STORMWATER ASSET MANAGEMENT PLAN

Cassowary Coast Regional Council

June 2024

Document Control	Stormwater Asset Management Plan				
Document ID :					
Rev No	**Date**	**Revision Details**	**Author**	**Reviewer**	**Approver**
V0.11	May 2021	Update	IPWEA		
V0.12	August 2023	Update to asset valuation terminology	IPWEA		
V1.1	November 2023	Draft AM Plan	Luke McAvoy	Christopher Accatino	
V1.2	May 2024	Draft AM Plan	Luke McAvoy	David Goodman	
V1.3	June 2024	AM Plan	Luke McAvoy	David Goodman	CEO

The structure and content of this template is aligned to the International Infrastructure Management Manual and the ISO 550xx and 31000 series of standards.

This Asset Management Plan is prepared in line with the Strategic Asset Management Plan (also referred to as an AM Strategy) and AM Policy and is to be used to inform the Long-Term Financial Plan.

Contents

1.0 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

The Asset Management Plan (AM Plan) details information about stormwater infrastructure assets with actions required to provide an agreed level of service while outlining associated risks. The plan defines the services to be provided, how the services are provided and what funds are required to provide over the ten (10) year planning period. The AM Plan is a legislative requirement under the Local Government Act (2009) and Regulations (2012) and is required to provide a forecast period of ten (10) years to inform Planned Budgets within the Long Term Financial Plan (LTFP). Targets for the Stormwater AM Plan set by the Strategic Asset Management Plan (2022) include:

- Major Review (Five Yearly) (to coincide with Asset Class revaluations)
- Annual Minor Reviews

This AM Plan is the Major Review of the previous Stormwater AMP (2018).

1.2 Asset Description

This plan covers the infrastructure assets that are designed or actively managed by an asset owner for collecting, storing, treating, conveying, or attenuating stormwater. Council's Stormwater Asset network comprises of two (2) Asset Classes, namely Pits and Pipes, of the following sub-class descriptions estimated at a current replacement value estimated at $97,230,000:

- Access Chamber (Manholes)
- BlackMax Plastic Pipes
- Culvert/Pipe Head Walls
- Flood Gates
- Field/Grated Inlet Pits
- Gross Pollutant Traps
- HDPE Plastic Pipes
- Kerb Inlet Pits
- PVC Plastic Pipes
- Polypropylene Plastic Pipes
- Reinforced Concrete Box Culvert
- Reinforced Concrete Pipe
- Tide Flex (Coastal Outlets)

The Stormwater Asset class in delineated as capitalised drainage infrastructure falling within Council's Urban Footprint as per the Planning Scheme (2015). The following assets are excluded as stormwater assets:

- Kerb and Channel
- Rural Culverts
- Bridges
- Causeways
- Floodways
- Open Drains

The stormwater asset data available to inform the AM Plan is considered low/uncertain confidence. Forecasts contained within the AM Plan should be considered in this context. This issue is outlined to be rectified as part of the Improvement Plan.

1.3 Levels of Service

The allocation in the planned budget (LTFP) is insufficient to continue providing existing services at levels for the planning period, predominantly in the lifecycle area of Renewals. Performance of the Asset against Levels of Service is expected to decline. The main service consequences of the Planned Budget (LTFP) are:

- Potential Catastrophic Condition Failure
    - Any reduction in current Renewal Levels of Service will see continued 'falling behind' of stormwater asset class renewals
    - Any reduction in current Maintenance Levels of Service (Reactive Maintenance) will mean a Run-to-Failure Approach

1.4 Future Demand

The factors influencing future demand and the impacts they have on service delivery are created by:

- Climate Change (both through rainfall changes and sea level rise)
- Changes to Asset Base through Asset Rationalisation Program
- Legislative Requirements
- Population Growth Forecasts and Targets (including Target of 20% growth by 2033 set in the Economic Development Strategy (2023)

These demands and associated risks will be managed via direct asset management outlined in the Demand Management Plan and Improvement Plan. This includes a combination of non-asset solutions, insuring against risks and managing failures such as:

- Managing the Impacts of Climate Change on the Stormwater Asset Class by:
    - Identifying Critical Infrastructure and Vulnerable Assets
    - Identifying a standardised approach to design and management considering Climate Change
- Investigating extraneous influences on Asset Register i.e. Asset Rationalisation Program
- Monitoring Relevant Legislation
- Monitoring Population Growth and Projections

1.5 Lifecycle Management Plan

1.5.1 What does it Cost?

The forecast lifecycle costs necessary to provide the services covered by this AM Plan includes operation, maintenance, renewal, acquisition, and disposal of assets to inform the Long Term Financial Planning period of ten (10) years. Therefore, a summary output from the AM Plan is the forecast of 10-year total outlays, which for the Stormwater asset class is estimated as $25,798,000 or $2,580,000 on average per year.

The majority of forecast costs is in Renewals, where forecasts estimate $1,936,000 should be budgeted on renewals annually over the ten (10) year LTFP forecasts.

1.6 Financial Summary

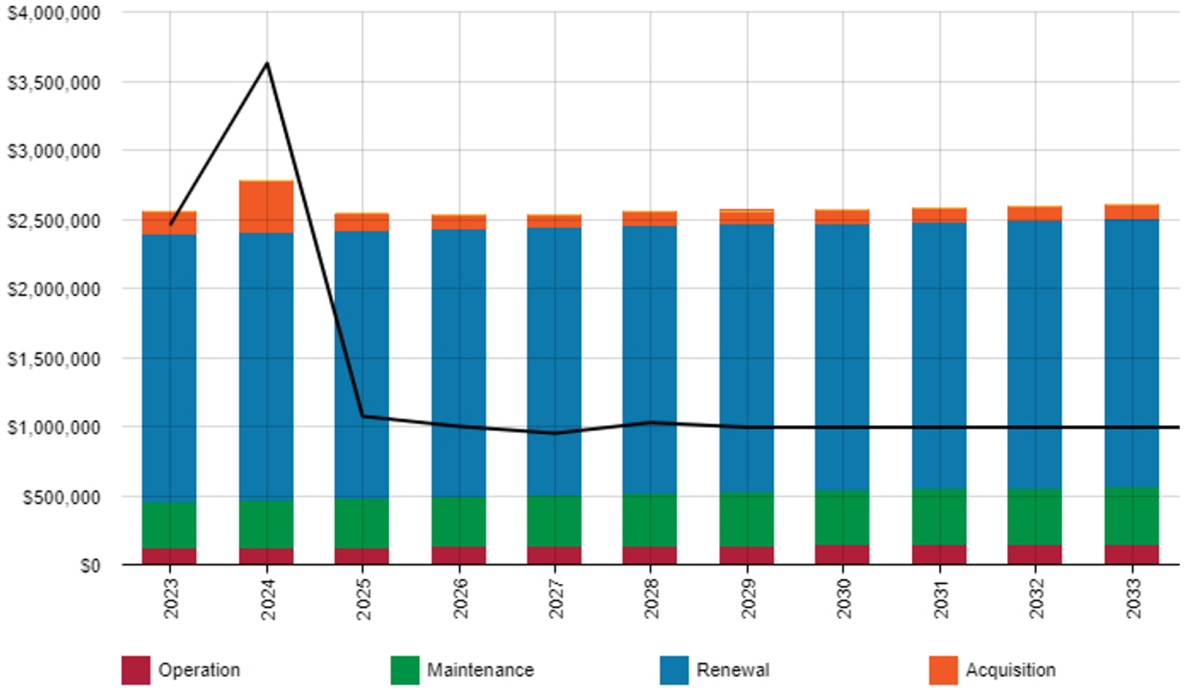
1.6.1 What we are currently doing

Estimated available funding for the ten (10) year period is $14,108,000 or $1,411,000 on average per year. This is 54.7% of the forecast lifecycle cost to sustain the current level of service.

The anticipated Planned Budget (LTFP) for the Stormwater asset class leaves an average shortfall of $1,169,000 per year of the forecast lifecycle costs required to provide services in the AM Plan compared with the Planned Budget currently included in the Long-Term Financial Plan. The majority of this shortfall lies in Renewals.

The infrastructure reality is that only what is funded in the long-term financial plan can be provided. Informed decision making depends on the AM Plan emphasising the consequences of Planned Budgets (LTFP) on the service levels provided and risks.

The lifecycle costing to achieve this when compared to current planned budget (LTFP) is shown in the figure below in current dollars. The current deficit in the LTFP is clear, and requires a broader Capital Works Program (min. 3 years as per Strategic AMP Risk Treatment Plan) to rectify. This Capital Works program requires an Asset Condition Inspection Program to improve data confidence, which is outlined to be rectified as part of the Improvement Plan.



Forecast Lifecycle Costs vs Planned Budget (LTFP)

1.6.2 What we are currently not doing

We currently do not allocate enough budget to sustain stormwater asset services at the proposed Level of Service standard. Works and services that cannot be provided under present LTFP budget levels are:

- Adequate Renewals over the ten (10) year forecast due to budget shortfall and low confidence data
- Constructed acquisitions to address 20% growth targets of Economic Development Strategy (2023)
- Capacity-based upgrades/acquisitions due to condition-based Renewal backlog
- Identification of service levels due to lack of condition assessment program

1.6.3 What we propose to do

We plan to provide services for the following:

- Operation, maintenance, renewal and acquisition of stormwater assets to meet service levels set by Customer Research and Expectations, Strategic and Corporate Goals, and Legislative Requirements.
- Delivery of prioritised capital projects within the ten (10) year planning period to do so.

1.7 Managing the Risks

The acceptable risk level is given as Moderate in the Strategic Asset Management Plan (2022). Our present LTFP budget levels are insufficient to manage risks to this level over the forecast period. Risks above the Moderate threshold (High and Very High) and their associated Treatment Plan costs to rectify, have been determined as part of the Stormwater AM Plan.

1.7.1 Identified Critical (Very High) Risk

Current risks within the stormwater asset class were identified and ranked according to the IPWEA Risk Ranking Matrix based on assessed likelihood and probability. The critical (very high) risks identified are tabulated below.

Stormwater Asset Class – Identified Very High Risks

Risk	Risk Treatment Plan	Residual Risk	Treatment Costs
Broad unknown Asset Condition leading to reduction in LOS / Catastrophic Failure	Develop Asset Condition Inspection Program and Implement	Assets missing from Register/ Program	Operational Request circa $80,000 p/a
Planned Budget (LTFP) deficit to Forecast Lifecycle Costing leading to reduction in LOS / Catastrophic Failure	Develop Plan and Process to reach Expenditure based on Risk Based Prioritisation and Quality Data	Broader Budgetary Constraints and Financial Influences	Current shortfall average $1,170,000 p/a over 10 year forecast period Will change with Asset Register Maturity and Relining outcomes
Risk to Council due to lack of Tenure over stormwater assets including Open Drainage (non-capitalised) Assets	Develop Stormwater Asset Tenure Prioritisation Plan including Open Drainage (non-capitalised Assets)	Assets missing from Register/ Program	Wages to Implement circa $5000 p/a Drainage Tech Officer + Tenure Acquisition Costs
Critical Asset Failure due to non-targeted inspection and maintenance scheduling	Develop Heirarchy/Criticality Rating for Asset Class as per IPWEA PN5 (inc. Climate Change)	Assets missing from Register/ Program	Wages to Implement circa $5000 p/a Drainage Tech Officer
Council Target of 20% Population Growth by 2033 – impact on lifecycle costs, LOS	Engage Internal Stakeholders as to assumptions made in Economic Development Strategy and consistency with AM Plans	TBD – based on Outcome of Risk Treatment Plan	TBD – based on Outcome of Risk Treatment Plan
Asset Engineering Long Term Vacancies leading to reduction in LOS	Hire Manager Asset Engineering Develop PDs Fill Vacancies in Asset Engineering	May still be vacancies – no Open Space Technical Officer	Wages circa $250,000 p/a MAE + Asset Analyst
Natural Disasters - potential increase in occurrence due to climate change - Financial Shock for Asset Renewals - lack of data leading to DRFA ineligibility	Condition Photos (Reflect/Recover) requirement as part of Inspection	Unknowns of Natural Disaster Frequency	Inclusive in Condition Inspection Program
Climate Change - Increase in rainfall IFD resulting in under design of older infrastructure and increase in service failure	Investigate Climate Change Guidelines as per ARR/QUDM and CSIRO to be adopted during design of Critical Infrastructure	Climate Change Potential Risk left on Non-Critical Infrastructure	Potential increase in Capital Costs on Critical Works (as identified through Hierarchy)

1.7.2 Improvement Plan (Critical Tasks)

The tasks arising from the critical risks and associated Risk Treatment Plan are laid out as part of the Improvement Plan. The critical next steps identified in the AM Plan to improve asset management practices are:

- Develop Asset Condition Inspection Program and Implement
- Develop Plan and Process to reach Lifecycle Costing Targets based on Risk Based Prioritisation and Quality Data
- Develop Stormwater Asset Tenure Prioritisation Plan including Open Drainage (non-capitalised Assets)
- Develop Heirarchy/Criticality Rating for Asset Class as per IPWEA PN5 (inc. Climate Change)
- Investigate assumptions in Economic Development Plan and consistency with AM Planning
- Address Asset Engineering Long Term Vacancies (Manager Asset Engineering, Asset Analyst)
- Develop DRFA Stormwater Asset Data Program (Critical Infrastructure Inspection Program)
- Develop Climate Change Stormwater Design Criteria
- Feasibility Studies on RCP Relining
- Annual AMP Updates (post Annual Reports, Budgets) to inform LTFP and Capital Works Programs
- Develop Renewal Program for Stormwater Asset Class (min 3 year outlook)

1.8 Asset Management Planning Practices

Assets requiring renewal are identified from either the asset register or an alternative method.

- The timing of capital renewals based on the asset register can be applied by adding the useful life to the year of acquisition or year of last renewal (Asset Register Method),
- Alternatively, an estimate of renewal lifecycle costs is projected from external information and may be supplemented with, or based on, expert knowledge (Alternate Method).

The Alternate Method was used to forecast the renewal lifecycle costs for this AM Plan. Stormwater Asset data within the Asset Register was deemed too low/uncertain confidence to be used in the Asset Register Method.

Key assumptions made in this AM Plan are detailed in associated Organisational documents.

2.0 INTRODUCTION

2.1 Background

This AM Plan communicates the requirements for the sustainable delivery of services through management of assets, compliance with regulatory requirements, and required funding to provide the appropriate levels of service over the planning period.

The AM Plan is to be read with the Cassowary Coast Regional Council planning documents. This should include the Asset Management Policy and Asset Management Strategy or Strategic Asset Management Plan (SAMP, 2022) along with other key planning documents:

- CCRC Annual Budgets including Long Term Financial Plans (2016-2023)
- CCRC Annual Reports (2016-2023)
- CCRC Asset Management Policy (2023)
- CCRC Coastal Hazard Adaption Strategy (2023)
- CCRC Community Scorecard (2022)
- CCRC Corporate Plan (2021)
- CCRC Economic Development Strategy (2023)
- CCRC Local Government Infrastructure Plan (LGIP) (2018)
- CCRC Master Drainage Project (2012-2016)
- CCRC Operational Plan (2023)
- CCRC Planning Scheme (2015)
- CCRC Stormwater AM Plan (2018) (Previous Edition)
- CCRC Valuation of Stormwater Assets (2022)

This plan covers the infrastructure assets that are designed or actively managed by an asset owner for collecting, storing, treating, conveying, or attenuating stormwater. Council's Stormwater Asset network comprises of two (2) Asset Classes, namely Pits and Pipes, of the following sub-class descriptions estimated at a current replacement value estimated at $97,230,000:

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- Reinforced Concrete Box Culvert
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- Tide Flex (Coastal Outlets)

For a detailed summary of the assets covered in this AM Plan refer to Section 5. The Stormwater Asset class in delineated as capitalised drainage infrastructure falling within Council's Urban Footprint as per the Planning Scheme (2015). The following assets are excluded as stormwater assets:

- Kerb and Channel
- Rural Culverts
- Bridges
- Causeways
- Floodways
- Open Drains

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 2.1.

