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City of Wollongong Council

Asset Management Review

Part 1 Review of Asset Portfolio

July 2007

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1. Executive Summary

With \$2.5 billion in assets, the City of Wollongong 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 and Rehabilitation/ Renewal has been described as the biggest management challenge in local government (Allan 2006, Inquiry into financial sustainability of NSW local government). City of Wollongong are making positive steps towards addressing this challenge, and commissioned Review Today to assist them in ascertaining an up-to-date view of their financial status and the condition of their 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 City of Wollongong Council Asset Portfolio going forward, conducted in February 2007.

Based on our analysis we have concluded that Council have a present Rehabilitation/ Renewals and Maintenance Backlog of approximately \$192M and are proposing to further under-invest (In Backlog, Enhancements, Rehabilitation/ Renewals and Maintenance) going forward at an average rate of \$38.6M per year under the Existing Spending Policy. Adopting this strategy would result in a further decline in the condition of assets, having a negative effect on service performance. In financial terms, Council would experience a rise in Maintenance costs and a potential future Rehabilitation/ Renewal and Maintenance Backlog in the order \$1.03Bn, 20 years on.

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

2. Review of Asset Portfolio

2.1 Introduction

The purpose of this assessment is to obtain an understanding of the required level of spending on Council's assets to sustain the specified levels of service going forward. The data generated from the study is sufficiently accurate to be used for long-term strategic planning and management decision making and should not be used to support the short-term tactical management of assets.

This report on the City of Wollongong 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 is done at the individual Asset Set level (e.g. Pavement). Once completed the results are aggregated in order to provide an overall summary.

Our data analysis is carried out using a dynamic model, providing us with 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 Rehabilitation/ Renewal);
- Performance; and
- Asset life.

This is a distinct advantage over static forecasting models that do not track the behaviour of assets over time, discounting the effects of decay in condition, rise in costs to maintain and the benefits of investment in Rehabilitation/ Renewal and Enhancements.

2.2 Definitions

Table 1 Table of Definitions

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 Page 15).
Asset Group	A group of asset sets with similar behaviours (eg. wearing surfaces and pavements are part of the Roads group).
Asset Portfolio	All of Council's infrastructure assets.
Asset Set	The particular asset type (eg. wearing surfaces or pavements)
Backlog	The level of overdue Rehabilitation/ Renewal and Maintenance based upon Council treatments to-date.
Condition	The condition of the asset against the 10-point condition rating scale (refer to Page 15).
Consequential Maintenance	The resultant level of Maintenance required to support a given Rehabilitation/ Renewals strategy.
Enhancements	The cost associated with increasing a physical asset's service level beyond that which existed originally.
Existing Spending Policy	The existing spending policy covers Council's proposed infrastructure expenditure inclusive of: <ul style="list-style-type: none"> – Enhancements driven by Council's plan; – Council proposed Rehabilitation and Renewal Expenditure; – the Consequential Maintenance Expenditure.
Growth	The cost associated with increasing the quantum of physical assets.
Intervention Condition Level (ICL)	The condition level at which Council intervene and renew an asset.
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	The Preferred Spending Scenario analyses the Total Expenditure requirements to achieve: <ul style="list-style-type: none"> – Enhancements driven by Council's plan; – the required Rehabilitation and Renewal Expenditure accounting for these Enhancements (as calculated by GHD); – the Consequential Maintenance Expenditure accounting for these Enhancements (as calculated by GHD); – clearance of the present Backlog over a 5-year period.



Term	Definition
Present Condition Distribution	The percentage of assets within each of the 10 condition ratings.
Present Condition Rating	The condition of the asset against the 10-point condition rating scale, at today's date.
Quantity	The number of units of a particular asset.
Rehabilitation/ Renewal	The total cost of restoring a physical asset's service level to that which existed originally, applying current standards and technology.
Responsive Spending Scenario	<p>The Responsive Spending Scenario analyses the Total Expenditure requirements to achieve:</p> <ul style="list-style-type: none">– Enhancements driven by projected municipal population growth of 0.73% per annum from 2007/08 to 2016/027 (Projections provided by Review Today based on NSW Department of Infrastructure, Planning and Natural Resources (DIPNR), New South Wales Statistical Local Government Area Population Projections 2001-2031, published 2004);– the required Rehabilitation and Renewal Expenditure accounting for these Enhancements (as calculated by GHD);– the Consequential Maintenance Expenditure accounting for these Enhancements (as calculated by GHD);– clearance of the present Backlog over a 5-year period.
Restrained Spending Scenario	<p>The Restrained Spending Scenario analyses the Total Expenditure requirements to achieve:</p> <ul style="list-style-type: none">– a freeze on Enhancements Expenditure;– the required Rehabilitation and Renewal Expenditure accounting for a freeze on Enhancements (as calculated by GHD);– the Consequential Maintenance Expenditure accounting for a freeze on Enhancements (as calculated by GHD);– clearance of the present Backlog over a 5-year period.
Expenditure Gap	The difference between Council's proposed expenditure and the level of expenditure required to sustain Council's specified Intervention Condition levels.
Treatment	Treatment of the assets. In this case; Maintenance, Rehabilitation/ Renewal, Backlog and Enhancements.
Treatment Strategy	The strategy for Maintenance, Rehabilitation/ Renewal, Backlog and Enhancements.

2.3 Major Asset Groups

Figure 1 describes the asset groups modelled (e.g. Roads Assets) and subsequently the Asset Sets (e.g. Asphalt surface) that make up the particular group. The colour coding used relates to the expenditure profiles.

Figure 1 Major Asset Groups



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 extent of any present Rehabilitation/ Renewals and Maintenance Backlog;
- the impact of Council's Existing Spending Policy on the future Asset Base condition;
- the annual level of spending required for Rehabilitation/ Renewals and Maintenance over a 20 year period to sustain Council's specified Intervention Condition Levels;
- any expenditure gap between Council's Existing Spending Policy and the level of spending required to sustain Council's specified intervention condition levels;
- a summary of the Total Expenditure requirements as a result of 4 conceptual scenarios defined by Review Today:
 - Existing Spending Policy:
 - § Enhancements driven by Council's plan;
 - § Council proposed Rehabilitation and Renewal Expenditure ; and
 - § the Consequential Maintenance Expenditure.

- Preferred Spending Scenario:
 - § Enhancements driven by Council's plan;
 - § the required Rehabilitation and Renewal Expenditure accounting for these Enhancements (as calculated by GHD);
 - § the Consequential Maintenance Expenditure accounting for these Enhancements (as calculated by GHD);
 - § clearance of the present Backlog over a 5-year period.
- Restrained Spending Scenario;
 - § a freeze on Enhancements Expenditure;
 - § the required Rehabilitation and Renewal Expenditure accounting for a freeze on Enhancements (as calculated by GHD);
 - § the Consequential Maintenance Expenditure accounting for a freeze on Enhancements (as calculated by GHD);
 - § clearance of the present Backlog over a 5-year period.
- Responsive Spending Scenario;
 - § Enhancements driven by projected municipal population growth of 0.73% per annum from 2007/08 to 2016/27 (Projections provided by Review Today based on NSW Department of Infrastructure, Planning and Natural Resources (DIPNR), New South Wales Statistical Local Government Area Population Projections 2001-2031, published 2004);
 - § the required Rehabilitation and Renewal Expenditure accounting for these Enhancements (as calculated by GHD);
 - § the Consequential Maintenance Expenditure accounting for these Enhancements (as calculated by GHD);
 - § clearance of the present Backlog over a 5-year period.

Review Today advised GHD to assume that the long-term historical ratio between percentage population growth and percentage growth in quantum of assets was 1:1

Given the accuracy of these assumptions, these conceptual scenarios are useful for illustrative purposes only.

3. Methodology

3.1 Pre-start Meeting

Prior to commencing any assessment activities, GHD attended a pre-meeting that was facilitated by Review Today along with City of Wollongong Council. The meeting was held to ensure that the project team had a common understanding of the objectives of the project and to agree on the process and controls that we would implement to ensure a coordinated achievement. The agenda for the meeting was as follows:

- Introductions;
- History of Council's position;
- Overview and background to the project;
- Appointment of project officers and contact details;
- Presentation on how GHD will carry out the work including an overview of the forthcoming;
 - Asset review process (including data requirements); and
 - 1-day workshop to review of Council's asset management systems and processes;
- Agree project deliverables and timescales.

3.2 Overview of Modelling Process

The modelling process takes a stepped approach to reach our conclusion by answering the following 7 questions. Question 1 must be answered prior to commencement of our analysis and therefore is dealt with in the Methodology section below. Once the base data generated by Question 1 is in place, Questions 2 through 7 can then be answered. These questions are subsequently addressed in the results section of the report. The seven questions answered by this report are as follows:

Question 1 - What are the behavioural characteristics of Council's assets and how do they behave in this particular situation?

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

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

Question 4 - If Council implements the Existing Spending Policy, what will be the status 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 between the Existing Spending Policy and the Total Expenditure required under the Preferred Spending Scenario?

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

3.2.1 Data Requirements

To support the modelling process we obtained/ jointly developed the following information with regard to 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;
- The Maintenance/ Asset Condition Relationship; and
- Proposed expenditure (Rehabilitation/ Renewals, Maintenance and Enhancements).

3.3 Question 1 – What are the behavioural characteristics of Council’s Assets and how do they behave in this particular situation?

To be able to complete a dynamic assessment of the financial expenditure requirements of assets into the future, we must begin by understanding 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 restore, 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 restore/ 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 restore/ renew the asset to ensure the required service levels are sustained (the intervention condition level; ICL).
 - the condition levels to which Council will restore a particular asset when they intervene to restore/ renew it.

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).
- 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;
- 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 within this 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 we work through and the consideration we make to enable us to present our results at a summarised level for the purpose of this report.
- 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 6 (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.

3.3.1 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 (i.e. Pavement) against the 10-point condition rating scale and identifying the percentage of the total asset set that currently sits within in each condition rating, up to 100 percent. **For the purpose of illustration**, the Condition Distribution for a set of Pavement assets can be seen in Table 2 on the next page.

For the purpose of this study (high-level view), our analysis was carried out based upon condition data from Council's Asset Management System and therefore accuracy is governed by the quality and accuracy of their 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 may also carry out independent survey work if required.

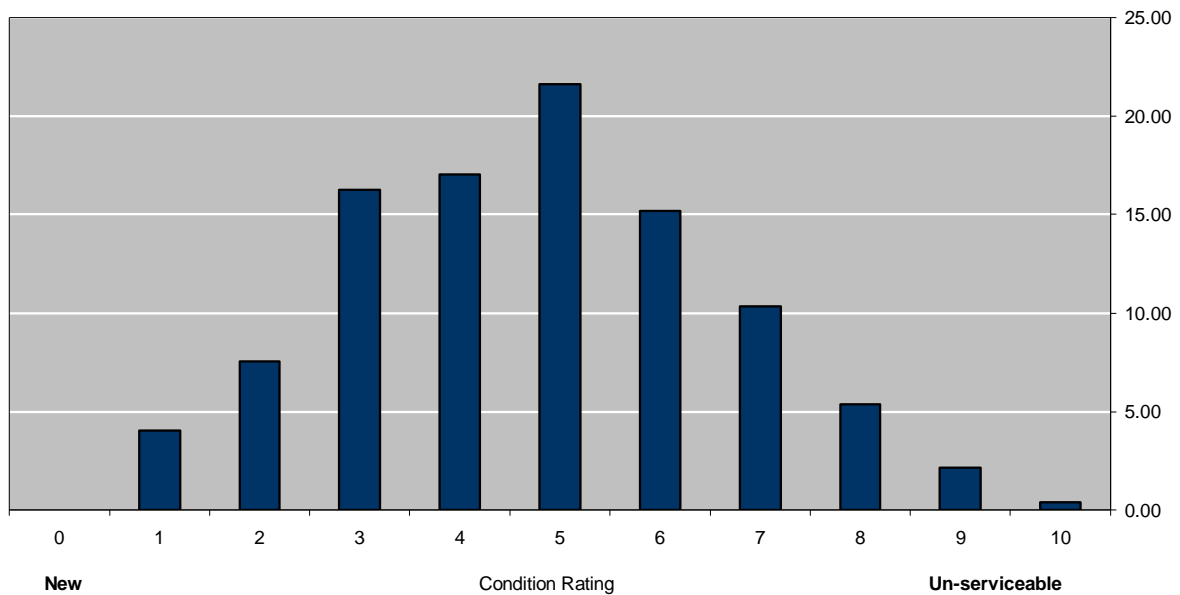
Table 2 Asset Condition Distribution Data Input Table (table to illustrate Methodology only)

Condition Rating	Description	% 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.	0.40
9	An asset in extremely poor condition with severe serviceability problems and needing Rehabilitation immediately. Could be a risk to remain in service.	2.15
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.	5.38
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.	10.35
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.	15.19
5	An asset in fair overall condition. The deterioration in condition would be obvious and there would be some serviceability loss.	21.62
4	An asset in good overall condition, but with some obvious deterioration evident, serviceability would be impaired very slightly.	17.05
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.	16.26
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.	7.56
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.	4.05
0	A new asset or an asset recently rehabilitated back to new condition.	0.00
	Total	1.00

Based upon the information from Table 2, we are able to display the current Condition Distribution for the set of Pavement assets (see Figure 2). The graph indicates that 21.62% of the Test asset set modelled, are in condition 5.

