

Gawler River Floodplain Management Authority

GRFMA

Flood Mitigation

Asset Management Plan (Concise)



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NAMS.PLUS Asset Management Plan Templates

NAMS.Plus offers two Asset Management Plan templates – ‘Concise’ and ‘Comprehensive’.

The Concise template is appropriate for those entities who wish to present their data and information clearly and in as few words as possible whilst complying with the ISO 55000 Standards approach and guidance contained in the International Infrastructure Management Manual.

The Comprehensive template is appropriate for those entities who wish to present their asset management plan and information in a more detailed manner.

This is the **Concise** Asset Management Plan template.

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1 EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

This asset management plan details information about infrastructure assets including actions required to provide an agreed level of service in the most cost effective manner while outlining associated risks. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services over a 20-year planning period.

This plan covers the infrastructure assets that provide Flood Mitigation

1.2 Asset Description

These assets include:

The Flood Mitigation network comprises:

- Bruce Eastick North Para Flood Mitigation Dam
- Associated land

These infrastructure assets have significant value estimated at \$ 19,149,365 (\$18,823,000+\$326,364)

1.3 Levels of Service

Our present funding levels are insufficient to continue to provide existing services at current levels in the medium term.

The main services consequences are:

- Asset not fit for purpose
- Land in disrepair

1.4 Future Demand

The main demands for new services are created by:

- Economic and Infrastructure development in the Gawler River Catchment
- Heavy rainfall events over the catchment

These will be managed through a combination of managing existing assets, upgrading of existing assets

and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures.

- Initiating recommendations of the Gawler River 2016 Flood Review and the 2016 Dam Raise Feasibility study

1.5 Lifecycle Management Plan

What does it Cost?

The projected outlays necessary to provide the services covered by this Asset Management Plan (AM Plan) includes operations, maintenance, renewal and upgrade of existing assets over the 10-year planning period is \$2,380,140.

1.6 Financial Summary

What we will do

Estimated available funding for this period is \$68,020 as per the long term financial plan or budget forecast. This is "[Enter 10 yr sustainability indicator as %]" of the cost to sustain the current level of service at the lowest lifecycle cost.

The infrastructure reality is that only what is funded in the long term financial plan can be provided. The emphasis of the Asset Management Plan is to communicate the consequences that this will have on the service provided and risks, so that decision making is "informed".

The allocated funding leaves a shortfall of \$2,312,120 required to provide services in the AM Plan compared with planned expenditure currently included in the Long Term Financial Plan. This is shown in the figure below.

Projected Operating and Capital Expenditure

(Insert graph of projected future operating and capital expenditure Fig 7 or Fig 12 – see guidelines for details
– DELETE)

Figure Values are in current (real) dollars.

We plan to provide Flood Mitigation services for the following:

- Operation, maintenance, renewal and upgrade of the Bruce Eastick North Para Flood Mitigation Dam and associated land to meet service levels set by in annual budgets.
- Trash Rack cleaning rubbish removal from the Dam , two asset condition inspections and annual weed spraying programs.
- Consideration of raising the height of the Dam is currently on hold. Projected cost indications of the Dam raise are in the order of \$62 Million

What we cannot do

We currently do **not** allocate enough funding to sustain these services at the desired standard or to provide all new services being sought. Works and services that cannot be provided under present funding levels are:

- Technical condition inspections of the Dam
- Annual maintenance on the Dam infrastructure

Managing the Risks

Our present funding levels are insufficient to continue to manage risks in the medium term.

The main risk consequences are:

- Lack of capacity to fund repairs and maintenance and renewal due to not recognising depreciation (consumption of asset value).
- Insufficient fund availability to renew assets at end of estimated service life

We will endeavour to manage these risks within available funding by:

- Undertaking six monthly inspections

1.7 Asset Management Practices

Our systems to manage assets include:

- Inspections to identify defects and loss of service capacity
- To be funded from the annual budget or other funds identified by the Board

1.8 Monitoring and Improvement Program

The next steps resulting from this asset management plan to improve asset management practices are:

- Consideration by the GRFMA Board on implications and perceived risks.

2. INTRODUCTION

2.1 Background

This asset management plan communicates the actions required for the responsive management of assets (and services provided from assets), compliance with regulatory requirements, and funding needed to provide the required levels of service over a 20-year planning period.

The asset management plan is to be read with the GRFMA 3 year Business Plan .

The infrastructure assets covered by this asset management plan are shown in Table 2.1.

These assets are used to provide flood mitigation services.

Table 2.1: Assets covered by this Plan

Asset Category	Dimension	Replacement Value
• Bruce Eastick North Para Flood Mitigation Dam	25mtr high @y 80 mtr wide	18,823,000
Associated land lot 62 hd Kingsford	3 HA	\$326,364
TOTAL		19,149,365

2.2 Goals and Objectives of Asset Ownership

Our goal in 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 expenditure and how it will be allocated.

