# **Review report**

2B3BRiver Murray Operations Cost Review

3608-06

Prepared for Murray-Darling Basin Authority

20 December 2019





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| Level 11<br>515 St Paul's Terrace            | Project Name   | 0B2B3BRiver Murray<br>Operations Cost Review     |
| Fortitude Valley QLD 4006<br>Australia       | File Reference | 360806-REPT - MDBA RMO<br>cost review_04-00.docx |
| www.cardno.com                               | Job Reference  | 3608-06  |
| Phone +61 7 3369 9822<br>Fax +61 7 3369 9722 | Date           | 18 May 202019                                    |
|  | Version Number | 4  |

|                                   | Effective Date | 19/12/2019 |
|-----------------------------------|----------------|------------|
| Approved By:                      |                |            |
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## **Document History**

| Version | Effective<br>Date | Description of<br>Revision            | Prepared by   | Reviewed by                                 |
|---------|-------------------|---------------------------------------|---|---|
| 1       | 18/11/2019        | Draft for issue                       | Susan Chamberlain, Ella Hingston,<br>Stephen Walker | Justin Edwards, Colin<br>Kemp               |
| 2       | 6/12/2019         | Interim version for<br>client comment | Stephen Walker, Ella Hingston                       | N/A – Interim version<br>for client comment |
| 3       | 9/12/2019         | Final                                 | Stephen Walker, Ella Hingston                       | Justin Edwards                              |
| 4       | 19/12/2019        | Revision to address further comments  | Ella Hingston                                       | Stephen Walker                              |

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## **Executive summary**

#### Background

The Commonwealth Government has committed to undertake triennial reviews of River Murray Operations costs to provide greater transparency and assurance to the Joint Venture governments and water users that the River Murray Operations Joint Program expenditure is reasonable. This was agreed to by the Murray-Darling Basin Ministerial Council in August 2019.

Cardno has been engaged by the Murray-Darling Basin Authority (MDBA) to undertake this review of the reasonableness of River Murray Operations Joint Program expenditure and report on the findings to the Joint Venture governments.

This report presents the approach and findings of this review of the reasonableness of River Murray Operations Joint Program expenditure.

#### Purpose of this review

The purpose of this review is to provide greater transparency and assurance to the Joint Venture governments and water users that the River Murray Operations Joint Program expenditure is reasonable.

#### Methodology

Our methodology for this review comprised the three complementary elements summarised below.

| Review of business<br>processes governing<br>expenditure   | Review of overall<br>expenditure and specific<br>expenditure items   | Benchmarking of<br>processes and<br>expenditure   |
|--|--|---|
| • <b>Objective:</b> Evaluate the<br>effectiveness of the business<br>processes of each agency to<br>support the development and<br>delivery of reasonable<br>expenditure forecasts | <ul> <li>Objective: Test the overall reasonableness of activities to deliver service</li> <li>Objective: Test the reasonableness of a sample of capital and operating expenditure items</li> </ul> | • <b>Objective:</b> Develop<br>benchmarks to inform the<br>assessment of<br>reasonableness of<br>expenditure and to provide<br>transparency regarding costs |

The review of the business processes of the MDBA and the State Constructing Authorities (SCAs) provides assurance that these processes are appropriate and sufficiently mature to support the delivery of the River Murray Operations activities with reasonable incurred costs. Appropriate and sufficiently mature business processes should also facilitate forecasts of future costs that are reasonable. In reviewing business processes, we considered:

- > The particular assets managed by each SCA and their different functions and operating environment
- > The varying organisational structures and governance arrangements in place for each SCA and the MDBA
- > The scope of expenditure and nature of the activities undertaken by each SCA and the MDBA.

We also considered overall expenditure and specific capital and operating expenditure items from both historic and forecast River Murray Operations budgets. We focused on expenditure items material to the overall program and each SCA. We also identified and reviewed material variances in operating expenditure over the review period.

#### **Operating context**

The MDBA is a Commonwealth statutory authority established by the Water Act 2007 (the Act). The Act makes provision for the management of the water resources within the Murray-Darling Basin. The MDBA has significant functions under the Water Act and, in particular, the Murray-Darling Basin Agreement (the Agreement), which forms Schedule 1 of the Act. The Agreement establishes the Authority to deliver, in conjunction with the Contracting Governments, jointly funded programs for the Contracting Governments. This includes giving effect to decisions of the Ministerial Council and the Basin Officials Committee in relation to River Murray Operations and Natural Resource Management programs, advising these bodies, and providing them with administrative support.

The governance and oversight arrangements relating to the MDBA, as set out in the Act, are summarised below.



The Act also defines important documents relevant to the River Murray Operations assets. These documents, and the relationships between each document, are summarised below.



#### **Overview of the Joint Programs**

The MDBA manages Joint Programs for River Murray Operations and Natural Resource Management on behalf of the Joint Venture governments. While the Joint Programs are budgeted and funded separately, both suites of Joint Programs share a common objective of promoting and coordinating effective planning, management and sharing of the water and other natural resources of the Murray-Darling Basin.

The River Murray Operations Joint Program comprises the following sub-programs:

- > River Operations
- > Assets (including Salt Interception Schemes).

#### Strategic management of the Joint Program

Under the Joint Venture, the River Murray Operations assets are not under the ownership or control of the MDBA. These assets are instead controlled jointly by the Joint Venture governments, with the MDBA responsible for managing the assets on behalf of the Joint Venture governments, providing head office functions such as technical and modelling support, and coordinating and directing river operations. The SCAs are responsible for the day-to-day operations, maintenance and management of the River Murray Operations assets, including functions such as:

- > Investigation and construction of new works or implementation of new measures
- > Improvement or upgrade of assets
- > Operation and maintenance of assets
- > Development and implementation of Dam Safety Programs.

Each year, as part of the Annual Work Plan process, the SCAs are also responsible for proposing the activities required to undertake the above functions and implement the Asset Management Plan, as well as estimating the costs required to perform these activities.

A summary of the assets managed by each SCA is provided below.

| Agency  | Assets managed  |
|---|---|
| WaterNSW  | <ul> <li>Hume Dam</li> <li>Locks and weirs</li> <li>Operation and maintenance of environmental works and measures programs</li> <li>Hydrometric assets</li> <li>Operation of Menindee Lakes</li> </ul>  |
| Department of Planning, Industry and Environment<br>(New South Wales) | <ul><li>Land management at Lake Victoria</li><li>River works</li><li>Salt interception schemes</li></ul>  |
| Goulburn-Murray Water   | <ul> <li>Dartmouth Dam</li> <li>Hume Dam</li> <li>Locks and weirs</li> <li>Salt interception schemes</li> <li>Operation and maintenance of environmental works and measures programs</li> <li>Hydrometric assets</li> <li>River management</li> <li>Land and on-water management</li> </ul>     |
| SA Water  | <ul> <li>Lake Victoria</li> <li>Locks and weirs</li> <li>Salt interception schemes</li> <li>Lower Lakes Barrages</li> <li>Operation and maintenance of environmental works and measures programs</li> <li>Dredging at Murray Mouth</li> <li>Land management at Sir Richard Peninsula</li> </ul> |
| Department for Environment and Water (South Australia)                | <ul> <li>Monitoring assets</li> </ul>   |

#### **Review of asset management processes**

We consider that the asset management practices of MDBA and SCAs are sufficiently robust to support reasonable expenditure through the Joint Program. Our review of documents and engagement with SCAs and MDBA found that there is a large number of service and performance standards for the assets and service delivery and that there was a high level of awareness of these measures and targets. An improvement project is underway to provide a clearer line of sight between activities in the Joint Program and the overall objectives of the River Murray Operations.

The SCAs are at varying levels of maturity with respect to asset information systems and for functions such as storing asset information centrally, managing operation and maintenance centrally, and using asset

information to inform asset planning. While this does not necessarily impact the reasonableness of expenditure, the greater use of information systems should improve transparency over Joint Program activities and costs.

Asset risk is managed through a combination of the risk management approach documented in the Asset Management Plan and the asset risk assessment approaches of the SCAs. However, all dams and weirs are managed in accordance with state dam safety legislation, and if that does not exist, the Australian National Committee on Large Dams guidelines. We consider that a simple approach to communicating risk (acceptable or unacceptable) may be a simple way to provide consistency in communicating risk across the assets. While MDBA recognises that there are significant spikes in its long-term forward expenditure projects sourced from its renewal annuity model, there is no forecast that incorporates expenditure for all drivers, particularly dam safety, noting that Portfolio Risk Assessments in progress will improve this information. We recommend that a long-term expenditure forecast covering all drivers is developed, covering all River Murray Operations assets.

Each SCA decides how to deliver Annual Work Program based on its own procurement policies and the availability of resources. The MDBA is informed and provides guidance on procurement where appropriate. Our review of a sample of capital expenditure projects (Section 10.3) found that in all cases appropriate procurement strategies has been adopted which provides some assurance that outturn costs are reasonable.

While this review of asset management processes has found that the MDBA and the SCAs are at different levels of maturity and that there are some opportunities for improvement, we do not consider that any of the shortcomings identified would materially impact on the reasonableness of Joint Program expenditure.

#### Benchmarking

The benchmarking undertaken for this review is internal to the River Murray Operations. The benefit of internal benchmarking is that it draws on a generally consistent dataset and inherently controls for factors (e.g., organisation size, market structure, climate) that may distort comparisons in external benchmarking. The following cost benchmarking was undertaken:

- 1. Operating expenditure by asset class
- 2. Operation and maintenance costs by SCA for assets within an asset class
- 3. Long-term total operating expenditure
- 4. Support service and administration costs.

The following conclusions were drawn from our cost benchmarking:

- Operating expenditure as a proportion of the replacement cost of assets at a site are generally consistent within an asset class, which is consistent with the hypothesis being tested. There is also a general trend of operating and maintenance costs increasing with asset age.
- > Economies of scale are not strongly evident although diseconomies of scale are observed for very small sites such as the Pike/Mundic salt interception scheme, Overland Corner lock and weir, and Lake Victoria
- > There is considerable variability in salt interception scheme costs. It may be beneficial to undertake benchmarking that considers power costs separately.
- > The relative costs for dams, and locks, weirs and barrages, are consistent with industry averages
- > There is no evidence of unreasonable operation and maintenance costs within each asset class through this analysis
- > There is no distinct relationship between the operating expenditure and the SCA for any of the asset classes. Operating expenditure trends are more aligned with asset type, scale and age.
- > There is no evidence of unreasonable operation and maintenance costs by any SCA through this analysis.
- > Our analysis of the 'Support Services' and 'Administration/Mgmt' cost categories shows potentially varying levels of efficiency in these areas between the three major SCAs. However, we consider that the data is not sufficiently robust to make an unqualified conclusion in this area.

#### Operating expenditure

In the last three years, actual operating expenditure for the Joint Program has increased by an average of 3% per annum in real terms to be \$60.8 million in 2018/19. We reviewed operating expenditure in aggregate, by service type and for activities that showed material variance or were material in absolute terms. We did

2022/23

2021/22

not identify any historical operating expenditure that is unreasonable. In the future forecasts, SA Water advised that one activity (River Operations from 2020/21 forward) had been incorrectly sustained at prior levels and should be decreased. Oversights of this nature are to be expected in outer years of forecasts.



Budget and actual operating expenditure from 2016/17 to 2022/23 is shown below.

2018/19

#### **Capital expenditure**

2016/17

30.0

10.0

Operating 20.0

The 2019/20 budget for Joint Program capital expenditure is \$11.0 million. Capital expenditure for the Joint Program is much lower than operating expenditure (average annual budgeted capital expenditure of \$12.0 million from 2016/17 to 2022/23 which is a fifth of average annual budgeted operating of \$62.9 million from 2016/17 to 2022/23). Capital expenditure includes both Investigations and Construction cost types with Investigation averaging 18% of all capital expenditure over the past and forward periods.

Budget

2019/20 Actual 2020/21

The capital expenditure program is comprised mainly of small to medium projects with a median value of \$70.7k and average value of \$280k. We consider that the Joint Program is more consistent and less lumpy than the expenditure programs typical of other water service providers across Australia. We reviewed a sample of ten capital expenditure projects to complement this review.

Budget and actual capital expenditure from 2016/17 to 2022/23 is shown below.

2017/18



#### Conclusions

Our conclusions across the main elements of this review are summarised below:

- > We consider that the River Murray Operations Joint Program is developed and delivered within a comprehensive governance framework. However, we support the views of stakeholders that the Joint Program budget process is too time consuming and that having the annual budget not formally approved until well into the financial year has the potential to impact on the ability of the SCAs to effectively procure activities.
- > Given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning and we recommend that a long-term expenditure forecast covering all expenditure drivers is developed, covering all River Murray Operations assets.
- > There is no evidence of unreasonable operation and maintenance costs within each asset class through this analysis. There is no evidence of unreasonable operation and maintenance costs by SCA through this analysis.
- > Our analysis of the 'Support Services' and 'Administration/Mgmt' cost categories shows potentially varying levels of efficiency in these areas between the three major SCAs. However, we consider that the data is not sufficiently robust to make an unqualified conclusion in this area.
- There is consistent and substantial underspend in operating expenditure between that budgeted and that actually incurred which has averaged about 10% of budget or \$6.8 million per year in the three-year period from 2016/17 to 2018/19. We concluded that organisational capacity is the most material factor driving the observed underspend of operating expenditure. We note that the SCAs with the largest underspends are working to address their underlying causes of underspend. We concluded that there is no evidence that budgeted operating expenditure is unreasonably high.
- Consistent underspend is also observed for capital expenditure. Unlike for operating expenditure, there is no clear relationship between underspend and the SCA responsible for delivery with all SCAs having a similar level of underspend. We consider that the underspend of capital expenditure does not impact on the reasonableness of expenditure. The underspend is partially obscured by the carry-overs and for discrete capital expenditure projects, deferrals are partly driven by agencies seeking better information on the scope.
- > Forecasting of future operating expenditure is performed inconsistently across agencies. Forecasts are made on a nominal basis but a wide range of inflators are used to arrive at the forecasts. In our interviews with agencies, it was generally not clear how the assumptions underlying forecasts reflected movements in real costs. We consider that improved consistency in forecasting costs will provide greater assurance over the reasonableness of River Murray Operations costs.

Overall, we conclude that the River Murray Operations Joint Program costs are overall reasonable. There are some small anomalies in the forward budget but these are not material and under the budgeting and oversight arrangements for the Joint Program they would likely not be actually incurred.

#### Recommendations

We make the following recommendations for potential improvements to development of budgets for and delivery of the Joint Program to provide greater assurance over the reasonableness of proposed and incurred costs. In making these recommendations, we have been mindful of the operating context and have recognised that the MDBA, States and SCAs have autonomy to decide individually how to discharge their respective responsibilities relating to the Joint Program.

- 1. We recommend that the Joint Program budget process is streamlined and concluded in a timelier manner. Improved budget timeframes should enhance the ability of the SCAs to undertake procurement to deliver reasonable costs for activities. Further, the multi-year program management function over the Joint Program can be strengthened to provide improved certainty and management of funds carried over from one budget year to the next.
- 2. We recommend that the Terms of Reference of the Joint Programs Budget Committee and the River Murray Operations Committee with respect to the budget process and governance be reviewed to ensure that there is clarity in the roles and responsibilities of each and to avoid duplication
- 3. We recommend that a consistent approach to communicating asset risk across the asset portfolio is adopted
- 4. We recommend that a more consistent approach to forecasting future costs is agreed to and implemented for the Joint Program
- 5. Given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning and we recommend that a long-term expenditure forecast covering all expenditure drivers is developed, covering all River Murray Operations assets

- 6. We recommend that the Joint Venture partners consider the costs and benefits of undertaking benchmarking of operating expenditure by asset class as part of the annual budget process with a requirement on the SCA's asset managers to provide commentary on the reasons driving observed trends and outliers
- 7. We recommend that the SCAs and the MDBA consider the value of extending benchmarking to service delivery measures
- 8. We recommend that the SCAs and the MDBA consider the robustness and value of benchmarking the 'Support Services' and 'Administration/Mgmt' categories. Reporting on these metrics could be included in the annual budget process with a requirement that the SCAs justify their relative position for these measures
- 9. We recommend that the scope of future reviews of the reasonableness of River Murray Operations costs should be similar to this review and cover business processes, actual/budgeted expenditure and benchmarking
- 10. We recommend that benchmarking similar to that undertaken for this review be undertaken for future reviews and provided to SCAs early in the review period to provide SCAs with time to review and comment on the drivers for observed trends and variances.

## Acronyms and abbreviations

| Acronym or<br>abbreviation           | Description  |
|--------------------------------------|--|
| Act                                  | Water Act 2007 (Commonwealth)  |
| Agreement                            | Murray-Darling Basin Agreement, which is Schedule 1 of the Water Act 2007 (Commonwealth)   |
| Authority                            | Six-member Authority that governs the Murray-Darling Basin Authority. The Authority comprises the Chair, the MDBA's Chief Executive and four part-time members |
| С                                    | Construction   |
| <b>DEW</b><br>Alternative:<br>SA_DEW | Department for Environment and Water (South Australia)   |
| <b>DPIE</b><br>Alternative: DPI      | Department of Planning, Industry and Environment (New South Wales)   |
| I                                    | Investigations   |
| GMW                                  | Goulburn-Murray Water  |
| MDBA                                 | Murray-Darling Basin Authority   |
| MP                                   | Maintenance - Planned  |
| MR                                   | Maintenance – Routine  |
| 0                                    | Operations   |
| WNSW                                 | WaterNSW   |
| RMW                                  | River Murray Water   |
| SAW                                  | SA Water   |
| SCA                                  | State Constructing Authority   |

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## 1 Introduction

### 1.1 Background

The Commonwealth Government has committed to undertake triennial reviews of River Murray Operations costs to provide greater transparency and assurance to the Joint Venture governments and water users that the River Murray Operations Joint Program expenditure is reasonable. This was agreed to by the Murray-Darling Basin Ministerial Council in August 2019.

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This report presents the approach and findings of this review of the reasonableness of River Murray Operations Joint Program expenditure.

### 1.2 Murray-Darling Basin Authority

The MDBA is a Commonwealth statutory authority established by the *Water Act 2007* (the Act). The MDBA sits within the Australian Government Agriculture portfolio. The policy and strategic direction of the MDBA's activities are set by the six-member Authority, consisting of a Chair, the MDBA's Chief Executive and four part-time members. The Authority reports to the Commonwealth minister responsible for water in relation to the Murray-Darling Basin Plan. For River Murray Operations and Natural Resource Management Joint Programs, the Authority reports to the Murray-Darling Basin Ministerial Council (the Ministerial Council) through the Basin Officials Committee.

The Act makes provision for the management of the water resources within the Murray-Darling Basin. Schedule 1 of the Act is the Murray-Darling Basin Agreement which has the purpose to:

'... promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water and other natural resources of the Murray-Darling Basin, including by implementing arrangements agreed between the Contracting Governments to give effect to the Basin Plan, the Water Act and state water entitlements.'

The MDBA has significant functions under the Water Act and, in particular, the Murray-Darling Basin Agreement (the Agreement). The Agreement establishes the Authority to deliver, in conjunction with the Contracting Governments, jointly funded programs for the Contracting Governments. This includes giving effect to decisions of the Ministerial Council and the Basin Officials Committee in relation to River Murray Operations and Natural Resource Management programs, advising these bodies, and providing them with administrative support. There is a long history of collaboration between the states and the Commonwealth in the joint management of the River Murray Operations assets. The first River Murray Waters Agreement was made in 1914. There have been 13 subsequent agreements, with the current Murray-Darling Basin Agreement being made in 2008.

## 1.3 The River Murray System and River Murray Operations

The scope of this review applies to River Murray Operations. River Murray Operations are the activities required to manage and operate the assets in the River Murray System. The River Murray System is the main regulated river system that drains the southern part of the Murray-Darling Basin. The extent of the River Murray System is defined under subsection 86A(3) of the Act and shown in Figure 1-1.



Figure 1-1 Schematic of River Murray Operations

Source: MDBA 2019



- South Australia
- Australian Capital Territory

This diagram is an overview of river operations in the River Murray system. It is not a complete or accurate reference map of irrigation areas and regulating structures.

For more detailed information on operations or regulating structures in each state, contact the relevant state water management authority. This shows that the River Murray System extends through New South Wales, Victoria and South Australia. These three state governments, along with the Australian Government, form a Joint Venture for the control of the River Murray Operations assets. Each state government's control is exercised through the Ministerial Council and the Basin Officials Committee. The MDBA manages the River Murray Operations assets on behalf of the Joint Venture governments and in accordance with the functions, powers and duties set out in the Agreement.

The functions of the River Murray Operations assets include:

- > Delivery of water from storages along the system to end users, including agriculture and industry, and for critical human water needs
- > Achievement of water needs of the environment (via targeted releases of water for the environment)
- Provision of a system of constraints to control the levels of the river in order to reduce erosion and flooding.

The infrastructure assets that underpin River Murray Operations to deliver these functions comprise:

- > Hume and Dartmouth Dams
- > Lake Victoria
- > 14 weirs (with 13 locks)
- > Barrages at the Lower Lakes
- > 13 salt interception schemes
- > A range of minor water regulating structures
- > River bank protection and restoration works
- > An extensive hydrometric network
- > Large-scale environmental works constructed under The Living Murray Program
- > Ancillary assets such as offices, accommodation, and plant and equipment.

In addition to infrastructure assets, the River Murray Operations asset base also includes plant and equipment, land, and easements. These assets support and enable the Joint Venture governments, through the appointed State Constructing Authorities (SCA), to deliver the River Murray Operations Joint Program.

A simplified depiction of the River Murray Operations assets and their functions is provided in Figure 1-2.



Figure 1-2 Examples of River Murray Operations river management structures

Source: Joint Programs 101 (MDBA 2019)

The SCAs have been appointed by each of the Joint Venture governments to carry out the construction, operation, maintenance and implementation of works and other measures required to deliver the River

Murray Operations. This power is conferred under Section 52 of the Murray-Darling Basin Agreement. The SCAs are:

- > New South Wales: WaterNSW and the Department of Planning, Industry and Environment Water
- > Victoria: Goulburn-Murray Water
- > South Australia: SA Water and the Department for Environment and Water, as the agents for the minister responsible for the River Murray.

#### 1.4 Purpose of review

The purpose of this review is to provide greater transparency and assurance to the Joint Venture governments and water users that the River Murray Operations Joint Program expenditure is reasonable.

#### 1.5 Scope of review

The Terms of Reference prepared by the MDBA, and approved by the Basin Officials Committee, for this review stipulate that the scope is to include:

- > Actual expenditure for the Joint Program for 2016/17 to 2018/19
- > Budget expenditure for 2019/20 and forecast expenditure for 2020/21, 2021/22 and 2022/23
- > Expenditure by sub-program and asset site (both operating and capital)
- > Defining an appropriate methodology for assessing the reasonable costs of the River Murray Operations, including relevant metrics
- > Discussion and advice on approaches to benchmarking River Murray Operations costs to inform the assessment of their reasonableness and the application of these benchmarks to past and future costs.

More details on specific areas of the review are provided in the following sections. Revenue relating to the River Murray Operations is outside the scope of this review.

#### 1.5.1 Strategic review of investment planning and asset management

The Terms of Reference require us to consult with the MDBA and the SCAs to inform the review findings. The purpose of this engagement is to understand how the business processes of the MDBA and the SCAs inform expenditure forecasts and support reasonable expenditure. This review is required to consider:

- 1. The level of service required to be provided by River Murray Operations, and how expenditure decisions are informed by these required service levels
- 2. The processes that support the development of River Murray Operations expenditure forecasts and whether these are appropriate. Processes to be considered include long-term planning, stakeholder engagement, needs identification, options analysis, cost estimating and whole-of-life planning; including capital/operating expenditure trade-offs and procurement strategies.
- 3. The effectiveness of asset management approaches to balancing whole-of-life cost, service levels and risk in the delivery of River Murray Operations services.

#### 1.5.2 Allocation of corporate overheads

The process of allocating corporate overheads incurred by the SCAs to Joint Program expenditure is to be reviewed at a high level. The MDBA is currently conducting a separate review of corporate overhead costs which will be concluded after this review report is finalised.

#### 1.5.3 Operating expenditure review

In assessing the reasonableness of operating expenditure, we are required to:

- Identify variances between the River Murray Operations operating expenditure budgets for 2016/17 to 2018/19 and actual expenditure, and comment on the reasons for these variances by focusing on material items
- 2. Analyse historic and forecast operating expenditure by cost categories, and determine the major components of operating expenditure and drivers for changes in operating expenditure.

#### 1.5.4 Capital expenditure review

In assessing the reasonableness of capital expenditure, we are required to:

- 1. Comment on the overall forward capital expenditure program and the extent to which it supports River Murray Operations service requirements and stakeholder expectations
- 2. Review actual capital expenditure incurred in 2016/17 to 2018/19, and identify variances from forecasts in capital expenditure. Assess the reasonableness of this capital expenditure and comment on the reasons for variances from forecasts.
- 3. Review the 2019/20 and forecast capital expenditure and assess the reasonableness of the forecast capital expenditure program
- 4. Comment on the impact on operating expenditure of capital expenditure on operating expenditure (i.e., the scope for increases and savings in operating expenditure).

#### 1.5.5 Benchmarking

The review is required to provide discussion and advice on approaches to benchmarking River Murray Operations costs and consider previous work on benchmarking the River Murray Operations expenditure program. If appropriate, the review should ensure that the sensitive assumptions are still relevant, and if not, update these as required. Alternative benchmarking approaches can be considered.

To meet the objectives and scope of the review, we have implemented the review methodology described in Section 3.

### 1.6 Definitions

The terms of reference require an assessment of whether the River Murray Operations Joint Program historic and forecast expenditure is reasonable. In the context of this review, reasonable expenditure is defined as expenditure that:

- > Is clearly justified to deliver the service required of River Murray Operations
- > Has appropriate timing
- > Has regard for the operating context and risk in delivery of River Murray Operations
- > Proposes a scope of works that is the best means of achieving the desired outcome, having regard for lifecyle costs
- > Has a level of expenditure that is reasonable for the scope of works.

#### 1.7 Price base

This review is based on the River Murray Operations Joint Program budget for 2019/20. This budget was developed through the budgeting process described in Section 2.1.1 and approved by the Ministerial Council on 4 August 2019. Carry-overs from previous financial years into 2019/20 were approved by the Authority's Chief Executive on 24 October 2019. Past expenditure has been provided by the MDBA for the River Murray Operations Joint Program for 2016/17 to 2018/19. These costs are nominal as the costs were recorded in the year that they were incurred.

Forward forecasting for the River Murray Operations Joint Program is undertaken on a nominal basis. That is, the forecasts include an allowance for inflation.

For the purpose of this review, we have sought to present all costs in a consistent, real price base of 2019/20. This allows for better comparison of the underlying drivers of costs over time. However, we have found that the assumptions made in forward forecasts relating to cost inflation are inconsistent between agencies. We do not consider that these differences in assumptions materially impact the assessment of the reasonableness of future costs.

To achieve a consistent price base, the consumer price index averaged for Sydney, Melbourne and Adelaide has been used to inflate past costs. For future costs, inflation has been assumed at 1.7% per annum. This is based on the year end change in the consumer price index for all groups to September 2019. The indices applied to convert all costs to a real 2019/20 price base are summarised in Table 1-1. While the Consumer Price Index is a measure of the movement in price of household goods, which may not always reflect the movement in costs relevant to the Joint Program, it provides a sufficient reflection of the movement in underlying inflation. The Consumer Price Index is also preferred by most economic regulators across Australia for the inflation of costs.

Table 1-1 Indices used to convert costs to real 2019/20 price base

| 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 |
|---------|---------|---------|---------|---------|---------|---------|
|---------|---------|---------|---------|---------|---------|---------|

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| Index 1.06 1.04 1.01 1.00 0.98 0.97 0.99 | Index | 1.06 | 1.04 | 1.01 | 1.00 | 0.98 | 0.97 | 0.95 |
|--|-------|------|------|------|------|------|------|------|

We discuss the approach to forward budgeting costs for the River Murray Operations in Section 9.3.2.

## 2 Operating context for Joint Programs

### 2.1 Governance arrangements

The MDBA is an independent Commonwealth agency that is responsible for planning for and managing water resources in the Murray-Darling Basin. The governance arrangements relating to the MDBA, as set out in the Act, are summarised in Figure 2-1. These arrangements provide for decision-making under the Agreement, while supporting the MDBA and others in the delivery of the Basin Plan.



Figure 2-1 Governance arrangements for MDBA

Source: <u>https://www.mdba.gov.au/about-us/governance-water-management-murray-darling-basin/committees-decision-making</u> (MDBA 2018)

In addition to the roles and responsibilities identified in the above figure, the following key roles and responsibilities, as applicable to River Murray Operations, are noted. Further detail is also provided below on the roles and responsibilities of the Ministerial Council and Basin Officials Committee.

