The Rural City of MURRAY BRIDGE

Bridge to Opportunity

Stormwater Asset Management Plan

2021 - 2026

Author: Matt James & Judy Howland

Date: 12 July 2021

This page intentionally blank

The Rural City of MURRAY BRIDGE

Bridge to Opportunity

CONTENTS

1. INTRODUCTION 1
1.1. Background Data 1
1.1.1. Stormwater Management in Council 1
1.1.2. Effect of Development in Murray Bridge 1
1.1.3. What is a Catchment? 2
1.2. Asset Details 4
1.2.1. Asset Capacity and Performance 5
1.2.2. Asset Condition Assessment 7
1.2.3. Current Asset Condition 7
1.3. Routine Maintenance Plan 8
1.4. Renewal & Replacement Plan 9
1.5. Creation, Expansion and Upgrade Plan 9
1.6. Disposal Plan 10
2. FINANCIAL SUMMARY 11
2.1. Financial Statements 12
2.2. Projected 10-Year Funding Requirements 12
3. REFERENCES 15

1. INTRODUCTION

The Rural City of Murray Bridge manages a vast network of Infrastructure throughout the region. The Stormwater Asset Management Plan specifically relates to the management of Council assets directly associated with the stormwater drainage systems within our region.

Under the Local Government Act 1999, Council is required to develop and adopt an infrastructure and asset management plan covering a period of at least 10 years. In addition, Council is required to adopt a Long-Term Financial Plan (LTFP) associated with such service plans also covering a period of at least 10 years. There is a direct link between the development and implementation of these two plans, with the LTFP updated to reflect forecast expenditure as detailed within these plans.

The focus of this plan is to model, forecast and document the physical and financial performance of Council's Stormwater assets and provide a robust management framework that informs Council's Long Term Financial strategy.

It is the intent of Council to manage and operate its Stormwater network to an agreed level of service while optimising life cycle costs in order to normalise its infrastructure spend over consecutive budgets.

Rivers and streams on gazetted Crown Land are not considered drainage assets and are managed by the State or Federal Governments. Similarly, stormwater infrastructure with in railway corridors are owned and managed by the Australian Rail Track Corporation(ARTC).

Household (domestic) drainage systems located within private properties, up until the drainage discharge point (kerb outlet), are not maintained by Council and are the responsibility of the property owners and/or strata managers.

Responsibly funding capital expenditure for the renewal of Council assets is a key factor in the organisation remaining sustainable and creating an environment where there is generational equity.

1.1. Background Data

1.1.1. Stormwater Management in Council

The management of stormwater assets in RCMB covers a range of services to the community, including:

- Protection of life, property and transport networks from both riverine and local catchment flooding.
- Management of water quality, aquatic environmental values and environmental flows
- Capture and storage, treatment and reuse of Stormwater as a natural resource for irrigation purposes.

The provision of these stormwater-related services is managed through a holistic multi-pronged approach.

1.1.2. Effect of Development in Murray Bridge

Murray Bridge was settled along the banks of the Murray River and over many years the town has grown. Urban sprawl has naturally progressed away from the river. The town, its road

network and associated stormwater drainage network grew gradually in an organic and somewhat haphazard manner.

The oldest stormwater infrastructure was constructed during the early 1900's and was generally built to meet the needs of the day. As development moved further west, away from the river, the original drainage system was unable to cater for the increased run-off. Over time, numerous deficiencies in the stormwater drainage network developed.

In addition, growing amounts of infill development in Council's catchments has led to increased runoff due to the rise in amounts of impervious areas. The increase in runoff results in both a rise in peak flow rates and in the total volume of stormwater run-off generated. Consequently, in some areas the peak flow rates now exceed the capacity of the drainage networks, resulting in an increase in nuisance flows and potential damage to property or personal injury.