Council's organisational management hierarchy for stormwater infrastructure asset service delivery is shown in Figure 2.1 and Council's organisational document hierarchy for stormwater infrastructure asset service delivery is shown in Figure 2.2.

Table 2.1: Key Stakeholders in the AM Plan (SAMP, 2022)

Key Stakeholder	Role in Asset Management Plan
Mayor/Councillors	**Strategic Direction** Corporate plan Key Goals and Strategic Objectives Council Policies Strategic Prioritisation Resources available to achieve AM objectives Act as stewards for all Council Assets
Executive Management Team	**Operational Decision Making** Statutory requirements Administration Policies Sustainability Service strategy Future demand and considerations Asset management objectives
Asset Management Working Group	**Strategic Alignment** Strategic AM Planning Policy management Legislative compliance Review of Asset Management Plans for consistency Demand management Infrastructure management Asset Related risks are captured in Council's Risk Management System Guiding continuous improvement Defining the level of service Whole of council asset performance monitoring
Asset Custodians Maintenance Managers Service Managers	**Tactical/Operational** Service Delivery Asset capture Asset risk management Accurate asset data Asset specific performance measures Prioritisation and optimisation of resources Planned and unplanned maintenance Planned capital renewals Planned new, upgraded and expanded capital Planned disposals Asset management plan development

Figure 2.1: CCRC Stormwater Infrastructure Asset Management Hierarchy

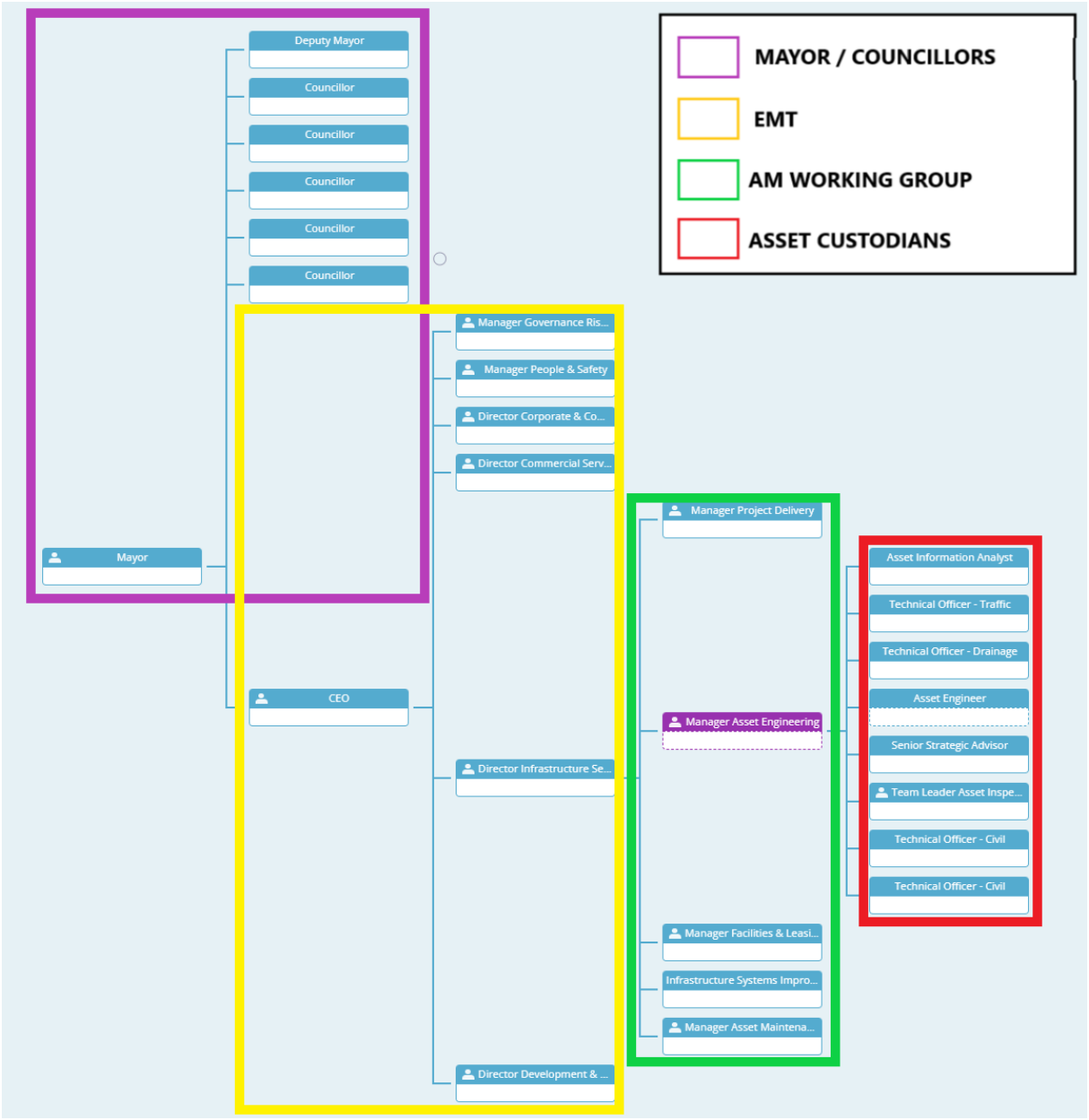


Figure 2.2: CCRC Asset Management Document Hierarchy (SAMP, 2022)

2.2 Goals and Objectives of Asset Ownership

Our goal for managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance
- Managing the impact of growth through demand management and infrastructure investment
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service
- Identifying, assessing and appropriately controlling risks, and
- Linking to a Long-Term Financial Plan which identifies required, affordable forecast costs and how it will be allocated.

Key elements of the planning framework are

- Levels of service – specifies the services and levels of service to be provided,
- Risk Management,
- Future demand – how this will impact on future service delivery and how this is to be met,
- Lifecycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

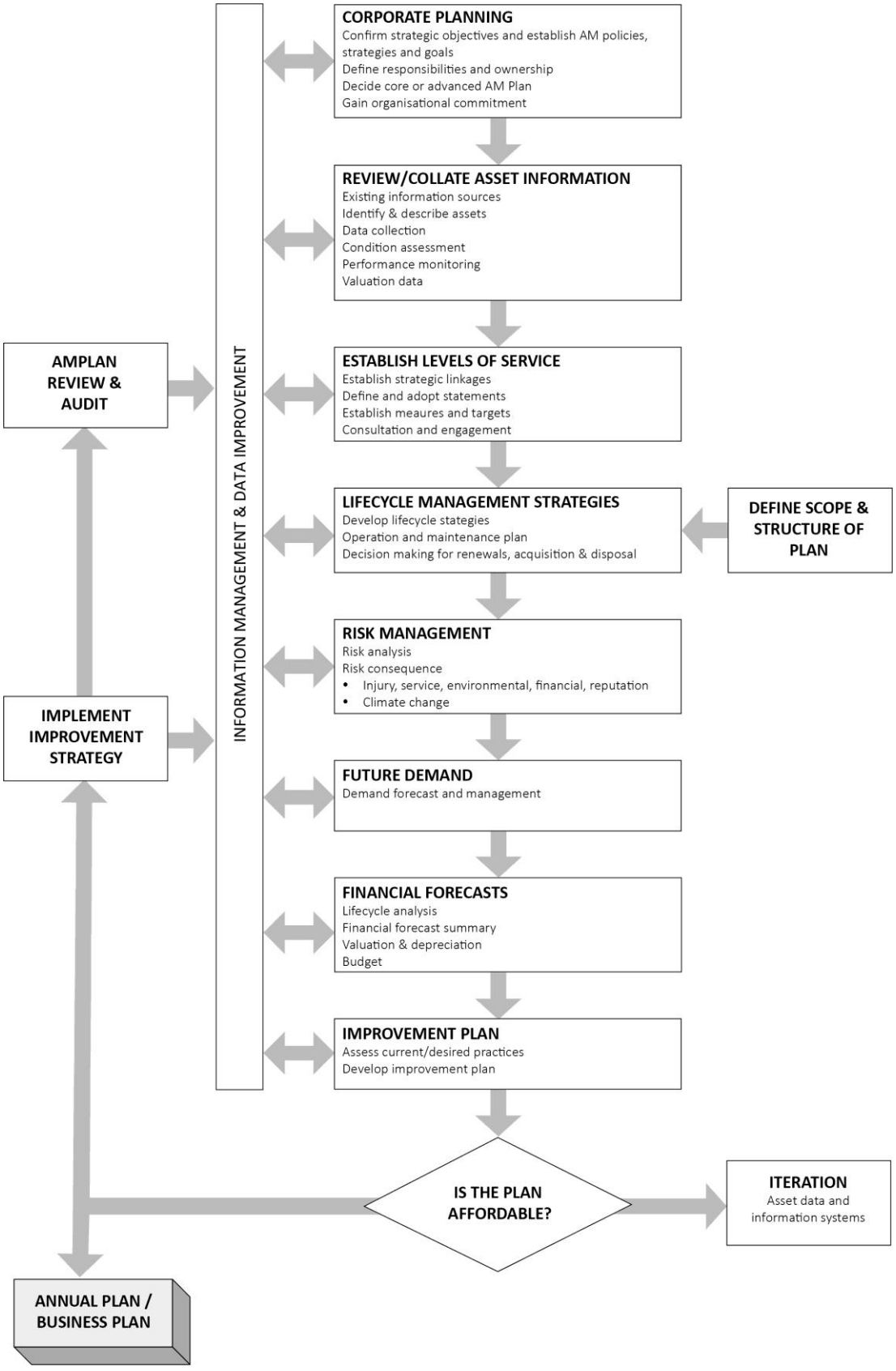
Other references to the benefits, fundamentals principles and objectives of asset management are:

- International Infrastructure Management Manual 2015 1
- ISO 550002

A road map for preparing an AM Plan is shown below.

[1] Based on IPWEA 2015 IIMM, Sec 2.1.3, p 2| 13
[2] ISO 55000 Overview, principles and terminology

Road Map for preparing an Asset Management Plan
Source: IPWEA, 2006, IIMM, Fig 1.5.1, p 1.11



3.0 LEVELS OF SERVICE

3.1 Customer Research and Expectations

Council currently has no research on customer expectations. Council's previous Stormwater Asset Management Plan (2018) indicated that as part of the organisational restructure, the new organisation will develop levels of service in consultation with Council and the community. This work is identified to be undertaken in the Improvement Plan.

In the absence of asset-specific customer consultation, staff experience and indicators from Council's 2022 Community Scorecard have been used to provide guidance on Customer Values.

Customer expectations can also be gleaned from levels of service given in guidelines such as the Far North Queensland Organisation of Councils (2019) publications, the Queensland Urban Drainage Manual (2016) and Australian Rainfall and Runoff (2019) publications.

Future revisions of the AM Plan will incorporate customer consultation on service levels and costs of providing the service. This will assist the Executive Management Team and stakeholders in matching the level of service required, service risks and consequences with the customer's ability and willingness to pay for the service.

3.2 Strategic and Corporate Goals

This AM Plan is prepared under the direction of Council's vision of 'One Coast: Cassowary Coast' to ensure great experiences, deliver value and create a sustainable future for our community. Everything we do is underpinned by three core values of Respect, Integrity, and Courage. The relevant goals and objectives and how these are addressed in this AM Plan are summarised below.

Corporate goals have been set by Council's Corporate Plan (2020) and are summarised in Table 3.2. Strategic Asset Management goals have been set by Council's Strategic Asset Management Plan (SAMP) (2022) and are summarised in Table 3.3.

Table 3.2: Corporate Goals and how these are addressed in this Plan

Document	Goal	Objective	How Goal and Objectives are addressed in the AM Plan
Corporate Plan (2020)	Council working in partnership with the community, to enhance and promote pride in and livability of the region.	Promote safe, active, healthy, resilient and prepared communities	The AM Plan considers climate driven extreme weather events and rainfall intensities as part of future infrastructure and community preparedness.
Corporate Plan (2020)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	A safe, reliable and financially sustainable transport network throughout the Cassowary Coast to facilitate movement of goods and people throughout our community	Stormwater management is a major component of both safety and reliability of the transport network in urban areas. Planning around asset management and design will ensure positive outcomes of this objective.
Corporate Plan (2020)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Sustainable asset management to effectively deliver services in a consistent and financially sustainable manner representing value to the community	The AM Plan identifies problems regarding the financial sustainability of stormwater assets and offers solutions where improvement is required through the Improvement Plan.
Corporate Plan (2020)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Resilient infrastructure with planning and design informed by climate change risks	The AM Plan outlines the need for an approach to managing impact and building resilience to climate change within the Stormwater Asset Class.
Corporate Plan (2020)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Integrated planning to support current and future needs of the region	Future impacts and demands on stormwater infrastructure are forecast and plans to manage these demands are summarised or flagged for future development.
Corporate Plan (2020)	An environmentally balanced and aware community, that preserves and maintains our natural environment and incorporates contemporary and proven sustainability principles, as part of all activities for current and future generations.	Prepare for climate adaptation and management of climate change hazards and risks	Climate change affects all major weather patterns driving stormwater asset management. The associated hazards and risks are identified in the AM Plan, along with proposed Risk Management Planning.

Table 3.3: Strategic Goals and how these are addressed in this Plan

Document	Goal	Objective	How Goal and Objectives are addressed in the AM Plan
SAMP (2022)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Renewal decision making processes are consistent with the Council's broader strategic objectives, asset/workforce and systems capability, actual asset performance, and prioritisation of need	The AM Plan takes direction from the SAMP (2022) amongst other relevant documentation. A realistic view of Council's capability and current asset performance is taken. Priorities and needs are considered objectively based on whole of life costing.
SAMP (2022)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Asset data is considered an asset and managed objectively with outcome in mind	Asset data improvement is identified as a key area for improvement in the SAMP (2022) and in the AM Plan. Areas for improvement and associated improvement actions are identified in the Improvement Plan.
SAMP (2022)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Asset management planning that drives compliance, continuous improvement and inclusiveness within council and the community	The AM Plan is a key cog in the holistic approach to Asset Management outlined in the SAMP (2022). A key focus of the AM Plan and associated Improvement Plan is identifying clear and achievable areas for improvement.
SAMP (2022)	Regional infrastructure that delivers levels of service supported by the community and is financially sustainable.	Maintenance of Assets that is adaptive, integrated and informed by shared data aimed to improve the reliability of services and their financial sustainability	The AM Plan is prepared with consultation between specific and relevant Council departments and with direction from the latest industry guidelines.

3.3 Legislative Requirements

There are many legislative requirements relating to the management of assets. Legislation that impacts the delivery of the Stormwater Asset Class services include (but is not limited to):

- Queensland Local Government Act (2009)
- Queensland Local Government Regulations (2012)
- Queensland Planning Act (2016)
- Queensland Planning Regulation (2017)
- Relevant Common Law

3.4 Customer Values

Service levels are defined in three ways:

- Customer values
- Customer levels of service and
- Technical levels of service.