- Ministerial Council: The Ministerial Council is established by the Agreement and comprises the Ministers responsible for water from the Commonwealth, New South Wales, Victoria, South Australia, Queensland and the Australian Capital Territory (the Basin Governments). The Ministerial Council is responsible for approving any amendments to the Agreement, along with approving the MDBA's annual Corporate Plan, Annual Work Plan and budget, and Asset Management Plan for the River Murray Operations assets. These core governance documents are discussed further in Sections 2.1.1 and 2.1.2.
- Basin Officials Committee: The Basin Officials Committee is established by the Agreement and comprises officials from the Basin Governments, who give effect to policies or decisions by the Ministerial Council and make high-level decisions in relation to river operations. The Basin Officials Committee is responsible for approving annual 'Objectives and Outcomes' for River Murray Operations. Prior to its submission to the Ministerial Council for approval, the Basin Officials Committee is also responsible for reviewing the MDBA's Asset Management Plan for the River Murray Operations assets. The annual Objectives and Outcomes are discussed further in Section 2.1.2.
- > Joint Programs Budget Committee: The Joint Programs Budget Committee reports to the Basin Officials Committee and comprises a representative from each Basin Government. The purpose of the

Joint Programs Budget Committee is to provide advice to the Basin Officials Committee on budget matters relating to the River Murray Operations and Natural Resource Management Joint Programs, including advice on the assessment of business cases for capital expenditure items and advice on the draft Annual Work Plan and budget. The Joint Programs Budget Committee also works with the MDBA and the River Murray Operations Committee to prepare each year's River Murray Operations Joint Program budget. The Annual Work Plan and budget is discussed further in Section 2.1.1, while the River Murray Operations Committee is discussed further below.

- River Murray Operations Committee: The River Murray Operations Committee comprises representatives from the Joint Venture governments and the SCAs. The purpose of the River Murray Operations Committee is to provide formal oversight of River Murray Operations, give effect to policies or decisions of the Ministerial Council or Basin Officials Committee, and provide support and advice to the Basin Officials Committee. Concurrent with the Joint Programs Budget Committee's review of the draft Annual Work Plan and budget, and assessment of business cases for capital expenditure items, the River Murray Operations Committee also provides advice on the draft Annual Work Plan and budget.
- Asset Management Advisory Panel: The Asset Management Advisory Panel is established by the MDBA under the Act and comprises representatives from the MDBA and the SCAs. Meetings of the Asset Management Advisory Panel are held quarterly to facilitate collaboration between the SCAs, and provide a mechanism for reporting and discussing progress against the Annual Work Plan and budget and any significant issues encountered.
- Water Liaison Working Group: The Water Liaison Working Group is established by the MDBA under the Act and comprises representatives from the MDBA, WaterNSW, the Department of Planning, Industry and Environment (New South Wales), Goulburn-Murray Water, the Department for Environment and Water (South Australia), SA Water, the Department of Agriculture and Water Resources (Commonwealth) and the Department of Environment, Land, Water and Planning (Victoria). The Water Liaison Working Group is responsible for reviewing the Annual Operations Plan (Annual Operating Outlook) for the River Murray System. The MDBA must also notify and seek the advice of the Water Liaison Working Group for certain matters relating to river operations in the River Murray System.
- Independent River Operations Review Group: The Independent River Operations Review Group is established by the MDBA under the Act and comprises up to five independent consultants with significant expertise in river operations or environmental water delivery. The Independent River Operations Review Group is responsible for providing an annual review report on the MDBA's compliance with the Objectives and Outcomes. As part of this responsibility, the Independent River Operations Review Group reviews river operations, environmental water delivery actions and water sharing activities.

#### 2.1.1 Annual Work Plan and budgeting process

Under the Agreement, the MDBA is required to prepare a draft Annual Work Plan. The draft Annual Work Plan is developed in consultation with the SCAs, who each propose a work plan for the upcoming financial year and three outyears. Once received, the proposed work plans are aggregated by the MDBA and, through discussions with each SCA, activities are prioritised.

The draft Annual Work Plan is required to set out:

- > The Joint Programs activities relating to the Agreement for the next four years, including the activities through which the MDBA and the SCAs intend to achieve the objectives and outcomes set by the Ministerial Council and Basin Officials Committee
- New capital works and operation and maintenance programs to be undertaken or required under the Agreement, including works and programs that may be required to implement the Asset Management Plan
- > Budget for these activities, works and programs.

While the draft Annual Work Plan is required to adopt a four-year planning horizon, approval is only given by the Ministerial Council for the first year of the budget.

The MDBA's integrated business planning and reporting cycle is illustrated in Figure 2-2.



INTEGRATED BUSINES S PLANNING AND REPORTING CYCLE ATTACHMENT D

Figure 2-2 Integrated business planning and reporting cycle for MDBA

Source: Murray-Darling Basin Ministerial Council and Murray-Darling Basin Authority Service Level Agreement (2018)

Once prepared by the MDBA, the draft Annual Work Plan is submitted to the Basin Officials Committee through the River Murray Operations Committee and Joint Programs Budget Committee. The Basin Officials Committee considers the draft Annual Work Plan and submits this, along with its advice regarding the plan, to the Ministerial Council. The Ministerial Council may then approve the Annual Work Plan with or without amendment or refer the plan back to the MDBA for further consideration.

Once approved by the Ministerial Council, the MDBA may propose to amend the Annual Work Plan if it considers that a 'significant variation' is desired or required. Amendments proposed for significant variations are approved through the approval process used for the draft Annual Work Plan. Less material variations may be managed by the MDBA. In conjunction with the approval of the Annual Work Plan, the funding shares between the Commonwealth and Basin Governments are determined for the activities enclosed in the Annual Work Plan.

Among the other services delivered by the MDBA, the Annual Work Plan includes the activities proposed by the SCAs and the MDBA for the River Murray Operations Joint Program.

The process used to prepare the Annual Work Plan and confirm the funding arrangements for the River Murray Operations is described below:

- 1. The SCAs propose work activities and submit an estimate to the MDBA for inclusion in the Annual Work Plan
- 2. The MDBA works with the Joint Programs Budget Committee, River Murray Operations Committee and the SCAs to prepare the annual River Murray Operations Joint Program budget. The budget is also reviewed by the Joint Programs Budget Committee and River Murray Operations Committee.
- The MDBA submits the draft Annual Work Plan to the Basin Officials Committee. The Joint Programs Budget Committee and River Murray Operations Committee provide advice to the Basin Officials Committee on the Annual Work Plan, including advice on the assessment of business cases for capital expenditure items.
- 4. The Basin Officials Committee submits the draft Annual Work Plan to the Ministerial Council together with its advice on the plan
- 5. If the Ministerial Council accepts the draft Annual Work Plan, with or without amendment, the Ministerial Council approves the construction of the works in the draft Annual Work Plan and includes the funding for the works in the plan. If the Ministerial Council does not accept the draft Annual Work Plan, the plan is returned to the MDBA for further consideration.

- 6. As work proceeds through investigation and design to construction ready, estimates are updated and subsequent Annual Work Plans amended appropriately
- 7. For the construction of significant items (>\$3.2 million) under Section 56 of the Agreement, the MDBA is required to approve the general scheme of work, designs, specifications, estimates and award of contract; provided all are in accordance with the Annual Work Plan; and authorises the SCA to proceed with construction. While this formal limit is in place, in practice the MDBA is involved in the development and approval of many expenditure items of lesser value.
- 8. The SCA constructs the work and makes all payments relevant to the project to internal and external resources. The SCA submits to the MDBA a claim for the reimbursement of actual costs incurred. Under Clause 78 of the Agreement, the MDBA pays the SCA the costs claimed.
- 9. Should the total estimated cost of the works increase, or should the scope or schedule need to be increased, and if there are insufficient funds available from underspends in the current year to cover the additional costs, an amendment to the Annual Work Plan may need to be approved by the Ministerial Council. It is possible that Joint Venture governments could be requested to provide additional funds, although instances of this are rare and tend to have occurred in response to an emergency.
- 10. Once an amended Annual Work Plan is approved, the MDBA is able to authorise the SCA to incur the additional expense
- 11. Under Clause 60 of the Agreement, if the total estimated cost of the work increases by more than 10% of the amount of the accepted tender, the MDBA must immediately notify the Ministerial Council and obtain approval from the Ministerial Council for the work to proceed. If approval to proceed is not received within one month of notification, the MDBA must direct the SCA to suspend further action on the work.

Stakeholders acknowledged that the MDBA River Murray Office has an important role in developing and delivering the program through testing the need for proposed activities, providing input into options analysis and providing advice on procurement strategies. The MDBA River Murray Office also has a program management role in monitoring progress and expenditure and working with the SCAs to reprioritise activities and expenditure in response to changing circumstances. While some SCAs expressed a desire for greater clarity over how the MDBA River Murray Office should interact in development and delivering the program, all acknowledged that the MDBA plays an important role in ensuring that the River Murray Operations Joint Programs are sound.

Stakeholders commented that there is some uncertainty over the roles and responsibilities of the Joint Programs Budget Committee and River Murray Operations Committee with respect to development of the budget and how these two committees should work together to provide assurance that expenditure is reasonable. We have made a recommendation for improvement in this area.

#### 2.1.2 Other governance documents

The Act also defines other important documents relevant to the River Murray Operations assets. These documents, and the relationships between each document, are summarised in Figure 2-3.



Figure 2-3 Relationships between key MDBA governance documents

Source: Objectives and outcomes for river operations in the River Murray System (MDBA 2019)

An overview of the key governance documents relating to the River Murray Operations is provided below, along with an overview of the Ministerial Council's overarching Statement of Intent and Service Level Agreement with the MDBA:

- Statement of Intent: The Ministerial Council is responsible for maintaining the Statement of Intent, which articulates the agreed approach between the Ministerial Council, Basin Officials Committee, the MDBA and jurisdiction agencies for the authorisation, management and delivery of Joint Programs activities. The Statement of Intent sets out the principles by which the Ministerial Council operates; an overview of the roles and responsibilities of the Ministerial Council, Basin Officials Committee and the MDBA; and the Council's expectations of the Basin Officials Committee and the MDBA.
- Service Level Agreement: The Statement of Intent is supported by a Service Level Agreement, which was entered into by the Ministerial Council and the MDBA in 2014. The Service Level Agreement further defines the roles and responsibilities of the Ministerial Council, Basin Officials Committee and the MDBA, including delegations made within the MDBA for the purpose of the Joint Programs. As part of the roles and responsibilities included in the Service Level Agreement for the MDBA, requirements for financial and performance reporting to the Ministerial Council are stipulated, along with the requirements for periodic audits and reviews.
- > Objectives and Outcomes for river operations in the River Murray System: A document approved by the Basin Officials Committee each year that sets out 'objectives and outcomes to be achieved by the Authority in relation to river operations.' The Objectives and Outcomes are classified as either 'general' or 'specific'. The general objectives and outcomes cover the areas of water storage and delivery accounting, River Murray Operations assets, people and communities, environment, and communication and information management. The specific objectives and outcomes are mostly defined operating rules or guidance relating to specific assets or reaches of the River.
- Asset Agreement: Under the Agreement, the Authority is required to establish an Asset Agreement with the Joint Venture governments regarding the Authority's management of the River Murray Operations assets. On 12 June 2009, all Joint Venture governments entered into an Asset Agreement covering the governments' requirements for accounting for, recording, reporting and auditing the River Murray Operations assets.
- Asset Management Plan: This is required to cover all River Murray Operations assets and be reviewed annually. The Asset Management Plan is reviewed by the Basin Officials Committee and approved by the Ministerial Council. The Asset Management Plan sets out for each asset how it will be 'managed,

maintained, repaired, renewed or replaced'. The River Murray Operations assets are required to be constructed, operated and maintained in accordance with the Asset Management Plan.

Memoranda of Understanding: The MDBA has entered into Memoranda of Understanding with a number of the SCAs: the Department for Environment and Water (South Australia), Goulburn-Murray Water and SA Water. The Memoranda of Understanding further delineate the responsibilities of the MDBA and the SCAs in relation to works and measures constructed or undertaken with funds provided by the MDBA under the Agreement.

### 2.2 Joint Programs

The MDBA manages Joint Programs for River Murray Operations and Natural Resource Management on behalf of the Joint Venture governments. While the Joint Programs are budgeted and funded separately, both suites of Joint Programs share a common objective of promoting and coordinating effective planning, management and sharing of the water and other natural resources of the Murray-Darling Basin.

The River Murray Operations Joint Program is aligned to the MDBA's Corporate Plan via the 'Run the River' function under Goal 3 ('Efficiently operate the River Murray System for partner governments'). The relevant desired outcomes under this goal are:

- > Operate the River Murray system in accordance with the Murray-Darling Basin Agreement
- > Maintain the salinity of water in the River Murray below target levels to ensure it is fit for purpose for intended uses (as relevant to the operation and maintenance of salt interception schemes)
- > Water quality information is collected and accessible to users, and long-term trends are analysed (as relevant to modelling and the operation and maintenance of hydrometric data stations).

Table 2-1 provides a summary of the programs and sub-programs within the River Murray Operations Joint Program.

| Table 2-1 | Summary of progra | ns and sub-programs | in River Murray | Operations Jo | oint Program |
|-----------|-------------------|---------------------|-----------------|---------------|--------------|
|-----------|-------------------|---------------------|-----------------|---------------|--------------|

| Program          | Sub-program   | Context   | Purpose  | Committee oversight   |
|------------------|---|---|--|---|
| River Operations | <ul> <li>River Operations</li> <li>Operations Services<br/>(RM Office)</li> <li>Operations Services<br/>(Hydrometric<br/>Network)</li> <li>Operations<br/>Improvement</li> <li>Water Markets</li> <li>Data and<br/>Information</li> </ul> | <ul> <li>Conducted according to the Annual Operating Plan to achieve the general and specific objectives and outcomes</li> <li>Operations Services (Hydrometric Network):<br/>The purpose of this sub-program is to provide accurate and timely data to the Murray–Darling Basin users</li> </ul> | <ul> <li>Delivery of water shares to end<br/>users and to meet critical human<br/>water needs and environmental<br/>objectives</li> <li>Accurate accounting for water<br/>levels through the Murray–Darling<br/>Basin</li> </ul> | <ul> <li>Basin Officials<br/>Committee</li> <li>River Murray<br/>Operations<br/>Committee</li> <li>Independent River<br/>Operations Review<br/>Group</li> </ul> |
| Assets           | <ul> <li>Asset Management<br/>Strategies</li> <li>Water Assets<br/>Goulburn Murray<br/>Water (Vic)</li> <li>Water Assets Water<br/>NSW</li> <li>Water Assets SA</li> </ul>  | <ul> <li>Governed by the Asset Management Plan and Asset<br/>Agreement</li> </ul>   | <ul> <li>Operate and maintain the River<br/>Murray System assets</li> <li>Renew and improve the River<br/>Murray System assets</li> </ul>  | River Murray<br>Operations<br>Committee   |



| Program  | Sub-program  | Context   | Purpose  | Committee oversight   |
|--|--|---|--|---|
| Salt Interception<br>Schemes                   |  | <ul> <li>Large scale pumping schemes that divert saline groundwater before it enters rivers</li> <li>The purpose of this function is to:</li> <li>Operate and maintain the River Murray System assets</li> <li>Renew and improve the River Murray System assets</li> <li>Achieve the agreed salinity levels in the River Murray System</li> </ul> | <ul> <li>As for Asset Management<br/>Strategies</li> </ul> | <ul> <li>River Murray<br/>Operations<br/>Committee</li> </ul> |
| Environmental<br>Works and Measures<br>Program | <ul> <li>Environmental<br/>Works and<br/>Measures</li> <li>Operate and<br/>Maintain<br/>Environmental<br/>Works</li> </ul> | <ul> <li>Purpose-built structures that facilitate the delivery of<br/>water for the environment. In many cases, these<br/>deliver water to key environmental sites would<br/>otherwise only receive water when the river is in flood.</li> </ul>  | <ul> <li>As for Asset Management<br/>Strategies</li> </ul> | <ul> <li>River Murray<br/>Operations<br/>Committee</li> </ul> |

## 2.3 Conclusions

The River Murray Operations Joint Program is developed and delivered within a comprehensive governance framework derived from the Murray-Darling Basin Agreement. The governance framework includes clearly articulated processes, various committees for approval and oversight, and guiding documentation. It was evident from our meetings with stakeholders and analysis of expenditure that the Joint Program also relies on collaboration between the parties involved, particularly the MDBA and the SCAs.

The stakeholders consulted expressed views that the roles and responsibilities of the Joint Programs Budget Committee and the River Murray Operations Committee were not always clear with respect to budget development and that there was likely duplication. Further, it was felt that the overall budget development process was too time-consuming and impacted on the ability of the SCAs to effectively procure activities. We discuss this further in Section 9.2.2.

The Annual Work Plan and budget, when approved, gives certainty for the current year's budget. The threeyear forward program is also subject to review and governance but the activities and total expenditure are not committed to. There is no formal requirement for long-term planning. Given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning. We discuss this further in Section 6.6. Also, the weak commitment to expenditure beyond the current year may create inefficiencies in procurement as the SCAs and the MDBA may take less risk or not be able to gain economies of scale that can be achieved in longer-term agreements.

## 3 Methodology

### 3.1 Overview of approach

Our methodology for this review comprises three complementary elements summarised in Figure 3-1.



#### Figure 3-1 Overview of review methodology

The review of the business processes of the MDBA and the SCAs provides assurance that these processes are appropriate and sufficiently mature to support delivery of the River Murray Operations activities with reasonable incurred costs. Appropriate and sufficiently mature business processes also should facilitate forecasts of future costs that are also reasonable. In reviewing business processes, we have considered:

- > The particular assets managed by each SCA and their different functions and operating environments
- > The varying organisational structure and governance arrangements in place for each SCA and the MDBA
- > The scope of expenditure and nature of the activities undertaken by each SCA and the MDBA.

The varying operating contexts of each SCA mean that it is appropriate that the underlying business processes differ between each agency; we have accounted for this in our review.

Our review of the business processes of the MDBA and the SCAs is detailed in Sections 5 and 6.

We have also considered overall expenditure and specific capital and operating expenditure items from both historic and forecast River Murray Operations budgets. We have focused on expenditure items material to the overall program and for each SCA. We have also identified and reviewed material variances in operating expenditure over the review period. Our review of operating and capital expenditure is included in Sections 9 and 10.

Our reviews of business processes and capital and operating expenditure items were undertaken through the following activities:

- 1. Preparation and submission of requests for information to the MDBA and each SCA
- 2. Selection of two to four material capital expenditure items for each SCA, covering major water storages, locks and weirs, barrages, river reaches and hydrometric data. For the Department of Planning, Industry and Environment (New South Wales) and the Department for Environment and Water (South Australia), which are responsible for smaller portfolios of River Murray Operations assets, only one material capital expenditure item is included for each agency in the forward four-year program.
- 3. Preparation and transmittal of agendas and questions for face-to-face interviews with the MDBA and each SCA, with the scope of these agendas aligned to the scope and structure of this review report
- 4. Face-to-face interviews with relevant staff from the MDBA and each SCA
- 5. Review of information provided by the MDBA and each SCA, relating to business processes and specific capital and operating expenditure items
- 6. Documentation of findings from the information reviews and interviews
- 7. Analysis of the River Murray Operations Joint Program budget trends, variances and specific expenditure items.

Our methodology for the reviews of business processes and specific expenditure items is underpinned by our sampling approach, which selected expenditure items across a range of SCAs (and thus geographies) and asset types, and use of face-to-face interviews. Through this methodology, we are able to provide comment and opinion on the reasonableness of the Joint Program expenditure and the level to which each agency's business processes and systems are applied to the development and delivery of the Joint Program.

### 3.2 Meetings held

Table 3-1 outlines the schedule of face-to-face interviews held with the MDBA and each SCA. For each agency, the meeting location, meeting date, and attendees from the agency are listed.

| Agency  | Meeting location                             | Meeting date            | Agency attendees   |
|---|--|-------------------------|--|
| MDBA  | Canberra,<br>Australian Capital<br>Territory | 21 – 22<br>October 2019 | <ul> <li>Director, Environmental Assets, Assets, River<br/>Management</li> <li>General Manager, Assets, River Management</li> <li>Director Asset Management, River Management</li> <li>RM Business Coordinator, Assets, River Management</li> <li><i>Demand forecasting and river operations only:</i> Senior<br/>Director, Operations Improvements</li> <li><i>'RMW Production Services' only:</i> Director, River Murray<br/>Operations Services</li> <li><i>'Realise Cost Efficiency in Water Delivery' only:</i><br/>Director, Adaptation, Operations Improvement, River<br/>Management</li> </ul> |
| WaterNSW  | Albury, New<br>South Wales                   | 6 November<br>2019      | <ul> <li>Manager, Asset Maintenance and Services</li> <li>Regional Manager South - Asset Operations &amp;<br/>Maintenance</li> </ul>   |
| Department of<br>Planning,<br>Industry and<br>Environment<br>(New South<br>Wales) | Buronga, New<br>South Wales                  | 28 October<br>2019      | <ul> <li>Manager Joint Venture Program, Programs and<br/>Performance</li> </ul>  |
| Goulburn-<br>Murray Water   | Tatura, Victoria                             | 30 October<br>2019      | <ul> <li>General Manager Water Storage Services</li> <li>Manager Storage Operations</li> <li>Strategic management only: Manager Financial<br/>Analytics and Systems</li> <li>Capital expenditure only: Manager Project Delivery</li> <li>Asset management only:         <ul> <li>Maximo Support Officer</li> <li>Information Services Manager</li> <li>Manager Asset Forward Planning and Program<br/>Management</li> </ul> </li> </ul>  |
| SA Water  | Adelaide, South<br>Australia                 | 23 – 24<br>October 2019 | <ul> <li>Senior Manager - River Murray Operations</li> <li>Manager Business Services</li> <li>Manager Engineering and Assets</li> </ul>  |
| Department for<br>Environment<br>and Water<br>(South<br>Australia)                | Teleconference                               | 29 October<br>2019      | <ul> <li>Principal Groundwater Modeller</li> <li>Manager, Groundwater Planning and Modelling</li> <li>Acting Manager, Water Resource Monitoring</li> <li>Program and Policy Coordinator</li> <li>Project Officer, Intergovernmental Relations</li> </ul>   |

Table 3-1 Schedule of interviews held with MDBA and SCAs

A standard meeting agenda, covering business processes and specific expenditure items, was adopted for all interviews. The structure of this review report is aligned to our adopted meeting agenda, which is summarised below:

1. Attendee introductions, project background and project objectives

- 2. Operating context (MDBA interviews only)
- 3. Strategic management
- 4. Asset management
- 5. Operating expenditure methodology, key trends and key variances
- 6. Capital expenditure methodology and review of specific capital expenditure items.

#### 3.3 Information used for this review

A list of information relied upon for this review is included in Appendix A. While some of these documents are publicly available online, the majority were directly issued by the MDBA or each SCA.

### 3.4 Limitations

The methodology for this review has been based on the time and information available. We have relied on the information provided in documents and through meetings with stakeholders. The information provided and opinions sought were for the specific purpose of this review and should not be construed for other purposes. In testing the reasonableness of expenditure, we have relied on a sampling approach for both capital and operating expenditure in addition to considering expenditure in aggregate.

Where these factors have limited our ability to draw conclusions, we have made the limitation clear in this report.

## 4 Overview of expenditure on the River Murray Operations Joint Program

## 4.1 Cost and service categorisation

The Murray-Darling Basin Agreement defines different cost categories for the delivery and management of the River Murray Operations assets. The cost categories and the codes used in the River Murray Operations Joint Program budget are summarised in Table 4-1.

 Table 4-1
 Definitions of Agreement Classifications

| Code | Classification        | Description   |
|------|-----------------------|---|
| I    | Investigations        | Investigating the need for new assets, asset renewal or asset<br>upgrade. This includes, but is not limited to, feasibility<br>assessments and options assessments.   |
| С    | Construction          | Design, approvals, and construction of any work   |
| 0    | Operations            | Activities to operate the assets to deliver the intended service  |
| MP   | Maintenance – Planned | Maintenance is work necessary to keep an existing work in the<br>state of utility in which it was upon its original completion or<br>upon the completion of any improvement or replacement of the<br>work.<br>Planned maintenance (also called major or cyclic maintenance)<br>typically comprises substantial maintenance activities that occur<br>irregularly or at cycles greater than annually. |
| MR   | Maintenance – Routine | Maintenance is work necessary to keep an existing work in the<br>state of utility in which it was upon its original completion or<br>upon the completion of any improvement or replacement of the<br>work.<br>Routine maintenance comprises maintenance activities that<br>typically recur annually.  |

The River Murray Operations Joint Program budget categorises all budget activities in terms of:

- > Responsible Agency
- > Asset Site
- > Service Description
- > Cost Sharing Class Description
- > Service Type Description
- > Sub Function Description

These categories are complete for all activities. This provides a comprehensive view of expenditure from these different perspectives.

To provide insight into the services and service types used within the budget, Table 4-2 provides a mapping of the services that occur under each service type.

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#### Table 4-2 Mapping of services and service types

| Service Type                | Service                       |
|-----------------------------|-------------------------------|
|                             | Capital Works                 |
|                             | Insurance                     |
|                             | Investigation                 |
| Environmental<br>Management | Maintenance – Planned         |
| management                  | Maintenance – Routine         |
|                             | Operations                    |
|                             | Water Quality                 |
|                             | Capital Works                 |
|                             | Insurance                     |
| Forest Water                | Maintenance – Planned         |
| Management                  | Maintenance – Routine         |
|                             | Operations                    |
|                             | Asset Management              |
|                             | Capital Works                 |
|                             | Dam Safety                    |
| <b>N</b> 1                  | Investigation                 |
| Navigation                  | Maintenance – Planned         |
|                             | Maintenance – Routine         |
|                             | Operations                    |
|                             | Support Services              |
|                             | Maintenance – Planned         |
| Not Applicable              | Not Applicable                |
|                             | Administration/Mgt            |
|                             | Capital Works                 |
| Real Estate                 | Maintenance – Planned         |
|                             | Maintenance – Routine         |
|                             | Plant, Vehicles and Equipment |
|                             | Capital Works                 |
| Recreation and              | Maintenance – Planned         |
| Tourism                     | Maintenance – Routine         |
|                             | Public Relations              |
|                             | Capital Works                 |
|                             | Investigation                 |
| River Channel               | Maintenance – Planned         |
| Management                  | Maintenance – Routine         |
|                             | Plant, Vehicles and Equipment |
|                             | Support Services              |

| Service Type              | Service                       |
|---------------------------|-------------------------------|
|                           | Administration/Mgt            |
|                           | Asset Management              |
|                           | Capital Works                 |
| RMW Office                | Maintenance – Planned         |
|                           | Maintenance – Routine         |
|                           | Operations                    |
|                           | Support Services              |
|                           | Capital Works                 |
|                           | Insurance                     |
| Colinity Mitigation       | Investigation                 |
| Samily Miligation         | Maintenance – Planned         |
|                           | Maintenance – Routine         |
|                           | Operations                    |
|                           | Administration/Mgt            |
|                           | Asset Management              |
|                           | Capital Works                 |
|                           | Dam Safety                    |
|                           | Insurance                     |
| Support Services          | Investigation                 |
|                           | Maintenance – Planned         |
|                           | Maintenance – Routine         |
|                           | Plant, Vehicles and Equipment |
|                           | Support Services              |
|                           | Training                      |
|                           | Asset Management              |
|                           | Capital Works                 |
|                           | Dam Safety                    |
|                           | Investigation                 |
|                           | Maintenance – Planned         |
| Water Storage &<br>Supply | Maintenance – Routine         |
|                           | Operations                    |
|                           | Plant, Vehicles and Equipment |
|                           | Stream Gauging                |
|                           | Support Services              |
|                           | Water Quality                 |
|                           |                               |

## 4.2 Overview of expenditure

The budgeted and actual expenditure for the River Murray Operations Joint Program over the period 2016/17 to 2022/23 is shown in Figure 4-1. Unless noted otherwise, the analysis throughout this section excludes carry-overs.



Figure 4-1 Budgeted and actual expenditure for River Murray Operations Joint Program from 2016/17 to 2022/23

This figure shows that:

- > Total budgeted expenditure for the past period (2016/17 to 2018/19) has averaged \$77.4 million per annum
- > Total budgeted expenditure for the current year and forward period (2019/20 to 2022/23) averages \$71.4 million per annum. This is a decrease of 7.7% between the total average annual budgets in the forward and past periods.
- > Actual expenditure has been lower than budgeted expenditure for the last three years at \$64.1 million per annum. On average, \$13.3 million or 17.2% of the budgeted expenditure has not been spent. Specific areas of underspend are discussed in Sections 9 and 10.

The budgeted and actual expenditure by cost category for the River Murray Operations Joint Program over the period 2016/17 to 2022/23 is shown in Figure 4-2. In this figure, the magniture of underspend is illustrated by the distance between each solid line and each dotted line of the same colour.





This figure shows that:

- > Across the past and forward periods, the Operations and Maintenance Routine cost categories form the two largest components of expenditure, while the Investigations cost category forms the smallest component of expenditure
- For the Maintenance Routine, Maintenance Planned and Construction cost categories, budgeted expenditure decreases from the final year of the past period (2018/19) to the current year (2019/20). While the budgeted expenditure for these cost categories recovers to varying degrees in 2020/21, the budgeted expenditure for the Maintenance Planned cost category is generally decreasing. Specific trends and variances across all cost categories are discussed in Sections 9 and 10.
- > Although the budgeted expenditure for the Construction cost category has increased over the past period and peaks in 2020/21, this cost category has experienced the largest underspend in absolute terms (averaging \$4.9 million per annum).