An increase in peak flow rates and runoff volumes through urban development raises the level of pollutants that enter receiving waterways. Pollutants include litter, suspended solids, nitrogen, phosphorous and hydrocarbons, which cause sediment build up, increased aquatic plant growth and, in extreme cases, algal blooms. Council is addressing this issue through the implementation of two pollutant reduction techniques:

- Increased street sweeping process to reduce pollutants entering the stormwater system at the top of the catchment, and
- Installing treatment devices such as Gross Pollutant Traps and Trask Racks at the end of pipes into stormwater basins or the river

Many deficiencies throughout the Council Stormwater Catchments have been addressed however as the township grows additional work is required to continue delivering the level of service the community expects.

1.1.3. What is a Catchment?

The catchment area of any point is defined by the limits from where surface runoff will make its way, either by natural or man-made paths, to lowest point which may be natural or man-made.

Murray Bridge has 30 identified catchments and sub-catchment areas within the greater Township and surrounds, detailed in figure 1.

Stormwater Catchments

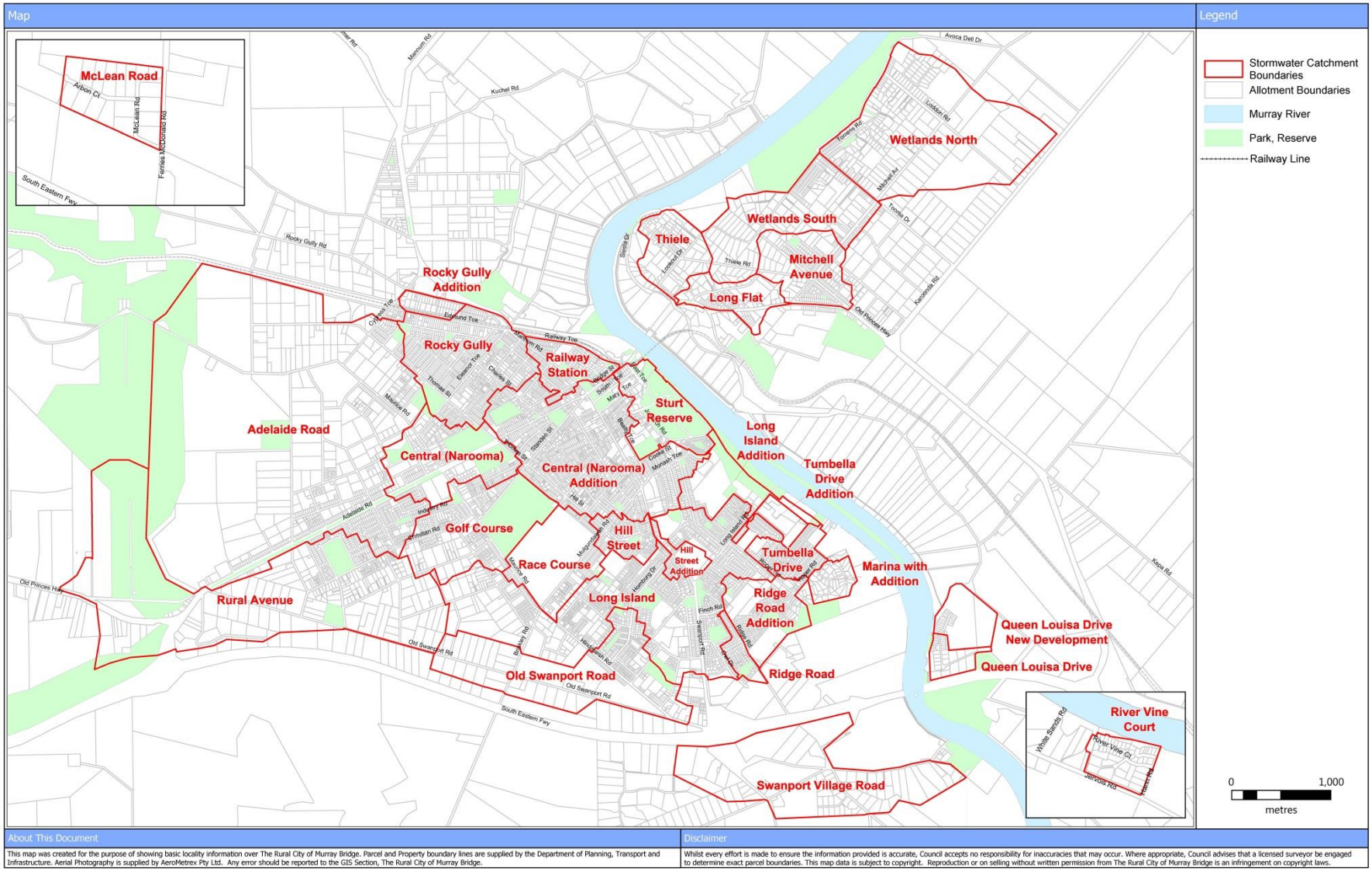

Figure 1: Map of Stormwater Catchments in RCMB

1.2. Asset Details

The assets covered by this Asset Management Plan are detailed in the table below.

Asset Category	Description	Quantity
Stormwater Pipes	Located underground, normally within the roadway or nature strip and range in size from 300mm in diameter to greater than 1200mm in diameter. They convey stormwater from entry points to detention basins, creeks or rivers. Rising Mains (pipes under pressure) Gravity Feed	 13,416.41m 71,873.82m
Box Culverts	Typically located where the underground system crosses a road where • minimum cover is available, • significant loads (weight) is required to be supported, or • where an unusually large capacity is required.	2,230.16m
Headwalls/Outfall Structures	Points where water enters or leaves the underground system, these are located; • in detention basin, • where culverts cross under a road, or • where water flows into a river or creek.	167