Customer Values indicate:

- what aspects of the service is important to the customer,
- whether they see value in what is currently provided and
- the likely trend over time based on the current budget provision

Table 3.4 summarises currently identified Customer Values regarding the Stormwater Asset class. The expected trend based on Planned Budgets (LTFP) is a decreasing trend in performance against estimated Customer Values.

Table 3.4: Customer Values

Service Objective:

Customer Values	Customer Satisfaction Measure	Current Feedback	Expected Trend Based on Planned Budget
Property Value/Protection (Nuisance Flooding)	Customer Requests relating to stormwater network (unplanned) capacity performance issues inundating/damaging ratepayer property	Difficult to quantify - limited data due to CR allocation/process Internal investigation shows multiple network capacity issues Level of Acceptance higher for Cassowary Coast residents (wet tropics residents expectant of flooding)	Planned Budget and Lifecycle Costing shows historic underspend on Stormwater Assets. Expected trend is to potentially worsen before improving. Current data quality makes predicting acquisitions/renewals moving from condition based to performance based difficult
Local Transport Accessibility (Nuisance Flooding)	Customer Requests relating to stormwater network (unplanned) performance issues affecting transport network	Many legacy requests on poor stormwater management Response times/solutions historically considered unsatisfactory	Planned Budget and Lifecycle Costing shows historic underspend on Stormwater Assets. Expected trend is to potentially worsen before improving. Current data quality makes predicting acquisitions/renewals moving from condition based to performance based difficult
Public Safety (Nuisance Flooding/Network Exposure)	Customer Requests relating to stormwater network (planned) discharge/safety issues and Council response	Limited Safety Specific Complaints These are generally prioritised internally	Trend expected to stay stable - limited instances
Failure Rates (Condition Failure)	Asset Inspector/Customer Requests Condition Failures	Current Stormwater Capital Project forecasts are entirely Condition Based. Emergent Works Budget predicted to trend upwards	Trend expected to increase based on increasing proportion of Emergent Works and remaining useful life in the stormwater asset class
Personal Experience (Sights and Smells)	Asset Inspector/Customer Requests relating to stormwater network ponding/stagnation, silting, (Operational Issues) and Separation/Cracking etc. (Maintenance Issues)	Difficult to quantify - often not complained about yet still negative experience	Trend expected to stay stable as per Operations/Maintenance Budget Allocation
Environmental Protection (Interference with Nature)	Customer Requests relating to fish passageway, erosion, habitat interference etc.	Minimal requests - often well considered in design	Continued improving trend under existing regulation/legislation
Transport Network Performance (Accelerated Deterioration)	Customer Requests and Community Feedback within 2022 Community Scorecard.	The 2022 Community Scorecard showed the highest priority across the whole of ratepayer's community priorities (not just Infrastructure/Assets) was Local Roads. Improving drainage of these roads was a Community Driven Action and is closely linked to stormwater asset performance through washouts, potholes etc.	Expected improving trend due to: - Unsealed Roads Improvement Plan - Transport Asset Revaluation (data improvement)

3.5 Customer Levels of Service

The Customer Levels of Service are considered in terms of:

Condition How good is the service … what is the condition or quality of the service?

Function Is it suitable for its intended purpose …. Is it the right service?

Capacity/Use Is the service over or under used … do we need more or less of these assets?

In Table 3.5 under each of the service measures types (Condition, Function, Capacity/Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the current budget allocation. The expected trend based on Planned Budgets (LTFP) is a decreasing trend in performance against estimated Customer Levels of Service measures.

These are measures of fact related to the service delivery outcome (e.g. number of occasions when service is not available or proportion of replacement value by condition %'s) to provide a balance in comparison to the customer perception that may be more subjective.

Table 3.5: Customer Level of Service Measures

Type of Measure	Level of Service	Performance Measure	Current Performance	Expected Trend Based on Planned Budget
Condition	Condition of Stormwater Assets	Condition Rating of Stormwater Assets as per IPWEA Practice Note 5	7% of Current Assets are in Poor / Very Poor Condition. This equates to approximately $6.8M Replacement Cost.	Based on predicted LTFP renewal budgets (circa $800k per annum) - Condition Based works expected to consume budget between next 5 - 10 years. Expected trend of Condition improvement but Capacity based LOS upgrades will be minimal.
	Confidence levels		Low	Low
Function	Measure of whether Stormwater Assets are appropriate for intended use	Industry Standards and Guidelines i.e. - FNQROC - QUDM - ARR	Assets generally be considered fit-for-purpose. Issue lies in level of performance of that purpose (capacity).	Trend of minimal occurrence/discovery of non fit-for-purpose designs expected to continue
	Confidence levels		High (Professional Judgement supported by extensive data)	High (Professional Judgement supported by extensive data)
Capacity	Measure of whether Capacity of Stormwater Assets are sufficient.	Industry Standards and Guidelines i.e. - FNQROC - QUDM - ARR	Original QUDM published in 1992, original ARR in 1987 - design flood capacity of pits/pipes as per current requirements unlikely prior to those publications. Circa. 57% of Council Stormwater Assets were constructed prior to 1987. Drainage Master Project shows significant proportion of Stormwater Pipe Assets undersized throughout urban centres.	Trend likely to remain (no improvement in capacity) unless upgrades form part of condition based works which are predicted to consume budget within next 5 - 10 years.
	Confidence levels		Medium (Professional judgement supported by data sampling	Medium (Professional judgement supported by data sampling

3.6 Technical Levels of Service

Technical Levels of Service are operational or technical measures of performance to deliver the customer values, and impact the achieved Customer Levels of Service. These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance. Technical service measures are linked to the activities and annual budgets covering:

Acquisition – the activities to provide a higher level of service (e.g. widening a road, sealing an unsealed road, replacing a pipeline with a larger size) or a new service that did not exist previously (e.g. a new library).

Operation – the regular activities to provide services (e.g. cleaning, mowing grass, energy, inspections, etc.

Maintenance – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g. road patching, unsealed road grading, building and structure repairs). Council's adopted current approach to Maintenance is shown in Figure 3.1.

Renewal – the activities that return the service capability of an asset up to that which it had originally provided (e.g. road resurfacing and pavement reconstruction, pipeline replacement and building component replacement),

Service and asset managers plan, implement and control technical service levels to influence the service outcomes.[3] Table 3.6 shows the activities and current performance expected to be provided under the Budget (LTFP) allocation, and recommended performance to achieve levels of service and risk outlined in this AM Plan.

Table 3.6: Technical Levels of Service

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
TECHNICAL LEVELS OF SERVICE				
Acquisition	Infrastructure Acquisition	Asset Base increases (i.e. Greenfields construction, Asset Handovers after Private Development)	Asset Maintenance and Operations Budget performing adequately. Limited knowledge on long term Acquisition Cost of upcoming Major Acquisitions (i.e. Port Hinchinbrook Stormwater Network)	100% Acquisitions (non-Donated) to be kept at a minimum Brownfields development more desirable. (from an Asset Management Budget perspective).
	Infrastructure Capacity Upgrades	Pit/Pipe Upgrades (Size/Capacity Increase - sometimes represented as partial Acquisitions in Council data/records)	Reactive Decision to Upgrade (based on Condition Failure)	Proactive Decision to Upgrade - Planned/Capacity Based Renewals - Proactive Condition Assessment Program for Condition Based Renewals
		Budget	**$131,416**	**$131,416**
Operation	Stormwater Inspections	Stormwater Inspections Record M-006361 Budget Cost Code	Reactive Inspections (i.e. Customer Request/Level of Service Failure)	Performance Requiring Improvement via Condition Inspection Program
	Drainage Management	Operational Works in REFLECT M-000217 Budget Cost Code	Reactive Management (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP)
		Budget	**$123,015**	**$136,364**

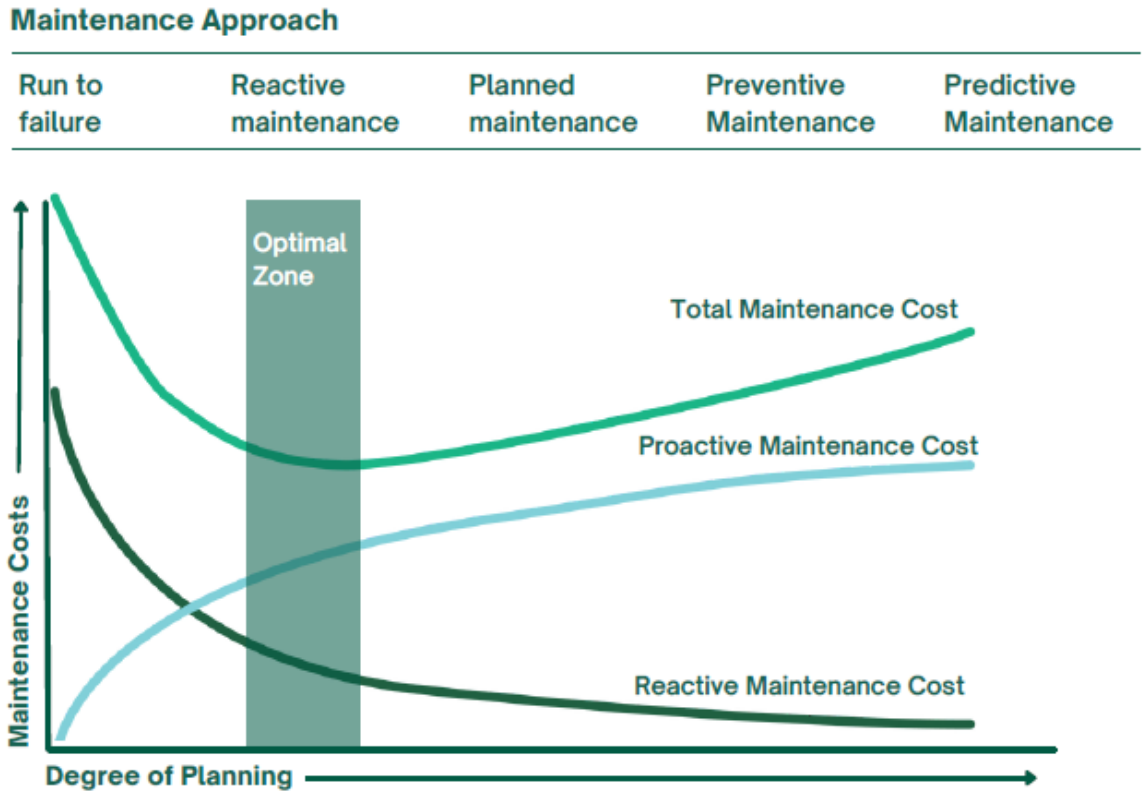
[3] IPWEA, 2015, IIMM, p 2|28.

Lifecycle Activity	Purpose of Activity	Activity Measure	Current Performance*	Recommended Performance **
Maintenance	Drainage Channel Maintenance	Maintenance Works in REFLECT M-005671 Budget Cost Code M-005672 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Recommended Performance cannot be evaluated as Drainage Channels are not treated as Capitalised Assets.
	Waterway Outfall Maintenance	Maintenance Works in REFLECT M-005673 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP Figure 3.1)
	Ocean Outfall Maintenance	Maintenance Works in REFLECT M-005674 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP Figure 3.1)
	Drainage Line Maintenance	Maintenance Works in REFLECT M-005675 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP Figure 3.1)
	Drainage Structures Maintenance	Maintenance Works in REFLECT M-005676 Budget Cost Code M-005677 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP Figure 3.1)
	Flood Mitigation Structures Maintenance	Maintenance Works in REFLECT M-000237 Budget Cost Code	Reactive Maintenance (i.e. Customer Request/Level of Service Failure)	Performance Acceptable (as per Strategic AMP Figure 3.1)
		Budget	**$339,774**	**$375,713**
Renewal	Condition Based Renewal	Renewals as per Capital Budget	Current LTFP Budget will take approx. 5 - 10 years to clear backlog of Condition Based Renewals ($6.8M Replacement Cost Poor/Very Poor Condition)	Accelerate Rate of Condition Based Renewals to clear backlog in <5 years
	Performance Based Renewals	Renewals as per Capital Budget	Minimal to No Current Performance Based Renewals	Depending on Condition renewals, plan for Performance Based Renewals (Upgrades) in circa 5 years (once Condition Renewal Backlog is cleared)
		Budget	**$816,633**	**$1,936,349**
Disposal	Asset Disposal	Minimal to No Asset Disposals	Minimal to No Asset Disposals	Minimal to No Asset Disposals
		Budget	**$0**	**$0**

Note: * Current activities related to Planned Budget.

** Expected performance related to forecast lifecycle costs.

Figure 3.1: Maintenance Asset Management Approach (SAMP, 2022)



4.0 FUTURE DEMAND

4.1 Demand Drivers

Drivers affecting demand on assets broadly include things such as population change, regulations, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, agricultural practices and environmental awareness.

4.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of stormwater assets have been identified and documented.

4.3 Demand Impact and Demand Management Plan

The impact of demand drivers that may affect future service delivery and use of assets are shown in Table 4.3.

Demand for new services will be managed through a combination of managing and potential upgrading of existing assets. If identified and prioritised through the Capital Works program, new assets will be constructed to meet and manage demand. Demand management practices can include non-asset solutions, insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in Table 4.3. Further opportunities will be developed in future revisions of this AM Plan.

Table 4.3: Demand Management Plan

Demand driver	Current position	Projection	Impact on services	Demand Management Plan
Climate Change (Increase in Rainfall and Severe Weather Patterns)	The CCCHAS (2023) identifies the Cassowary Coast region and its residents are vulnerable to changes in coastal hazards and the long-term impacts of climate change. These need to be considered during asset planning and design. Particular focus needs to be on assets vulnerable to flooding in low-lying areas and stormwater capacity during renewal planning.	Providing confident rainfall projections for the Wet Tropics is difficult because global climate models offer diverse results, and models have shortcomings in resolving some tropical processes. In the near future (2030) natural variability is projected to predominate over trends due to greenhouse gas emissions.	By late in the century, potential summer and autumn rainfall changes for the Wet Tropics are approximately -25% to +20% under a high emission scenario and -15% to +10% under an intermediate scenario. Impacts on runoff should be assessed and consider the risk of both a drier and wetter climate (CSIRO, 2023).	Identify Critical Infrastructure Identify Rainfall approach with stakeholders
Climate Change (Sea Level Rise)	The CCCHAS (2023) identifies the Cassowary Coast region and its residents are vulnerable to changes in coastal hazards and the long-term impacts of climate change. These need to be considered during asset planning and design. Particular focus needs to be on assets vulnerable to flooding in low-lying areas and stormwater capacity during renewal planning.	CCCHAS (2023) and State Planning Policy (2017) recommend adopting strategies based on 0.8m Sea Level Rise by 2100.	Intrusion of saltwater and impact on stormwater and coastal outlet design should be assessed	Identify assets vulnerable to sea level rise and potential changes to class and/or cover requirements Develop Renewal Program/update Policy with CCCHAS approach regarding design tailwater sea level considerations

Value of Asset Base per rateable property (Asset Rationalisation Program)	2015 QTC (Qld Treasury Corporation) report identified high asset base a risk to Council sustainability. Council has commenced the Asset Rationalisation project to achieve its commitment to ratepayers to generate savings by rationalising some assets that are unused or underutilised.	The Asset Rationalisation program is expected to reduce the demand on Council Lifecycle costs of stormwater assets through the handover of custodianship to community stakeholders.	The services provided through the Annual Budget for stormwater assets are expected to improve. The rate of this improvement is dependent on individual outcomes in the Asset Rationalisation program, and is difficult to quantify at this stage.	Updating of Asset Register and subsequently Asset Management Plans as Assets are Disposed
Legislative Requirements	Legislation is a major driver of stormwater asset management in local government, e.g. Local Government Act, Local Government Regulations, Planning Act and Planning Regulations.	There is minimal major changes expected to Legislation governing Council-owned and managed asset classes.	Minimal but subject to change	Monitor Relevant Legislation
Population Growth	Over the past 5 years the region has experienced an average annual growth rate 0.6%.	The forecast population in 2026 is 30,521 i and in 2031, 31,022 . These growth rates are lower than the state average but comparable to other Queensland Councils.	Minimal if projections are met. Unknown impacts if desired population growth as per Economic Development Strategy (2023) of 20% by 2033 is reached.	Monitor LGA Population Growth (Census Data Reviews) Consequences of 20% growth by 2033 (Economic Development Strategy, 2023) on Asset Class to be investigated with stakeholders

4.4 Asset Programs to meet Demand

The new assets required to meet demand may be acquired, donated or constructed. Additional assets are discussed in Section 5.4.

