serviceability problems and needing Rehabilitation immediately. Could be a risk to remain in service.	5
8	An asset in very poor overall condition with serviceability now being heavily impacted upon by the poor condition. Maintenance cost would be very high and the asset would be at a point where it needed to be rehabilitated.	10
7	An asset in poor overall condition deterioration would be quite severe and starting to limit the serviceability of the asset. Maintenance costs would be high.	12
6	An asset in fair to poor overall condition. The deterioration condition would be quite obvious. Asset serviceability would now be affected and Maintenance costs would be rising.	15
5	An asset in fair overall condition where the deterioration in condition would be obvious and some serviceability loss.	15
4	An asset in good overall condition but with some obvious deterioration evident, serviceability would be impaired very slightly.	17.5
3	An asset in very good overall condition but with some early stages of deterioration evident, but the deterioration is still minor in nature and therefore causing no serviceability problems.	12
2	An asset in excellent overall condition with only very slight condition decline but obvious that the asset is no longer in new condition.	7.5
1	A near new asset with no visible signs of deterioration often moved to condition 1, based upon the time since construction rather than observed condition decline.	5
0	A new asset or an asset recently rehabilitated back to new condition.	1
Total		100



The information from Table 3 is illustrated in Figure 3. This information is used during modelling to simulate degradation of the asset over time. The graph indicates that the Asset Set modelled, spends 50% or 2 years of its life in condition 1.

Figure 3 Degradation Curve - Pavement (Urban)



3.2.3 Question 1c – Intervention Condition Levels

After simulating an asset's degradation we need to define the condition level at which an asset must be renewed, based upon the 10-point condition rating scale. This is illustrated for the set of Pavement Sealed (Local-Urban) assets by the blue shaded cell in Table 5.

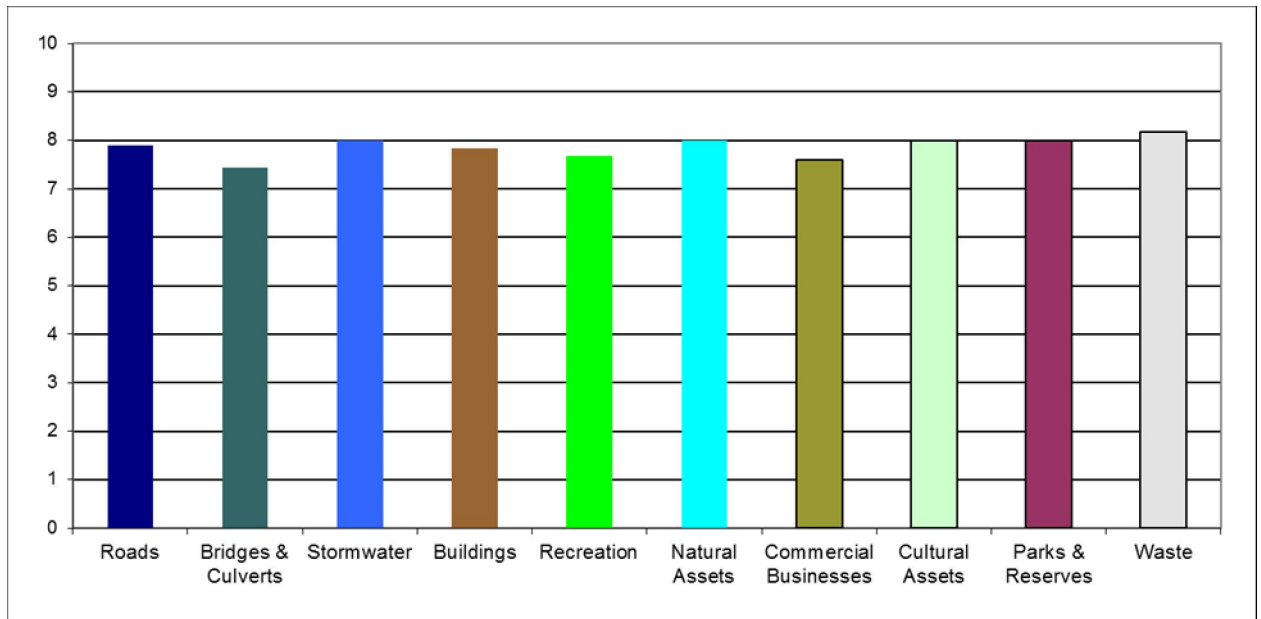
When determining the Intervention Condition Levels (ICL) for a set of assets, there are a number of issues to take into account:

- ▶ Based upon this method, the Intervention Condition Levels is closely tied to the required minimum service level of the asset, assuming that the poorer the condition that an asset is allowed to reach, the poorer its performance will be as a result; therefore
- ▶ Different Intervention Condition Levels can be selected for the same type of asset (e.g. a building) in a different application. For example, one building is used daily by the public and must be maintained to high standards, the other is for storage purposes and can afford to be kept to a lesser standard; however
- ▶ When setting the Intervention Condition Levels, safety must be the prime (though not only) consideration, assuming that once an asset reaches a particular condition, it is no longer safe to use, operate and maintain.
- ▶ Operational efficiency and effectiveness, increasing cost of maintenance, aesthetic value and heritage value, among other factors, may also be considered when determining a particular asset's Intervention Condition Levels.



For the above reasons, the Intervention Condition Levels are derived jointly between Council and GHD to take account of Council's asset strategies, whilst ensuring assets remain safe to use, operate and maintain. The average Intervention Condition Levels for each Asset Group, as determined by Council, are provided in Figure 4.

Figure 4 Asset Group Intervention Condition Levels (average)



The Asset Set Intervention Condition Levels are provided for the Roads Asset Group in Table 4 as an example.



Table 4 Individual Intervention Condition Levels for the Roads Asset Group

Asset Set	Intervention Condition Level (average)
Sealed Pavement Urban - Local	8
Sealed Pavement Rural - Local	8
Unsealed Pavement Urban - Local	8
Sealed Pavement - Regional	8
Unsealed Pavement Urban - Local	8
Unsealed Pavement Rural - Local	8
Unsealed Pavement Regional	7
Sprayed Seal Urban - Local	7
Sprayed Seal Rural – Local	7
Sprayed Seal Regional	7
Kerb & Gutter	8
Footpath – Concrete	8
Footpath – Brick/Block	8
Roadside Furniture - Signs	8
Roadside Furniture – Guard rail	8
Roadside Furniture - Lighting	8
Roadside Furniture – Bus Shelters	9
Cycleway – Concrete	8
Cycleway – Asphalt/Seal	8

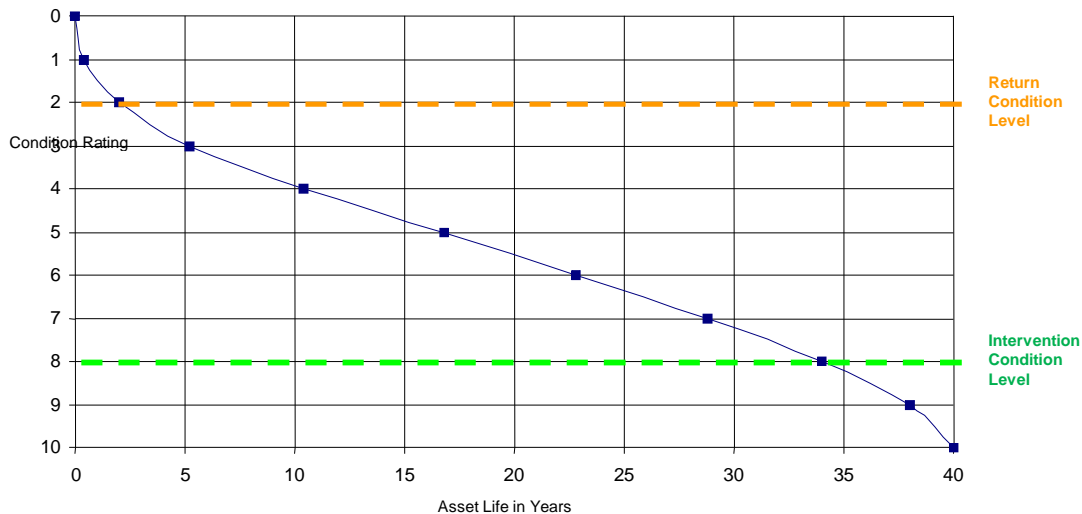
Based upon the information in Table 4 we are able to demonstrate the Intervention Condition Levels for the generic set of Pavement Sealed (Urban) assets on the condition distribution graph, which is illustrated by the blue dashed line in Figure 5 (i.e. condition 8). The asset service levels therefore should range between conditions 0 and 8.

Table 5 Intervention Condition Level – Generic Pavement (Urban)

Year ahead to be analysed	Actual year ahead	Intervention Condition Level	Asset return Condition
20	2030	8.0	2.0



Figure 5 Present Condition Distribution Showing ICL and RCL¹⁰



3.2.4 Question 1d - Return Condition Levels

The next step is to define the condition level to which Council will renew an asset when it intervenes. This is illustrated for the set of Pavement Sealed (Local-Urban) assets by the orange-shaded cell in Table 5.

To maintain accuracy of results when carrying out this process, it must be ensured that the level of treatment (Renewal) being simulated, the life of that treatment and the level of cost to achieve it are aligned. This is necessary for two main reasons:

- ▶ The cost to rehabilitate an asset to a particular condition level will be different from the cost to renew it; and
- ▶ The amount of asset life gained from different levels of treatment (Rehabilitation / Renewal) will vary.

Based upon this information we are able to degrade the asset in line with its particular Degradation Curve until it reaches the defined ICL, at which point we rehabilitate / renew it to the defined Return Condition Level (RCL). This is illustrated by the orange-dashed line in Figure 5.

Whilst the Return Condition Level is not reported on separately in the results, it is a major influencing factor in the modelling process.

3.2.5 Question 1e - Understanding the present Renewals and Maintenance Backlog

Based upon the information in Table 5 we are also able to estimate the current Renewals and Maintenance Backlog. That is, the level of required Rehabilitation based upon current asset condition and Council treatments to-date.

¹⁰ As defined in section 2.2.



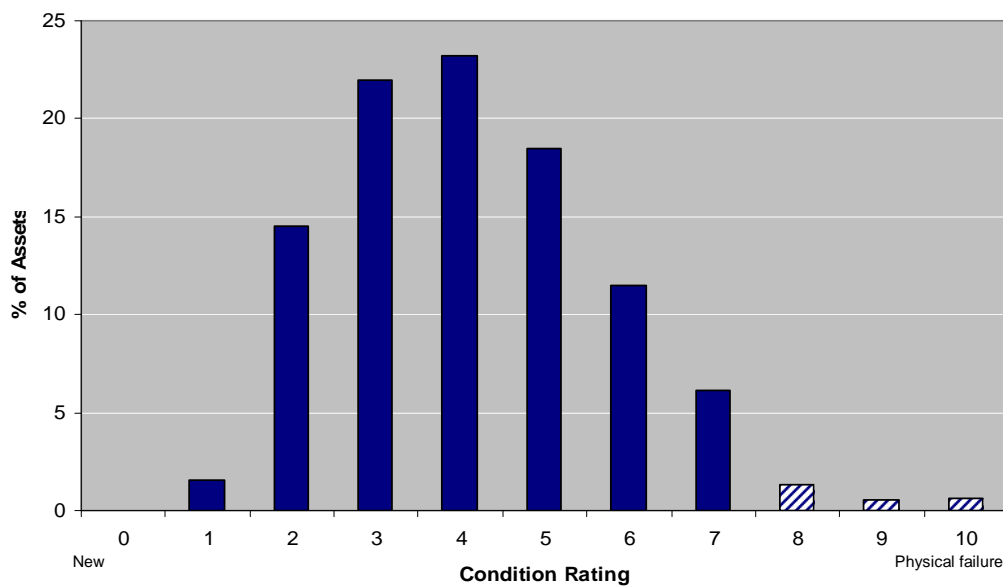
This is derived by quantifying the number of assets in a particular Asset Set that are currently worse than Council's specified ICL for that set (e.g. the shaded 2.5% in Figure 6), and estimating the cost to renew these assets back to Council's RCL for that set.

Calculating the Backlog is then a simple sum of the number of units of asset (e.g. m² for Roads) at or over the ICL multiplied by the unit Rehabilitation cost. For example:

- ▶ Total area of urban pavement - 3,000,000 m²
- ▶ Urban pavement at or above ICL – 5%
- ▶ Unit rehabilitation cost - \$25/m²
- ▶ Total backlog = \$[3,000,000 x 0.05 x 25] = \$3.75 million

As part of GHD's analysis we implement this exercise for each individual Asset Set.

Figure 6 Present Condition Distribution showing Assets which are at, or are worse than, the adopted ICL – Generic Pavement (Urban)



3.2.6 Question 1f – Maintenance Cost Adjustment Ratio

The Maintenance Cost Adjustment Ratio is the final variable required for modelling and is a 'behavioural' characteristic. It is used to link asset condition to Maintenance cost, working on the rationale that the poorer the assets condition, the higher the cost to maintain. For this reason the cost adjustment ratio used must be a factor greater than 1, or the Maintenance costs will remain static as the asset degrades. If this was the case, we would be assuming that improving the asset by expending funds on Renewal will have no effect.

The chosen factor represents the amount by which one expects the Maintenance cost to vary, for each whole number rise or fall in asset condition against the 10-point condition rating scale. For the Pavement (Urban) Asset Set, we have used a Maintenance Cost Adjustment Ratio of 1.4 as shown in Table 6.



This means that each time the asset degrades to the next condition rating, the Maintenance costs would increase by a factor of 1.4 as a direct consequence of deferring renewal beyond the optimum time.

Table 6 Maintenance Cost Adjustment Factor - Pavement (Urban)

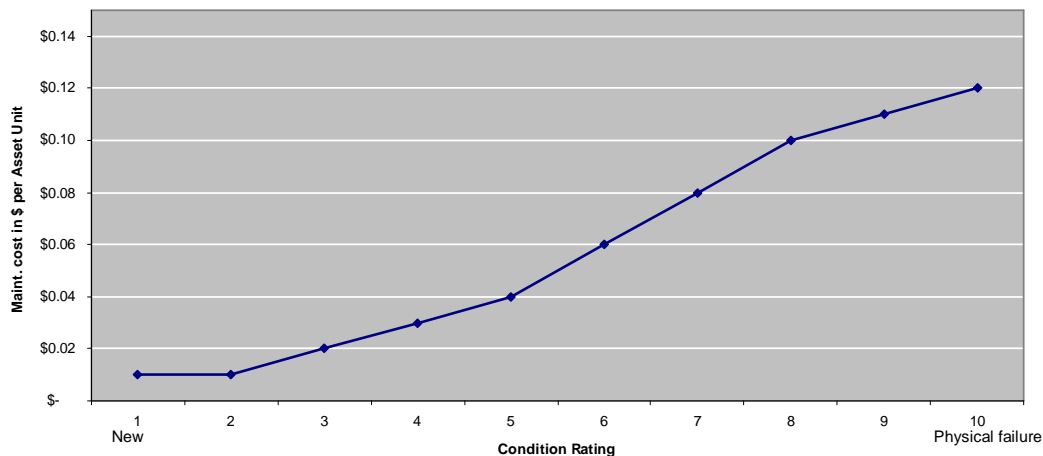
Maintenance Cost Adjustment Ratio for each whole number Change in Overall Asset Condition	1.4
---	-----

The current annual Maintenance cost for an asset set is then defined by dividing the total annual Maintenance cost (Council actual) by the total number of assets in that set to derive the current Maintenance cost per unit (eg m² if it were a road asset). For example:

- ▶ Total area of urban pavement - 3,000,000 m²
- ▶ Total annual maintenance – \$250,000
- ▶ Unit maintenance cost = $[\$250,000 / 3,000,000] = \$0.08/m^2$

Finally the through-life cost/ condition relationship is then created for the asset. This is illustrated in Figure 7.

Figure 7 Maintenance Cost Condition Relationship - Pavement (Urban)



Based upon this curve we are able to simulate the relationship between change in asset condition and the Consequential Maintenance cost.

This information is used to estimate the level of Maintenance Expenditure required as a consequence of different levels of Renewal Expenditure, assuming Renewal Expenditure improves asset condition.



4. Current Infrastructure Condition Assessment

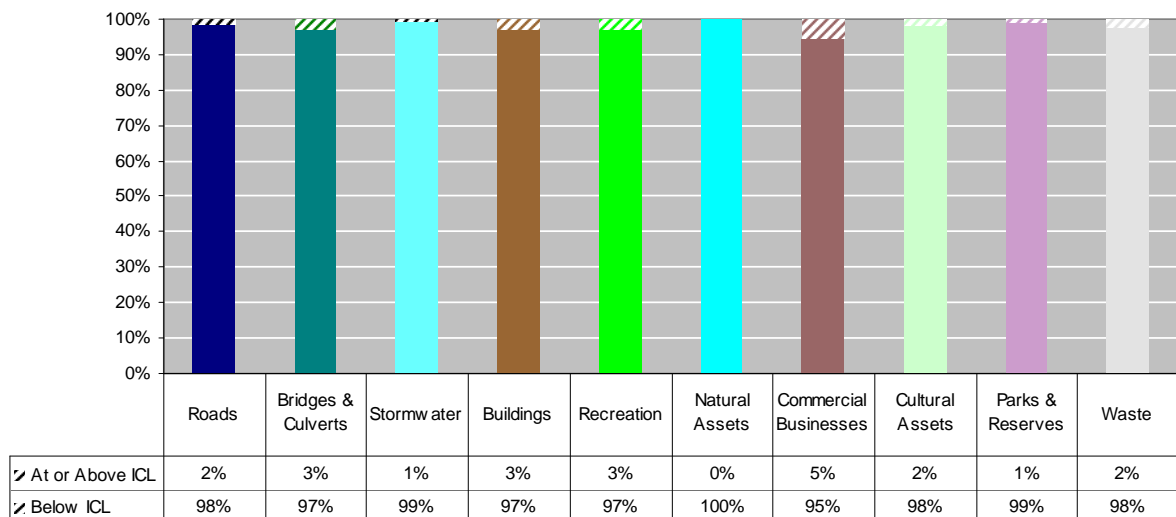
4.1 Current Condition

In order to understand the present condition of Council's assets, we created a Condition Distribution graph for each individual Asset Set like the one shown in Figure 2. These profiles were then aggregated to produce the summary graph shown in Figure 8. The purpose of this graph is to quickly demonstrate the present relative status of each major Asset Group.