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

- International Infrastructure Management Manual 2015 ¹
- ISO 55000²

2.3 Core and Advanced Asset Management

This asset management plan is prepared as a ‘core’ asset management plan over a 20 year planning period in accordance with the International Infrastructure Management Manual³. Core asset management is a ‘top down’ approach where analysis is applied at the system or network level. An ‘advanced’ asset management approach uses a ‘bottom up’ approach for gathering detailed asset information for individual assets.

¹ Based on IPWEA 2015 IIMM, Sec 2.1.3, p 2| 13

² ISO 55000 Overview, principles and terminology

³ IPWEA, 2015, IIMM.

3. LEVELS OF SERVICE

3.1 Customer Research and Expectations

This 'core' asset management plan is prepared to facilitate consultation prior to adoption by the GRFMA Board. Future revisions of the asset management plan will incorporate community consultation on service levels and costs of providing the service. This will assist the GRFMA and stakeholders in matching the level of service required, service risks and consequences with the community's ability and willingness to pay for the service.

We currently have no research on customer expectations. This will be investigated for future updates of the asset management plan.

3.2 Strategic and Corporate Goals

This asset management plan is prepared under the direction of the GRFMA Charter goals and objectives.

The GRFMA was established for the following purposes:

1. To co-ordinate the construction, operation and maintenance of flood mitigation infrastructure in the Gawler River area ('the Floodplain');
2. To raise finance for the purpose of developing, managing and operating and maintaining flood mitigation works within the Floodplain;
3. To provide a forum for the discussion and consideration of topics relating to the Constituent Council's obligations and responsibilities in relation to management of flood mitigation within the Floodplain;
4. To enter into agreements with Constituent Councils for the purpose of managing and developing the Floodplain.

The GRFMA will exercise its duty of care to ensure public safety in accordance with the infrastructure risk management plan prepared in conjunction with this AM Plan. Management of infrastructure risks is covered in Section 6.

3.3 Legislative Requirements

Legislative requirements relating to the management of assets include:

Table 3.3: Legislative Requirements

Legislation	Requirement
Local Government Act 1999	Asset Management planning, financial plans and service delivery.
Natural Resources Management Act	Water Affecting Activities

3.4 Customer Levels of Service

Service levels are defined service levels in two terms, customer levels of service and technical levels of service. These are supplemented by organisational measures.

Customer Levels of Service measure how the customer receives the service and whether value to the customer is provided.

Customer levels of service measures used in the asset management plan are:

Quality 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?*

The current and expected customer service levels are detailed in Tables 3.4 and 3.5. Table 3.4 shows the expected levels of service based on resource levels in the current long-term financial plan.

Organisational measures are measures of fact related to the service delivery outcome e.g. number of occasions when service is not available, condition %'s of Very Poor, Poor/Average/Good, Very good.

These Organisational/Organizational measures provide a balance in comparison to the customer perception that may be more subjective.

Table 3.4: Customer Level of Service

	Expectation	Performance Measure Used	Current Performance	Expected Position in 10 Years based on the current budget.
Service Objective: Flood Mitigation				
Quality	Flood protection for a 1 in 100 AEP event	Extent of flooding	High	Low
			Satisfactory	
	Confidence levels		Medium	Medium
Function	The Dam is a flood control dam and was built in 2007 with the design objective of providing flood protection to the township of Gawler for a 1 in 100 AEP event	Measurement of rainfall/flood event severity	High	Low
	Confidence levels		Medium	Low
Capacity and Use				
	The main dam has a crest length of approximately 226m of which 150m is the primary spillway. The main dam has a 5m wide crest with a vertical upstream face and stepped downstream face. The main dam incorporates a low level outlet pipe that is 2.1 m in diameter and twin high level outlets each 1.8m in diameter. The dam will see substantial flows over the spillway in design flood events,	Review of flood events	High - 2016 Flood	High for similar event as 2016. Low for greater ARI event
	Confidence levels		High	Low

3.5 Technical Levels of Service

Technical Levels of Service - Supporting the customer service levels are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities to best achieve the desired customer outcomes and demonstrate effective performance.

Technical service measures are linked to the activities and annual budgets covering:

- Operations – the regular activities to provide services (e.g. opening hours, cleansing, 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),
- Renewal – the activities that return the service capability of an asset up to that which it had originally (e.g. road resurfacing and pavement reconstruction, pipeline replacement and building component replacement),
- Upgrade/New – 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).

Service and asset managers plan, implement and control technical service levels to influence the customer service levels.⁴

Table 3.5 shows the technical levels of service expected to be provided under this AM Plan. The ‘Desired’ position in the table documents the position being recommended in this AM Plan.