Stormwater Pits	Side Entry Pits and Field Gully Pits are points of entry for stormwater to enter the underground system from the above ground drainage. Typically located within the kerb and gutter, dish drains or in the centre of the road to allow water to freely enter the underground drainage system by gravity. Junction pits are located within the underground drainage network and provide for changes in the direction, for increasing pipe size / capacity, or connection of a second pipe. Junction Pits also allow for a point of entry to inspect and clean the underground drainage system. Gross Pollutant Traps (GPT's) capture litter and other debris that is washed into stormwater drains. GPT's	2126 5

Asset Category	Description	Quantity
	intercept litter and debris prior to it entering the receiving waterways.	
Basins	Stormwater basins are designed to temporarily retain or detain stormwater in order to manage peaks runoff flows generated during and after significant storm events. Stormwater basins provide flood protection for downstream urban areas by artificially creating a localized low points available for water storage and shifting flood prone areas away from occupied areas. Stormwater basins and wetland also provide water quality treatment and landscape amenity.	439 ML[3]
Bores	Typically located within a basin and provides additional storage capacity by returning stormwater to the aquifer. These are not considered an appropriate stormwater management approach	12
Pumps & Pump Stations	Used as needed to shift stormwater where gravity systems are not possible.	17
Treatment Plant	Removes pollutants and contaminants from stormwater so it can be reused to irrigate Council's parks and ovals.	1
Open Drains	Open waterway usually constructed from earth or rock to direct flow of stormwater over open land	10,590.3m

Table 1: Assets Covered by this Asset Management Plan

1.2.1. Asset Capacity and Performance

Council's stormwater infrastructure has, in general, been built to meet the engineering design standards available at the time of construction. The stormwater network within Murray Bridge covers only urban areas and part of the network is beginning to age, with some pipes approaching 70 years old.

Like all assets, as they age their condition degrades until a points where the asset no longer serves its intended purpose and requires renewal.

Concerning Stormwater Infrastructure, Whole of life management requires Council not only to model the condition degradation of its assets, but more importantly, manage the performance with respect to capacity.