The hatched area at the top of each of the bars represents the percentage of Council's assets that are currently at, or are worse than, the Intervention Condition Level, as a result of infrastructure treatment to date. That is, the hatched area represents the percentage of assets within the given asset sets that are currently at an unacceptable (as defined by Council) condition level, as a result of Council being unable to fulfil Renewal and/or Maintenance programmes.

Overall the average renewals and maintenance backlog for Council assets (other than water and sewerage) is 0.8% based on value.

Figure 8 Percentage of Asset Group that presently are at, or are worse than, Council Intervention Condition Levels (based on number of assets in each group; not value of assets)



4.1.1 Observations

These assets should be treated to return them to acceptable levels if unnecessary risk and costs are to be avoided. The cost to achieve this desired state is referred to as the Renewals and Maintenance Backlog. Completing Rehabilitation reduces the Backlog.



Table 7 Percentage of Asset Group that are presently at, or worse than, Council Intervention Condition Levels

Asset Group	Percentage of Assets that are at, or are worse than, Council Intervention Condition Levels
Roads	2%
Bridges & Culverts	3%
Stormwater	1%
Buildings	3%
Recreation	3%
Natural Assets	0%
Commercial Businesses	5%
Cultural Assets	2%
Parks & Reserves	1%
Waste	2%

4.2 Current Infrastructure Renewals and Maintenance Backlog

The investment required to Rehabilitate all assets that are currently at or are worse than Council's adopted Intervention Condition Levels, back to the required standard are shown in Figure 9. The graph, therefore, represents an estimate of the present Renewals and Maintenance Backlog in dollars.



Figure 9 Current Renewals and Maintenance Backlog



4.2.1 Observations

Based on information supplied, we estimate that the current Renewals and Maintenance Backlog is in the order of **\$5.0 M**. Table 8 below shows the breakdown of this \$5.0 M as it is attributable to the major Asset Groups.



Table 8 Present Renewals and Maintenance Backlog

Asset Group	Present Backlog
Roads	\$2.4 M
Bridges & Culverts	\$0.7 M
Stormwater	\$0.0 M
Buildings	<\$0.1 M
Recreation	\$0.9 M
Natural Assets	\$0.0 M
Commercial Businesses	\$0.5 M
Cultural Assets	\$0.2 M
Parks & Reserves	<\$0.1 M
Waste	\$0.2 M
Total	\$5.0M



5. Existing Infrastructure Spending Policy

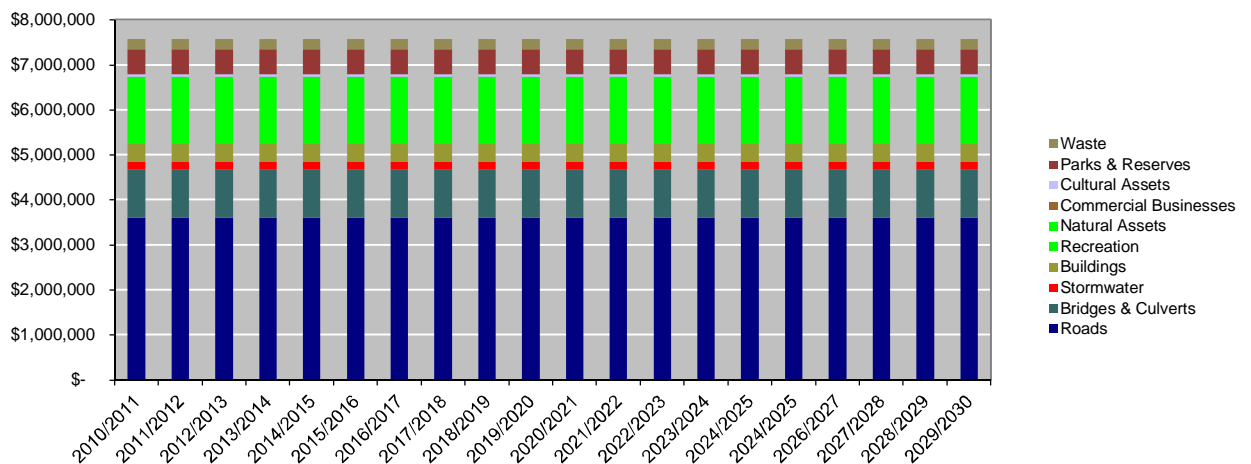
5.1 Rehabilitation Expenditure

Under the Existing Spending Policy, Council does not distinguish between Rehabilitation and Renewal so both concepts are subsumed under Renewals. For modelling purposes however, we have assumed all infrastructure expenditure other than Enhancements is for Renewals as the infrastructure backlog has been growing.

5.2 Renewal Expenditure

An estimate of Council's proposed Renewal Expenditure if the Existing Spending Policy is pursued is indicated in Figure 10.

Figure 10 Renewal Expenditure under the Existing Spending Policy



5.2.1 Observations

Council proposes to spend a total of approximately **\$7.6M** per year on asset Renewals, broken down by Asset Group as illustrated in Table 9.

Table 9 Renewal Expenditure by Asset Group under the Existing Spending Policy

Asset Group	Average Annual Renewal Expenditure
Roads	\$3.6 M
Bridges & Culverts	\$1.1 M
Stormwater	\$0.2 M
Buildings	\$0.4 M
Recreation	\$1.5 M
Natural Assets	\$0.0 M
Commercial Businesses	<\$0.1 M



Asset Group	Average Annual Renewal Expenditure
Cultural Assets	<\$0.1 M
Parks & Reserves	\$0.6 M
Waste	\$0.2 M
Total	\$7.6M

5.3 Enhancement Expenditure

Council's proposed Enhancement Expenditure is depicted in Figure 11.

Figure 11 Enhancement Expenditure under the Existing Spending Policy

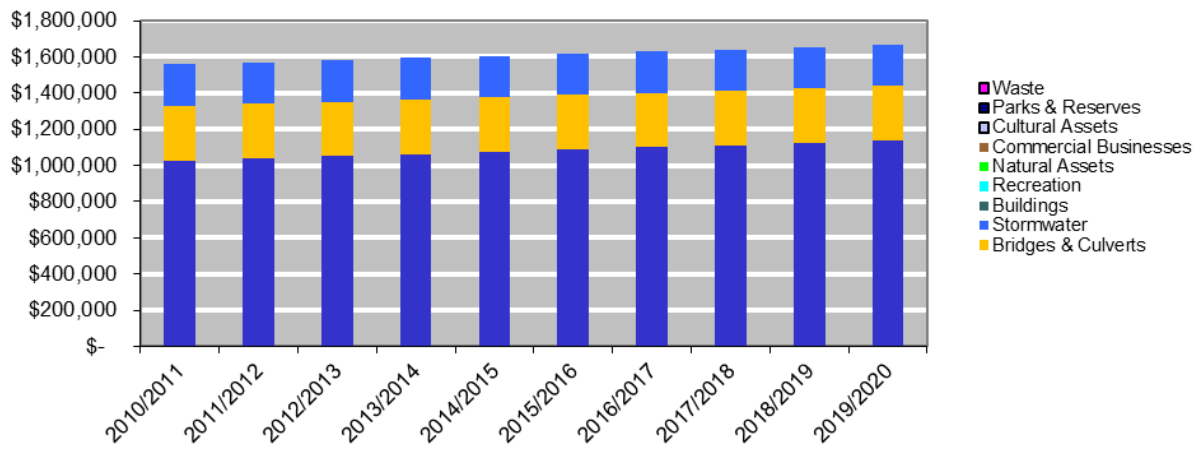




Table 10 Enhancement Expenditure under the Existing Spending Policy (as provided by Council)

Budget year	Enhancement Expenditure
2010/2011	\$1,558,200
2011/2012	\$1,569,625
2012/2013	\$1,581,331
2013/2014	\$1,593,327
2014/2015	\$1,605,622
2015/2016	\$1,618,220
2016/2017	\$1,631,129
2017/2018	\$1,640,000
2018/2019	\$1,654,172
2019/2020	\$1,668,227
Total	\$16,120,204

5.3.1 Observations

Council proposes to spend a total of approximately **\$16.1M** on infrastructure over the next 10 years, broken down annually as illustrated in Table 10.

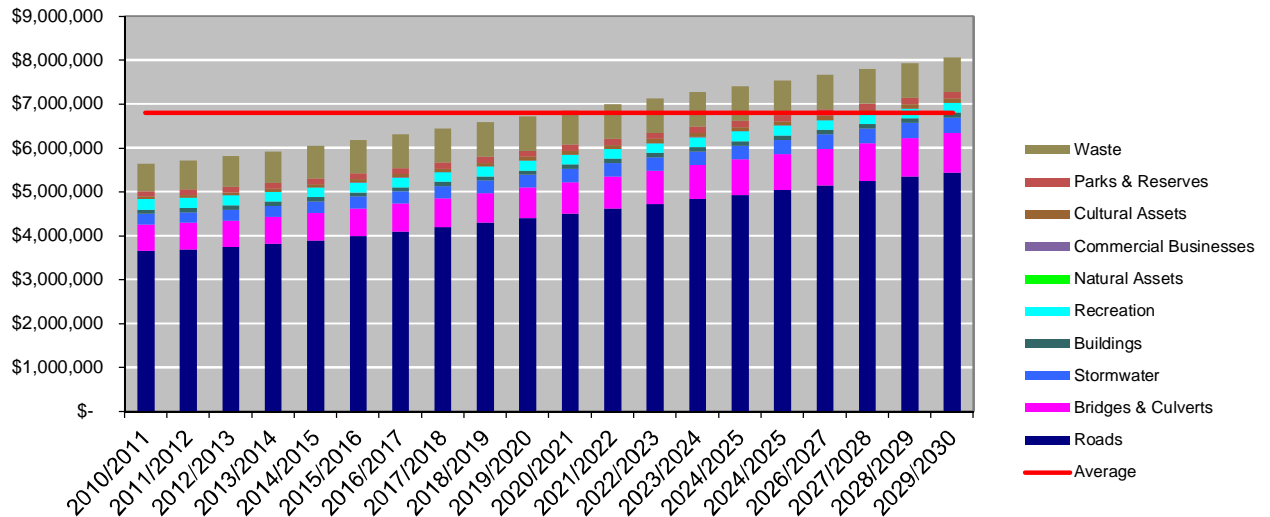
Beyond this Council will likely inherit a considerable number of Assets over the 20 year planning horizon used in this report, as a result of developer activities / contributions. These changes to the asset base have been incorporated as enhancements throughout the calculations in this report as estimated by Council.

5.4 Consequential Maintenance Expenditure

The required Consequential Maintenance Expenditure under the Existing Spending Policy is depicted in Figure 12.



Figure 12 Consequential Maintenance Expenditure under the Existing Spending Policy



5.4.1 Observations

The Consequential Maintenance Expenditure required by Council to support the Existing Rehabilitation/ Renewal Expenditure is approximately **\$6.8M** per year (average).

For purposes of illustration, the average annual Consequential Maintenance Expenditure by Asset Group is provided in Table 11.

Table 11 Consequential Maintenance Expenditure by Asset Group under the Existing Spending Policy

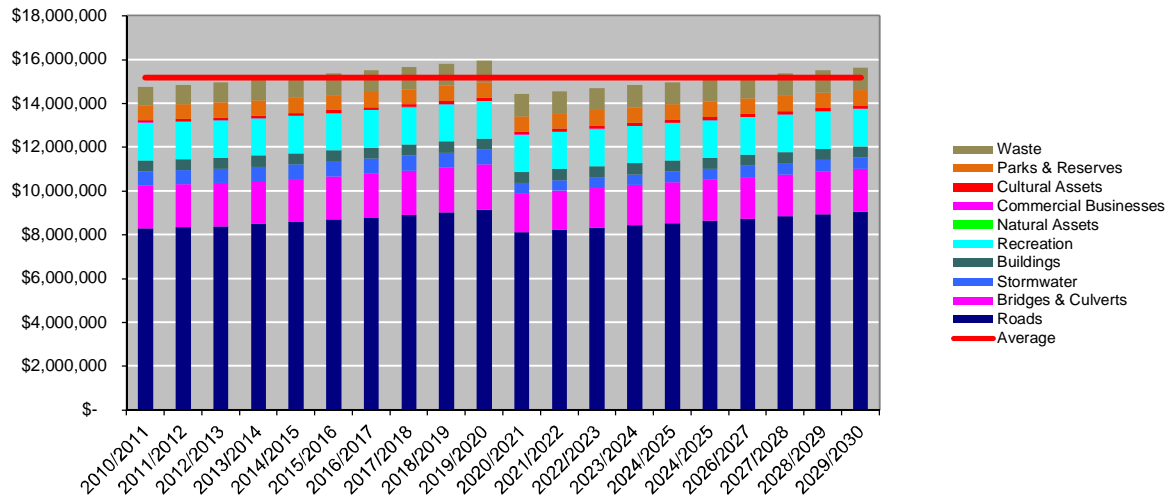
Asset Group	Average Annual Consequential Maintenance Expenditure
Roads	\$ 4.5 M
Bridges & Culverts	\$ 0.7 M
Stormwater	\$ 0.3 M
Buildings	\$ 0.1 M
Recreation	\$ 0.2 M
Natural Assets	\$ 0.0 M
Commercial Businesses	< \$ 0.1 M
Cultural Assets	\$ 0.1 M
Parks & Reserves	\$ 0.1 M
Waste	\$ 0.7 M
Total	\$ 6.8 M



5.5 Total Expenditure

The Total Expenditure under Council's Existing Spending Policy by Asset Group is provided in Figure 13.

Figure 13 Total Renewal/Rehabilitation & Consequential Maintenance under the Existing Spending Policy



5.5.1 Observations

The Total Expenditure under the Existing Spending Policy is estimated to be approximately **\$15.1M** per year (average). For purposes of illustration, the average annual expenditure by asset group is provided in Table 12.

Table 12 Total Expenditure under the Existing Spending Policy

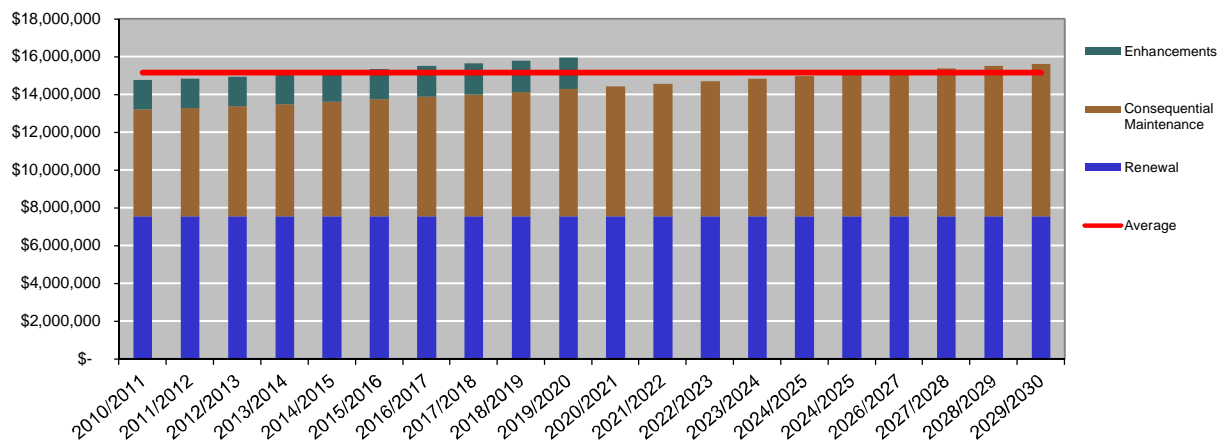
Asset Group	Average Annual Expenditure
Roads	\$ 8.6 M
Bridges & Culverts	\$ 1.9 M
Stormwater	\$ 0.6 M
Buildings	\$ 0.5 M
Recreation	\$ 1.7 M
Natural Assets	\$ 0.0 M
Commercial Businesses	< \$0.1 M
Cultural Assets	\$ 0.1 M
Parks & Reserves	\$ 0.7 M
Waste	\$ 1.0 M
Total	\$15.1M



A high-level summary of Council’s proposed expenditure under the Existing Spending Policy is included at Figure 14. This accounts for:

- Enhancements driven by Council’s plan;
- Rehabilitation and Renewal Expenditure; and
- Consequential Maintenance Expenditure.

Figure 14 Total Expenditure under the Existing Spending Policy



5.6 Observations

For purposes of illustration, a summary of the proposed average annual expenditure as it relates to Rehabilitation, Enhancements, Renewals and Maintenance is provided in Table 13.