Table 3.5: Technical Levels of Service

Service Attribute	Service Activity Objective	Activity Measure Process	Current Performance *	Desired for Optimum Lifecycle Cost **
TECHNICAL LEVELS OF SERVICE				
Operations				
	Inspection of site access roads, swales and culverts, gates, fencing and signage	Inspection		Two site inspections
	Inspect of site access roads, swales and culverts Remove debris from dam land Where covered by easement repair fences to stock standard with breakaway provisions	Inspection		Two site inspections
	Inspect Dam wall, LLOP, HLOP Stilling Basin, Secondary Spillway wall, downstream rockwork.	Inspection		Two site inspections
		Budget	\$2,000	
Maintenance				
	Remove debris and logs from upstream of the dam wall Reinstall LLOP screens and repairs to railing	Inspection		As required

⁴ IPWEA, 2015, IIMM, p 2 | 28.

Service Attribute	Service Activity Objective	Activity Measure Process	Current Performance *	Desired for Optimum Lifecycle Cost **
	Annual weed spraying program			
		Budget	\$4.800	
Upgrade/New				
	Gawler River Northern Floodway Proposal	Gawler River 2016 Flood Review		
		Budget	\$27,000,000	Proposal only – subject to final GRFMA approval

It is important to monitor the service levels provided regularly as these will change. The current performance is influenced by work efficiencies and technology, and customer priorities will change over time. Review and establishment of the agreed position which achieves the best balance between service, risk and cost is essential.

4. FUTURE DEMAND

4.1 Demand Drivers

Drivers affecting demand 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, environmental awareness, etc.

4.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of assets were identified and are documented in Table 4.3.

4.3 Demand Impact on Assets

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

Table 4.3: Demand Drivers, Projections and Impact on Services

Demand drivers	Present position	Projection	Impact on services
Economic and Infrastructure development in the Gawler River Catchment	Development is not co-ordinated across the floodplain.	Major developments being proposed. Eg Buckland Park, Norther Adelaide Irrigation Investments	Increases severity of flooding potential
Heavy rainfall events over the catchment	Dam works OK however the Gawler River is prone to breakaways during high rainfall events	Material flood damage to lower reaches of the Gawler river- community assets and horticulture	Demand for mitigation infrastructure

4.4 Demand Management Plan

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. 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 4.4. Further opportunities will be developed in future revisions of this asset management plan.

Table 4.4: Demand Management Plan Summary

Demand Driver	Impact on Services	Demand Management Plan
Gawler River 2016 Flood Review	New infrastructure required	Develop a Gawler River Floodplain Master Plan
Raise Dam Feasibility Study	Under consideration	Develop a Gawler River Floodplain Master Plan

4.5 Asset Programs to meet Demand

The new assets required to meet demand can be acquired, donated or constructed. Additional assets are discussed in Section 5.5. The summary of the cumulative value of additional asset is shown in Figure 1.

Figure 1: Upgrade and New Assets to meet Demand – (Cumulative)

(Insert graph of new assets to meet demand– see Guidelines for details – DELETE)

Figure Values are in current (real) dollars.

Acquiring any new assets will commit ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are required to be identified and considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long term financial plan further in Section 5.

5. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the GRFMA plans to manage and operate the assets at the agreed levels of service (defined in Section 3) while managing life cycle costs.

5.1 Background Data

5.1.1 Physical parameters

The assets covered by this asset management plan are shown in Table 2.1.

The assets are generally the Bruce Eastick North Para Flood Mitigation dam, and adjoining land.

The age profile of the assets included in this AM Plan are shown in Figure 2.

Figure 2: Asset Age Profile

(Insert graph of asset age profile where available – DELETE)

The Board sought an independent valuation on the 29th May 2014, to be applied as at 30th June 2014, of the Bruce Eastick North Para Flood Mitigation Dam. The Board recognises that the dam is a unique infrastructure. The Board sought the advice of Entura (Hydro Tasmania), who provided a replacement cost valuation based on the actual construction contract costs, including some 'owner's costs' which would be incurred in the event of a replacement being necessary. The estimate of the replacement cost was \$18.497 million at June 2014. In accordance with

Accounting Standard (AASB)13 Fair Value Measurement, it is to be noted that valuation has been under level 3 valuation.

Figure Values are in current (real) dollars.

The dam land includes the land on which the dam is constructed, rights of way access to the land and 'right to flood' easements over the land upstream from the dam that will be inundated by dam waters for short periods of time during a flood event. The Board valuation was undertaken at 30th June 2011.

5.1.2 Asset capacity and performance

Assets are generally provided to meet design standards where these are available.

Locations where deficiencies in service performance are known are detailed in Table 5.1.2.

Table 5.1.2: Known Service Performance Deficiencies

Location	Service Deficiency
Bruce Eastick North Para Flood Mitigation Dam	Events of 100 ARI
Land	All weather access to the Dam

5.1.3 Asset condition

Condition is monitored as per item 3.5

The condition profile of our assets is shown in Figure 3.

