



SHIRE OF CHRISTMAS ISLAND

ROADS ASSET MANAGEMENT PLAN - 2013



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1.1 Context

Tropical rainforest dominates the limestone and basalt rock Christmas Island with an area of 135km². Situated 2,600 km north-west of Perth in the Indian Ocean the Shire of Christmas Island administers and maintains 32km of sealed roads and 110km of unsealed road servicing the local community, Christmas Island Nature Reserve, the immigration detention facility and phosphorous mining operations.

The Christmas Island Nature Reserve covers 63% of the island; management of roads within the Nature Reserve is undertaken by the Shire under a Service Delivery Agreement involving Main Roads WA and the Federal Government.

1.2 Scope

This Plan is generated in accordance with the Shire of Christmas Island Asset Management Policy and forms a component of an overall Asset Management Strategy which addresses the Shire's current asset management processes and documents the steps required to continuously improve the management of Shire controlled assets.

1.3 Strategic Road Management Issues

Providing access for the community, mining operations, Nature Reserve and the detention facility the network of unsealed roads are strategically important to the Shire.

The availability of high quality gravel reserves on the Island facilitates the maintenance of these unsealed roads. However, the lack of appropriate aggregate for road seals results in sealed roads with a low skid resistance. This combined with steep road gradients and high rainfall levels on the Island often result in hazardous driving conditions.

Currently there is a lack of footpath facilities between Silver City and Gaze Road and this has resulted in Murray Road being closed to pedestrians at night due to the safety concerns. The installation of new footpath access on this road section is planned and urgently required to adequately service the community.

Maintenance and renewal of the Island's road transport network is highly dependent on continued receipt of Federal grant funding. In the absence of these grant network would be at significant risk of sudden catastrophic failure due to limited alternative sources of funding.

1.4 Road Expenditure and Projections

The Shire has the following road assets recorded in its road inventory system.

Road Type	Dimensions
Sealed roads no kerbing	22.00 km
Sealed roads kerbing both sides	12.98 km
Sealed roads kerbing one side	6.81 km
Gravel sheeted roads	52.42 km
Footpaths	9.35 km
Bridge	1
Culverts	48
Signs	673

The road infrastructure assets were valued by management at \$71,831,225 in the Annual Financial Report at 30 June 2012, using a depreciated replacement cost method. This value includes roads within the Nature Reserve which are controlled by the Shire and fully funded by the Federal Government.

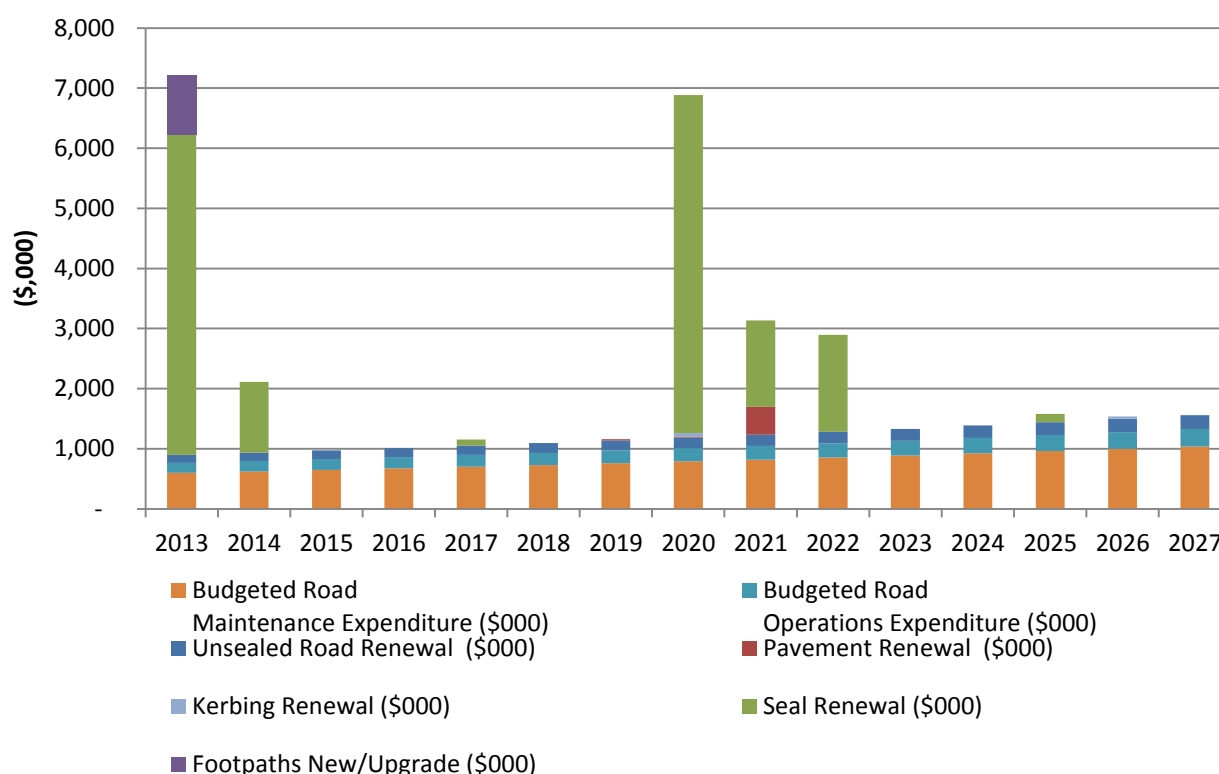
Parks Australia has installed crab fences and crab bridges at numerous locations within the road network to enable the islands unique crab population to safely cross the road. Under an agreement with the Shire the crab bridges and crab fences are managed and maintained by Parks Australia and have been excluded from this asset management plan.

Current data held for the sealed road network is based on a condition assessment undertaken in 2009 and is not considered current as road condition data has not been maintained in addition, no age data is recorded for unsealed roads. Improvements in road asset data is required as a prerequisite to better understand future asset renewal requirements.

1.4 Road Expenditure and Projections (Continued)

The projected cost required to provide the road infrastructure services covered by this Asset Management Plan (including operations, maintenance and renewal of existing assets) over a 15 year planning period is \$35,305,896. The renewal expense for road assets is projected to be \$19,944,180 over the same period. The composition of the projected road expenditure is shown in Chart 1.4 (a) below

Chart 1.4 (a) Forecast Road Assets Expenditure



The projected costs are initial estimates based on the available road inventory information and using the renewal methodologies currently employed by the Shire. It should be noted, actual costs may vary significantly from this projected expenditure in light of an updated road condition assessment as recommended.

The overall condition of the roads is considered appropriate for the current levels of service with only a reseal backlog evident. Future road condition assessments will not impact on the need to eventually renew the road network or the cost of doing so; however will provide a more accurate indication of the required timing of the renewal works.

A review of current road construction, maintenance and renewals practices is suggested to identify the most efficient means of undertaking road maintenance and renewals. Coordination of major resealing works to occur across large sections of the road network at one time has the potential to result in improved efficiencies due to the costs of moving specialised plant onto the island.

Historically, new asset expenditure and asset renewals expenditure have not been identified separately in the accounting system or capital works budgets. This has restricted the analysis of historical asset renewal expenditure. In the future these costs components will need to be separately identified.

1.5 Financial Capacity and Timing

External funding requests are currently prepared annually in conjunction with Main Roads WA who is responsible for the road network under a Service Delivery Agreement (SDA) with the Federal Government.

The Shire acknowledges and appreciates the funding received under the current arrangement and the assistance and cooperation of Main Roads WA and remains heavily reliant on this annual funding allocation.

Approval for the annual road funding application is usually received in November or December. In addition to the problems caused due to the non-alignment of the funding approval with the annual budget process, the lack of a long term funding commitment results in difficulties for the Shire when attempting to develop a long term road management expenditure plan. Long lead times to ship materials to the Island and heavy rains in the first three months of the year combine with the approval timing to limit the scale of the road works which are able to be undertaken. The Shire will continue to seek a commitment to future road funding to permit it to move toward improved long term financial planning and asset management.



Raised Wooden Footpath Ethel Beach

1.6 Managing The Risks

The major risks in relation to the provision of road infrastructure are identified as:

- Storm damage to assets;
- Asset Condition decreasing due to inadequate renewal program;
- A sudden and significant changes in population; and
- The loss of current levels of service and failure to meet community expectations.

The Shire will endeavour to manage these risks using its internal financial capacity and external contributions by:

- Undertaking drainage works to protect susceptible road infrastructure;
- Conduct routine asset maintenance and renewals in good condition to minimise the impact of periods when funding is not available; and
- Continuing to seek sufficient external funding for road maintenance and renewal.

1.7 The Next Steps

As a priority, the Shire should review its Asset Management practices in relation to the currency, quality and maintenance of its road asset data systems. This would involve undertaking an updated road condition assessment to provide the basis for improvements to future Asset Management plans and permit the development of a detailed planned works program in agreement with Main Roads WA. It is anticipated that this action is occurring during the development of this plan. Other recommended actions resulting from this asset management plan are detailed in Section 14.0.

Current climate forecasts predict an increase in the frequency and severity of storm activity on Christmas Island¹. In the absence of the financial and physical resources required to undertake extensive asset protection works, the Shire will be forced to consider which assets are critical to the community and prioritise protection works accordingly.



Footpath – Poon Saan

¹ Maunsell, *Climate Change Risk Assessment for the Australian Indian Ocean Territories*. 2009

2.1 Background

The purpose of this Plan is to document compliance with the relevant regulations, the planned management of the relevant assets and their associated services, and communicate the funding needed to provide the desired levels of service.

The Plan should be read in conjunction with the Shire of Christmas Island:

- *Asset Management Policy;*
- *Asset Management Strategy; and*
- *Strategic Community Plan 2012;*

The infrastructure assets covered by this Plan (shown below in Table 2.1 (a)), have been extracted from the Shire's road pavement management system (ROMAN) database.

Table 2.1 (a) Assets Covered By This Plan

Asset Type	Length	Area
Sealed roads no kerbing	22.00 km	169,766 m ²
Sealed roads kerbing both sides	12.98 km	106,147 m ²
Sealed roads kerbing one side	6.81 km	56,662 m ²
Gravel sheeted roads	52.42 km	434,519 m ²
Footpaths	9.35 km	
Bridge	1	
Culverts	48	
Signs	673	

Whilst all of the asset types set out above are addressed in the plan, where data is insufficient or not available renewal and maintenance of those assets has not been considered.

2.2 Linkage To Strategic Community Plan

This plan is prepared to progress the Shire's vision, mission, goals and objectives as set out in the adopted Strategic Plan titled "*Our Future, Christmas Island 2018 Plan*". The vision being:

"A place for everyone, without exception"².

A major review of the Strategic Plan is currently underway which includes engagement and consultation with the community. Reference to relevant strategic objectives and actions and how these are addressed in this asset management plan will be undertaken on completion of the reviewed plan.

² Shire of Christmas Island, 2011, *Our Future, Christmas Island: 2018 Plan*.

2.3 Goals And Objectives Of Asset Management

Provision of the road network and associated infrastructure is a high priority objective for the Shire. To achieve its strategic objectives the Shire aims to manage these assets over their lifecycle within an asset management framework that takes into consideration the community's service expectations.

The key elements of infrastructure asset management are to:

- providing a defined level of service and monitoring performance;
- managing the impact of growth or decline through demand management and infrastructure investment;
- taking a life cycle approach to developing cost-effective management strategies for the long term that meet defined level of service;
- identifying, assessing and appropriately controlling risks; and
- having a long term financial plan which identifies required expenditure and how it will be funded.³



Murray Road – Poon San

³ IPWEA, 2011, //IMM Sec 1.2.1, p 1.7.

3.1 Plan Framework

The Plan content is influenced by the Department of Local Government Asset Management Framework and Guidelines and the Asset Management for Small, Rural or Remote Communities Practice Note (AM4SRRC) framework released by the Institute of Public Works Engineering Australia.

Key elements of the planning framework are:

- Levels of service – specifies the services and levels of service to be provided by the Shire;
- Demand management– how this will impact on future service delivery and how is demand is to be met;
- Life cycle management – how the organisation will manage its existing and future assets to provide the required services;
- Operational planning;
- Financial summary – what funds are required to provide the required services;
- Asset management practices;
- Monitoring – how the plan will be monitored to ensure it is meeting the organisation’s objectives; and
- Asset management improvement planning.

3.2 Core And Advanced Asset Management

This Plan is prepared as an initial ‘core’ asset management plan in accordance with the International Infrastructure Management Manual 2011 and the Department of Local Government Asset Management Framework and Guidelines.