Table 13 Total Expenditure under the Existing Spending Policy

Treatment Option	Average Annual Expenditure under the Existing Spending Policy (Over 20 Years)
Renewals	\$ 7.6 M
Consequential Maintenance	\$ 6.8 M
Enhancements	\$ 0.7 M
Rehabilitation	\$ Nil
Total	\$ 15.1 M



6. Preferred Infrastructure Spending Scenario

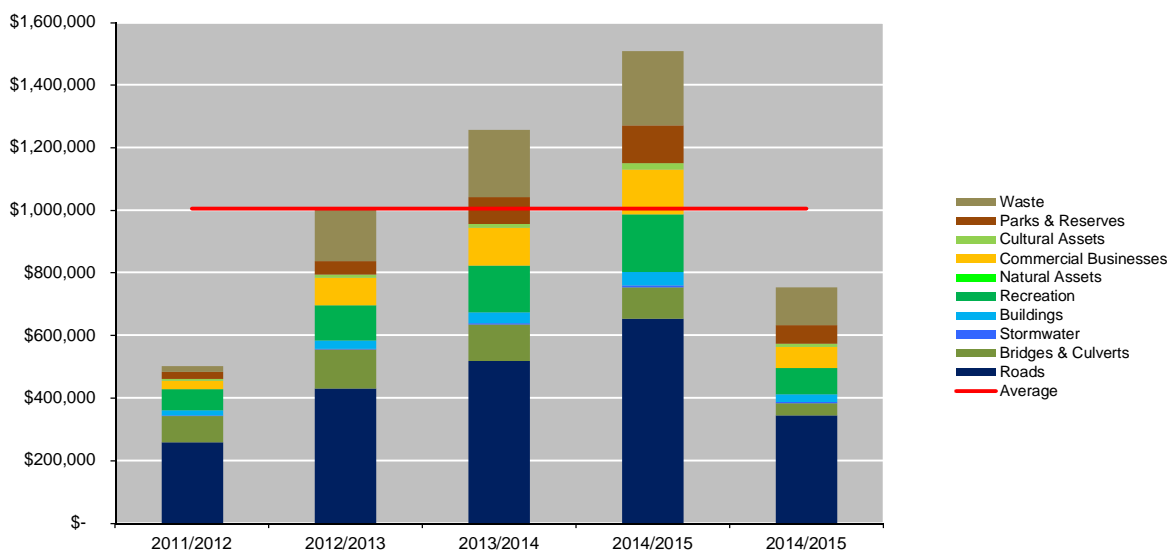
The Preferred Scenario for Rehabilitation, Renewal, Enhancements and Consequential Maintenance includes:

- ▶ Rehabilitation expenditure for clearance of the present Backlog over a 5-year period;
- ▶ The required Renewal expenditure to sustain asset condition levels, as defined by the ICL and RCL;
- ▶ Enhancement expenditure as per Council's existing plan; and
- ▶ Consequential Maintenance expenditure as a result of Rehabilitation, Renewal and Enhancement expenditure.

6.1 Rehabilitation Expenditure

The remedial strategy adopted for clearing the Backlog is 5 years, as shown in Figure 15. This was decided as an appropriate timeframe for this scenario. More detailed future studies would benefit by examining different scenarios based on a range of remedial timeframes.

Figure 15 Rehabilitation Strategy



6.1.1 Observations

If Council were to adopt a five-year remedial strategy for the clearance of the existing Backlog, it is estimated it would need to spend an **average** of **\$1.0M** per year, broken down by actual per year as illustrated in Table 14.

The annual average expenditure on Backlog over the 20-year planning horizon used in this report is calculated as **\$1.4M**.



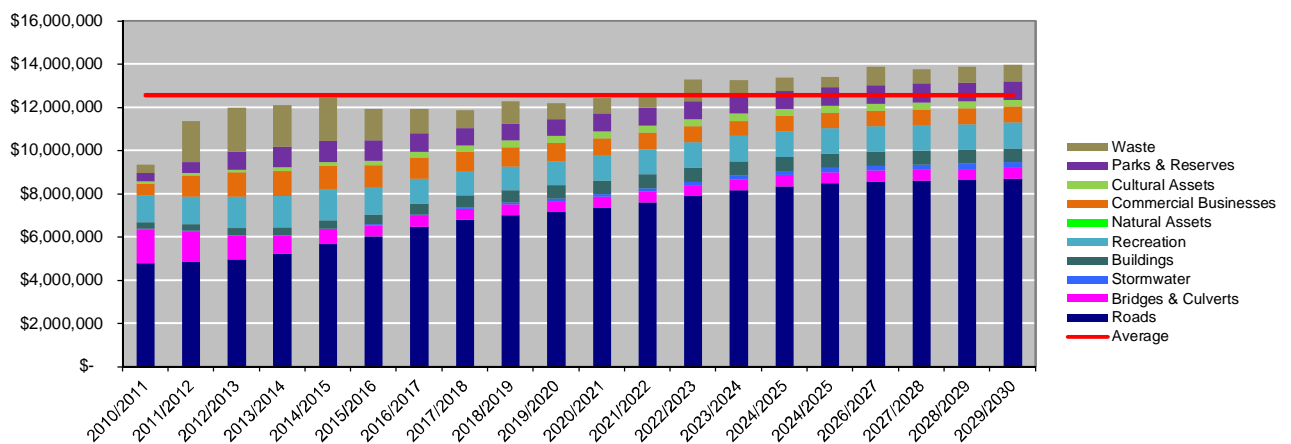
Table 14 Rehabilitation Strategy

Year	Expenditure
2010/ 2011	\$ 0.5 M
2011/ 2012	\$ 1.0 M
2012/ 2013	\$ 1.3 M
2013/ 2014	\$ 1.5 M
2014/ 2015	\$ 0.7 M
Total	\$ 5.0 M

6.2 Renewal Expenditure

GHD's estimated required Renewal Expenditure to sustain the Council's specified Intervention Condition Levels is depicted in Figure 16.

Figure 16 Renewal Expenditure under the Preferred Spending Scenario



6.2.1 Observations

Based upon Council's specified Intervention Condition Levels, we estimate that they need to spend in the order of **\$ 12.3M** per year on asset Renewals (average).

For purposes of illustration, the average annual required Renewal Expenditure by Asset Group is provided in Table 15. From this, it can be seen that the Roads assets are by far the major contributor to this expenditure requirement.



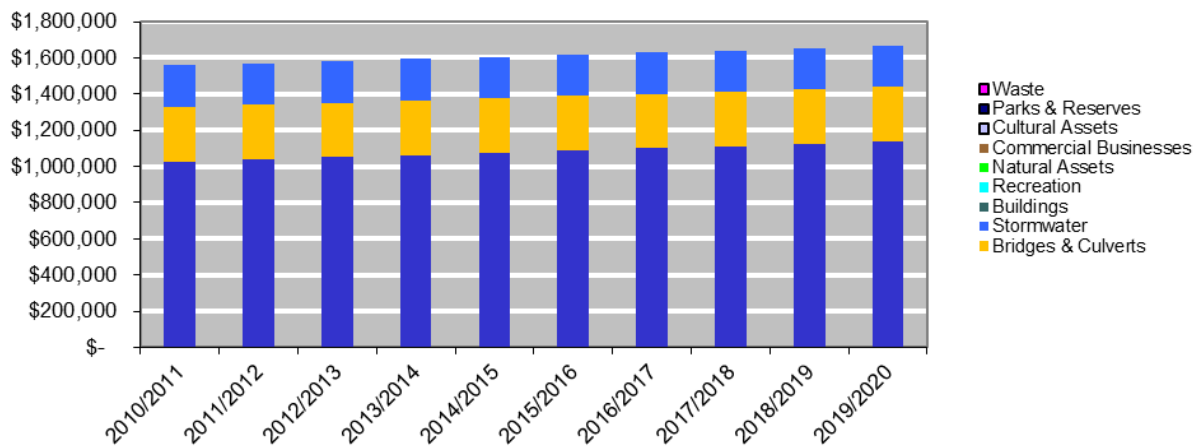
Table 15 Renewal Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Renewal Expenditure
Roads	\$ 6.9 M
Bridges & Culverts	\$ 0.6 M
Stormwater	\$ 0.1 M
Buildings	\$ 0.5 M
Recreation	\$ 1.2 M
Natural Assets	\$ 0.0 M
Commercial Businesses	\$ 0.8 M
Cultural Assets	\$ 0.3 M
Parks & Reserves	\$ 0.8 M
Waste	\$ 1.0 M
Total	\$ 12.3 M

6.3 Enhancement Expenditure

Council's proposed Enhancement Expenditure is illustrated in Figure 17. This profile is identical to that in Figure 11 above as it is a Council preferred position. It is included here to complete the picture by showing the expenditure required to achieve Council's desired Enhancements plan.

Figure 17 Enhancement Expenditure under the Preferred Spending Scenario



6.3.1 Observations

Council proposes to spend a total of approximately **\$16.1M** on infrastructure. Enhancements over the next 10 years, broken down annually are illustrated in Table 16.



The annual average expenditure on Enhancements over the 10 year planning horizon used in this report would be **\$1.6M**.

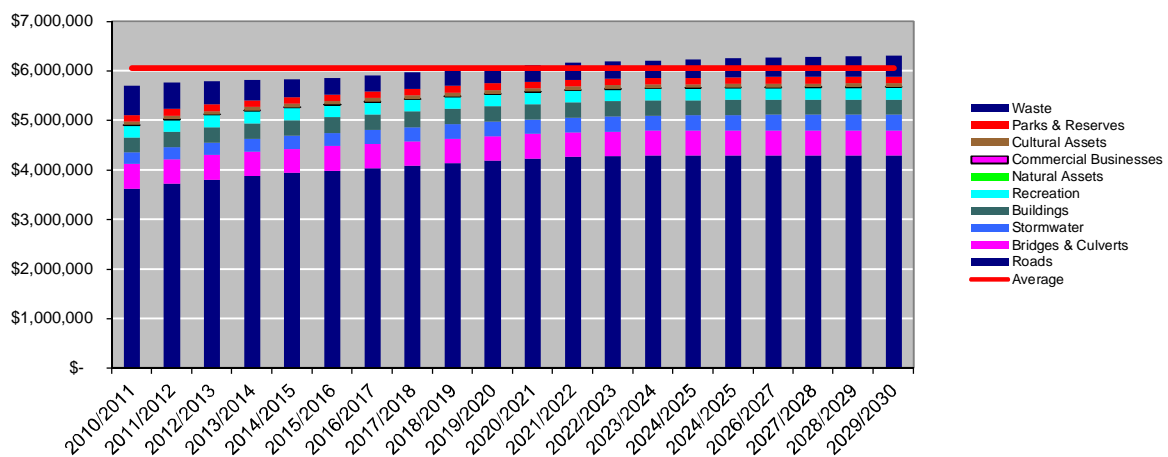
Table 16 Enhancement Expenditure under the Preferred Spending Scenario

Budget year	Enhancement Expenditure
2010/2011	\$1,558,200
2011/2012	\$1,569,625
2012/2013	\$1,581,331
2013/2014	\$1,593,327
2014/2015	\$1,605,622
2015/2016	\$1,618,220
2016/2017	\$1,631,129
2017/2018	\$1,640,000
2018/2019	\$1,654,172
2019/2020	\$1,668,227
Total	\$16,120,204

6.4 Consequential Maintenance Expenditure

The required level of spending on Consequential Maintenance, given the preferred level of expenditure on Rehabilitation, Renewals and Enhancements, is illustrated in Figure 18.

Figure 18 Consequential Maintenance Expenditure under the Preferred Spending Scenario



6.4.1 Observations

We estimate the required level of spending on Consequential Maintenance would be approximately **\$6.0M** per year (average). As renewals and rehabilitation is undertaken the required level of maintenance is reduced. This should result in a consequential maintenance requirement less than that of the Council's Existing Policy.



For purposes of illustration, the average annual required level of spending on Consequential Maintenance by Asset Group is provided in Table 17.

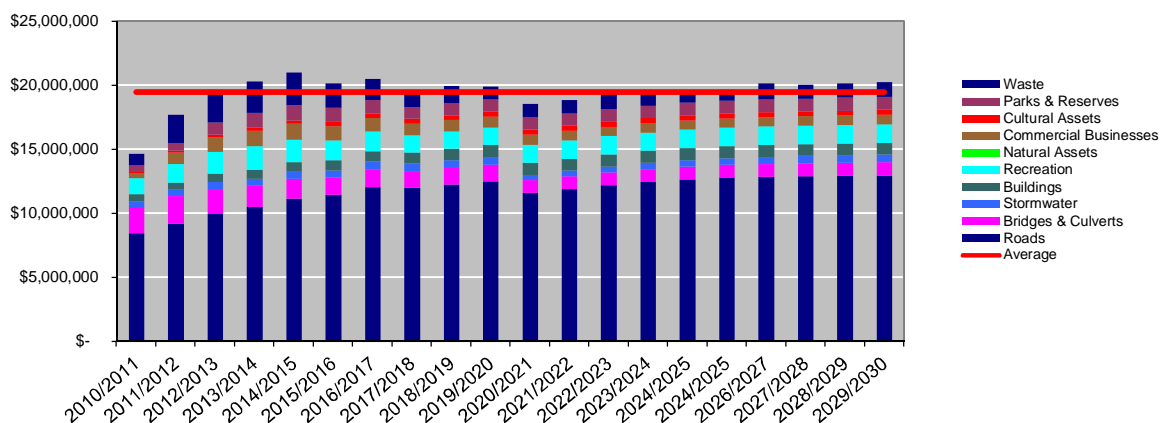
Table 17 Consequential Maintenance Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Consequential Maintenance Expenditure
Roads	\$ 2.9 M
Bridges & Culverts	\$ 0.5 M
Stormwater	\$ 0.3 M
Buildings	\$ 0.3 M
Recreation	\$ 0.3 M
Natural Assets	\$ 0.0 M
Commercial Businesses	<\$ 0.1 M
Cultural Assets	<\$ 0.1 M
Parks & Reserves	\$ 0.1 M
Waste	\$ 0.4 M
Total	\$ 6.0 M

6.5 Total Expenditure

The Total Expenditure required under the Preferred Spending Scenario, including Rehabilitation, Renewal, Enhancement and Consequential Maintenance, is depicted in Figure 19.

Figure 19 Total Expenditure under the Preferred Spending Scenario



6.5.1 Observations

We estimate the total required level of spending on combined Rehabilitation, Renewal, Enhancements and Consequential Maintenance would be approximately **\$19.4M** per year (average over 20 years).



For purposes of illustration, the average annual required level of spending on combined Rehabilitation, Renewal, Enhancements and Consequential Maintenance by Asset Group is provided in Table 18.

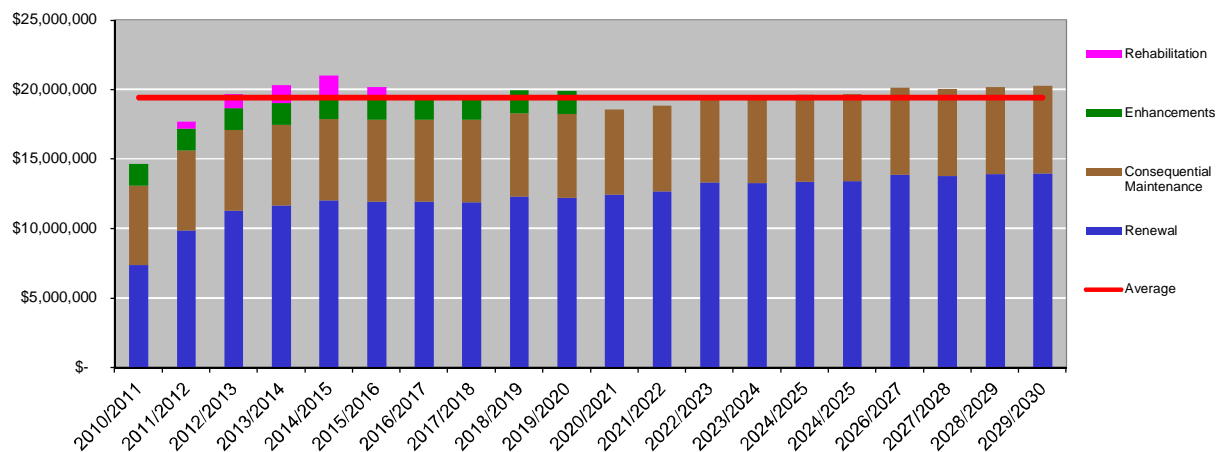
Table 18 Total Expenditure under the Preferred Spending Scenario

Asset Group	Average Annual Expenditure
Roads	\$ 11.7 M
Bridges & Culverts	\$ 1.3 M
Stormwater	\$ 0.5 M
Buildings	\$ 0.8 M
Recreation	\$ 1.5 M
Natural Assets	\$ 0.0 M
Commercial Businesses	\$ 0.8 M
Cultural Assets	\$ 0.3 M
Parks & Reserves	\$ 1.0 M
Waste	\$ 1.4 M
Total	\$19.4M

A high-level summary of the total expenditure we believe is required to support the Preferred Spending Scenario is included at Figure 20. This includes:

- Enhancements driven by Council's existing plan;
- The required Renewal Expenditure accounting for these Enhancements (as calculated by GHD);
- Rehabilitation expenditure for clearance of the present Backlog over a 5-year period;
- The Consequential Maintenance Expenditure after accounting for above Enhancements, Rehabilitation and Renewals (as calculated by GHD).

Figure 20 Total Expenditure under the Preferred Spending Scenario





6.5.2 Observations

The estimated total average annual expenditure under the Preferred Spending Scenario would be **\$19.3M**.

For purposes of illustration, a summary of the required average annual expenditure as it relates to Backlog, Enhancements, Rehabilitation/ Renewals and Maintenance is provided in Table 19.