Stormwater Infrastructure will generally fail due to lack of capacity long before the asset reaches the end of its useful life by way of condition. The management of capacity has a significant impact on overall drainage performance within stormwater catchments but importantly is potential results in the impairment of stormwater assets well before they reach their anticipated end of life age.

As Figure 2 below shows, much of Council's stormwater network is new, with 60% less than 25 years old, a third between 25 and 50 years old and only 7% over 50 years old.

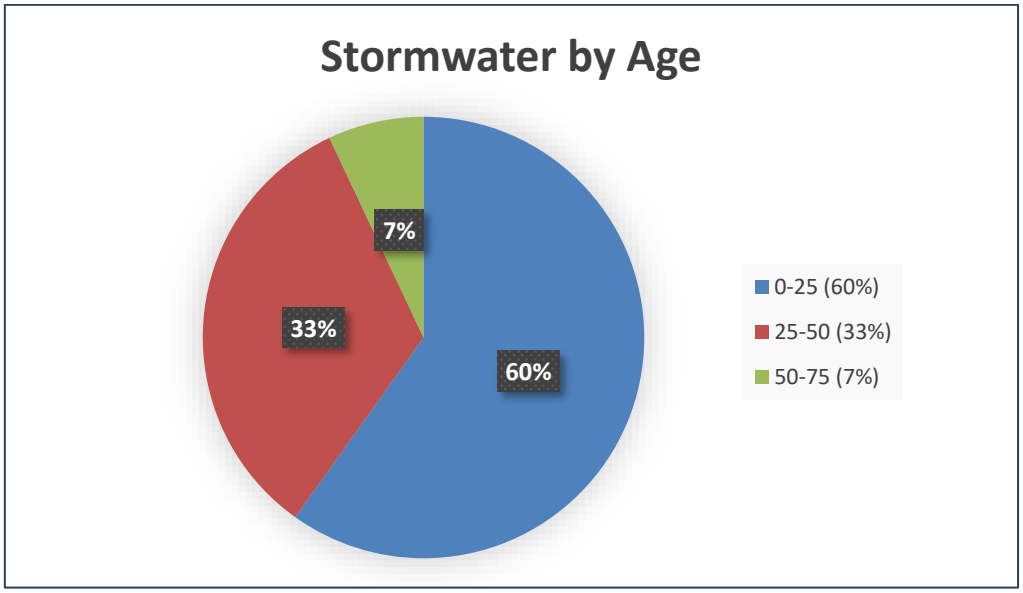

Figure 2: Distribution of Stormwater Network by Age

In order for Council to efficiently and affective manage its stormwater infrastructure, the drainage consideration need to be considered:

- **Drainage Capacity**: Some drainage infrastructure was constructed historically with the best intentions now only caters for a standard annual storm event.
- **Network Age**: Components of the drainage network are, or have reached the end of their expected life and will need replacing over the next 25 years. This will be confirmed through detailed condition assessments
- **Development, including infill development:** Rates and location of development changes land use, increase impervious area, alter how catchments behave and increase stormwater run-off volume and velocity
- **Private Discharge System**: Not all private drainage systems discharge to appropriate locations leading to a higher level of nuisance flows.
- **Water Quality**: In line and end of line environmental controls play a significant role in improvement the health of receiving waterways. These also influence drainage performance, which is critical in the drainage design process.

Locations where deficiencies in service performance exist are currently and progressively identified and are prioritised as part of a long term enhancement program.

Where a section of road has reached the end of its effective life and is due for rehabilitation, it is standard Council practice to analyse in detail the associated drainage system so that, if appropriate, both asset classes can be renewed or upgraded at the same time.

1.2.2. Asset Condition Assessment

As a majority of stormwater infrastructure is below the ground, meaningful and productive Condition Inspections are difficult to undertake. Often defects and hazards within the stormwater network are only identified during or following a storm event through the occurrence of localised flooding.

Historically the condition of underground assets was estimated using the age of the assets to give an estimated idea of condition until assessments that are more thorough could be undertaken.