It is prepared to meet minimum legislative and organisational requirements for sustainable service delivery and long term financial planning and reporting. Core asset management relies on the use of an asset register, maintenance management systems, top-down condition assessment, simple risk assessment and basic defined level of service, in order to establish a long-term cashflow projection. Users of this plan should recognise the level of asset management maturity at which the Shire is currently situated and the progressive nature of its journey toward higher levels of asset management.

The Shire may decide, by future revisions of this plan and the allocation of appropriate resources, to move towards advanced asset management which employs predictive modelling, risk management and optimised decision-making techniques to establish asset lifecycle treatment options and related long term cash flow predictions.

3.3 Legislative Requirements

As part of the provision of road infrastructure assets the Shire must meet numerous legislative requirements included in State and Federal legislation. For reference the most relevant legislation is shown below in Table 3.3 (a).

Table 3.3 (a) Legislative Requirements

Legislation	Requirement
Local Government Act CI 1995 (as amended) and associated regulations.	Sets out the role, purpose, responsibilities and powers of local governments including the preparation of Strategic Community Plans and Corporate Business Plans informed by Long Term Financial Plans and Asset Management Plans.
Road Traffic Act 1974 (as amended) and associated regulations.	Sets out the law relating to road traffic;
Main Roads Act 1930 (as amended) and associated regulations.	Sets out the law relating to and making provision for the construction, maintenance, and supervision of highways, main and secondary roads, and other roads, the control of access to roads and for other relative purposes.
Occupational Safety and Health Act 1984	An Act to promote and improve standards for occupational safety and health, to establish the Commission for Occupational Safety and Health, to provide for a tribunal for the determination of certain matters and claims, to facilitate the coordination of the administration of the laws relating to occupational safety and health and for incidental and other purposes.

4.1 Desired Levels Of Service

A description of levels of service seeks to document the outputs or objectives the Shire intends to deliver to its community and customers. There are two measures of level of service as follows:

- **Community Levels of Service** – are the service outcomes the community seeks in terms of safety, quality, quantity, reliability, responsiveness, cost effectiveness and legislative compliance.

These are generally contained in public documents and should be aimed at communicating to a layperson.⁴ Community Levels of Service measures may be tangible or intangible.

- **Technical Levels of Service** – are operational or technical measures of performance. These support customer measures and tend to be used internally to measure performance against service levels.⁵

At present, indications of desired levels of service are obtained from various sources including the 2012 Community survey, residents' feedback to Councillors and staff, service requests and correspondence.



Road use restrictions – Murray Road

⁴ IPWEA, 2011. *IMM* Sec 2.2.1, p 2.18.

⁵ IPWEA, 2011. *IMM* Sec 2.2.1, p 2.18.

4.2 Community Feedback on Levels Of Service

The Shire of Christmas Island currently has no formal process to obtain community feedback in relation to levels of service. The required levels of service are obtained from feedback received from elected members and complaints lodged by the community.

A documented process to obtain community feedback in relation to the level of importance and level of satisfaction with Shire assets and services is required.

4.3 Current Community Levels Of Service

Current community service levels are detailed in Table 4.3 (a).

Table 4.3 (a) Current Community Service Levels -Sealed And Unsealed Roads

Key Performance Measure	Level Of Service Measure	Performance Measurement Process	Target Performance Measure	Current Performance Measure
Quality	Smoothness of ride	Number of complaints received by Shire relating to smoothness of ride	No increase in current number received per year.	To be confirmed
	Community Satisfaction with roads	Community Survey Results	Mean satisfaction rating maintained	Unknown. Where 1= Low Satisfaction 3= High Satisfaction
Function	User requirements for availability and travel time are met	Number of complaints received by Shire relating to availability and travel time	No increase in current number received per year.	To be confirmed
	Community Importance with roads	Community Survey Results	Current Mean Importance Rating is maintained	Unknown. Where 1= Low Satisfaction 3= High Satisfaction
Safety	Safe roads are provided throughout district	Number of loss of control vehicle accidents per year attributable to road condition or layout.	Nil	To be confirmed
	Safe footpaths are provided.	Number of trip accidents per year attributable to footpath condition or layout.	Nil	To be confirmed

4.4 Current Technical Levels Of Service

Current technical service levels are detailed below in Table 4.4 (a).

Table 4.4 (a) Current Technical Service Levels -Sealed And Unsealed Roads

Key Performance Measure	Level Of Service Measure	Performance Measurement Process	Target Performance Measure	Current Performance Measure
Condition	Assessed unsealed road condition	Condition Assessment	Current average unsealed road condition to be maintained	Good
	Assessed sealed road condition	Condition Assessment	Current average sealed road condition to be maintained	Good
	Assessed footpath condition	Condition Assessment	Current average footpath condition to be maintained	Good
Function	No. of road closures during year due to damage.	Authorised road closures	No increase in current number per year.	Nil
Safety	Safe roads are provided throughout district	No of accidents due to defective road condition or design .	Number per year does not increase	Nil
Sustainability ⁶	Asset consumption ratio (ACR)	Depreciated replacement cost divided by current replacement cost	Ratio can be identified and is 50% or greater	Average for 20 Years unknown %
	Asset sustainability ratio (ASR)	Capital expenditure on replacement or renewal of assets divided by the depreciation expense	Ratio can be calculated and ratio is 90% or greater.	Average for 20 Years unknown %
	Asset renewal funding ratio	Net Present Value of planned capital expenditure over 10 years divided by the net present value of the required expenditure renewal over the same period	Ratio can be identified and is between 75% and 95%.	100% (assuming adequate Federal funding will continue to be received)

⁶ DLG, Advisory Standard, 2012, p 7.

5.1 Demand Forecast

The factors affecting demand for road services include population change, changes in demographics, seasonal factors, vehicle ownership, consumer preferences and expectations, economic factors, agricultural practices and environmental awareness. Demand factor trends and impacts on service delivery are summarised in Table 5.1 (a).

Table 5.1 (a) Demand Factors, Projections And Impact On Services

Demand Factor	Consideration	Present Position	Projection	Impact On Services
Population	Impact of projected population numbers on services or assets provided by the Shire.	The estimated resident population of the Shire of Christmas Island is 2072 in 2011. 1465 Males and 607 Females. ⁷	No increase expected by 2020.	Services considered steady state.
Demographics	Impact of projected population numbers on services or assets provided by the Shire.	Work aged persons between 15 and 65 represented 83.5% of the estimated resident population in 2009. Persons over the age of 65 represented 3.8% of the population. ⁸	No significant changes in demographics are currently expected.	Services considered steady state.
Legislative	Forecast changes to local, state or federal government laws, regulations or standard impacting on the type of assets or need for assets.		None known	None known
Governance	Impact of any proposed changes to the organisation, policies or practice affecting the need for or use of assets? Government directives or policies that impact on assets.	Currently Implementing Integrated Planning and reporting Framework.	Implementation of planned Asset Management.	Potential for improved level of service.
Community Expectations	Projected impact on assets or services provided by the Shire due to changes in community expectations.	Community expectations regarding the level of service provided by the Shire have increased over recent years.	An increase in expectations is likely to continue.	The impact on services may be varied dependent on which services the expectations relate.
Technology	Are there any changes to technology that will impact on the type of assets or services provided by the Shire?	Present internet & mobile phone system is basic.	National Broadband Network connection in 2015 (via satellite) will have a major positive impact., particularly on education and eCommerce services	Major improvements expected in data processing and communications.
Industries	Are there any new industries that impact on the Shire?	None known. Increase in tourism possible, but no impact on Shire assets.	Possible decrease in mining activity due to expiry of licences and limited resources. Detention centre related activities may suddenly vary significantly. .	Possible changes in demand on waste and other municipal services. Possible decrease in demand for unsealed roads.
Tourism	Tourism trends projected to impact on assets or services provided by the Shire.	Tourism is actively promoted by the Shire.	Increase in the number of visitors and visitor vehicles to the Shire.	Increase in demand on waste services.

⁷ Australian Bureau of Statistics, Basic Community Profile Code 910052009, 2011.

⁸ Australian Bureau of Statistics, Basic Community Profile Code 910052009, 2011.

5.1 Demand Forecast (Continued)

Table 5.1 (b) Demand Factors, Projections and Impact On Services (Continued)

Demand Factor	Consideration	Present Position	Projection	Impact On Services
Global Warming	Will global warming and rising sea levels impact the Shire assets?	The Shire is within a Cyclone region 'B'. Most Shire assets located well above sea level.	Increase in the frequency and ferocity of storms. Potential undercutting of limestone shoreline by rising sea levels	Design specifications for buildings may increase. Risk of major loss of property increasing.
Road Assets	Projected significant changes to: <ul style="list-style-type: none"> Sealed town roads Sealed rural roads Unsealed road 	Heavy vehicle use of unsealed roads by mine vehicles.	Decrease use of unsealed roads by mine vehicles as phosphorous reserves are mined out.	Possible lower level of service for unsealed roads.
Footpaths	Developments or areas where potential requirement for new or improved footpaths exists.	Limited Footpaths available. No footpath along section of Murray Road.	Increase demand for footpaths from detention centre staff.	Increased level of service to meet demand.

5.2 Changes In Technology

Technology changes may affect the delivery of services in construction and maintenance materials and techniques. These changes, which have not been specifically identified, have the potential to improve the life of certain road assets as well as changing the nature and level of demand for certain road services. At present no changes in technology are evident or forecast.

5.3 Demand Management Plan

Demand for new services will be managed through a combination of managing and upgrading of existing assets and providing new assets to meet demand and demand management.

Opportunities identified to date for demand management are shown in Table 5.3 (a). Further opportunities will be developed in future revisions of this Plan.

Table 5.3 (a) Demand Management Plan Summary

Service Activity	Demand Management Plan
Footpaths	Improving Footpath access along Murray Road between Silver City and Gaze Road.

5.4 New Assets and Growth

New road assets required to meet future growth will need to be funded by the Federal Government. No new road assets are currently forecast as being required to meet future population growth. Plans exist for the construction of a footpath behind the Shire offices to provide pedestrian access from Silver City to Gaze Road to meet increased demand for pedestrian access.



Recently constructed footpath – Murray Road

Lifecycle management planning details how the Shire plans to manage and operate the assets at the agreed levels of service (defined in Section 4.0) while optimising life cycle costs.

6.1 Background Data

The Shire's sealed road assets are primarily located around the settlement with unsealed roads providing access within the Nature Reserve and mining areas. Crab crossing are constructed and maintained within the road network by Parks Australia. Significant funding is received from the Federal Government under a SDA with Main Roads WA for the maintenance and renewal of the road network.

6.2 Physical parameters

Sourced from a road inventory assessment undertaken by an independent consultant in 2010, Table 6.2 (a) summarises the road assets recorded in the ROMAN inventory system.

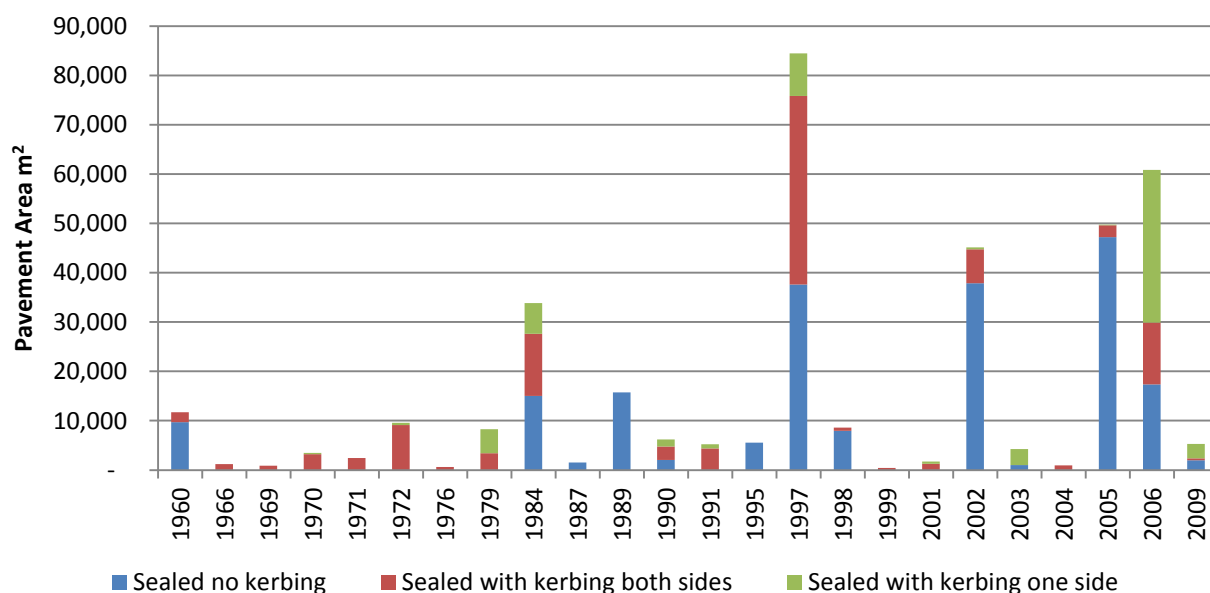
Table 6.2 (a) Road Assets

Road Type	Length	Area/Measure
Sealed roads no kerbing	22.00 km	169,766 m ²
Sealed roads kerbing both sides	12.98 km	106,147 m ²
Sealed roads kerbing one side	6.81 km	56,662 m ²
Gravel sheeted roads	52.42 km	434,519 m ²
Footpaths	9.35 km	
Bridge	1	
Culverts	48	
Signs	673	

The year of construction (or last renewal) of pavement recorded in ROMAN II are shown in the following Chart 6.2 (a).