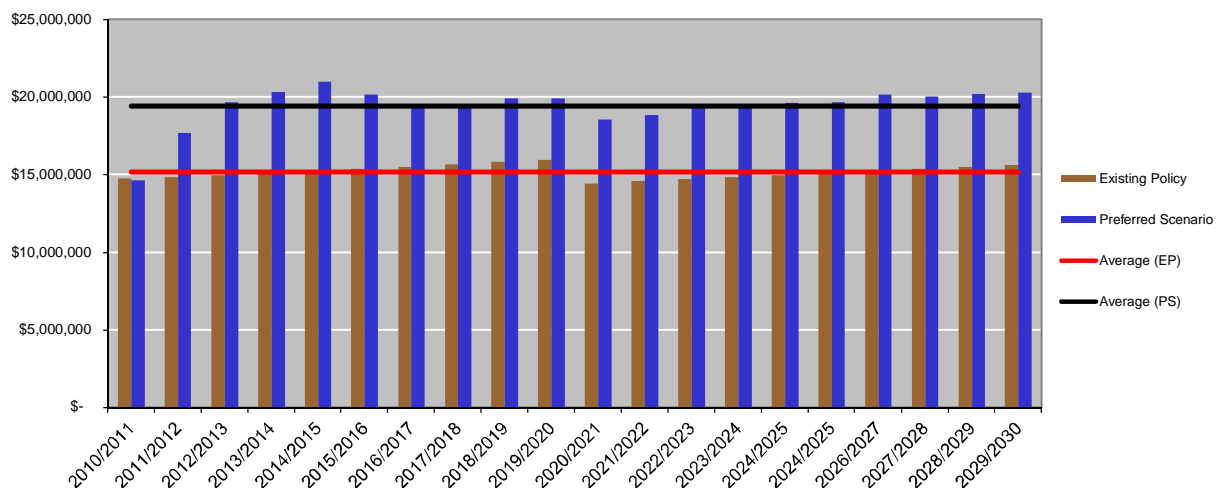
Table 19 Total Expenditure under the Preferred Spending Scenario

Treatment Option	Average Annual Expenditure under the Preferred Spending Scenario (Over 20 Years)
Renewals	\$ 12.3 M
Consequential Maintenance	\$ 6.0 M
Rehabilitation	\$ 0.3 M
Enhancement	\$ 0.8 M
Total	\$ 19.4 M

6.6 Existing versus Preferred Infrastructure Spending Scenarios

A comparison of Council's Existing Spending Policy and the level of expenditure that we believe is required to support the Preferred Spending Scenario is provided in Figure 21.

Figure 21 Existing Spending Policy vs. Preferred Spending Scenario





6.6.1 Observations

For purposes of illustration, a summary is provided in Table 20.

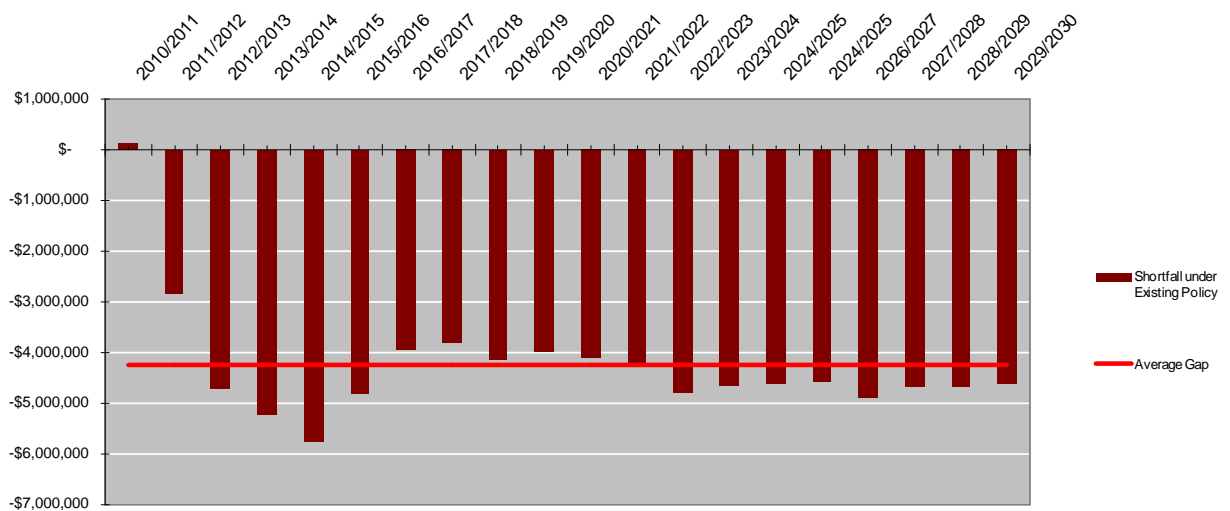
Table 20 Existing Spending Policy vs. Preferred Spending Scenario

Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$ 15.2 M
Preferred Spending Scenario	\$ 19.4 M
Existing Shortfall	-\$ 4.2 M

6.7 Total Expenditure Gap under the Preferred Spending Scenario

The gap between Council's Existing Spending Policy and the level of expenditure that we believe is required to support the Preferred Spending Scenario is displayed in Figure 22.

Figure 22 Total Expenditure Gap – Existing Spending Policy vs. Preferred Spending Scenario



6.7.1 Observations

The average annual Expenditure Gap between Council's Existing Spending Policy and our estimated required expenditure to support the Preferred Spending Scenario is approximately **\$4.2 M of under-funding per year**.

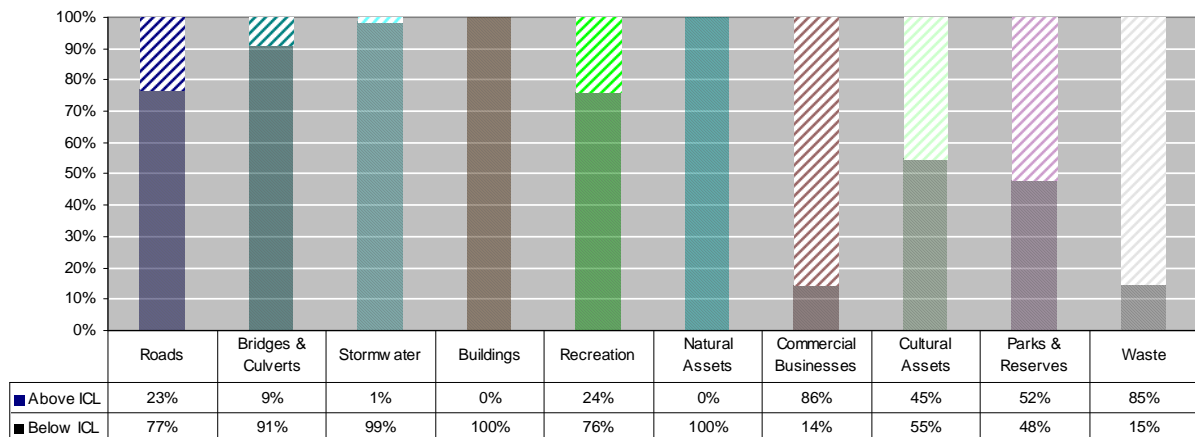


7. Future Condition of Assets Continuing the Existing Infrastructure Spending Scenario

7.1 Future Condition

The consequence of continuing Council's Existing Spending Policy to 2029 will now be illustrated. A summary of the percentage of each asset group that we predict will be at/ or worse than Council's specified Intervention Condition Levels after 20 years under the Existing Spending Policy is provided in Figure 23.

Figure 23 Percentage of Asset Base that will be at or are worse than Council Intervention Condition Levels after 20 years under the Existing Spending Policy



7.1.1 Observations

The graph shows a significant decline in condition across Roads, Recreation and Commercial Business, Cultural, Parks & Reserves and Waste assets suggesting that Council's proposed expenditure is insufficient in these areas.

The forecast change in the acceptable asset condition attributable to each major Asset Group is outlined in Table 21.

Building assets indicate a small improvement of 3%. This suggests that Council's proposed expenditures will aid in improving the asset set condition over time.

It should be noted, that changes to assets during this period as a result of proposed Enhancement Expenditure and / or inherited assets (for example, as a result of developer "gifted" assets in the form of roads within new subdivisions, see Figure 11) have been factored into these calculations.



Table 21 Forecast Condition change by Asset Group after 20 years under the Existing Spending Policy

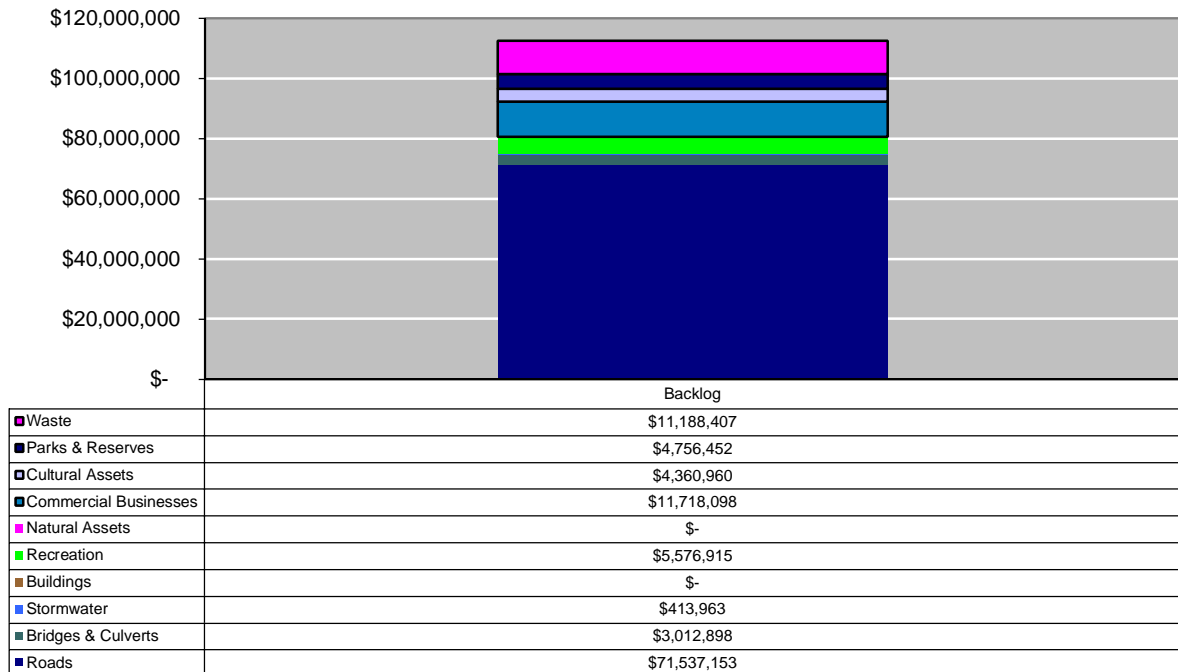
Asset Group	Forecast Condition Change (%)
Roads	-21%
Bridges & Culverts	-6%
Stormwater	-1%
Buildings	3%
Recreation	-21%
Natural Assets	0%
Commercial Businesses	-81%
Cultural Assets	-43%
Parks & Reserves	-51%
Waste	-83%

7.2 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy

The investment that we estimate will be required in 20 years' time to rehabilitate all assets that will be at, or worse than, Council's specified Intervention Condition Levels is shown in Figure 24. The graph represents the forecast 2029/30 Renewals and Maintenance Backlog in constant (2010) dollars under the Existing Policy



Figure 24 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy



7.2.1 Observations

We estimate that the future Renewals and Maintenance Backlog in 20 years' time will be in the order of **\$112.6M**, based on the Existing Spending Policy scenario. Figure 25 shows the increase in backlog over time. Table 22 below shows the breakdown of this, as it is attributable to the major asset groups. It should be noted, that improvements to assets during this period as a result of the proposed Enhancement Expenditure under the Existing Policy (see Figure 11) have been factored into these calculations.



Figure 25 Forecast Renewals and Maintenance Backlog Ratio after 20 years under the Existing Council's Existing Policy (as a percentage of total rehabilitation cost)

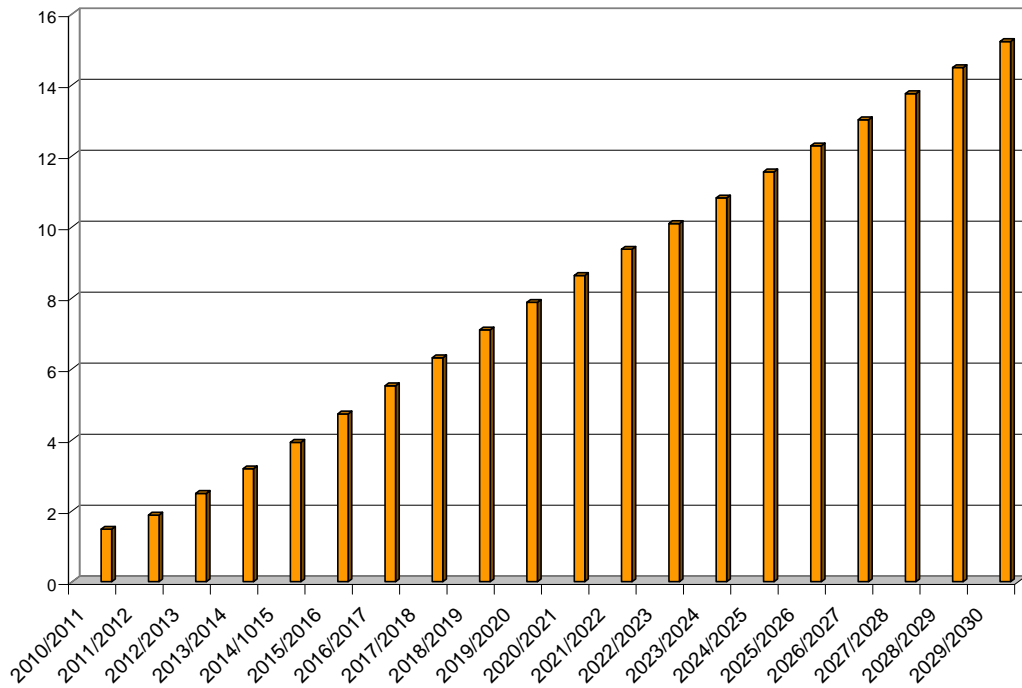


Table 22 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy

Asset Group	Forecast Renewals and Maintenance Backlog in 20 years time
Roads	\$ 71.5 M
Bridges & Culverts	\$ 3.0 M
Stormwater	\$ 0.4 M
Buildings	\$ 0.0 M
Recreation	\$ 5.6 M
Natural Assets	\$ 0.0 M
Commercial Businesses	\$11.7M
Cultural Assets	\$ 4.4 M
Parks & Reserves	\$ 4.8 M
Waste	\$ 11.2 M
Total	\$112.6 M



8. Alternative Infrastructure Spending Scenarios

This section tests two further spending scenarios *against Council's Existing Spending Policy* to determine the potential Expenditure Gap in the event that Council adopted:

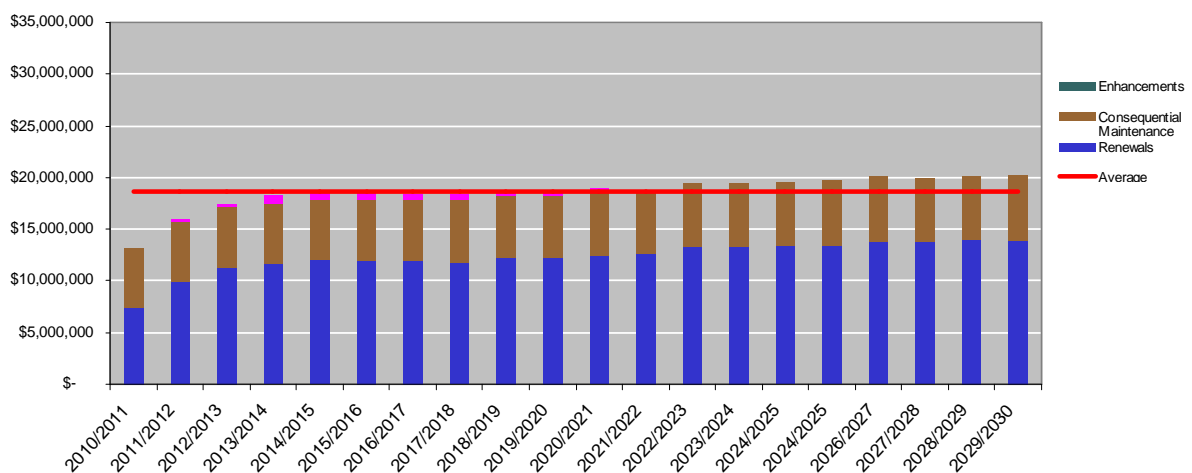
- a Restrained Spending Scenario; or
- a Responsive Spending Scenario.

8.1 Total Expenditure required to support the Restrained Spending Scenario

The estimated Total Expenditure required if Council were to adopt a Restrained Spending Scenario is provided in Figure 26. The Restrained Policy scenario includes:

- The required Rehabilitation and Renewal Expenditure (as calculated by GHD);
- Consequential Maintenance Expenditure (as calculated by GHD);
- No Enhancements Expenditure; and
- Rehabilitation expenditure for clearance of the Backlog over a 10-year period.

Figure 26 Total Expenditure under the Restrained Spending Scenario



8.1.1 Observations

The estimated total average annual expenditure under the Restrained Spending Scenario would be **\$18.6M**.

For purposes of illustration, a summary of the estimated average annual expenditure required, as it relates to Rehabilitation, Enhancements, Renewals and Maintenance, is provided in Table 23.