Fig 3: Asset Condition Profile

(Insert graph of asset condition profile if available – DELETE)

This graph is available on the NAMS.PLUS3 web site where Method 1 (Asset Register) is used and condition data is entered .

Add Comment about the condition distribution DELETE.

Figure Values are in current (real) dollars.

Condition is measured using a 1 – 5 grading system⁵ as detailed in Table 5.1.3.

Table 5.1.3: Simple Condition Grading Model

Condition Grading	Description of Condition
1	Very Good: only planned maintenance required
2	Good: minor maintenance required plus planned maintenance
3	Fair: significant maintenance required
4	Poor: significant renewal/rehabilitation required
5	Very Poor: physically unsound and/or beyond rehabilitation

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

5.2 Operations and Maintenance Plan

Operations include regular activities to provide services such as public health, safety and amenity, e.g. cleaning, street sweeping, utilities costs and street lighting.

Routine maintenance is the regular on-going work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again, e.g. road patching.

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.

Maintenance expenditure is shown in Table 5.2.1.

Table 5.2.1: Maintenance Expenditure Trends

Year	Maintenance Budget \$
2016/17	\$6,800
2017/18	\$6,800
2018/19	\$6,800

Maintenance expenditure levels are considered to be adequate to meet projected service levels, which may be less than or equal to current service levels. Where maintenance expenditure levels are such that they will result in a lesser level of service, the service consequences and service risks have been identified and highlighted in this AM Plan.

Summary of future operations and maintenance expenditures

Future operations and maintenance expenditure is forecast to trend in line with the value of the asset stock as shown in Figure 4. Note that all costs are shown in current "[Enter relevant financial year]" dollar values (i.e. real values).

Figure 4: Projected Operations and Maintenance Expenditure

(Insert graph of projected maintenance expenditure – see guidelines for details – DELETE)

Figure Values are in current (real) dollars.

Deferred maintenance, i.e. works that are identified for maintenance and unable to be funded are to be included in the risk assessment and analysis in the infrastructure risk management plan.

Maintenance is funded from the operating budget where available. This is further discussed in Section 7.

5.3 Renewal/Replacement Plan

Renewal and replacement expenditure is major work which does not increase the asset's design capacity 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 upgrade/expansion or new work expenditure resulting in additional future operations and maintenance costs.

Assets requiring renewal/replacement are identified from one of three methods provided in the ‘Expenditure Template’.

- Method 1 uses Asset Register data to project the renewal costs using acquisition year and useful life to determine the renewal year, or
- Method 2 uses capital renewal expenditure projections from external condition modelling systems (such as Pavement Management Systems), or
- Method 3 uses a combination of average network renewals plus defect repairs in the Renewal Plan and Defect Repair Plan worksheets on the ‘Expenditure template’.

Method 1 is used for this asset management plan.

5.3.1 Renewal ranking criteria

Asset renewal and replacement 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. roughness of a road).⁶

It is possible to get some indication of capital renewal and replacement priorities by identifying assets or asset groups that:

- Have a high consequence of failure,
- Have high use and subsequent impact on users would be greatest,
- Have a total value representing the greatest net value,
- Have the highest average age relative to their expected lives,
- Are identified in the AM Plan as key cost factors,
- Have high operational or maintenance costs, and
- Have replacement with a modern equivalent asset that would provide the equivalent service at a savings.⁷

The ranking criteria used to determine priority of identified renewal and replacement proposals is detailed in Table 5.3.1.

Table 5.3.1: Renewal and Replacement Priority Ranking Criteria

Criteria	Weighting
Dam with 100 ARI capacity	30%
Low flooding incidence in Gawler River floodway	70%
Total	100%

5.3.2 Summary of future renewal and replacement expenditure

Projected future renewal and replacement expenditures are forecast to increase over time when the asset stock increases. The expenditure is required is shown in Fig 5. Note that all amounts are shown in current (real) dollars.

⁶ IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.

⁷ Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

The projected capital renewal and replacement program is shown in Appendix B.

Fig 5: Projected Capital Renewal and Replacement Expenditure

(Insert graph of projected renewal and replacement expenditure – see guidelines for details – DELETE)

Figure Values are in current (real) dollars.

Deferred renewal and replacement, i.e. those assets identified for renewal and/or replacement and not scheduled in capital works programs are to be included in the risk analysis process in the risk management plan.

Renewals and replacement expenditure in the capital works program will be accommodated in the long term financial plan. This is further discussed in Section 7.

5.4 Creation/Acquisition/Upgrade Plan

New works are those that create a new asset that did not previously exist, or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may also be acquired at no cost. These additional assets are considered in Section 4.4.

5.4.1 Selection criteria

New assets and upgrade/expansion of existing assets are identified from various sources such as community requests, proposals identified by strategic plans or partnerships with others. Candidate proposals are inspected to verify need and to develop a preliminary renewal estimate. Verified proposals are ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed below.