Note: As part of GHD’s analysis we implement this exercise for each individual asset set.

Figure 2 Present Condition Distribution (graph to illustrate Methodology only)



3.3.2 Question 1b - Asset Degradation Rate

This asset degradation curve defines the rate of degradation for a particular asset 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 the same set of Pavement assets.

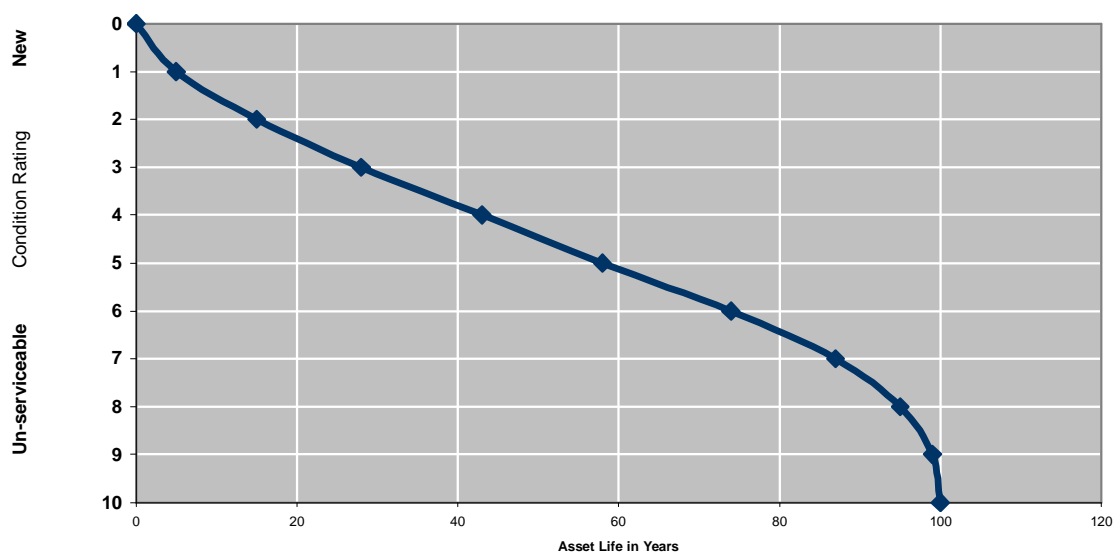
Table 3 Asset Degradation Rate Data Input Table (table to illustrate Methodology only)

Condition Rating	Description	% 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.	0.00
9	An asset in extremely poor condition with severe serviceability problems and needing Rehabilitation immediately. Could be a risk to remain in service.	1.00
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.	4.00
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.	8.00
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.	13.00
5	An asset in fair overall condition where the deterioration in condition would be obvious and some serviceability loss.	16.00
4	An asset in good overall condition but with some obvious deterioration evident, serviceability would be impaired very slightly.	15.00
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.	15.00
2	An asset in excellent overall condition with only very slight condition decline but obvious that the asset is no longer in new condition.	13.00
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.	10.00
0	A new asset or an asset recently rehabilitated back to new condition.	5.00
Total		100

Based upon the information from table Table 3 we are able to create a degradation profile for the particular asset. This is illustrated in Figure 3. This information is used during modelling to simulate degradation of the asset over time. The graph indicates that the Pavement Asset Set modelled, spends 10% or 10 years of its life in condition 1.

Note: As part of GHD's analysis we implement this exercise for each individual asset set.

Figure 3 Degradation Curve (graph to illustrate Methodology only)



3.3.3 Question 1c – Intervention Condition Levels

In order to simulate degradation and the effect of treatment for the asset over time, 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 assets by the yellow shaded cell in Table 4).

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

- Based upon our method, the ICL is closely correlated with service levels, assuming that the poorer the condition that an asset is allowed to reach, the poorer its performance will be as a result; therefore
- Different ICLs 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 ICL, safety must be taken into consideration, assuming that once an asset reaches a particular condition, it is no longer safe to use, operate and maintain.

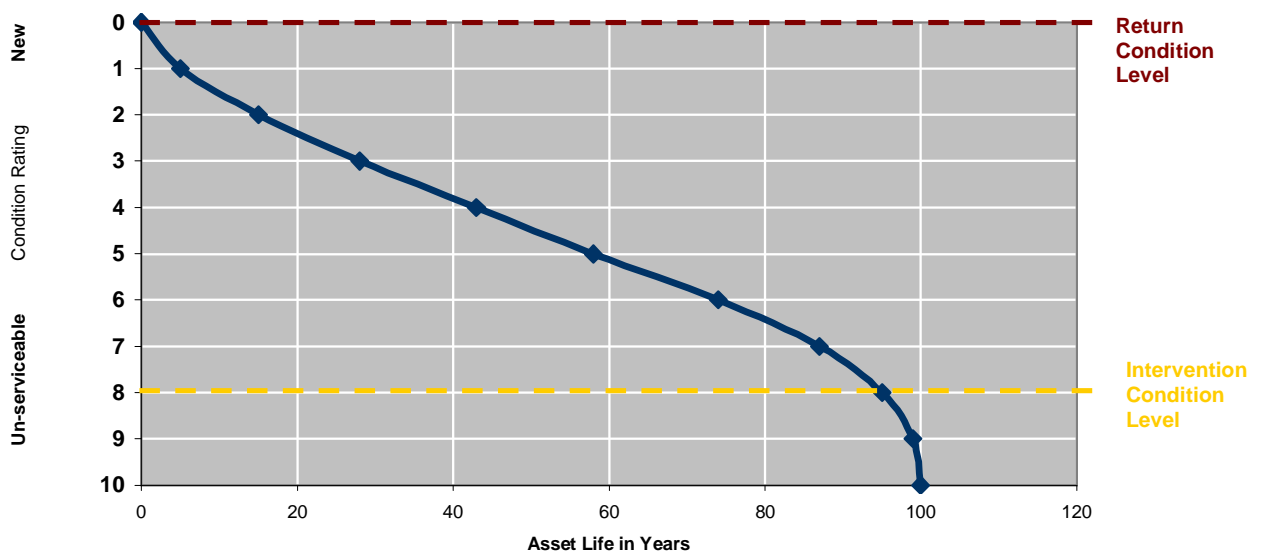
For the above reasons, the ICLs are derived jointly between Council and GHD to take account of Council's asset strategies, whilst ensuring assets remain safe to use, operate and maintain.

Table 4 Intervention Condition Level (table to illustrate Methodology only)

Year ahead to be analysed	Actual year ahead	Intervention Condition Level	Asset return Condition
20	2027	8.0	0.00

Based upon the information in Table 4 above we are able to demonstrate the ICL for the set of Pavement assets on the condition distribution graph, which is illustrated by the yellow dashed line in Figure 4.

Figure 4 Present Condition Distribution Showing ICL (graph to illustrate Methodology only)



Note: As part of GHD’s analysis we implement this exercise for each individual asset set.

3.3.4 Question 1d - Return Condition Levels

The next step is to define the condition level to which Council will restore/ renew an asset when they intervene. This is illustrated for the set of Pavement assets by the dark-red shaded cell in Table 4.

To maintain accuracy of results when carrying out this process, it must be ensured that the level of treatment (Rehabilitation/ 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 restore an asset to a particular condition level will be different than the cost to renew it.
- The amount of 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 restore/ renew it to the defined Return Condition Level. This is illustrated by the dark-red dashed line in Figure 4 above.

Note: Whilst the return condition level is not reported on separately in the results, it is a major influencing factor in the modelling process.

3.3.5 Question 1e - Understanding the present Rehabilitation/ Renewals and Maintenance Backlog

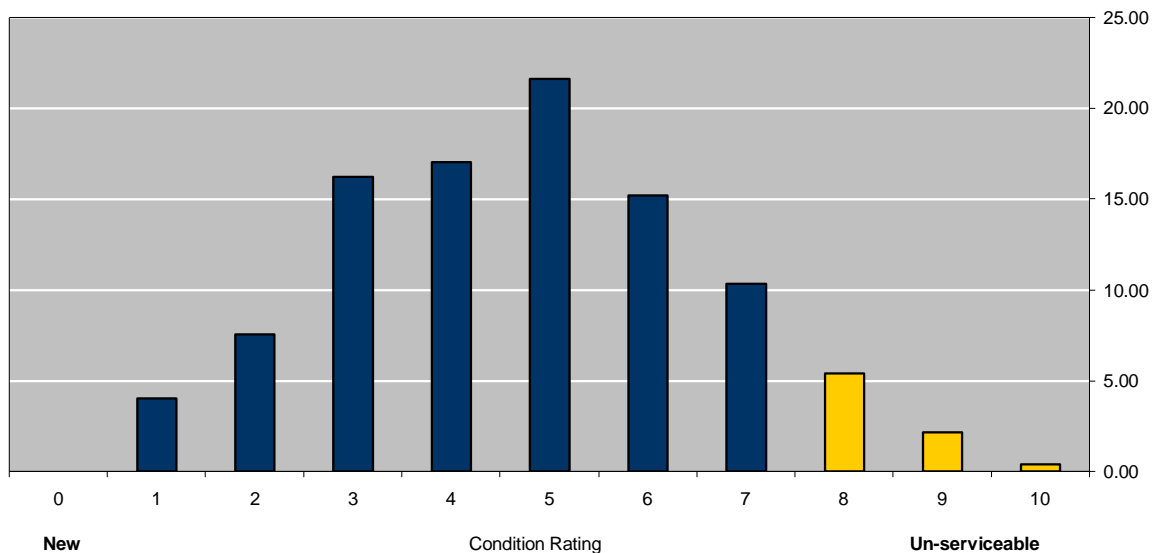
Based upon the information in Table 4 we are also able to estimate the current Rehabilitation/ Renewals and Maintenance Backlog, that is, the level of overdue Rehabilitation/ Renewal and Maintenance based upon Council treatments to-date.

This is derived by quantifying the number of assets in a particular Asset Set, that are currently at or above Council's specified Intervention Condition Levels (e.g. the 7% in Figure 5), and estimating the cost to restore/ renew all of these assets back to Council's Return Condition Levels.

Calculating the Backlog is then a simple sum of the number of units of asset (e.g. m² for Pavements) at or over the Intervention Condition Level multiplied by the unit Rehabilitation/ Renewal cost.

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

Figure 5 Present Condition Distribution showing Assets at or above ICL (graph to illustrate



3.3.6 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 general, rationale assumption, 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 were to be the case, we would be assuming that improving the asset by expending funds on restoration/ rehabilitation/ renewal will have no effect.

The chosen factor represents the amount by which you expect 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 asset set, we have input a Maintenance cost adjustment ratio of 1.4 as shown Table 4.

This means that each time the asset degrades to the next condition rating, the maintenance cost would increase by a factor of 1.4.

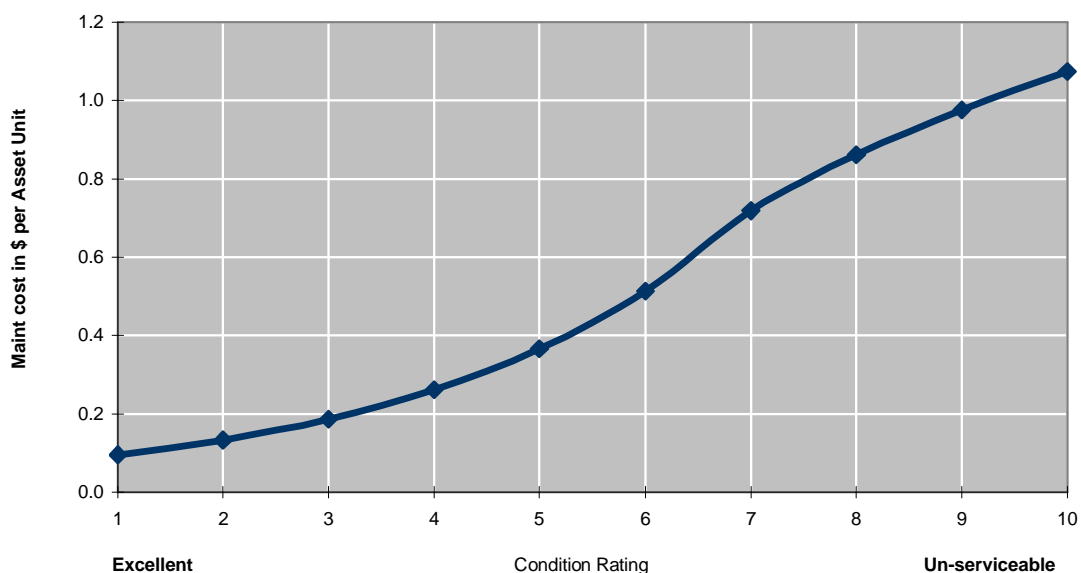
Table 5 Maintenance Cost Adjustment Factor (Table for Illustration Only**)**

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 (i.e. m² if it were a Pavement asset).