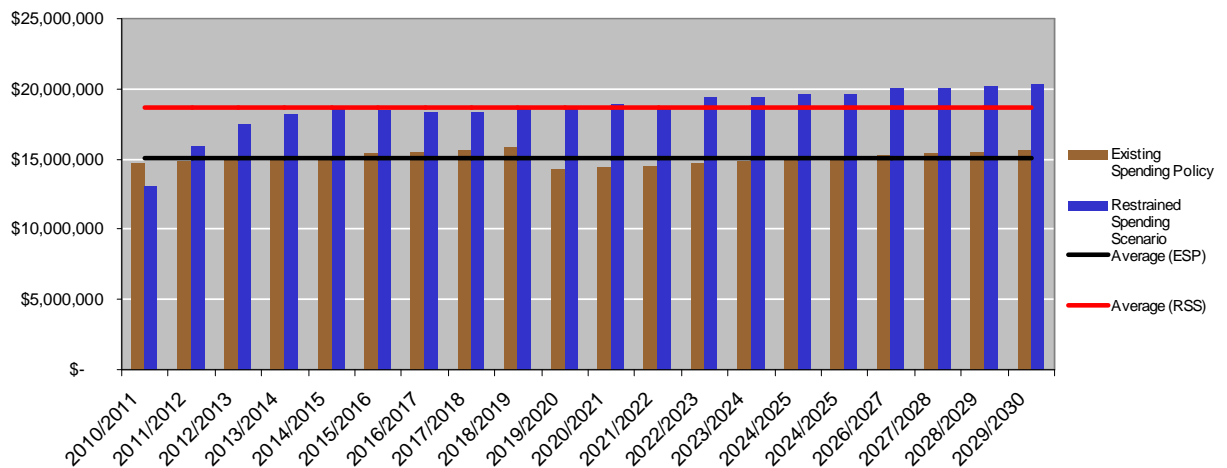
Table 23 Total Expenditure under the Restrained Spending Scenario

Treatment Option	Average Annual Expenditure
Renewals	\$12.3 M
Consequential Maintenance	\$6.0 M
Enhancements	\$0.0 M
Rehabilitation	\$0.3 M
Total	\$18.6 M

8.1.2 Existing Spending Policy vs. Restrained Spending Scenario

A comparison of Council’s proposed expenditure and the level of expenditure that we estimate is required to support the Restrained Spending Scenario is illustrated in Figure 27.

Figure 27 Existing Spending Policy vs. Restrained Spending Scenario



8.1.3 Observations

For purposes of illustration, a summary of the Existing Spending Policy and estimated average annual expenditure required under the Restrained Spending Policy Scenario is provided in Table 24.

Table 24 Existing Spending Policy vs. Restrained Spending Scenario

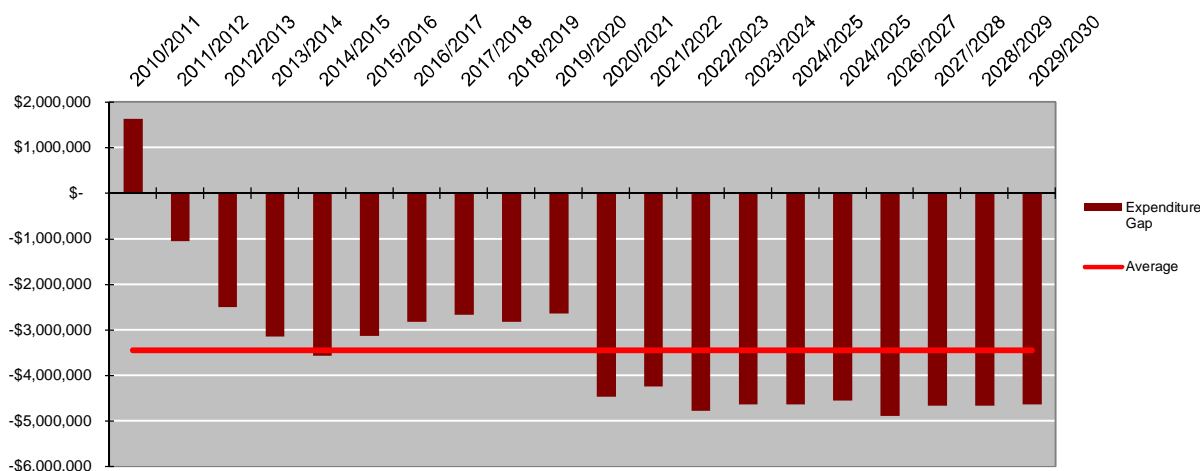
Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$15.2M
Restrained Spending Scenario	\$18.6M
Shortfall	-\$3.4M



8.1.4 Total Expenditure Gap under the Restrained Spending Scenario

The gap between Council’s Existing Spending Policy and the level of expenditure that we estimate is required to support the Restrained Spending Scenario is depicted in Figure 28.

Figure 28 Total Expenditure Gap - Existing Spending Policy vs. Restrained Spending Scenario



8.1.5 Observations

The average annual Expenditure Gap between Council’s Existing Spending Policy and our estimated required expenditure under the Restrained Spending Scenario is estimated to be **\$3.4 M of under-funding per year**.

8.2 Total Expenditure Required to Support the Responsive Spending Scenario

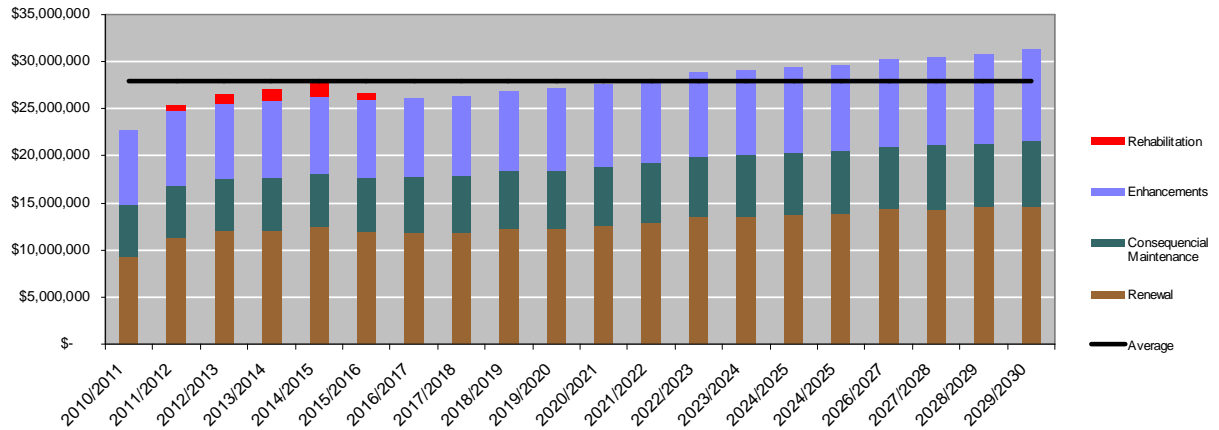
The estimated Total Expenditure required if Council were to adopt a Responsive Spending Scenario is provided in Figure 29. The Responsive Spending Scenario includes:

- Enhancements driven by projected municipal population growth of 1% per annum from 2009/10 to 2028/29;
- The required Rehabilitation and Renewal Expenditure (as calculated by GHD);
- Consequential Maintenance Expenditure (as calculated by GHD);
- Backlog will be cleared over a 5-year period.

The long-term historical ratio between percentage population growth and percentage growth in quantum of assets was 2:1, for reasons given earlier in this report.



Figure 29 Total Expenditure under the Responsive Spending Scenario



8.2.1 Observations

The estimated total average annual expenditure under the Responsive Spending Scenario would be **\$27.9M**.

For purposes of illustration, a summary of the required average annual expenditure as it relates to Backlog, Enhancements, Rehabilitation/ Renewals and Maintenance is provided in Table 25.

Table 25 Total Expenditure under the Responsive Spending Scenario

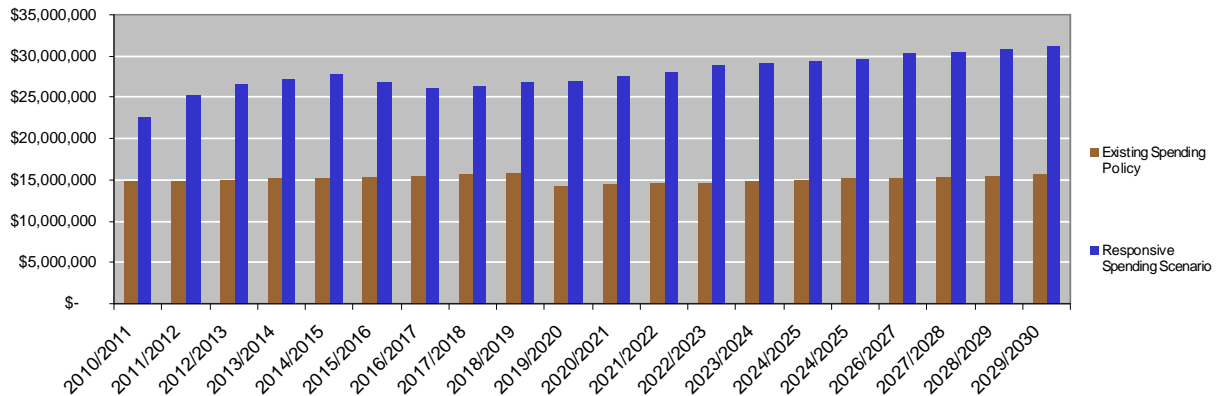
Treatment Option	Average Annual Expenditure
Renewals	\$ 12.8 M
Consequential Maintenance	\$ 6.2 M
Rehabilitation	\$ 0.2 M
Enhancements	\$ 8.7M
Total	\$ 27.9 M

8.2.3 Existing Spending Policy vs. Responsive Spending Scenario

A comparison of Council’s Existing Spending Policy and the level of expenditure that we estimate is required to support the Responsive Spending Scenario is provided in Figure 30.



Figure 30 Existing Spending Policy vs. Responsive Spending Scenario



8.2.4 Observations

For purposes of illustration, a summary estimate of required annual expenditure under Council’s Existing Spending Policy compared to the Responsive Spending Scenario is provided in Table 26.

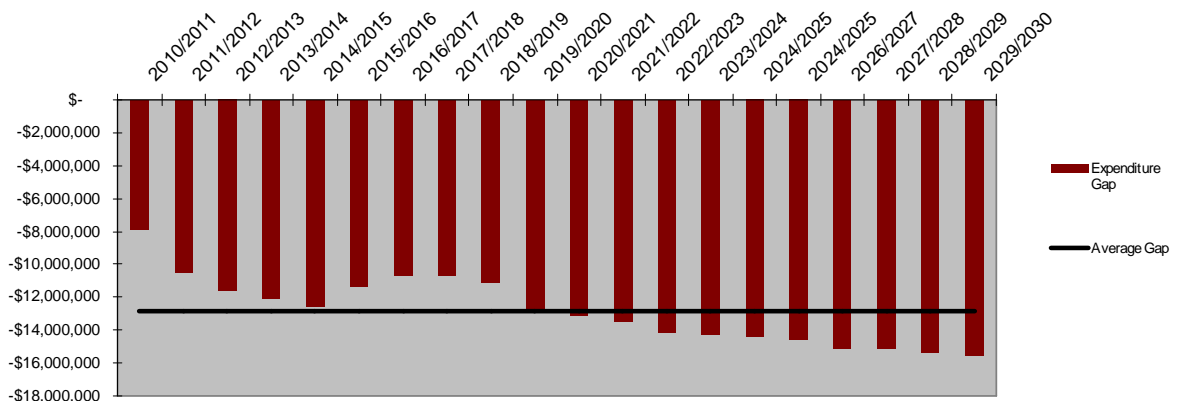
Table 26 Existing Spending Policy vs. Responsive Spending Scenario

Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$ 15.2 M
Responsive Spending Scenario	\$ 27.9 M
Shortfall	-\$ 12.7 M

8.2.5 Total Expenditure Gap under the Responsive Spending Scenario

The gap between Council’s Existing Spending Policy and the level of expenditure that we estimate is required to support the Responsive Spending Scenario is illustrated in Figure 31.

Figure 31 Total Expenditure Gap – Existing Spending Policy vs. Responsive Spending Scenario





8.2.6 Observations

The average annual Expenditure Gap between Council's Existing Spending Policy and our estimated required expenditure under the Responsive Spending Scenario is approximately **\$12.7M of under-funding per year (average)**.

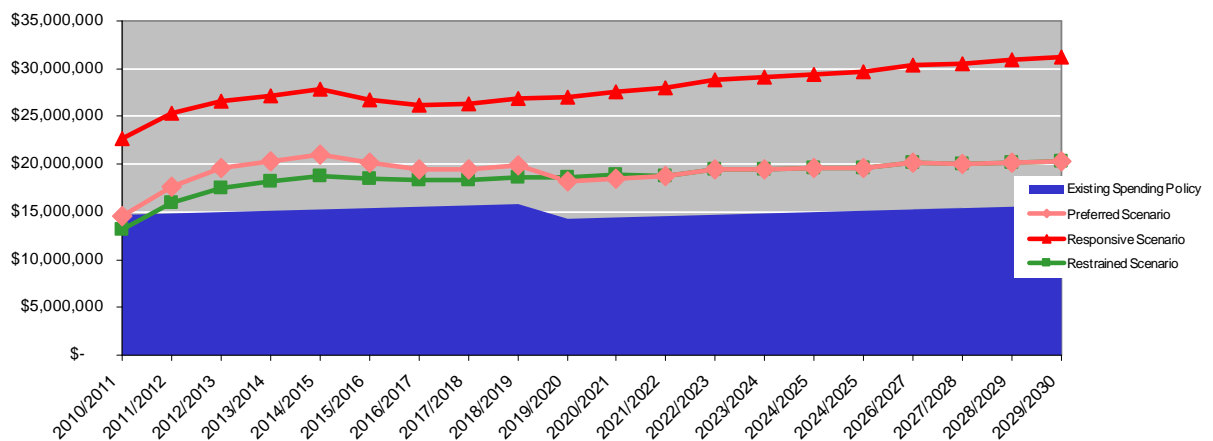
8.3 Overall Scenario Analysis

An overall comparison between Council's Existing Spending Policy and the expenditures we estimate are required to support the:

- ▶ Preferred Spending Scenario;
- ▶ Restrained Spending Scenario; and
- ▶ Responsive Spending Scenario,

is provided in Figure 32.

Figure 32 Overall Scenario Comparison



8.3.1 Observations

Council proposes to spend a total of approximately **\$14.5M** per year (average) under the Existing Spending Policy.

We estimate that Council will need to spend the following **additional** funds to support the alternative Scenarios:

- ▶ **\$4.2M** per year (average) to support the Preferred Spending Scenario;
- ▶ **\$3.4M** per year (average) to support the Restrained Spending Scenario; and
- ▶ **\$12.7M** per year (average) to support the Responsive Spending Scenario.



B. Analysis and Results Water, Sewer & Reuse



9. Current Infrastructure Condition Assessment

9.1 Current Infrastructure Expenditure

Council has a current Water, Sewerage & Reuse Budget of **\$11.1M** (without enhancements) as shown in Table 27 for assets with a replacement value of \$356 M.

Table 27 Current Infrastructure Expenditure

Asset Group	Current Annual Expenditure
Water	\$ 4.8 M
Sewerage & Reuse	\$ 6.3 M
Total	\$ 11.1 M

9.2 Council's Intervention Condition Levels.

Council has set intervention condition levels for water and sewerage major asset types as follows:

- Water assets other than reservoirs and reticulation - 5
- Water reservoirs - 7
- Water reticulation - 9
- Sewer treatment works - 6
- Sewer mains – 7
- Sewer rising mains - 7

These provide an average ICL for water and sewerage assets overall of 7.

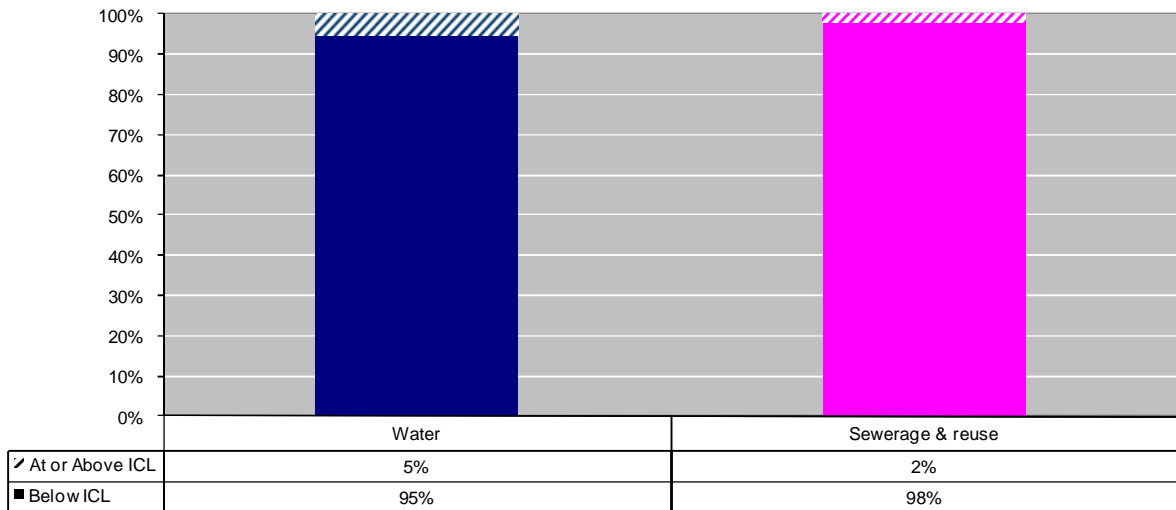
The average economic life of water and sewerage assets before they have to be renewed is 56 years.