Acquiring new assets will commit the Cassowary Coast Regional Council to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan (Refer to Section 5).

4.5 Climate Change Adaptation

The impacts of climate change may be significant on the assets we manage and the services they provide. In the context of the Asset Management Planning process, climate change can be considered as both a future demand and a risk.

How climate change impacts on assets will vary depending on the location and the type of services provided, as will the way in which we respond and manage those impacts.[4]

As a minimum we must consider how to manage our existing assets given potential climate change impacts for our region.

Risk and opportunities related to climate change are identified to date are shown in Table 4.5.1

[4] IPWEA Practice Note 12.1 Climate Change Impacts on the Useful Life of Infrastructure

Table 4.5.1 Managing the Impact of Climate Change on Assets and Services

Climate Change Description	Projected Change	Potential Impact on Assets and Services	Management
Rainfall Variation	Potential 10% - 20% increase in rainfall (CSIRO, 2020). Localised Wet Tropics conditions are highly variable and difficult to quantify (ARR, 2019).	If rainfall severity increases, there will be an increase in capacity required to maintain the same accepted level of risk from capacity failure of stormwater assets.	Identify Critical Infrastructure Identify Rainfall approach w/stakeholders
Cyclone Severity	10% increase in Cyclone Intensity relative to Maximum Potential Intensity (SPP, 2017)	Increased structural stresses during cyclone events - stormwater assets generally sheltered by nature	Stormwater Asset materials and construction must maintain high standard Construction with lighter (i.e. plastic composite pipes) must consider increased stresses vs structural integrity and cover. FNQROC Standards should consider or Council have input to FNQROC consideration.
Sea Level Rise/ Ocean Acidification	0.8m SLR predicted by 2100. Ocean Ph levels predicted to decrease (between 1.5 and 5.0 times more acidic)	Increased corrosion/attack on stormwater assets exposed to rising ocean/tidal prism	Stormwater Asset materials and construction must maintain high standard. Concrete cover and class may need to be increased in these areas. FNQROC Standards should consider or Council have input to FNQROC consideration.
Increasing Temperatures	Unanimous climate model agreeance on increase - magnitude varies (circa. 0.5 - 3.0 degree increase)	Increases heat stresses on materials (i.e. concrete, steel reinforcement)	Stormwater Asset materials and construction must maintain high standard. Improvements in heat resilience/shrink/swell of materials may be required and adopted by Council. FNQROC Standards should consider or Council have input to FNQROC consideration.

Additionally, the way in which we construct new assets should recognise that there is opportunity to build in resilience to climate change impacts. Building resilience can have the following benefits:

- Assets will withstand the impacts of climate change;
- Services can be sustained; and
- Assets that can endure may potentially lower the lifecycle cost and reduce their carbon footprint

Table 4.5.2 summarises some asset climate change resilience opportunities.

Table 4.5.2 Building Asset Resilience to Climate Change

New Asset Description	Climate Change impact These assets?	Build Resilience in New Works
Critical Pit/Pipe Infrastructure	By late in the century, potential summer and autumn rainfall changes are approximately -25 to +20 per cent under a high emission scenario (RCP8.5) and -15 to +10 per cent under an intermediate scenario (RCP4.5). Impact assessment in this region should consider the risk of both a drier and wetter climate.	Identify Critical Pipe Infrastructure Identify Rainfall approach w/ stakeholders
All Concrete Infrastructure	Increased severity of both heat, ocean acidity and weather events. Increased sea levels and greater extents of tidal prism and exposure to saltwater and acidified ocean water.	Enhance structural resilience of Stormwater Assets by considering material/cover/concrete grades.

The impact of climate change on assets is a new and complex discussion and further opportunities will be developed in future revisions of this AM Plan.

5.0 LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the Council plans to manage and operate the assets at the agreed levels of service (Refer to Section 3) while managing forecast lifecycle costs.

5.1 Background Data

5.1.1 Physical parameters

The assets covered by this AM Plan are shown in Table 5.1.1. All figure values are shown in current day dollars.

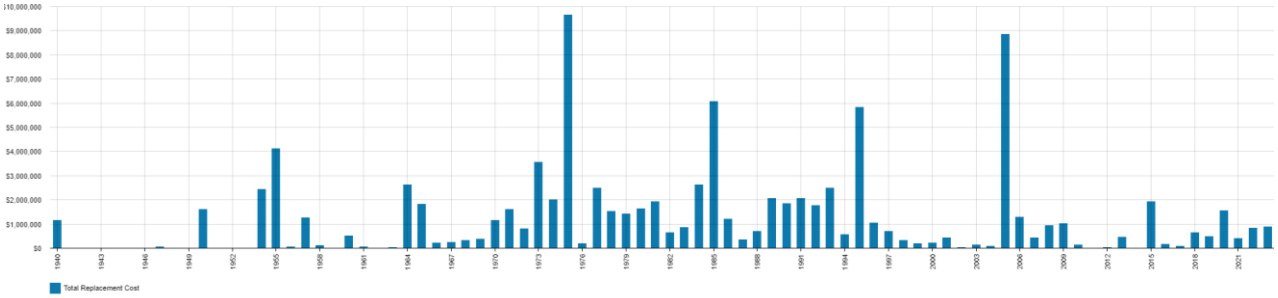
It is important to note the inconsistencies between Stormwater Assets in the Asset Register and other databases such as Council's Spectrum Spatial Analyst (SSA) Mapping. For the purposes of the AM Plan, only data contained in the Asset Register (Council's primary Asset Database) is considered. Rectification of the inconsistencies above is to be addressed as detailed in the Improvement Plan.

The age profile of the assets included in this AM Plan are shown in Figure 5.1.1.

Table 5.1.1: Assets covered by this Plan

Asset Category Label	Number	Replacement Value
Access Chamber - Manhole	362	$1,675,473.52
Culvert/Pipe Head Wall	1065	$3,381,284.54
Flood Gate	49	$2,032,334.01
Field Inlet Pit/Grated Inlet/Grated Side Inlet Pit	557	$2,078,876.95
Gross Pollutant Trap	1	$25,488.53
HDPE Plastic Pipe	1	$42,888.67
Kerb/Side Inlet Pit	1899	$8,629,323.56
Manhole	1	$14,169.32
PVC Plastic Pipe	2	$54,836.08
Reinforced Box Culvert	190	$13,258,425.55
Reinforced Concrete Box Culvert	1	$408,143.06
Reinforced Concrete Pipe	3106	$64,947,017.46
Tide Flex (Coastal Outlet)	14	$179,328.81
TOTAL		**$96,727,590.06**

Figure 5.1: Asset Age Summary



The quality of Council's Stormwater Asset Data is also of concern when considering the Asset Age Summary of data contained in the Asset Register.

The Asset Register has distinctly defined 'bins' of Acquisition/Renewal for the years of 1975, 1985, 1995 and 2005. Investigation into the sourcing and upkeep of the Asset Register data has revealed the following likely causes and concerns with the data quality:

- Accuracy of Council data pre-amalgamation (Johnstone and Cardwell Shire merger (2008)) is difficult to verify as very little information was known and/or kept regarding asset data management practice and procedures (quality assurance);
- Council remaining useful life data (based on condition received at time of amalgamation) from commission date (date of asset handover) are 'binned' by nature of their entry method e.g. all concrete pipes (Adopted Useful Live = 90 years) having the same Condition (Rating of 1 – 5 as discussed in Section 5.1.3) would all be factored by the same value to determine a Remaining Useful Life based on Condition. This would result in the large number of 'bins' at consistent intervals as is shown in the Asset Age Summary;
- There was a severe lack of information regarding construction of stormwater assets upon Council amalgamation. A method was adopted where construction dates were estimated based on surrounding survey dates. This may have contributed to the 10 years cohorts/bins.

The issues outlined above can only be eliminated through the implementation of a Condition Inspection Program and gradual maturing of the Asset Register. These Programs do not currently exist but are recommended as part of the Improvement Plan.

5.1.2 Asset capacity and performance

Assets are currently provided to meet design standards such as FNQROC, QUDM and ARR. However, current 'best practice' in asset capacity and performance has not always existed. Such legacy issues, in combination with condition based failures, have led to service level deficiencies within Council. Draft exercises such as the American Society of Civil Engineer's Report Card Grading Scale (2021) show Stormwater as Council's worst performing asset class.

Many of these capacity service deficiencies were noted as part of Council's Master Drainage Program (BMT, 2012 – 2016). This work was built upon in the Investigation of Priorities (GenEng, 2018), which identified approximately $25M in priority Stormwater asset upgrades within Council. This report prioritised the proposed upgrades of the Master Drainage Program according to a select methodology, recommending that Acquisition/Renewal be limited to:

- Known critical inundation areas;
- Aged infrastructure;
- Poor condition infrastructure;
- Maintaining a Level of Service (possible increase in cleaning activity);
- Preventative actions (where non-action may result in major damage).

Key locations where deficiencies in service performance are known are detailed in Table 5.1.2. Further information can be found in the aforementioned documentation.

Table 5.1.2: Known Service Performance Deficiencies

Location	Key Service Deficiency
Kurrimine Beach	Jacobs Road Reserve Outlet
Innisfail	Innisfail CBD
Mission Beach	Major Shopping Precinct (CBD)
Tully	Butler Street
Silkwood	Around North Coast Rail Line and Silkwood-Japoon Road
Innisfail Estate	Aluart/Flying Fish Point Road and Carellos Drain

The above service deficiencies were identified from both previous studies and staff experience and judgement.

5.1.3 Asset condition

Condition assessments of stormwater assets are currently undertaken on an as-needed basis due to condition failures or to satisfy minimum requirements for Stormwater Asset class valuations. A minimum percentage (approx. 10%) is inspected to be adopted as reflective of the entire Asset Class. These inspections currently only occur with the Stormwater Asset class revaluations - once every five (5) years.

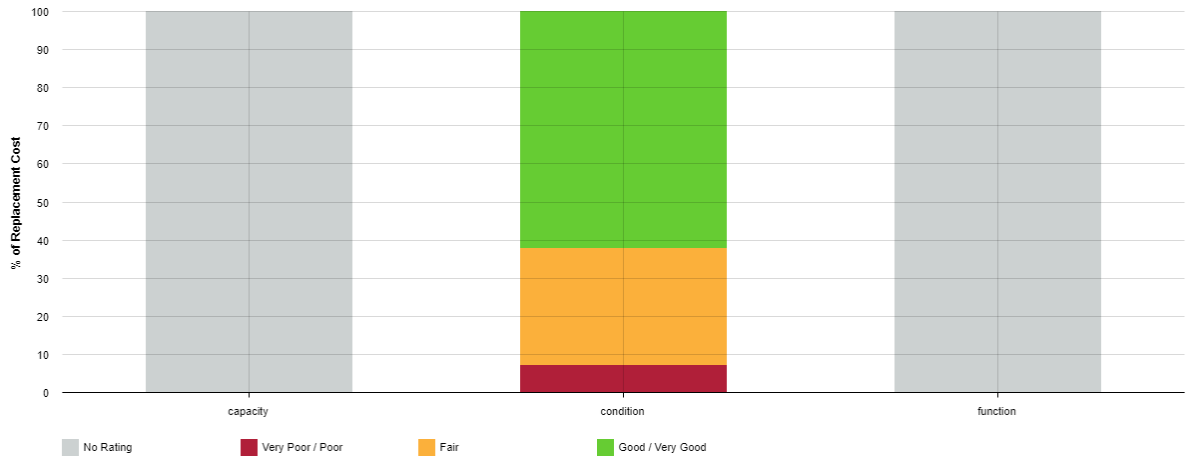
Condition is measured using a 1 – 5 grading system[5] as detailed in Table 5.1.3 (IPWEA Practice Note 5 – Stormwater Drainage (Condition Assessment and Asset Performance Guidelines). It is important that a consistent approach is used in reporting asset performance enabling effective decision support.

Table 5.1.3: Condition Grading System

Condition Grading	Description of Condition
1	**Very Good**: free of defects, only planned and/or routine maintenance required
2	**Good**: minor defects, increasing maintenance required plus planned maintenance
3	**Fair**: defects requiring regular and/or significant maintenance to reinstate service
4	**Poor**: significant defects, higher order cost intervention likely
5	**Very Poor**: physically unsound and/or beyond rehabilitation, immediate action required

The condition profile of Council stormwater assets is shown in Figure 5.1.3. All figure values are shown in current day dollars.

Figure 5.1.3: Asset Condition Profile



Around 7% ($6.8M Replacement Cost) of stormwater assets are rated as either Poor or Very Poor (Condition 4 or 5). IPWEA Practice Note 5 – Stormwater Drainage (Condition Assessment and Asset Performance Guidelines) states that stormwater assets assessed as such will generally need renewal/replacement within ten (10) years at most. If this is not undertaken, risks of catastrophic failure of potentially serious consequence (dependent on hierarchy/criticality) are likely.

Council has no scheduled Asset Inspection Program for the Stormwater Asset Class i.e. there is no formalised process to monitor nor confirm changes to condition of stormwater assets. This is addressed to be rectified in the Improvement Plan.

[5] IPWEA, 2015, IIMM, Sec 2.5.4, p 2|80.

5.1.4 Asset Tenure

Multiple issues within the stormwater asset class exist due to a lack of tenure (through either drainage easement or reserve) over stormwater infrastructure on private land. This exposes Council to legal, service, financial and reputational risk due to lack of access to undertake asset management activities. Figure 5.1.4 shows an example of the use of an easement over water/wastewater network to gain tenure over local government responsibility (orange) infrastructure located on private land (Columbia Water, 2023). The lack of tenure over Council stormwater assets is identified to be addressed in the Improvement Plan.

Figure 5.1.4: Asset Tenure – Use of an Easement

5.2 Operations and Maintenance Plan

Operations include regular activities to provide services to customers. Examples of typical broader operational activities include cleaning, street sweeping, asset inspection, and utility costs. Operations activities specific to the stormwater asset class include basic management, inspections and revaluations.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Examples of typical maintenance activities include pipe repairs, asphalt patching, and equipment repairs. Maintenance activities specific to the stormwater asset class include cleaning, clearing, and servicing.

The historic trend in stormwater maintenance budgets is inconsistent. Budgets and actual expenditure for the last five (5) years is shown in Table 5.2.1.

Table 5.2.1: Maintenance Budget Trends

Financial Year	Maintenance Budget $	Maintenance Actuals $
2019	$403,178.00	$354,235.41
2020	$374,379.37	$348,186.11
2021	$215,909.00	$140,950.80
2022	$442,965.00	$510,963.59
2023	$262,437.42	$312,626.07
AVERAGE	**$339,773.76**	**$333,392.40**

Maintenance budget levels are currently considered to be adequate to meet projected service levels, which are considered to be equal to current service levels. If maintenance budget allocations were to reduce, there will be a resultant lesser level of service.