Recently Council implemented an annual CCTV (Closed Circuit Television) inspection regime to provide Council with an indication of the overall network condition and pinpoint defects and hazards within the system that are hidden bellow the ground. As the network is extensive a percentage of pipe network will be inspected each year, starting with the oldest sections and known trouble spots, which will allow Council to build up a complete condition assessment over time. The snap shot of condition the CCTV inspection provides will give Council engineers an indication of the networks overall condition index and inform the level of investment required to renew the network and provide a suitable level of service.

Following the CCTV inspection and independent review, each individual asset is given an overall condition score from 0 to 6. Zero (0) being brand new assets, 1 near new, through to 6, which is an assets that has become unserviceable and reached the end of its useful life.

1.2.3. Current Asset Condition

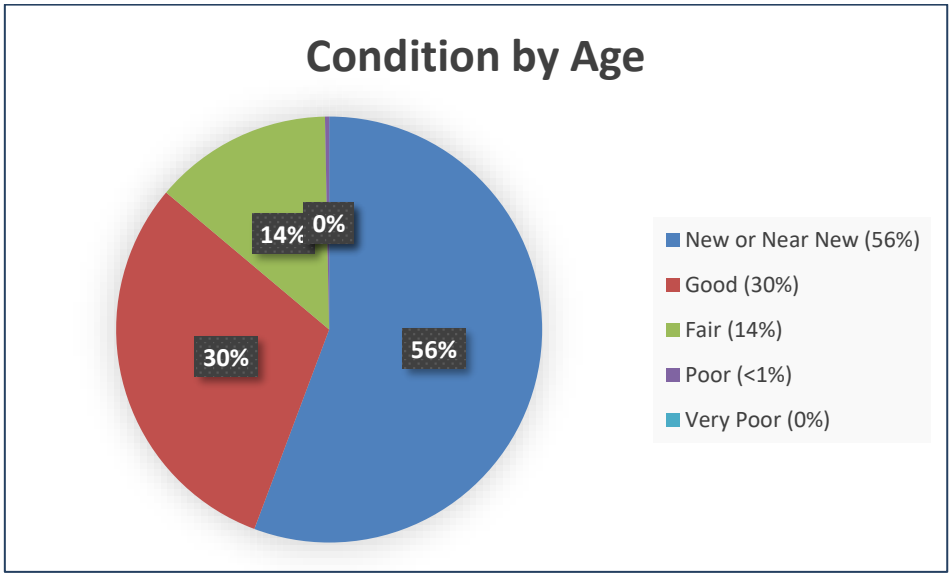

Figure 3: Condition of Council's Stormwater Network by Age

Figure 3 shows the estimated Overall Condition scores for Council's Stormwater Network using age and assuming a Straight Line Condition degradation curve. As can be seen, the condition of the stormwater pipes is excellent with 56% of the assets being assessed as New or Near New and 30% assessed as Good.

During 2019-20, Council inspected 3.5km of underground stormwater infrastructure via CCTV. This was the first time Council utilised this technique for Condition Assessment and therefore the segments considered most urgent were selected for inspection. These segments included pipes approaching the end of their estimated useful life (age) and segments where poor drainage performance has been identified through localised flooding, property damage and public inconvenience.

Following Councils initial CCTV inspection and condition review, it was deemed that the network was in the following state:

1. 26% in New or Near New Condition, (OCI 0-1)
2. 59% in Good condition (OCI 2-3)
3. 15% Fair condition (OCI 3-4)
4. 0% Poor or Very Poor condition. (OCI 5-6)

While this result indicated no significant renewal work was required, detailed analysis showed that some pipes segments require attention to maintain the level of service the community expects. As will be discussed in Section 1.4. timely renewal of failing stormwater components is vital if asset life, value and drainage system performance is to be maximised.