Table 5.4.1: New Assets Priority Ranking Criteria

Criteria	Weighting
Dam with 100 ARI capacity	30%
Low flooding incidence in Gawler River floodway	70%
Total	100%

5.4.2 Summary of future upgrade/new assets expenditure

Projected upgrade/new asset expenditures are summarised / summarized in Fig 6. The projected upgrade/new capital works program is shown in Appendix C. All amounts are shown in real values.

Fig 6: Projected Capital Upgrade/New Asset Expenditure

(Insert graph of projected capital upgrade/new expenditure – see guidelines for details – DELETE)

Figure Values are in current (real) dollars.

Expenditure on new assets and services in the capital works program will be accommodated in the long term financial plan but only to the extent of the available funds

Should these new assets be realised additional funding commitments of ongoing operations, maintenance and renewal costs will be required for the period that the service provided from the assets is required.

5.4.3 Summary of asset expenditure requirements

The financial projections from this asset plan are shown in Fig 7 for projected operating (operations and maintenance) and capital expenditure (renewal and upgrade/expansion/new assets). Note that all costs are shown in real values.

The bars in the graphs represent the anticipated budget needs required to achieve lowest lifecycle costs, the budget line indicates what is currently available. The gap between these informs the discussion on achieving the balance between services, costs and risk to achieve the best value outcome.

Fig 7: Projected Operating and Capital Expenditure

(Insert graph of projected future operating and capital expenditure – see guidelines for details – DELETE)

Figure Values are in current (real) dollars.

5.5 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 5.5, together with estimated annual savings from not having to fund operations and maintenance of the assets. These assets will be further reinvestigated to determine the required levels of service and see what options are available for alternate service delivery, if any. Any costs or revenue gained from asset disposals is accommodated in the long term financial plan.

Table 5.5: Assets Identified for Disposal

Asset	Reason for Disposal	Timing	Disposal Expenditure	Operations & Maintenance Annual Savings
Nil				

6. RISK MANAGEMENT PLAN

The purpose of infrastructure risk management is to document the results 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 31000:2009 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2009 as: ‘coordinated activities to direct and control with regard to risk’⁸.

An assessment of risks⁹ associated with service delivery from infrastructure assets has identified critical risks that will result in loss or reduction in service from infrastructure assets or a ‘financial shock’. The risk assessment process

⁸ ISO 31000:2009, p 2

identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Similarly, critical failure modes are those which have the highest consequences.

Critical assets have been identified and their typical failure mode and the impact on service delivery are as follows:

Table 6.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Bruce Eastick North Para Flood Mitigation Dam	Flood Failure" - the difference between the consequences of a natural rainfall and flooding event with the consequences resulting from the failure of the dam during the same AEP flood event	High

By identifying critical assets and failure modes investigative activities, condition inspection programs, maintenance and capital expenditure plans can be targeted at the critical areas.

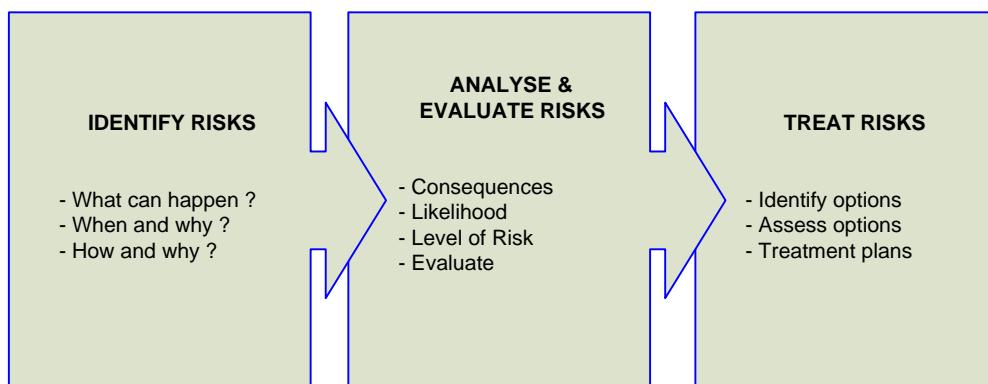
6.2 Risk Assessment

The risk management process used in this project 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 the ISO risk assessment standard ISO 31000:2009.

Fig 6.2 Risk Management Process – Abridged



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

An assessment of risks¹⁰ associated with service delivery from infrastructure assets has identified the critical risks that will result in significant loss, 'financial shock' or a reduction in service.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment cost after the selected treatment plan is implemented is shown in Table 6.2. These risks and costs are reported to management and GRFMA .