Assessment and priority of stormwater maintenance is currently undertaken by internal staff using experience and judgement. Maintenance works can also be reactive in response to Customer Requests received externally.

5.2.1 Asset hierarchy

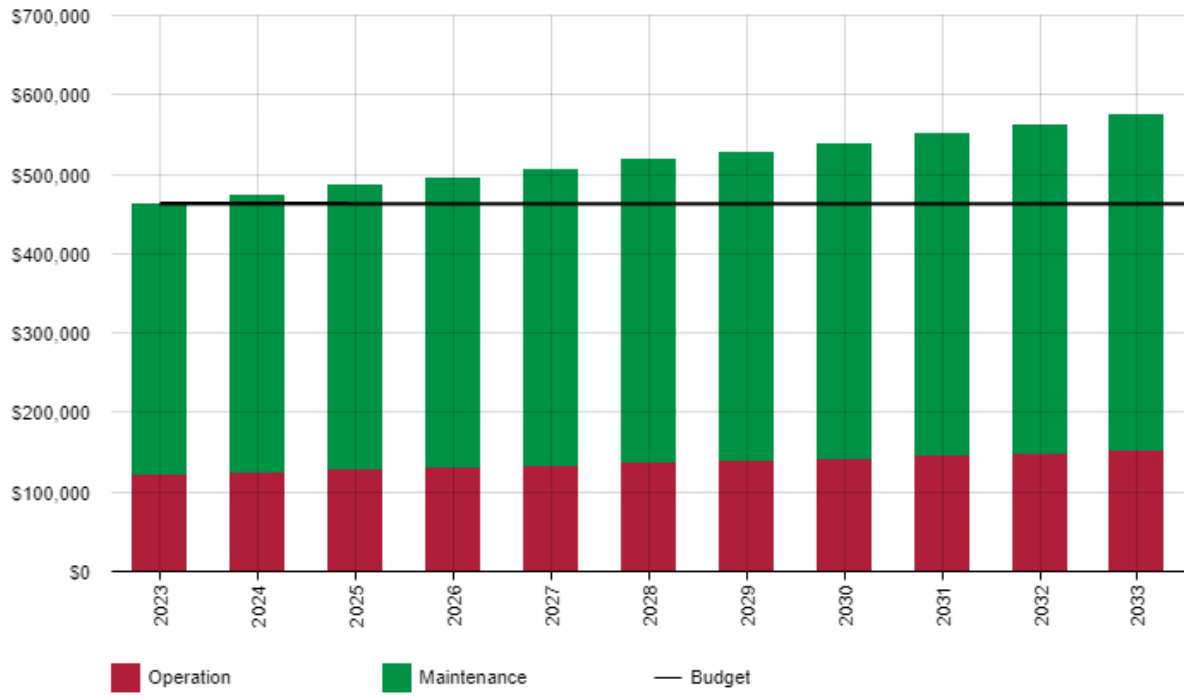
An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component (used for asset planning and financial reporting) and service level hierarchy (used for service planning and delivery).

Council currently has no asset hierarchy or identified critical assets for the stormwater asset class. This is to be rectified as per the Improvement Plan.

5.2.2 Summary of forecast operations and maintenance costs

Forecast operations and maintenance costs are expected to vary in relation to the total value of the asset stock. If additional assets are acquired, the future operations and maintenance costs are forecast to increase. If assets are disposed of the forecast operation and maintenance costs are expected to decrease. Figure 5.2 shows the forecast operations and maintenance costs relative to the proposed operations and maintenance Planned Budget as per the LTFP. All figure values are shown in current day dollars.

Figure 5.2: Operations and Maintenance Summary



Increases in Maintenance lifecycle costs are largely attributed to future Capital Projects and Programs and their respective forecast Acquisition/Renewal split. These forecasts are financially driven (New Capital Percentage) and may not necessarily be reflective of direct Asset Acquisitions in future. Examples of the Acquisition/Renewal split include:

- Urban Drainage Renewal Program (25% New Capital/Acquisition)
- Stormwater Miscellaneous Upgrades Program (25% New Capital/Acquisition)
- Mission Beach CBD Master Plan (10% New Capital/Acquisition)

It is considered the increasing Maintenance costs shown above are conservative and the actual increase to cost will likely be less. This, combined with the inherent flexibility shown in Table 5.2.1, shows the Maintenance budget is well placed to meet current projections of future demands.

By association, it is also considered the Operations Budget is well placed to meet current projections of future demand. This may be subject to change pending costing vs saving impacts of the Improvement Plan regarding Asset Condition Inspection Programs.

5.3 Renewal Plan

Renewal is major capital work which does not significantly alter the original service provided by the asset, 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 considered to be an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from one of two approaches in the Lifecycle Model.

- The first method uses Asset Register data to project the renewal costs (replacement cost) and renewal timing (acquisition year plus updated useful life to determine the renewal year), or
- The second method uses an alternative approach to estimate the timing and cost of forecast renewal work (i.e. condition modelling system, staff judgement, average network renewals, or other).

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in Table 5.3. Asset useful lives were last reviewed as part of the 2022 Stormwater Valuation (Stantec, 2022).[6]

Table 5.3: Useful Lives of Assets

Asset (Sub)Category	Useful life
Kerb Inlet Pit	90
Flood Gate	60
Access Chamber – Manhole	90
Field Inlet Pit	90
Headwall	90
Gross Pollutant Trap	60
Tide Flex	60
Reinforced Concrete Pipe	90
Reinforced Box Culvert	90

There are issues outlined in Section 5.1 regarding data quality relevant to Stormwater Asset acquisition dates and condition. The Improvement Plan identifies Asset Inspections need to be more broadly and systematically undertaken to determine the accuracy and maturity of the Asset Register before it is deemed suitable for the development of a Renewal Plan. As a result, Asset Register data has been deemed currently unsuitable for use in lifecycle analysis of Asset Renewals using the Asset Register Method.

The estimates for renewals in this AM Plan are based on the Alternate Method.

5.3.1 Renewal ranking criteria

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a bridge that has a 5 t load limit), or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. condition of a playground).[7]

It is possible to prioritise renewals by identifying assets or asset groups 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.[8]

[6] Stantec, 2022, Valuation Report, Sec 3.5.5
[7] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.
[8] Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

This lack of a Capital Project Prioritisation Procedure/Tool for the stormwater asset class is to be rectified as per the Improvement Plan. This will be used in combination with the Condition Assessment Program and IPWEA Practice Note 5 Guidelines to confirm renewal priority ranking for the stormwater asset class.

5.4 Summary of future renewal costs

The forecast costs associated with renewals are shown relative to the proposed renewal budget in Figure 5.4.1. A detailed summary of the forecast renewal costs is shown in Appendix D. All figure values are shown in current day dollars.

Figure 5.4.1: Forecast Renewal Costs

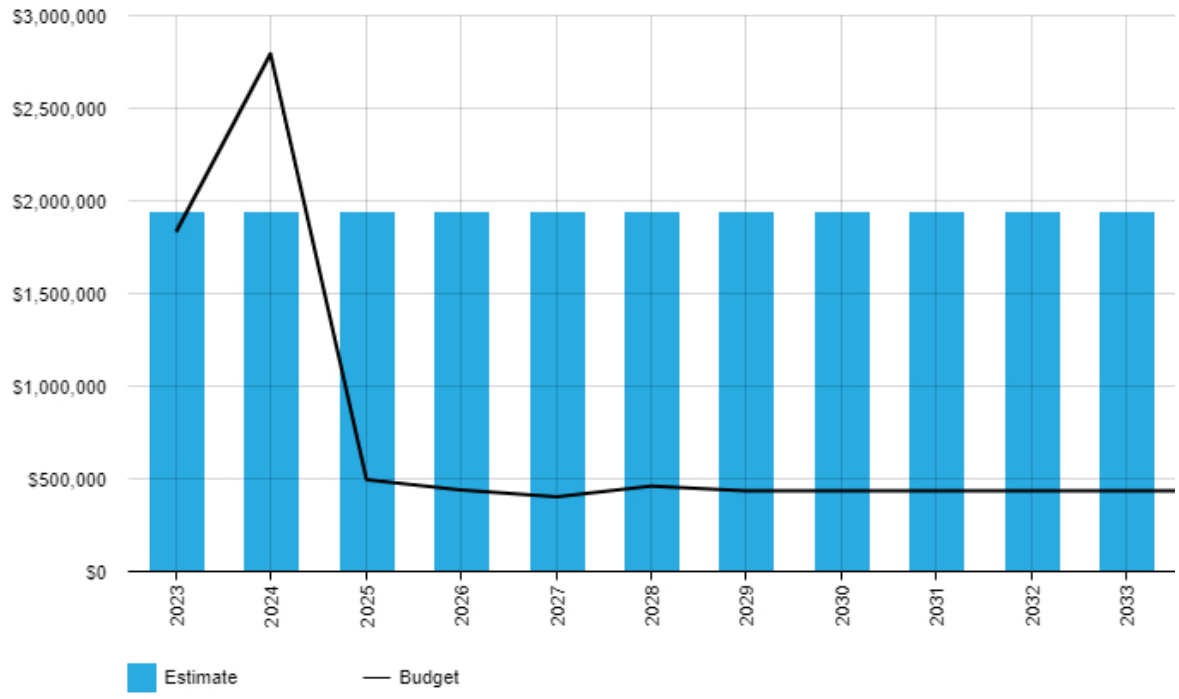


Figure 5.4.1 shows a significant drop off in Planned Budget (LTFP) renewal funding over the ten (10) year forecast period. As detailed in Table 5.6, Forecast Renewal Costs are estimated at approximately $1.9M per year over the forecast period, but average around $0.8M in Planned Budget funding. Initial spikes in budget expenditure are due to current allocation of major Capital Projects, namely;

- Callendar Park Drainage Upgrade (23/24 FY)
- Mission Beach CBD Master Plan (24/25 FY)

As discussed, if the current LTFP Budget is to remain, Council will be exposed to higher risk and decreasing levels of service within the Stormwater Asset Class. Funding gaps between planned budgets and forecast lifecycle costs must be addressed considering some/all of the following:

- Increasing Stormwater Assets Planned Budget (LTFP)
- Decreasing Stormwater Assets Lifecycle Costs
- Acceptance of higher Risks and decreasing Levels of Service

The recommended approach is discussed in Section 5.7.

5.4.1 Estimation of future renewal costs

Future renewal cost were estimated for the Alternate Method using the information outlined in Table 5.4 below. Some points of note regarding Table 5.4 include;

- Expected Annual Renewal Cost (adopted in Figure 5.4.1) is calculated by dividing the Average Remaining Useful Life by the total Renewal Cost of each stormwater asset sub-class in the Asset Register.
    - This method averages the total cost of renewal over the average remaining useful life of each asset sub-class. Issues around acquisition dates and condition in the Asset Register still exist, however by averaging the remaining useful life and applying across entire asset sub-classes, any inconsistencies in acquisition dates and therefore renewal dates can be spread across the remaining life as opposed to falling on single disposal/renewal years.
    - This is particularly relevant when the vast majority of assets in the class have one of only two Useful Life values (60 or 90 years), further concentrating any 'bins' falling on single disposal/renewal years.
- Both PVC and RCP (Reline) were not allocated Useful Life as part of the Valuation (Stantec, 2022)
    - The Useful Life of RCP Reline has been included for consideration as part of future RCP Renewals as seen in Figure 5.4.1. This is considered a key option for reducing the current funding gap between budget and forecast renewals of the stormwater asset network.
    - RCP Reline is yet to be undertaken on Council Stormwater Assets, however Asset Engineering is currently determining both focused and broader feasibility of Relining for use within Council. This is flagged in the Improvement Plan.
- The Asset Register and Spectrum Spatial Analyst (SSA Mapping) data shows inconsistencies in recent updates. The following have been flagged for correction as part of the Improvement Plan amongst other specific inconsistencies:
    - Creation of inconsistent 'Manhole' and 'RCBC' Asset Sub-class in Asset Register
    - No inclusion of ARMCO (Corrugated), BlackMax or Polypropylene Pipe Assets in Asset Register
    - Seventy-six (76) Stomwater Assets within SSA not included in Asset Register. These are focused around recent land developments such as Nautilus Drive and Pelican Close.
    - Thirteen (13) Stormwater Assets within Asset Register not included in SSA.

Table 5.4: Alternate Method Renewal Costings

Asset (Sub)Category	Average Remaining Useful Life	Total Renewal Cost	Expected Average Annual Renewal Cost
Access Chamber - Manhole	50	$1,675,474	$33,597
Culvert/Pipe Head Wall	49	$3,381,285	$68,382
Flood Gate	26	$2,032,334	$78,975
Field Inlet Pit/Grated Inlet/Grated Side Inlet Pit	48	$2,078,877	$43,656
Gross Pollutant Trap	46	$25,489	$557
HDPE Plastic Pipe	86	$42,889	$499
Kerb/Side Inlet Pit	53	$8,629,324	$162,620
Manhole	79	$14,169	$179
PVC Plastic Pipe	61	$54,836	$897
Reinforced Box Culvert	52	$13,258,426	$255,154
Reinforced Concrete Box Culvert	90	$408,143	$4,535
Reinforced Concrete Pipe (Replace)	51	$64,947,017	$1,282,451
Reinforced Concrete Pipe (Reline)	50	-	-
Tide Flex (Coastal Outlet)	37	$179,329	$4,847
Forecast Annual Renewal Cost			**$1,936,349**

5.5 Acquisition Plan

Acquisition reflects new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, demand, social or environmental needs. Assets may also be donated to Council, for example via greenfields development handovers.

5.5.1 Selection criteria

Any potential upgrade and new works should be reviewed to verify that they are essential to Council and community needs. Proposed upgrade and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals can then be ranked by priority and available funds to be scheduled in future works programmes.

As with Renewals, Council currently has no priority ranking criteria for Asset Acquisitions. Historically, decisions have been made through channels other than Asset Custodians (Asset Engineering) regarding the Acquisition of stormwater assets; generally through other departments (Planning Services) or higher levels of local government (Mayors/Councilors).

Known asset acquisitions are detailed in Table 5.5.1.