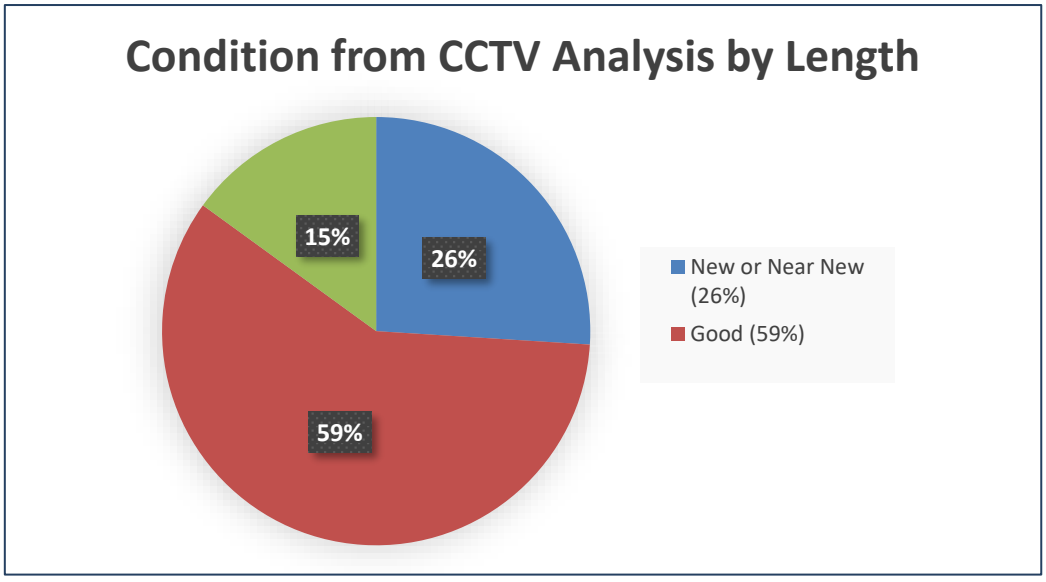

Figure 4: Condition of Council's Stormwater Inspected by CCTV by Length

1.3. Routine Maintenance Plan

Routine operations and maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular day-to-day work necessary to keep assets operating as intended.

Operations and Maintenance Expenditure is forecast to trend in line with the value of the asset stock and assumes a CPI increase of 2% per annum.

Operations that assist in the ongoing maintenance of the Stormwater Drainage System include but are not limited to

- Pipe and Pit flushing, cleaning and collection of trapped debris
- Clearing End-of-Line gross pollutant traps and trach racks
- Provision of street sweeping operating to reduce top of catchment pollutant sources

1.4. Renewal & Replacement Plan

Renewal expenditure is defined as Capital works that do not increase the asset's design capacity, but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Sound asset management dictates that assets are renewed or replaced before they deteriorate to the point where associated assets may be affected or become unserviceable.

Assets requiring renewal are identified using the Asset Register data to project the renewal costs (replacement cost) and renewal timing (determined using acquisition date and useful life).

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service is was constructed to facilitate, or
- To ensure the infrastructure is of sufficient quality to meet the service requirements

Renewal may be prioritised by identifying assets that:

- Have a high consequence of failure
- Have high use and subsequent impact on users would be significant
- Have higher than expected operational or maintenance costs, and
- Have potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.

Analysis of the Asset Register data indicates that no major capital renewal works are required within the next 10 years, however as previously stated in this plan, Stormwater Infrastructure will generally fail due to lack of capacity long before the asset reaches the end of its useful life by way of condition.

It is for this reason the renewal of stormwater infrastructure needs to be carefully balanced with an element of expansion and upgrade.

1.5. Creation, Expansion and Upgrade Plan

The principal drivers for the construction of new or upgraded stormwater assets are new developments and the identification of areas of insufficient capacity and poor drainage performance within the current stormwater network, discussed in section 1.1.2. above.