6.2 Physical parameters (Continued)

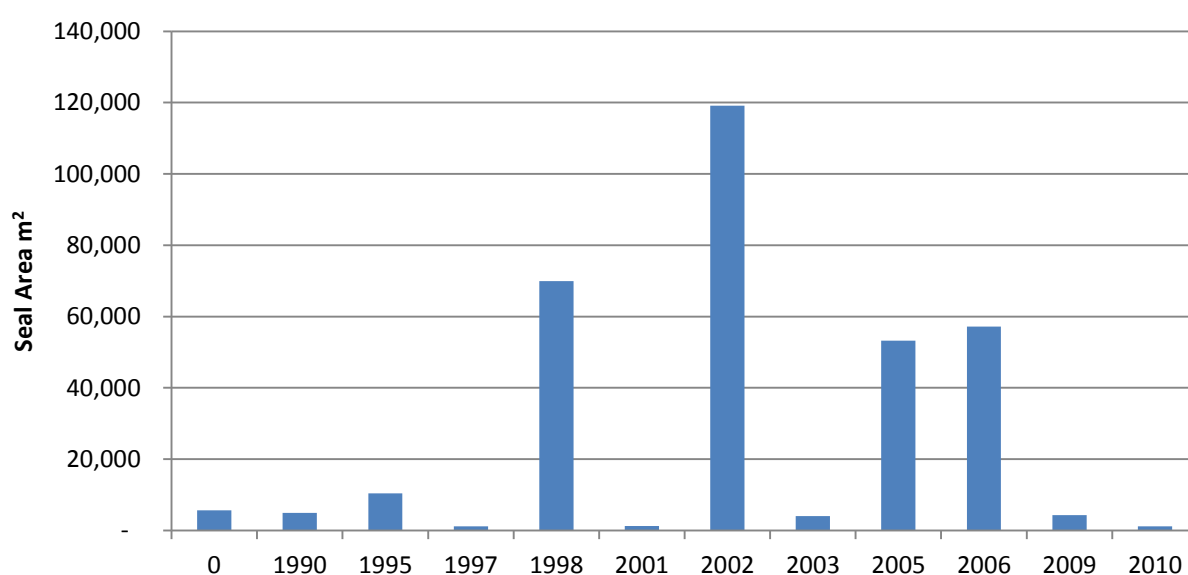
Chart 6.2 (a) Pavement Construction Dates – Sealed Roads



Construction of pavement layer for Lily Beach Road in 2002, Phosphate Hill Road 2005 and Murray Road in 2006 dominate the construction timeline along with a number of townsite roads constructed in 1997.

The areas of seal construction reflect the timing of pavement construction for sealed roads as shown below in Chart 6.2 (b).

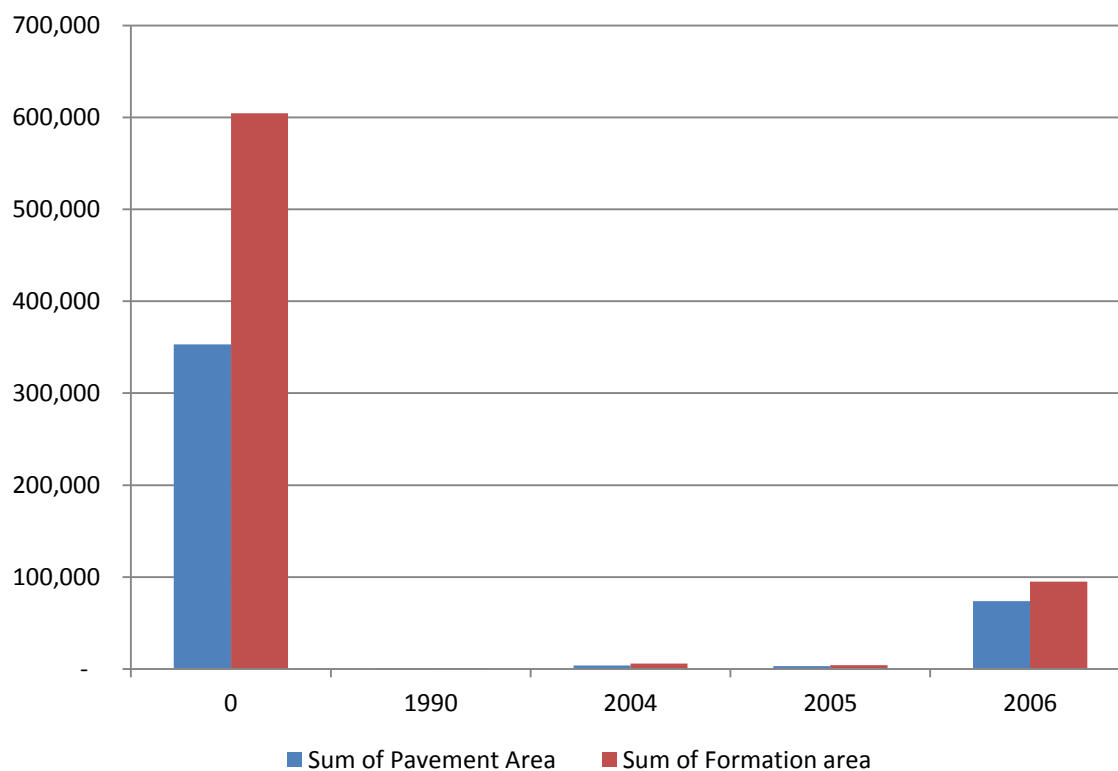
Chart 6.2 (b) Seal Construction – Sealed Roads



6.2 Physical parameters (Continued)

The area of pavement construction for unsealed roads is shown below in Chart 6.2 (b).

Chart 6.2 (c) Pavement Construction Dates Unsealed roads



Unsealed roads which do not have age data associated with them are reflected in the first column. The chart highlights the lack of information relating to ages of unsealed roads.

6.3 Asset capacity and performance

On advice from Shire staff no formal or specific design standards have been used for the construction or maintenance of roads on the Island. Known deficiencies in service performance are detailed in Table 6.3 (a)

Table 6.3 (a) Known Service Performance Deficiencies

Road Type	Service Deficiency
Sealed	Low skid resistance due to nature of locally available aggregate. Large number of sealed roads require reseal.
Pavement	Pavement in certain areas constructed from sub-standard materials may suddenly fail.



Seal slippage and patching at roundabout (Oct 2012)

6.4 Asset condition

A condition assessment was last undertaken in 2010 and forms the base data source for this Plan. The Shire considers this condition data to be out dated and a new condition assessment was being undertaken by external consultants at the same time as this plan was formulated. The results of this new condition assessment were not available for inclusion in this plan however should be included in later plans.

6.5 Asset valuations

The last valuation of the road network was undertaken in 2010 in conjunction, with a road condition assessment, by independent consultants. The current replacement cost of assets at the time of the valuation is shown below in Table 6.5 (a).

The valuation was undertaken by measuring the dimensions of the road segments and uploading these into road inventory software (ROMAN). Construction years and condition data were also entered along with replacement unit rates applied for each component to derive the asset values reflected in the table below.

Table 6.5 (a) Road Asset Values

Component	Current Replacement Cost	Accumulated Depreciation	Depreciated Replacement Cost
Formation	\$57,171,667	\$0	\$57,171,667
Pavement	\$2,785,450	\$1,224,908	\$1,560,542
Kerbing	\$20,879,807	\$11,213,682	\$9,666,125
Seal	\$5,945,436	\$4,162,493	\$1,782,943
Footpaths	\$424,825	\$24,128	\$400,697
Total	\$87,207,185	\$16,625,211	70,581,974

During 2012, the road inventory software was changed to an online road inventory system called ROMAN II. This road inventory system involved translation of road inventory data from ROMAN with certain checks and changes being effected to the data.

A full valuation has not been undertaken using the ROMAN II data and will only be available on conclusion of the condition assessment being undertaken at the same time as this plan was formed.

Subsequent to the valuation undertaken in 2010 resealing works have been undertaken, unit rates for road segments are also likely to have varied over this time. These two factors combined with different a valuation methodology in ROMAN II as compared to ROMAN may result in future valuations which are significantly different to this valuation. Users of the plan should consider these limitations and events.

7.1 Identified Risks

Risk management planning seeks to assess the risks associated with infrastructure assets to identify critical risks that may result in the loss or reduction in services or a result in 'financial shock' to the organisation when seeking to maintain current service level.

The risk assessment process identifies credible risks, a risk rating, the likelihood and consequences of any occurrence and then evaluates the risk and develops a risk treatment plan.

Identified risks have been rated within the Infrastructure Risk Management Plan using the following ratings:

- Extreme/Exceptional; (requiring immediate corrective action);
- High (requiring prioritised corrective action);
- Medium (requiring planned action); or
- Low (managed by routine procedures).

The consequences of the risk event and plan for treating the risk are reflected in Table 7.1 (a) below along with the rating for each identified risk.

Table 7.1 (a) Critical Risks and Treatment Plans

Risk	Consequence	Risk Rating	Risk Treatment Plan
Asset Condition decreases due to flood damage.	Desired level of service not maintained.	Medium	Ensure adequate drainage inroad design and maintenance to mitigate risk of flood damage.
Climate Change.	Likelihood of severe storm damage increases.	Medium	Consider climate change when managing assets.
Significant unforeseen increases in maintenance or renewal costs.	Desired level of service not maintained.	Medium	Monitor costs and adjust long term plans accordingly.
Asset condition decreases due to inadequate renewal program.	Desired level of service not maintained.	Medium	Determine maintenance priorities based on lifecycle cost.
Sudden significant changes in population.	Sudden increase in level of service requirements.	Medium	Monitor population trends and industry developments in the region.
Asset condition decreases due to inadequate maintenance program.	Desired level of service not maintained.	Low	Determine maintenance priorities based risk assessment and lifecycle cost.
Traffic incident attributable to sub-standard road conditions or road layout.	Liability Risk.	Low	Ensure road/footpath network is maintained in compliance with applicable standards.
Health and safety incident whilst working on assets causing fatality or serious injury.	Prosecution risk.	Low	Ensure Council has compliant H & S policy. Ensure staff and contractors are trained in policy and all procedures are complied with.

8.1 Maintenance Plan

Maintenance incorporates reactive and planned maintenance which are either routine or specific in nature.

Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Planned maintenance is repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Routine maintenance is defined as the regular on-going work that is necessary to keep assets operating, including instances where portions of the asset fail and require immediate repair to make the asset operational again.

Specific maintenance is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including verge mowing, brush cutting, clearing of drains, road sweeping, minor crack repairs etc. This work generally falls below the capital/maintenance threshold but may require a specific budget allocation.