Table 5.5.1: Acquired Assets

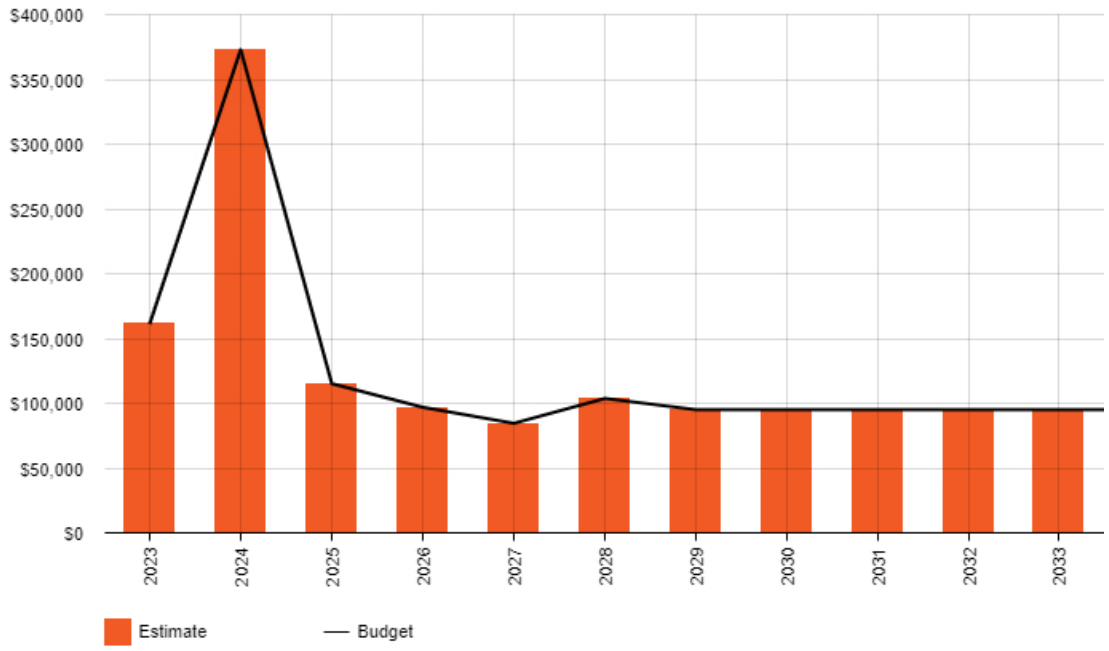
Acquisition	Value $
Port Hinchinbrook Stormwater Network	$319,199

The primary upcoming stormwater asset acquisition for Council is the Port Hinchinbrook stormwater network. This is yet to be componetised and is currently represented in the Asset Register as a lump sum value. This value (and the componetised amount) is expected to vary once condition assessment of the Port Hinchinbrook stormwater network is complete.

Summary of future asset acquisition costs

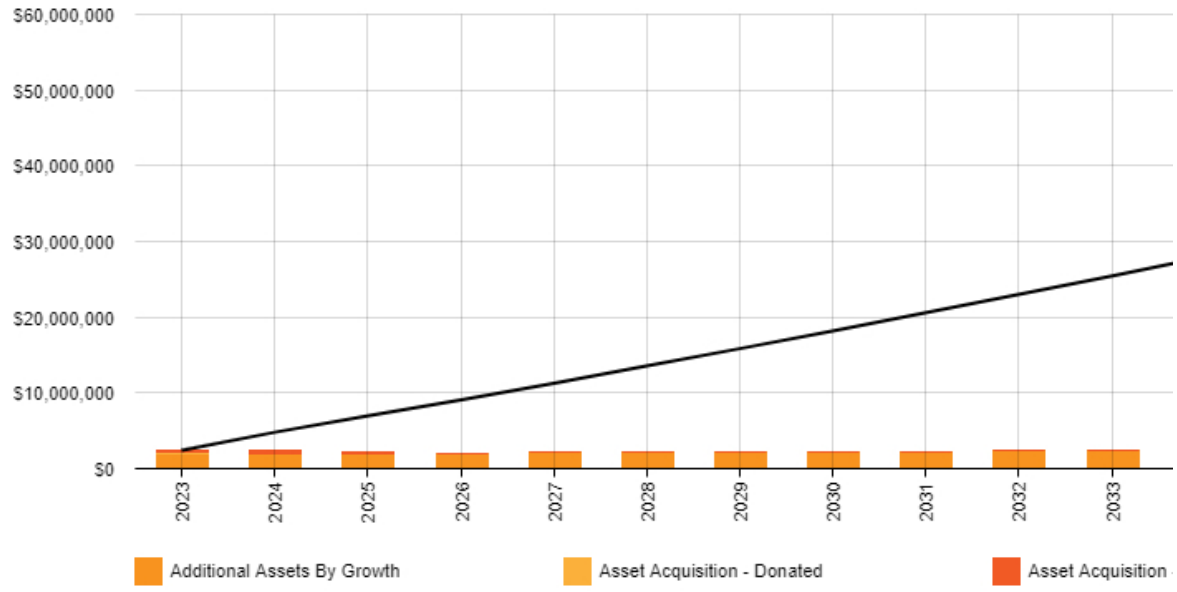
Forecast acquisition asset costs are summarised / summarized in Figure 5.5.1 and shown relative to the proposed acquisition budget. The forecast acquisition capital works program is shown in Appendix A. All figure values are shown in current day dollars.

Figure 5.5.1: Acquisition (Constructed) Summary



When committing to new assets, Council must be prepared to fund future operations, maintenance and renewal costs. When reviewing the long-term impacts of asset acquisition, it is useful to consider the cumulative value of the acquired assets being taken on by the Entity. The cumulative value of all acquisition work, including assets that are constructed and contributed shown in Figure 5.5.2. All figure values are shown in current dollars.

Figure 5.5.2: Acquisition Summary



Expenditure on new assets and services in the capital works program will be accommodated in the long-term financial plan (LTFP), but only to the extent that there is available funding.

Under the current budget and lifecycle costing arrangements there is limited scope for stormwater asset acquisitions. The Acquisitions in Figure 5.5.1 are predominately the proportions of future Capital Projects and Programs and their respective forecast Acquisition/Renewal split. These forecasts are financially driven (New Capital Percentage) and may not necessarily be reflective of direct Asset Acquisitions in future. Examples of the Acquisition/Renewal split include:

- Urban Drainage Renewal Program (25% New Capital/Acquisition)
- Stormwater Miscellaneous Upgrades Program (25% New Capital/Acquisition)
- Mission Beach CBD Master Plan (10% New Capital/Acquisition)

There is no explicitly allocated budget for bulk Acquisitions; Council stormwater assets are almost always treated as majority Renewals. Acquisitions of stormwater new assets almost exclusively are 'Donations'. That is, Council assumes ownership with no upfront acquisition cost upon handover. Future asset lifecycle costs (i.e. Operation and Maintenance) are then borne by Council.

Acquiring these new assets commits the funding of ongoing operations, maintenance, and renewal costs for the period that the service provided from the assets is required. Forecast Lifecycle Costs allow for a two percent (2%) growth in Acquired Assets through Donations (increases in Operations and Maintenance Cost but no upfront Acquisition Cost). There is no allowance for Constructed Asset Acquisitions.

This allowance is required to in-part consider the population growth target outlined in Council's Economic Development Strategy (20% population growth by 2023). The assumption that all Acquisitions required to achieve this goal are to be donated is one that needs clarification through other stakeholders and decision makers as to its suitability. If this Asset Acquisition is not proposed to be wholly through donations, there may be major impacts on Lifecycle Costing.

The clear gap emerging between the stormwater budget and forecast lifecycle costs, considering there is no appetite for an increase in risk or decreasing levels of service, shows there is little scope for acquisitions (other than Donated) in the stormwater asset class. Under current funding arrangements it is recommended that focus instead be on disposals, as facilitated through programs such as Council's Asset Rationalisation Program.

5.6 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. Any costs or revenue gained from asset disposals is included in the long-term financial plan.

Due to the nature of the service delivery, there are little Disposals that occur in the Stormwater Asset class (Assets are almost exclusively Renewed).

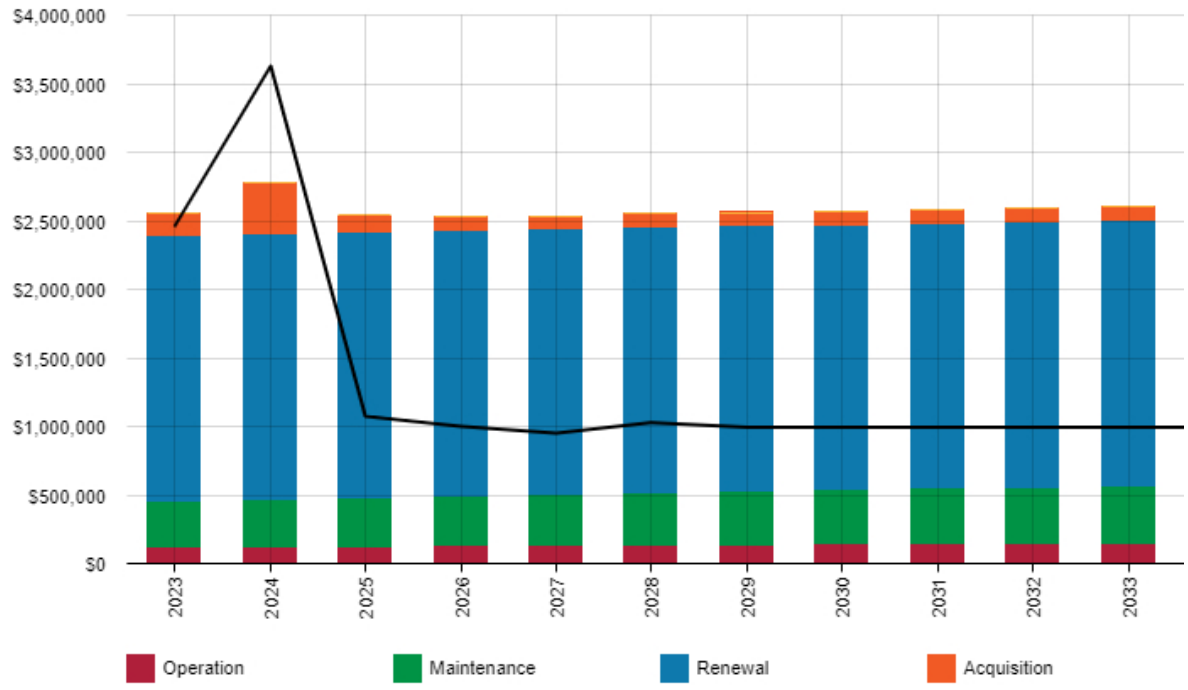
There is scope within Council's Asset Rationalisation Program for Disposal of Stormwater Assets. The scope of these Disposals is relatively undefined, as much of the Program is still in the process of negotiations with community groups/third parties. The investigation of potential opportunities for Stormwater Asset Disposal through the Asset Rationalisation Program is flagged in the Improvement Plan.

5.7 Summary of asset forecast costs

The financial projections from this asset plan are shown in Figure 5.7.1. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget. All figure values are shown in current day dollars.

The bars in the graphs represent the forecast lifecycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.

Figure 5.7.1: Lifecycle Summary



Estimated available funding for the 10 year period is $14,108,000 or $1,411,000 on average per year as per the Long-Term Financial Plan. This is 54.7% of the cost to sustain the current level of service at the forecast lifecycle cost. The infrastructure reality is that only what is funded in the long-term financial plan can be provided. Informed decision making depends on the AM Plan emphasising the consequences of Planned Budgets on the service levels provided and risks.

The anticipated Planned Budget for the Stormwater asset class leaves a shortfall of $-1,169,000 on average per year of the forecast lifecycle costs required to provide services in the AM Plan compared with the Planned Budget currently included in the Long-Term Financial Plan (see Appendices for detail).

It is proposed that potential solutions to address this shortfall begin with the below:

- **Increasing Stormwater Assets Budget**
    - The Stormwater Asset Class Budget of recent major projects such as the Callendar Park Drainage Upgrade and the Mission Beach CBD Master Plan show there is a will for decision makers to increase funding in the stormwater asset class.
    - Decision makers must be given sound and justifiable Capital Projects for consideration during annual budget planning and this should come from Asset Custodians. The lack of a formalised process for this to occur is addressed as part of the Improvement Plan.

- **Decreasing Stormwater Asset Costs**
    - The Replacement Cost of RCP makes up approximately two-thirds of the entire Stormwater Asset class Renewal Cost, making it an ideal sub-class to target savings.
    - New technologies around RCP Relining show potential for savings in the RCP Stormwater asset sub-class. Asset Engineering is currently determining both focused and broader feasibility of Relining for use within Council as indicated in the Improvement Plan.

- **Acceptance of higher Risks and/or decreasing Levels of Service in the Stormwater Asset Class**
    - There is little to no appetite for decision makers and customer stakeholders to increase risks or decrease Levels of Service across the Stormwater Asset class (including Operations and Maintenance). It is not recommended Lifecycle Costing be reduced through the cutting of Operations or Maintenance Budgets or the postponement of Renewals.

6.0 RISK MANAGEMENT PLANNING

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'[9].

An assessment of risks[10] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment should also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets should be identified and along with their typical failure mode, and the impact on service delivery. Failure modes may include physical failure, collapse or essential service interruption.

Council currently has no methodology in place to identify Critical Assets. This is addressed as part of the Improvement Plan.

By identifying critical assets and failure modes an organisation can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

6.2 Risk Assessment

The risk management process used is shown in Figure 6.2 below.

It is an analysis and problem-solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2018.

[9] ISO 31000:2009, p 2

[10] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

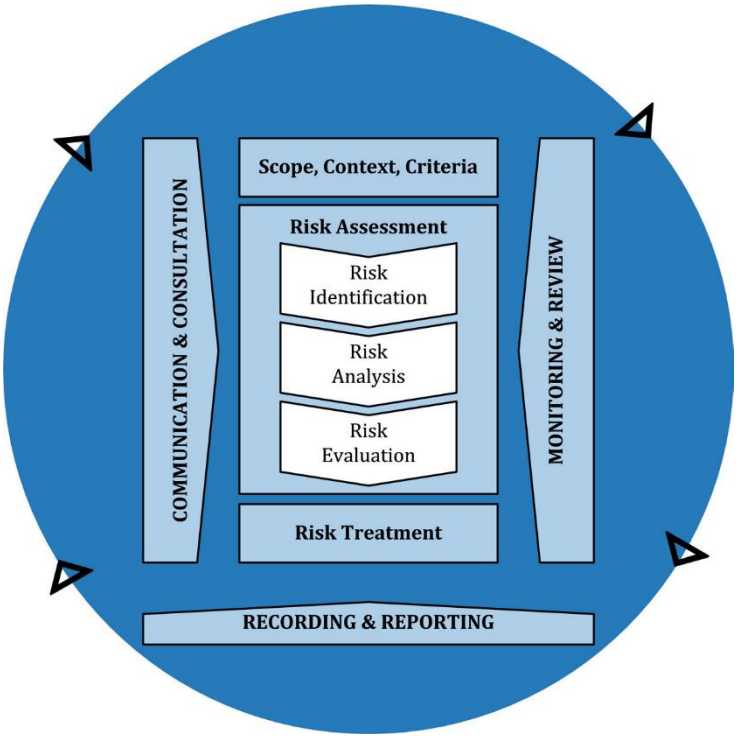


Fig 6.2 Risk Management Process – Abridged
Source: ISO 31000:2018, Figure 1, p9

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks[11] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) risk rating identified in the Risk Assessment Process. The residual risk and treatment costs of implementing the selected treatment plan is shown in Table 6.2. It is essential that these critical risks and costs are reported to management and decision makers, and Council's appetite for risk outlined in the SAMP (2022) is 'Moderate'.

Note none of the Treatment Costs have been added to any Budgets or Lifecycle Costing as they are yet to be formally scoped, costed, or endorsed by decision makers. As these Risk Treatment Plans are endorsed, future updates to the Stormwater AM Plan will include these costs.