Finally the through-life cost/ condition relationship is then created for the asset. This is illustrated in Figure 6.

Figure 6 Maintenance Cost Condition Relationship (graph to illustrate Methodology only)



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:

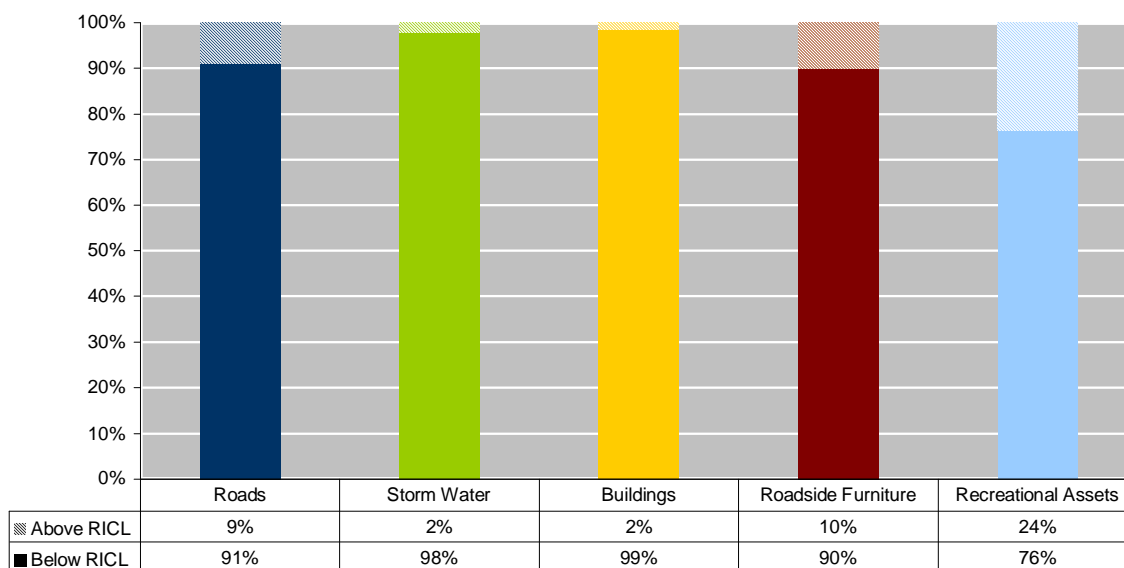
- Estimate the level of Maintenance Expenditure required as a consequence of different levels of Rehabilitation/ Renewal Expenditure, assuming Rehabilitation/ Renewal Expenditure improves asset condition.

4. Analysis and Results

4.1 Question 2 - What is the present status of Council's Assets?

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 7. The purpose of this graph is to quickly demonstrate the present status of each major Asset Group.

Figure 7 Percentage of Asset Group presently at or above Council Intervention Condition Levels



Observations

The hatched area at the top of each of the bars represents the percentage of Council's assets that are currently at or above the Intervention Condition Levels as a result of infrastructure treatment to date. These assets must be treated to return them to acceptable levels. As explained in 3.3.5 above, the cost to achieve this is referred to as the Rehabilitation/ Renewals and Maintenance Backlog (see section 4.1.1).

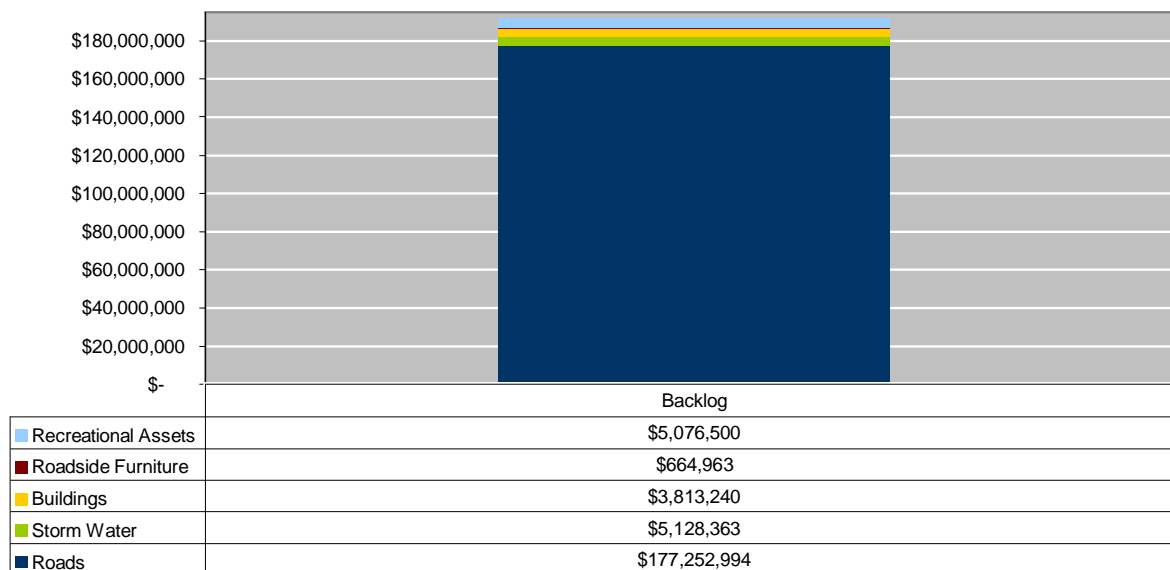
Table 6 Percentage of Asset Group presently at or above Council Intervention Condition Levels

Asset Group	Percentage of Assets presently at or above Council ICL (%)
Roads	9%
Storm Water & Sewer	2%
Buildings	2%
Roadside Furniture	10%
Recreational Assets	24%

4.1.1 Present Rehabilitation/ Renewals and Maintenance Backlog

Figure 8 shows the investment required to restore all assets that are currently at/ or above Council’s specified Intervention Condition Levels, back to the required standard. The graph, therefore, represents the present Rehabilitation/ Renewals and Maintenance Backlog in dollars.

Figure 8 Present Backlog



Observations

We estimate that the current Rehabilitation/ Renewals and Maintenance Backlog is in the order of **\$192M**. Table 7 below shows the breakdown of this \$192M as it is attributable to the major Asset Groups.

Table 7 Present Rehabilitation/ Renewals and Maintenance Backlog

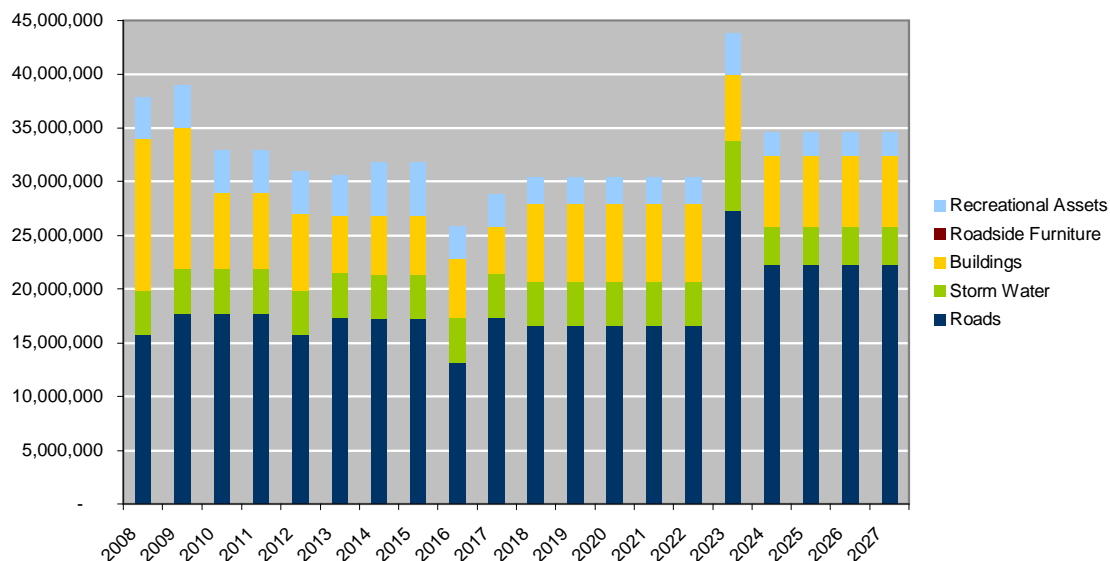
Asset Group	Present Backlog
Roads	\$177.3M
Storm Water & Sewer	\$5.1M
Buildings	\$3.8M
Roadside Furniture	\$0.7M
Recreational Assets	\$5.1M

4.2 Question 3 – What is Council’s Existing Spending Policy?

4.2.1 Enhancement Expenditure under the Existing Spending Policy

Figure 9 shows Council’s proposed Enhancement Expenditure over the next 20 years.

Figure 9 Enhancement Expenditure under the Existing Spending Policy



Observations

Council proposes to spend a total of approximately **\$657.4M** on infrastructure Enhancements between now and the 2026/ 2027 budget year, broken down annually as illustrated in Table 8.

Table 8 Enhancement Expenditure under the Existing Spending Policy

Asset Group	Enhancement Expenditure
2007/2008	\$38.0M
2008/2009	\$39.0M
2009/2010	\$33.0M
2010/2011	\$33.0M
2011/2012	\$31.0M
2102/2013	\$31.0M
2013/2014	\$31.8M
2014/2015	\$31.8M
2015/2016	\$25.8M
2016/2017	\$28.8M

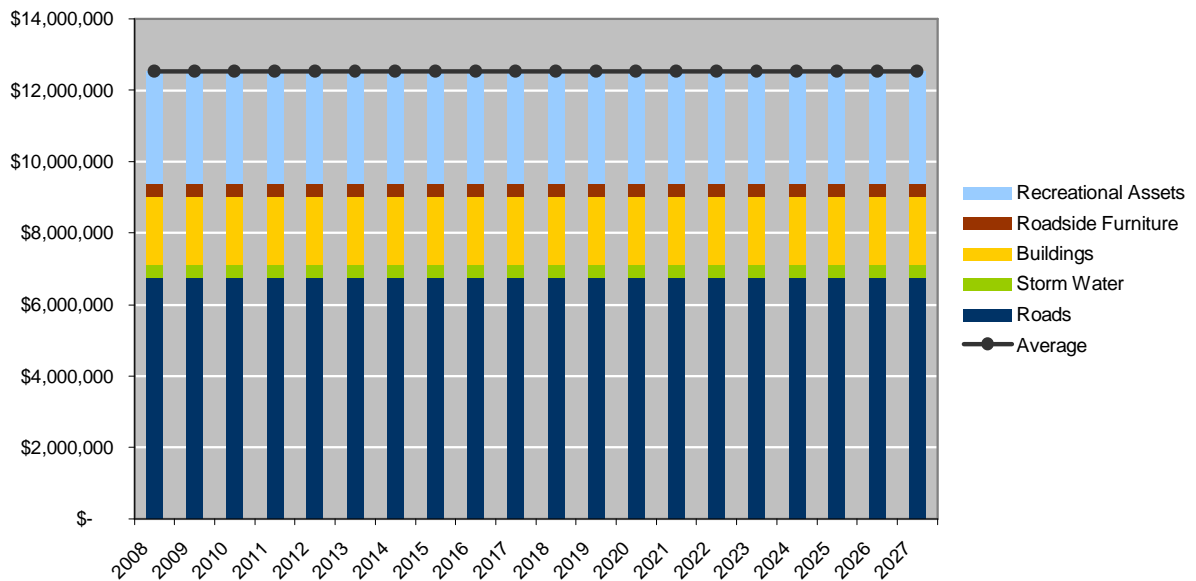


Asset Group	Enhancement Expenditure
2017/2018	\$30.4M
2018/2019	\$30.4M
2019/2020	\$30.4M
2020/2021	\$30.4M
2021/2022	\$30.4M
2022/2023	\$43.8M
2023/2024	\$34.6M
2024/2025	\$34.6M
2025/2026	\$34.6M
2026/2027	\$34.6M

4.2.2 Rehabilitation/ Renewal Expenditure under the Existing Spending Policy

Figure 10 shows Council's proposed Rehabilitation/ Renewal Expenditure.