Where a deficiency in service performance is identified a proposal for the expansion and/or upgrade of the stormwater network is developed. The proposal is then assessed and prioritised as part of an annual or long-term works program.

Where a section of stormwater pipe has reached the end of its effective life and is due for rehabilitation, sound engineering principles require Council to analyse in detail the associated drainage system so that, if appropriate, assets can be renewed or upgraded at the same time.

The creation, acquisition or upgrade of Council infrastructure needs to be funded in isolation from renewal works and certainly not at the expense of renewal works.

1.6. Disposal Plan

The modelling of Council's Stormwater Infrastructure as it moves through its life cycle assumes that an asset will be disposed of at the point in time when it reaches the end of its useful life, or at a particular intervention point based on agreed levels of service.

Council has no upcoming disposals for Stormwater Assets. As such there is no funding required or expected from the decommissioning of any assets at this point in time.

2. FINANCIAL SUMMARY

Council's financial settings required to deliver positive and sustainable outcomes for Stormwater Infrastructure is based on the analysis of data presented in previous sections of this Asset Management Plan, and testing the sensitivity of various attributes in order to model and forecast the most efficient management strategy.

As Council's data collection methods improve, and historical modelling is analysed against true asset performance, Council's financial projections will also improve and the level of Asset Management Maturity will develop.

Council's Stormwater Asset Management Plan is fundamentally based on the estimated cost of capital renewal (construction cost) and the length of time an asset is expected to remain serviceable (useful life).

Asset Valuations are undertaken in accordance with Australian Accounting Standards AASB13 – Fair Value, and AASB116 – Property, Plant and Equipment. These valuations are required every three to five years, with an independent audit required every five years. Council's last independent audit was completed in March 2021.

Unit rates for all Stormwater assets were determined through actual cost, industry standards and benchmarking or first principal estimations and applied to measured quantities to determine the asset valuation or replacement cost.

An asset's useful life is determined through known intervention periods, design life calculations and industry standards, and together with replacement cost is used to determine the annual depreciation of an asset.

The following useful lives are applied to Council's Stormwater Infrastructure assets.

Asset Type	Useful Life
Pipes, Culverts, Headwalls, Pits, Basins, Bores, Open Drains	100
Rising Mains	50
Pump Stations, Pumps, Switchboards	15-25

Table 2: Useful Lives of Stormwater Assets

It is critical to continue to monitor and refine the useful life assigned to stormwater infrastructure. Industry standards show that a useful life of 100 years for reinforced concrete pipe and box culverts represents a conservative approach. It is likely that stormwater infrastructure, in particular buried concrete in the right conditions, will carry a useful life far greater than 100 years.

2.1. Financial Statements

Category	Current Replacement Cost $	Depreciable Amount $	Written Down Value $	Annual Depreciation Expense $
Pipes and Culverts	43,169,274.35	43,169,274.35	31,254,148.24	501,093.41
Headwalls	625,253.25	625,253.25	468,582.61	6,252.53
Pits	7,314,091.33	7,314,091.33	5,890,042.27	73,140.91
Pumps and Pump Stations	2,176,714.90	2,176,714.90	1,784,654.69	92,581.07
Basins and Bores	6,974,456.10	6,974,456.10	6,056,049.85	69,929.18
Open Drains	640,190.81	640,190.81	454,750.73	6,401.90
Total	**60,899,980.73**	**60,899,980.73**	**45,908,228.39**	**749,399.01**

Table 3: Asset Valuations at 1 July 2020

For the purpose of this plan, all figures are based on 2020 data and no allowance has been made to apply CPI/inflation.

The Depreciation expense associated with Council's Stormwater Infrastructure is calculated through applying a "straight line" model and using the age of the asset to estimate its condition to determine its remaining useful life. Pumps and Pump Stations are an exception where the condition is used to determine remaining useful life.

2.2. Projected Funding Requirements

Council's level of funding directly relates to the level of service the community expects and the level of sustainability Council wishes to manage its assets.