The 2019/20 budget by service type is shown in Figure 4-3.
Figure 4-3 2019/20 River Murray Operations Joint Program budget by service type

This figure shows that:

- Water Storage and Supply has the largest budgeted expenditure by service type, accounting for 33% (\$22.8 million) of expenditure
- The next three largest categories comprise a similar proportion of the total program Support Services (\$12.8 million, 18%), RMW Office (\$9.2 million, 13%), and Salinity Mitigation (\$8.8 million, 12%)
- > Together, these four programs account for 77% of the current year budget.

The 2019/20 budget by SCA is shown in Figure 4-4.



Figure 4-4 2019/20 River Murray Operations Joint Program budget by responsible agency

| Key:    |  |
|---------|--|
| SAW:    | SA Water   |
| GMW:    | Goulburn-Murray Water  |
| WNSW:   | WaterNSW   |
| RMW:    | River Murray Water   |
| DPI:    | Department of Planning, Industry and Environment (New South Wales) |
| SA_DEW: | Department for Environment and Water (South Australia)             |

This figure shows that:

- > SA Water, Goulburn-Murray Water, WaterNSW and River Murray Water account for 92% of the budgeted expenditure in 2019/20
- > The Department for Environment and Water (South Australia) accounts for 1% of the budgeted expenditure in 2019/20.

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In order to illustrate the spatial distribution of current budgeted expenditure, the 2019/20 budget by site is shown spatially in Figure 4-5. Within this figure, each site is indicated by a circle, and the colour and size of each circle is representative of the relative magnitude of its budgeted 2019/20 expenditure. Separate figures by asset class are presented in Appendix C.



Key:

#### Major water storage

- Lock, weir or barrage
- Salt interception scheme
- Environmental Works and Measures Program site
- Other site

Murray Mouth Sand Pumping is included at the 'Murray Mouth' site rather than at any of the barrages. We discuss Murray Mouth Sand Pumping in Section 9.2.3. Note:

#### 4.2.2 Carry-overs

In the above figures, 'carry-overs' have been excluded from the forward budget in order to present budgeted annual expenditure as it was originally approved by the Ministerial Council. However, within the MDBA's budgeting process for the Joint Programs, a provision is made for unspent committed or contracted funds to be "carried over" to the next financial year. Past practice, on delegation from the Ministerial Council, is that the MDBA's Chief Executive approves committed carry-over funds. The original Annual Work Plan for 2019/20, as applicable to River Murray Operations and excluding carry-overs, was approved by the Ministerial Council on 4 August 2019. The amended 2019/20 budget for River Murray Operations was approved by the MDBA's Chief Executive on 24 October 2019.



The carry-over in the 2019/20 budget by cost category is shown in Figure 4-6.

Figure 4-6 Carry-over in 2019/20 River Murray Operations Joint Program budget by cost category

Key: Percentages represent the portion of the 2019/20 budget for each cost category that is attributed to carry-overs

For the Construction, Maintenance – Planned and Investigations cost categories, carry-overs form around one third of the 2019/20 budget for each category. However, for the Maintenance – Routine and Operations cost categories, which comprise activities that are undertaken on a more regular basis, carry-overs form a significantly smaller portion of the respective 2019/20 budgets. This suggests that routine activities are more likely to be undertaken as scheduled, with less deferral of these activities to subsequent financial years. Underspends of capital and operating expenditure, and therefore the potential carry-over of these underspends, is discussed further in Sections 9 and 10.

The carry-over in the 2019/20 budget by service type is shown in Figure 4-7.







Key: Percentages represent the portion of the 2019/20 budget for the service type that is attributed to carry-overs

The majority of carry-overs in the 2019/20 budget are associated with the Water Storage and Supply and Support Services service types, which are responsible for almost 80% of carry-overs. Within these two service types, carry-overs form just over one fifth of the respective 2019/20 budgets. The Water Storage and Supply and Support Services service types also have the largest budgeted expenditure in 2019/20, as observed earlier.

Table 4-3 summarises the operating expenditure carry-over in 2019/20 by SCA. This shows that WaterNSW has the largest amount of carry-overs as a proportion of its 2019/20 budget for operating expenditure.

| SCA    | Total carry-overs in 2019/20 | Total 2019/20 budget including<br>carry-overs | Carry-overs as proportion of<br>SCA's 2019/20 budget |
|--------|------------------------------|---|--|
| DPIE   | \$219,472                    | \$4,212,065                                   | 5%   |
| GMW    | \$963,173                    | \$14,032,927                                  | 7%   |
| RMW    | \$1,118,431                  | \$9,704,655                                   | 12%  |
| SA_DEW | \$0                          | \$785,422                                     | 0%   |
| SAW    | \$1,805,967                  | \$21,450,969                                  | 8%   |
| WNSW   | \$2,393,913                  | \$11,359,142                                  | 21%  |

Table 4-3 Operating expenditure carry-over in 2019/20 River Murray Operations Joint Program budget by SCA

# 5 Strategic management overview

# 5.1 Scope of SCA activities

Under the Joint Venture, the River Murray Operations assets are not under the ownership or control of the MDBA. These assets are instead controlled jointly by the Joint Venture governments, with the MDBA responsible for managing the assets on behalf of the Joint Venture governments, providing head office functions such as technical and modelling support, and coordinating and directing river operations. The SCAs are responsible for the day-to-day operations, maintenance and management of the River Murray Operations assets, including functions such as:

- > Investigation and construction of new works or implementation of new measures
- > Improvement or upgrade of assets
- > Operation and maintenance of assets
- > Development and implementation of Dam Safety Programs.

Each year, as part of the Annual Work Plan process, the SCAs are also responsible for proposing the activities required to undertake the above functions and implement the Asset Management Plan, as well as estimating the costs required to perform these activities. Once the Annual Work Plan activities are approved, quarterly meetings of the Asset Management Advisory Panel provide a mechanism for the SCAs to report on progress against the Annual Work Plan. Formal financial and performance reports are also submitted by the MDBA to the Basin Officials Committee and Ministerial Council, detailing risks and delivery against the Annual Work Plan. The Annual Work Plan process is discussed in Section 2.

The specific assets managed by each SCA are documented in Table 5-1.

| Agency   | State                 | Assets managed   | Comments   |
|--|-----------------------|--|--|
| WaterNSW   | New<br>South<br>Wales | <ul> <li>Hume Dam (joint management with<br/>Goulburn-Murray Water – refer to<br/>'Comments' column)</li> <li>Wentworth Lock and Weir (Lock 10)</li> <li>Euston Lock and Weir (Lock 15)</li> <li>Operation and maintenance of<br/>environmental works: <ul> <li>Koondrook-Perricoota</li> <li>Barmah-Millewa</li> </ul> </li> <li>Hydrometric assets</li> <li>Operation of Menindee Lakes</li> </ul> | <ul> <li>MDBA leases Menindee<br/>Lakes from the New South<br/>Wales Government. When<br/>levels in Menindee Lakes<br/>are sufficiently high, the<br/>MDBA may direct water to<br/>be released from the lakes to<br/>meet downstream demand</li> <li>MDBA contributes 75% of<br/>the costs of operating and<br/>maintaining Menindee Lakes</li> <li>At Hume Dam, WaterNSW<br/>manages all dam structures<br/>and ancillaries, New South<br/>Wales-owned land, depot<br/>buildings and the New South<br/>Wales shoreline. Meridian<br/>Energy owns the<br/>hydropower station at Hume<br/>Dam.</li> </ul> |
| Department of<br>Planning, Industry<br>and Environment<br>(New South<br>Wales) | New<br>South<br>Wales | <ul> <li>Land management at Lake Victoria</li> <li>River works</li> <li>Salt interception schemes: <ul> <li>Buronga</li> <li>Mallee Cliffs</li> <li>Upper Darling</li> </ul> </li> </ul>   | <ul> <li>Assets are owned by the<br/>Water Administration<br/>Ministerial Corporation on<br/>behalf of the Joint Program</li> </ul>  |
| Goulburn-Murray<br>Water   | Victoria              | <ul> <li>Dartmouth Dam</li> <li>Hume Dam (joint management with WaterNSW – refer to 'Comments' column)</li> <li>Yarrawonga Weir (refer to 'Comments' column)</li> <li>Torrumbarry Lock and Weir (Lock 26)</li> </ul>   | <ul> <li>At Hume Dam, Goulburn-<br/>Murray Water manages<br/>Victorian land and the<br/>Victorian shoreline. Meridian<br/>Energy owns the</li> </ul>   |

Table 5-1 Assets managed by each SCA

| Agency  | State              | Assets managed   | Comments   |
|---|--------------------|--|--|
|   |                    | <ul> <li>Mildura Lock and Weir (Lock 11)</li> <li>Salt interception schemes: <ul> <li>Barr Creek</li> <li>Pyramid Creek</li> <li>Mildura-Merbein</li> </ul> </li> <li>Operation and maintenance of environmental works: <ul> <li>Gunbower Forest</li> <li>Hattah Lakes</li> <li>Barmah-Millewa</li> </ul> </li> <li>Hydrometric assets</li> <li>River management</li> <li>Land and on-water management</li> </ul>  | <ul> <li>hydropower station at Hume<br/>Dam.</li> <li>At Dartmouth Dam, AGL is<br/>responsible for the<br/>hydropower station</li> <li>At Yarrawonga Weir, AGL is<br/>responsible for the<br/>hydropower station</li> </ul>  |
| SA Water  | South<br>Australia | <ul> <li>Lake Victoria</li> <li>Locks and Weirs 1 to 9: <ul> <li>Blanchetown</li> <li>Waikerie</li> <li>Overland Corner</li> <li>Bookpurnong</li> <li>Renmark</li> <li>Murtho</li> <li>Rufus River</li> <li>Wangumma</li> <li>Kulnine</li> </ul> </li> <li>Salt interception schemes: <ul> <li>Murtho Lakes</li> <li>Pike/Mundic</li> <li>Bookpurnong</li> <li>Loxton</li> <li>Waikerie</li> <li>Woolpunda</li> <li>Rufus River</li> </ul> </li> <li>Lower Lakes Barrages (Goolwa, Mundoo, Boundary Creek, Ewe Island and Tauwitchere)</li> <li>Operation and maintenance of environmental works: <ul> <li>Chowilla</li> <li>Lindsay-Mulcra</li> </ul> </li> <li>Dredging at Murray Mouth</li> <li>Land management at Sir Richard Peninsula</li> </ul> | <ul> <li>Provides specialist services<br/>to SCAs in Victoria and New<br/>South Wales. For example,<br/>SA Water undertakes<br/>bathymetric surveys for<br/>Goulburn-Murray Water and<br/>assists Goulburn-Murray<br/>Water at salt interception<br/>schemes.</li> </ul> |
| Department for<br>Environment and<br>Water (South<br>Australia) | South<br>Australia | <ul> <li>Monitoring assets</li> </ul>  | <ul> <li>Provides groundwater<br/>modelling services to<br/>underpin the Basin Salinity<br/>Management Strategy 2030</li> </ul>  |

# 5.2 Organisational arrangements

Within the MDBA, there are five divisions: River Management, Science and Knowledge, Office of Compliance, Partnerships, and Corporate Strategy and Services. The River Management division is responsible for managing all areas of operating the River Murray. Corporate strategy and support for River Murray Operations is provided by the Corporate Strategy and Services division, which also provides corporate strategy and support to the MDBA as a whole. This corporate structure reflects the three core

pillars of the MDBA, which are to 'Implement the Basin Plan', 'Run the River' and 'Run the Business'<sup>1</sup>. The River Management division is comprised of River Operations, Assets, Operations Improvements, and River Management Enhancements branches.

The organisational arrangements for the SCAs are described in Table 5-2.

Table 5-2 Organisational arrangements for MDBA and each SCA

| Agency  | Arrangement   | Corporate support   | Comments  |
|---|---|---|---|
| MDBA  | <ul> <li>Dedicated River Management division</li> <li>In addition to being responsible for the River<br/>Murray Operations, the River Management<br/>division also has responsibilities for the<br/>Sustainable Diversion Limit Adjustment<br/>Mechanism, environmental water<br/>coordination, water quality and salinity, and<br/>constraints management</li> </ul>   | <ul> <li>Support services<br/>provided by the<br/>Corporate Strategy<br/>and Services<br/>division</li> </ul>         | <ul> <li>As a whole, the<br/>MDBA has<br/>offices in a<br/>number of<br/>capital cities<br/>and regional<br/>locations</li> </ul> |
| WaterNSW  | <ul> <li>Dedicated operation and maintenance team<br/>at Hume Dam</li> <li>Remaining operation and maintenance<br/>teams are geographically based, with each<br/>team generally responsible for a mix of River<br/>Murray Operations assets and non-River<br/>Murray Operations assets</li> <li>Asset capability, project delivery and dam<br/>safety teams provide services for both River<br/>Murray Operations assets and non-River<br/>Murray Operations assets and non-River<br/>Murray Operations assets</li> </ul>   | <ul> <li>Support services<br/>provided by the<br/>wider organisation</li> </ul>                                       |   |
| Department of<br>Planning,<br>Industry and<br>Environment<br>(New South<br>Wales) | <ul> <li>Independent program under Department of<br/>Planning, Industry and Environment Water<br/>Group</li> <li>The River Murray Joint Venture Program<br/>reports to the Group Director Water<br/>Programs and Performance</li> <li>Director Water Planning Implementation is a<br/>member of the River Murray Operations<br/>Committee</li> <li>Manager River Murray Joint Venture<br/>Program is a member of the Asset<br/>Management Advisory Panel and the Joint<br/>Programs Budget Committee</li> <li>Manager River Murray Joint Venture<br/>Program manages the:         <ul> <li>Lake Victoria Program (land management<br/>component)</li> <li>River Works Program</li> <li>Salt Interception Schemes</li> <li>The Living Murray</li> <li>Basin Salinity Management</li> </ul> </li> </ul> | Support services<br>provided by the<br>wider Department<br>of Planning,<br>Industry and<br>Environment<br>Water Group | <ul> <li>River Murray<br/>Joint Venture<br/>Program office<br/>in Buronga</li> </ul>  |
| Goulburn-<br>Murray Water   | <ul> <li>River Murray Operations activities are<br/>undertaken by the Water Storage Services<br/>division</li> <li>While the General Manager of Water Storage<br/>Services and underlying Dam Operations<br/>Manager are responsible for both River<br/>Murray Operations assets and non-River<br/>Murray Operations assets, specific operation</li> </ul>  | <ul> <li>Support services<br/>provided by the<br/>wider organisation</li> </ul>                                       |   |

<sup>&</sup>lt;sup>1</sup> p. 3, MDBA Annual Report 2018-19, <u>https://www.mdba.gov.au/sites/default/files/pubs/mdba-annual-report-2018-19.pdf</u> (MDBA 2019)

| Agency  | Arrangement   | Corporate support   | Comments  |
|---|---|---|---|
|   | <ul> <li>and maintenance personnel are allocated to<br/>River Murray Operations assets.</li> <li>Dedicated operation and maintenance teams<br/>are based at Dartmouth Dam, Yarrawonga<br/>Weir, Torrumbarry Lock and Weir and<br/>Mildura Lock and Weir. The team based at<br/>Torrumbarry Lock and Weir is also<br/>responsible for the Barmah-Millewa<br/>Environmental Works and Measures<br/>Program site, while the team based at<br/>Mildura Lock and Weir is also responsible for<br/>the Hattah Lakes Environmental Works and<br/>Measures Program site and Mildura-Merbein<br/>salt interception scheme.</li> <li>Other asset management activities, such as<br/>asset planning and asset information<br/>management, along with project delivery, are<br/>undertaken by staff who are responsible for<br/>both River Murray Operations assets and<br/>non-River Murray Operations assets</li> </ul> |   |   |
| SA Water  | <ul> <li>Dedicated River Murray Operations business<br/>unit, including dedicated operation and<br/>maintenance teams for each major site type<br/>(Lake Victoria, locks and weirs, barrages,<br/>and salinity operations). At Lake Victoria, SA<br/>Water is responsible for the water supply<br/>infrastructure and some land management<br/>functions.</li> <li>Asset planning activities are also undertaken<br/>by the River Murray Operations business unit</li> </ul>  | <ul> <li>Support services<br/>provided by the<br/>wider organisation</li> </ul> | <ul> <li>River Murray<br/>Operations<br/>business unit is<br/>based at Berri</li> </ul> |
| Department for<br>Environment<br>and Water<br>(South Australia) | <ul> <li>Dedicated Basin Plan Strategy and<br/>Implementation Unit         <ul> <li>Sits in the Water Security, Policy and<br/>Planning Branch of the Water and River<br/>Murray Division. This unit has<br/>representatives that sit on the Joint<br/>Programs Budget Committee and Basin<br/>Salinity Management Advisory Panel</li> <li>Contains the key South Australian point<br/>of contact for Murray-Darling Basin<br/>matters and Joint Program budget<br/>matters</li> </ul> </li> <li>In addition to the Basin Plan Strategy and<br/>Implementation Unit, staff from the Water<br/>Resource Monitoring Unit and Water Science<br/>Unit (in the Strategy, Science and Corporate<br/>Services Division) are responsible for<br/>delivering hydrometric network, salt<br/>interception scheme monitoring, and salinity<br/>modelling activities</li> </ul>  |   |   |

# 5.3 Conclusions

Due to the inherently integrated nature of the Murray-Darling Basin water resources and associated River Murray Operations assets, similar types of assets are encountered across the Joint Venture jurisdictions. In some cases – specifically, Hume Dam and Lake Victoria – a single site is managed by two jurisdictions, although responsibilities between the jurisdictions appear to be clearly delineated. Some River Murray Operations assets are also bespoke in nature. The Lower Lakes Barrages operated by SA Water, for example, serve multiple specific functions such as the reduction of salinity levels in the lower reaches of the River Murray and associated lakes, limitation of 'reverse' seawater inflows, and provision of navigation access for boats.

While the integrated and bespoke nature of the River Murray Operations assets presents a complex management environment for the MDBA and the SCAs, it also provides opportunities for the SCAs to share knowledge, skills and resources across jurisdiction boundaries, and optimise project delivery. For example, SA Water has shared staff and equipment with other SCAs to provide salinity expertise and bathymetric survey services. This demonstrates a culture of collaboration between the SCAs, which is discussed further in Section 6, and is assisted by the quarterly meetings of the Asset Management Advisory Panel.

The organisational arrangements used to perform River Murray Operations activities vary across the MDBA and the SCAs. The MDBA, SA Water, Department of Planning, Industry and Environment (New South Wales) and Department for Environment and Water (South Australia) have created distinct divisions or units for the provision of River Murray services. At these agencies, operation and maintenance personnel are dedicated to River Murray Operations, and budgeting and asset planning functions are often undertaken within the same division or unit.

In contrast, WaterNSW and Goulburn-Murray Water have adopted largely geographical-based organisational structures. While some operation and maintenance teams are therefore dedicated to River Murray sites, such as WaterNSW's team based at Hume Dam or Goulburn-Murray Water's teams based at its key River Murray Operations sites, other teams are responsible for both River Murray Operations assets and non-River Murray Operations assets. Management and asset planning functions appear to be undertaken outside those teams that are directly responsible for River Murray Operations assets. Common to the MDBA and all SCAs, however, is the provision of corporate services (e.g., workplace health and safety) from whole-of-agency teams.

# 6 Asset management

### 6.1 Strategic asset management

The Murray-Darling Basin Agreement requires that the MDBA prepare an Asset Management Plan for the River Murray Operations assets and review the plan annually. The agreement also requires that works on the assets must be in accordance with the Asset Management Plan. The Asset Management Plan is required to reflect decisions on service level and risk management made by the Contracting Governments.

A review of the current Asset Management Plan was undertaken in 2016 and identified ten areas for improvement across the following three primary areas:

- 1. Governance and policy
- 2. Prioritisation, justification and service levels
- 3. Corporate systems.

The majority of the recommendations will be addressed by early 2020. One of the areas of focus for the improvement program is to provide better line of sight between Joint Program activities and the overall objectives of the Joint Program. This line of sight is also intended to enable more objective prioritisation of expenditure.

The SCAs assist MDBA to develop and implement strategies for the management of the River Murray Operations assets throughout their lifecycle. Any proposed amendments to the Plan are reviewed by the Asset Management Advisory Panel to ensure they are consistent with the strategy for asset management in the Plan.

All SCAs except the Department for Environment and Water (South Australia) have in place corporate policies and frameworks for asset management. We note that the Department for Environment and Water (South Australia) currently has a draft asset management policy and framework in place. While these frameworks have typically been scoped to include all assets, we found that in practice the River Murray Operations assets are typically only a minor consideration in the corporate-wide framework. We don't consider that this impacts on the development of reasonable expenditure forecasts as there is considerable focus from the SCAs and the MDBA in developing and delivering appropriate lifecycle strategies for the assets through the MDBA Asset Management Plan.

We consider that the River Murray Operations Asset Management Plan provides a sound basis for managing the assets to provide the required service.

### 6.2 Service standards and asset performance targets

As mentioned in Section 2, the MDBA is required to set general and specific objectives and outcomes for river operations in the River Murray System. The 'Objectives and Outcomes for river operations in the River Murray System' document is issued annually and approved by the Basin Officials Committee. The Objectives and Outcomes provide clear description of the service delivery and operational outcomes expected from the River Murray Operations assets.

A range of other documents set standards and performance targets for the assets and delivery of service. For example, the Annual Work Plan and budget for 2019/20 details the following performance indicators that the work plan is intended to support and associated reporting requirements:

- > Positive report on River Murray System operations by the Independent River Operations Review Group, endorsed by the Basin Officials Committee
- > No adverse rulings from jurisdictional dam safety regulators
- > No unscheduled major outages of assets
- > Report on:
  - Number of unplanned maintenance activities (or frequency rates)
  - Safety statistics for the overall program
  - Maintenance budget spend versus programmed maintenance activities completed
  - Percentage of capital projects delivered in accordance with approved program.

The MDBA Corporate Plan also includes key performance indicator areas and performance measures consistent with those in the Annual Work Plan. There are also service and performance measures included in the Memoranda of Understanding that have been put in place between the MDBA and some SCAs. For

example, the Memorandum of Understanding between the MDBA and Minister for Water and the River Murray, South Australia (2017) sets additional performance targets relating to:

- > Documentation reviewed at the specified frequencies, such as operation and maintenance manuals and dam safety emergency plans
- > Retention of data from key hydrometric data stations (95% of the time)
- > Breakdown or malfunction at key hydrometric data stations rectified within three business days
- > Retention of data from secondary stations (90% of the time)
- > Breakdown or malfunction at secondary stations rectified within five business days
- > Activities delivered within budget.

SCAs also typically have their own internal standards, such as completion of planned maintenance.

Our engagement with the SCAs and the MDBA found that there was a high level of awareness of the service and performance measures and targets included in the various agreements. The agencies have been working together on the overall service level and line of sight project, which intends to also better link operating expenditure and capital expenditure activities with the service requirements. SCAs generally saw that an area for improvement was to better define asset-level performance standards. This would help provide assurance over the reasonableness of expenditure where these asset-level performance standards could be demonstrated to support service delivery and the higher level objectives. We consider that the current level of maturity in this area across the agencies is sufficient to support the development of reasonable expenditure proposals.

### 6.3 Asset information systems

#### 6.3.1 Asset register

Under the Murray-Darling Basin Agreement and Asset Agreement, the MDBA is required to maintain an asset register and undertake asset revaluations for the River Murray Operations assets. Up until this year, the MDBA has used spreadsheets to record and maintain its asset registers and accompanying valuations for its infrastructure assets, plant and equipment, land and easements. While the asset registers and valuations remain separate for these four groups of assets, the MDBA has transitioned to storing its asset information in TechnologyOne. The fields used within TechnologyOne for each asset group are summarised in Table 6-1.

| Table 6-1 | Fields in MDBA's asset registers for River Murray Operations assets |
|-----------|---|
|-----------|---|

| Asset group              | Fields in asset register   |
|--------------------------|--|
| Infrastructure<br>assets | <ul> <li>Unique asset identifier</li> <li>Site identifier</li> <li>Asset description</li> <li>Gross replacement cost</li> <li>Annual depreciation expense</li> <li>Share of the asset owned by the Joint Venture</li> <li>Additions, adjustments, revaluation adjustments and disposals</li> </ul> |
| Plant and equipment      | <ul> <li>Unique asset identifier</li> <li>Asset description</li> <li>Gross replacement cost</li> <li>Annual depreciation expense</li> <li>Additions, adjustments, revaluation adjustments and disposals</li> </ul>   |
| Land                     | <ul> <li>Jurisdiction</li> <li>Unique asset identifier</li> <li>Asset description</li> <li>Gross replacement cost</li> <li>Area</li> </ul>   |
| Easements                | <ul> <li>Jurisdiction</li> <li>Unique asset identifier</li> <li>Asset description</li> <li>Gross replacement cost</li> <li>Easement data such as land holder, file reference, registration date, payment date and area</li> </ul>  |

#### 6.3.2 Asset information systems

In order to undertake the activities approved under the Annual Work Plan, the MDBA and the SCAs use several information systems to:

- > Manage asset information (including geographical information)
- > Inform asset planning
- > Perform financial reporting
- > Manage operation and maintenance
- > Manage supporting documentation for the governance of capital and operating expenditure.

The information systems used by the MDBA and the SCAs to enable the management of the River Murray Operations assets are documented in Table 6-2.