Figure 10 Rehabilitation/ Renewal Expenditure under the Existing Spending Policy



Observations

Council proposes to spend a total of approximately **\$12.5M** per year on asset Rehabilitation/ Renewals, broken down by Asset Group as illustrated in Table 9.

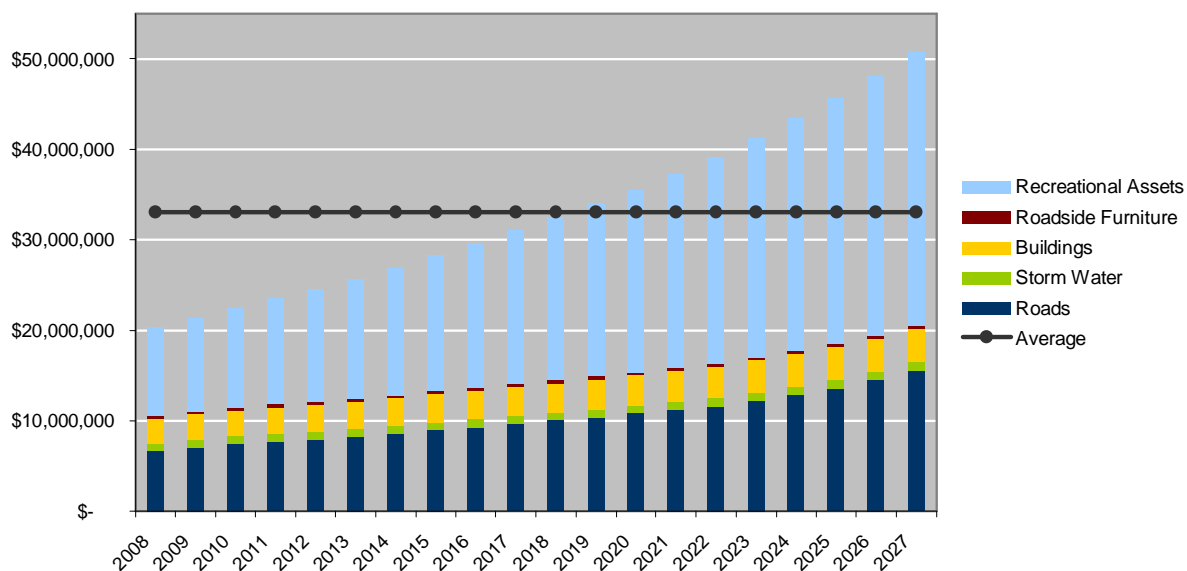
Table 9 Rehabilitation/ Renewal Expenditure by Asset Group under the Existing Spending Policy

Asset Group	Average Annual Rehabilitation/ Renewal Expenditure
Roads	\$6.7M
Storm Water & Sewer	\$0.4M
Buildings	\$1.9M
Roadside Furniture	\$0.4M
Recreational Assets	\$3.1M

4.2.3 Consequential Maintenance Expenditure under the Existing Spending Policy

Figure 11 shows the proposed Consequential Maintenance Expenditure under the Existing Spending Policy.

Figure 11 Proposed Consequential Maintenance Expenditure Under the Existing Spending Policy



Observations

We estimate that the Consequential Maintenance Expenditure required to support Council's proposed Rehabilitation/ Renewal Expenditure would be approximately **\$33M** per year (average).

For purposes of illustration, the average annual Consequential Maintenance Expenditure by Asset Group is provided in Table 10.

Table 10 Consequential Maintenance Expenditure by Asset Group under the Existing Spending Policy

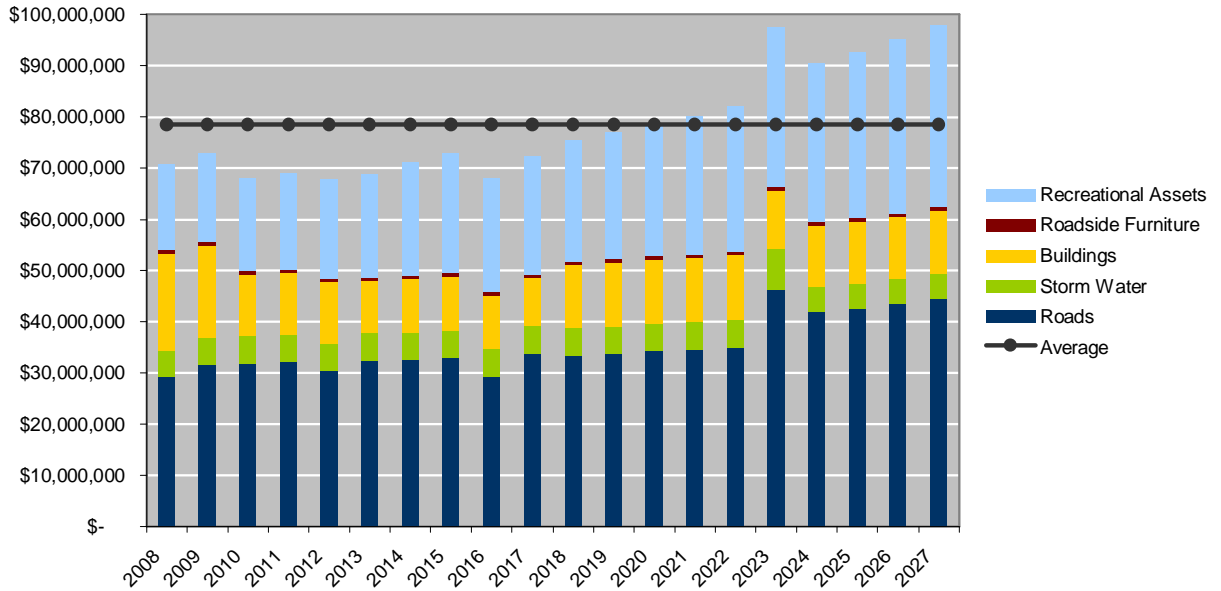
Asset Group	Average Annual Consequential Maintenance Expenditure
Roads	\$10.2M
Storm Water & Sewer	\$0.9M
Buildings	\$3.2M
Roadside Furniture	\$0.3M
Recreational Assets	\$18.4M

4.2.4 Total Expenditure under the Existing Spending Policy

Figure 12 shows the Total Expenditure under the Existing Spending Policy which includes:

- Council proposed Enhancements;
- Council proposed Rehabilitation/ Renewals; and
- the resultant Consequential Maintenance.

Figure 12 Total Expenditure under the Existing Spending Policy



Observations

The Total Expenditure under the Existing Spending Policy would be approximately **\$78.4M** per year (average). For purposes of illustration, the average annual expenditure by asset group is provided in Table 11.

Table 11 Total Expenditure under the Existing Spending Policy

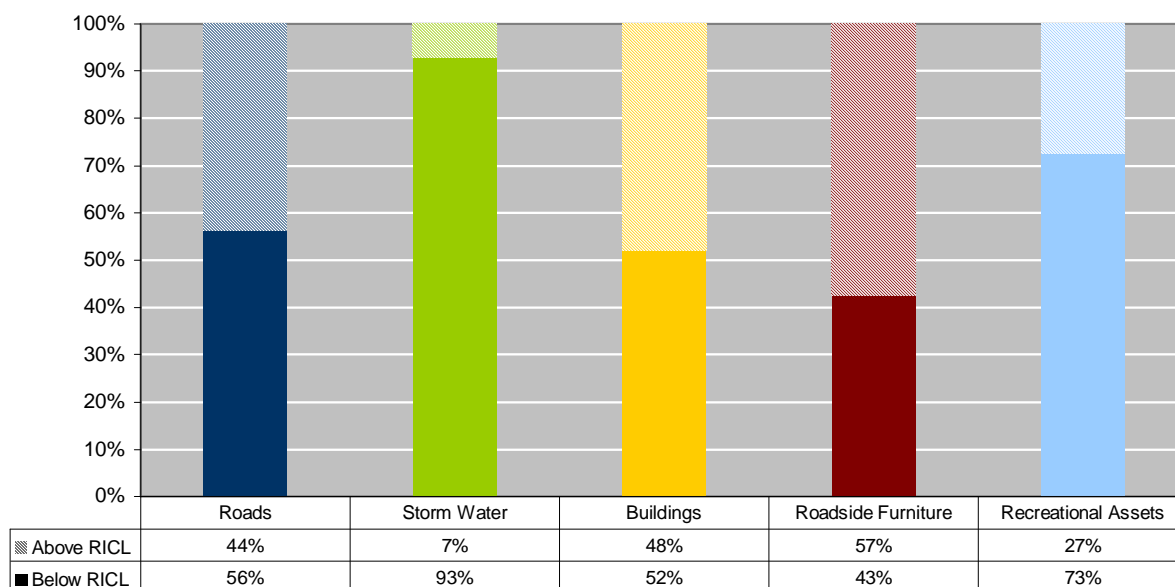
Asset Group	Average Annual Expenditure
Roads	\$35.3M
Storm Water & Sewer	\$5.4M
Buildings	\$12.3M
Roadside Furniture	\$0.7M
Recreational Assets	\$24.7M

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

4.3.1 Future Condition

Figure 13 shows a summarised version, of the percentage of each asset group that we predict will be at or above Council's specified Intervention Condition Levels after 20 years under the Existing Spending Policy.

Figure 13 Percentage of Asset Base that will be at or above Council Intervention Condition Levels after 20 years under the Existing Spending Policy



Observations

The graph shows considerable decline across Roads, Buildings and Roadside Furniture assets, suggesting that Council's proposed expenditure is insufficient in these areas.

Whilst Storm Water and Recreational assets will only experience a small decline of 5% and 3% respectively, considerable effort is required in these areas to bring a large percentage of these assets back within acceptable service levels.

It should be noted, that any improvements to assets during this period as a result of proposed Enhancement Expenditure (Figure 9) have been factored into these calculations.

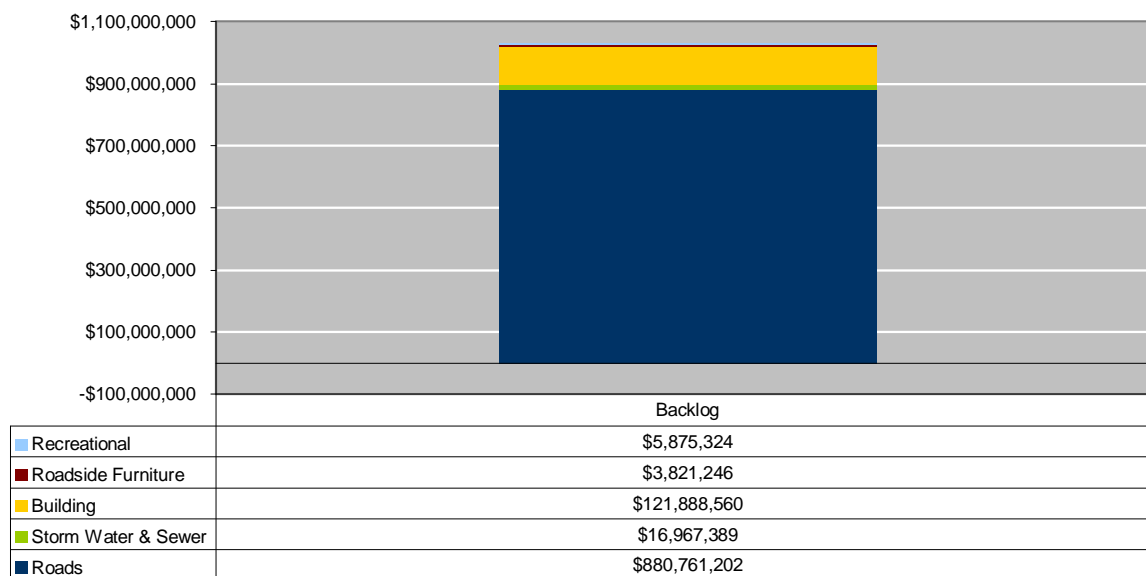
Table 12 Forecast Condition Change by Asset Group after 20 years under the Existing Spending Policy

Asset Group	Forecast Condition Change (%)
Roads	+35%
Storm Water & Sewer	+5%
Buildings	+46%
Roadside Furniture	+47%
Recreational Assets	+3%

4.3.2 Forecast Rehabilitation/ Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy

Figure 14 illustrates the investment that we estimate will be required in 20 years time to restore all assets that will be at/or above Council's specified intervention levels, back to the required standard. The graph represents the forecast future Rehabilitation/ Renewals and Maintenance Backlog in dollars.