Asset Sustainability Ratio is a measure by which Council compares the level of funding made available to renew its asset inventory versus the rate in which the community is consuming assets.

Whole of life management of stormwater infrastructure requires Council not only to model the condition degradation of its asset, but more importantly, manage the performance with respect to capacity of each of the asset types.

Stormwater Infrastructure will generally fail due to lack of capacity long before the asset reaches the end of its useful life by way of condition. It is for this reason Councils Stormwater Asset management Plan recommends not funding stormwater renewal at a level equal to annual depreciation, but at a level that maintains the level of service expected by the community by way of drainage performance and management of environmental protection.

This approach will address condition-based renewal on an annual basis with capacity-based renewal and capital enhancement works delivered through planned one off projects, funded through a combination of third party developer contribution, State/Federal Government Funding and Councils renewal budget allocation.

Stormwater Infrastructure consists of two very distinct asset types and each needs to be managed differently as there can be significant variations in how performance varies and how sensitive a stormwater asset type may be to varied levels of capital investment.

Inert, long life assets, such as buried pits and pipes, excavated or natural basins, and open channel drains, depreciate very slowly. It is anticipated that these asset types will reach capacity before their condition triggers renewal activity and require upgrading or potentially become redundant as the need of the stormwater drainage network changes over time.

This life cycle process will create the need for Council to intervene and upgrade infrastructure well before its theoretical end of life point. This in turn results in reduced requirement fund pure renewal however and increase need to fund upgrade.

It is therefore proposed to fund renewal of "inert" stormwater infrastructure including all concrete Pipes, Culverts, Pits and Headwalls based on 25% of annual depreciation and 65% of annual depreciation for upgrade and expansion works.

Funding 90% of councils annual depreciation expense on Stormwater infrastructure annually potentially creates an annual funding back log of 10% ($134,400 p.a) however it is anticipated that this backlog will be absorbed through one-off projects undertaken as part of residential development, expansion of Council Stormwater Harvesting and Reuse Scheme, or projects identified and funded through third party grant programs.

Fluid assets, such as pumps and pump stations that have high wearing and moving components and where condition can change rapidly, require a far more consistent and structured level of funding to maintain their performance. Deferring or neglecting these assets for short periods of time can result in adverse and irreversible deterioration and cause early asset impairment.

It is therefore proposed to fully fund the renewal of "fluid" stormwater infrastructure including pumps and pump stations based on Council annual depreciation expense.

It is important to note that while Council places a value on Basins, Bores and Open Drains these assets are managed through maintenance only and therefore no allocation for renewal or enhancement has been made within this asset management plan

Based on the above life cycle management philosophy, the level of funding Council requires to sustain both the renewal and enhancement of its stormwater Infrastructure needs to be tailored for individual assets types in order to meets its obligation of providing fit-for-purpose stormwater infrastructure that meets the desired level of service the community expect.

Table 4 below provides a high level indication of the funding required to sustain Council stormwater infrastructure network for both renewal and enhancement works.

Category	Annual Depreciation Expense $	Renewal %	Annual Renewal $	Upgrade%	Annual Upgrade $
Pipes and Culverts	$ 501,093.41	25%	$ 125,273.35	65%	$ 325,710.72
Headwalls	$ 6,252.53	25%	$ 1,563.13	65%	$ 4,064.14
Pits	$ 73,140.91	25%	$ 18,285.23	65%	$ 47,541.59
Pumps and Pump Stations	$ 92,581.07	100%	$ 92,581.07	0%	$ -
Basins and Bores	$ 69,929.18	0%	$ -	0%	$ -
Open Drains	$ 6,401.90	0%	$ -	0%	$ -
Total	**$ 749,399.01**		**$ 237,702.78**		**$ 377,316.45**

Table 4: Asset Renewal and Upgrade funding profile

3. REFERENCES

Local Government Act 1999, South Australia

International Infrastructure Maintenance Manual