Table 6-2 Information systems used by MDBA and SCAs for River Murray Operations assets

| Agency   | Information systems   | Status of information systems and other comments   |  |  |
|----------|---|--|--|--|
| MDBA     | <ul> <li>Asset information management: TechnologyOne</li> <li>Asset planning: Asset annuity spreadsheet</li> <li>Finance management: TechnologyOne</li> <li>Operations management: Various spreadsheets</li> <li>Document management: HP TRIM</li> </ul>  | <ul> <li>Spreadsheets were previously used by the MDBA to capture asset attributes and valuations</li> <li>While the MDBA has captured the location of most River Murray Operations assets in its geographical information system, unique asset identifiers are not used. The MDBA relies on the SCAs' systems for locational asset detail.</li> <li>There is a capability to insert coordinates into TechnologyOne, along with HP TRIM references</li> <li>Revaluations are undertaken triennially by an external consultant, with interim indexations performed annually by the MDBA. As part of the interim indexations, some updated data is obtained from the SCAs. Overall, the MDBA relies on data from the SCAs to confirm the remaining life useful life of each asset. The MDBA's asset register is, therefore, at a higher level of granularity than the individual asset registers held by the SCAs.</li> <li>Although the SCAs are ultimately responsible for proposing specific capital and operating expenditure activities, the MDBA has a 30-year asset annuity spreadsheet in place to provide a long-term overview of asset replacements that may be required. The asset annuity spreadsheet estimates the year in which each asset will need to be replaced, based on the remaining useful life of the asset. Remaining useful lives are extracted from the MDBA's River Murray Operations infrastructure assets register in TechnologyOne.</li> <li>Maintenance management is undertaken by the SCAs rather than the MDBA.</li> </ul> |  |  |
| WaterNSW | <ul> <li>Asset information management: Dynaway (built<br/>on Microsoft Dynamics 365 platform)</li> <li>Asset planning: Dynaway and PowerPlan</li> <li>Maintenance management:         <ul> <li>Dynaway (built on Microsoft Dynamics 365<br/>platform)</li> <li>DamGuard (Dam Surveillance Unit only)</li> </ul> </li> <li>Finance management: Microsoft Dynamics 365</li> <li>Document management: HP TRIM</li> </ul> | <ul> <li>An asset hierarchy is in place within Microsoft Dynamics 365 (and Dynaway, by extension). Each site, and asset under each site, is referred to as an "object". Each site is associated with a unique functional location, while each asset is associated with a unique asset identifier.</li> <li>Smart Asset was previously used by WaterNSW to capture asset attributes. As a result, some asset attributes remain in Smart Asset, drawings, and operation and maintenance manuals. Drawings, and operation and maintenance manuals, are stored in HP TRIM. The remaining asset attributes are yet to be transferred to Microsoft Dynamics 365. While WaterNSW would like all asset attributes to be held in Microsoft Dynamics 365, there is no program in place to finalise the data migration process.</li> </ul>  |  |  |

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| Agency                              | Information systems   | Status of information systems and other comments   |
|-------------------------------------|---|--|
|                                     |   | <ul> <li>WaterNSW has migrated its maintenance plans from Smart Asset to Microsoft Dynamics 365.<br/>We discuss this further in Section 6.4.</li> <li>WaterNSW's corporate Dam Surveillance Unit uses DamGuard, a mobile application for the</li> </ul>  |
|                                     |   | completion of work orders. Where a work order in Dynaway relates to dam surveillance, the work order references the corresponding work order in DamGuard.  |
|                                     |   | <ul> <li>WaterNSW is planning the following system upgrades and initiatives:</li> </ul>  |
|                                     |   | <ul> <li>Mobile application pilot for non-dam assets</li> <li>Modification and a set of the Disputer Decederation and the within Disputer to increase and the set of the set of the Disputer to increase and the set of the Disputer to increa</li></ul> |
|                                     |   | <ul> <li>Modification of replacement of the Planning Board module within Dynaway to increase<br/>user friendliness. The Planning Board module is used to assign and schedule operation<br/>and maintenance tasks to specific staff.</li> </ul>   |
| Department of                       | <ul> <li>Asset information management:</li> </ul>   | The Department of Planning, Industry and Environment acknowledged a lack of consistency  |
| Industry and                        | <ul> <li>River works: River Assets and Monitoring</li> <li>Database</li> </ul>                                  | across the systems it uses to store asset information. The Department of Planning, industry and Environment noted that this is a work in progress.   |
| Environment<br>(New South<br>Wales) | <ul> <li>Salt interception schemes: MDBA River Murray<br/>Operations valuation spreadsheet</li> </ul>           | <ul> <li>Within the River Assets and Monitoring Database, data is captured at the site level. Data from<br/>Esri ArcGIS is integrated into the user interface of the River Assets and Monitoring Database.</li> </ul>  |
| wales)                              | <ul> <li>Maintenance management: Not applicable – refer<br/>to comments</li> <li>Finance management:</li> </ul> | <ul> <li>Through a transfer deed with the Department of Planning, Industry and Environment, river<br/>works are undertaken by the Soil Conservation Service, a commercial business of the New<br/>South Wales Government. The Soil Conservation service uses OranaSoft to manage its</li> </ul>  |
|                                     |   | projects.  |
|                                     | - SAP myHQ  | There is an opportunity for the Department of Planning, Industry and Environment to adopt SA   |
|                                     | Expenses (low value items only)     Geographic information system: Esri ArcGIS                                  | Water's asset hierarchy for salt interception schemes, which is currently being developed  |
|                                     | <ul> <li>Operations management:</li> </ul>  |  |
|                                     | <ul> <li>Supervisory control and data acquisition</li> </ul>  |  |
|                                     | – Hydstra   |  |
|                                     | <ul> <li>Document management:</li> </ul>  |  |
|                                     | – CM9   |  |
|                                     | - Google Drive  |  |
|                                     |   |  |
| Goulburn-<br>Murrav Water           | Asset information management:     Maximo  | <ul> <li>Goulburn-Murray Water has commenced the migration of asset data into Maximo. However,<br/>within Maximo. asset data for River Murray Operations assets is less complete than for non-</li> </ul>  |
|                                     | <ul> <li>Maximo</li> <li>Spreadsbeets</li> </ul>  | River Murray Operations assets.  |
|                                     | Asset planning: Whole-of-life refurbishment and replacement spreadsheet model for dams                          | <ul> <li>Maintenance management and asset planning (such as the whole-of-life refurbishment and<br/>replacement of dam assets) is undertaken through paper records and spreadsheets</li> </ul>   |
|                                     | <ul> <li>Maintenance management: Paper records (e.g., inspection and maintenance reports)</li> </ul>            | <ul> <li>Over the last five to ten years, Goulburn-Murray Water has performed significant upgrades on<br/>the supervisory control and data acquisition systems at its dams, including Yarrawonga and<br/>Torrumbarry Weirs</li> </ul>  |
|                                     | <ul> <li>Geographical information system:</li> </ul>  |  |

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| Agency   | Information systems  | Status of information systems and other comments   |
|--|--|--|
|  | <ul> <li>Esri ArcGIS</li> <li>Esri Dekho (web portal based on ArcGIS)</li> <li>Geocortex (partner platform with Esri)</li> <li>Finance management: TechnologyOne -<br/>FinanceOne</li> <li>Operations: Supervisory control and data<br/>acquisition</li> <li>Document management: Objective</li> </ul>   | <ul> <li>In the coming years, Goulburn-Murray Water intends to migrate all asset data and maintenance delivery workflows to Maximo. Goulburn-Murray Water has also planned the following system upgrades for 2019/20:</li> <li>FinanceOne: Cloud migration and system upgrade – due in Quarter 3</li> <li>Maximo: Upgrade from Maximo 7.6.0 to Maximo 7.6.1 – due in Quarter 4</li> <li>Esri ArcGIS: Upgrade from Esri ArcGIS 10.6 to Esri ArcGIS 10.7.1 – due in Quarter 4</li> <li>Geocortex: Upgrade from Geocortex 10.10 to Geocortex 10.12 – due in Quarter 4</li> </ul>  |
| SA Water   | <ul> <li>Asset information management: Maximo</li> <li>Asset planning: Renewals model spreadsheet</li> <li>Maintenance management: Maximo with a business intelligence overlay</li> <li>Geographical information system:         <ul> <li>Esri ArcGIS</li> <li>AquaMap (web portal based on ArcGIS)</li> </ul> </li> <li>Finance management:         <ul> <li>Ellipse</li> <li>ECatalogue (purchase requisition only)</li> </ul> </li> <li>Operations: Q-Lock (cloud-based web application for weir operation)</li> <li>Document management: SharePoint</li> </ul> | <ul> <li>An asset hierarchy is in place within Maximo. This asset hierarchy is aligned with the asset hierarchy adopted within the MDBA's River Murray Operations infrastructure assets register but disaggregates assets to a lower level. However, as condition ratings are regularly updated by SA Water, through both scheduled and opportunistic inspections, the condition ratings held by SA Water likely do not align with the remaining useful lives held by the MDBA in its valuation register.</li> <li>SA Water intends to refine its asset hierarchy for salt interception schemes.</li> <li>Excluding the River Murray Operations business unit, SA Water has commenced the use of a mobile application for the completion of work orders. When completing a work order through this mobile application, users must update the condition rating of the affected asset before the work order can be closed. This mobile application is yet to be trialed by the River Murray Operations business unit.</li> </ul> |
| Department for<br>Environment<br>and Water<br>(South<br>Australia) | <ul> <li>Asset information management:         <ul> <li>Database</li> <li>Spreadsheets</li> <li>Operations:</li> <li>Monitoring software</li> <li>Groundwater modelling software</li> </ul> </li> </ul>  | <ul> <li>The Department for Environment and Water (South Australia) maintains a database of its<br/>monitoring assets for both River Murray Operations and non-River Murray Operations. Asset<br/>attributes supporting this database, such as useful lives, are held in spreadsheets.</li> </ul>  |

The following observations can be made:

- > The management of the River Murray Operations assets typically utilises the same information systems that are used by their organisation as a whole
- > A suite of information systems covering finances, maintenance management, operations and geographical information systems are typically used to manage the River Murray Operations assets
- > The SCAs are at varying levels of maturity in terms of storing asset information centrally, managing operation and maintenance centrally, and using asset information to inform asset planning. SA Water has reflected the extent of its River Murray Operations in its asset information and maintenance management

system, Maximo. Within SA Water's asset information and maintenance management system, assets are able to be mapped directly to the asset hierarchy adopted within the MDBA's River Murray Operations infrastructure assets register. The asset attributes are generally sound. No other SCA has this level of development of its asset information system and maintenance management system, instead relying in part on spreadsheets and paper records.

- > The use of spreadsheets and paper records can reduce the transparency of the acitivities and costs for managing the River Murray Operations but this does not necessarily impact on the reasonableness of costs for the activities
- > WaterNSW, the Department of Planning, Industry and Environment (New South Wales) and Goulburn-Murray Water intend to undertake more work to improve the structuring of their asset registers and to improve the coverage of asset attribute information.

# 6.4 Asset operation and maintenance

The River Murray Operations assets are operated to deliver water from the large storages – Dartmouth and Hume Dams – to users along the river. Each year, the MDBA releases an annual operating outlook which explains how the system may be operated across a range of possible climatic and rainfall scenarios. This annual operating outlook forms part of the MDBA's river operations planning. Planning is also undertaken for week-to-week and day-to-day operations. The outcomes of planning are communicated to stakeholders.

Hydrometric assets (which form part of the River Murray Operations assets) provide operating information on water levels, flows and some water quality parameters (temperature and electrical conductivity) within the system that informs planning and operations. Modelling of the system is undertaken based on the hydrometric data obtained to inform planning.

The operation of Salt Interception Schemes is subject to a rolling five-yearly review.

As noted previously, maintenance within the Joint Program is classified as routine or planned. Routine maintenance primarily consists of scheduled maintenance but incorporates corrective maintenance to address minor deficiencies in asset condition or performance. Planned maintenance is maintenance that is typically undertaken every few years, at significant cost, to ensure that an asset reaches its design life. Maintenance schedules are developed from manufacturer's recommendations, past operational experience and standards. Some activities can only be undertaken on an opportunistic basis (e.g. outside the irrigation season or when water levels are low). SA Water has commenced forecasting maintenance requirements on a probabilistic basis which has potential to better forecast the range of expenditure required for maintenance activities.

As detailed in Section 4.2, the Joint Program budget has been underspent in recent years. The underspend occurs across all operation and maintenance activities. This means that maintenance that is budgeted to be undertaken is not being completed. All SCAs acknowledged that this was an issue and identified it as a priority to address. WaterNSW further identified that its migration from Smart Asset to Microsoft Dynamics 365 has led to the creation of work orders at a lower level of granularity which, in turn, has led to under-reporting of preventive maintenance performed.

As an example, under WaterNSW's previous maintenance management system, a single work order was created for preventive maintenance on five gates at a single structure. However, under the current system, five separate work orders are created for the same type and level of maintenance activity. In this scenario, the completion of all five work orders may only be recorded against a single work order, which results in reported performance understating actual performance. WaterNSW's internal key performance indicator that greater than 80% of all preventive maintenance activities be completed is currently not being met. WaterNSW is aware of this issue and is working towards consistent work order administration and workflow process management. We discuss the magnitude of and contributors to operating expenditure underspend in Section 9.2.2.

The River Murray Operations assets are generally being maintained to avoid failure as there are typically substantial consequences if failure does occur. Failure of some sub-components may be acceptable. This means routine maintenance and refurbishment of components form a large part of the maintenance program. Asset replacement or major refurbishment is not preferred by the Joint Venture partners. Regular inspections form an important part of the maintenance approach.

Monitoring and reporting of maintenance completion and effectiveness is limited by the extent to which the assets and activities are recorded in information systems. For example, Goulburn-Murray Water uses a largely paper-based system for tracking operation and maintenance activities.

The SCAs generally use internal staff for operation and maintenance activities with external resources used for more complex activities. We were advised that internal staff are used due to the isolation of some of the sites, the unique assets being managed and the preference to manage the risk associated with the assets with a skilled and knowledgeable internal capability. We consider that this is a reasonable approach to procurement of operation and maintenance activities.

We consider that the approach taken by the MDBA and the SCAs for operation and maintenance of the River Murray Operations assets is sound. The scoping and frequency of operation and maintenance activities is based on manufacturer's recommendations, organisational knowledge and limited optimisation. This approach is reasonable given the long-lived nature of the assets. However, the consistent underspend of operation and maintenance budgets is a cause for concern as the impact of underspend on long-lived assets may not become apparent for some time.

# 6.5 Risk management

The MDBA and the SCAs all have corporate risk management frameworks in place. The MDBA corporate risk framework applies to organisation-wide risks but is not used for the management of the River Murray Operations assets. There is a separate risk management framework documented in the Asset Management Plan which provides guidance on assessing risk for the River Murray Operations assets. However, in practice, MDBA relies on the risk assessment undertaken by SCAs to inform the management of the assets.

The risks identified and managed for the River Murray Operations assets include asset failure, health and safety risks and operational risks. The potential failure of storages due to their possible high consequences are managed across the asset portfolio in accordance with the Australian National Committee on Large Dams Guidelines on Dam Safety Management (2003) and Guidelines on Risk Assessment (2003). An assessment of the dam safety risks across the River Murray Operations portfolio was undertaken in 2007. This Portfolio Risk Assessment led to a works program to address unacceptable risks. The works planned and undertaken included investigations to provide better information to assess the likelihood and consequence associated with dam failure events. The SCAs advised that the assessment of dam safety risks will be updated in coming years through separate Portfolio Risk Assessments to be undertaken. The MDBA in collaboration with the SCAs will need to consolidate the findings of the Portfolio Risk Assessments, and establish a consistent view of risk across the dams and prioritised work program to address any issues identified.

An important aspect of risk is consideration of the risk of asset failure. Asset failure risk is the combination of the likelihood of asset failure and the consequence of asset failure, where the condition of the asset is typically used as a proxy for the likelihood of asset failure. While each SCA uses similar approaches to assessing the risk associated with the failure of assets other than dams, there are differences in the details of the approaches used for determining asset condition and assessing the consequence of failure. For example, SA Water and Goulburn-Murray Water use a six-point condition grade scale while WaterNSW uses a five-point scale. The consequence of failure is also assessed using different criteria. Part of the asset management improvement program underway seeks to address these inconsistencies through mapping of risk assessment criteria to arrive at a consistent level of assessed risk.

We have found through this review that the link between expenditure and asset risk is not able to be clearly communicated by the SCAs and the MDBA. For example, it is not clear if the impact of the consistent underspend in the maintenance budget is leading to increased asset risk. We discuss current program development and delivery practices, along with current improvement initiatives, in Section 6.7.

We recommend that a consistent approach to communicating asset risk across the asset portfolio is adopted. As there are differing approaches to assessing asset-related risk which may make mapping across the portfolio difficult, this may be a simple framework such as:

- a. Value of assets by replacement cost at better than the desired level of risk
- b. Value of assets by replacement cost worse than the desired level of risk.

# 6.6 Long-term planning

The MDBA has developed an annuity model which forecasts the long-term requirements for renewal of the River Murray Operations assets on an age basis. SCAs have also developed long-term forecasting tools for asset renewal but these are at varying levels of maturity and coverage. The planned or in-progress approaches to renewal forecasting use risk-based criteria to estimate the appropriate timing for renewal of an asset. However, as the approaches to asset risk assessment are different between agencies, the outputs from the different approaches are also likely to have differences. These may not be material though, and the work underway to map risk between agencies may resolve this potential issue.

While there was good understanding across the agencies of the need for long-term planning for renewal of the assets, there was limited evidence of long-term forecasting or planning for other drivers, particularly dam safety. Additionally, long-term forecasting and planning should take into account environmental factors and risks such as the impact of climate change. A number of stakeholders commented that in-progress or upcoming Portfolio Risk Assessments across the assets may lead to increased expenditure requirements in the coming decade and will provide better information on which to base these forecasts. For the purpose of transparency, and given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning, and we recommend that a long-term expenditure forecast covering all expenditure drivers (not just renewals) is developed, covering all River Murray Operations assets. MDBA has undertaken work to investigate approaches to better plan for and fund

potential spikes in expenditure through the Managing Cost Spikes in the RMO report completed by Synergies in 2016.

# 6.7 Program development and delivery

The processes for investment appraisal and program development have been outlined in the discussion of the Joint Program governance arrangements and the Annual Work Plan and budgeting process in Section 2.1. The asset management improvement program includes activities which seek to better justify activities objectively and consistently across the asset portfolio.

Each year, MDBA provides a budget template to SCAs for all activities. The starting point is the previous year's budget and SCAs are required to advise of any changes for the upcoming year. New projects are identified along with expected expenditure requirements and profiles. The MDBA may request a business case to be provided to support the proposed expenditure. This is typically on a risk basis rather than at a specific expenditure threshold. The MDBA subjects SCA budget proposals to scrutiny and challenge.

Broadly, each SCA decides how to deliver Annual Work Program based on its own procurement policies. There may be requirements for program approval and procurement to be consistent with other state policies. For example, the contract for procurement of sand pumping at the River Murray mouth was subject to review by the South Australia government's Parliamentary Works Committee. MDBA works with SCAs to develop appropriate procurement and delivery strategies where appropriate, e.g. for larger capital expenditure projects.

Our review of a sample of capital expenditure projects (Section 10.3) found that in all cases appropriate procurement strategies has been adopted which provides some assurance that outturn costs are reasonable. We also found evidence of benchmarking of project costs undertaken by SCAs to provide internal assurance that costs are efficient.

SCAs keep the MDBA well informed of progress for larger projects through monthly reporting and invoicing and through the requirements in the Agreement for information sharing on risks to project delivery. The Asset Agreement sets out the obligations of the MDBA and SCAs in updating the River Murray Operations infrastructure assets register. Relevant obligations under the Asset Agreement include the frequency at which SCAs must notify the MDBA of any asset acquisition, construction, transfer, disposal or write-off; the timeframe in which the MDBA must update the asset register in response to a notification from an SCA; and the frequency and process for updating the asset valuation.

# 6.8 Conclusions

We consider that the asset management practices of MDBA and SCAs are sufficiently robust to support reasonable expenditure through the Joint Program. The asset management framework for the assets is documented in the River Murray Operations Asset Management Plan which is a requirement of the agreement. An asset management improvement program commenced in 2016 and should be completed in coming months. Activities under this program include more definition of a line of sight between activities in the Joint Program and the overall objectives of the River Murray Operations as well as mapping of risk approaches between agencies.

Our review of documents and engagement with SCAs and MDBA found that there are a large number of service and performance standards for the assets and service delivery and that there was a high level of awareness of these measures and targets. SCAs generally saw that an area for improvement was to better define asset level performance standards. This would help provide assurance over the reasonableness of expenditure where these asset level performance standards could be demonstrated to support service delivery and the higher level objectives. We consider that the current level of maturity in this area across the agencies is sufficient to support the development of reasonable expenditure proposals.

The SCAs are at varying levels of maturity with respect to asset information systems and for functions such as storing asset information centrally, managing operation and maintenance centrally, and using asset information to inform asset planning. SA Water is a leader in this area while the other SCAs have identified that this is an area in which they wish to improve in coming years. While this does not necessarily impact the reasonableness of expenditure, the greater use of information systems should improve transparency over Joint Program activities and costs.

Asset risk is managed through a combination of the risk management approach documented in the Asset Management Plan and the asset risk assessment approaches of the SCAs. However, all dams and weirs are managed in accordance with state dam safety legislation, and where that does not exist, the Australian National Committee on Large Dams guidelines. A comprehensive Portfolio Risk Assessment for the dams will be undertaken in coming years. While each SCA uses similar approaches to assessing the risk associated with the failure of assets other than dams, there are differences in the details of the approaches used. While each agency is able to adopt its own preferred approach, differences in methodologies may make it difficult to compare results. An improvement initiative to map the results of risk assessment is underway. We consider that a simple approach to communicating risk (acceptable or unacceptable) may help in this area.

While MDBA recognises that there are significant spikes in its long-term forward expenditure projects sourced from its renewal annuity model, there is no forecast that incorporates expenditure for all drivers particularly dam safety, noting that Portfolio Risk Assessments in progress will improve this information. We recommend that a long-term expenditure forecast covering all drivers is developed, covering all River Murray Operations assets.

Each SCA decides how to deliver Annual Work Program based on its own procurement policies and the availability of resources. The MDBA is informed and provides guidance on procurement where appropriate. Our review of a sample of capital expenditure projects (Section 10.3) found that in all cases appropriate procurement strategies has been adopted which provides some assurance that outturn costs are reasonable.

While this review of asset management processes has found that MDBA and the SCAs are at different levels of maturity and that there are some opportunities for improvement, we do not consider that any of the shortcomings identified would materially impact on the reasonableness of Joint Program expenditure.

# 7 Overview of related reviews

The purpose of this review is to form a conclusion regarding the reasonableness of the costs of the River Murray Operations Joint Program. River Murray Operations are typically delivered as one, small part of the overall business of the SCAs. The SCAs are all subject to oversight by State or Commonwealth economic regulators that review the efficiency of the costs of the SCAs to deliver those services that are within the scope of this regulatory oversight.

While River Murray Operations are not within the scope of current regulatory oversight by State and Commonwealth regulators, the SCAs use similar, or the very same, processes to deliver their River Murray Operations activities as they do for their activities that are subject to regulatory oversight. Therefore, the findings of the reviews of the SCAs undertaken by the State and Commonwealth regulators provide some assurance over the reasonableness of the costs of the Joint Programs. The scope and findings of related reviews are summarised in Table 7-1.

| SCA   | Regulator   | Year    | Scope of review   | Finding   |
|---|---|---------|---|---|
| Department of<br>Planning,<br>Industry and<br>Environment<br>(New South<br>Wales) | Independent<br>Pricing and<br>Regulatory<br>Tribunal<br>(IPART) | 2016/17 | Review of Water Administration<br>Ministerial Corporation (WAMC)<br>activities which are delivered by DPI<br>Water (now Department of Planning,<br>Industry and Environment) on their<br>behalf   | IPART applied a flat 5%<br>efficiency reduction to DPI<br>Water's contributions to the<br>Joint Programs due to what<br>it considered to be a lack of<br>transparency and efficiency<br>challenge by the MDBA of its<br>costs |
| WaterNSW  | Independent<br>Pricing and<br>Regulatory<br>Tribunal            | 2016/17 | WaterNSW's rural water services<br>including contributions to the MDBA<br>Joint Programs  | 1.25% per annum efficiency<br>reduction of MDBA<br>contributions due to what it<br>considered to be a lack of<br>transparency and efficiency<br>challenge by the MDBA of its<br>costs   |
| Goulburn-<br>Murray Water   | Essential<br>Services<br>Commission                             | 2019/20 | Regulated water supply will be<br>assessed under the Water Charge<br>(Infrastructure) Rules (WCIR).<br>Groundwater, unregulated surface<br>water, and non-infrastructure related<br>miscellaneous services will be<br>assessed against the state's Water<br>Industry Regulatory Order (WIRO). | Due early 2020  |
| SA Water  | Essential<br>Services<br>Commission of<br>South<br>Australia    | 2019/20 | SA Water's water, sewerage, and<br>recycled water business across<br>South Australia  | Due early 2020  |

Table 7-1 Overview of related reviews

It is notable that IPART made a 5% efficiency reduction to DPI Water's contributions to the Joint Programs and a 1.25% per annum reduction to WaterNSW's contributions due to its concerns over the transparency and perceived lack of efficiency challenge over Joint Program costs. This report should help address these concerns for any future reviews of the costs of the Water Administration Ministerial Corporation services provided by the Department of Planning, Industry and Environment (New South Wales). The impact of these reductions is that DPI Water and WaterNSW were not able to pass on all Joint Programs costs to its customers and this contribution shortfall would have had to have been made up elsewhere by the state of New South Wales.

Also, in 2014 the Basin Officials Committee commissioned an expenditure efficiency review of the River Murray Operations Joint Programs. This efficiency review was part of a project to construct a 'building block' model, consistent with best practice regulatory practice and the Water Charge (Infrastructure) Rules. This report is publicly available at: <u>https://www.mdba.gov.au/publications/research-report/independent-review-</u> <u>efficiency-river-murray-operations</u>. This review found that the expenditure for the Joint Programs was broadly efficient and recommended efficiency targets in line with those being applied to regulated water businesses across Australia at the time.

# 8 Benchmarking

### 8.1 Overview

The review is required to provide discussion and advice on approaches to benchmarking River Murray Operations costs and consider previous work on benchmarking the River Murray Operations program.

In 2014, the Basin Officials Committee engaged Synergies Economic Consulting to conduct an efficiency review of the River Murray Operations and construct a building block model, consistent with best practice regulatory practice and the Water Charge (Infrastructure) Rules, of River Murray Operations costs. This review included economic benchmarking undertaken by Economic Insights.

# 8.2 Findings from past study

The key findings from the 2014 Economic Insights benchmarking study were as follows:

- > There are limitations to the extent that economic benchmarking can be undertaken due to the lack of quality and consistent data on comparison businesses
- > Using the data available and the methodology preferred, River Murray Operations compared favourably to the peer organisations in terms of both technical and cost efficiency
- > Further development of a benchmarking database would improve the accuracy and reliability of any future economic benchmarking exercises.

The economic benchmarking exercise relied on the National Reporting Framework for rural water businesses as well as public financial reports.

# 8.3 Overview of approaches to benchmarking

The Economic Insights report identifies three broad benchmarking approaches:

- 1. Economic in which an organisation's performance over time and against other businesses is examined using holistic economic measures such as productivity or cost efficiency
- 2. Process which involves benchmarking specific processes within a business against similar processes in other business
- 3. Performance indicators in which a suite of key performance indicators (KPIs) are used, which individually reflect various aspects of the firm's overall purposes
- 4. Each is described in more detail following. This discussion follows that in the Economic Insights report.

#### 8.3.1 Economic

Economic benchmarking involves comparing an organisation's performance over time and against other businesses using holistic economic measures such as productivity or cost efficiency. It provides the most fundamental or "bottom line" measures of the performance of an organisation against purely economic objectives and provides a framework within which overall performance can be measured.

Economic benchmarking focuses on economic measures such as output and output quality, productivity and cost efficiency. This is suitable for businesses that largely pursue economic ends, or where non-economic ends can be represented as further output. For example, if part of an organisation's activities is oriented toward environmental goals, then the environmental outcomes can be treated as another output. Economic benchmarking provides comprehensive summary measures that provide an overall picture of the business's performance.

There are four broad economic benchmarking methodologies to consider:

- 1. Partial indicators such as partial productivity measures (i.e., the ratio of output to a single input) or unit cost measures (i.e., cost divided by a single measure of output)
- 2. Index number methods, particularly total factor productivity (TFP) indexes and multilateral TFP (MTFP) indexes, which are used for trend and comparative productivity analysis
- 3. Data envelopment analysis (DEA), where mathematical programming techniques are used to identify an efficiency frontier and best practice organisation, and the comparative technical efficiency of organisation

4. Stochastic frontier analysis (SFA), in which econometric methods are used to identify the best practice efficiency frontier and measure comparative cost efficiency or productivity levels and trends.

The choice of method(s) will depend on the objectives of the benchmarking analysis, and on data availability. More than one method may be desirable because this would enable the results of different quantitative methods and model specifications to be compared, which would assist to determine or improve the robustness and credibility of the results.

#### 8.3.2 Process

Process benchmarking is complementary to economic benchmarking. It focusses on identifying efficiency improvements of an organisation at an activity level rather than the business as a whole. It involves benchmarking specific processes within a business against similar processes in other businesses

The presumption is that by identifying best practice processes and comparing actual processes that organisations utilise, managers can improve the performance of sub-systems—leading to better overall performance. The goal of process benchmarking is to improve different stages of the process and to increase efficiency by "learning from others". Sharing experiences is crucial for the success of the technique. By comparing specific core indicators (and the procedures currently used that affect those indicators) best practice can be hopefully identified and transferred to weak performers, who should adopt in order to increase efficiency.

This review is in part based on benchmarking the processes of the SCAs and the MDBA against each other and appropriate practice for businesses of this nature.

#### 8.3.3 Performance indicators

Performance indicator benchmarking involves a suite of KPIs which individually reflect and measure various aspects of an organisations overall purpose.

Performance indicator benchmarking, like process benchmarking, is complementary to economic benchmarking, since it can provide more focus on identifying and implementing efficiency improvement at an activity level. However, they can be less effective in the absence of holistic economic performance measurement. For example, the limitations of the traditional use of KPIs include not only the difficulty of defining suitable and consistent KPIs across the businesses to be benchmarked, but also the difficulty in prioritising or weighting the performance outcomes when there is a large suite of KPIs to be considered. A common shortcoming is that poor choice of indicators or indicator definitions, or inappropriate balance in the range of KPIs reported, that do not adequately reflect the relevant business objectives, can bias the conduct of the benchmarked businesses and lead to detrimental and inefficient outcomes. There can also be a proliferation of KPIs without a clear logical framework integrating them into a measure of overall performance.

# 8.4 Adopted and future approaches to benchmarking

The limitations noted by Economic Insights regarding needing a robust data set to inform economic benchmarking apply. In addition, there has been no work to improve data relating to rural water service providers since the 2014 study. As a result, no economic benchmarking has been undertaken for this review. There is also no evidence that improved data will be available or collected in future. This makes economic benchmarking unlikely to be useful in the future until the availability of data has improved.

For this review, the benchmarking undertaken is internal to the River Murray Operations. The benefit of internal benchmarking is that it draws on a generally-consistent dataset and also inherently controls for factors (e.g. organisation size, market structure, climate) that may distort comparisons in external benchmarking. The following cost benchmarking has been undertaken:

- 1. Operating expenditure by asset class
- 2. Operation and maintenance costs by SCA for assets within an asset class
- 3. Long-term total operating expenditure
- 4. Support service and administration costs
- 5. We have also compared the business processes of MDBA and the SCAs that support the Joint Programs; the findings are documented in Section 6. Additionally, we comment on the approaches taken by SCAs to allocated corporate overheads to the Joint Program in Section 9.4.

The results of the benchmarking undertaken is presented in the following sections.

# 8.5 Operating expenditure by asset class

We undertook benchmarking of operating expenditure across four asset classes:

- > Dams
- > Environmental Works and Measures Program
- > Locks, weirs and barrages
- > Salt interception schemes.

Operating expenditure is presented as a ratio of the gross replacement cost of the assets at a particular site. The hypothesis being tested is that the costs to operate and maintain each site within an asset class should be similar (all else being equal) as the underlying costs are due to the type of assets to be managed. For example, salt interception schemes will have relatively high power costs due to pumping and require more maintenance of mechanical and electrical equipment compared to other asset classes. The ratio of operation and maintenance costs to replacement cost is shown against the relative consumption of the site (as measured by a weighted average of the constituent assets' age, as a percentage of their design life). For the purpose of this exercise, the operating expenditure at each site is taken to be the total actual operating expenditure incurred in 2018/19. As assets age, it is typical to see increased costs to operate and maintain the assets.