Figure 14 Forecast Future Rehabilitation/ Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy



Observations

We estimate that the future Rehabilitation/ Renewals and Maintenance Backlog in 20 years time will be in the order of **\$1.03 Bn**. Table 13 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 (see Figure 9) have been factored into these calculations.



Table 13 Forecast Rehabilitation/ Renewals and Maintenance Backlog after 20 years under the Existing Spending Policy

Asset Group	Forecast Rehabilitation/ Renewals and Maintenance Backlog in 20 years time
Roads	\$880.7M (+\$703.7M)
Storm Water & Sewer	\$16.9M (+\$14.9M)
Buildings	\$121.8M (+\$118M)
Roadside Furniture	\$3.8M (+\$3.1M)
Recreational Assets	\$5.8M (+\$0.8M)

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

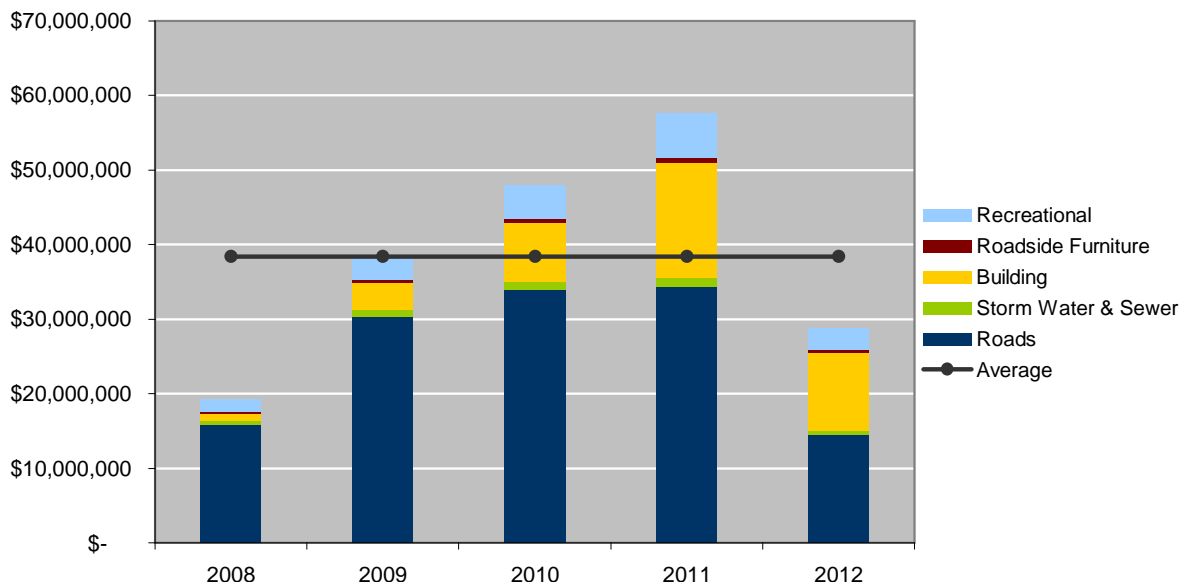
This section contains GHD’s estimated required level of expenditure required under the Preferred Spending Scenario including:

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

4.4.1 Rehabilitation/ Renewals and Maintenance Backlog Clearance Strategy

Figure 15 shows that the payback strategy adopted for clearing the Backlog is 5 years. This was decided as a reasonable timeframe assuming that a shorter period is not reasonably achievable and 10 years is too long. More detailed future studies would benefit by examining different scenarios based on a range of payback timeframes.

Figure 15 Rehabilitation/ Renewals and Maintenance Backlog Clearance Strategy



Observations

If council were to adopt a five-year payback strategy for the clearance of the existing Backlog, they would need to spend an average of **\$38.4M** per year, broken down by actual per year as illustrated in Table 14.

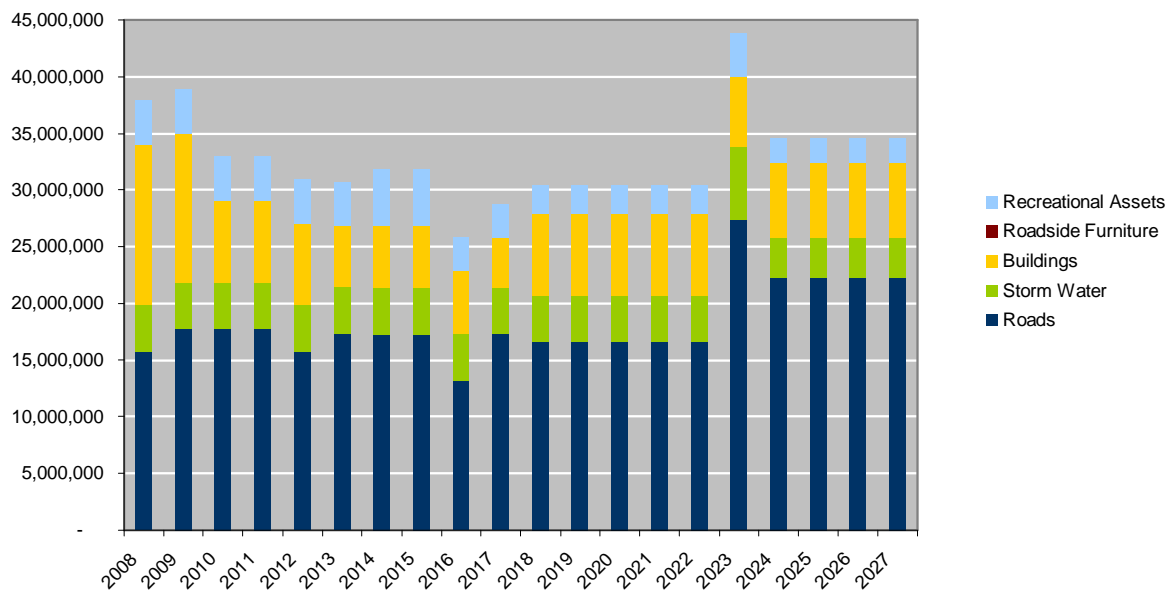
Table 14 Rehabilitation/ Renewals and Maintenance Backlog Clearance Strategy

Year	Expenditure
2008	\$19.1M
2009	\$38.4M
2010	\$48
2011	\$58M
2012	\$29M

4.4.2 Enhancement Expenditure under the Preferred Spending Scenario

Figure 16 shows Council's proposed Enhancement Expenditure over the next 9 years (no data exists beyond this point). This profile is identical to that in Figure 9 above as it is a Council determined factor. It is included here to complete the picture by showing the expenditure required to achieve Council's Enhancements plan.

Figure 16 Enhancement Expenditure under the Preferred Spending Scenario



Observations

Council proposes to spend a total of approximately **\$657.4M** on infrastructure Enhancements between now and the 2026/ 2027 budget year, broken down annually as illustrated in Table 15.

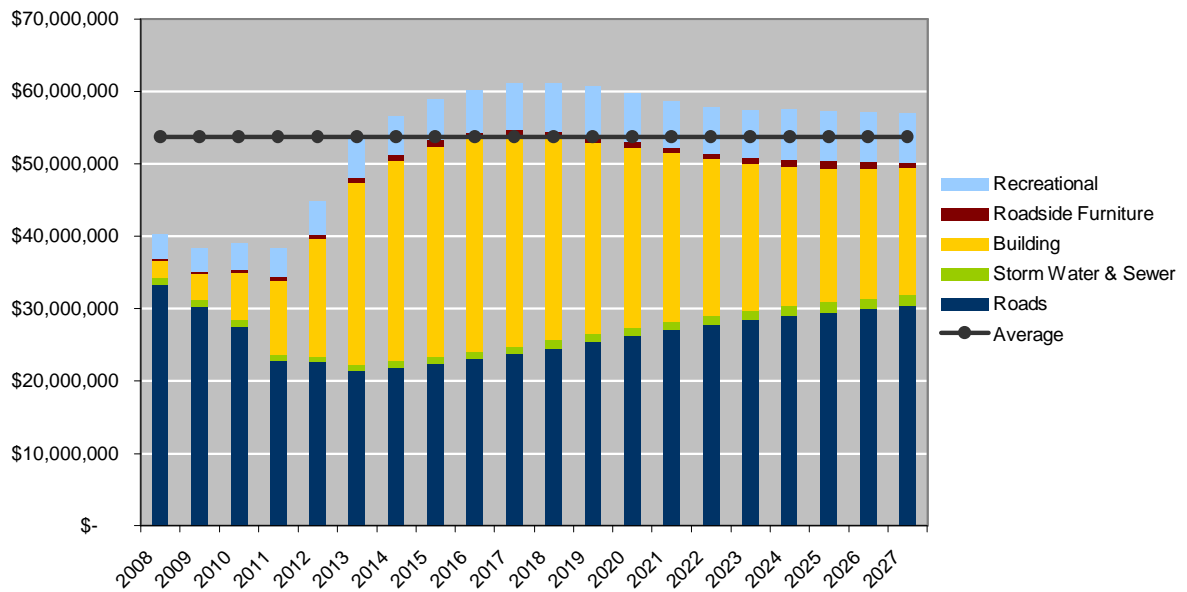
Table 15 Enhancement Expenditure under the Preferred Spending Scenario

Asset Group	Enhancement Expenditure
2007/2008	\$38.0M
2008/2009	\$39.0M
2009/2010	\$33.0M
2010/2011	\$33.0M
2011/2012	\$31.0M
2102/2013	\$31.0M
2013/2014	\$31.8M
2014/2015	\$31.8M
2015/2016	\$25.8M
2016/2017	\$28.8M
2017/2018	\$30.4M
2018/2019	\$30.4M
2019/2020	\$30.4M
2020/2021	\$30.4M
2021/2022	\$30.4M
2022/2023	\$43.8M
2023/2024	\$34.6M
2024/2025	\$34.6M
2025/2026	\$34.6M
2026/2027	\$34.6M

4.4.3 Rehabilitation/ Renewal Expenditure under the Preferred Spending Scenario

Figure 17 shows GHD's estimated required Rehabilitation/ Renewal Expenditure to sustain the Council's specified Intervention Condition Levels.

Figure 17 Rehabilitation/ Renewal Expenditure under the Preferred Spending Scenario



Observations

Based upon Council's specified Intervention Condition Levels, we estimate that they need to spend in the order of **\$53.8M** per year on asset Rehabilitation/ Renewals (average).

For purposes of illustration, the average annual Rehabilitation/ Renewal Expenditure by Asset Group is provided in Table 16.

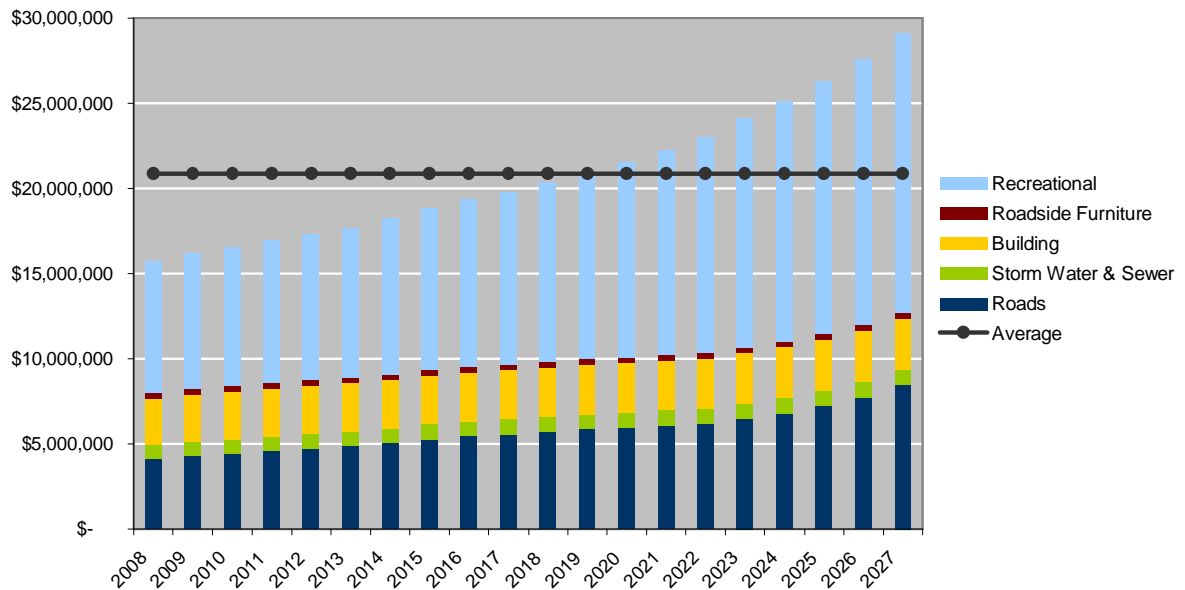
Table 16 Rehabilitation/ Renewal Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Rehabilitation/ Renewal Expenditure
Roads	\$26.4M
Storm Water & Sewer	\$1.1M
Buildings	\$19.9M
Roadside Furniture	\$0.7M
Recreational Assets	\$5.7M

4.4.4 Consequential Maintenance Expenditure under the Preferred Spending Scenario

Figure 18 shows the required level of spending on Consequential Maintenance.