Maintenance works North South Baseline Road – Oct 2012

8.1 Maintenance Plan (Continued)

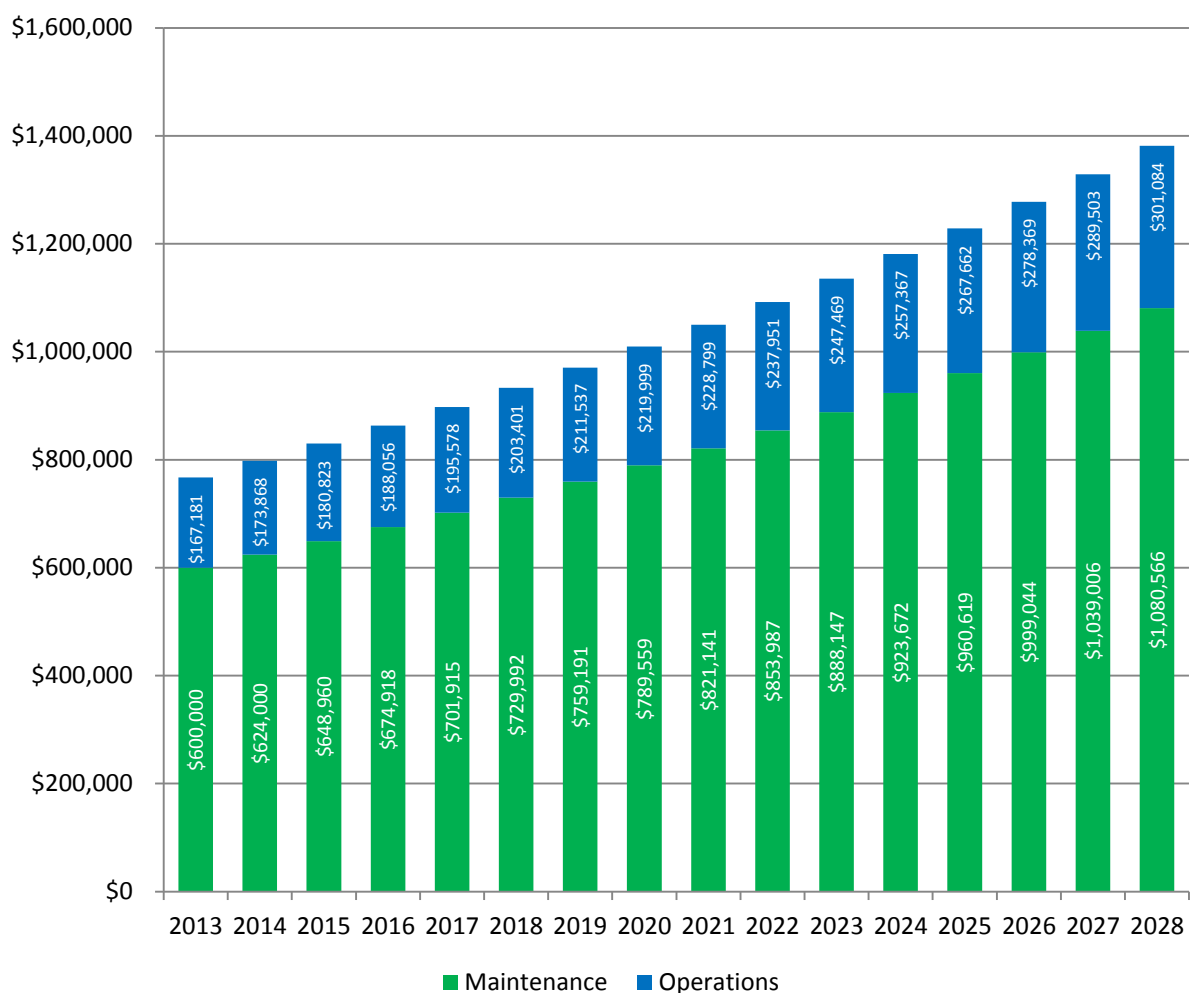
8.1.1 Maintenance Standards And Specifications

As advised by Shire staff, no documented standards are utilised when conducting maintenance.

8.1.2 Projected Operations And Maintenance Expenditures

Future road operations and maintenance expenditure is forecast to trend in line with historical levels, with Shire and Federal funding combining to achieve adequate maintenance work to support the current levels of service.

Chart 8.1 (a) Projected Road Operations and Maintenance Expenditure



Maintenance is funded from the Shire operating budget and external contributions by the Federal Government.

8.2 Asset Renewal/Replacement Plan

Renewal expenditure is defined as major work which does not increase the asset's design capacity or level of service but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure.

Based on age, road seals are the only road components scheduled for renewal within the period covered by this plan. Road seals are estimated to have a useful life of 8 years for bitumen seals and 40 years for concrete seals resulting in a forecast for the year the seals fall due for renewal. Road seals requiring renewal have been identified by adding the average standard useful life of 8 years to the year of construction/renewal to provide an indication of renewal timing and associated cost. In order to better estimate renewal dates for seals a physical inspection of the roads is required to estimate the remaining life.

Sealed Pavements are estimated to have a standard life of 60 years with unsealed pavements having an estimated life of 15 years. In the absence of current condition data for pavements the planned renewal date has been calculated by adding the standard life of the pavement to the year of construction.

Seal renewal dates are most accurately forecast using current condition information which is not presently available. A delay of reseal programs beyond the life of the seal has the potential for sudden catastrophic failure of the pavement layers with a potential significant loss of level of service.

A lack of information relating to footpaths has limited the ability to plan the renewal and replacement of footpaths; for this reason footpaths have been omitted from the renewal plans. The raised nature and high rate of degradation of wooden footpaths requires at least bi-annual maintenance inspections and maintenance work to ensure there are no safety hazards to users of the footpaths.



Commencement of Resealed section of Murray Road (Oct 2012)

8.2 Asset Renewal/Replacement Plan (Continued)

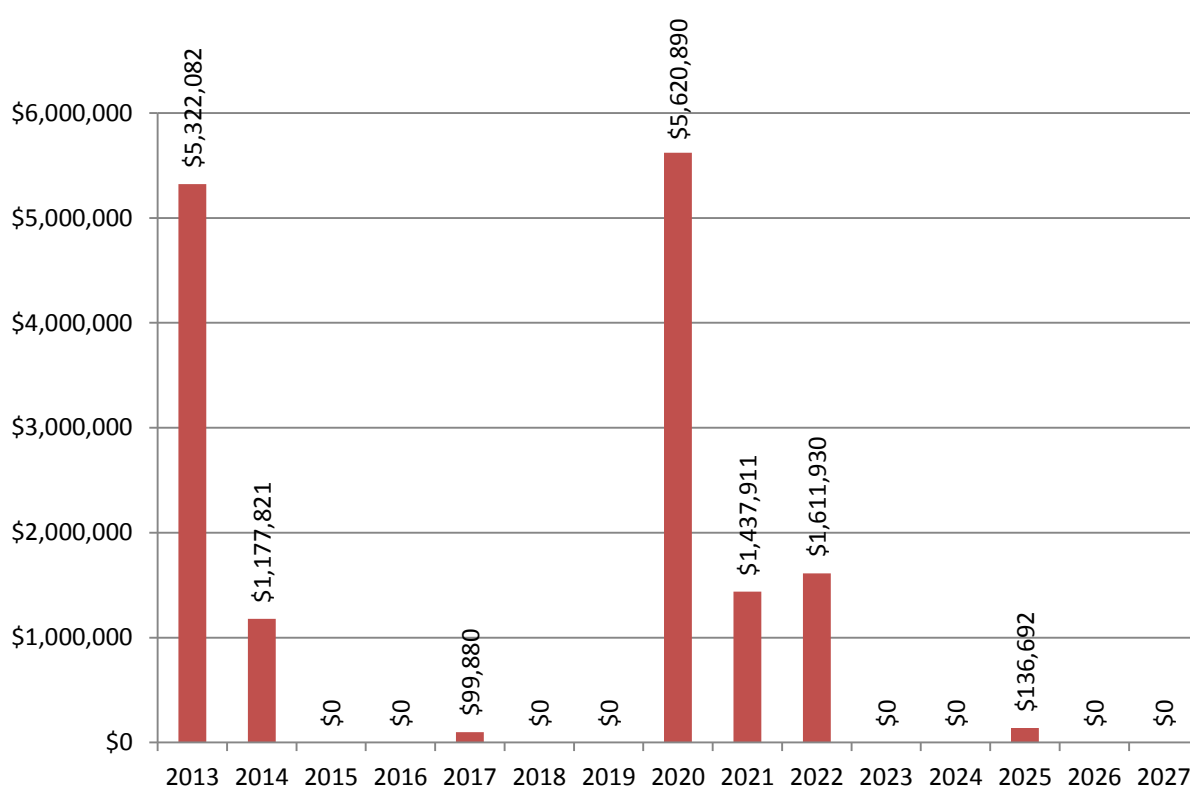
8.2.1 Renewal Standards And Specifications

Shire staff advise renewal works are not carried out in accordance with any documented standards or specifications.

8.2.2 Summary Of Projected Renewal Expenditure

Current estimated cost of resealing has been inflated by 4% per annum over the future years to derive the future cost of resealing.

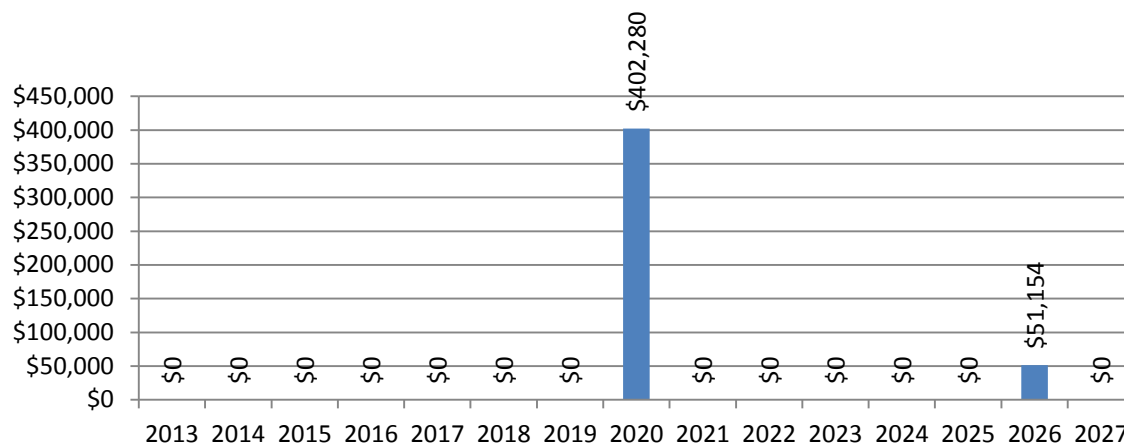
Chart 8.2 (a) Planned Seal Renewal Costs (\$)



The peaks in 2013 include seal renewals for 2012 which may have already been undertaken. The 2012 seals are scheduled for renewal in 2020 and form the peak in Chart 8.2 (a) are for the routine reseal of the same sections of road using the assumed service life of 8 years. The most significant section of road in need of re-sealing is Murray Road and Golf Course – Casino Road which each have an estimated reseal cost of approximately one million dollars. Refer to Appendix A for details of planned seal renewal costs in current dollar values.

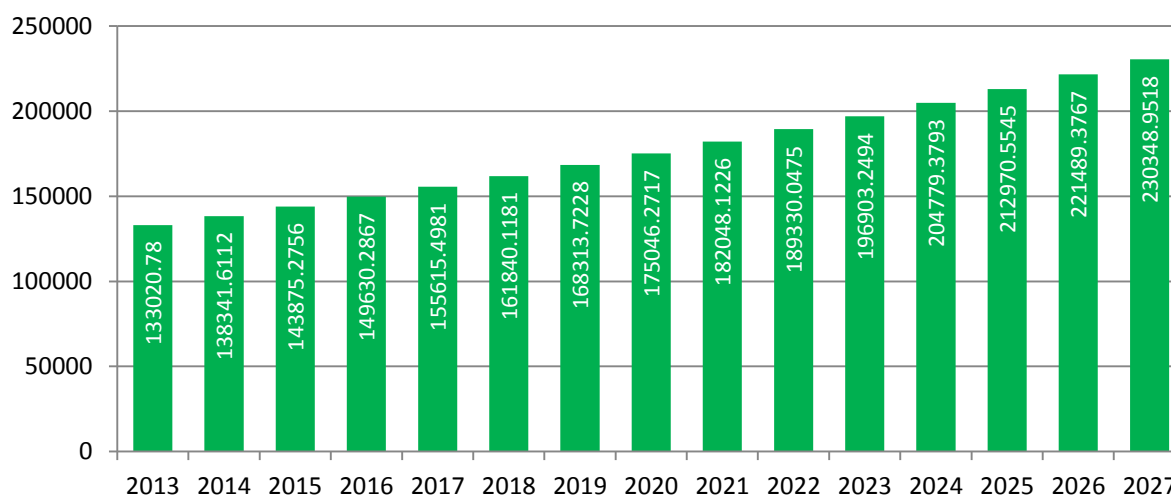
Current estimated cost of renewal of pavement layers for has been inflated by 4% per annum over the future years to derive the future cost of renewals.

Chart 8.2 (b) Planned Pavement Renewal Costs (\$) – Sealed Roads



The age based estimation of pavement renewal requires confirmation based on a physical condition inspection as the useful life of sealed pavement layers is highly dependent on construction methodologies and material quality as well as traffic levels, maintenance and adequacy of drainage over the life of the asset.