9.3 Current Infrastructure Condition Assessment

The analysis of Council's condition data shows that Council has a renewals/rehabilitation backlog due to under-expenditure as shown in Figure 33.



Figure 33 Percentage of Asset Group that presently are at, or are worse than, Council Intervention Condition Levels



These data are tabulated in Table 28.

Table 28 Percentage of Asset Group that are presently at, or worse than, Council Intervention Condition Levels

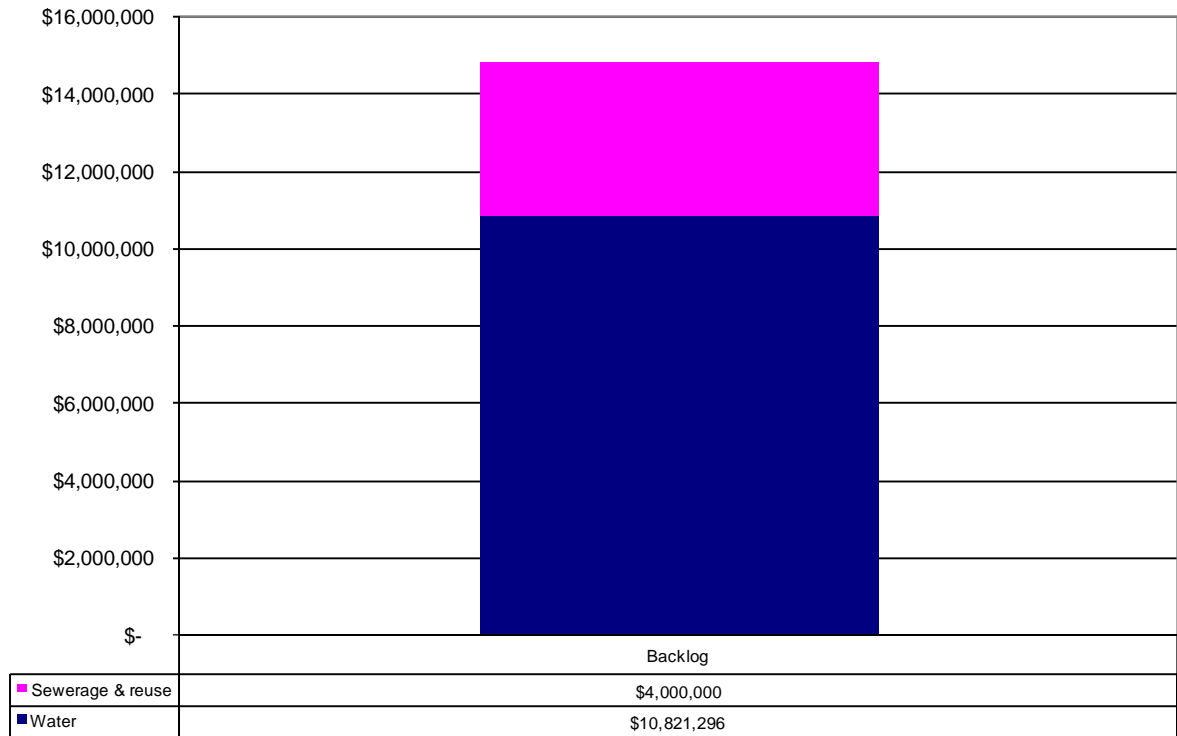
Asset Group	Percentage of Assets that are at, or are worse than, Council Intervention Condition Levels
Water	5%
Sewerage & Reuse	2%

9.4 Current Infrastructure Renewals and Maintenance Backlog

The investment required to rehabilitate all assets that are currently at or are worse than Council's adopted Intervention Condition Levels, back to the required standard are shown in Figure 34.



Figure 34 Current Renewals and Maintenance Backlog



9.4.1 Observations

Based on information supplied, we estimate that the current Renewals and Maintenance Backlog is in the order of **\$14.8 M** as shown in Table 29.

Table 29 Present Water, Sewerage & Reuse Renewals & Maintenance Backlog

Asset Group	Current Backlog
Water	\$ 4.0 M
Sewerage & Reuse	\$ 10.8 M
Total	\$ 14.8 M



10. Existing Infrastructure Spending Policy

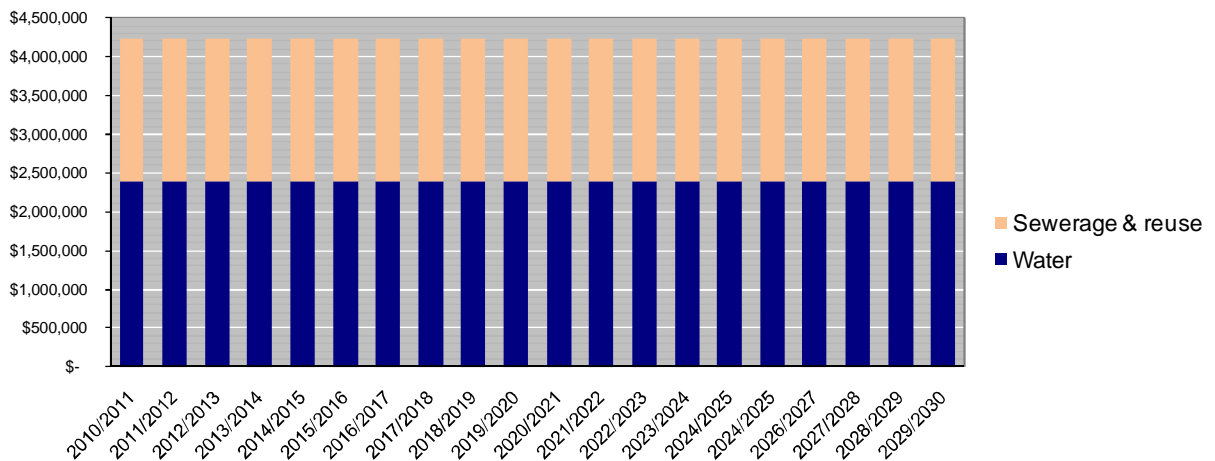
10.1 Rehabilitation Expenditure

Under the Existing Spending Policy, Council does not distinguish between Rehabilitation and Renewal so both concepts are subsumed under Renewals. For modelling purposes however, we have assumed all infrastructure expenditure other than Enhancements is for Renewals as the infrastructure backlog has been growing.

10.2 Renewal Expenditure

An estimate of Council's proposed Renewal Expenditure if the Existing Spending Policy is pursued is indicated in Figure 35.

Figure 35 Renewal Expenditure under the Existing Spending Policy



10.2.1 Observations

Council proposes to spend a total of approximately **\$4.2M** per year on asset Renewals, broken down by Asset Group as illustrated in Table 30.

Table 30 Renewal Expenditure by Asset Group under the Existing Spending Policy

Asset Group	Average Annual Renewal Expenditure
Water	\$ 2.4 M
Sewerage & Reuse	\$ 1.8 M
Total	\$ 4.2 M

10.3 Enhancement Expenditure

Council's proposed Enhancement Expenditure is depicted in Figure 36.



Figure 36 Enhancement Expenditure under the Existing Spending Policy

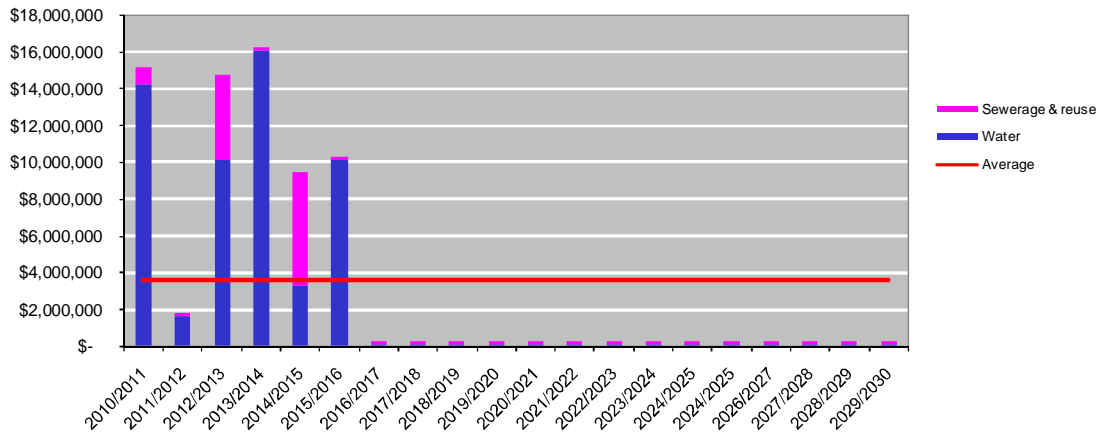


Table 31 Enhancement Expenditure under the Existing Spending Policy (as provided by Council)

Budget year	Enhancement Expenditure
2010/2011	\$15,170,000
2011/2012	\$1,177,000
2012/2013	\$14,770,000
2013/2014	\$16,270,000
2014/2015	\$9,470,000
2015/2016	\$10,270,000
2016/2017	\$270,000
2017/2018	\$270,000
2018/2019	\$270,000
2019/2020	\$270,000
Total	\$68,207,000

10.3.1 Observations

Council proposes to spend a total of approximately **\$68.2M** on infrastructure over the next 10 years, broken down annually as illustrated in Table 31.

The Council budget will total **\$72.3M** to expand the asset base between 2010/2011 and 2029/2030 as set out in Table 32.



Table 32 Proposed Water, Sewerage & Reuse Enhancements Budget for 2010/11 to 2029/30

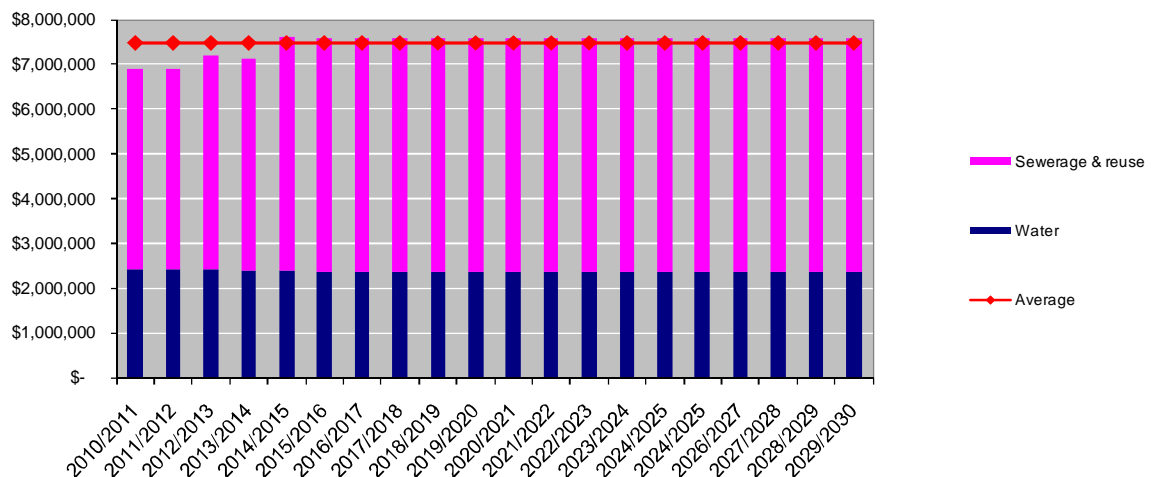
Asset Group	Current Annual Expenditure
Water	\$ 57.0 M
Sewerage & Reuse	\$ 15.3 M
Total	\$ 72.3 M

Our modelling assumes that, as the enhancement projects are brought online by Council will increase its maintenance budget proportionately to meet the increase maintenance needs brought about by the increased asset base.

10.4 Consequential Maintenance Expenditure

The required Consequential Maintenance Expenditure under the Existing Spending Policy is depicted in Figure 37.

Figure 37 Consequential Maintenance Expenditure under the Existing Spending Policy



10.4.1 Observations

The Consequential Maintenance Expenditure required by Council to support the Existing Rehabilitation/ Renewal Expenditure is approximately **\$7.5 M** per year (average).

For purposes of illustration, the average annual Consequential Maintenance Expenditure by Asset Group is provided in Table 33.



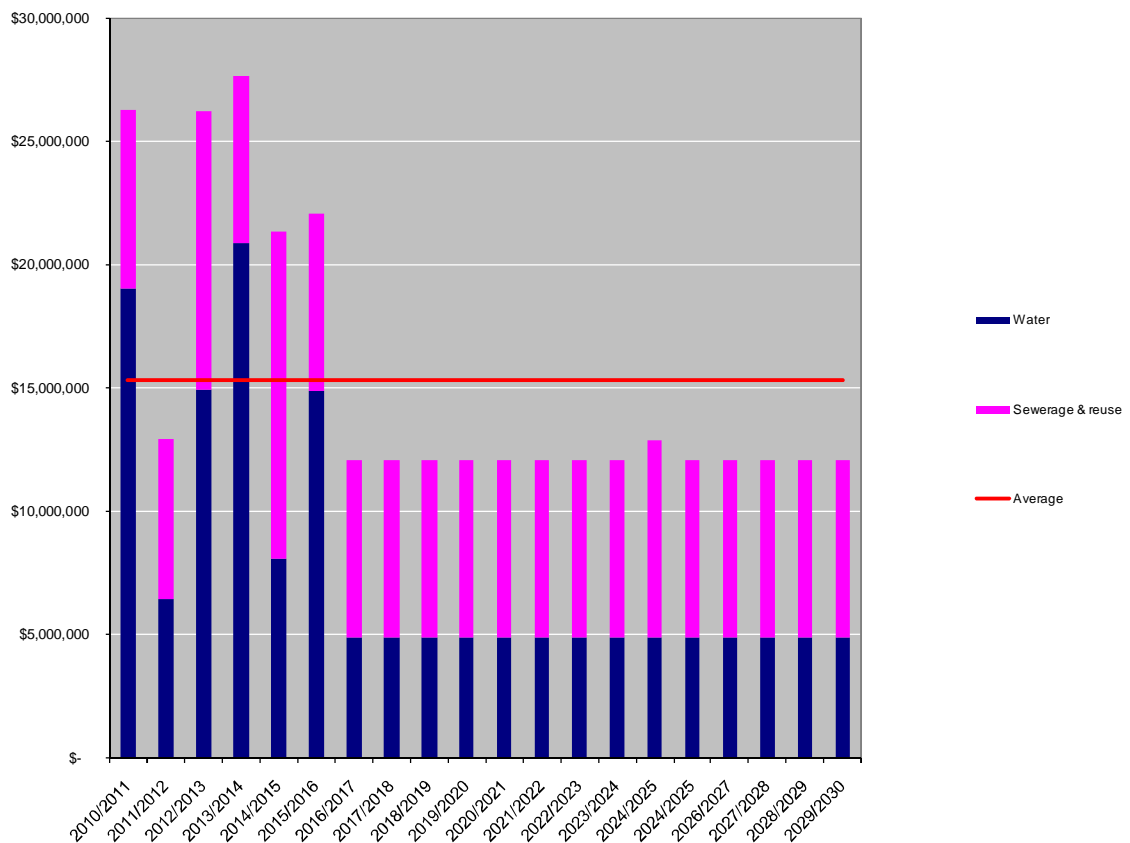
Table 33 Consequential Maintenance Expenditure by Asset Group under the Existing Spending Policy

Asset Group	Average Annual Consequential Maintenance Expenditure
Water	\$ 2.4 M
Sewerage & Reuse	\$ 5.1 M
Total	\$ 7.5 M

10.5 Total Expenditure

The Total Expenditure under Council’s Existing Spending Policy by Asset Group is provided in Figure 38.

Figure 38 Enhancement, Renewal/Rehabilitation & Consequential Maintenance under the Existing Spending Policy



10.5.1 Observations

The Total Expenditure under the Existing Spending Policy is estimated to be approximately **\$15.3M** per year (average). For purposes of illustration, the average annual expenditure by asset group is provided in Table 34.



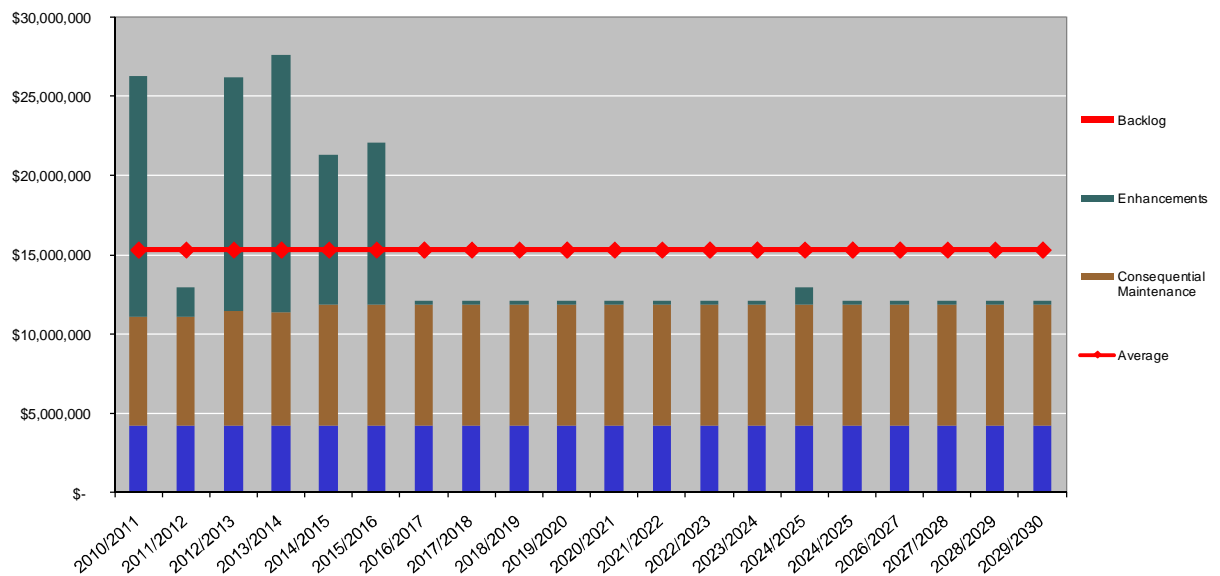
Table 34 Total Expenditure under the Existing Spending Policy

Asset Group	Average Annual Expenditure
Water	\$ 7.6 M
Sewerage & reuse	\$ 7.7M
Total	\$15.3 M

A high-level summary of Council's proposed expenditure under the Existing Spending Policy is included at Figure 39. This accounts for:

- Enhancements driven by Council's plan;
- Rehabilitation and Renewal Expenditure; and
- Consequential Maintenance Expenditure.