[11] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

Table 6.2: Risks and Treatment Plans

Risk	Risk Treatment Plan	Residual Risk	Treatment Costs
Broad unknown Asset Condition leading to reduction in LOS / Catastrophic Failure	Develop Asset Condition Inspection Program and Implement	Assets missing from Register/ Program	Operational Request circa $80,000 p/a
Planned Budget (LTFP) deficit to Forecast Lifecycle Costing leading to reduction in LOS / Catastrophic Failure	Develop Plan and Process to reach Expenditure based on Risk Based Prioritisation and Quality Data	Broader Budgetary Constraints and Financial Influences	Current shortfall average $1,170,000 p/a over 10 year forecast period Will change with Asset Register Maturity and Relining outcomes
Risk to Council due to lack of Tenure over stormwater assets including Open Drainage (non-capitalised) Assets	Develop Stormwater Asset Tenure Prioritisation Plan including Open Drainage (non-capitalised Assets)	Assets missing from Register/ Program	Wages to Implement circa $5000 p/a Drainage Tech Officer + Tenure Acquisition Costs
Critical Asset Failure due to non-targeted inspection and maintenance scheduling	Develop Heirarchy/Criticality Rating for Asset Class as per IPWEA PN5 (inc. Climate Change)	Assets missing from Register/ Program	Wages to Implement circa $5000 p/a Drainage Tech Officer
Council Target of 20% Population Growth by 2033 – impact on lifecycle costs, LOS	Engage Internal Stakeholders as to assumptions made in Economic Development Strategy and consistency with AM Plans	TBD – based on Outcome of Risk Treatment Plan	TBD – based on Outcome of Risk Treatment Plan
Asset Engineering Long Term Vacancies leading to reduction in LOS	Hire Manager Asset Engineering Develop PDs Fill Vacancies in Asset Engineering	May still be vacancies – no Open Space Technical Officer	Wages circa $250,000 p/a MAE + Asset Analyst
Natural Disasters - potential increase in occurrence due to climate change - Financial Shock for Asset Renewals - lack of data leading to DRFA ineligibility	Condition Photos (Reflect/Recover) requirement as part of Inspection	Unknowns of Natural Disaster Frequency	Inclusive in Condition Inspection Program
Climate Change - Increase in rainfall IFD resulting in under design of older infrastructure and increase in service failure	Investigate Climate Change Guidelines as per ARR/QUDM and CSIRO to be adopted during design of Critical Infrastructure	Climate Change Potential Risk left on Non-Critical Infrastructure	Potential increase in Capital Costs on Critical Works (as identified through Hierarchy)

Note * The residual risk is the risk remaining after the selected risk treatment plan is implemented.

6.3 Service and Risk Trade-Offs

The current 'gap' between the LTFP and forecast Lifecycle Costs mean trade-offs will exist between budgets and risk over the forecast period.

6.3.1 What we cannot do

There are asset lifecycle activities that are unable to be undertaken within the LTFP forecast period of ten (10) years without planned budget increase, lifecycle costing decrease, or an acceptance of greater risk or lowered Levels of Service. Examples of these include:

- Adequate Renewals are currently unattainable due to:
    - Major shortfall between actual budget (beyond the next 2 years) and forecast lifecycle cost.
    - Desire to maintain current Level of Service and existing Level of Risk
- Major Constructed (Non-Donated) Acquisitions are to be minimised due to:
    - Major shortfall between actual budget (beyond the next 2 years) and forecast lifecycle cost (considering current Stormwater Assets–shortfall will increase with Constructed Acquisitions)
    - Potentially significant impacts on Operations and Maintenance Costing
- Increases in Existing Levels of Service are currently unattainable due to:
    - Lack of budget and resourcing to increase Non-Condition (Capacity) Based Renewals
- Non-Condition Based Renewals/Acquisition (i.e. Capacity Upgrades) are also highly unlikely as:
    - Current data suggests a condition-based (Poor/Very Poor) renewal backlog of 5 – 10 years.
    - Note this is dependent on condition-based failures of assets without accurate condition data.

6.3.2 Service trade-off

If there is forecast work (operations, maintenance, renewal, acquisition or disposal) that cannot be undertaken due to available resources, then this will result in service consequences for users including:

- Potential Catastrophic Condition Failure
    - Any reduction in current Renewal Levels of Service will see continued 'falling behind' of stormwater asset class renewals
    - Any reduction in current Maintenance Levels of Service (Reactive Maintenance) will mean a Run-to-Failure Approach

6.3.3 Risk trade-off

The operations and maintenance activities and capital projects that cannot be (or are currently not being) undertaken may sustain or create risk consequences. These risk consequences include:

- Potential Catastrophic Condition Failure
    - Funding shortfall will see continued 'falling behind' of stormwater asset renewals
    - Overall stormwater asset class condition will continue to decline
- Increased Design Capacity Failure due to Climate Change
    - Current Design Procedure rarely considers Climate driven increased rainfall
    - Current Design Procedure rarely considers Climate driven increased sea level where applicable
- Potential Catastrophic Condition and/or Service Failure due to
    - Under resourced Asset Engineering (Asset Inspector) Department
    - Lack of formalised Stormwater Asset Inspection Program
- Inability to Recover Funding through Disaster Recovery Fund due to:
    - Under resourced Asset Engineering (Asset Inspector) Department
    - Lack of formalised Stormwater Asset Inspection Program
- Continued Capital Project proposals for funding through non-formalised process due to:
    - Lack of consistent stormwater Capital Project Assessment Procedure / Tool
    - Potential for highest impartially prioritised Capital Projects to remain unfunded
- Loss of Skills and Knowledge from Ageing Workforce
    - Lack of Future Planning regarding retirement of experienced and knowledgeable staff

7.0 FINANCIAL SUMMARY

This section contains the financial requirements resulting from the information presented in the previous sections of this AM Plan. The financial projections will be improved as the discussion and data on desired levels of service and asset performance matures.

7.1 Financial Sustainability and Projections

7.1.1 Sustainability of service delivery

There are two key indicators of sustainable service delivery that are considered in the AM Plan for this service area. The two indicators are the:

- Asset Renewal Funding Ratio (proposed renewal budget for the next 10 years / proposed renewal costs for the next 10 years shown in the AM Plan), and
- Lifecycle Funding Ratio (proposed lifecycle budget for the next 10 years / proposed budget over 10 years shown in the AM Plan).

Asset Renewal Funding Ratio

Asset Renewal Funding Ratio[12] 42.2%

The Asset Renewal Funding Ratio is an important indicator and illustrates that over the next 10 years we expect to have 42.2% of the funds required for the optimal renewal of assets.

The forecast renewal work along with the proposed renewal budget, and the cumulative shortfall, is illustrated in Appendix D.

Medium term – 10 year financial planning period

This AM Plan identifies the forecast operations, maintenance and renewal costs required to provide an agreed level of service to the community over a the ten (10) year forecast period. This provides input into the ten (10) year financial/funding plans (such as the LTFP) aimed at providing the required services in a sustainable manner.

This forecast work can be compared to the proposed budget over the first 10 years of the planning period to identify any funding shortfall.

The forecast operations, maintenance and renewal costs over the 10 year planning period is $2,448,000 average per year. The proposed (budget) operations, maintenance and renewal funding is $1,279,000 on average per year giving a 10 year funding shortfall of $-1,169,000 per year.

This indicates that 52.3% of the forecast costs needed to provide the services documented in this AM Plan are accommodated in the proposed budget.

Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to achieve a Lifecycle Funding Ratio indicator of between 90% - 110% ideally over the 10 year life of the Long-Term Financial Plan.

7.1.2 Forecast Costs (outlays) for the long-term financial plan (LTFP)

Table 7.1.3 shows the forecast costs (outlays) required for consideration in the 10 year long-term financial plan.

Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the long-term financial plan.

The gap between the forecast outlays and the amounts allocated in the financial plan indicates further work is required on reviewing service levels in the AM Plan and/or financial projections in the LTFP.

Forecast costs are shown in 2023 dollar values.

[12] AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9.

Table 7.1.2: Forecast Costs (Outlays) for the Long-Term Financial Plan

Year	Acquisition	Operation	Maintenance	Renewal	Disposal
2023	161,250	123,015	339,774	1,936,349	0
2024	372,951	126,168	348,262	1,936,349	0
2025	115,028	129,239	356,532	1,936,349	0
2026	96,810	132,027	364,038	1,936,349	0
2027	84,500	134,845	371,623	1,936,349	0
2028	103,623	137,700	379,309	1,936,349	0
2029	95,000	140,634	387,211	1,936,349	0
2030	95,000	143,614	395,233	1,936,349	0
2031	95,000	146,651	403,408	1,936,349	0
2032	95,000	149,746	411,741	1,936,349	0
2033	95,000	152,900	420,234	1,936,349	0

7.2 Funding Strategy

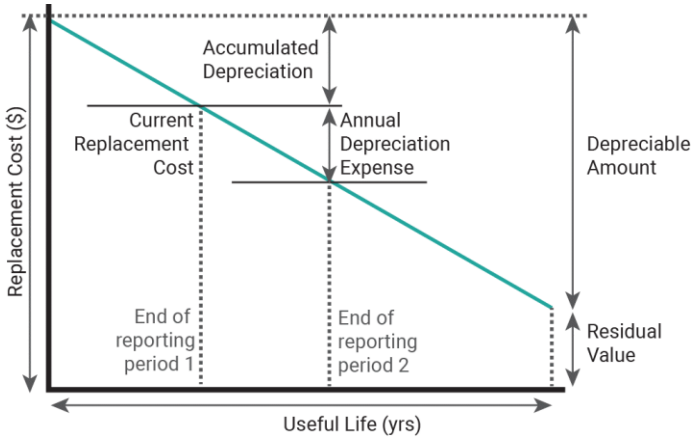
The proposed funding for assets is outlined in the Entity's Annual Budgets (within the LTFP) and the Economic Development Strategy (2023).

The financial strategy of the entity determines how funding will be provided, whereas the AM Plan communicates how and when this will be spent, along with the service and risk consequences of various service alternatives.

7.3 Valuation Forecasts

7.3.1 Asset valuations

The best available estimate of the value of assets included in this AM Plan are shown below. The assets are valued at fair value at cost to replace service capacity. Note these are IPWEA Model estimates from the extraction date and will not correspond exactly to current Organisational finances.



Replacement Cost (Gross)	$97,230,000
Depreciable Amount	$97,230,000
Current Replacement Cost[13]	$54,949,000
Depreciation	$1,096,000

[13] Also reported as Written Down Value, Carrying or Net Book Value.

7.3.2 Valuation forecast

Asset current cost values increased by 26% between the 2017 and 2022 Stormwater Asset class valuations. Stantec (2022) notes this was primarily due to a 19% increase in stormwater unit rates. The standardization of Useful Lives and adoption of IPWEA Practice Note 5 condition scoring was also attributed to the 21% variance in written down value.

Considering the need for improvement of stormwater asset data and the multiple uncontrollable variables involved, it is difficult to forecast future changes to the valuation of the stormwater asset class.

It should be noted that additional assets will add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs due to future renewals. Any additional assets will also add to future depreciation forecasts.

7.3.3 Renewal forecasts vs Depreciation

Good asset management practice recognises depreciation is not a renewal forecast in isolation. Relationships between the useful and remaining lives of the asset portfolio mean there are deficiencies in comparing asset renewals with depreciation at a point in time.

For example, a portfolio of long life assets that are relatively young may have a depreciation expense much greater than required renewal spending. Conversely, a portfolio consisting of majority older assets may warrant much greater renewal spending than the depreciation expense. This is illustrated in Figure 7.1 assuming straight line depreciation (IPWEA, 2021). As Council's Asset register matures through actions in the Improvement Plan, a more refined approach to Renewal Forecasts (Asset Register Method) can be adopted to refine forecasts.

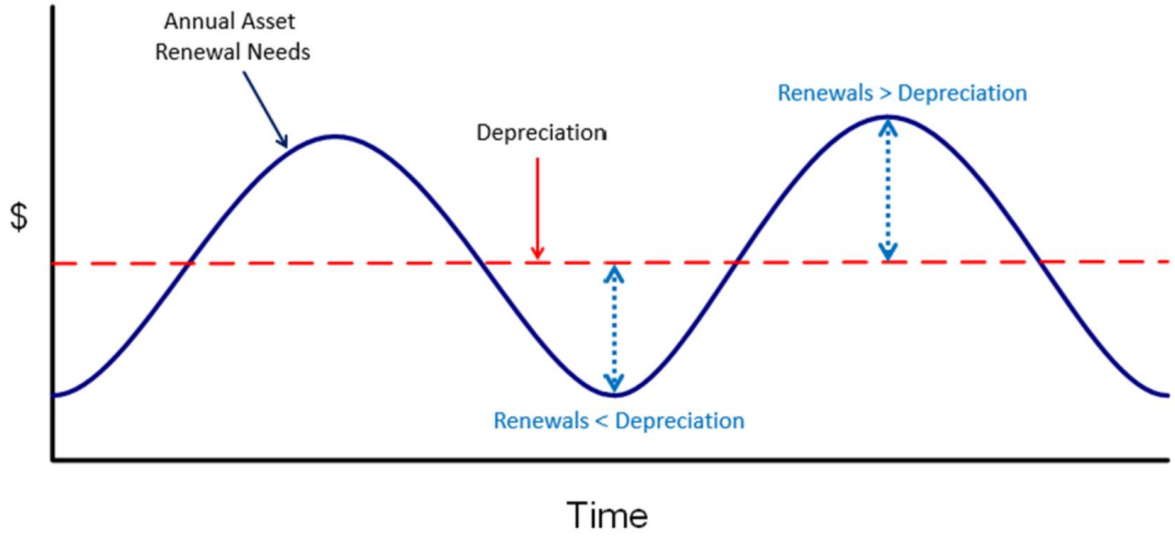


Fig 7.1 Asset Renewal vs Depreciation

7.4 Key Assumptions Made in Financial Forecasts

Key assumptions made in this AM Plan are detailed in associated Organisation Finance documents.

7.5 Forecast Reliability and Confidence

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is classified on a A - E level scale[14] in accordance with Table 7.5.1.

[14] IPWEA, 2015, IIMM, Table 2.4.6, p 2|71.

Table 7.5.1: Data Confidence Grading System

Confidence Grade	Description
A. Very High	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%
B. High	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%
C. Medium	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%
D. Low	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy ± 40%
E. Very Low	None or very little data held.

The estimated confidence level for and reliability of data used in this AM Plan is shown in Table 7.5.2.

Table 7.5.2: Data Confidence Assessment for Data used in AM Plan

Data	Confidence Assessment	Comment
Demand drivers	C	Inherent uncertainty in Climate Change predictions, particularly effects on local rainfall intensities which is a dominant factor in stormwater asset capacity design.
Growth projections	D	Growth Projections and desired Population Growth outlined in Economic Development Strategy are inconsistent.
Acquisition forecast	B	Stormwater Asset Class predominantly Renewals, new capital generally as a result of upgrades during renewal. However, clarity is required on proposed method to achieve growth outlined in Economic Development Strategy.
Operation forecast	B	Operation LoS not targeted for change
Maintenance forecast	B	Maintenance LoS not targeted for change
Renewal forecast - Asset values	C	Confident in Valuation process, however reduced confidence in underlying Asset Register data
- Asset useful lives	D	Condition data mostly unsupported, based off 5 year sample of between 10-20%
- Condition modelling	D	Confident in Modelling process, however little confidence in underlying Asset Register data
Disposal forecast	N/A	No Disposal Forecast

The estimated confidence level for and reliability of data used in this AM Plan is considered to be Low - Medium.

8.0 PLAN IMPROVEMENT AND MONITORING

8.1 Status of Asset Management Practices[15]

8.1.1 Accounting and financial data sources

This AM Plan utilises accounting and financial data. The source of the data is internal and external Council documentation and internal record keeping (such as the Tech One and Delta platforms, budgets).

8.1.2 Asset management data sources

This AM Plan also utilises asset management data. The source of the data is the Asset Register via the Tech One platform.

8.2 Improvement Plan Maturity

8.2.1 Previous Improvement Plan

Continual assessment of Improvement Plan maturity is required to assist in developing and implementing a continuous improvement programme to deliver Asset Management outcomes more effectively. Table 8.3 shows the Improvement Plan extracted from the previous iteration of the Organisation's Stormwater AM Plan and progress made towards each respective Task.