Chart 8.2 (c) Planned Pavement Renewal Costs (\$) – Unsealed Roads



The lack of age data for unsealed roads results in pavement renewals being planned based on an average annual renewal requirement. The total sheeted road network has been divided by the estimated useful life (15 Years) to arrive at the annual average renewal requirement. This value has been inflated annually by 4% to provide an initial estimated renewal cost for each year. On completion of an unsealed roads condition assessment timing of planned renewals should be scheduled based on expected remaining useful life.

8.3 Creation/Acquisition/Upgrade Plan

New works are defined as works which create a new asset (not previously existing), or works which upgrade or improve an existing asset beyond its previous service capacity. Assets acquired at no cost to the Council from land development or other government agencies are also considered new work.

The need for new assets and upgrade/expansion of existing assets is identified from various sources such as councillor or community requests, proposals identified in strategic plans or determined in consultation with other organisations.

8.3.1 New Assets Standards And Specifications

Standards and specifications for new assets and for upgrade/expansion of existing assets are determined on a project by project basis.

8.3.2 Summary Of Projected Upgrade/New Assets Expenditure

Projected upgrade/new asset expenditures are summarised below in Table 8.3 (a). All costs are shown in current 2012 dollar values.

Table 8.3 (a) Projected Capital Upgrade/New Asset Expenditure

New Asset	Year of Construction	Funding	Forecast Capital Cost
Dual Use Pathways	2013-14	Federal Government	\$1,000,000

The projected upgrade and construction of new road assets is entirely dependent on receipt of grant funding from external sources such as the Federal Government.

8.4 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. There are currently no road assets identified for disposal or decommissioning.

9.1 Funding Strategy

Roads located within Commonwealth land areas are only maintained and renewed when funded under the SDA with Main Roads WA. The funding strategy for these roads is expected to remain unchanged into the future.

Limited internal funding restricts the ability of the Shire to fund upgrading and renewing transport assets. Renewal and upgrading of transport assets located on land vested to the Shire of Christmas Island will continue to be primarily funded from external grants and contributions. Shire funds will continue to be utilised for maintenance and operations of transport assets on vested land.

9.2 Funding Gaps/Alternative delivery solutions

Whilst no funding gaps are currently forecast, high reliance on grant funding for purchase of new assets and renewal of major property plant assets requires consideration of alternative service delivery solutions and strategies to address funding gaps should these arise.

Whilst each funding gap will need to be considered on a case by case basis the lack of alternative internal funding sources currently available to the Shire will necessitate consideration of one or more of the following alternatives:

- Delayed acquisition of new assets;
- Decrease in level of service for existing assets not renewed; and
- Increased lifecycle cost of providing the existing level of service through continued maintenance of an asset beyond its best economic life.

Should a funding gap arise, in most cases the continued operation of assets beyond their best economic life will be selected, provided it is safe and affordable to do so.



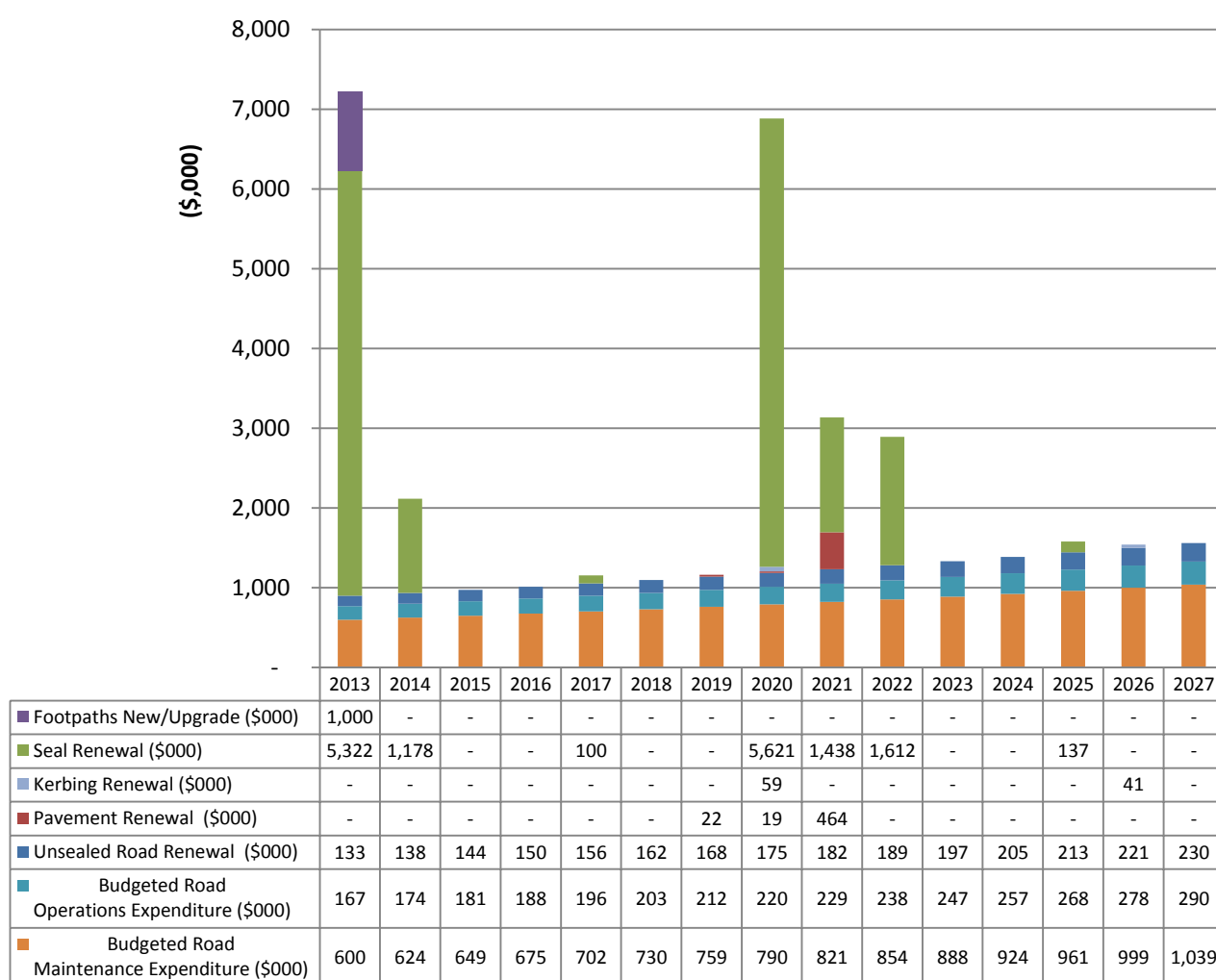
Start of steep descent Murray Road

10.1 Projected Expenditure

Projections have been developed using the available data sources as outlined in previously. The accuracy and reliability of the financial projections is likely to be improved as further information becomes available on the desired levels of service and current and projected future asset performance.

The financial projections shown below in Chart 10.1 (a) relate to projected operating (operations and maintenance) and capital expenditure (renewal and upgrade/expansion/new assets), net disposal expenditure excluding footpath renewals. The projections assume adequate funding and inflation at 4% per annum.

Chart 10.1 (a) Projected Operating and Capital Expenditure



10.1 Projected Expenditure (Continued)

Table 10.1 (b) shows the projected expenditures for each year using an forecast inflation index of 4%. Expenditure projections are based on the assumptions detailed at Section 12.0

Table 10.1 (b) Expenditure Projections for Long Term Financial Plan

Year	Maintenance \$	Operations \$	Renewal \$	Capital Upgrade/ New \$	Disposals \$
2013	\$600,000	\$167,181	\$5,455,102	\$1,000,000	0
2014	\$624,000	\$173,868	\$1,316,163	0	0
2015	\$648,960	\$180,823	\$143,875	0	0
2016	\$674,918	\$188,056	\$149,630	0	0
2017	\$701,915	\$195,578	\$255,495	0	0
2018	\$729,992	\$203,401	\$161,840	0	0
2019	\$759,191	\$211,537	\$189,928	0	0
2020	\$789,559	\$219,999	\$5,873,886	0	0
2021	\$821,141	\$228,799	\$2,084,319	0	0
2022	\$853,987	\$237,951	\$1,801,260	0	0
2023	\$888,147	\$247,469	\$196,903	0	0
2024	\$923,672	\$257,367	\$204,779	0	0
2025	\$960,619	\$267,662	\$349,663	0	0
2026	\$999,044	\$278,369	\$262,700	0	0
2027	\$1,039,006	\$289,503	\$230,349	0	0

Future road condition assessments will improve the accuracy of future financial forecasts as will recording expenditure information at a level sufficient to separately identify new and upgrade costs.

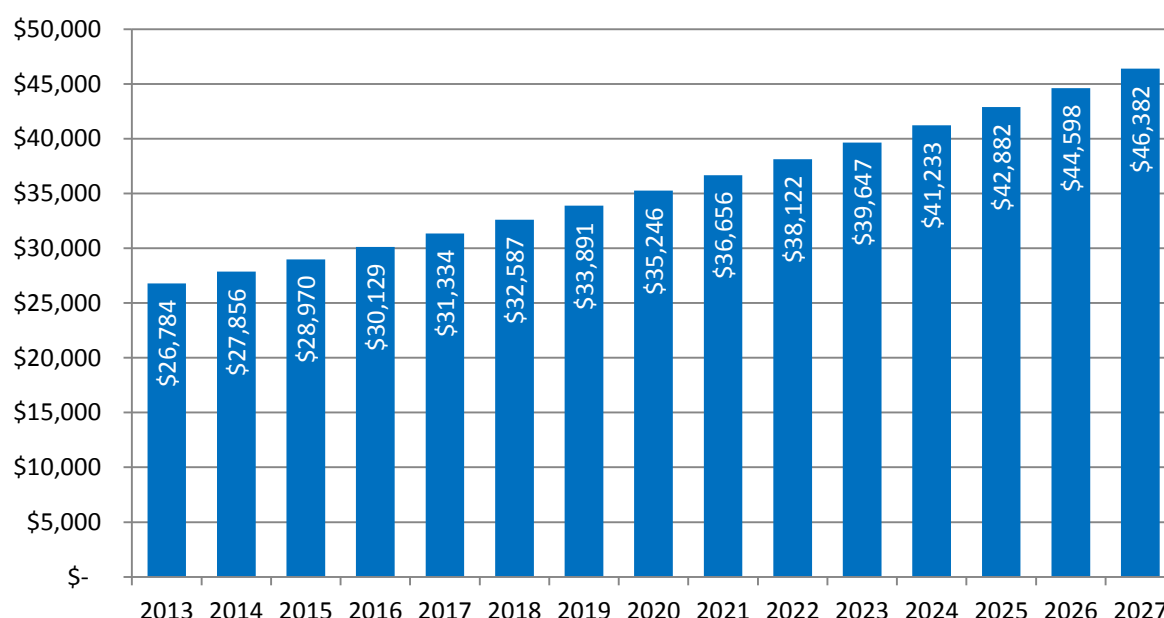
10.2 Valuation Forecasts

Current replacement cost of road assets are forecast to increase due to inflation through the routine revaluation of assets. Marginal increases may also occur through the addition of new assets and upgrades to existing assets from construction and acquisition by the Shire.

Footpaths have been excluded from the valuation forecasts due to a lack of reliable information.

Using the asset inventory data contained within the ROMAN inventory system and current estimated replacement costs of various road asset components, projected current replacement cost of road assets have been derived. Chart 10.2 (a) shows the projected current replacement cost asset values over the period. Road formation costs have not been included in the Current Replacement Cost estimates as they are currently unavailable.

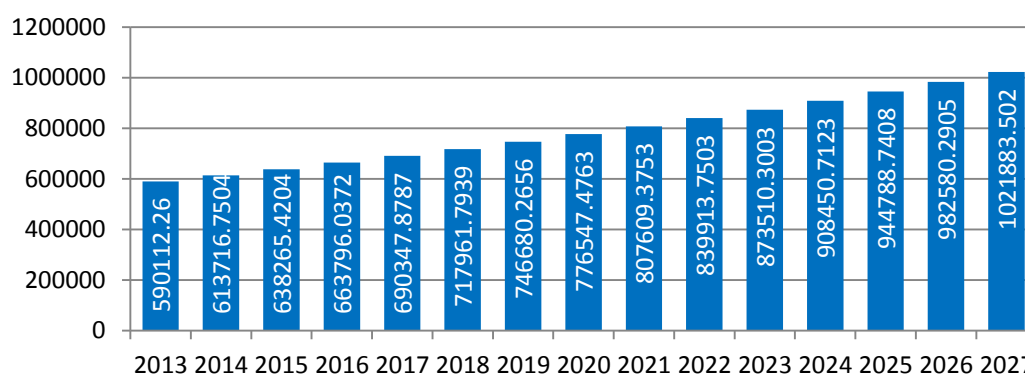
Chart 10.2 (a) Projected Current Replacement Cost of Road Assets \$(Thousands)



10.2 Valuation Forecasts (Continued)

Depreciation expense is forecast in line with asset values as shown in Chart 10.2 (b).