Another variable tested is the impact of scale: we would typically expect to see economies of scale in operating and maintaining larger assets. The size of the site is measured by the replacement cost of the assets at the site and is represented in the benchmarking by the size of the circle depicting the site.

Figure 8-1 shows the operation and maintenance costs for all benchmarked sites. This figure shows a generally increasing trend of operation and maintenance costs with asset age, as expected. There is also reasonably consistent grouping of sites within the same asset class (as shown by the colour of the circles). We note that the Water Data and RMO Office sites, along with sites relating to river reaches, have been excluded from this analysis. This is due to the uniqueness of these sites and consequent lack of comparators to enable conclusions to be made.

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Figure 8-1 Operating expenditure benchmarking by site replacement cost and consumption

Note: For scale, the largest site by asset replacement cost is Dartmouth Dam at \$1.3 billion. By comparison, the smallest site is Pike/Mundic at \$2 million.

Note: For unlabelled sites, please refer to the following figures by asset class in order to identify these sites. Due the close proximity of some sites in the above figure, not all labels are able to be shown.

#### 8.5.2 Dams

There are three dams in this asset class:

- > Dartmouth Dam
- > Hume Dam
- > Lake Victoria





Dartmouth and Hume Dams are large dams with similar absolute levels of operating expenditure. However, Hume Dam is older than Dartmouth Dam and is relatively more expensive to operate and maintain. This is likely due to the ongoing need to manage risks associated with Hume Dam that require greater surveillance and maintenance compared with Dartmouth Dam. Hume Dam is also a gated structure, requiring additional maintenance on mechanical components, whereas Dartmouth Dam is constructed from a fixed crest weir. Goulburn-Murray Water also advised that a proportion of its management costs have been allocated specifically to Hume Dam which may skew the analysis.

Lake Victoria is older and smaller than Hume Dam. Operation and maintenance costs at Lake Victoria, as a percentage of replacement cost, are significantly higher. This is likely due to diseconomies of scale, the relative isolation of Lake Victoria, and increased requirements for land and cultural heritage management.

In general, operating expenditure increases somewhat with asset age but Lake Victoria is an outlier with operating expenditure six times higher than Hume Dam. The observed ratios for Dartmouth and Hume Dams are comparable to industry benchmarks for dams.

#### 8.5.3 Environmental Works and Measures Program

There are six sites in the Environmental Works and Measures Program:

> Lindsay, Mullaroo and Mulcra Island



- > Chowilla
- > Gunbower Forest
- > Koondrook-Perricoota
- > Barmah-Millewa
- > Hattah Lakes



Figure 8-3 Environmental Works and Measures Program asset class operating expenditure benchmarking by site replacement cost and consumption

The age of four of the assets (Koondrook-Perricoota, Gunbower, Chowilla, and Lindsay, Mullaroo and Mulcra Island) is between 4% and 7% of the design life, but the operating expenditure varies across these four sites. Lindsay, Mullaroo and Mulcra Island is more expensive to maintain than Koondrook-Perricoota although replacement costs are very similar.

Barmah-Millewa is the oldest Environmental Works and Measures Program, at 45% of its design life, and has the highest cost to operate. Barmah-Millewa also includes non-environmental structures such as the Edward River Offtake Structure.

In general, operating expenditure increases somewhat with asset age, but Hattah Lakes is an outlier. It is slightly older than Koondrook-Perricoota, Gunbower, Chowilla, and Lindsay, Mullaroo and Mulcra Island, but operating expenditure is five times higher. In comparison, operating expenditure at Barmah-Millewa, which is significantly older than Hattah Lakes, is 2% lower. Goulburn-Murray Water noted that, in comparison to the other Environmental Works and Measures Program sites, Hattah Lakes has a relatively large pumping station which is currently undergoing refurbishment. In contrast, Koondrook-Perricoota is supplied by gravity and, as advised by the MDBA, has had limited operation since its commissioning.

There is no trend identified between replacement cost and operating expenditure. This is likely due to the varied nature of the assets within the Environmental Works and Measures Program asset class. It may be more meaningful to undertake an analysis at a greater level of granularity for these assets to overcome those differences. In addition to the varied nature of assets within this class, Environmental Works and

Measures Program sites are operated variably in any given year based on climatic conditions and the environmental demands of the site.

8.5.4 Locks, weirs and barrages

There are 16 assets in this asset class:

- > Yarrawonga Weir
- > Torrumbarry Lock and Weir (Lock 26)
- > Euston Lock and Weir (Lock 15)
- > Mildura Lock and Weir (Lock 11)
- > Wentworth Lock and Weir (Lock 10)
- > Kulnine Lock and Weir (Lock 9)
- > Wangumma Lock and Weir (Lock 8)
- > Rufus River Lock and Weir (Lock 7)
- > Murtho Lock and Weir (Lock 6)
- > Renmark Lock and Weir (Lock 5)
- > Bookpurnong Lock and Weir (Lock 4)
- > Overland Corner Lock and Weir (Lock 3)
- > Waikerie Lock and Weir (Lock 2)
- > Blanchetown Lock and Weir (Lock 1)
- > Lower Lakes Barrages:
  - Goolwa Barrage
  - Mundoo Barrage (Mundoo Barrage, Boundary Creek Barrage, Ewe Island Barrage and Tauwitchere Barrage)



Figure 8-4 Locks, weirs and barrages asset class operating expenditure benchmarking by site replacement cost and consumption

The age of all the assets in this class is greater than 50% of design life, except for Torrumbarry which is at 45% of its design life. Operating expenditure is similar across the asset class with the following exceptions:

- Overland Corner higher operating expenditure than other similarly aged sites such as Murtho and Bookpurnong
- > Wentworth this site is closest to the end of its design life, but it has the lowest operating expenditure
- > Torrumbarry operating expenditure is high considering it is the 'newest' site in this class, with significant refurbishment performed in the 1980s and 1990s.

Overland Corner is a much smaller asset than the comparators when measured by replacement cost, and it is likely that diseconomies of scale are a reason for its relatively high operating expenditure. Another reason for the relatively high operating expenditure at Overland Corner is the \$1.05 million refurbishment of its lock chamber in 2018/19 (in a nominal price base). It is of note that Wentworth has the lowest operating expenditure but is also the oldest asset.

We note that while Torrumbarry is depicted as the newest site in this class, the original lock was constructed in the 1920s. The age of this site, as represented in Figure 8-4, is skewed towards the significant refurbishment that was performed in the 1980s and 1990s.

For large civil/structural assets, the industry benchmarks for operating and maintenance costs are typically 1% to 2% of replacement cost. The locks, weirs and barrages within the River Murray System fall within this range, except for Overland Corner which is discussed above. Locks, weirs and barrages are likely more complex than large civil/structural assets because of their mechanical and electrical components. Therefore, higher operating expenditure is reasonable.

#### 8.5.5 Salt interception schemes

There are 13 salt interception schemes in the asset class:

- > Upper Darling
- > Murtho Lakes
- > Pike/Mundic
- > Buronga
- > Loxton
- > Bookpurnong
- > Mallee Cliffs
- > Pyramid Creek
- > Waikerie
- > Rufus River
- > Woolpunda
- > Mildura-Merbein
- > Barr Creek





Operating expenditure in general increases with asset age with the following exceptions:

- > Pike/Mundic a small salt interception scheme (\$2M replacement cost) that has comparatively very high operating expenditure
- > Waikerie similar replacement cost to Mildura-Merbein but the operating expenditure is three times higher
- > Rufus River one of the older salt interception schemes but lower operating expenditure than Upper Darling, which has a similar replacement cost and is significantly younger.

The relatively very high operating expenditure at Pike/Mundic is likely explained by its very small size compared to the other schemes. Additionally, the number of bores at Pike/Mundic (49 bores) is relatively high when compared to the number of bores at Mildura-Merbein (9 bores, with a major pump station to transfer flows). The relatively low operating expenditure at Rufus River can be attributed to, in part, this site being on standby mode for several years.

In general, the schemes have varying pumping requirements (volume and head), and power costs are likely to be a large driver of the variance in costs observed as power comprises around one third of all salt interception scheme costs. The salt interception schemes are subject to performance reviews every five years.

#### 8.5.6 Conclusions

This benchmarking shows that operating expenditure as a proportion of the replacement cost of assets at a site are generally consistent within an asset class, which is consistent with the hypothesis being tested. There is also a general trend of operating and maintenance costs increasing with asset age.

Economies of scale were not strongly evident although diseconomies of scale were observed for very small sites such as the Pike/Mundic salt interception scheme, Overland Corner lock and weir, and Lake Victoria.

There is considerable variability in the operating expenditure at salt interception schemes, which correlates with substantial variability in the size and configuration (e.g. bore depth and flow rate) of the schemes. It may be beneficial to undertake benchmarking that considers power costs separately.

The relative operating expenditure at dams, locks, weirs and barrages are consistent with industry averages.

No evidence of unreasonable operation and maintenance costs has been found through this analysis.

# 8.6 Operating expenditure by asset class by SCA

We undertook benchmarking of operating expenditure of asset classes across the five SCAs.

As in the asset class analysis, operating expenditure is presented as a fraction of the replacement cost of the assets at the site, but, in this instance, the relevant SCAs managing the site are also shown. The hypothesis being tested is that the costs to operate and maintain each site within an asset class should be similar (all else being equal) for each SCA.

As in the asset class analysis, the operating expenditure at each site is taken to be the total actual operating expenditure incurred in 2018/19, while the replacement cost of each site is represented by the size of the circle depicting the site. Each segment of each circle represents a different SCA, where the size of the segment represents the size of the SCA's contribution to the 2016/17 to 2022/23 operating expenditure at the site.

No distinct trend can be identified across the asset classes. Operating expenditure at SA Water-managed sites does tend to sit in a band higher than sites managed by Goulburn-Murray Water and WaterNSW, but site type, age and scale are also factors.

An analysis by asset class follows.

#### 8.6.1 Dams

Based on each SCA's share of the operating expenditure at each site, the applicable SCAs for the management of the three dams are as follows:

- > Dartmouth Dam: 100% Goulburn-Murray Water
- > Hume Dam: 68% WaterNSW (management of the dam and other assets on the New South Wales side of the site), 32% Goulburn-Murray Water (waterway and land management on the Victorian side of the site)
- Lake Victoria: 85% SA Water, 15% Department of Planning, Industry and Environment (New South Wales)



Figure 8-6 Dams asset class operating expenditure benchmarking by site replacement cost, site consumption and SCA

Relative to the replacement cost of each site, Goulburn-Murray Water's dam operating expenditure is lower than for WaterNSW, SA Water and the Department of Planning, Industry and Environment (New South Wales), as shown by Dartmouth Dam in Figure 8-6 where operating expenditure as a percentage of replacement cost is only 0.2%. However, Dartmouth Dam is a large dam and younger than Hume Dam and Lake Victoria. In comparison to Hume Dam, Dartmouth Dam also requires less mechanical maintenance, as it comprises a fixed crest weir.

No conclusive trend can be identified from the operating expenditure of dams by SCA.

### 8.6.2 Environmental Works and Measures Program

Based on each SCA's share of the operating expenditure at each site, the applicable SCAs for the management of the Environmental Works and Measures Program are as follows:

- > Lindsay, Mullaroo and Mulcra Island: 100% SA Water
- > Chowilla: 100% SA Water
- > Gunbower Forest: 100% Goulburn-Murray Water
- > Koondrook-Perricoota: 100% WaterNSW. Goulburn-Murray Water assist with surveillance due to proximity of site to Goulburn-Murray Water-managed sites.
- Barmah-Millewa: 91% WaterNSW (New South Wales side of site), 9% Goulburn-Murray Water (Victorian side of site)
- > Hattah Lakes: 100% Goulburn-Murray Water



Figure 8-7 Environmental Works and Measures Program asset class operating expenditure benchmarking by site replacement cost, site consumption and SCA

WaterNSW has both the lowest (Koondrook-Perricoota) and the highest (Barmah-Millewa) operating expenditure in this asset class, as shown in Figure 8-7. These two sites represent relatively young and old sites. Additionally, Koondrook-Perricoota is supplied by gravity and has had limited operation since its commissioning, while Barmah-Millewa also includes non-environmental structures such as the Edward River Offtake Structure.

SA Water manages the two youngest sites (Chowilla, and Lindsay, Mullaroo and Mulcra Island), with operating expenditure of between 0.8% and 1% of replacement cost. This is higher than WaterNSW's operating expenditure at Koondrook-Perricoota, which is of similar age. However, we note that in addition to Koondrook-Perricoota's gravity-supply configuration and limited operation, some budgeted operating expenditure at this site has been deferred in recent years and will instead be completed as part of WaterNSW's Maintaining Capability Program. We discuss the Maintaining Capability Program in Section 9.

We also note that while Hattah Lakes appears to be an outlier, it has a relatively large pumping station which is currently undergoing refurbishment.

Operating expenditure appears to vary with site age and scale, as expected, and not with SCA.

#### 8.6.3 Locks, weirs and barrages

Based on each SCA's share of the operating expenditure at each site, the applicable SCAs for the management of the locks, weirs and barrages are as follows:

- > Yarrawonga Weir: 100% Goulburn-Murray Water
- > Torrumbarry Lock and Weir (Lock 26): 100% Goulburn-Murray Water
- > Euston Lock and Weir (Lock 15): 100% WaterNSW. SA Water have assisted with repairs in the past.
- > Mildura Lock and Weir (Lock 11): 100% Goulburn-Murray Water

- > Wentworth Lock and Weir (Lock 10): 100% WaterNSW
- > Kulnine Lock and Weir (Lock 9): 100% SA Water
- > Wangumma Lock and Weir (Lock 8): 100% SA Water
- > Rufus River Lock and Weir (Lock 7): 100% SA Water
- > Murtho Lock and Weir (Lock 6): 100% SA Water
- > Renmark Lock and Weir (Lock 5): 100% SA Water
- > Bookpurnong Lock and Weir (Lock 4): 100% SA Water
- > Overland Corner Lock and Weir (Lock 3): 100% SA Water
- > Waikerie Lock and Weir (Lock 2): 100% SA Water
- > Blanchetown Lock and Weir (Lock 1): 100% SA Water
- > Lower Lakes Barrages:
  - Goolwa Barrage: 100% SA Water
  - Mundoo Barrage (Mundoo Barrage, Boundary Creek Barrage, Ewe Island Barrage and Tauwitchere Barrage): 100% SA Water



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Figure 8-8 Locks, weirs and barrages asset class operating expenditure benchmarking by site replacement cost, site consumption and SCA

WaterNSW's operating expenditure (Euston and Wentworth) is lower than Goulburn-Murray Water's and SA Water's operating expenditure at sites that are not necessarily younger or smaller. Wentworth has the lowest operating expenditure across the asset class and is the oldest site. However, operating expenditure at all locks, weirs and barrages is in a fairly tight band between 0.7% and 1.6% of replacement cost, with the exception of SA Water's Overland Corner, although this also has a very low replacement cost. We also note that a \$1.05 million (nominal price base) lock chamber refurbishment was undertaken at Overland Corner in 2018/19.

No overall trend can be identified between SCA and operating expenditure. Trends relate to site age and scale.

#### 8.6.4 Salt interception schemes

Based on each SCA's share of the operating expenditure at each site, the applicable SCAs for the management of the salt interception schemes are as follows:

- > Upper Darling: 100% Department of Planning, Industry and Environment (New South Wales)
- > Murtho Lakes: 98% SA Water, 2% Department for Environment and Water (South Australia)
- > Pike/Mundic: 100% SA Water
- > Buronga: 100% Department of Planning, Industry and Environment (New South Wales)
- > Loxton: 98% SA Water, 2% Department for Environment and Water (South Australia)
- > Bookpurnong: 98% SA Water, 2% Department for Environment and Water (South Australia)
- > Mallee Cliffs: 100% Department of Planning, Industry and Environment (New South Wales)
- > Pyramid Creek: 100% Goulburn-Murray Water
- > Waikerie: 99% SA Water, 1% Department for Environment and Water (South Australia)
- > Rufus River: 89% SA Water, 11% Department for Environment and Water (South Australia)
- > Woolpunda: 99% SA Water, 1% Department for Environment and Water (South Australia)
- > Mildura-Merbein: 100% Goulburn-Murray Water
- > Barr Creek: 100% Goulburn-Murray Water



SA Water

Figure 8-9 Salt interception schemes asset class operating expenditure benchmarking by site replacement cost, site consumption and SCA

Goulburn-Murray Water's (Pyramid Creek) and SA Water's (Rufus River) operating expenditure are the lowest, while SA Water also has the highest operating expenditure at Pike/Mundic and Waikerie.

The Department of Planning, Industry and Environment (New South Wales)'s operating expenditure is in a band between 2.2% and 3.2% of replacement cost, whereas Goulburn-Murray Water's operating expenditure is spread across a wider band from 0.9% to 2.8% of replacement cost. SA Water's operating expenditure is also spread over a wider band between 0.9% and 10.8% of replacement cost. This variability correlates with the substantial variability in the size and configuration (e.g. bore depth and flow rate) of the schemes.

As with the other asset classes, no distinct trend can be identified between operating expenditure and SCA. Trends relate more to site age and scale.

#### 8.6.5 Conclusions

This SCA benchmarking shows that there is no distinct relationship between operating expenditure and SCA for any of the asset classes. Operating expenditure trends are more aligned with site age and scale, consistent with the hypothesis.

No evidence of unreasonable operation and maintenance costs by any SCA has been found through this analysis.

### 8.7 Long-term operation and maintenance costs

In order to comment on the long-term sustainment of the River Murray Operations asset base, we were provided with a breakdown of budgeted and actual operating and capital expenditure by year from 2001/02 to 2018/19. This breakdown includes carry-overs. As per our treatment of the 2016/17 to 2022/23 expenditure programs, we have applied annual indices to convert the historical (2001/02 to 2015/16) expenditure to a real 2019/20 price base. The annual indices applied to expenditure from 2001/02 to 2015/16 are summarised in Table 8-1. This approach is consistent with that outlined in Section 1.7.

Table 8-1 Indices used to convert costs to real 2019/20 price base

| 2001/ | 2002/ | 2003/ | 2004/ | 2005/ | 2006/ | 2007/ | 2008/ | 2009/ | 2010/ | 2011/ | 2012/ | 2013/ | 2014/ | 2015/ |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 02    | 03    | 04    | 05    | 06    | 07    | 08    | 09    | 10    | 11    | 12    | 13    | 14    | 15    | 16    |
| 1.54  | 1.50  | 1.45  | 1.42  | 1.39  | 1.33  | 1.31  | 1.26  | 1.24  | 1.20  | 1.16  | 1.15  | 1.12  | 1.09  | 1.07  |

This benchmarking has considered the long-term trend in operating expenditure alongside the long-term movement in the size of the River Murray Operations asset base, as measured by its gross replacement cost. Importantly, the last 15 years have seen the addition of around \$400 million of assets to the asset base, largely through the Environmental Works and Measures Program but also including navigable pass and Hume Dam safety upgrade works. These assets are required to have their ongoing operation, maintenance and renewal funded through the River Murray Operations Joint Program.

Figure 8-10 illustrates actual operating expenditure from 2001/02 to 2018/19 against the replacement cost of the River Murray Operations asset base, with replacement costs being shown for the period from 2008/09 onwards.




While actual operating expenditure is observed to have increased over time, it appears to be increasing at a lower rate than the replacement cost of the asset base. This observation is confirmed through Figure 8-11, where actual operating expenditure, as a percentage of the total replacement cost, has decreased from 1.65% in 2008/09 to 1.25% in 2018/19.

In order to determine whether this decrease is due to underspends or budgets, the budgeted operating expenditure over the same timeframe is also included in Figure 8-11. It is evident that, after including budgeted operating expenditure, the slowing growth in actual operating expenditure can be attributed to both underspends and diminishing growth in operating expenditure budgets.

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Figure 8-11 Budgeted and actual operating expenditure as percentage of total replacement cost (2008/09 to 2018/19)

One reason for the relative decrease in operating expenditure may be that the recent increase in the asset base has delivered assets that have relatively lower requirements for operation and maintenance because of their age, composition or use. These assets are largely Environmental Works and Measures Program assets, which Figure 8-1 shows have a somewhat lower operating expenditure requirement than other assets (as represented by their vertical position on the graph), but only moderately so. An exception is Hattah Lakes, which is an outlier due to its relatively large pumping station that is currently undergoing refurbishment.

Another argument is that the assets, when measured by age, are 60% consumed on average and are, therefore, passing their mid-life. As these assets age, they are likely to need increasing levels of maintenance. This analysis suggests that there is no evidence of River Murray Operations Joint Program expenditure being unreasonably high. There is potential that the current level of operating expenditure is insufficient based on the size and age of the asset base. However, this should be justified by a better understanding of the condition, risk and service levels of the assets. We discussed this in Sections 6.2 and 6.5.

### 8.8 Support services and administration costs

The structure of the River Murray Operations Joint Program budget and the categorisation of costs into different services and service types (see Section 4.1) allows costs in some of these categories for different SCAs to be benchmarked. We undertook benchmarking for the 'Support Services' service type and the 'Administration/Mgmt' service type.

A limitation of this benchmarking is that the cost category may not capture all costs relevant to that area, e.g. there are likely to be other 'Support Services' costs in other categories and different SCAs may approach categorisation differently, leading to inconsistent costs and results. For example, some support costs may be categorised against individual projects under other service types. These limitations mean that caution should be exercised when drawing conclusions from the benchmarking. However, this analysis provides a starting point for future analyses, and we make recommendations for future benchmarking approaches in Section 12.2.

'Support Services' costs for the three large SCAs are compared in Figure 8-12. This analysis shows a consistent trend in the absolute and relative levels of support costs for the three large SCAs, with Goulburn-Murray Water having the highest support costs (average of 26% of total operating expenditure) over the

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period and SA Water the lowest (average of 20% of total operating expenditure over the period). With all else being equal, this may indicate that SA Water has the most efficient support costs for the delivery of Joint Program activities. However, we are not sufficiently confident in the categorisation of costs, and whether operating environments are sufficiently 'equal', to make a firm conclusion in this area.



Figure 8-12 Budgeted 'Support Services' costs as a proportion of total operating expenditure

'Administration/Mgmt' costs are compared for the three large SCAs in Figure 8-13. This figure shows considerable variability in WaterNSW's costs from year to year but, overall, it has the lowest proportion of costs in this category with an average of 2.5% over the period. SA Water's 'Administration/Mgmt' costs are more consistent over the period but higher at an average of 3.4% of operating expenditure. The trend for Goulburn-Murray Water is one of increasing costs over the period and higher costs than the other two SCAs. The average over the period for that SCA is 5.8% and the maximum is 6.9% in 2022/23.

With all else being equal, this may indicate that WaterNSW has the most efficient 'Administration/Mgmt' costs for the delivery of Joint Program activities and Goulburn-Murray Water the least efficient. However, we are not confident in the categorisation of costs, and whether operating environments are sufficiently 'equal', to make a firm conclusion in this area.

In response to the draft report, Goulburn-Murray Water noted that support costs are likely to be included inconsistently against specific sites or assets which would distort this analysis. We agree, based on our analysis, that some support costs are allocated against specific sites. Goulburn-Murray Water provided an alternative analysis showing annual support costs as a proportion of total expenditure. In this analysis, Goulburn-Murray Water's support costs are less than or equal to that of the other SCAs.



Figure 8-13 Budgeted 'Administration/Mgmt' costs as a proportion of total operating expenditure

# 9 Operating expenditure

### 9.1 Overview

As detailed in the overview of the Joint Program budget in Section 4, operating expenditure comprises three cost categories: Operations (O), Maintenance – Planned (MP) and Maintenance – Routine (MR). For the purpose of this analysis, a significant adjustment has been made in that costs for dredging the River Murray mouth have been reallocated from capital expenditure to operating expenditure (Maintenance – Routine). The allocation of these costs as capital expenditure within the Joint Programs budget is for cost sharing purposes only, as costs are shared between Joint Venture governments based on the location of the cost (asset site) and category of the cost (C, I, O, MP or MR). Unless noted otherwise, the analysis throughout this section excludes carry-overs.

The 2019/20 budget for operating expenditure is \$59.0 million. This represents a 3% decrease compared with actual expenditure in 2018/19 and a decrease of 11% compared with the \$66.2 million budgeted for 2018/19. Figure 9-1 shows budget and actual operating expenditure for the period 2016/17 to 2022/23. We discuss further the observed underspend in historical operating expenditure in Section 9.2.2.



Figure 9-1 Budget and actual operating expenditure 2016/17 to 2022/23

### 9.2 Historical operating expenditure (2016/17 to 2018/19)

### 9.2.1 Trend and variance analysis

Figure 9-2 shows actual operating expenditure by service type for the past three years. This figure shows that Water Storage and Supply is the most significant expenditure category, accounting for 23% of expenditure in 2018/19, but that it has also shown a significant decline in expenditure over the period. Expenditure in 2016/17 was \$19.8 million meaning that expenditure has declined by \$4.8 million (26%). The next largest service type category of expenditure is Support Services which has been flat across the period at \$11.2 million per annum.

Salinity Mitigation and Environmental Management were the third and fourth largest service type categories of expenditure in 2018/19 (\$8.9 million and \$8.0 million respectively). Both of these categories have shown notable increases in recent years of 45% to 50% compared with 2016/17 levels of expenditure. RMW Office is the next largest service type category with \$6.9 million of expenditure in 2018/19. Expenditure in this category has been flat for the last three years.

We discuss trends and variances in expenditure by service type categories in Section 9.2.3.



Figure 9-2 Actual operating expenditure by service type 2016/17 to 2018/19

Figure 9-3 shows how the substantial decrease in expenditure for Water Storage and Supply has been offset by increases in other service type categories to lead to an overall increase in actual expenditure across the period of \$3.3 million (+6%).



Figure 9-3 Movement in actual expenditure by service type 2016/17 to 2018/19

### 9.2.2 Analysis of consistent underspend

In testing the reasonableness of the costs of the Joint Program, we are interested in the observed consistent underspend for operating expenditure as it may indicate:

> That budgets are unreasonably high and that actual expenditure is a better reflection of the reasonable level of expenditure needed to manage the assets, as the actual expenditure reflects the activities priortised and committed to by Joint Venture parties as "must do" > That the budgets are reasonable but that the SCA finds limitations in their ability to action, i.e. to deliver service and manage the risks associated with the assets.

We note that there will always be variation between budgeted and actual expenditure; of interest here is that the underspend is systemic.

To better understand the drivers for the consistent underspend of operating expenditure, we analysed budget and actual expenditure for the past three years by cost type, service type and responsible agency.

Table 9-1 shows that there is a clear trend with WaterNSW and the Department of Planning, Industry and Environment (New South Wales) having substantially greater average annual underspend (25% and 21% respectively) than the other three agencies (excluding the Department for Environment and Water (South Australia)) which have an average underspend of 6% to 7%. This suggests that underspend may be in part explained by the varying capacity of the agencies to deliver works.

Table 9-1 Average annual underspend in operating expenditure by SCA 2016/17 to 2018/19

| Agency   | Average annual underspend<br>(2016/17 to 2018/19) |
|--|---|
| Department of Planning, Industry and Environment (New South Wales) | 21%   |
| Goulburn-Murray Water  | 7%  |
| MDBA   | 6%  |
| SA Water   | 6%  |
| WaterNSW   | 25%   |
| Average across all agencies  | 10%   |

During our meetings with the SCAs, both WaterNSW and the Department of Planning, Industry and Environment (New South Wales) indicated that work is underway to reduce their annual underspend. In the case of WaterNSW, it has established a Maintaining Capability Program, where activities in remote locations are bundled in order to increase the attractiveness of these projects to contractors and ultimately reduce underspend. In response to the draft report, WaterNSW stated that the period of observed underspend occurred when:

"WaterNSW as an organisation was forming and completed a process of recruiting into a newly formed organisation structure and was rebuilding policy and process. Whilst this did have a material impact on delivery of capital programs, in particular, early in this four-year period, structure and process is now largely in place and delivery across the organisation is generally hitting or exceeding targets".

We have not tested WaterNSW's performance to budget in the current financial year given that the year is less than half way progressed.

The Department of Planning, Industry and Environment (New South Wales) has also increased internal capability as a means to reduce underspend, through the recruitment of a permanent Manager Joint Venture Program, increase in Joint Venture staffing from six full-time equivalent staff in January 2018 to nine full-time equivalent staff as of December 2019 and restructure of its Joint Venture team. The increased staffing at the Department of Planning, Industry and Environment (New South Wales) correlates with a significant reduction in annual operating expenditure underspend between 2016/17 (27% of budget not spent) and 2018/19 (10% of budget not spent). The Department of Planning, Industry and Environment (New South Wales) advised that activities carried over from 2018/19 to 2019/20 are currently 95% complete. The Department of Planning, Industry and Environment (New South Wales) considers that it is on track to deliver the 2019/20 budget.