Figure 18 Consequential Maintenance Expenditure under the Preferred Spending Scenario



Observations

We estimate the required level of spending on Consequential Maintenance would be approximately **\$20.8M** per year (average).

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

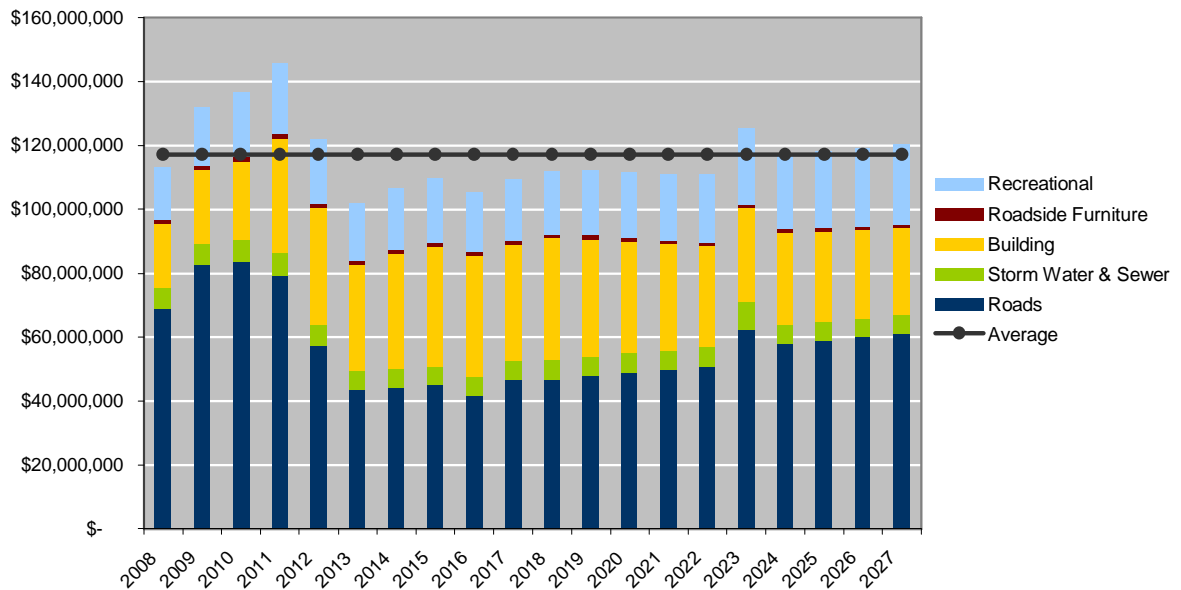
Table 17 Consequential Maintenance Expenditure by Asset Group under the Preferred Spending Scenario

Asset Group	Average Annual Consequential Maintenance Expenditure
Roads	\$5.7M
Storm Water & Sewer	\$0.9M
Buildings	\$2.9M
Roadside Furniture	\$0.3M
Recreational Assets	\$11.0M

4.4.5 Total Expenditure under the Preferred Spending Scenario

Figure 19 shows the Total Expenditure required under the Preferred Spending Scenario.

Figure 19 Total Expenditure under the Preferred Spending Scenario



Observations

We estimate the total required level of spending on combined Enhancement, Rehabilitation/ Renewal and Consequential Maintenance would be approximately **\$117.1M** per year (average).

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

Table 18 Total Expenditure under the Preferred Spending Scenario

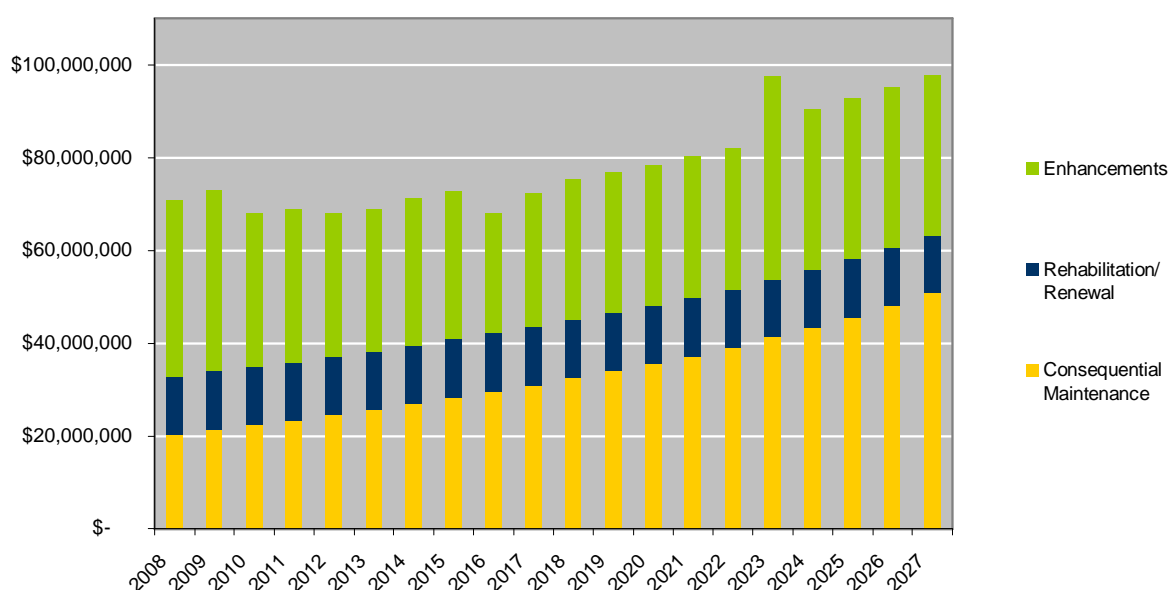
Asset Group	Average Annual Expenditure
Roads	\$56.8M
Storm Water & Sewer	\$6.3M
Buildings	\$31.9M
Roadside Furniture	1.2M
Recreational Assets	20.9M

4.5 Question 6 – What is the Gap between the Existing Spending Policy and the Total Expenditure required under the Preferred Spending Scenario?

4.5.1 Total Expenditure under the Existing Spending Policy

Figure 20 shows a high-level summary of Council’s proposed expenditure under the Existing Spending Policy.

Figure 20 Total Expenditure under the Existing Spending Policy



Observations

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

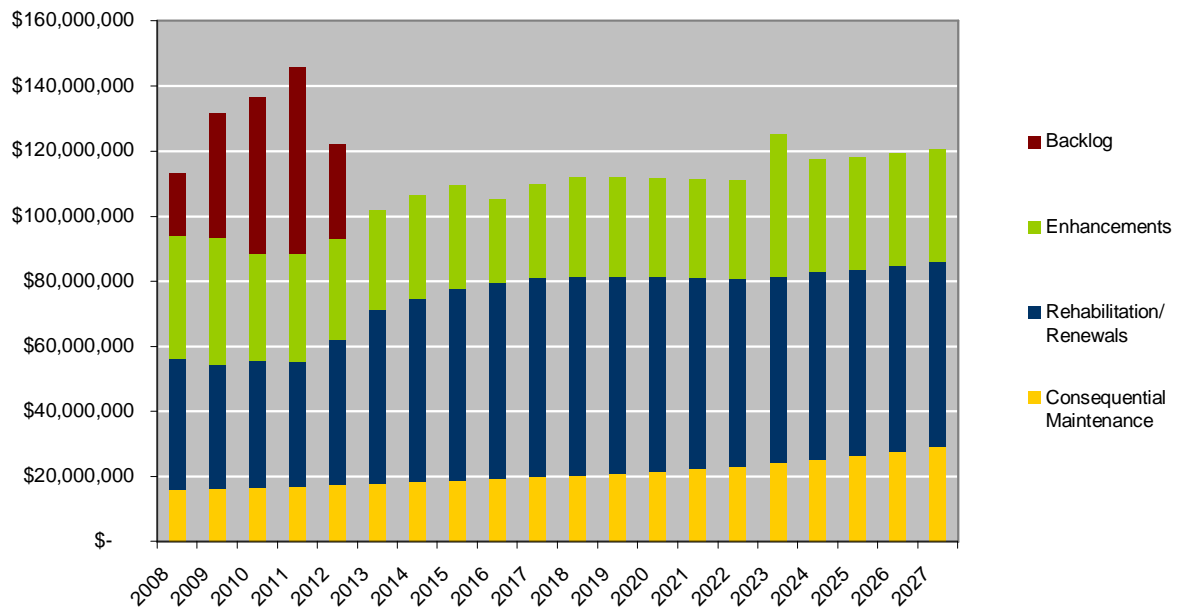
Table 19 Total Expenditure under the Existing Spending Policy

Treatment Option	Average Annual Expenditure under the Existing Spending Policy
Backlog (over 20 years)	
Enhancements	\$32.9M
Rehabilitation/ Renewals	\$12.5M
Consequential Maintenance	\$33M

4.5.2 Total Expenditure under the Preferred Spending Scenario

Figure 21 shows a high-level summary of the total expenditure we believe is required to support the Preferred Spending Scenario.

Figure 21 Total Expenditure under the Preferred Spending Scenario



Observations

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 20.

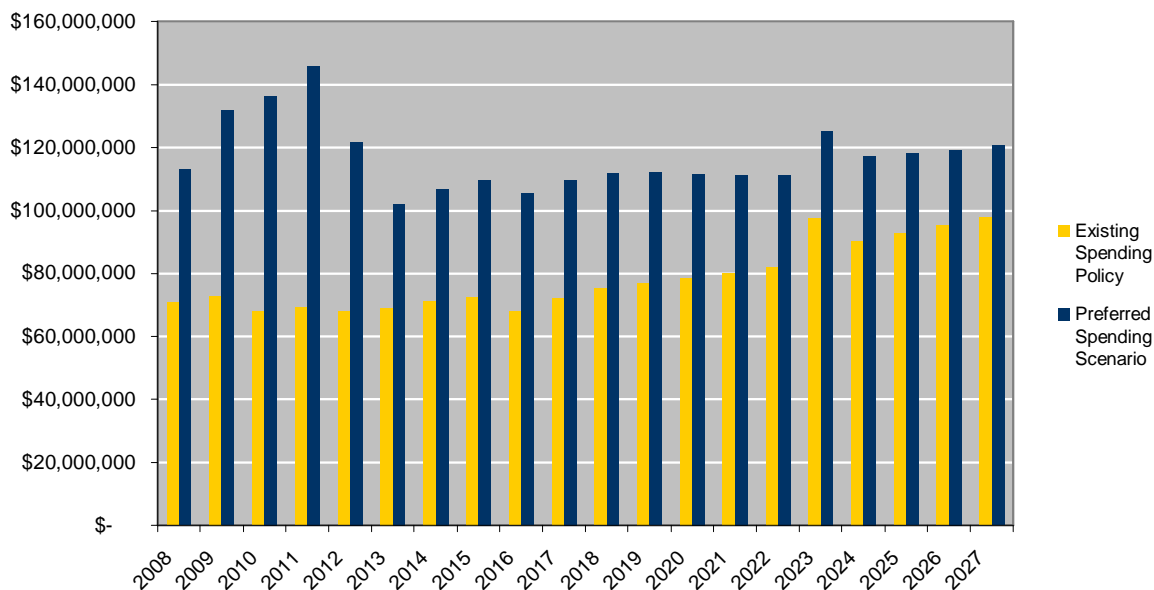
Table 20 Total Expenditure under the Preferred Spending Scenario

Treatment Option	Average Annual Expenditure under the Preferred Spending Scenario
Backlog (over 20 years)	\$9.6M
Enhancements	\$32.9M
Rehabilitation/ Renewals	\$53.8M
Consequential Maintenance	\$20.8M

4.5.3 Existing Spending Policy v's Preferred Spending Scenario

Figure 23 shows a comparison of Council's Existing Spending Policy and the level of expenditure that we believe is required to support the Preferred Spending Scenario.

Figure 22 Existing Spending Policy v's Preferred Spending Scenario



Observations

For purposes of illustration, a summary is provided in Table 21.