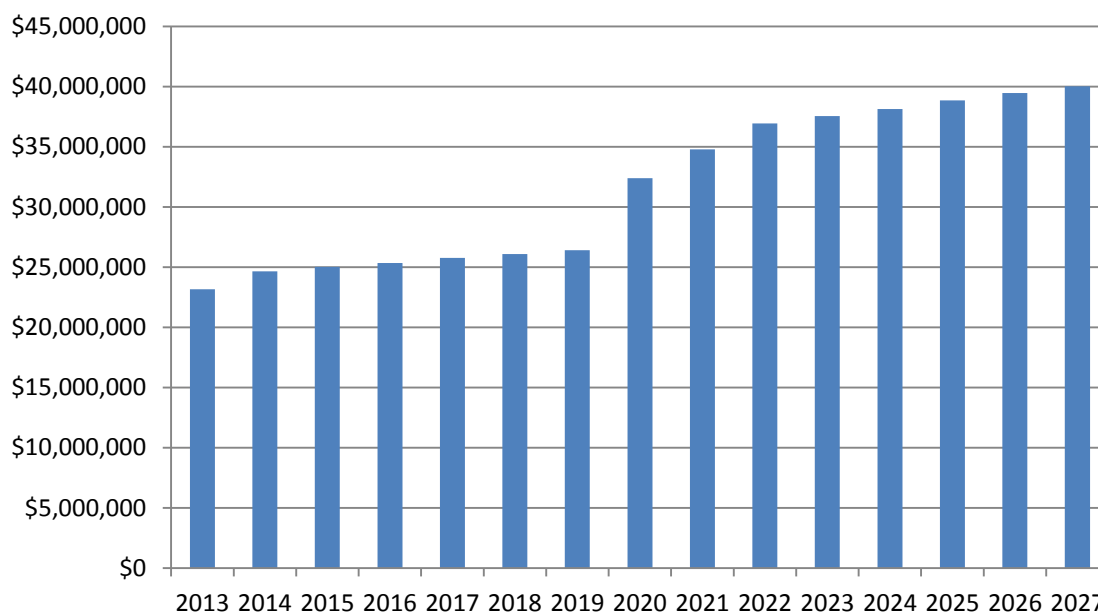
Chart 10.2 (b) Projected Depreciation Expense



In the absence of details of the composition of new/upgraded assets the depreciation estimates are based on the addition of no new assets.

The depreciated replacement cost (current replacement cost less accumulated depreciation) will vary over the forecast period depending on the rate of addition of new assets, disposal of old assets and the consumption and renewal of existing assets. A forecast of the depreciated replacement cost (DRC) excluding formations is shown in Chart 10.2 (c).

Chart 10.2 (c) Projected Depreciated Replacement Cost



The depreciated replacement costs are based on the assumption of no new assets with the increases in DRC occurring as a result of the renewal of depreciated assets and the effects of inflation over time.

11.1 Financial Sustainability In Service Delivery

The effectiveness of the asset management plan can be measured in the following ways:

- The degree to which the required cashflows identified in the Plan are incorporated into the organisation's long term financial plan and community/strategic planning processes; and
- The degree to which 1-5 year detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends outlined in the asset management plan.

The Department of Local Government's Asset Management Framework and Guidelines provides three key indicators (KPI) for asset management performance which have been used to assess the Shire's service delivery sustainability.

The lack of current condition information reduces the accuracy of the key indicators however; the output does serve to highlight issues raised previously such as the renewal backlog resulting from limited asset renewal over the past 10 years and the short asset life due to the lack of appropriate road building materials.

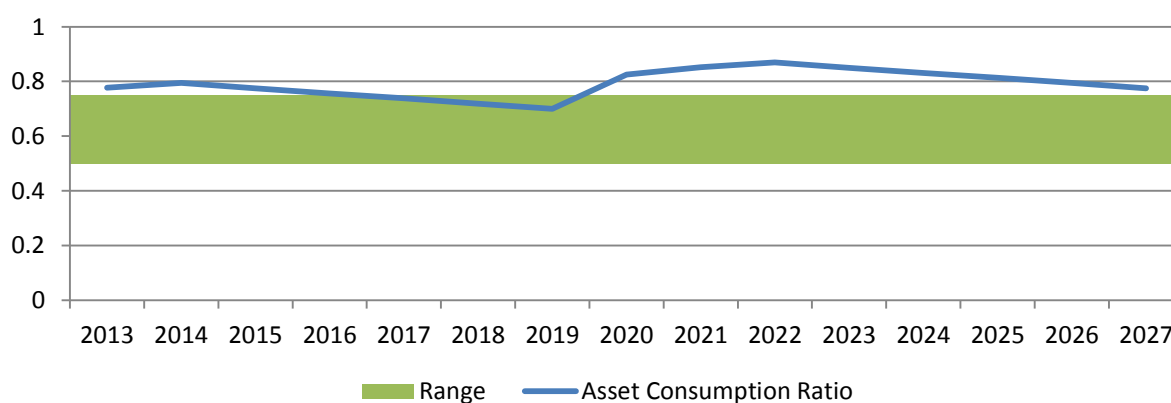
11.2 Asset Consumption Ratio

This KPI shows the proportion of 'as new' condition remaining for road. A ratio of less than 50% indicates a potential rapid deterioration of the local government's asset base requiring relevant investment in order to ensure service levels are maintained.

The Asset Consumption Ratio (ACR) is calculated by dividing the projected Depreciated Replacement Cost (DRC) of Assets by the Current Replacement Cost (CRC). The projection for Road assets of the Shire of Christmas Island is reflected in Chart 11.2 (a) below.

The projected renewal of road seals in line with their expected life and the relatively new state of sealed roads on the Island results in a ratio above the target range (reflected by the green band). Projected resealing of West Island roads in 2024 results in a peak in the ratio.

Chart 11.2 (a) Projected Asset Consumption Ratio



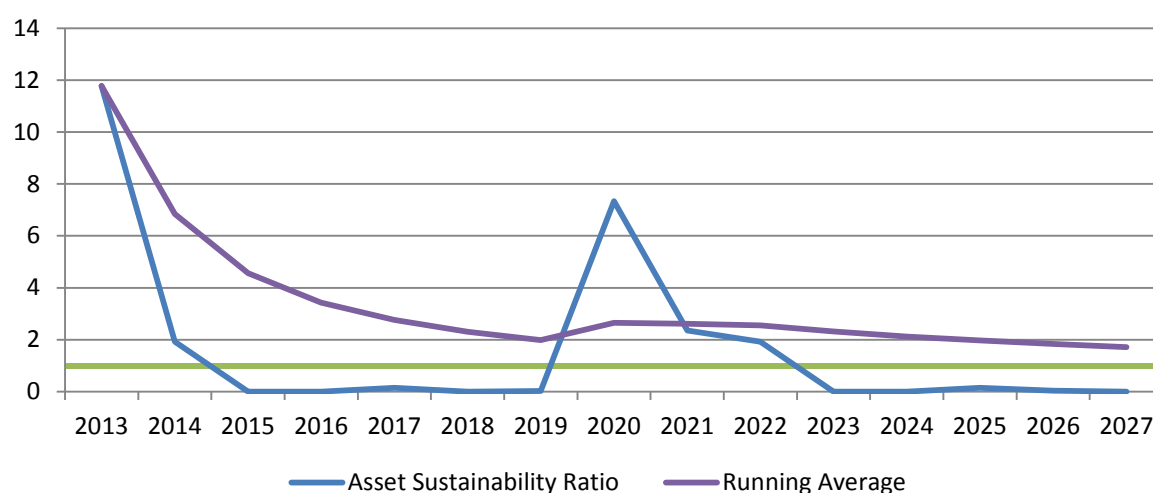
11.3 Asset Sustainability Ratio

The rationale for the Asset Sustainability Ratio (ASR) is to highlight if the renewal or replacement of road assets is occurring at variance to the level of depreciation. The ASR is calculated by dividing the budgeted renewal or replacement of assets by the annual depreciation of the assets for the same period.

Where the ratio is greater than 110% it indicates renewal expenditure is higher than the level of deterioration. The projected ASR for the Shire is shown in Chart 11.3 (a) below.

The peaks in the sustainability ratio are as a result of projected resealing requires the use of a running average to establish the ratios trend over the long term. Due to the lack of planned renewal of pavements or brick paving during the period of this plan the ratio drops below the target range reflected by the green band. Normally this situation would require the placement of funds in reserves to cover these renewals into the future, however the lack of available internal funding sources limits the ability of the Shire undertake this action within its current rating policy.

Chart 11.3 (a) Projected Asset Sustainability Ratio



11.4 Asset Renewal Funding Ratio

The Asset Renewal Funding Ratio indicates the long term funding availability for the renewal or replacement of road assets. Using a discount rate of 4% the ratio has been calculated by dividing the net present value of planned capital expenditure for the next 10 years by the net present value of the required capital expenditure over the same period.

A target range of 95% to 105% indicates the required asset renewals are fully funded. For the Shire of Christmas Island a ratio of 100% is assumed on the basis that any works will not be carried out without being fully funded from external sources such as the Federal Government.

12.1 Key Assumptions

Various key assumptions have been used to prepare expenditure forecasts and forecast asset replacement costs, the required operating and capital expenditure, depreciation expense and asset carrying amounts. These assumptions are presented below. It is important to understand the limiting impact they may have on the accuracy of the data presented in this Plan.

Key assumptions made in this Plan are:

- Projections are based on local operating knowledge and expected budgets;
- Estimated replacement costs are based on 2012 base prices provided by engineering department of Shire of Christmas Island
- Forecast renewal expenditure is based on estimated entry costs (costs of acquiring asset);
- Forecast renewal costs may differ from the fair value of the asset as defined in AASB 13;
- Average useful life estimates are based on current local knowledge, historical trends understanding of construction techniques utilised. These estimates may be significantly varied following access to new condition assessment data;
- Maintenance and operational forecasts are based on available current expenditure levels and percentage of replacement cost information;
- Roads will be sufficiently protected throughout routine resealing to prevent damage and loss of road formation. On this basis road formation has no planned maintenance expenditure; and
- The unit renewal costs and standard asset lives reflected in Table 12.1 (a) below have been utilised.

Table 12.1 (a) Estimated renewal costs, lives and residual values

Category	Sub-category	Renewal Cost	Standard Life	Residual Value
Formation	N/A			100%
Pavement	Unsealed	\$7/m ²	15	34%
Pavement	Sealed	\$45/m ²	60	41%
Surfacing	Single coat chip seal	\$19.80/m ²	8	Nil
Surfacing	Double coat chip seal	\$19.80/m ²	8	Nil
Surfacing	Cement Concrete	\$77.14/m ²	40	Nil
Surface water channel	Kerb	\$112.50/m	60	Nil
Footpath	Cement Concrete	\$70/m ²	35	30%

13.1 Asset Management Systems

Accounting/financial systems form the principal reporting system for past transactions undertaken by the entity. All asset maintenance and expenditure is recorded within the accounting/financial system for statutory reporting purposes.

The Shire utilises Synergysoft as the central accounting/financial reporting system. The software includes an asset register module which is used for maintenance of an asset inventory. The asset register contains expenditure information for each road. Detailed physical road inventory information is held within the on line road inventory software ROMAN II. Detailed road inventory information is maintained by Shire staff with external consultants annually updating the information and undertaking physical inspections on a three year cycle.

The software systems in use are viewed as appropriate to meet the current requirements of the Shire.

13.2 Accountabilities for Financial and Asset Systems

The Chief Executive Officer is responsible for the financial management of the Shire in terms of the Local Government Act 1995. Currently the Deputy Chief Executive Officer and Manager of Works and Services are responsible for asset management systems and the associated data.

13.3 Accounting Standards and Regulations

The Shire of Christmas Island prepares a general purpose Annual Financial Report in accordance with Australian Accounting Standards and the Local Government Act (CI) 1995. In the preparation of Annual Financial Statements a capitalisation threshold of \$1,000 is used with assets under this value being immediately expensed.