Analysing the underspend by cost category (Table 9-2) shows that Maintenance – Routine has the least variation to budget with an average annual underspend of 6%. Less variance in routine maintenance is expected given the routine nature of these activities. Operations (12%) and Maintenance – Planned (15%) have similar levels of underspend as a proportion of budget.

| Table 9-2 | Average annual | underspend in | operating | expenditure | by cost | type 2016 | /17 to 2018/19 |
|-----------|----------------|---------------|-----------|-------------|---------|-----------|----------------|
|-----------|----------------|---------------|-----------|-------------|---------|-----------|----------------|

| Cost category         | Average annual underspend | Proportion of total average<br>annual underspend |
|-----------------------|---------------------------|--|
| Maintenance – Planned | 15%                       | 31%  |

| Cost category         | Average annual underspend | Proportion of total average<br>annual underspend |
|-----------------------|---------------------------|--|
| Maintenance – Routine | 6%                        | 21%  |
| Operations            | 12%                       | 49%  |
| Grand Total           | 10%                       | 100%   |

At the service type level, four categories account for 90% of the total underspend. These are summarised in Table 9-3. This table also shows underspend as a proportion of the average annual budget. Water Storage and Supply is the largest category contributing to underspend. It is 44% of the total and an average of \$3.1 million per annum. The next largest category is Salinity Mitigation at \$1.8 million per annum or 25% of the total underspend. Factors contributing to underspend are discussed following Table 9-3.

| Service type             | Average annual<br>underspend<br>(\$ million) | Proportion of total<br>average annual<br>underspend | Average annual<br>underspend<br>(% of 2016/17 budget) |
|--------------------------|--|---|---|
| Environmental Management | \$0.9  | 13%   | 11%   |
| Forest Water Management  | \$0.6  | 8%  | 43%   |
| Salinity Mitigation      | \$1.8  | 25%   | 20%   |
| Water Storage & Supply   | \$3.1  | 44%   | 22%   |

 Table 9-3
 Average annual underspend by service type 2016/17 to 2018/19

In our meetings with agencies, it was apparent that all parties were well aware of the historic underspend and were focusing on improved delivery to budget. Agencies identified that contributing factors to underspend include:

- > The time taken for the Joint Program budget to be approved. The 2019/20 budget which commenced on 1 July 2019 was approved on 4 August 2019. Carry-over of expenditure from previous years was not officially approved until 24 October 2019. The lateness of budget approval will impact the ability of agencies to deliver, as until officially approved, there is a risk that some planned expenditure is unfunded. The delay in approval is also likely to have a negative impact on procurement of any external activities as sound procurement requires time for the market to respond.
- Climate some work can only be performed when the system has particular storage and flow levels (e.g. access to some assets is only possible when storages are low) and year-to-year variability such as the need to pump sand to keep the mouth of the River Murray open. We agree that this is a contributing factor. We analyse underspend for specific activities following.
- > Prudent deferral or adjustment to the scope of activities as better information is gained. For example, the unique nature of many of the assets managed means that the cost of works (particularly major maintenance) is not known with confidence until initial investigation is undertaken. SA Water shared an example of the need to use bespoke cranes for work at locks and weirs.

Underspend has also been considered at a recent (September 2019) River Murray Operations Committee meeting where possible contributing factors to the underspend were identified. These factors are largely consistent with those detailed above. The Committee paper sets out that the level of underspend is a concern for the current financial year.

Table 9-4 identifies the activities with the largest levels of historic average annual underspend. These activities total \$4.1 million in underspend. Where contributing factors were identified in interviews with agencies, these are included within the table.

| Asset Site<br>(RMO)<br>Description | Activity Description         | n Cost Responsible<br>type Agency<br>Description |          | Average<br>annual<br>underspend<br>(2016/17 to<br>2018/19) | Contributing factors  |
|------------------------------------|------------------------------|--|----------|--|---|
| Murray Mouth                       | Murray Mouth Sand<br>Pumping | 0  | SA Water | \$746,836  | <ul> <li>Variability in flows that<br/>move sand and in the<br/>deposition of sediment</li> </ul> |

Table 9-4 Largest average annual underspend by activity 2016/17 to 2018/19

| Asset Site<br>(RMO)<br>Description | Activity Description                          | Cost<br>type | Responsible<br>Agency<br>Description | Average<br>annual<br>underspend<br>(2016/17 to<br>2018/19) | Contributing factors   |
|------------------------------------|---|--------------|--------------------------------------|--|--|
| RMO Office                         | RMW – Assets<br>Management                    | 0            | MDBA                                 | \$648,658  | <ul> <li>Works deferred due to<br/>other priorities</li> </ul>   |
| LW1 –<br>Blanchetown               | LW1 Investigate<br>Seepage Gantry<br>Abutment | MR           | SA Water                             | \$454,553  |  |
| RMO Office                         | Contingency – O & M MP MDBA \$447,736         |              | \$447,736                            |  |  |
| Water Data                         | Annual Program                                | 0            | WaterNSW                             | \$424,656  |  |
| Dartmouth                          | LLOW Forced Air<br>injection                  | 0            | Goulburn-<br>Murray Water            | \$370,144  | <ul> <li>Required to operate the<br/>low level outlets when<br/>storage levels are low</li> <li>Budgeted for in<br/>previous years but not<br/>used</li> </ul>       |
| Upper Darling                      | Maintenance – Planned                         | MP           | NSW Dept of<br>Primary<br>Industry   | \$368,145  |  |
| Hume                               | Spillway Gate Painting<br>Program             | MP           | WaterNSW                             | \$364,311  | <ul> <li>Works deferred while<br/>appropriate<br/>methodology<br/>developed.</li> <li>Works will be<br/>undertaken on a rolling<br/>basis in coming years</li> </ul> |
| Woolpunda                          | Maintenance – Routine                         | MR           | SA Water                             | \$315,710  |  |

This analysis of specific activities supports that climate variability and prudent deferral/rescoping of works is contributing to the observed underspend and we accept that these are factors. However, they also suggest that forward budgeting can be improved to better account for these factors. We discuss this further in Section 9.3.2.

Overall, we conclude that there is a variety of factors contributing to the historic underspend of the Joint Program budget. The stark difference in the level of underspend between agencies suggest that the capacity of agencies to deliver is a major factor. This was confirmed by interviews with agencies.

Climate variability is also a driver as is evident by the largest single activity – Murray Mouth Sand Pumping – which varies from year to year. However, the systemic underspend suggests that budgeting can be improved to better account for anticipated variation in climate or other factors that drive costs. An 'improvements review' focusing on reducing the risk of underspend in future years is planned for 2019/20 and will involve the MDBA, River Murray Operations Committee, Joint Programs Budget Committee and the SCAs.

We do not consider that the underspend suggests that actual or budgeted expenditure is unreasonable. It is more likely that the underspend represents a shortfall between required maintenance and operations and that delivered. However, there is scope to improve budgeting for expenditure that varies from year to year.

### 9.2.3 Analysis of activities by service type

In our meetings with agencies, we sought justification for the level of expenditure for various activities, focusing on material items of expenditure and items which had shown significant variance (positive or negative) over the past period. Focusing on the largest four service types, Table 9-5 details the sites with the largest expenditure in 2018/19 and significant activities in 2018/19.

| Service type                   | Actual<br>expenditure<br>2018/19 | Sites with largest actual expenditure in 2018/19  | Significant activities in 2018/19  |
|--------------------------------|----------------------------------|---|--|
| Water<br>Storage and<br>Supply | \$14.1 million                   | <ul> <li>Water Data – \$2.7 million</li> <li>Hume – \$2.3 million</li> <li>Dartmouth – \$1.4 million</li> </ul> | <ul> <li>River operations – \$2.4 million</li> <li>Operations and maintenance – Water data – \$0.9 million</li> <li>Annual program – Water data – \$0.8 million</li> <li>Annual dam inspections – \$0.6 million</li> </ul> |
| Support<br>Services            | \$11.3 million                   | <ul> <li>Dartmouth – \$1.7 million</li> <li>Hume – \$1.6 million</li> </ul>                                     | <ul> <li>Depot and buildings – \$1.9 million</li> <li>Property insurance – \$1.2 million</li> <li>Berri depot O&amp;M – \$0.9 million</li> </ul>   |
| Salinity<br>Mitigation         | \$8.9 million                    | <ul> <li>Woolpunda – \$2.3 million</li> <li>Waikerie – \$2.1 million</li> </ul>                                 | <ul> <li>Maintenance – Routine – \$2.6 million</li> <li>Operations power – \$2.1 million</li> </ul>  |
| Environmental<br>Management    | \$8.0 million                    | <ul> <li>Murray Mouth – \$6.1 million</li> </ul>  | <ul> <li>Murray Mouth sand pumping – \$6.1 million</li> </ul>  |

| Table 0.5  | Summony | of major | convico | typos and | activition ( | for operating | ovpondituro |
|------------|---------|----------|---------|-----------|--------------|---------------|-------------|
| 1 able 9-5 | Summary | or major | Service | types and | activities   | for operating | expenditure |

For major expenditure items, we challenged the SCAs and the MDBA to provide justification that the level of expenditure incurred was reasonable. The major activities discussed were:

- Murray Mouth Sand Pumping: This activity was procured through a competitive process with a specification of works that appropriately reflects the variable scope of pumping required. We were provided with an extract of the tender evaluation report. This report demonstates that SA Water received competent and competitive tenders for the work. The procurement was subject to governance by the SA Water board, the South Australia Parliamentary Works Committee and the MDBA. The amount of pumping undertaken is determined based on river flows and tidal variation. During our interviews with SA Water, we sighted the Procurement Plan and Probity Report developed for this activity. We were also provided with the Murray Mouth Dredging Efficiency Review report prepared by BMT for SA Water in January 2019. The River Murray Mouth Dredging Steering Committee which comprises representatives from the MDBA, SA Water and the Department for Environment and Water meets as required to provide direction to the program.
- Salinity Mitigation Maintenance-Routine and Operations Power: These activities occur across all the salt interception scheme assets. All SCAs purchase power through purchase agreements that apply across their wider businesses.
- Support Services Depot and buildings: This is a category unique to SA Water. It covers routine maintenance for depots and buildings at the locks and weirs in South Australia. While this category is unique, we are satisified based on our discussion with SA Water that these reflect reasonable costs reflected by other SCAs in different activities.
- Support Services Berri depot O&M: This category covers support costs for SA Water's management of River Murray Operations as SA Water's River Murray Operations business unit is headquartered at Berri. As for the above activitiy, while this expenditure item is unique to SA Water, we are satisified based on our discussions with SA Water that these reflect reasonable costs reflected by other SCAs in different activities.
- Water Storage and Supply Gauging South Australian Murray Darling Basin: The Department for Environment and Water (South Australia) undertakes River Murray monitoring for operational and environmental purposes at 71 sites along the river. Tight key performance indicators are imposed to ensure data continuity and precision. This is a labour-intensive activity focussed on validating and uploading data and maintaining the telemetry assets and supporting structures in the river. This activity is also covered by a capital expenditure item for maintenance and construction of instruments and supporting structures. We consider this is a reasonable approach.

In our review of specific items of historic operating expenditure, we did not identify any expenditure that is unreasonable. Costs are clearly allocated to sites, service types and functions. While the purpose of the activity may not be immediately clear or be consistent across agencies (e.g. the categorisation of SA Water support costs), we consider that the historic costs are appropriate.

### 9.3 Future operating expenditure (2019/20 to 2022/23)

### 9.3.1 Current year (2019/20) budget

The Joint Program budget for operating expenditure in 2019/20 is shown in Figure 9-4. The total budget for operating expenditure items is \$59.0 million. This shows that Water Storage and Supply is the largest service type and comprises \$17.0 million of budgeted expenditure. Support Services (\$9.8 million), MDBA costs (RMW Office) (\$8.9 million) and Salinity Mitigation (\$8.7 million) are the next largest categories. There is a notable decrease in the budget for Environmental Management (\$5.6 million) compared with actual expenditure in 2018/19 of \$8.0 million (see Figure 9-2).



Figure 9-4 2019/20 operating expenditure budget by service type (\$ million)

The 2019/20 budget by asset class is shown in Figure 9-5. Locks and weirs are the asset class with the largest proportion of expenditure (\$13.5 million, 23%) followed by dams (\$12.8 million, 22%) and Support Services costs (\$12.3 million, 21%). In Section 8.5, we undertook benchmarking of expenditure by site and by asset class.



Figure 9-5 2019/20 operating expenditure budget by asset class

#### 9.3.2 Forecasting approach

In our analysis of the forward budgets for the Joint Program and in discussion with agencies, it was evident that the approach to forecasting future costs is not consistent. Scope changes, e.g. where major maintenance occurs in one year but not the next, were clear. However, while it was agreed amongst agencies that forecasts were made on a nominal basis, assumptions underlying real movements in costs were not well articulated by all agencies or clear to us. For some agencies considerable effort is applied to these forecasts but there is no consistent approach.

We analysed the movement in expenditure items in the forward three years (2020/21 to 2022/23) and excluded outliers which suggested a scope change rather than having been changed due to anticipated inflation of costs. This analysis is shown in Figure 9-6 as a box and whisker plot for each agency.



Figure 9-6 Annual change in operating expenditure activities (excluding outliers) by agency

This figure shows that there is no consistent approach to forward forecasting of costs of activities across agencies. The Department of Planning, Industry and Environment (New South Wales), for example, has predominantly indexed expenditure items by 2.0% per annum while SA Water has applied a wide range of factors with many items having 0.0% applied but the 75th percentile is higher at 3.3%. Movement in input costs will largely be outside of the direct control of agencies, except for labour costs subject to collective agreements. Therefore, we would expect to see more consistency in the applied indexation of future costs.

We consider that there is an opportunity for the agencies to improve the forecasting of forward costs by being more consistent. Increased consistency would provide further assurance that budgets are reasonable and reflective of cost drivers. A more consistent approach to forecasting future costs may include:

- > A clear statement that forward forecasts are nominal (or otherwise)
- > An agreed starting point for inflating costs. This may be, for example, on a zero basis unless justified otherwise or use an assumed level of general cost inflation (such as recent levels of movement in the consumer price index).
- > A requirement for justification of movements in costs that are different to the agreed starting point. For example, known movements in enterprise bargaining agreements or known movements in power purchasing agreements.
- > A requirement for changes in scope to be documented in sufficient detail.

When assessing the reasonableness of the costs of River Murray Operations, we are interested in the forecasting approach to determine whether it provides forecasts that fairly reflect the likely movement in future costs. When forecasts are made on a nominal basis and where the indices applied exceed the underlying movements in costs, there is a risk that budgets 'ratchet' up in real terms from year to year. Considering the factors applied by agencies to operating expenditure activities and the current level of the increase in general prices (1.7% per annum as measured by the consumer price index), the median and average rates applied by most agencies exceed the underlying level of movement in general costs.

However, when weighted by the absolute movement in expenditure, the indexation applied results in a movement of between \$0.8 million to \$1.0 million in the forward three years for operating expenditure. This has an impact of increasing expenditure by between 1.4% and 1.7% in each of these three years, which is equal to or lower than the current level of underlying inflation. The remaining movement in operating expenditure appears to be due to changes in scope for the activities. Therefore, while we consider that the forward forecasting approach for the Joint Programs presents a risk of leading to unreasonable costs through potential ratcheting of costs, this is not evident when looking at the overall movement in costs.

### 9.3.3 Trend and variance analysis

Figure 9-7 shows budget and forecast operating expenditure by service type for the current year (2019/20) and the forward three years to 2022/23. Water Storage and Supply is the most significant expenditure category averaging \$17.7 million over the four years. This is a step up from the \$14.1 million of actual expenditure incurred in 2018/19 for this category. Support Services at an average annual expenditure of \$10.3 million per annum is the next largest category. This is a step down from the actual expenditure incurred in 2018/19 of \$11.2 million. The remaining service types are largely stable over the forward period. Of note is that Environmental Management in the forward period decreases from \$8.0 million in 2018/19 to an average of \$5.9 million per annum over the four-year forward period.



Figure 9-7 Budget and forecast operating expenditure by service type 2018/19 to 2022/23

The key drivers for the observed movements in forward expenditure are discussed following.

### Water Supply and Storage:

> The increase from the 2018/19 actual to 2019/20 budget is driven by:

- \$0.52 million increase in River Operations costs largely at SA Water sites. SA Water advised that this is in part due to unfilled vacancies (approximately four full-time equivalent staff) and due to the allocation of regional management costs to this category. SA Water advised that this was a one-off step increase in costs for 2019/20 but that it should have not been sustained past this year.
- \$0.43 million increase in WaterNSW's stream gauging annual program
- \$0.35 million for continuation of the LLOW Forced Air Injection activities discussed previously. These costs are not included in future years.
- The increase from the 2019/20 budget to 2020/21 budget is driven by the scheduling of a range of planned maintenance activities (major maintenance). These planned maintenance activities include the recommencement of WaterNSW's spillway gate painting program at Hume Dam and dewatering the logbays at a number of locks and weirs to carry out inspection and maintenance. It is reasonable that planned maintenance will show variance from year to year as the activities are carried out at irregular cycles. The Hume Dam spillway gate painting program will be an ongoing program to paint one of the 30 dam gates each year following a number of years where this activitiy has not been undertaken.

#### **Support Services:**

The decrease from the 2018/19 actual to 2019/20 budget is driven by a decrease for routine maintenance across SA Water depots and buildings. The 2018/19 actual was \$1.8 million and \$1.0 million is budgeted for 2019/20.

### **Environmental Management:**

The decrease between the 2018/19 actual costs (\$8.0 million) and the forward period (average of \$5.9 million per annum) is due to the allowance for future costs for pumping sand at the mouth of the River Murray to return to previously budgeted levels (\$3.65 million) which are lower than the actual costs in 2018/19 (\$6.02 million) which are considered unusually high.

With the exception of the increase in SA Water's River Operations costs in 2020/21 and beyond, which SA Water advised was made in error, we consider that these movements in costs are explained by underlying drivers and reflect the varying costs to manage the assets base.

### 9.4 Allocation of overheads

The Terms of Reference for this review require a review of the allocation of the corporate overheads incurred by the SCAs to Joint Program expenditure. Corporate overheads are costs for activities that support the SCAs to deliver their services (e.g. IT, legal, customer services, communications). As the SCAs have businesses that provide services to the River Murray Operations and outside of the River Murray Operations, it is necessary for them to allocate costs between these different areas of operation. However, the SCAs are not reimbursed based on the actual proportion of support costs that they allocate to the Joint Program. They are reimbursed based on a long-standing methodology. This means that there will likely be a difference between the support costs allocated by SCAs to the Joint Program and what they are reimbursed.

The current methodology for reimbursing corporate overheads was reviewed in 2011 by the Basin Officials Committee, which found that agencies had different approaches to allocation but that there was a reasonable level of consistency in the calculated cost of corporate overheads per full-time equivalent staff (ranging from \$41.7k to \$52.2k with a median of \$44.8k).

Through our interviews with the SCAs, we found that there continues to be a range of methodologies used by the SCAs to allocate their corporate overheads to Joint Program activities. These approaches are as follows:

- > MDBA costs apportioned based on the number of full-time equivalent staff
- Department of Planning, Industry and Environment (New South Wales) allocation based on a flat rate of \$20.35 per hour endorsed by the Independent Pricing and Regulatory Tribunal through its review of the regulated businesses
- Soulburn-Murray Water applies a flat overhead of 8% to River Murray Operations expenditure. Goulburn-Murray Water noted that it is currently undergoing a transformation where its corprorate structure and costs are likely to change. Goulburn-Murray Water also noted that its corporate overheads have been previously subject to review and endorsement by the Essential Services Commission and that the Essential Services Commission will review its allocation approach as part of the upcoming price review.

SA Water – allocation of costs at a cost centre level which considers the benefit/usage of the River Murray Operations for the services, e.g. number of IT service desk calls.

Generally, allocation methodologies that reflect the actual cost of providing corporate services are preferred, e.g. that proposed by SA Water which considers overheads by individual cost centre. There is a risk in the MDBA's methodology, which is based on the count of full-time equivalent staff, that there are different costs per full-time equivalent staff for the River Murray Operations business compared to the remaining business. The Goulburn-Murray Water methodology based on expenditure may also not reflect actual need for corporate services.

### 9.5 Conclusions

In the last three years, actual operating expenditure for the Joint Program has increased by an average of 3% per annum in real terms to be \$60.8 million in 2018/19.

However, there is a consistent and substantial underspend in operating expenditure between that budgeted and that actually incurred which has averaged about 10% of budget or \$6.8 million per year in the three-year period 2016/17 to 2018/19. Actual operating expenditure is also influenced by factors which vary from year to year, such as the need for sand pumping at the mouth of the River Murray. This activity is the most substantial single operating activity and in 2018/19 accounted for almost 10% of the total budget at \$6.1 million in actual expenditure.

We have reviewed operating expenditure in aggregate, by service type and for activities that showed material variance or were material in absolute terms. We did not identify any historical operating expenditure that is unreasonable. In the future forecasts, SA Water advised that one activity (River Operations from 2020/21 forward) had been incorrectly sustained at prior levels and should be decreased. Oversights of this nature are to be expected in in outer years of forecasts.

The consistent underspend in operating expenditure is concerning as it may mean that budgets are unreasonably high (if actual expenditure reflects reasonable expenditure) or that actual expenditure is insufficient to address asset and service risks (if budgeted expenditure is reasonable). We analysed the underspend and could not establish a strong relationship by service type or cost type. The strongest contributor to underspend appears to be the agency tasked with delivering the budget, with the Department of Planning, Industry and Environment (New South Wales) and WaterNSW having much higher rates of underspend than the other SCAs.

The observed underspend is an area of focus for the Joint Program partners with an improvement program underway in the current financial year. As an example, WaterNSW has established a Maintaining Capability Program, where activities in remote locations are bundled in order to increase the attractiveness of these projects to contractors and ultimately reduce underspend. The Department of Planning, Industry and Environment (New South Wales) is also increasing capability as a means to reduce underspend, with its increased internal staffing correlating with a significant reduction in annual operating expenditure underspend between 2016/17 (27% of budget not spent) and 2018/19 (10% of budget not spent).

Forecasting of future operating expenditure is performed inconsistently across agencies. Forecasts are made on a nominal basis but a wide range of inflators are used to arrive at the forecasts. In our interviews with agencies, it was generally not clear how the assumptions underlying forecasts reflected movements in real costs. There is a risk that the current approach to forecasting future costs leads to a sustained increase in costs in real terms that is not justified based on changes in input costs. However, this risk does not appear to have been realised in the forward three years, with indexed costs being lower or equal to underlying inflation in aggregate. We consider that improved consistency in forecasting costs will provide greater assurance over the reasonableness of River Murray Operations costs.

## 10 Capital expenditure

### 10.1 Overview

Capital expenditure comprises two cost categories: Investigation (I) and Construction (C). As noted in Section 9.1, the allocation of costs for sand pumping at the River Murray mouth has been changed from Construction in the Joint Program budget to operating expenditure for this analysis. The allocation of these costs as Construction (capital expenditure) within the Joint Program budget is for cost sharing purposes only. Unless noted otherwise, the analysis throughout this section excludes carry-overs.

The 2019/20 budget for capital expenditure is \$11.0 million. This is more than double the \$4.9 million in actual capital expenditure in 2018/19. Figure 10-1 shows budget and actual capital expenditure for the period 2016/17 to 2022/23. This figure shows that there is persistent underspend of capital expenditure compared with budget for the three-year period between 2016/17 and 2018/19, as has been observed for operating expenditure in Section 9.

Capital expenditure is much lower than operating expenditure for the Joint Program, with the average annual budget capital expenditure from 2016/17 to 2022/23 (\$12.0 million) being a fifth of the average annual budget operating expenditure over the same period (\$62.9 million).



Figure 10-1 Budget and actual capital expenditure 2016/17 to 2022/23

For operating expenditure, we analysed historical and future expenditure separately. However, as capital expenditure reflects discrete projects that span a number of years (rather than recurring each year), we analysed historic and future capital expenditure jointly.

Capital expenditure over the period of interest for this review is lower than that in preceding years as shown in Figure 10-2. This figure shows expenditure on the Environmental Works and Measures Program assets separately, which also includes funds for fishway and navigable pass works. There has been significant spend of \$400 million on Environmental Works and Measures Program assets since 2001. These assets were funded by the Commonwealth Government, but the ongoing operation, maintenance and renewal is funded under the Joint Program budget.

Capital expenditure excluding that for the Environmental Works and Measures Program has materially declined in the last five years. Up to and including 2012/13, capital expenditure averaged \$38.8 million. From 2013/14 to 2018/19, capital expenditure was one third of this level at \$12.1 million per annum. While we note that the spikes observed up to and including 2012/13 may be due to significant flood events in this period, the level of capital expenditure after this period is 0.3% of the gross replacement cost of the asset base. While considering time-based measures of renewal of the capital base is inferior to condition and risk-based measures, this level of expenditure will replace the asset base in 360 years. The average useful life of the River Murray Operations assets is 115 years. The low level of expenditure in recent years raises concerns as to whether the asset base is being sustained. We commented on this in Section 6.5.



Figure 10-2 Actual capital expenditure 2001/02 to 2018/19

### 10.2 Drivers for capital expenditure

### 10.2.1 Investigations



Figure 10-3 shows capital expenditure broken down into Construction and Investigation costs.

Figure 10-3 Budget capital expenditure by cost type 2016/17 to 2022/23

Investigation costs comprise 6% to 21% of total annual capital expenditure with an average of 18% across the seven-year period. Investigation costs total \$14.6 million over this period. Investigation expenditure is for projects to gain better information to confirm the need for and scope of Construction projects, e.g. detailed condition assessment. Because of the varied and unique nature of the River Murray Operations asset base,

these Investigations are also varied and unique in nature. Over the past and forward periods, the three largest Investigation items comprise just under 60% of all budgeted Investigation expenditure and are detailed in Table 10-1.

|               | Responsible<br>Agency | Asset Site<br>(RMO)<br>Description | Activity Description   | 16/17 to 22/23<br>- Budget |
|---------------|-----------------------|------------------------------------|--|----------------------------|
|               | WNSW                  | Hume                               | Inspection - Inspection of Emergency Closure Gates for FDC V | \$3,491,019                |
|               | SAW LW9 - Kulnine     |                                    | Investigate and Remediate Sheetpile Cutoffs                  | \$2,899,038                |
| GMW Yarrawong |                       | Yarrawonga                         | Fishway Modification Investigation                           | \$2,059,102                |

Table 10-1 Largest Investigation items 2016/17 to 2022/23

We have considered these Investigation activities at a high level and we consider that they are justified to support the development of capital expenditure proposals.

### 10.2.2 Capital expenditure by service type and site

Figure 10-4 provides a breakdown of capital expenditure by service type. Expenditure is largest over the period for the Water Storage and Supply service type, accounting for 72% (\$60.6 million of all expenditure). Support Services is the next largest category at 19% (\$16.1 million). The remaining service types account for the balance of the 9% of capital expenditure. This demonstrates that Water Storage and Supply dominates capital expenditure over this period.



Figure 10-4 Budget capital expenditure by service type 2016/17 to 2022/23

While capital expenditure is concentrated in the one service type category, Figure 10-5 shows that expenditure is well spread across sites. The three storages (Dartmouth Dam, Hume Dam and Lake Victoria) have the largest budgeted levels of capital expenditure. This spread of expenditure reflects that there are no large or very large capital expenditure projects but that expenditure is instead largely comprised of many small to medium-sized projects.





Figure 10-5 Budget capital expenditure by site 2016/17 to 2022/23

### 10.2.3 Analysis of consistent underspend

As observed for operating expenditure, there is consistent underspend of capital expenditure budgets. Underspend has averaged \$6.8 million per year for the last three years. Unlike for operating expenditure, there is no clear relationship between underspend and the SCA responsible for delivery, with all SCAs having a similar level of underspend. As the capital expenditure program is lumpier, individual projects have a greater impact. Also, underspend in one year may not be shown as being caught up in later years due to the carry-over of funds which are accounted for separately to the main Joint Program budget.

The single largest item of underspend is for the Lake Victoria Outlet Regulator Upgrade – Stage 2 project. This project was within the sample of projects we reviewed in detail and we summarise our findings relating to this project in Section 10.3. The underspend is due to ongoing deferral of the project as SA Water gains better information on the risks associated with the asset. While it is prudent for the works to be delayed, this suggests that the original timing of the works included in the budget was optimistic.

We consider that the underspend of capital expenditure does not impact on the reasonableness of expenditure. The underspend is partially obscured by the carry-overs and for discrete capital expenditure projects, deferrals are partly driven by agencies seeking better information on the scope.

### 10.3 Review of major capital projects

The ten largest capital expenditure projects based on actual and budget expenditure over the review period are detailed in Table 10-2. The median size for a capital expenditure project (C and I) is \$70.7k and the average size is \$280k. This shows that the program, while skewed by a number of larger projects, is not as lumpy as expenditure programs undertaken by other water service providers across Australia.