Table 6.2: Critical Risks and Treatment Plans

Service or Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan	Residual Risk *	Treatment Costs
Bruce Eastick North Para Flood Mitigation Dam	Flood Failure	H	Raise Dam height	Low	\$60,000,000

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

6.3 Infrastructure Resilience Approach

The resilience of our critical infrastructure is vital to our customers and the services we provide. To adapt to changing conditions and grow over time we need to understand our capacity to respond to possible disruptions and be positioned to absorb disturbance and act effectively in a crisis to ensure continuity of service.

Resilience is built on aspects such as response and recovery planning, financial capacity and crisis leadership.

Our current measure of resilience is shown in Table 6.4 which includes the type of threats and hazards, resilience assessment and identified improvements and/or interventions.

Table 6.4: Resilience

Threat / Hazard	Resilience LMH	Improvements / Interventions
Earthquake	Low	Unknown
Significant flood event (40 ARI)	Low	Northern Floodways infrastructure
100 ARI Flood	Medium	Raise dam

6.4 Service and Risk Trade-Offs

The decisions made in adopting this AM Plan are based on the objective to achieve the optimum benefits from the available resources.

6.4.1 What we cannot do

There are some operations and maintenance activities and capital projects that are unable to be undertaken within the next 10 years. These include:

- "[Enter relevant O&M activity / capital project]"
- "[Enter relevant O&M activity / capital project]"
- "[Enter relevant O&M activity / capital project]"
- "[Enter relevant O&M activity / capital project]"

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

6.4.2 Service trade-off

Operations and maintenance activities and capital projects that cannot be undertaken will maintain or create service consequences for users. These include:

- "[Enter associated service consequence]"

6.4.3 Risk trade-off

The operations and maintenance activities and capital projects that cannot be undertaken may maintain or create risk consequences. These include:

- "[Enter associated risk consequence]"

These actions and expenditures are considered in the projected expenditures, and where developed are included in the Risk Management Plan.

7. FINANCIAL SUMMARY

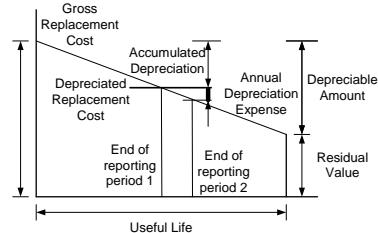
This section contains the financial requirements resulting from all the information presented in the previous sections of this asset management plan. The financial projections will be improved as further information becomes available on desired levels of service and current and projected future asset performance.

7.1 Financial Statements and Projections

7.1.1 Asset valuations

The best available estimate of the value of assets included in this Asset Management Plan are shown below. Assets are valued at Fair Value

Gross Replacement Cost	18,823,324
Depreciable Amount	18,497,000
Depreciated Replacement Cost ¹¹	16,416,362
Annual Average Asset Consumption	231,213



7.1.1 Sustainability of service delivery

Two key indicators for service delivery sustainability that have been considered in the analysis of the services provided by this asset category, these being the:

- asset renewal funding ratio, and
- medium term budgeted expenditures/projected expenditure (over 10 years of the planning period).

¹¹ Also reported as Written Down Value, Carrying or Net Book Value.

Asset Renewal Funding Ratio

Asset Renewal Funding Ratio¹² "[Enter asset renewal funding ratio %]"

The Asset Renewal Funding Ratio is the most important indicator and indicates that over the next 10 years of the forecasting that we expect to have "[Enter asset renewal funding ratio %]" of the funds required for the optimal renewal and replacement of assets.

Medium term – 10 year financial planning period

This asset management plan identifies the projected operations, maintenance and capital renewal expenditures required to provide an agreed level of service to the community over a 10 year period. This provides input into 10 year financial and funding plans aimed at providing the required services in a sustainable manner.

These projected expenditures may be compared to budgeted expenditures in the 10 year period to identify any funding shortfall. In a core asset management plan, a gap is generally due to increasing asset renewals for ageing assets.

The projected operations, maintenance and capital renewal expenditure required over the 10 year planning period is \$238,000 on average per year.

Estimated (budget) operations, maintenance and capital renewal funding of \$68,000 on average per year giving a 10 year funding shortfall of \$2,312,120 per year. This indicates "[Enter 10 yr financing indicator as % age]" of the projected expenditures needed to provide the services documented in the asset management plan. This excludes upgrade/new assets.

Providing services from infrastructure in a sustainable manner requires the matching and managing of service levels, risks, projected expenditures and financing to achieve a financial indicator of approximately 1.0 for the first years of the asset management plan and ideally over the 10-year life of the Long Term Financial Plan.

7.1.2 Projected expenditures for long term financial plan

Table 7.1.2 shows the projected expenditures for the 10 year long term financial plan.

Expenditure projections are in 2017/18 real values.