13.4 Linkage from Asset Management to other Strategic Plans

The asset management system is not directly linked to the financial system. The projected expenditures derived from the system are considered as input into the development of the Long Term Financial Plan. Available future funding levels derived from the Long Term Financial Plan are utilised within the asset management system to identify funding gaps requiring consideration in the Asset Management Plan.

Workforce implications of changes in service level are considered where necessary and captured within the workforce plan. At present no changes in workforce are expected as a result of this plan.

13.5 Information Flow Requirements and Processes

The key information flows into this asset management plan are:

- Council strategic and operational plans;
- Service requests from the community;
- Network assets information;
- The unit rates for categories of work/materials;
- Current levels of service, expenditures, service deficiencies and service risks;
- Projections of various factors affecting future demand for services and new assets acquired by Council;
- Future capital works programs; and
- Financial asset values.

The key information flows from this asset management plan are:

- The resulting initial long term expenditure projections, for consideration in the Long Term Financial Plan; and
- Initial financial sustainability indicators for road infrastructure.

These will impact the Long Term Financial Plan, annual budget and departmental business plans and budgets.

14.1 Roads Asset Management Improvement Plan

An essential element of Asset Management involves undertaking a process of continuous improvement. During the development of this plan a number of areas for improvement of current asset management practices were noted. These initial areas of improvement are detailed below in Table 14.1 (a).

Table 14.1 (a) Asset Management Improvement Plan

	Task	Responsibility
1	The draft Asset Management Policy be presented to the Council for adoption.	Council
2	The draft Asset Management Strategy be adopted by the Executive as the basis for implementation of the Asset Management Policy after consideration of the current and future resourcing constraints.	Executive
3	The draft Property Infrastructure Asset Management Plan be presented to the Council for adoption.	Council
4	Future Long Term Financial Plans be prepared following consideration of the output of the Asset Management Plans for each class of asset.	Executive
5	A level of service review be undertaken using a process of defining, quantifying and documenting current community levels of service and technical levels of service and associated costs.	Executive
6	The Shire form a cross functional asset management working group tasked primarily with the implementation of asset management within the organisation with the goal of significantly improving the governance and management arrangements in relation to asset management.	Executive
7	The Shire establish systems and procedures to update and maintain property asset information. Following the availability of base data, a data improvement program should be implemented to improve the quality of asset data and close identified data gaps.	Asset Management Working Group
8	A coordinated asset management process implementation across all Departments be developed and the topic of asset management be included in all new staff and elected members induction programs.	Executive
9	The Shire conduct an annual evaluation of its asset management program including planning, processes and sustainability and prepares the following performance measures, consumption ratio, asset renewal funding ratio and asset sustainability ratio to assist with this evaluation process.	Council
10	The Shire link the Annual Report with asset management by reporting on short and long-term service delivery levels in the Annual Report each year.	Council

14.1 Roads Asset Management Improvement Plan (Continued)

Further improvement to the asset data utilised in the formation of this plan is required to progress the quality of future revision of the plan. These data improvements are summarised below and detailed in the Plan and in Table 14.1 (b).

Table 14.1 (b) Data Improvement Plan

Road Infrastructure Data Improvement Tasks	
1	Inspection Dates and Condition Information <ul style="list-style-type: none"> a Conduct a condition assessment of transport assets including measurement of sub components to improve the accuracy of the projected timeline for subcomponent renewals to prevent sudden major failure of the property subcomponents. b Update the asset inventory records with current measurement, condition and inspection date.
2	Unit Rates <ul style="list-style-type: none"> a Document the assumptions underlying unit rates considering renewal of existing assets (Brownfields) rather than construction of assets in pristine situation (Greenfields). Document the construction standard such as type of materials and quality of finishing's to ensure the rates used are in accord with the level of service provided by the asset. b Establish a process to routinely review unit rates to reflect current replacement costs and current renewal costs.
3	Useful Lives of Assets <ul style="list-style-type: none"> a Clarify the definitions of useful lives to reflect Levels of Service: i.e. the length of time assets can be allowed to deteriorate until requiring renewal or replacement by new assets. b Review useful lives to reflect current practices and distinguishing between <ul style="list-style-type: none"> i renewal (replacement) frequency; and ii maintenance frequency (actions on the assets which allow them to reach their useful lives).
4	Expiry Dates <ul style="list-style-type: none"> a Calculate the expiry date of each asset sub component from the asset condition and inspection date. b Use a sample of assets in each asset class with a range of conditions and inspection dates to determine the remaining life useful of each asset. c Use the correlation between conditions and remaining lives in the sample to determine a relationship between condition and remaining useful life for all assets. d Apply the above relationship to the asset register and derive renewal dates (expiry dates) for all assets. e Use the total useful lives to calculate a deemed construction date for components where the construction date is unknown by subtracting the useful life from the expiry date.
	Level of Service <ul style="list-style-type: none"> a Quantify current community level of service expectations and current performance measures. b Quantify technical level of service specifications and current performance measures.

15.1 Monitoring

The Shire will routinely monitor progress in implementing the improvement plan. The implementation of Asset Management Plans will be monitored through the quarterly reporting of KPI's in conjunction with reporting the Shires' overall performance in achieving the objectives set out in its Corporate Business Plan.

How the Shire is meeting the objectives of the Strategic Community Plan will be undertaken by reporting performance to the community through the Annual Report.

15.2 Review

This Plan will be reviewed during annual budget preparation and amended to recognise any material changes in service levels and/or resources available to provide those services as a result of the budget.

The Plan will be subject to a major review as soon as up to date condition information is available or within 4 years whichever is the sooner.



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7.1 Appendix A – Estimated Sealed Road Current Renewal Costs

Road Name	Length m	Area m ²	Estimated Renewal Cost Pavement	Estimated Renewal Cost Seal	
ABBOTTS NEST	70	406	\$10,624	\$8,039	2012
ARENGA CLOSE	310	1,674	\$43,806	\$33,145	2012
BLOCK 413 LOOP RD	150	1,283	\$33,574	\$25,403	2012
CANBERRA PLACE	90	1,200	\$32,449	\$23,760	2012
CLUB RD	180	1,306	\$35,013	\$25,859	2012
COCONUT GROVE	240	1,072	\$35,955	\$21,226	2012
EAST WEST BASE LINE	1,060	9,251	\$267,049	\$183,170	2012
ETHEL BEACH RD	400	1,720	\$52,337	\$34,056	2017
EXILES PLACE	180	1,758	\$51,814	\$34,808	2013
GAZE (SERVICE) RD	350	2,358	\$71,440	\$46,688	2012
GAZE RD	1,860	15,842	\$414,561	\$313,672	2012
GOLDEN BOSUN	130	1,122	\$29,623	\$22,216	2013
GOLF COURSE CASINO RD	7,080	55,214	\$1,591,958	\$1,093,237	2013
GUANO CLOSE	70	399	\$10,441	\$7,900	2013
HIGHLAND COURT	60	312	\$8,165	\$6,178	2012
IRVINE HILL RD	1,080	10,337	\$290,915	\$204,673	2014
IRVINE HILL-AIRPORT RD	880	7,040	\$230,282	\$139,392	2013
JALAN GURU	140	994	\$26,011	\$19,681	2012
JALAN KETAM MERAH	460	4,014	\$107,343	\$79,477	2013
JALAN MASJID	130	972	\$25,436	\$19,246	2012
JALAN MASJID SPUR	60	972	\$25,436	\$19,246	2012
JALAN PANTAI	840	6,940	\$182,656	\$144,407	2045
JALAN PERAK	310	2,780	\$72,748	\$55,044	2012
KUNG WAI LANE	260	1,300	\$40,823	\$25,740	2012
LAM LOK LOH	880	7,472	\$200,450	\$147,946	2012
LILY BEACH RD	4,390	30,401	\$1,050,664	\$601,940	2013
LINKWATER RD	820	5,084	\$201,707	\$100,663	2012
LISTER PLACE	100	590	\$15,439	\$11,682	2012
LORONG KAMPONG MELAYU	100	1,040	\$27,215	\$20,592	2012
LORONG KAMPONG MELAYU SPUR	60	888	\$23,238	\$39,773	2050
LOWER POON SAAN DRIVE	510	4,641	\$121,448	\$91,892	2012
MINE OFFICE ACCESS RD	110	902	\$23,604	\$17,860	2012
MURRAY RD	6,250	53,601	\$1,486,290	\$1,061,300	2014
NORTH SOUTH BASELINE (S"TH PT)	460	4,100	\$114,880	\$81,180	2013
NOTH-WEST POINT RD	600	5,315	\$157,011	\$105,237	2012
NURSERY RD	310	1,184	\$33,757	\$23,443	2012

7.1 Appendix A – Estimated Sealed Road Current Renewal Costs

Road Name	Length m	Area m ²	Estimated Renewal Cost Pavement	Estimated Renewal Cost Seal	
PAI CHIN LU	230	2,070	\$54,169	\$40,986	2012
PAK KAM LOH	290	2,639	\$69,059	\$52,252	2012
PHOSPHATE HILL RD	3,540	30,589	\$926,520	\$605,662	2013
PLANT HILL ROAD	350	2,892	\$83,216	\$57,262	2017
POON SAAN RD	1,040	9,891	\$258,832	\$195,842	2012
QUARRY RD	340	2,728	\$72,958	\$54,014	2012
ROCKY POINT CRESCENT	410	2,144	\$72,748	\$42,451	2012
RYAN HILL RD	90	657	\$20,725	\$13,009	2012
SAN CHYE LOH	300	3,290	\$89,313	\$65,142	2013
SEAVIEW DRIVE	870	6,741	\$176,402	\$133,472	2013
SHORT ST	60	360	\$11,619	\$7,128	2012
SILVER CITY RD	400	3,692	\$96,614	\$73,102	2013
SIN SANG RD	240	1,776	\$47,731	\$35,165	2012
SMITH'S POINT ROAD	470	1,764	\$47,051	\$136,075	2050
SUNG MIAW LOH	130	1,182	\$30,931	\$23,404	2012
SUNSET PLACE	80	680	\$17,795	\$13,464	2012
TAMAN SWEETLAND CLOSE	100	720	\$18,841	\$14,256	2012
TAMAN SWEETLAND CRESCENT	560	4,130	\$108,076	\$81,774	2012
TAMPA VIEW	100	1,040	\$29,099	\$20,592	2012
TONG CHEE RD	120	696	\$18,213	\$13,781	2012
TONG YAN LOH	180	1,353	\$36,741	\$26,789	2012
TRIADIC CRESCENT	320	1,736	\$52,232	\$34,373	2012
TUTOR CLOSE	60	414	\$10,834	\$8,197	2012
VAGABOND RD	450	3,459	\$105,878	\$68,488	2013
VETERANS ROAD	80	448	\$14,654	\$8,870	2012
Grand Total	41,790	332,575	\$9,616,412	\$6,715,319	

APPENDICES

17.2 Appendix B – Unsealed Road Dimensions

Road Name	Length m	Area m ²
Formed	11,740	0
BLOW HOLES	970	0
BLOW HOLES-SOUTH POINT	6,000	0
GRETA BEACH RD	1,560	0
RESEARCH STATION RD	1,250	0
ROAD NO. 111	1,960	0
Sheeted	52,420	434,519
BLOW HOLES	3,700	20,180
DALES RD	2,210	9,620
EAST WEST BASE LINE	6,610	59,100
ETHEL BEACH RD	40	360
GRETA BEACH RD	1,840	10,560
IRVINE HILL RD	790	8,690
JEDDA CAVE RD	3,250	13,000
KILN PLACE	100	900
LILY BEACH RD	810	6,300
MURRAY RD	6,520	65,200
NORTH SOUTH BASELINE (S"TH PT)	13,140	132,795
NOTH-WEST POINT RD	5,900	55,130
QUARRY RD	2,110	15,215
RESEARCH STATION RD	630	2,520
RYAN HILL RD	2,460	19,254
SMITH"S POINT ROAD	620	3,100
SOUTH POINT TEMPLE RD	1,320	10,560
VETERANS ROAD	370	2,035
UnFormed	24,760	0
DALES RD	1,620	0
GRANTS WELL RD	4,520	0
GRETA BEACH RD	1,860	0
HAWKS ROAD	460	0
HUTAN RIMBA TRACK	6,800	0
KUNG WAI LANE	130	0
MARGARET KNOLL	810	0
NORTH SOUTH BASELINE (S"TH PT)	600	0
ROAD NO. 109	2,700	0
ROCKY POINT CRESCENT EAST	100	0
WINIFRED RD	5,160	0
Grand Total	88,920	434,519

17.3 [Appendix C - Abbreviations](#)

AAAC	Average annual asset consumption
AMP	Asset management plan
CRC	Current replacement cost
DA	Depreciable amount
LCC	Life Cycle cost
LCE	Life cycle expenditure
SDA	Service Delivery Agreement

17.4 Appendix D - Glossary

Annual service cost (ASC)

- 1) Reporting actual cost
The annual (accrual) cost of providing a service including operations, maintenance, depreciation, finance/opportunity and disposal costs less revenue.
- 2) For investment analysis and budgeting
An estimate of the cost that would be tendered, per annum, if tenders were called for the supply of a service to a performance specification for a fixed term. The Annual Service Cost includes operations, maintenance, depreciation, finance/ opportunity and disposal costs, less revenue.