Figure 39 Total Expenditure under the Existing Spending Policy



10.6 Observations

For purposes of illustration, a summary of the proposed average annual expenditure as it relates to Rehabilitation, Enhancements, Renewals and Maintenance is provided in Table 35.



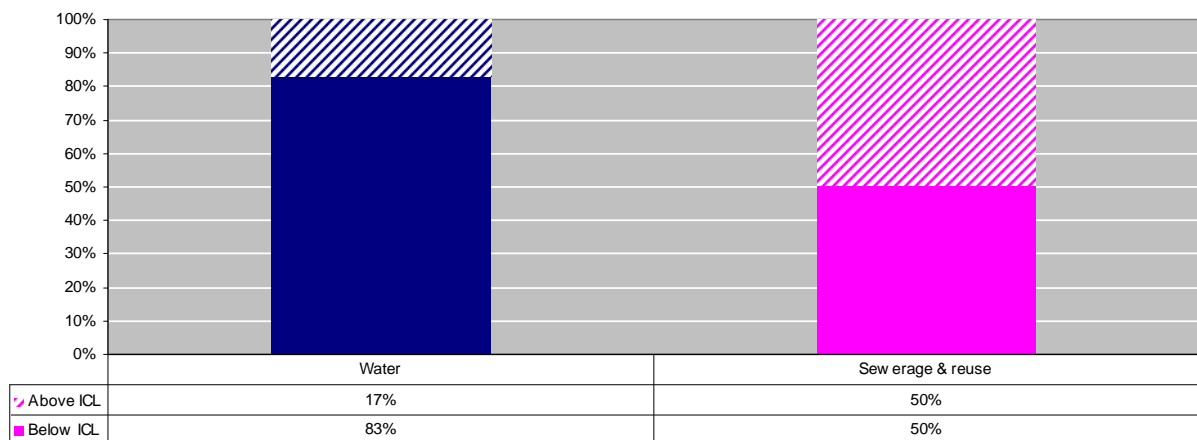
Table 35 Total Expenditure under the Existing Spending Policy

Treatment Option	Average Annual Expenditure under the Existing Spending Policy (Over 20 Years)
Renewals	\$ 4.2 M
Consequential Maintenance	\$ 7.5 M
Enhancements	\$ 3.6 M
Rehabilitation	\$ Nil
Total	\$ 15.3 M

10.7 Impact of Existing Funding Policy on Asset Condition

The analysis shows that Council’s existing funding policy will lead to a significant deterioration in asset condition over the next 20 years as shown in Figure 40 Percentage of Asset Base that will be at or are worse than Council Intervention Condition Levels after 20 years under the Existing Spending Policy

Figure 40 Percentage of Asset Base that will be at or are worse than Council Intervention Condition Levels after 20 years under the Existing Spending Policy (based on number of assets)





11. Preferred Infrastructure Spending Scenario

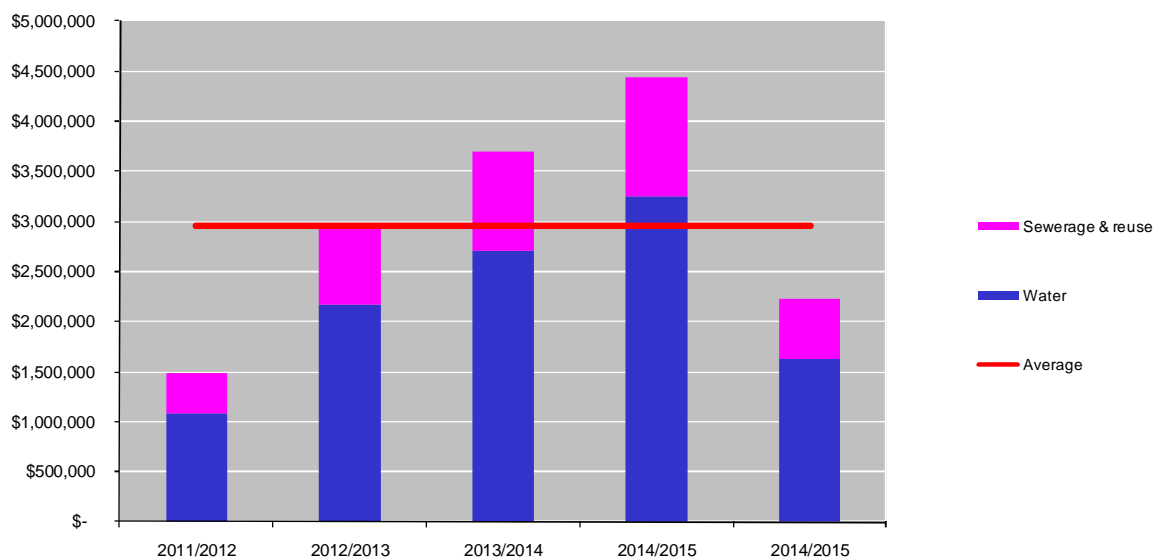
The Preferred Scenario for Rehabilitation, Renewal, Enhancements and Consequential Maintenance includes:

- ▶ Rehabilitation expenditure for clearance of the present Backlog over a 5-year period;
- ▶ The required Renewal expenditure to sustain asset condition levels, as defined by the ICL and RCL;
- ▶ Enhancement expenditure as per Council's existing plan; and
- ▶ Consequential Maintenance expenditure as a result of Rehabilitation, Renewal and Enhancement expenditure.

11.1 Rehabilitation Expenditure

The remedial strategy adopted for clearing the Backlog in 5 years, as shown in Figure 41. This was decided as an appropriate timeframe for this scenario. More detailed future studies would benefit by examining different scenarios based on a range of remedial timeframes.

Figure 41 Rehabilitation Strategy



11.1.1 Observations

If Council were to adopt a five-year remedial strategy for the clearance of the existing Backlog, it is estimated it would need to spend an **average** of **\$3.0M** per year, broken down by actual per year as illustrated in Table 36.



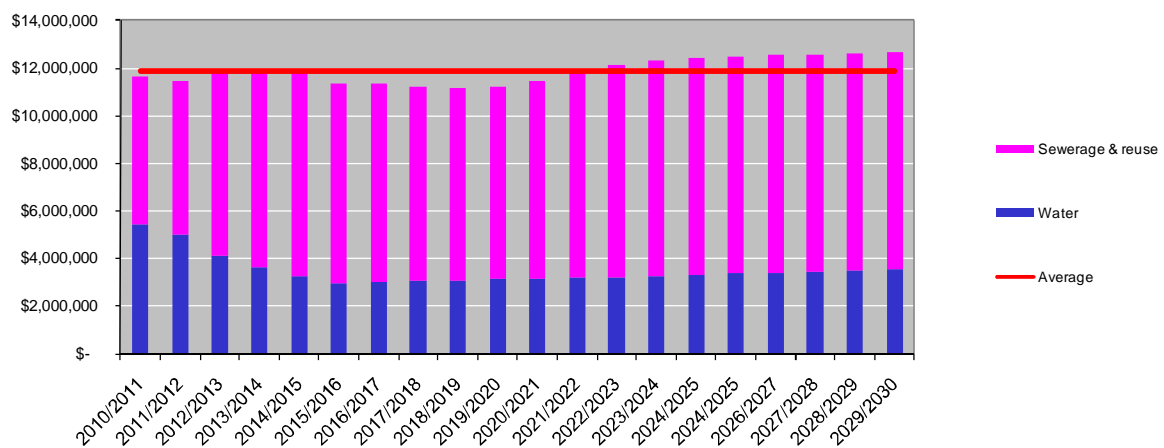
Table 36 Rehabilitation Strategy

Year	Expenditure
2011/ 2012	\$ 1.5 M
2011/ 2013	\$ 3.0 M
2013/ 2014	\$ 3.7 M
2014/ 2015	\$ 4.4 M
2015/ 2016	\$ 2.2 M
Total	\$ 14.8 M

11.2 Renewal Expenditure

GHD's estimated required Renewal Expenditure to sustain the Council's specified Intervention Condition Levels is depicted in Figure 42

Figure 42 Renewal Expenditure under the Preferred Spending Scenario



11.2.1 Observations

Based upon Council's specified Intervention Condition Levels, we estimate that they need to spend in the order of **\$ 11.9M** per year on asset Renewals (average).

For purposes of illustration, the average annual required Renewal Expenditure by Asset Group is provided in Table 37.

Table 37 Renewal Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Renewal Expenditure
Water	\$ 3.5 M
Sewerage & reuse	\$ 8.4 M
Total	\$ 11.9 M



11.3 Enhancement Expenditure

Council's proposed Enhancement Expenditure is depicted in Figure 43. This profile is identical to that in shown in Council's preferred spending scenario above as it is a Council preferred position. It is included here to complete the picture by showing the expenditure required to achieve Council's desired Enhancement Plan.

Figure 43 Enhancement Expenditure under the Preferred Spending Policy

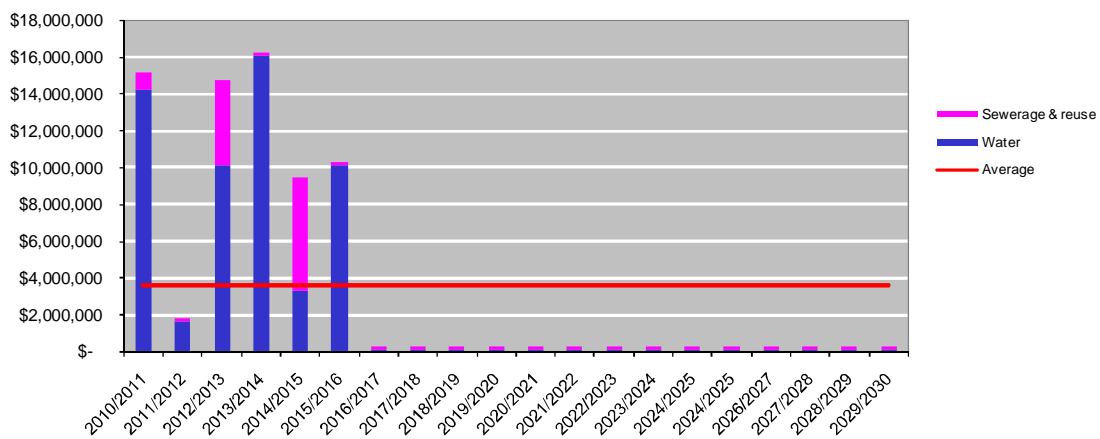


Table 38 Enhancement Expenditure under the Existing Spending Policy (as provided by Council)

Budget year	Enhancement Expenditure
2010/2011	\$15,170,000
2011/2012	\$1,177,000
2012/2013	\$14,770,000
2013/2014	\$16,270,000
2014/2015	\$9,470,000
2015/2016	\$10,270,000
2016/2017	\$270,000
2017/2018	\$270,000
2018/2019	\$270,000
2019/2020	\$270,000
Total	\$68,207,000

11.3.1 Observations

Council proposes to spend a total of approximately **\$68.2M** on infrastructure over the next 10 years, broken down annually as illustrated in Table 38.

The Council budget will total **\$72.3M** to expand the asset base between 2010/2011 and 2029/2030 as set out in Table 40.



Table 39 Proposed Water, Sewerage & Reuse Enhancements Budget for 2010/11 to 2029/30

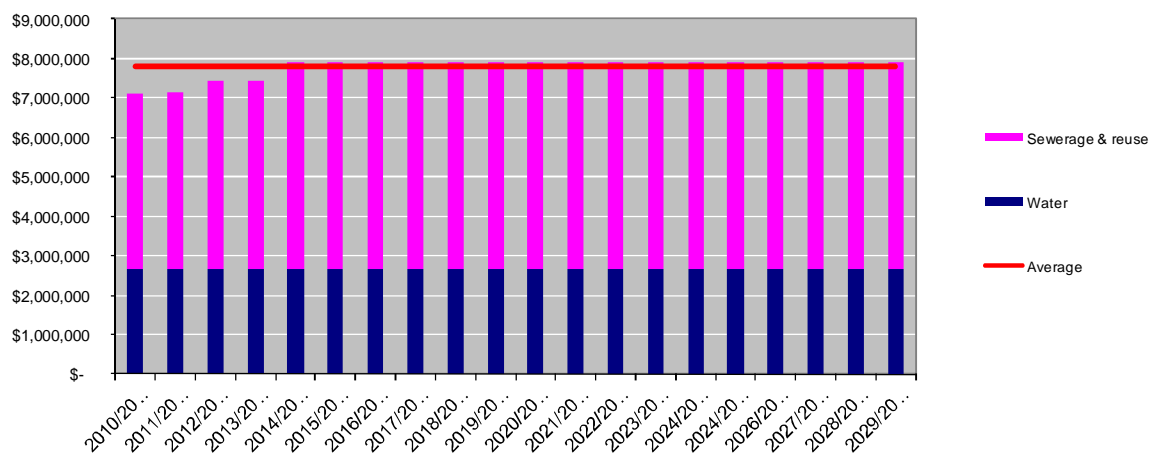
Asset Group	Current Annual Expenditure
Water	\$ 57.0 M
Sewerage & Reuse	\$ 15.3 M
Total	\$ 72.3 M

Our modelling assumes that, as the enhancement projects are brought online by Council will increase its maintenance budget proportionately to meet the increase maintenance needs brought about by the increased asset base.

11.4 Consequential Maintenance Expenditure

The required level of spending on Consequential Maintenance, given the preferred level of expenditure on Rehabilitation, Renewals and Enhancements, is illustrated in Figure 44 Consequential Maintenance Expenditure under the Preferred Spending Scenario

Figure 44 Consequential Maintenance Expenditure under the Preferred Spending Scenario



11.4.1 Observations

We estimate the required level of spending on Consequential Maintenance would be approximately **\$7.8M** per year (average). As renewals and rehabilitation is undertaken the required level of maintenance is reduced. This should result in a consequential maintenance requirement less than that of the Council's Existing Policy.

For purposes of illustration, the average annual required level of spending on Consequential Maintenance by Asset Group is provided in Table 40



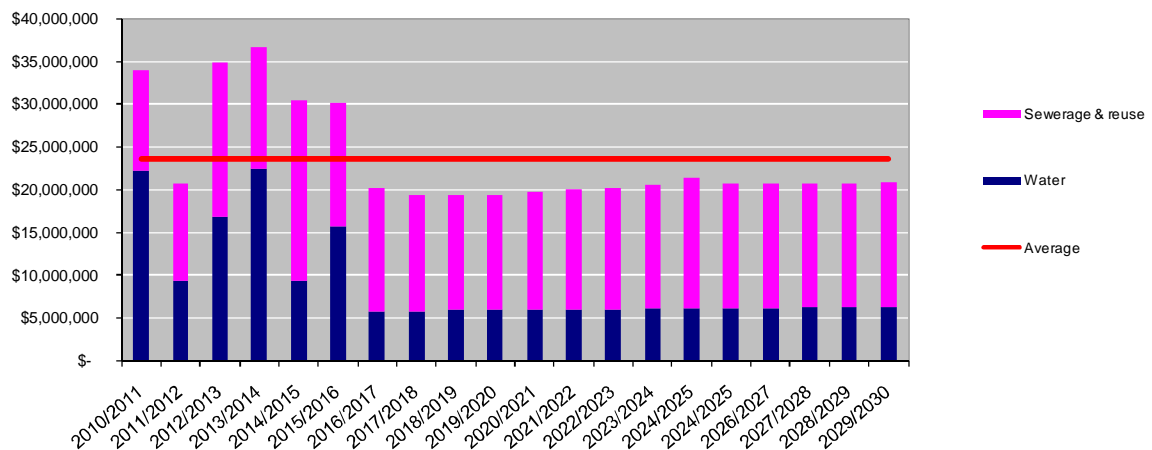
Table 40 Consequential Maintenance Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Consequential Maintenance Expenditure
Water	\$ 2.7 M
Sewerage & reuse	\$ 5.1 M
Total	\$ 7.8 M

11.5 Total Expenditure

The Total Expenditure required under the Preferred Spending Scenario, including Rehabilitation, Renewal, Enhancement and Consequential Maintenance, is depicted in Figure 45 Total Expenditure under the Preferred Spending Scenario.

Figure 45 Total Expenditure under the Preferred Spending Scenario



11.5.1 Observations

We estimate the total required level of spending on combined Rehabilitation, Renewal, Enhancements and Consequential Maintenance would be approximately **\$24.0M** per year (average over 20 years).