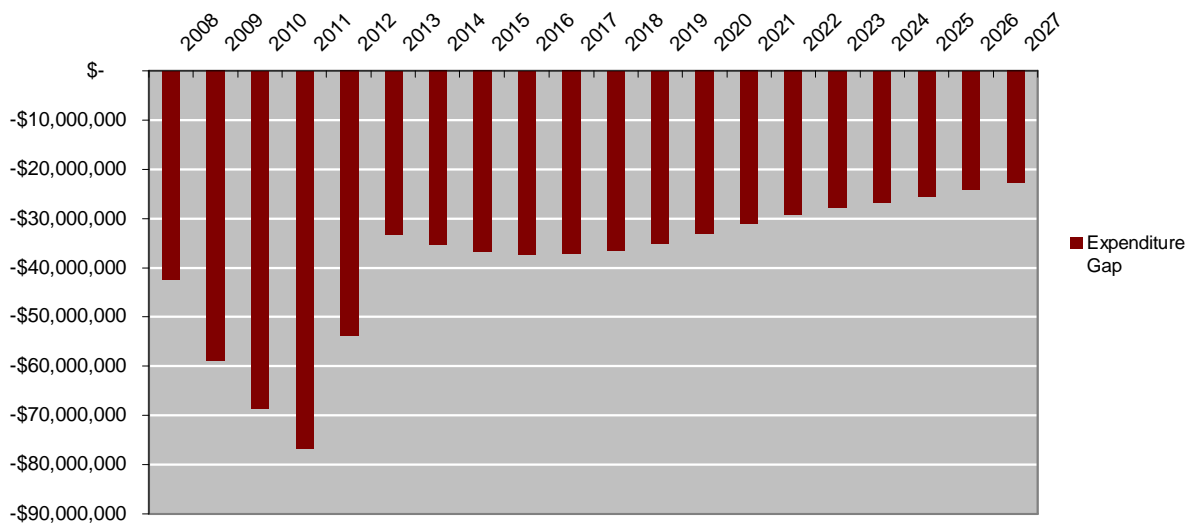
Table 21 Existing Spending Policy v's Preferred Spending Scenario

Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$78.4M
Preferred Spending Scenario	\$117.1M

4.5.4 Total Expenditure Gap under the Preferred Spending Scenario

Figure 23 shows the gap between Council’s Existing Spending Policy and the level of expenditure that we believe is required to support the Preferred Spending Scenario. .

Figure 23 Total Expenditure Gap – Existing Spending Policy v’s Preferred Spending Scenario



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 **\$38.7M under-funded per year**.

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

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:

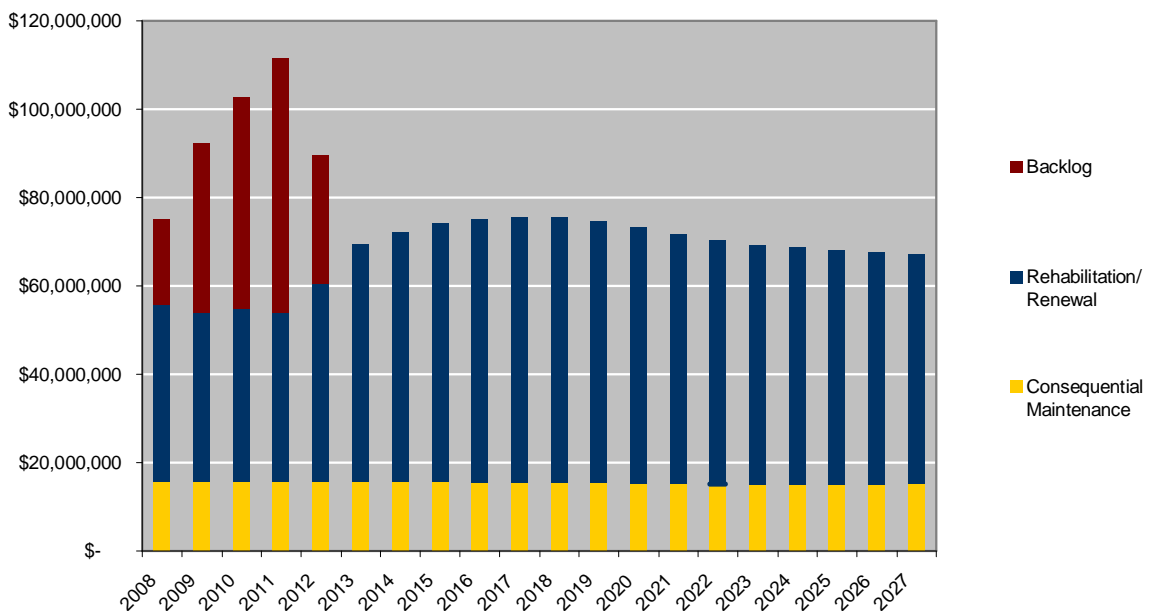
- a Restrained Spending Scenario; or
- a Responsive Spending Scenario.

4.6.1 Summary of the Total Expenditure required to support the Restrained Spending Scenario

Figure 24 shows the Total Expenditure required if Council were to adopt a Restrained Spending Scenario. The Restrained Policy scenario includes:

- the required Rehabilitation and Renewal Expenditure (as calculated by GHD);
- Consequential Maintenance Expenditure (as calculated by GHD);
- a freeze will be put on Enhancements Expenditure;
- Backlog will be cleared over a 5-year period.

Figure 24 Total Expenditure under the Restrained Spending Scenario



Observations

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 22.

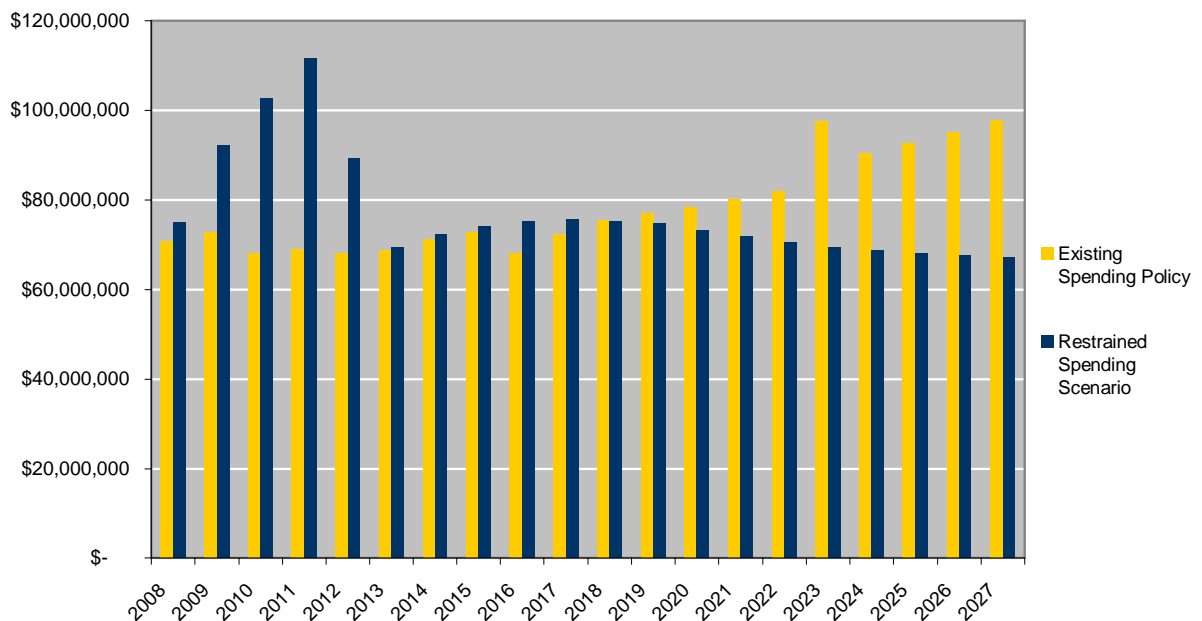
Table 22 Total Expenditure under the Restrained Spending Scenario

Treatment Option	Average Annual Expenditure
Backlog (over 20 years)	\$9.6M
Enhancements	\$0.0M
Rehabilitation/ Renewals	\$52.2M
Consequential Maintenance	\$15.4M

4.6.2 Existing Spending Policy v’s Restrained Spending Scenario

Figure 25 shows a comparison of Council’s proposed expenditure and the level of expenditure that we believe is required to support the Restrained Spending Scenario.

Figure 25 Existing Spending Policy v’s Restrained Spending Scenario



Observations

For purposes of illustration, a summary of the Existing Spending Policy and required average annual expenditure under the Restrained Spending Policy Scenario is provided in Table 23.

Table 23 Existing Spending Policy v’s Restrained Spending Scenario

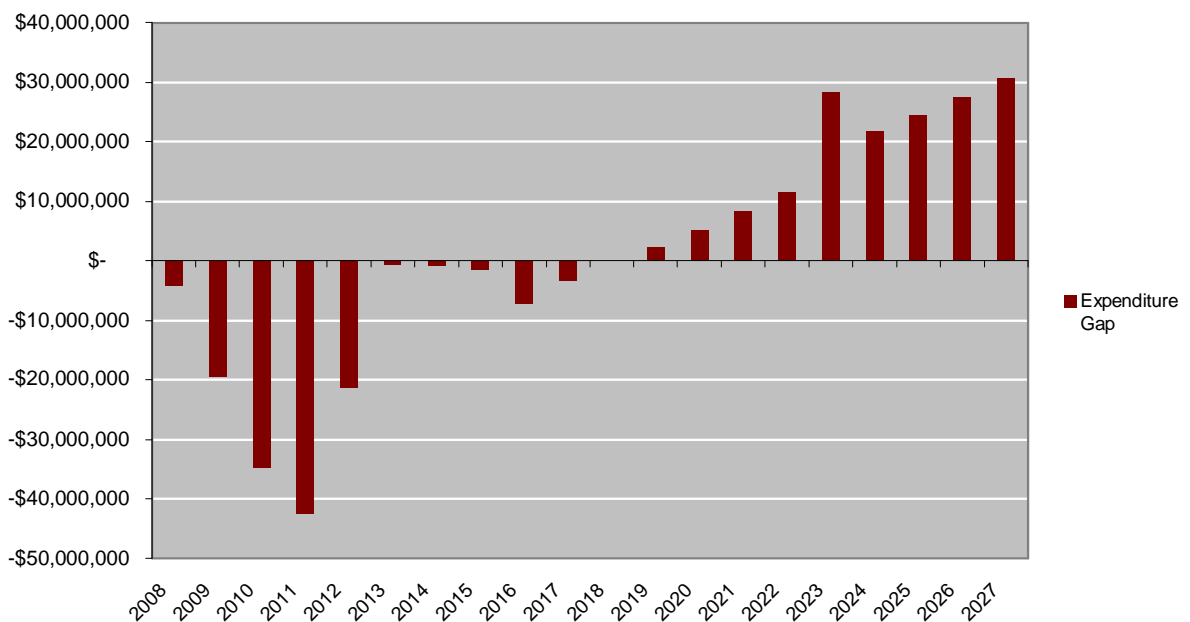
Treatment Option	Average Annual Expenditure
Existing Spending Policy	78.4M

Treatment Option	Average Annual Expenditure
Restrained Spending Scenario	\$77.2M

4.6.3 Total Expenditure Gap under the Restrained Spending Scenario

Figure 26 shows the gap between Council’s Existing Spending Policy and the level of expenditure that we believe is required to support the Restrained Spending Scenario.

Figure 26 Total Expenditure Gap - Existing Spending Policy v’s Restrained Spending Scenario



Observations

The average annual Expenditure Gap between Council’s Existing Spending Policy and our estimated required expenditure under the Restrained Spending Scenario is approximately **\$1.2M over-funded per year**.