Asset

A resource controlled by an entity as a result of past events and from which future economic benefits are expected to flow to the entity. Infrastructure assets are a sub-class of property, plant and equipment which are non-current assets with a life greater than 12 months and enable services to be provided.

Asset class

A group of assets having a similar nature or function in the operations of an entity, and which, for purposes of disclosure, is shown as a single item without supplementary disclosure.

Asset condition assessment

The process of continuous or periodic inspection, assessment, measurement and interpretation of the resultant data to indicate the condition of a specific asset so as to determine the need for some preventative or remedial action.

Asset management (AM)

The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.

Average annual asset consumption (AAAC)*

The amount of an organisation's asset base consumed during a reporting period (generally a year). This may be calculated by dividing the depreciable amount by the useful life (or total future economic benefits/service potential) and totalled for each and every asset OR by dividing the carrying amount (depreciated replacement cost) by the remaining useful life (or remaining future economic benefits/service potential) and totalled for each and every asset in an asset category or class.

Borrowings

A borrowing or loan is a contractual obligation of the borrowing entity to deliver cash or another financial asset to the lending entity over a specified period of time or at a specified point in time, to cover both the initial capital provided and the cost of the interest incurred for providing this capital. A borrowing or loan provides the means for the borrowing entity to finance outlays (typically physical assets) when it has insufficient funds of its own to do so, and for the lending entity to make a financial return, normally in the form of interest revenue, on the funding provided.

Appendix D - Glossary (Continued)

Capital expenditure

Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, expansion and upgrade. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

Capital expenditure - expansion

Expenditure that extends the capacity of an existing asset to provide benefits, at the same standard as is currently enjoyed by existing beneficiaries, to a new group of users. It is discretionary expenditure, which increases future operations and maintenance costs, because it increases the organisation's asset base, but may be associated with additional revenue from the new user group, eg. extending a drainage or road network, the provision of an oval or park in a new suburb for new residents.

Capital expenditure - new

Expenditure which creates a new asset providing a new service/output that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operations and maintenance expenditure.

Capital expenditure - renewal

Expenditure on an existing asset or on replacing an existing asset, which returns the service capability of the asset up to that which it had originally. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it generally has no impact on revenue, but may reduce future operations and maintenance expenditure if completed at the optimum time, eg. resurfacing or re sheeting a material part of a road network, replacing a material section of a drainage network with pipes of the same capacity, resurfacing an oval.

Capital expenditure - upgrade

Expenditure, which enhances an existing asset to provide a higher level of service or expenditure that, will increase the life of the asset beyond that which it had originally. Upgrade expenditure is discretionary and often does not result in additional revenue unless direct user charges apply. It will increase operations and maintenance expenditure in the future because of the increase in the organisation's asset base, eg. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility.

Appendix D - Glossary (Continued)

Capital funding

Funding to pay for capital expenditure.

Capital grants

Monies received generally tied to the specific projects for which they are granted, which are often upgrade and/or expansion or new investment proposals.

Capital investment expenditure

See capital expenditure definition

Capitalisation threshold

The value of expenditure on non-current assets above which the expenditure is recognised as capital expenditure and below which the expenditure is charged as an expense in the year of acquisition.

Carrying amount

The amount at which an asset is recognised after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.

Class of assets

See asset class definition

Component

Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.

Cost of an asset

The amount of cash or cash equivalents paid or the fair value of the consideration given to acquire an asset at the time of its acquisition or construction, including any costs necessary to place the asset into service. This includes one-off design and project management costs.

Current replacement cost (CRC)

The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost, to replace the existing asset with a technologically modern equivalent new asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs.

Depreciable amount

The cost of an asset, or other amount substituted for its cost, less its residual value.

Depreciated replacement cost (DRC)

The current replacement cost (CRC) of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset.

Depreciation / amortisation

The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.

Economic life

See useful life definition.

Expenditure

The spending of money on goods and services. Expenditure includes recurrent and capital.

Fair value

The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.⁹

⁹ AASB13, Fair Value Measurement, September 2011

Appendix D - Glossary (Continued)

Funding gap

A funding gap exists whenever an entity has insufficient capacity to fund asset renewal and other expenditure necessary to be able to appropriately maintain the range and level of services its existing asset stock was originally designed and intended to deliver. The service capability of the existing asset stock should be determined assuming no additional operating revenue, productivity improvements, or net financial liabilities above levels currently planned or projected. A current funding gap means service levels have already or are currently falling. A projected funding gap if not addressed will result in a future diminution of existing service levels.

Heritage asset

An asset with historic, artistic, scientific, technological, geographical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture and this purpose is central to the objectives of the entity holding it.

Impairment Loss

The amount by which the carrying amount of an asset exceeds its recoverable amount.

Infrastructure assets

Physical assets that contribute to meeting the needs of organisations or the need for access to major economic and social facilities and services, eg. roads, drainage, footpaths and cycleways. These are typically large, interconnected networks or portfolios of composite assets. The components of these assets may be separately maintained, renewed or replaced individually so that the required level and standard of service from the network of assets is continuously sustained. Generally the components and hence the assets have long lives. They are fixed in place and are often have no separate market value.

Investment property

Property held to earn rentals or for capital appreciation or both, rather than for:

- (a) use in the production or supply of goods or services or for administrative purposes; or
- (b) sale in the ordinary course of business.

Key performance indicator

A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.

Appendix D - Glossary (Continued)

Level of service

The defined service quality for a particular service/activity against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental impact, acceptability and cost.

Life Cycle Cost

- **Total LCC** The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.
- **Average LCC** The life cycle cost (LCC) is average cost to provide the service over the longest asset life cycle. It comprises annual operations, maintenance and asset consumption expense, represented by depreciation expense. The Life Cycle Cost does not indicate the funds required to provide the service in a particular year.

Life Cycle Expenditure

The Life Cycle Expenditure (LCE) is the actual or planned annual operations, maintenance and capital renewal expenditure incurred in providing the service in a particular year. Life Cycle Expenditure may be compared to average Life Cycle Cost to give an initial indicator of life cycle sustainability.

Loans / borrowings

See borrowings.

Maintenance

All actions necessary for retaining an asset as near as practicable to its original condition, including regular on going day-to-day work necessary to keep assets operating, eg road patching but excluding rehabilitation or renewal. It is operating expenditure required to ensure that the asset reaches its expected useful life.

- **Planned maintenance**

Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown criteria/experience, prioritising scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

- **Reactive maintenance**

Unplanned repair work that is carried out in response to service requests and management/supervisory directions.

- **Significant maintenance**

Maintenance work to repair components or replace sub-components that needs to be identified as a specific maintenance item in the maintenance budget.

- **Unplanned maintenance**

Corrective work required in the short-term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.

Appendix D - Glossary (Continued)

Maintenance and renewal gap

Difference between estimated budgets and projected required expenditures for maintenance and renewal of assets to achieve/maintain specified service levels, totalled over a defined time (e.g. 5, 10 and 15 years)

Maintenance and renewal sustainability index

Ratio of estimated budget to projected expenditure for maintenance and renewal of assets over a defined time (eg 5, 10 and 15 years).

Maintenance expenditure

Recurrent expenditure, which is periodically or regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service. It is expenditure, which was anticipated in determining the asset's useful life.

Materiality

The notion of materiality guides the margin of error acceptable, the degree of precision required and the extent of the disclosure required when preparing general purpose financial reports. Information is material if its omission, misstatement or non-disclosure has the potential, individually or collectively, to influence the economic decisions of users taken on the basis of the financial report or affect the discharge of accountability by the management or governing body of the entity.

Modern equivalent asset

Assets that replicate what is in existence with the most cost-effective asset performing the same level of service. It is the most cost efficient, currently available asset which will provide the same stream of services as the existing asset is capable of producing. It allows for technology changes and, improvements and efficiencies in production and installation techniques

Net present value (NPV)

The value to the organisation of the cash flows associated with an asset, liability, activity or event calculated using a discount rate to reflect the time value of money. It is the net amount of discounted total cash inflows after deducting the value of the discounted total cash outflows arising from eg the continued use and subsequent disposal of the asset after deducting the value of the discounted total cash outflows.

Non-revenue generating investments

Investments for the provision of goods and services to sustain or improve services to the community that are not expected to generate any savings or revenue to the Council, eg. parks and playgrounds, footpaths, roads and bridges, libraries, etc.

Appendix D - Glossary (Continued)

Operations expenditure

Recurrent expenditure, which is continuously required to provide a service. In common use the term typically includes, eg power, fuel, staff, plant equipment, on-costs and overheads but excludes maintenance and depreciation. Maintenance and depreciation is on the other hand included in operating expenses.

Operating expense

The gross outflow of economic benefits, being cash and non cash items, during the period arising in the course of ordinary activities of an entity when those outflows result in decreases in equity, other than decreases relating to distributions to equity participants.

Pavement management system

A systematic process for measuring and predicting the condition of road pavements and wearing surfaces over time and recommending corrective actions.

PMS Score

A measure of condition of a road segment determined from a Pavement Management System.

Rate of annual asset consumption

A measure of average annual consumption of assets (AAAC) expressed as a percentage of the depreciable amount (AAAC/DA). Depreciation may be used for AAAC.

Rate of annual asset renewal

A measure of the rate at which assets are being renewed per annum expressed as a percentage of depreciable amount (capital renewal expenditure/DA).

Rate of annual asset upgrade

A measure of the rate at which assets are being upgraded and expanded per annum expressed as a percentage of depreciable amount (capital upgrade/expansion expenditure/DA).

Recoverable amount

The higher of an asset's fair value, less costs to sell and its value in use.

Recurrent expenditure

Relatively small (immaterial) expenditure or that which has benefits expected to last less than 12 months. Recurrent expenditure includes operations and maintenance expenditure.

Recurrent funding

Funding to pay for recurrent expenditure.

Rehabilitation

See capital renewal expenditure definition above.

Remaining useful life

The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining useful life is useful life.

Renewal

See capital renewal expenditure definition above.

Residual value

The estimated amount that an entity would currently obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset were already of the age and in the condition expected at the end of its useful life.

Appendix D - Glossary (Continued)

Revenue generating investments

Investments for the provision of goods and services to sustain or improve services to the community that are expected to generate some savings or revenue to offset operating costs, eg public halls and theatres, childcare centres, sporting and recreation facilities, tourist information centres, etc.

Risk management

The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.

Section or segment

A self-contained part or piece of an infrastructure asset.

Service potential

The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset. A measure of service potential is used in the not-for-profit sector/public sector to value assets, particularly those not producing a cash flow.

Service potential remaining

A measure of the future economic benefits remaining in assets. It may be expressed in dollar values (Fair Value) or as a percentage of total anticipated future economic benefits. It is also a measure of the percentage of the asset's potential to provide services that is still available for use in providing services (Depreciated Replacement Cost/Depreciable Amount).

Strategic Longer-Term Plan

A plan covering the term of office of councillors (4 years minimum) reflecting the needs of the community for the foreseeable future. It brings together the detailed requirements in the council's longer-term plans such as the asset management plan and the long-term financial plan. The plan is prepared in consultation with the community and details where the council is at that point in time, where it wants to go, how it is going to get there, mechanisms for monitoring the achievement of the outcomes and how the plan will be resourced.

Specific Maintenance

Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, cycle, replacement of air conditioning equipment, etc. This work generally falls below the capital/maintenance threshold and needs to be identified in a specific maintenance budget allocation.

Sub-component

Smaller individual parts that make up a component part.

Appendix D - Glossary (Continued)

Useful life

Either:

- (a) the period over which an asset is expected to be available for use by an entity, or
- (b) the number of production or similar units expected to be obtained from the asset by the entity.

It is estimated or expected time between placing the asset into service and removing it from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the council.

Value in Use

The present value of future cash flows expected to be derived from an asset or cash generating unit. It is deemed to be depreciated replacement cost (DRC) for those assets whose future economic benefits are not primarily dependent on the asset's ability to generate net cash inflows, where the entity would, if deprived of the asset, replace its remaining future economic benefits.

Source: IPWEA, 2009, Glossary