In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown in Table 10-2 for the past period (2016/17 to 2018/19). However, for each project, we have used "X" to denote the years in which future period (2019/20 to 2022/23) expenditure is budgeted.

| Table 10-2 | Major capital | projects | 2016/17 to 2018/19 |
|------------|---------------|----------|--------------------|

| Туре | Agency Asset Site (RMO) |             | Activity Description   | Actual |       |       |       | Budget |       |       |
|------|-------------------------|-------------|--|--------|-------|-------|-------|--------|-------|-------|
|      | Description             | Description |  |        | 17/18 | 18/19 | 19/20 | 20/21  | 21/22 | 22/23 |
| С    | GMW                     | Dartmouth   | Crest Trench Detailed<br>Design, Approvals and<br>Construction | -      | -     | -     | -     | х      | х     | Х     |

| Туре | Agency | Asset Site (RMO)<br>Description                   | Activity Description  | Actual |       |       |       | Budget |       |       |  |
|------|--------|---|---|--------|-------|-------|-------|--------|-------|-------|--|
|      |        |   |   | 16/17  | 17/18 | 18/19 | 19/20 | 20/21  | 21/22 | 22/23 |  |
| С    | DPI    | Hume -<br>Yarrawonga                              | Whole of Reach<br>Construction  | -      | -     | -     | Х     | Х      | Х     | Х     |  |
| С    | SAW    | Mundoo (Mundoo,<br>Ewe, Boundary,<br>Tauwitchere) | Upgrade Concrete Deck<br>Tauwitchere and Ewe Island<br>– Construction | 1.16   | 0.97  | 0.42  | Х     | Х      | Х     | Х     |  |
| I    | WNSW   | Hume  | Inspection – Inspection of<br>Emergency Closure Gates<br>for FDC V    | -      | -     | 0.24  | Х     | -      | -     | -     |  |
| С    | SAW    | Lake Victoria                                     | Lake Victoria Outlet<br>Regulator Upgrade - Stage 2                   | 0.02   | -     | 0.03  | Х     | Х      | Х     | -     |  |
| С    | GMW    | Hume  | Headworks Management –<br>I&C (RMW Projects)                          | 0.16   | 0.27  | 0.17  | Х     | Х      | Х     | Х     |  |
| С    | WNSW   | LW10 Wentworth                                    | Downstream river bank stabilisation                                   | -      | -     | 0.00  | Х     | Х      | -     | -     |  |
| I    | SAW    | LW9 - Kulnine                                     | Investigate and Remediate<br>Sheetpile Cutoffs                        | -      | -     | -     | Х     | Х      | Х     | -     |  |
| С    | GMW    | LW26 -<br>Torrumbarry                             | Upgrade Telemetry   | 1.07   | 0.50  | 0.01  | -     | -      | -     | -     |  |
| С    | WNSW   | LW15 - Euston                                     | Remediate - Erosion of<br>Southern Embankment                         | -      | -     | -     | Х     | Х      | -     | -     |  |

To inform this review, we selected a sample of capital expenditure projects for detailed review. The projects included in this sample are shown shaded in blue in Table 10-2. In addition, two further projects (see Table 10-3) were reviewed to provide greater coverage across SCAs and the types of expenditure undertaken. While the 'Headworks Management – I&C (RMW Projects)' project was not selected for detailed review, Goulburn-Murray Water advised that the expenditure budgeted for this activity in 2019/20 relates to previous under-recovery of corporate overheads.

| Table 10-3 | Additional c | apital | expenditure | projects | reviewed |
|------------|--------------|--------|-------------|----------|----------|
|------------|--------------|--------|-------------|----------|----------|

| Туре | Agency     | Asset Site (RMO) |  |       | Actual |       | Budget |       |       |       |
|------|------------|------------------|--|-------|--------|-------|--------|-------|-------|-------|
|      |            | Description      | Activity Description   | 16/17 | 17/18  | 18/19 | 19/20  | 20/21 | 21/22 | 22/23 |
| С    | SA_DE<br>W | Water Data       | Asset Infrastructure/<br>Instrument Maintenance and<br>Replacement | -     | -      | -     | Х      | Х     | Х     | Х     |
| С    | SAW        | Lake Victoria    | Lake Victoria - Replace truck<br>Mack Granite s602-aqr             | -     | -      | -     | -      | -     | Х     | -     |

The findings of the review of each project are detailed in separate sheets provided in Appendix B. Following is a short summary of the findings for each project reviewed:

Dartmouth – Crest Trench Detailed Design, Approvals and Construction: The scope of this project predominantly relates to the replacement of the existing filters within the upper downstream portion of Dartmouth Dam with filters designed to meet current standards. The replacement of these filters is intended to provide increased protection for piping through the dam embankment. The driver for this project is the renewal of a key asset component in order to reduce associated risks in line with the guidelines published by the Australian National Committee on Large Dams. As part of the most recent Portfolio Risk Assessment undertaken for Dartmouth Dam (October 2019), two failure modes (F1 and F2) were identified as the key risks. Goulburn-Murray Water is of the opinion that, based on value-for-money in terms of the risk reduction achieved, addressing F2 (the impact of piping through the dam embankment initiated by flooding) is preferred.

As part of informing the cost estimate for this project, Goulburn-Murray Water utilised unit rates from its recent dam upgrade and obtained commercial estimates for sourcing the key filter material from local commercial quarries. The timing of the crest work at Dartmouth Dam will need to be confirmed, based on the results of Goulburn-Murray Water's review of the consequence assessment and any inter-site

prioritisation that is undertaken across the River Murray Operations dam portfolio.

Given the use of a detailed risk assessment to establish the driver for this project and inform the failure mode selected for rectification, we consider that the project need and scope of works are reasonable. We also consider that the cost estimation approach is reasonable for a project at the functional design stage. However, while not unreasonable, we note that there is less certainty in the timing of outyear expenditure (2020/21 to 2022/23).

- Hume Yarrawonga Whole of Reach Construction: There are 68 waterways within the 16 reaches between Hume and Yarrawonga. The waterways are managed through an overarching Waterway Management Plan and management plans for each individual reach. River works projects have been ongoing since the 1960s. Needs for each reach are assessed via a biannual boat inspection. Identified works are prioritised and a rolling program of works developed. Options to address identified needs are informed by stakeholder engagement, including the adjacent landowners. The Department of Planning, Industry and Environment (New South Wales) have engaged Soil Conservation Services to complete the works program. Soil Conservation Services perform their own procurement, using sub-contractors where necessary. This is a thorough process of works identification and prioritisation and we are satisfied the costs are reasonable.
- Mundoo (Mundoo, Ewe, Boundary, Tauwitchere) Upgrade Concrete Deck Tauwitchere and Ewe Island – Construction: This project is part of an ongoing program to replace concrete deck units at the Tauwitchere and Ewe Island Barrages. The original replacement program commenced approximately a decade ago. The driver for this project is the condition-based renewal of a key asset component.

The total forward expenditure proposed by SA Water for this project was based on an estimated cost to complete the replacement program, staged over the current year (2019/20) and three outyears (2020/21 to 2022/23). This, in turn, was based on an existing, ongoing supply contract and an allowance of approximately 15% for the installation of the deck units by SA Water.

The amount of work undertaken annually is limited to the capacity of internal work crews, the capacity of SA Water to store deck units and the time of the year. These limitations are reflected in the forward budget for this project. As inspections are undertaken annually, SA Water is satisfied that the staged delivery of works will not adversely affect the risk profile of the assets.

Given that this project is part of an ongoing replacement program that is informed by regular inspections, we consider that the project need, scope of works and overall cost estimates are reasonable. However, we note that the increased expenditure in the later outyears may exceed the internal capacity to deliver the remainder of the replacement program.

Lake Victoria – Outlet Regulator Upgrade – Stage 2: The scope of this project is the remediation of the wing walls, strengthening of the apron slab and works to address downstream erosion at the Lake Victoria Outlet Regulator. The driver for this project is the remediation of key asset components in order to reduce associated risks to acceptable levels. The net present values of two options (remediation and replacement options) were compared, and the remedial works option was selected on the basis of a lower net present value and a lower detrimental impact on cultural heritage.

Cost estimates for this project were developed by URS in 2010, which was used as the basis for the 2019/20 Annual Work Plan and not indexed to a real 2019/20 price base, and GHD in 2013. GHD forecasted a total construction cost of approximately quadruple the current budget for 2020/21. The significant difference in cost estimates is due to the uncertainty in climatic conditions and associated constructability, with the GHD cost estimate representing the construction of a coffer dam in wet conditions.

Given that this project is informed by a Portfolio Risk Assessment and several concept designs, we consider that the project need is reasonable. However, we note that significant refinement of the concept design and associated cost estimate is required in order to provide budget certainty for the three outyears (2020/21 to 2022/23).

> LW10 Wentworth – Downstream River Bank Stabilisation: The scope of this project is the remediation and stabilisation of 145 metres of eroded river bank sections at Lock and Weir 10 – Wentworth through the placement of rock protection. The driver for this project is remediation and renewal to reduce risks to the safety of WaterNSW staff and the public, reduce sediment loads due to erosion, maintain function of the lock chamber and reduce potential future rectification costs. Based on the benefits identified for this project, a cost comparison and multi-criteria analysis were performed to distinguish between the 'do nothing' option and remediation and stabilisation option. Concept design cost estimates were subsequently prepared by Aurecon (2018) for six specific remediation and stabilisation options, including a rock buttress option (the preferred option) and a gabion wall and rock berm option.

The Preliminary Business Case was based on the original concept design cost estimate prepared in 2012, which included planning, design, construction, internal costs and a project-level contingency. However, the Aurecon (2018) concept design cost estimate forecasted, for construction alone, a cost of more than double the 2012 estimate, including 15% contingencies but excluding WaterNSW costs, approvals and professional fees.

Given that this project is informed by a site assessment and supported by a high-level risk assessment, we consider that the project need is reasonable. However, with the majority of expenditure budgeted for 2019/20 and 2020/21, we note that increased certainty is required around the cost estimate. Given this uncertainty and the stage of the project, a contingency of 15% also appears to be low.

LW26 – Torrumbarry – Upgrade Telemetry: The scope of this project is the replacement, upgrade and installation of telemetry and associated electrical and building assets at Lock and Weir 26 – Torrumbarry. The main driver for this project is renewal to meet current standards and practice. Three options were considered at the concept design stage of the project, comprising a 'do nothing' option, partial upgrade of the electrical control system (manual control only) and a full upgrade of the electrical control system. The option to implement a full upgrade of the electrical control system was selected on the basis of reducing risk to an acceptable level, maintaining site operability and mitigating cascading impacts on the operation of the Gunbower and Barmah-Millewa Environmental Works and Measures Program sites, which are serviced by the same operations staff.

For the three major components of this project (design of the electrical control system, supply of electrical cubicles and site installation works, and system integration works), quotes were sought from a minimum of three experienced service providers. Following the completion of the detailed design stage, the budget was revised by Goulburn-Murray Water by approximately \$500,000 in nominal terms. Goulburn-Murray Water advised that this increase was largely due to increases in scope and complexity since the concept design stage of the project.

Given the risk posed by the age and obsolescence of the electrical control system, we consider that the project need is reasonable.

- Water Data Asset Infrastructure/Instrument Maintenance and Replacement: This program is closely aligned with a similar operational activity for the collection and dissemination of data from 71 sites. Each site is regularly cleaned and inspected to ensure data key performance indicators are met, and this is a labour-intensive activity. With a number of the assets reaching the end of their useful life, budget has been allowed for renewal of instruments and supporting structures (where necessary). Timely and precise data is critical for operational and environmental purposes. The costs are assessed as reasonable and the increased budget for 2020/21 and 2021/22 required to address end-of-life assets. Alternate data collection methods may be available in the future, but the transition would be significant and would not negate the need for the works as budgeted.
- Lake Victoria Replace Truck Mack Granite S602-AQR: The scope of this project is the changeover of two Mack Granite trucks to Mack Trident trucks. The driver for this project is to increase the cost efficiency of operating the Mack Granite truck fleet. SA Water compared the net present value of three options ('business as usual', 'replace early' and 'changeover to Mack Trident' options) based on estimates of maintenance and refurbishment costs. The cost estimates were also informed by advice from Mack Australia. The 'changeover to Mack Trident' option was found to be the most cost-effective option and was selected on this basis. Given that this project is relatively low in value and informed by a net present value comparison, we consider that the project need, scope of works and cost estimation approach are reasonable.

### 10.4 Conclusions

The 2019/20 budget for Joint Program capital expenditure is \$11.0 million. Capital expenditure is much lower than operating expenditure for the Joint Program, with the average annual budget capital expenditure from 2016/17 to 2022/23 (\$12.0 million) being a fifth of the average annual budget operating expenditure over the same period (\$62.9 million). Capital expenditure includes both Investigation and Construction cost types with Investigation averaging 18% of all capital expenditure over the past and forward periods.

The capital expenditure program is comprised mainly of small to medium-sized projects with a median value of \$70.7k and average value of \$280k. The Joint Program is more consistent and less lumpy than the expenditure programs typical of other water service providers across Australia. Expenditure is spread across many sites with no very large projects underway or planned. Most expenditure is for the Water Storage and Supply service type.

Capital expenditure shows consistent underspend with an average of just under half the program delivered in the last three years. All SCAs display similar levels of underspend. As the capital expenditure program is lumpier, individual projects have a greater impact. Also, underspend in one year may not be shown as being caught up in later years due to the carry-over of funds which are accounted for separately to the main Joint Program budget. We consider that the underspend of capital expenditure does not impact on the reasonableness of expenditure. The underspend is partially obscured by the carry-overs and for discrete capital expenditure projects, deferrals are partly driven by agencies seeking better information on the scope.

We reviewed a sample of capital expenditure projects to inform this review. This assessment of capital expenditure projects found:

- > No evidence of unreasonable expenditure
- > The need for projects was clear and backed by evidence
- > That options analysis, financial assessment and the level of project development varies between the SCAs due to their varying internal processes and is not consistent based on the project stage.

We found that capital expenditure excluding that for the Environmental Works and Measures Program has materially declined in the last five years. From 2001/02 and up to and including 2012/13, capital expenditure averaged \$38.8 million. From 2013/14 to 2018/19, capital expenditure has been one third of this level at \$12.1 million per annum. This level of capital expenditure is 0.3% of the gross replacement cost of the asset base. While considering time-based measures of renewal of the capital base is inferior to condition and risk-based measures, this level of expenditure will replace the asset base in 360 years. The average useful life of the River Murray Operations assets is 115 years. The low level of expenditure in recent years raises concerns as to whether the asset base is being sustained. This suggests that it is very unlikely that the current level of capital expenditure is unreasonably high.

### **11 Conclusions on reasonableness of costs**

The purpose of this review is to provide greater transparency and assurance to the Joint Venture governments and water users that the River Murray Operations Joint Program expenditure is reasonable. Our conclusions across the main elements of this review are summarised following.

### **Operating context**

We consider that the River Murray Operations Joint Program is developed and delivered within a comprehensive governance framework. Successful delivery of the Joint Program also relies on collaboration between the parties involved, particularly the MDBA and SCAs. This robust governance framework should promote reasonable expenditure.

We support the views of stakeholders that the Joint Program budget process is too time consuming and that having the annual budget not formally approved until well into the financial year has the potential to impact on the ability of the SCAs to effectively procure activities.

Given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning and we recommend that a long-term expenditure forecast covering all expenditure drivers is developed, covering all River Murray Operations assets.

### Asset management processes

We consider that the asset management practices of MDBA and SCAs are sufficiently robust to support reasonable expenditure through the joint programs. Our review of documents and engagement with SCAs and MDBA found that there is a large number of service and performance standards for the assets and service delivery and that there was a high level of awareness of these measures and targets. An improvement project is underway to provide a clearer line of sight between activities in the Joint Programs and the overall objectives of the River Murray Operations.

The SCAs are at varying levels of maturity with respect to asset information systems and for functions such as storing asset information centrally, managing operation and maintenance centrally, and using asset information to inform asset planning. While this does not necessarily impact the reasonableness of expenditure, the greater use of information systems should improve transparency over Joint Program activities and costs.

Asset risk is managed through a combination of the risk management approach documented in the Asset Management Plan and the asset risk assessment approaches of the SCAs. However, all dams and weirs are managed in accordance with state dam safety legislation, and where that does not exist, the Australian National Committee on Large Dams guidelines. We consider that a simple approach to communicating risk (acceptable or unacceptable) may be a simple way to provide consistency in communicating risk across the assets. While MDBA recognises that there are significant spikes in its long-term forward expenditure projects sourced from its renewal annuity model, there is no forecast that incorporates expenditure for all drivers particularly dam safety, noting that Portfolio Risk Assessments in progress will improve this information. We recommend that a long-term expenditure forecast covering all drivers is developed, covering all River Murray Operations assets.

Each SCA decides how to deliver Annual Work Program based on its own procurement policies and the availability of resources. The MDBA is informed and provides guidance on procurement where appropriate. Our review of a sample of capital expenditure projects (Section 10.3) found that in all cases appropriate procurement strategies has been adopted which provides some assurance that outturn costs are reasonable.

While this review of asset management processes has found that MDBA and the SCAs are at different levels of maturity and that there are some opportunities for improvement, we do not consider that any of the shortcomings identified would materially impact on the reasonableness of Joint Programs expenditure.

### Benchmarking

We undertook benchmarking of operating expenditure at an asset class level, long-term operating expenditure and for the 'Support Services' and 'Administration/Mgmt' cost categories.

Benchmarking of operating expenditure by asset class has shown that operating expenditure as a proportion of the replacement cost of assets at a site are generally consistent within an asset class. There is also a general trend of operating and maintenance costs increasing with asset age.

Economies of scale were not strongly evident although diseconomies of scale were observed for very small sites such as the Pike Mundic salt interception scheme, Overland Corner Lock and Weir and Lake Victoria. There is considerable variability in salt interception scheme costs. It may be beneficial to undertake benchmarking that considers power costs separately. The relative costs for dams and lock and weirs and barrages are consistent with industry averages.

No evidence of unreasonable operation and maintenance costs has been found through the analysis of operating expenditure by asset class.

The analysis of long-term operating expenditure as a proportion of the size of the asset base (as measured by replacement cost) found that operating expenditure as a percentage of the total gross replacement cost, has decreased from 1.65% in 2008/09 to 1.25% in 2018/19. We concluded that the decreasing relative level of actual operating expenditure can be attributed to both underspends and relatively declining operating expenditure budgets.

Our analysis of the 'Support Services' and 'Administration/Mgmt' cost categories shows potentially varying levels of efficiency in these areas between the three major SCAs. However, we consider that the data is not sufficiently robust to make an unqualified conclusion in this area.

### Consistent underspend of operating and capital expenditure

There is consistent and substantial underspend in operating expenditure between that budgeted and that actually incurred which has averaged about 10% of budget or \$6.8 million per year in the three-year period 2016/17 to 2018/19.

The consistent underspend in operating expenditure is concerning as it may mean that budgets are unreasonably high (if actual expenditure reflects reasonable expenditure) or that actual expenditure is insufficient to address asset and service risks (if budgeted expenditure is reasonable). We analysed the underspend and could not find a strong relationship by service type or cost type. The strongest contributor to underspend appears to be the agency tasked with delivering the budget, with the Department of Planning, Industry and Environment (New South Wales) and WaterNSW having much higher rates of underspend, with WaterNSW establishing a Maintaining Capability Program for the bundling of remote activities and the Department of Planning, Industry and Environment (New South Wales) increasing their internal capacity and thereby reducing their historic annual underspend.

We, therefore, concluded that organisational capacity is the most material factor driving the observed underspend of operating expenditure. We also concluded that there is no evidence that budgeted operating expenditure is unreasonably high.

Consistent underspend is also observed for capital expenditure. Unlike for operating expenditure, there is no clear relationship between underspend and the SCA responsible for delivery with all SCAs having a similar level of underspend. As the capital expenditure program is lumpier, individual projects have a greater impact. Also, underspend in one year may not be shown as being caught up in later years due to the carry-over of funds which are accounted for separately to the main Joint Venture budget.

We consider that the underspend of capital expenditure does not impact on the reasonableness of expenditure. The underspend is partially obscured by the carry-overs and for discrete capital expenditure projects, deferrals are partly driven by agencies seeking better information on the scope, and hence, budget.

### Approach to forecasting operating expenditure

Forecasting of future operating expenditure is performed inconsistently across agencies. Forecasts are made on a nominal basis but a wide range of inflators are used to arrive at the forecasts. In our interviews with agencies, it was generally not clear how the assumptions underlying forecasts reflected movements in real costs. There is a risk that the current approach to forecasting future costs leads to a sustained increase in costs in real terms that is not justified based on changes in input costs. However, this risk does not appear to have been realised in the forward three years, with indexed costs being lower or equal to underlying inflation in aggregate. We consider that improved consistency in forecasting costs will provide greater assurance over the reasonableness of River Murray Operations costs.

#### **Operating expenditure**

In the last three years, actual operating expenditure for the Joint Programs has increased by an average of 3% per annum in real terms to be \$60.8 million in 2018/19. We reviewed operating expenditure in aggregate, by service type and for activities that showed material variance or were material in absolute terms. We did not identify any historical operating expenditure that is unreasonable. In the future forecasts, SA Water

advised that one activity (River Operations from 2020/21 forward) had been incorrectly sustained at prior levels and should be decreased. Oversights of this nature are to be expected in outer years of forecasts.

We also analysed long-term trends in operating expenditure compared to the size of the River Murray Operations asset base, which showed that operating expenditure has declined in recent years as a proportion of the replacement cost of the asset base. This analysis suggested that there is no evidence of River Murray Operations Joint Program expenditure being unreasonably high. There is potential that the current level of operating expenditure is insufficient based on the size and age of the asset base. However, this should be justified by a better understanding of the condition and risk of the assets.

We consider that the actual and budgeted operating expenditure for the River Murray Operations Joint Programs is reasonable noting some minor inconsistencies for forward operating expenditure.

### **Capital expenditure**

The 2019/20 budget for Joint Programs capital expenditure is \$11.0 million. Capital expenditure for the Joint Programs is much lower than operating expenditure (average annual budgeted capital expenditure of \$12.0 million from 2016/17 to 2022/23 which is a fifth of average annual budgeted operating of \$62.9 million from 2016/17 to 2022/23). Capital expenditure includes both Investigation and Construction cost types with Investigation averaging 18% of all capital expenditure over the past and forward periods.

The capital expenditure program is comprised mainly of small to medium projects with a median value of \$70.7k and average value of \$280k. We consider that the Joint Program is more consistent and less lumpy than the expenditure programs typical of other water service providers across Australia.

We found that capital expenditure excluding that for the Environmental Works and Measures Program has materially declined in the last five years. From 2000/01 and up to and including 2012/13, capital expenditure averaged \$38.8 million. From 2013/14 to 2018/19, capital expenditure has been one third of this level at \$12.1 million per annum. This level of capital expenditure is 0.3% of the replacement cost of the asset base. While considering time-based measures of renewal of the capital base is inferior to condition and risk-based measures, this level of expenditure will replace the asset base in 360 years. The average useful life of the River Murray Operations assets is 115 years. The low level of expenditure in recent years raises concerns as to whether the asset base is being sustained. This suggests that it is very unlikely that the current level of capital expenditure is unreasonably high.

We reviewed a sample of ten capital expenditure projects to complement this review. This review of specific projects found:

- > No evidence of unreasonable expenditure
- > The need for projects was clear and backed by evidence
- > That options analysis, financial assessment and the level of project development varies between SCAs and is not consistent based on the project stage.

#### Summary

We conclude that the River Murray Operations Joint Programs costs are overall reasonable. There are some small anomalies in the forward budget but these are not material and under the budgeting and oversight arrangements for the Joint Programs they would likely not be actually incurred.

## 12 Recommendations

# 12.1 Recommendations for improved management of River Murray Operations costs

We make the following recommendations for potential improvements to development of budgets for and delivery of the Joint Programs to provide greater assurance over the reasonableness of proposed and incurred costs. In making these recommendations, we have been mindful of the operating context and have recognised that the MDBA, States and SCAs have autonomy to decide individually how to discharge their respective responsibilities relating to the Joint Programs.

- 1. We recommend that the Joint Programs budget process is streamlined and concluded in a timelier manner. Improved budget timeframes should enhance the ability of the SCAs to undertake procurement to deliver reasonable costs for activities. Further, the multi-year program management function over the Joint Program can be strengthened to provide improved certainty and management of funds carried over from one budget year to the next.
- 2. We recommend that the Terms of Reference of the Joint Programs Budget Committee and the River Murray Operations Committee with respect to the budget process and governance be reviewed to ensure that there is clarity in the roles and responsibilities of each and to avoid duplication
- 3. We recommend that a consistent approach to communicating asset risk across the asset portfolio is adopted. As there is differing approaches to assessing asset related risk across the portfolio, this may be a simple framework such as:
  - a. Value of assets by replacement cost at better than the desired level of risk
  - b. Value of assets by replacement cost worse than the desired level of risk
- 4. We recommend that a more consistent approach to forecasting future costs is agreed to and implemented for the Joint Programs. This may include:
  - A clear statement that forward forecasts are nominal (or otherwise)
  - An agreed starting point for inflating costs. This may be for example on a zero basis unless justified otherwise or using an assumed level of general cost inflation (such as recent levels of movement in the consumer price index).
  - A requirement for justification of movement in costs that are different to the agreed starting point. For example, known movements in enterprise bargaining agreements or known movements in power purchasing agreements.
  - A requirement for changes in scope to be documented in sufficient detail.
- 5. Given that the River Murray Operations assets are long-lived, we consider that there should be greater emphasis on long-term planning and we recommend that a long-term expenditure forecast covering all expenditure drivers is developed, covering all River Murray Operations assets.

### 12.2 Recommendations for ongoing benchmarking

We make the following recommendations regarding ongoing benchmarking of River Murray Operations costs:

- 6. We recommend that the Joint Venture partners consider the costs and benefits of undertaking benchmarking of operating expenditure by asset class as part of the annual budget process with a requirement on the SCA's asset managers to provide commentary on the reasons driving observed trends and outliers
- 7. We recommend that the SCAs and the MDBA consider the robustness and value of benchmarking the 'Support Services' and 'Administration/Mgmt' categories. Reporting on these metrics could be included in the annual budget process with a requirement that the SCAs justify their relative position for these measures.
- 8. We recommend that the SCAs and the MDBA consider the value of extending benchmarking to service delivery measures.

### 12.3 Recommendations for future cost reviews

We make the following recommendations regarding future reviews of the costs of River Murray Operations:

- 9. We recommend that the scope of future reviews of the reasonableness of River Murray Operations costs should be similar to this review and cover business processes, actual/budgeted expenditure and benchmarking.
- 10. We recommend that benchmarking similar to that undertaken for this review be undertaken for future reviews and provided to SCAs early in the review period to provide SCAs with time to review and comment on the drivers for observed trends and variances.