Table 7.1.2: Projected Expenditures for Long Term Financial Plan (\$000)

Year	Operations \$	Maintenance \$	Projected Capital Renewal \$	Capital Upgrade/ New (\$000)	Disposals (\$000)
17/18	2,000	4,800	231,213		
18/19	2,000	4,800	231,213		
19/20	2,000	4,800	231,213		
20/21	2,000	4,800	231,213		
21/22	2,000	4,800	231,213		
22/23	2,000	4,800	231,213		
23/24	2,000	4,800	231,213		
24/25	2,000	4,800	231,213		
	2,000	4,800	231,213		
	2,000	4,800	231,213		

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

7.2 Funding Strategy

Funding for assets is provided from the budget and long term financial plan.

The financial strategy of the entity determines how funding will be provided, whereas the asset management plan communicates how and when this will be spent, along with the service and risk consequences of differing options.

7.3 Valuation Forecasts

Asset values are forecast to remain static unless additional assets are added.

Additional assets will generally add to the operations and maintenance needs in the longer term, as well as the need for future renewal. Additional assets will also add to future depreciation forecasts.

7.4 Key Assumptions Made in Financial Forecasts

This section details the key assumptions made in presenting the information contained in this asset management plan. It is presented to enable readers to gain an understanding of the levels of confidence in the data behind the financial forecasts.

Key assumptions made in this asset management plan are:⁴

Table 7.4: Key Assumptions made in AM Plan and Risks of Change

- "[Enter assumptions]"

7.5 Forecast Reliability and Confidence

The expenditure and valuations projections in this AM Plan are based on best available data. Currency and accuracy of data is critical to effective asset and financial management. Data confidence is classified on a 5 level scale¹³ in accordance with Table 7.5.

Table 7.5: Data Confidence Grading System

Confidence Grade	Description
A Highly reliable	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 Reliable	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 Uncertain	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 Very Uncertain	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 Unknown	None or very little data held.

¹³ IPWEA, 2015, IIMM, Table 2.4.6, p 2 | 71.

The estimated confidence level for and reliability of data used in this AM Plan is considered to be Reliable

8. PLAN IMPROVEMENT AND MONITORING

8.1 Status of Asset Management Practices¹⁴

8.1.1 Accounting and financial data sources

2016/17 GRFMA Financial Statements

8.1.2 Asset management data sources

2016/17 GRFMA Financial Statements

8.2 Improvement Plan

The asset management improvement plan generated from this asset management plan is shown in Table 8.1.

Table 8.1: Improvement Plan

Task No	Task	Responsibility	Resources Required	Timeline
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

8.3 Monitoring and Review Procedures

This asset management plan will be reviewed during annual budget planning processes and amended to show any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

The AM Plan will be updated annually to ensure it represents the current service level, asset values, projected operations, maintenance, capital renewal and replacement, capital upgrade/new and asset disposal expenditures and projected expenditure values incorporated into the long term financial plan.

The AM Plan has a life of 4 years and is due for complete revision and updating within "[Enter review time limit]" of each "[Enter Board / Governing Body]" election.

8.4 Performance Measures

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

¹⁴ ISO 55000 Refers to this the Asset Management System

- The degree to which the required projected expenditures identified in this asset management plan are incorporated into the long term financial plan,
- The degree to which 1-5 year detailed works programs, budgets, business plans and corporate structures take into account the ‘global’ works program trends provided by the asset management plan,
- The degree to which the existing and projected service levels and service consequences (what we cannot do), risks and residual risks are incorporated into the Strategic Plan and associated plans,
- The Asset Renewal Funding Ratio achieving the target of 1.0.

9. REFERENCES

- IPWEA, 2006, ‘International Infrastructure Management Manual’, Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2008, ‘NAMS.PLUS Asset Management’, Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/namsplus.
- IPWEA, 2015, 2nd edn., ‘Australian Infrastructure Financial Management Manual’, Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/AIFMM.
- IPWEA, 2015, 3rd edn., ‘International Infrastructure Management Manual’, Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2012 LTFP Practice Note 6 PN Long Term Financial Plan, Institute of Public Works Engineering Australasia, Sydney
- Sample, ‘Strategic Plan 20XX – 20XX’,
- Sample , ‘Annual Plan and Budget’.

10. APPENDICES

Appendix A Projected 10 year Capital Renewal and Replacement Works Program

Appendix B Projected 10 year Capital Upgrade/New Works Program

Appendix C LTFP Budgeted Expenditures Accommodated in AM Plan

Appendix A Projected 10-year Capital Renewal and Replacement Works Program

Where the asset register data is the method used for renewal modelling (Method 1), download the Projected Renewal Program for Asset Management Plan Appendix B from the Graphs and Reports page of the NAMS.PLUS3 portal, export the renewal and replacement program to an Excel spreadsheet, **COPY** and **PASTE** the first 10 years of the program into Appendix B.