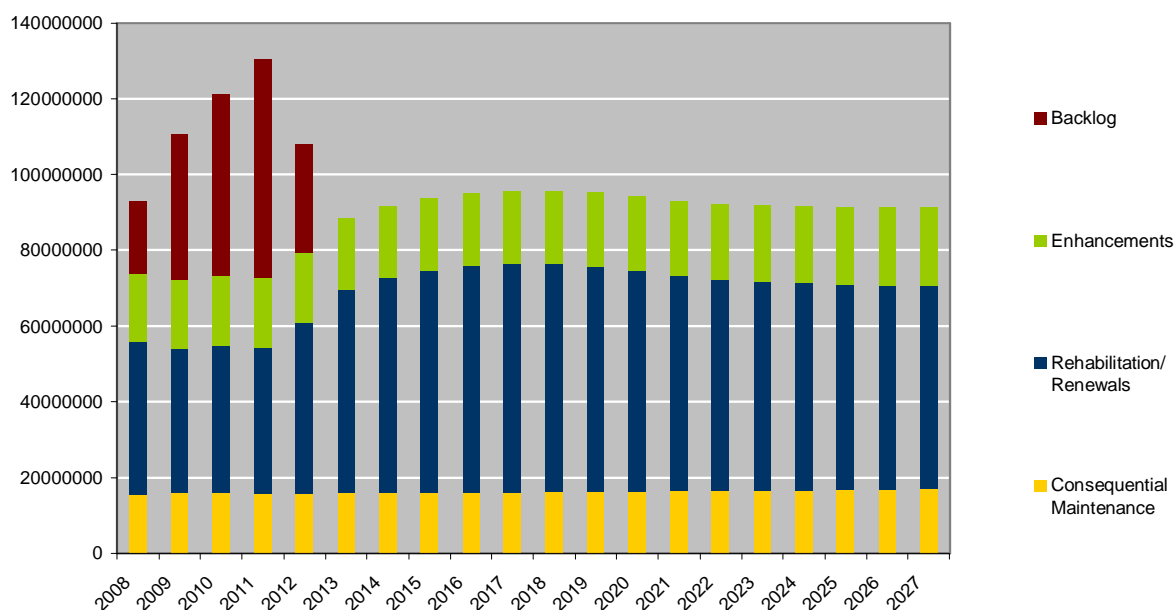
4.6.4 Total Expenditure required to support the Responsive Spending Scenario

Figure 27 shows the Total Expenditure required if Council were to adopt a Responsive Spending Scenario. The Responsive Spending Scenario includes:

- The required Rehabilitation and Renewal Expenditure (as calculated by GHD);
- Consequential Maintenance Expenditure (as calculated by GHD);
- Enhancements driven by projected municipal population growth of 0.73% per annum from 2007/2008 to 2026/2027 (Projections provided by Review Today based on NSW Department of Infrastructure, Planning and Natural Resources (DIPNR), New South Wales Statistical Local Government Area Population Projections 2001-2031, published 2004);
- Backlog will be cleared over a 5-year period.

Review Today advised GHD to assume that the long-term historical ratio between percentage population growth and percentage growth in quantum of assets was 1:1.

Figure 27 Total Expenditure under the Responsive Spending Scenario



Observations

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 24.

Table 24 Total Expenditure under the Responsive Spending Scenario

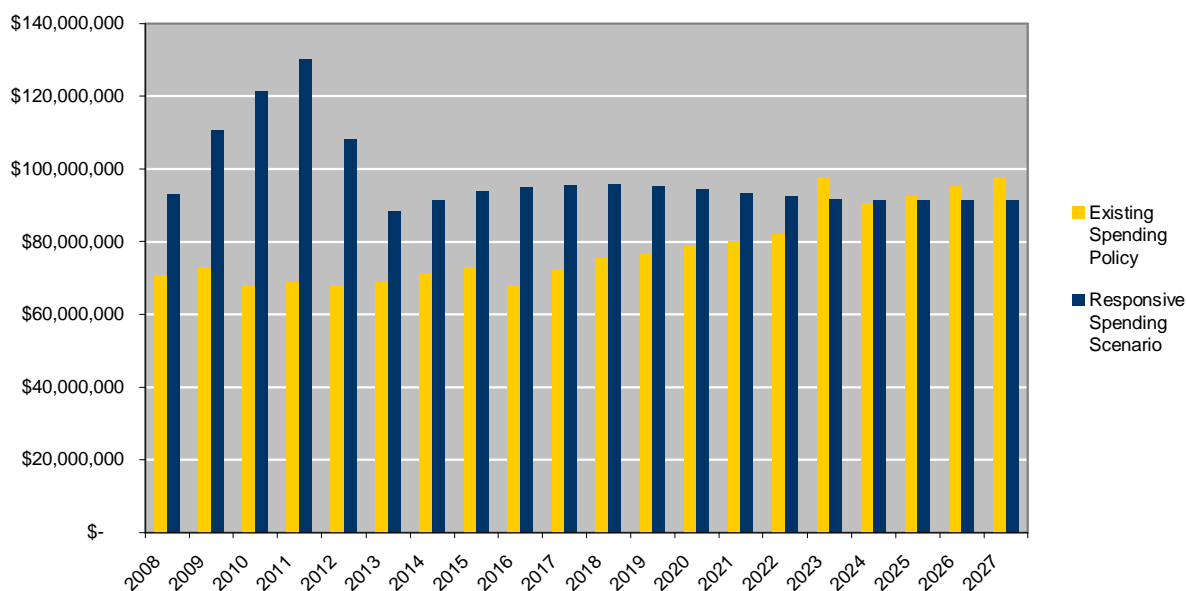
Treatment Option	Average Annual Expenditure
Backlog (over 20 years)	\$9.6M
Enhancements	\$19.3M

Treatment Option	Average Annual Expenditure
Rehabilitation/ Renewals	\$52.6M
Consequential Maintenance	\$16.2M

4.6.5 Existing Spending Policy v's Responsive Spending Scenario

Figure 28 shows a comparison of Council's Existing Spending Policy and the level of expenditure that we believe is required to support the Responsive Spending Scenario.

Figure 28 Existing Spending Policy v's Responsive Spending Scenario



Observations

For purposes of illustration, a summary of Council's Existing Spending Policy and the required average annual expenditure under the Responsive Spending Scenario is provided in Table 25.

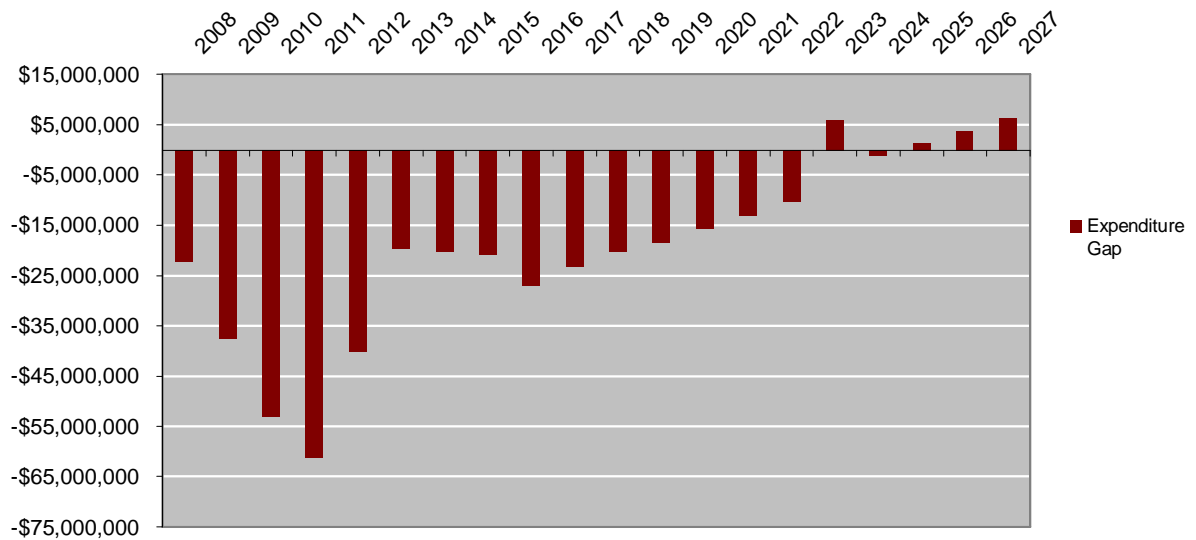
Table 25 Existing Spending Policy v's Responsive Spending Scenario

Treatment Option	Average Annual Expenditure
Existing Spending Policy	\$78.4M
Responsive Spending Scenario	\$97.7M

4.6.6 Total Expenditure Gap under the Responsive Spending Scenario

Figure 29 shows the gap between Council’s Existing Spending Policy and the level of expenditure that we believe is required to support the Responsive Spending Scenario.

Figure 29 Total Expenditure Gap –Existing Spending Policy V’s Responsive Spending Scenario



Observations

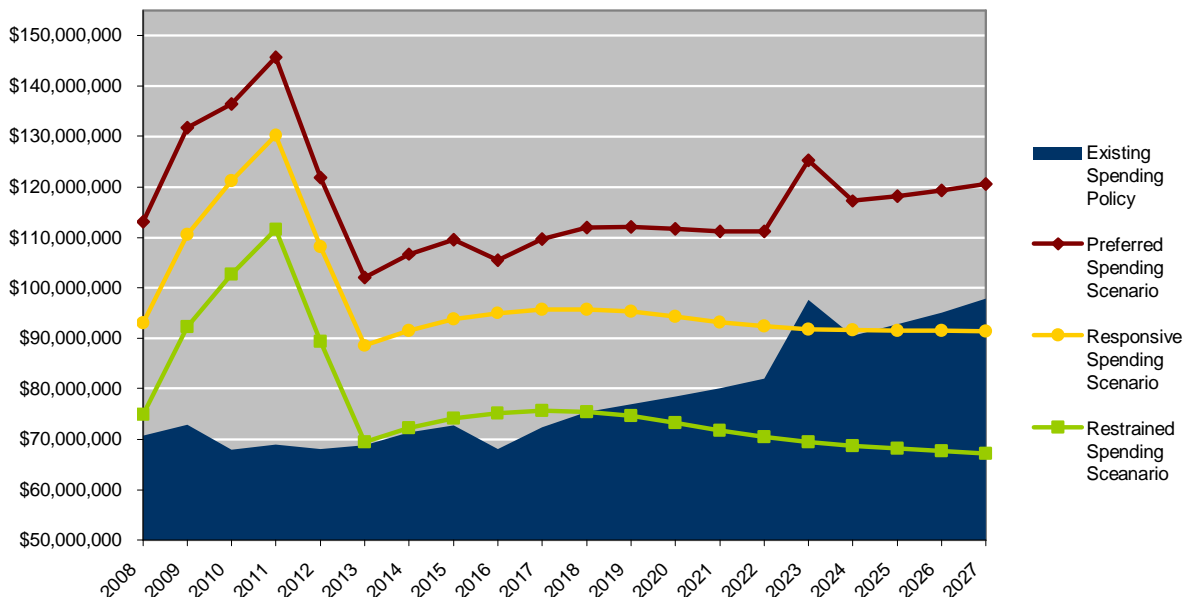
The average annual Expenditure Gap between Council’s Existing Spending Policy and our estimated required expenditure under the Responsive Spending Scenario is approximately **\$19.3M under funded per year (average)**.

4.6.7 Overall Scenario Analysis

Figure 30 shows an overall comparison between Council’s Existing Spending Policy and the expenditure we believe is required to:

- support the Preferred Spending Scenario;
- support the Restrained Spending Scenario;
- support the Responsive Spending Scenario.

Figure 30 Overall Scenario Comparison



Observations

Council propose to spend a total of approximately **\$78.4M** per year (average) under the Existing Spending Policy.

We estimate that Council will need to spend the following to support the 3 Spending Scenarios:

- **\$117.1M** per year (average) to support the Preferred Spending Scenario;
- **\$77.2M** per year (average) to support the Restrained Spending Scenario;
- **\$97.7M** per year (average) to support the Responsive Spending Scenario.

5. Conclusions

5.1 Question 2 - What is the present status of Council's Assets?

- 1) A significant number of Council's assets are currently at or above the specified condition intervention levels.
- 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;
- 3) We estimate that the investment required to recover the present Rehabilitation/ Renewals and Maintenance Backlog is in the order of **\$192M**.

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

- 1) Council propose to spend an average of **\$78.4M** per year on their assets over the next 20 years under the Existing Spending Policy.
- 2) Based on Council's Spending to date, Maintenance costs exceed Rehabilitation/ Renewal costs significantly, suggesting that under-investment in Rehabilitation/ Renewals is resulting in asset degradation and hence rising costs to maintain.

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

- 1) If Council were to continue with the proposed expenditure estimate that the future Rehabilitation/ Renewals and Maintenance Backlog in 20 years time will be in the order of **\$1.03 Billion**. This is an increase of **\$838M** on the present Backlog.

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

- 1) We estimate that they need to spend an average of **\$117.1M** per year on their assets to sustain the specified intervention levels and service performance.
- 2) As a result of adopting the required level of spending:
 - a) Council would be able to sustain the specified intervention levels;
 - b) Backlog would be reduced to zero within 5 years;
 - c) Council would be able to achieve its planned Enhancements.
- 3) By adopting the required expenditure Council would experience a positive effect on asset condition and hence the cost to maintain is reduced (even with a growing asset portfolio).

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

- Under the Existing Spending Policy we have concluded that Council proposes to under invest in its assets by an average of **\$38.7M** per year.



5.6 Question 7 - If we apply potential alternative Spending Scenarios, what will be the effect on the required level of expenditure?

Council propose to spend a total of approximately **\$78.4M** per year (average) under the Existing Spending Policy.

We estimate that Council will need to spend the following to support the 3 Spending Scenarios:

- **\$117.1M** per year (average) to support the Preferred Spending Scenario;
- **\$77.2M** per year (average) to support the Restrained Spending Scenario;
- **\$97.7M** per year (average) to support the Responsive Spending Scenario.



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