For purposes of illustration, the average annual required level of spending on combined Rehabilitation, Renewal, Enhancements and Consequential Maintenance by Asset Group is provided in Table 41.

Table 41 Total Expenditure under the Preferred Spending Scenario

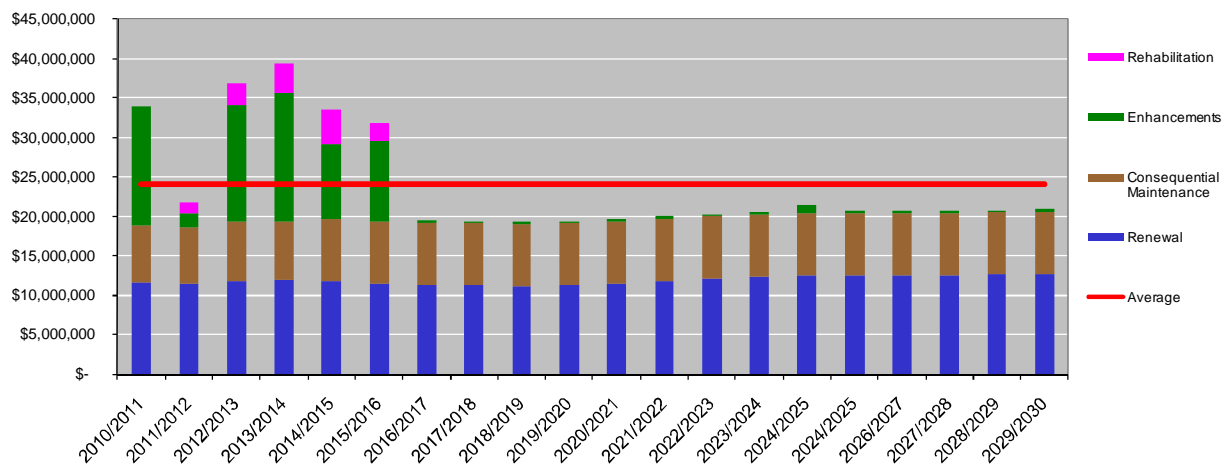
Asset Group	Average Annual Expenditure
Water	\$ 9.6 M
Sewerage & reuse	\$ 14.4 M
Total	\$24.0 M



A high-level summary of the total expenditure we believe is required to support the Preferred Spending Scenario is included at Figure 46. This includes:

- Enhancements driven by Council’s existing plan;
- The required Renewal Expenditure accounting for these Enhancements (as calculated by GHD);
- Rehabilitation expenditure for clearance of the present Backlog over a 5-year period;
- The Consequential Maintenance Expenditure after accounting for above Enhancements, Rehabilitation and Renewals (as calculated by GHD).

Figure 46 Total Expenditure under the Preferred Spending Scenario



11.5.2 Observations

The estimated total average annual expenditure under the Preferred Spending Scenario would be **\$24.0M**.

For purposes of illustration, a summary of the required average annual expenditure as it relates to Backlog, Enhancements, Rehabilitation/ Renewals and Maintenance is provided in Table 42.

Table 42 Total Expenditure under the Preferred Spending Scenario

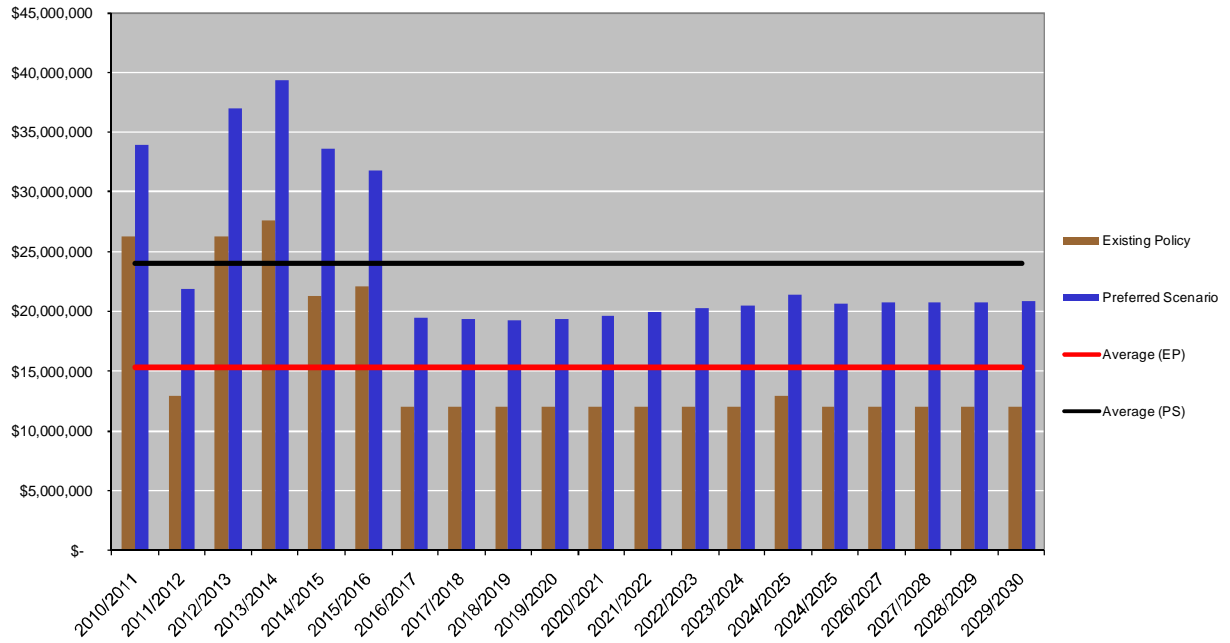
Treatment Option	Average Annual Expenditure under the Preferred Spending Scenario (Over 20 Years)
Renewals	\$ 11.9 M
Consequential Maintenance	\$ 7.8 M
Rehabilitation	\$ 0.7 M
Enhancement	\$ 3.6 M
Total	\$ 24.0 M

11.6 Existing versus Preferred Infrastructure Spending Scenarios

A comparison of Council’s Existing Spending Policy and the level of expenditure that we believe is required to support the Preferred Spending Scenario is provided in Figure 47.



Figure 47 Existing Spending Policy vs. Preferred Spending Scenario



11.6.1 Observations

For purposes of illustration, a summary is provided in Table 43.

Table 43 Existing Spending Policy vs. Preferred Spending Scenario

Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$ 15.3 M
Preferred Spending Scenario	\$ 24.0 M
Existing Shortfall	\$ 8.7 M

11.7 Total Expenditure Gap under the Preferred Spending Scenario

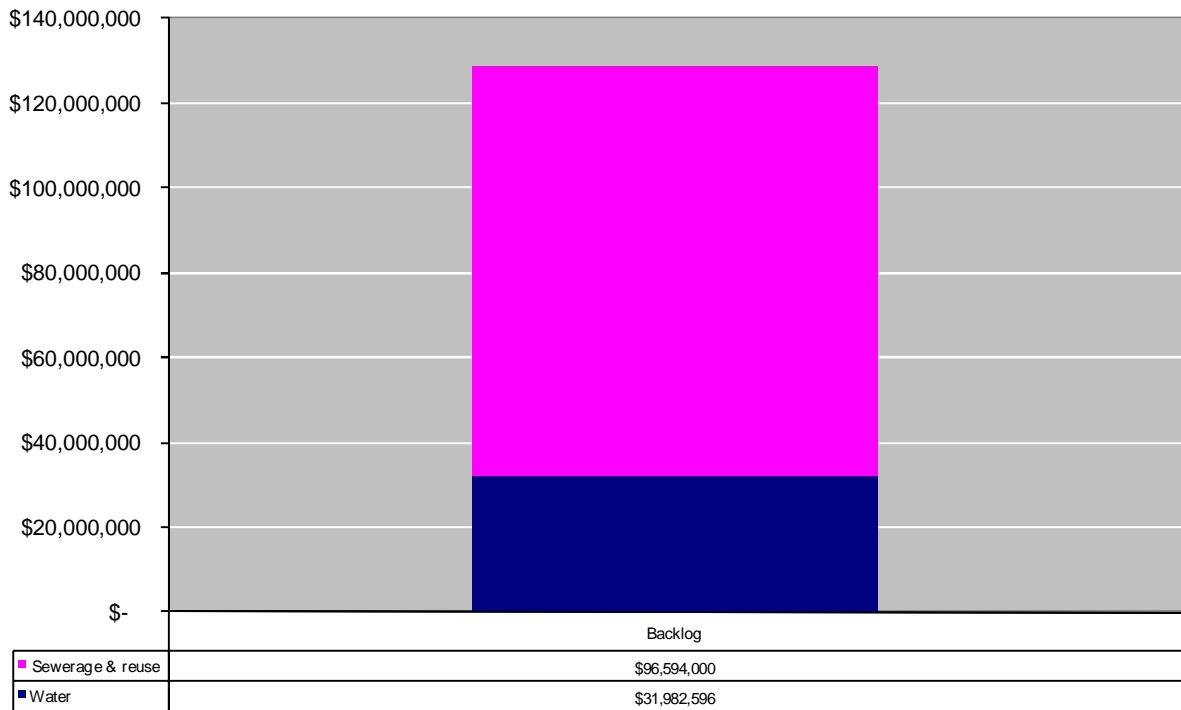
Council’s proposed spending scenario will result in a funding shortfall of **\$ 8.7M** per annum.

11.8 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy

The investment that GHD estimates will be required in 20 years to rehabilitate all assets that will be at, or worse than, Council’s specified Intervention Condition levels is shown in Figure 48.



Figure 48 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy



11.8.1 Observations

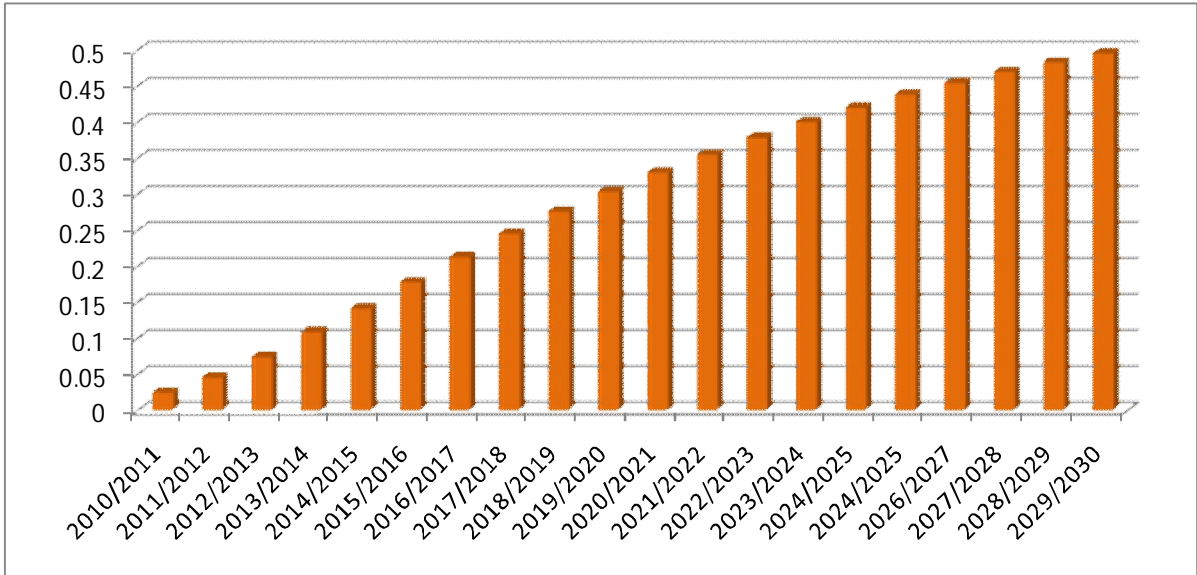
We estimate that the future Renewals and Maintenance Backlog in 20 years time will be in the order of **\$128.6 M**, based on the Existing Spending Policy scenario. Table 44 below shows the breakdown of this, as it is attributable to the major asset groups. Figure 4948 shows the increase in backlog over time.

Table 44 Future Water, Sewerage & Reuse Renewals & Maintenance Backlog under Existing Spending policy

Asset Group	Current Annual Expenditure
Water	\$ 32.0 M
Sewerage & Reuse	\$ 96.6 M
Total	\$ 128.6 M



Figure 49 Forecast Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy





12. Conclusions

12.1 Assets other than Water, Sewerage and Reuse

12.1.1 What is the present status of Council's Infrastructure Assets?

- 1) Many of Council's assets are currently at or worse than the Condition Intervention Levels recommended by Council staff.
- 2) This suggests that treatment to date has been insufficient to sustain the required Condition Intervention Levels and subsequently the required levels of service performance for each Asset Group. We estimate that the investment required to recover the present Renewals and Maintenance Backlog is in the order of **\$5.0M** attributable to:
 - a) Roads (\$2.4 M);
 - b) Bridges & Culverts (\$0.7 M);
 - c) Recreation (\$0.8 M);
 - d) Cultural; Assets (\$0.3M);
 - e) Waste (\$0.2M); and
 - f) Commercial Business (\$0.5M).

12.1.2 What is Council's Existing Infrastructure Spending Policy?

Council proposes to spend an average of **\$15.0M** per year on its major infrastructure assets over the next 20 years under the Existing Spending Policy including:

- a) Enhancements driven by Council's existing plan (\$0.7M);
- b) Renewal Expenditure (\$7.5M);
- c) Proposed Maintenance Expenditure (\$6.8M).

Based on Council's spending to date, Maintenance costs are approaching Renewal costs, suggesting that under-investment in Renewals is causing accelerated asset degradation that is forcing up maintenance costs.

12.1.3 What will be the future condition of Council's assets under the Existing Infrastructure Spending Policy?

If Council were to continue with the Existing Spending Policy, the estimated Renewals and Maintenance Backlog in 20 years time would be of the order of **\$112.6M**. This is an increase of **\$107.6M** on the present Backlog.

12.1.4 What level of expenditure is required under the Preferred Infrastructure Spending Scenario?

We estimate that Council needs to spend an average of **\$19.3M** per year on infrastructure assets to sustain minimum acceptable condition levels and service performance (as specified by intervention levels) over the 20 year planning horizon used in this report, including:



- a) Enhancements driven by Council's plan (\$0.7M);
- b) The required Renewal Expenditure after accounting for these Enhancements as calculated by GHD (\$12.3M);
- c) The Consequential Maintenance Expenditure after accounting for these Enhancements as calculated by GHD (\$6.0M); and
- d) Rehabilitation expenditure for clearance of the present Backlog (\$0.3M).

As a result of adopting the estimated required level of spending:

- a) Council would be able to sustain the specified intervention levels;
- b) Backlog would be reduced to zero; and
- c) Council would be able to achieve its planned Enhancements.

The Preferred Spending Scenario would have a positive effect on asset condition and hence the cost of maintenance would be reduced (taking into account the needs of a growing asset portfolio).

12.1.5 What is the gap in Total Infrastructure Spending between Existing Policy and the Preferred Scenario?

We have concluded that Council proposes to under invest in its assets by an estimated average of **\$4.2M** per year under the Existing Spending Policy.

12.1.6 What would be the cost of possible alternative Spending Scenarios?

Council proposes to spend a total of approximately **\$19.4M** per year (average) under the Existing Spending Policy between 2010/2011 and 2029/2030.

GHD estimatea that Council will need to spend the following to support the 3 alternative scenarios over a twenty year period:

- **\$19.4M** per year (average) to support the Preferred Spending Scenario resulting in a shortfall of **\$4.2M** under existing policy;
- **\$18.6M** per year (average) to support the Restrained Spending Scenario resulting in a shortfall of **\$3.5M** under existing policy;
- **\$27.5M** per year (average) to support the Responsive Spending Scenario resulting in a shortfall of **\$12.8M** under existing policy.

12.2 Water, Sewerage & Reuse Assets

12.2.1 What is the present status of Council's Infrastructure Assets?

Council's assets are currently in a well maintained condition with only a small percentage of assets being at, or worse than Council Intervention Levels.

We estimate that the investment required to recover the present Renewals and Maintenance Backlog is of the order of **\$14.8 M** attributable to:

- a) Water (\$10.8M); and



- b) Sewerage & reuse (\$4.0M).

12.2.2 What is Council's Existing Infrastructure Spending Policy?

Council proposes to spend an average of **\$15.3M** per year on its existing assets over the next 20 years under the Existing Spending Policy including:

- a) Renewal Expenditure (\$4.8M); and
- b) Proposed Maintenance Expenditure (\$7.5M).

Council also proposes to spend a total of **\$72.3M** on enhancements over the next 20 years including:

- a) Water (\$57.0M); and
- b) Sewerage & reuse (\$10.8M).

12.2.3 What will be the future condition of Council's assets under the Existing Infrastructure Spending Policy?

If Council were to continue with the Existing Spending Policy, the estimated Renewals and Maintenance Backlog in 20 years time would be of the order of **\$128.6 M**. This is an increase of **\$114.2 M** on the present Backlog.

12.3 Recommendations

12.3.1 Infrastructure Assets other than Water, Sewerage and Reuse

It is recommended that consideration be given to strategies to reduce the gap identified between the Existing and Preferred Scenario. Three general options are possible:

- ▶ Continue present amount of funding and accept a reduction in the level of infrastructure service to the community;
- ▶ Review whether the required level of infrastructure service is appropriate and if not reduce infrastructure stock; and/or
- ▶ Increase funding to meet the required levels of infrastructure service.

12.3.2 Water, Sewerage and Reuse Assets

Council must increase funding to meet the required levels of service for its Water, Sewerage & Reuse Assets.



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