PASTE 10 year Projected Capital Renewal and Replacement Program from other sources where network modelling methods (Method 2) are used

OR

PASTE 10 year Projected Capital Renewal Program from Worksheet *Renewal Program* on the NAMS.PLUS3 Expenditure Template where the Network Renewal/Defect Repair (Method 3) is used as the renewal data entry method

Further details are provided in the **NAMS.PLUS Guidelines**.

DELETE above clauses as appropriate.

Appendix B Projected Upgrade/Exp/New 10-year Capital Works Program

Insert 10 year Projected Capital Upgrade/New Program from Worksheet - *Upgrade-New Program* on the NAMS.PLUS Expenditure Template

DELETE above sentence.

Appendix C Budgeted Expenditures Accommodated in LTFP

Insert 10 year Budgeted Expenditures from Worksheet - Form 3 Expenditure Planning on the NAMS.PLUS3 Expenditure Template. See Appendix J of the NAMS.PLUS Guidelines for details.

DELETE above sentence.

NAMS.PLUS3 Asset Management		Paradise																																											
© Copyright. All rights reserved. The Institute of Public Works Engineering Australasia																																													
Infrastructure_S1_V1		Asset Management Plan																																											
First year of expenditure projections		2017 (financial yr ending)																																											
Infrastructure																																													
Asset values at start of planning period		<table border="1"> <tr> <td>Current replacement cost</td> <td>\$95,000 (000)</td> <td>Calc CRC from Asset Register</td> <td>\$95,000 (000)</td> </tr> <tr> <td>Depreciable amount</td> <td>\$94,993 (000)</td> <td colspan="8">This is a check for you.</td> </tr> <tr> <td>Depreciated replacement cost</td> <td>\$40,171 (000)</td> <td colspan="8"></td> </tr> <tr> <td>Annual depreciation expense</td> <td>\$1,800 (000)</td> <td colspan="8"></td> </tr> </table>										Current replacement cost	\$95,000 (000)	Calc CRC from Asset Register	\$95,000 (000)	Depreciable amount	\$94,993 (000)	This is a check for you.								Depreciated replacement cost	\$40,171 (000)									Annual depreciation expense	\$1,800 (000)								
Current replacement cost	\$95,000 (000)	Calc CRC from Asset Register	\$95,000 (000)																																										
Depreciable amount	\$94,993 (000)	This is a check for you.																																											
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Annual depreciation expense	\$1,800 (000)																																												
Planned Expenditures from LTFP																																													
20 Year Expenditure Projections		Note: Enter all values in current 2017 values																																											
Financial year ending		2017 \$000	2018 \$000	2019 \$000	2020 \$000	2021 \$000	2022 \$000	2023 \$000	2024 \$000	2025 \$000	2026 \$000																																		
Expenditure Outlays included in Long Term Financial Plan (in current \$ values)																																													
Operations																																													
Operations budget		\$220	\$220	\$220	\$220	\$220	\$220	\$220	\$220	\$220																																			
Management budget		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																			
AM systems budget		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																			
Total operations		\$220	\$220	\$220	\$220	\$220	\$220	\$220	\$220	\$220																																			
Maintenance																																													
Reactive maintenance budget		\$240	\$240	\$240	\$240	\$240	\$240	\$240	\$240	\$240																																			
Planned maintenance budget		\$480	\$480	\$480	\$480	\$480	\$480	\$480	\$480	\$480																																			
Specific maintenance items budget		\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80																																			
Total maintenance		\$800	\$800	\$800	\$800	\$800	\$800	\$800	\$800	\$800																																			
Capital																																													
Planned renewal budget		\$800	\$800	\$800	\$800	\$800	\$800	\$800	\$800	\$800																																			
Planned upgrade/new budget		\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500																																			
Non-growth contributed asset value		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																			
Asset Disposals																																													
Est Cost to dispose of assets		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																			
Carrying value (DRC) of disposed assets		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																			
Additional Expenditure Outlays Requirements (e.g from Infrastructure Risk Management Plan)																																													
Additional Expenditure Outlays required and not included above		2017 \$000	2018 \$000	2019 \$000	2020 \$000	2021 \$000	2022 \$000	2023 \$000	2024 \$000	2025 \$000	2026 \$000																																		
Operations		\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50																																		
Maintenance		\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100	\$100																																		
Capital Renewal		to be incorporated into Forms 2 & 2.1 (where Method 1 is used) OR Form 2B Defect Repairs (where Method 2 or 3 is used)																																											
Capital Upgrade		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																		
User Comments #2																																													
Forecasts for Capital Renewal using Methods 2 & 3 (Form 2A & 2B) & Capital Upgrade (Form 2C)																																													
Forecast Capital Renewal from Forms 2A & 2B		2017 \$000	2018 \$000	2019 \$000	2020 \$000	2021 \$000	2022 \$000	2023 \$000	2024 \$000	2025 \$000	2026 \$000																																		
Forecast Capital Upgrade from Form 2C		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																		
		\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750																																		