Table 8.3: 2018 Stormwater Asset Class Improvement Plan

Task No.	Task	Responsibility	Resources Required	Target Timeline	Progress
1	Update of LTFP following adoption of AM Plan	Chief Financial Officer	Council Staff	2019	**Complete**
2	Council Adoption of Regional Stormwater Investigation of Priorities (GenEng, 2018)	Director of Infrastructure Services	Council Staff	2019	**Complete**
3	Regular Update of AM Plan following adoption of Budget and LTFP	Director of Infrastructure Services	Council Staff	Annual	**Started**
4	Incorporate findings of Coastal Hazard Adaption Strategy into AM Plan	Director of Infrastructure Services	Council Staff	2020	**Started**
5	Improve financial costing approach for operations and maintenance through improved and consistent use of the Tech One works system	Chief Financial Officer	Council Staff, Tech One	2020	**Started**
6	Developing Annual Servicing Plan for Water Quality and Flood Mitigation Devices	Director of Infrastructure Services	Council Staff	2021	**Unstarted**
7	Improve confidence levels and quality of asset register to Moderate (additional condition assessment of 10% of network and installation date review)	Director of Infrastructure Services	Council Staff CCTV Contractor	2022	**Complete***
8	Develop Annual Cleaning and Condition Assessment Program	Director of Infrastructure Services	Council Staff	2022	**Unstarted**
9	Investigate Potential and if viable develop RCP Relining Program	Director of Infrastructure Services	Council Staff	2022	**Started**
10	Review Useful Lives and Componetisation if Relining Programs prove successful	Director of Infrastructure Services	Council Staff	2024	**Unstarted***

[15] ISO 55000 Refers to this as the Asset Management System

8.2.2 Assessment

The Organisation has had various levels of progress towards implementing the tasks identified in the previous iteration of the Improvement Plan. The following assessment is made of the maturity of the Improvement Plan:

Task No. 1 – The LTFP is annually updated as part of the Budget. It now is considered part of the Appendix and is no longer a stand-alone document.

Task No. 2 – The GenEng (2018) Report has been adopted by Council. As identified, implementation of the Priorities identified in the report has been restricted due to other required condition based renewals.

Task No. 3 - The AM Plan was updated once (2018) since the original was produced (2017). This is not considered 'regular updates' in order to be consistent with the aims of the Task.

Task No. 4 – The CCCHAS (2023) was only recently adopted by Council. The AM Plan incorporates the CCCHAS themes of adaption such as Building Community Resilience and Transition. Council has also undertaken the development of an Implementation Plan (the Operational tool for implementing the Strategy) for the CCCHAS. The Implementation Plan ensures that coastal hazards are included within the organisation risk framework, and gives direction to apply for specific project grants and modify existing business as usual processes to take account of coastal hazards into the future. The AM Plan will be updated to reflect the Implementation Plan.

Task No. 5 – Tech One (and associated programs such as REFLECT) have been adopted, however additional work is required to utilise functions relevant to Asset Management.

Task No. 6 – The Organisation has only one registered Water Quality (GPT) under its responsibility, and a broader approach to urban/stormwater Water Sensitive Urban Design has not been developed within Council but are outlined in FNQROC. However there are clear Maintenance issues regarding Flood Mitigation/Coastal Outlets within the LGA (i.e. Carello's Levee.) In order for a Servicing Plan to be developed, the first step must be to properly establish Condition through an Annual Condition Assessment Program (part of Task No. 8).

Task No. 7 - This task was completed, however outcomes did not achieve the desired level of confidence improvements (i.e. 'binning' of commission dates and minimal percentage of network assessed)

Task No. 8 – Neither have been implemented. Condition Assessment Program considered critical.

Task No. 9 – Asset Engineering currently investigating feasibility of Relining. Some initial projects have had limited success however causes have been identified and not deemed a broader reflection on potential.

Task No. 10 – Requires completion of Task No. 9.

It should be noted that responsibility for the completion of the tasks still relevant has been redelegated to more relevant staff hierarchy i.e. (Asset Working Group and Asset Custodians) in the current Improvement Plan.

8.3 Improvement Plan

It is important that an entity recognise areas of their AM Plan and planning process that require improvements to ensure effective asset management and informed decision making. The Improvement Plan generated from this AM Plan and carrying over from previous is shown in Table 8.2.

The improvement plan includes costing estimates based on nominated staff rates. The investment required from nominated staff to address issues identified in the improvement plan is around six to nine months Full Time Equivalent.

Table 8.2: Improvement Plan

Task Criticality	Task	Responsibility	Resources Required	Timeline	Estimate Cost (approx. $)	Progress
1	Develop Asset Condition Inspection Program and Implement	Asset Engineering	Council Staff, CCTV Contractor	Q4 2024	80,000 p/a	**Started**
2	Develop Plan and Process to reach Lifecycle Costing Targets based on Risk Based Prioritisation and Quality Data	Asset Engineering, Project Delivery	Council Staff	Q1 2025	7500	**Started**
3	Stormwater Asset Tenure Prioritisation Plan including Open Drainage (non-capitalised Assets)	Asset Engineering, Asset Maintenance, GIS	Council Staff, Contractor	Q1 2025	10000	**Started**
4	Develop Heirarchy/Criticality Rating for Asset Class as per IPWEA PN5 (inc. Climate Change)	Asset Engineering, GIS	Council Staff	Q3 2024	5000	**Unstarted**
5	Investigate assumptions in Economic Development Plan and consistency with Stormwater AM Plan	Asset Engineering, Finance	Council Staff	Q3 2024	5000	**Unstarted**
6	Address Asset Engineering Long Term Vacancies (Manager Asset Engineering, Asset Analyst)	EMT/People and Safety	Council Staff	Annual Ongoing (begin immediately)	250,000 p/a	**Started**
7	Develop DRFA Stormwater Asset Data Program (Critical Infrastructure Inspection Program)	Asset Engineering	Council Staff, CCTV Contractor	Q1 2025	2500	**Unstarted**
8	Develop Climate Change Stormwater Design Criteria	Asset Engineering, Planning Services, Project Delivery, EMT	Council Staff	Q3 2024	2500	**Started**
9	Feasibility Studies on RCP Relining	Tech Officer - Drainage	Council Staff	Q2 2025	5000	**Started**
10	Annual AMP Updates (post Annual Reports, Budgets) to inform LTFP and Capital Works Programs	Tech Officer - Drainage	Council Staff	Annual Q3 (begin 2025)	2000	**Unstarted**
11	Develop Renewal Program for Stormwater Asset Class (min 3 year outlook)	Tech Officer - Drainage, Asset Inspectors	Council Staff	Annual Q2 (begin 2025)	5000	**Started**
12	Review Useful Lives and Componetisation if RCP Relining Feasibility Study proves successful	Asset Engineering, Finance	Council Staff	Q2 2026	2000	**Unstarted**
13	Rectify inconsistencies between Asset Register and Spectrum Spatial Analyst (SSA)	Asset Data Analyst, Finance	Council Staff	Q1 2025	2500	**Started**

14	Undertake Customer Values Survey - Internal and External	Asset Engineering, Comms	Council Staff	Q1 2025	2000	**Unstarted**
15	Improve financial costing approach for operations and maintenance through improved and consistent use of the Tech One works system	Asset Engineer	Council Staff, Tech One	Annual Ongoing (begin immediately)	Nominal	**Started**
16	Componetise Port Hinchinbrook Stormwater Network	Asset Data Analyst, Finance	Council Staff	Q1 2025	5000	**Started**
17	Develop Capital Project Asset Handover Procedure (inc. Capitalisation and Donations)	Project Delivery, Asset Engineering, Finance	Council Staff	Q1 2025	5000	**Unstarted**
18	Develop Open Drainage Channel Asset Maintenance Plan (inc. Feasibility of Capitalisation)	Asset Engineering, Finance, Asset Maintenance, EMT	Council Staff	Q1 2025	7500	**Unstarted**
19	Assess impact of Asset Rationalisation Program on Stormwater Asset Class (inc. TMR infrastructure)	Tech Officer - Drainage, Asset Engineer	Council Staff	Q2 2024	1500	**Unstarted**
20	Incorporate findings of Coastal Hazard Adaption Strategy Implementation Plan into AM Plan	Tech Officer - Drainage, Planning Services	Council Staff	Q2 2027	Nominal	**Started**

8.4 Monitoring and Review Procedures

This AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The AM Plan will be reviewed and updated annually to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget are to be incorporated into the Long-Term Financial Plan once completed.

The AM Plan has a maximum life and is due for complete revision every five (5) years as per the Asset Management Strategy outlined in the SAMP (2022). Annual post-budgetary revisions of the following (as a minimum) and their assessment against Performance Measures are required:

- Actual Budget vs Lifecycle Costing
- Risk Treatment Plan
- Demand Management Plan
- Improvement Plan

The above is to be released as updated versions of this report.

8.5 Performance Measures

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan,
- The degree to which the 1-5 year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan,
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans,
- The Asset Renewal Funding Ratio achieving the Organisational target (generally 90 – 110%).

9.0 REFERENCES

CCRC Annual Budgets including Long Term Financial Plans (2016-2023)

CCRC Annual Reports (2016-2023)

CCRC Asset Management Policy (2023)

CCRC Coastal Hazard Adaption Strategy (2023)

CCRC Community Scorecard (2022)

CCRC Corporate Plan (2021)

CCRC Economic Development Strategy (2023)

CCRC Local Government Infrastructure Plan (LGIP) (2018)

CCRC Master Drainage Project (2012-2016)

CCRC Operational Plan (2023)

CCRC Planning Scheme (2015)

CCRC Strategic Asset Management Plan (SAMP) (2022)

CCRC Stormwater AM Plan (2018) (Previous Edition)

CCRC Valuation of Stormwater Assets (2022)

IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM

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IPWEA, 2014, Practice Note 8 – Levels of Service & Community Engagement, Institute of Public Works Engineering Australasia, Sydney, https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn8

ISO, 2014, ISO 55000:2014, Overview, principles and terminology

ISO, 2018, ISO 31000:2018, Risk management – Guidelines

10.0 APPENDICES

Appendix A Acquisition Forecast

A.1 – Acquisition Forecast Assumptions and Source
Donated Acquisition Forecast taken from Asset Register (non-componentised Port Hinchinbrook Stormwater Assets). Constructed Acquisition Forecast taken from respective Capital Works Acquisition/Renewal split:

- Urban Drainage Renewal Program (25% New Capital/Acquisition)
- Stormwater Miscellaneous Upgrades Program (25% New Capital/Acquisition)
- Mission Beach CBD Master Plan (10% New Capital/Acquisition)

Note budgets, project delivery timing and forecast costing are currently in flux on both major constructed acquisition projects and are subject to change.

A.2 – Acquisition Project Summary

Year	Acquisition	Value
2023	Callendar Park Drainage Upgrade	161,250
2023	Port Hinchinbrook Stormwater Network	319,199
2024	Mission Beach CBD Master Plan	372,951

A.3 – Acquisition Forecast Summary

Table A3 - Acquisition Forecast Summary

Year	Constructed	Donated	Growth
2023	161,250	319,199	1,944,597
2024	372,951	0	1,989,873
2025	115,028	0	2,029,670
2026	96,810	0	2,070,264
2027	84,500	0	2,111,669
2028	103,623	0	2,153,902
2029	95,000	0	2,196,980
2030	95,000	0	2,240,920
2031	95,000	0	2,285,738
2032	95,000	0	2,331,453
2033	95,000	0	2,378,082

Appendix B Operation Forecast

B.1 – Operation Forecast Assumptions and Source
Operations Forecast using *Cost Centre: 1076 Drainage Program Support* which is assumed true and correct. Average of previous 5 year budgets adopted as forecast operations costs.

Year	Operation Budget
2019	138,796
2020	130,572
2021	108,223
2022	119,240
2023	118,244
Average	**123,015**

B.2 – Operation Forecast Summary

Table B2 - Operation Forecast Summary

Year	Operation Forecast	Additional Operation Forecast	Total Operation Forecast
2023	123,015	3,153	123,015
2024	123,015	3,072	126,168
2025	123,015	2,788	129,239
2026	123,015	2,817	132,027
2027	123,015	2,855	134,845
2028	123,015	2,935	137,700
2029	123,015	2,980	140,634
2030	123,015	3,037	143,614
2031	123,015	3,095	146,651
2032	123,015	3,154	149,746
2033	123,015	3,215	152,900

Appendix C Maintenance Forecast

C.1 – Maintenance Forecast Assumptions and Source
Maintenance Forecast using *Cost Centre: 1077 Stormwater Drainage* which is assumed true and correct. Average of previous 5 year budgets adopted as forecast Maintenance costs.

Year	Operation Budget
2019	403,178
2020	374,379
2021	215,909
2022	442,965
2023	262,437
Average	**339,773**

C.2 – Maintenance Forecast Summary

Table C2 - Maintenance Forecast Summary

Year	Maintenance Forecast	Additional Maintenance Forecast	Total Maintenance Forecast
2023	339,774	8,488	339,774
2024	339,774	8,270	348,262
2025	339,774	7,506	356,532
2026	339,774	7,585	364,038
2027	339,774	7,687	371,623
2028	339,774	7,901	379,309
2029	339,774	8,022	387,211
2030	339,774	8,176	395,233
2031	339,774	8,333	403,408
2032	339,774	8,493	411,741
2033	339,774	8,656	420,234

Appendix D Renewal Forecast Summary

D.1 – Renewal Forecast Assumptions and Source
Assumptions and relevant information relating to the Renewal Forecast are included in Section 5.4.

D.2 – Renewal Project Summary
Specific Capital Projects are subject to change and have not being explicitly deliniated in planned budgets or lifecycle costings for the purpose of the AM Plan, with the exception of those outlined in Appendix A.

D.3 – Renewal Forecast Summary

Table D3 - Renewal Forecast Summary

Year	Renewal Forecast	Renewal Budget
2023	1,936,349	1,832,970
2024	1,936,349	2,793,480
2025	1,936,349	495,083
2026	1,936,349	440,429
2027	1,936,349	403,500
2028	1,936,349	460,868
2029	1,936,349	435,000
2030	1,936,349	435,000
2031	1,936,349	435,000
2032	1,936,349	435,000
2033	1,936,349	435,000

Appendix E Disposal Summary

E.1 – Disposal Forecast Assumptions and Source
There are currently no assumed Disposals in the Asset class.

E.2 – Disposal Project Summary
There are currently no assumed Disposals in the Asset class. This is subject to change pending investigation into the Organisation's Asset Rationalisation Program.

E.3 – Disposal Forecast Summary
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Table E3 – Disposal Activity Summary

Year	Disposal Forecast	Disposal Budget
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0
2031	0	0
2032	0	0
2033	0	0

Appendix F Budget Summary by Lifecycle Activity

Table F1 – Budget Summary by Lifecycle Activity

Year	Acquisition	Operation	Maintenance	Renewal	Disposal	Total
2023	161,250	123,015	339,774	1,832,970	0	2,457,009
2024	372,951	123,015	339,774	2,793,480	0	3,629,220
2025	115,028	123,015	339,774	495,083	0	1,072,900
2026	96,810	123,015	339,774	440,429	0	1,000,028
2027	84,500	123,015	339,774	403,500	0	950,789
2028	103,623	123,015	339,774	460,868	0	1,027,280
2029	95,000	123,015	339,774	435,000	0	992,789
2030	95,000	123,015	339,774	435,000	0	992,789
2031	95,000	123,015	339,774	435,000	0	992,789
2032	95,000	123,015	339,774	435,000	0	992,789
2033	95,000	123,015	339,774	435,000	0	992,789