# APPENDIX



# LIST OF INFORMATION USED



### C Cardno

| Provided by | File name   |
|-------------|---|
| MDBA        | 11092019 - INSTRUMENT OF DELEGATION - CORE FINANCIAL ARRANGEMENTS - 2019.PDF                                |
| MDBA        | 11092019 - INSTRUMENT OF DELEGATION - WATER ACT AND MURRAY-DARLING BASIN AGREEMENT No 2 - 2019.PDF          |
| MDBA        | 16 - BOC 30 - Attachment A - River Murray Operations Asset Management Plan - 2014(2).PDF                    |
| MDBA        | 1a. Objectives-and-outcomes-for-river-operations-in-the-RMS-2019.pdf  |
| MDBA        | 2h. Operational Procedures Register.docx  |
| MDBA        | 2i. D18 23607 Draft Flood Management Manual - 2019 - Dartmouth Dam, Hume Dam and Yarrawonga Weir.DOCX       |
| MDBA        | 2j. D19 32349 River Murray System Emergency Action Plan Version 4.0 - FOR APPROVAL.DOCX                     |
| MDBA        | 2I. river-murray-system-losses-report-march-2019.pdf  |
| MDBA        | 2m. River-Murray-system-Annual-Operating-Outlook-2019-20.pdf  |
| MDBA        | 2p. Report - Independnt Review of River Operations 2018-19 - Final (STC) - 30 Sep 2019.docx                 |
| MDBA        | 2p. River Murray System Summary of River Operations 2018-19 - FINAL.pdf                                     |
| MDBA        | 360703-REPT-02-0C - Interim year indexation methodology.docx  |
| MDBA        | 360703-REPT-02-0C - Interim year indexation methodology.pdf   |
| MDBA        | 360703-REPT-MDBA Revaluations 2018-01-G.pdf   |
| MDBA        | 3608xx-REG - RFI Register 01-00 MDBA Tracking.XLSX  |
| MDBA        | 3608xx-REG - RFI Register_01-00 (002) - 3608-xx-RFI-050.xlsx  |
| MDBA        | 3608xx-REG - RFI Register_01-00 (002) - 3608-xx-RFI-054.xlsx  |
| MDBA        | 3608xx-REG - RFI Register_01-00 (002) - 3608-xx-RFI-058.xlsx  |
| MDBA        | 3608xx-REG - RFI Register_01-00 (002) - 3608-xx-RFI-060.xlsx  |
| MDBA        | 7. Operations Services - RM Division meeting presentation Mar 2019pptx                                      |
| MDBA        | Attachment B - 2019 2020 Budget notification - including carryover.xlsx                                     |
| MDBA        | Basin Officials Committee (BOC) 43 - 15 - Attachment A - Synergies.pdf                                      |
| MDBA        | BOC 44 - 13 - Attachment A - Final Report Synergies - Managing Cost Spikdocx                                |
| MDBA        | BOC 45 - 14 - Attachment A - Final Report Synergies - Managing Cost Spikdocx                                |
| MDBA        | BOC 67 - AI 15 - Amendment to AI 15.DOCX  |
| MDBA        | BOC 67 - AI 15 - Attachment A - Draft 2019 2020 Work Plan and Budget.PDF                                    |
| MDBA        | BOC 67 - AI 15 - Attachment B - Key Work Plan Elements for 2019 2020.PDF                                    |
| MDBA        | BOC 67 - AI 15 - Attachment C - Carry-over of unspent contractual commitments.PDF                           |
| MDBA        | BOC 67 - AI 15 - Joint Program work plan 2019 2020 to 2022 2023.PDF   |
| MDBA        | BOC Out of Session (OoS) 132 - Attachment C - Summary of Joint Program Pdocx                                |
| MDBA        | BOC Out of Session (OoS) 132 - Attachment D - Individual Programs Perforxlsx                                |
| MDBA        | BOC Out of Session (OoS) 132 - Q4 Performance Reports 2018 2019 - initidocx                                 |
| MDBA        | Copy of Attachment B - 2019 2020 Budget notification - including carryoxlsx                                 |
| MDBA        | D18 49814 MINCO Out of Session (OoS) 65 - Attachment B - Minco Q4 Performance Report 2017<br>18.pdf         |
| MDBA        | D18 5396 RMOC Terms of Reference (ToR) - FINAL(2).DOCX  |
| MDBA        | D19 29103 BOC 67 - Confirmed minutes - 16 May 2019.pdf  |
| MDBA        | D19 35526 MinCo 24 - AI 15 - Attachment A- Review of Murray-Darling Basin Joint Governance Arrangements.pdf |
| MDBA        | Divisional Structure - Future of the MDBA.pdf   |

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| Agency      | File name  |
| MDBA        | Independent River Operations Review Group (IRORG) Review of River Operations 2017 2018.pdf |
| MDBA        | Joint Programs 101.docx  |
| MDBA        | Joint Programs Budget Committee (JPBC) 0_ Final Report Synergies - Managdocx               |
| MDBA        | MDBA Asset Management Improvements Scoping Study - GHD - 23 May 2016 - Fpdf                |
| MDBA        | MDBA Risk Management Framework and Policy 2017-2019 (May 2018).DOCX                        |
| MDBA        | Minute - Valuation Policy Update.docx  |
| MDBA        | Objectives-and-outcomes-for-river-operations-in-the-RMS-2019.pdf                           |
| MDBA        | Operations Services strategic investment program and budget - 2017 18 to 20 21.DOCX        |
| MDBA        | PPE Register - June 2019 - TechOne Report.xlsx   |
| MDBA        | River Murray Operations - Infrastructure Assets Register - 30 June 2019.XLSB               |
| MDBA        | River Murray Operations Committee (RMOC) 21 - 17 April 2019 - Confirmed minutes.PDF        |
| MDBA        | RM Office Budgets - historical and forecast - for upload.xlsx                              |
| MDBA        | RMO Accounting Policy - Asset Recognition.docx   |
| MDBA        | RMO Accounting Policy - Existence and Completeness.docx                                    |
| MDBA        | RMO Accounting Policy - Impairment of Assets.docx  |
| MDBA        | RMO Change in Infrast 2009 - 2018 Cardno V3.xlsx   |
| MDBA        | RMOC 21 - AI 02 - Attachment A - Draft Agenda.PDF  |
| MDBA        | RMOC 21 - AI 06.2 - 2019 2020 Joint Programs annual work plan and budget.PDF               |
| MDBA        | RMOC 21 - AI 06.2 - Attachment A - Draft Joint Program Budget.PDF                          |
| MDBA        | RMOC 23 - AI 06.4 - Quarter 4 River Murray Operations (RMO) performance report.PDF         |
| MDBA        | RMOC 23 - AI 06.4- Attachment A - Quarter 4 Performance Report.PDF                         |
| MDBA        | Role legislative responsibilities of BOC committees - Draft.docx                           |
| MDBA        | Role legislative responsibilities of BOC committees.docx                                   |
| MDBA        | S_MDB_MAIN_STRUCTURES_DRAFT.kmz  |
| MDBA        | SAW - 2020-21 budget development - Example.xlsm  |
| MDBA        | Superseded   |
| MDBA        | TechOne Detailed IAR Report - 30 June 2019.XLSX  |
| MDBA        | TechOne Easements Register 2019.xlsx   |
| MDBA        | TechOne Land Register 2019.xlsx  |
| WaterNSW    | FW MDBA - maintain capacity MDBA Program SECUNCLASSIFIED.msg                               |
| WaterNSW    | FY19 & FY20 MCP List.xlsx  |
| WaterNSW    | Hume Dam - Pre ACAC Penstock Inspection 1 & 3.PDF  |
| WaterNSW    | MCP Multi Criterion Analysis - MASTERXLSX  |
| WaterNSW    | RE_ Cardno Cost Review - Activity 11891SEC_UNCLASSIFIEDmsg                                 |
| WaterNSW    | RE_Lock 10 Bank stabilisation _SEC_UNCLASSIFIEDmsg   |
| WaterNSW    | Revised Cost Estimate 3 October 2018.xls   |
| WaterNSW    | Rural MCP FY18-FY21 - Validation Study Murray Valley Structures Aureconpdf                 |
| WaterNSW    | South Region Outage Plan 2019.xlsx   |
| WaterNSW    | Wentworth Embankment Stabilisation - client review.pdf                                     |
| WaterNSW    | Wentworth Lock 10 - Riverbank Stabiliation Works - Preliminary Business Case.pdf           |

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|-------------|---|
| WaterNSW    | Wentworth Riverbank Stabilisation Project - Final Business Case.msg                         |
| DPIE (NSW)  | Attachment A - Joint Venture River Murray Operations - Governance Structure.pdf             |
| DPIE (NSW)  | Attachment AA - Lake Victoria Annual Compliance Report 2015-16 DRAFT.pdf                    |
| DPIE (NSW)  | Attachment AB - Lake Victoria Annual Compliance Report 2017.pdf                             |
| DPIE (NSW)  | Attachment AC - Lake Victoria Annual Compliance Report 2018.pdf                             |
| DPIE (NSW)  | Attachment AD - Mallee Cliffs O&M Manual v1.6 20140718.pdf                                  |
| DPIE (NSW)  | Attachment AE - Buronga O&M Manual v1.2 140829.pdf  |
| DPIE (NSW)  | Attachment AF - Upper Darling O&M Manual v1.3 20140617.pdf                                  |
| DPIE (NSW)  | Attachment AG - River Works Upper Murray Annual Report 2016-17.pdf                          |
| DPIE (NSW)  | Attachment AH - River Works Upper Murray Annual Report 2017-18.pdf                          |
| DPIE (NSW)  | Attachment AI - River Works Upper Murray Annual Report 2018-19.pdf                          |
| DPIE (NSW)  | Attachment AJ - Buronga SIS 2016-17 Annual Performance Report - FINAL DRAFT.pdf             |
| DPIE (NSW)  | Attachment AK - Buronga SIS 2017-18 Annual Performance Report - FINAL.pdf                   |
| DPIE (NSW)  | Attachment AL - Mallee Cliffs SIS 2016-17 Annual Performance Report - FINAL DRAFT.pdf       |
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| DPIE (NSW)  | Attachment AP - NSW DPIE Joint Venture Budget Development - Process Map.pdf                 |
| DPIE (NSW)  | Attachment AQ - River Murray - Hume to Yarrawonga Works Summary - 2016-17.pdf               |
| DPIE (NSW)  | Attachment AR - River Murray - Hume to Yarrawonga Works Summary - 2017-18.pdf               |
| DPIE (NSW)  | Attachment AS - River Murray - Hume to Yarrawonga Works Summary - 2018-19.pdf               |
| DPIE (NSW)  | Attachment B - NSW River Murray Joint Venture Program Team.docx.pdf                         |
| DPIE (NSW)  | Attachment C - Lands and Water 2023 Strategy.pdf  |
| DPIE (NSW)  | Attachment D - 2019-20 to 2022-23 Joint Venture Work Plan and Budget.pdf                    |
| DPIE (NSW)  | Attachment E - MDBA JV Asset Management Policy 2014.pdf                                     |
| DPIE (NSW)  | Attachment F - Draft DOI Water Strategic Plan.pdf   |
| DPIE (NSW)  | Attachment G - NSW Dol Water - Asset Management Strategy - 2019-2020.DOCX                   |
| DPIE (NSW)  | Attachment H - NSW Dol Water - Asset Management Plan - 2019-2020.DOCX                       |
| DPIE (NSW)  | Attachment I - GHD Asset Management Improvement Project - Draft Rev A LoS.XLSX              |
| DPIE (NSW)  | Attachment J - GHD Asset Management Improvement Project - Activity 3 Report - AMO & LoS.PDF |
| DPIE (NSW)  | Attachment K - GHD AMIP - Activity 3.XLSX   |
| DPIE (NSW)  | Attachment L - Asset Agreement for River Murray Operations Assets (Joint Venture) - 12pdf   |
| DPIE (NSW)  | Attachment M - Enterprise Risk Management Framework.pdf                                     |
| DPIE (NSW)  | Attachment N - PMO Smartsheets - Project Submission Form.docx                               |
| DPIE (NSW)  | Attachment O - Project Brief Template.docx  |
| DPIE (NSW)  | Attachment P - Project Plan Template Large and Intermediate Projects.DOCX                   |
| DPIE (NSW)  | Attachment Q - E2E - DPI Budget Process Framework FINAL.pdf                                 |
| DPIE (NSW)  | Attachment R - Department of Industry - Procurement Policy Framework - July 2015.pdf        |
| DPIE (NSW)  | Attachment S - TPP18-06 NSW Government Business Case Guidelines.pdf                         |
| DPIE (NSW)  | Attachment T - CPT3 Long Business Case Template.DOCX  |
| DPIE (NSW)  | Attachment U - TC12-19 Submission of Business Cases 2012-10-11.pdf                          |

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| DPIE (NSW)  | Attachment V - Procurement Management Plan.PDF   |
| DPIE (NSW)  | Attachment W - SIS Rolling Program Workplan.xlsx   |
| DPIE (NSW)  | Attachment X - Department of Industry - Budget Development Process Map August 2018.pdf   |
| DPIE (NSW)  | Attachment Y - APPROVED Brief Joint Venture Program and Basin Salinity Management Structure Realignment.pdf  |
| DPIE (NSW)  | Attachment Z - DPIE Joint Programs Q4 Report.pdf   |
| GMW         | 20190606 Dartmouth Governor Test Schedule & 7 June 19.xlsx   |
| GMW         | 20190906_A3598550_CORPORATE PLAN 2019-20.pdf   |
| GMW         | ANNUAL REPORT - 2018.19 - FINAL (A3675403).pdf   |
| GMW         | ASSET CERTIFICATE OF COMPLETION - DARTMOUTH SOLAR POWER SYSTEM 2017<br>(A2992471).pdf  |
| GMW         | ASSET MANAGEMENT POLICY (A3377848).pdf   |
| GMW         | Audit & Risk Committee Meeting 3 - 16 August 2018 - Item 6.1A AMAF INTERNAL AUDIT.DOCX (A3345989).pdf  |
| GMW         | BARR-TUTCHEWOP DRAIN STRUCTURES - INVESTIGATION REPORT FOR MDBA (A2889845).pdf   |
| GMW         | Copy of CHART OF ACCOUNTS LISTING (A501718).xls  |
| GMW         | Copy of DAM ASSETS - CONSEQUENCE OF FAILURE - SUMMARY TABLE OF SCORING (A1217887).pdf  |
| GMW         | CORPORATE_BENCHMARKING_PRESENTATION_TO_EXECUTIVE_26_MAY_2015<br>(A3687092).pdf   |
| GMW         | COSTING MANUAL (A3687086).pdf  |
| GMW         | DAM ASSETS - ASSET CLASS MANAGEMENT PLAN - CRANES, HOISTS AND WINCHES - APRIL 2015 (A2497020).pdf  |
| GMW         | DAM ASSETS - ASSET CLASS MANAGEMENT PLAN - DAM INSTRUMENTATION -<br>EMBANKMENTS AND SPILLWAYS - APRIL 2015 (A1384863).pdf  |
| GMW         | DAM ASSETS - DAMS - DECISION & PRIORITY MANUAL (A1584310).pdf  |
| GMW         | DAM ASSETS - STORAGE - ASSET CLASS - CONSEQUENCE OF FAILURE SCORING -<br>RATIONALE GUIDELINES (A1865155).pdf   |
| GMW         | DAM SAFETY EMERGENCY PLAN & FLOOD INCIDENT MANAGEMENT PLAN - DESKTOP<br>EXERCISE - YARRAWONGA WEIR - 10 MAY 2017 (A2740885).pdf                                    |
| GMW         | DAM SAFETY MANAGEMENT - KEY PERFORMANCE INDICATORS (A2885663).pdf  |
| GMW         | DAM SAFETY MANAGEMENT SYSTEM - FLOWCHART (A2235643).vsd  |
| GMW         | DAMS - TECHNICAL STANDARD - GMW BASE FORMAT COMMISSIONING DOCUMENT (A1066796).pdf  |
| GMW         | Dams PRA Dartmouth Dambreak & Consequences Report Final - Not including App A - Inundation Maps (A3681980).pdf   |
| GMW         | DPS protection checks may 2109.pdf   |
| GMW         | EMISSIONS REDUCTION PLEDGE 2018-25- 5-YEAR AVERAGE BASELINE FINAL NARRATIVE TO DELWP (A2831243).pdf  |
| GMW         | Fact Sheet - 3D Printing Elec-Mech 2018 (A3357170).pdf   |
| GMW         | FINANCE GUIDE TO INVESTMENT APPRAISAL (A1898265).pdf   |
| GMW         | GMW ASSET CLASS - CONDITION ASSESSMENT CRITERIA AND SCORING GUIDELINES (A2155112).pdf  |
| GMW         | GMW ASSET MANAGEMENT STRATEGY - 26 FEBRUARY 2014 - INCORPORATING ASSET<br>MANAGEMENT IMPROVEMENT PROGRAMME (10 INDIVIDUAL WORK PACKAGES-PROJECTS)<br>(A980452).pdf |

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| GMW         | GMW MDBA historic expenditure.docx   |
| GMW         | GMW MDBA PERFORMANCE TARGETS - REPORT - 2018-19 (A3624065).pdf   |
| GMW         | GMW Org structure.pdf  |
| GMW         | GMW organisation structure for MDBA assets.pdf   |
| GMW         | GMW Service Standards as applicable to MDBA.pdf  |
| GMW         | GMW-ASSETS- ASSET CLASS MANAGEMENT PLAN - ACCESS ROADS, TRACKS AND CAR PARKS (A1990864).pdf  |
| GMW         | GOULBURN-MURRAY WATER REPORT ON VICTORIAN WATER INDUSTRY BENCHMARKING<br>OF DAM SAFETY MANAGEMENT BY AUSTRALIAN DAMS & WATER CONSULTANTS PTY LTD -<br>APRIL 2015 (A2360914).pdf  |
| GMW         | GUIDE TO GETTING A PROJECT APPROVED (A1283623).pdf   |
| GMW         | HATTAH LAKES - PUMPING STATION - RELIABILITY CENTERED MAINTENANCE STRATEGY (A2732805).pdf  |
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| GMW         | HATTAH LAKES PUMPING STATION -STRATEGIC MAINTENANCE PLAN - PHASE 1 FINAL REPORT (A3361009).pdf   |
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| GMW         | HUME AND DARTMOUTH DAMS - REFINEMENT OF EXTREME RAINFALL AND FLOOD<br>CHARACTERISTICS FOR HUME AND DARTMOUTH DAM CATCHMENTS - FINAL REPORT BY<br>JACOBS, MAY 2015 (A3089643).pdf |
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| GMW         | MDBA Corporate Overhead Allocation FY2017 - FY2019 v4 (A3687079).xlsx  |
| GMW         | MDBA Dams PRA Strategy Report Final.pdf  |
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| GMW         | MDBA Efficiency Review - GMW additional information.msg  |
| GMW         | MDBA EFFICIENCY REVIEW - RFI Update 24 Oct 2019.xlsx   |
| GMW         | MDBA Electricity costs analysis 2019 Efficiency review (A3681550).xlsx   |
| GMW         | MDBA Projects - Capex presentation to Cardno - 30 Oct 2019.ppt   |
| GMW         | Mildura Lock - Proposed Channel Desilting - Technical Report (A3404838).pdf  |
| GMW         | MILDURA WEIR TRESTLEWAY REPAIRS 2011 TO 2015 FACT SHEET (A2800028).pdf   |
| GMW         | Mildura-Merbein SIS - Disposal Pipeline Condition Assessment (A3686709).pdf  |
| GMW         | MILDURA-MERBEIN SIS - POST CONSTRUCTION SCHEME PERFORMANCE REVIEW - APRIL 2018 (A3044105).pdf  |
| GMW         | Model comments PL.xlsx   |
| GMW         | Monthly Report on Dam Safety Surveillance August 2019 (A3659125) (2).pdf   |
| GMW         | Oil sample 1 Mar 2019.pdf  |
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| GMW         | OM MANUAL - YARRAWONGA WEIR - VOLUME 1 - 2018 (2530046-V10 PDF WITH APPENDICES) (A3031593).pdf   |
| GMW         | OM MANUAL - YARRAWONGA WEIR - VOLUME 2 (A1684524).pdf  |
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| GMW         | PROCUREMENT FRAMEWORK (A2810299).pdf  |
| GMW         | PROJECT MANAGEMENT GOVERNANCE FRAMEWORK (A1340202).pdf  |
| GMW         | Risk Management Policy and Procedure (A3395664).pdf   |
| GMW         | Staff Delegations Manual - Contents & Introduction (A3687073).pdf   |
| GMW         | TORRUMBARRY WEIR - CONTROL SYSTEM UPGRADE - MDBA CONSTRUCTION REPORT (A3309933).pdf   |
| GMW         | TORRUMBARRY WEIR - ELECTRICAL CONTROL SYSTEM UPGRADE - STAGE 2 (DETAILED DESIGN) PAC PROJECT BUSINESS CASE.DOCX                     |
| GMW         | TORRUMBARRY WEIR - ELECTRICAL CONTROL SYSTEM UPGRADE PROJECT - STAGE 3 (IMPLEMENTATION) - PAC PROJECT BUSINESS CASE (A2830802).DOCX |
| GMW         | Videoconferencing Phase 2 Business Case (A3125232).pdf  |
| GMW         | YARRAWONGA - FLOOD INCIDENT MANAGEMENT PLAN - 2016 - PDF VERSION (A3094358).pdf   |
| GMW         | YARRAWONGA WEIR - DAM SAFETY EMERGENCY PLAN - DSEP (A1772994).pdf   |
| GMW         | YARRAWONGA WEIR - REPORT ON INTERMEDIATE DAM SAFETY INSPECTION - 2018- 2019-<br>FEBRUARY 2019 (A3445298).pdf                        |
| SA Water    | 001-flochart.pdf  |
| SA Water    | 002-MDBA MOU - Signed by MRM.pdf  |
| SA Water    | 05-tauwichere1208.pdf   |
| SA Water    | 08-goolwa1805.pdf   |
| SA Water    | Asset Class - Condition Assessment Criteria And Scoring Guidelines.pdf  |
| SA Water    | Asset Condition and Matrix Project.xlsm   |
| SA Water    | Asset Condition and Matrix Project.xlsm   |
| SA Water    | Asset Management Advisory Panel (AMAP) No. 56 - Minutes - 7 March 2019 Ddocx  |
| SA Water    | Asset Management Plan - 2014.docx   |
| SA Water    | Assets Management Advisory Panel (AMAP) No. 57 - Draft Agenda - 20 Junedocx   |
| SA Water    | Attachment A - MDBA River Management (RM) Budget 2018 2019 Services Reqdocx   |
| SA Water    | Attachment B River Murray Operations 2018 2019 Budget Notification .xlsx  |
| SA Water    | Attachment B River Murray Operations 2018 2019 Budget Notification.xlsx   |
| SA Water    | Attachment C - Specific River Murray Operations (RMO) Assets Major Projedocx  |
| SA Water    | Business Case - Lake Vic Outlet Regulator Remedial Works (Stage 1) - Augpdf   |
| SA Water    | L.B16915.159.MidOctober2019.docx  |
| SA Water    | Lead Asset Management Plan.docx   |
| SA Water    | Lead Asset Management Plan.docx   |
| SA Water    | Letter to Mark Gobbie - Budget notification 2017 2018.pdf   |

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| Provided by | File name   |
|-------------|---|
| SA Water    | MD004554 - Attachment B - Updated River Murray Systems Assets Budget forxlsx                    |
| SA Water    | MD004554 - Letter to Mark Gobbie - SA Water - Budget notification 2018pdf                       |
| SA Water    | MDBA River Murray Operations Infrastructure Asset Register 2014-2015 - Cardno FINAL.XLSX        |
| SA Water    | Redacted_FINAL_R-1546_00-1 Murray_Mouth_Dredging.pdf  |
| SA Water    | Risk Management Methodology.pdf   |
| SA Water    | RMO Asset Costing Guideline.docx  |
| SA Water    | RMO Asset Life Assessments Guideline.docx   |
| SA Water    | RMO Dam Safety Inspection Guideline.docx  |
| SA Water    | RMO Fleet guideline - Approved For Use.pdf  |
| SA Water    | RMO Fleet guideline.docx  |
| SA Water    | RMO Floating Plant AMP.docx   |
| SA Water    | RMO Housing Guideline.docx  |
| SA Water    | RMO IAR- MASTER v4.1 adjustments post Valuation for 30 June 2018.xlsb                           |
| SA Water    | RMO Lead in piles and boat mooring guideline.docx   |
| SA Water    | RMO LOCK AND WEIR VESSEL Guideline - Approved For Use.pdf                                       |
| SA Water    | RMO LOCK CHAMBER REFURBISHMENT GUIDELINE.docx   |
| SA Water    | RMO Lubrication Guide .docx   |
| SA Water    | RMO Navigation Pass Asset Guideline.docx  |
| SA Water    | RMO Stone Dumping AMP.docx  |
| SA Water    | RMO Stoplog Condition Asssement Guideline.docx  |
| SA Water    | RMO Underwater Diving Inspection Guideline.docx   |
| SA Water    | RMO-ALL-0000-Lock and Weir Operating Principles.docx  |
| SA Water    | RMO-ALL-0000-Lock and Weir Operating Principles.docx  |
| SA Water    | RMOC 23 - AI 05.5 - Att A - Kato Review of Life - Final Report.pdf                              |
| SA Water    | RMOC 23 - AI 05.5 - Kato Replacement Strategy for Locks and Weirs.pdf                           |
| SA Water    | SA INVOICE 0119.pdf   |
| SA Water    | SA INVOICE 0219.pdf   |
| SA Water    | SA INVOICE 0319.pdf   |
| SA Water    | SA INVOICE 0419.pdf   |
| SA Water    | SA INVOICE 0519.pdf   |
| SA Water    | SA INVOICE 0619.pdf   |
| SA Water    | SA INVOICE 0719.pdf   |
| SA Water    | SA INVOICE 0819.pdf   |
| SA Water    | SA INVOICE 0919.pdf   |
| SA Water    | SA INVOICE 1019.pdf   |
| SA Water    | SA INVOICE 1119.pdf   |
| SA Water    | SA Water - Asset Condition and Martix Project - aae Stage 1 General Report - September 2017.pdf |
| SA Water    | SA Water Asset Management Policy.msg  |
| SA Water    | SA Water site based importance ranking for asset class plan risk assessment.xlsx                |
| SA Water    | SA Water site based importance ranking for asset class plan risk assessment.xlsx                |
| SA Water    | Weekly Report 18.pdf  |
## C Cardno

| Provided by | File name   |
|-------------|---|
| SA Water    | Weekly Report 19.pdf  |
| SA Water    | Weekly Report 20.pdf  |
| SA Water    | Weekly Report V119.pdf  |
| SA Water    | Weekly Report V120.pdf  |
| SA Water    | Weekly Report V122.pdf  |
| SA Water    | Weekly Report V124.pdf  |
| SA Water    | Weekly Report V125.pdf  |
| SA Water    | Weekly Report V126.pdf  |
| SA Water    | Weekly Report V127.pdf  |
| SA Water    | Weekly Report V128.pdf  |
| SA Water    | Weekly Report V129.pdf  |
| DEW (SA)    | DEW RMO Programs Org Structure FINAL.pptx                       |
| DEW (SA)    | MinCo22_11_AttB_MinCo_ServiceLevelAgreemt_Jun2018.docx          |
| DEW (SA)    | RM GW Salinity Modelling and Advice 2019 - ProjectPlan vOct.pdf |
| DEW (SA)    | SA MDB Monitoring Project Plan.pdf                              |
| DEW (SA)    | Signed MoU - SA - V2 - 22 September 2017.pdf                    |
| DEW (SA)    | SIS Monitoring Project Plan.pdf                                 |

# APPENDIX



# CAPITAL EXPENDITURE PROJECT REVIEWS



## Dartmouth Dam – Crest Trench Detailed Design, Approvals and Construction

#### PROJECT DETAILS

| Activity Description     | Crest Trench Detailed Design, Approvals and Construction |               |                          |
|--------------------------|--|---------------|--------------------------|
| Activity Number          | 18007  | Project Stage | Concept Design           |
| Responsible Agency       | Goulburn-Murray Water                                    |               |                          |
| Agreement Classification | Construction   | Service Type  | Water Storage and Supply |

#### **PROJECT DESCRIPTION**

The scope of this project relates to the replacement of the existing filters within the upper downstream portion of Dartmouth Dam with filters designed to meet current standards in order to provide increased protection for piping through the dam embankment. The scope of this project also includes raising the existing clay core to the crest of the dam.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | -       | -       | -       |
| Actual | -       | -       | -       |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is the renewal of a key asset component in order to reduce associated risks in line with the guidelines published by the Australian National Committee on Large Dams.

#### SOLUTIONS DEVELOPMENT

As part of the most recent Portfolio Risk Assessment undertaken for Dartmouth Dam (October 2019), risks were assessed for 13 failure modes. Two failure modes (F1 and F2) were subsequently identified as the key risks, with the works under this project aimed at addressing the economic and loss-to-life risks posed by the impact of piping through the dam embankment initiated by flooding (F2). While overtopping due to flooding (F1) poses a higher economic risk and a slightly higher loss-to-life risk, Goulburn-Murray Water is of the opinion that, based on value-for-money in terms of the risk reduction achieved, addressing F2 is preferred. Goulburn-Murray Water advised that works to address F1 will be undertaken as a second stage, but the timing of this work is likely to be in the long term based on the broader priorities across the River Murray System. Concept designs were prepared for works to address both failure modes.

The locations of F1 (overtopping due to flooding), F2 (piping over the top of the core) and a related failure mode, F3 (piping through the core), are illustrated in the figure below.



#### COST ASSESSMENT

This project is at the functional design stage, where an allowance for 40 - 50% contingencies has been made. As part of informing the cost estimate for this project, Goulburn-Murray Water utilised unit rates from its recent dam upgrade and obtained commercial estimates for sourcing the key filter material from local commercial quarries.

#### DELIVERY

As the bulk of the expenditure budgeted for this project has been scheduled for 2022/23, Goulburn-Murray Water intends to review the consequence assessment undertaken in the recent Portfolio Risk Assessment for Dartmouth Dam before proceeding with the planned work. Goulburn-Murray Water also advised that it is their understanding the outcomes and recommendations from all Portfolio Risk Assessments for dams within the River Murray System will be issued to the River Murray Operations Committee, Basin Officials Committee and Ministerial Council in order to inform decisions on inter-site prioritisation. Based on the results of the review of the consequence assessment, and any inter-site prioritisation that is undertaken across the River Murray Operations dam portfolio, the timing of the crest work at Dartmouth Dam will need to be confirmed.

#### CONCLUSION ON REASONABLENESS

Given the use of a detailed risk assessment to establish the driver for this project and inform the failure mode selected for rectification, we consider that the project need and scope of works are reasonable. We also consider that the cost estimation approach is reasonable for a project at the functional design stage. However, while not unreasonable, we note that there is less certainty in the timing of outyear expenditure (2020/21 to 2022/23).

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

MDBA Projects - Capex presentation to Cardno - 30 Oct 2019.ppt

## Hume – Yarrawonga – Whole of Reach Construction

#### **PROJECT DETAILS**

| Activity Description     | Whole of Reach Construction  |              |                             |
|--------------------------|--|--------------|-----------------------------|
| Activity Number          | 13332   Project Stage   Ongoing Program                            |              | Ongoing Program             |
| Responsible Agency       | Department of Planning, Industry and Environment (New South Wales) |              |                             |
| Agreement Classification | Construction   | Service Type | River Channel<br>Management |

#### PROJECT DESCRIPTION

This project is part of an ongoing program of works along the Hume – Yarrawonga reaches of the River Murray. Examples of river works include river bank stabilisation through the installation of rock beaching and riparian vegetation. River works projects have been ongoing since the 1960s.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | -       | -       | -       |
| Actual | -       | -       | -       |

#### \* Notes:

1. Past period expenditure was recorded against activity 13230 - 'Whole of Reach - Planned'

2. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is remediation to maintain the condition, stability and function of river channel assets.

#### SOLUTIONS DEVELOPMENT

There are 68 waterways within the 16 reaches between Hume and Yarrawonga along the River Murray. The waterways are managed through an overarching Waterway Management Plan and management plans for each individual reach. Regular boat inspections are undertaken along the Hume – Yarrawonga reaches in order to capture asset and river bank condition and identify sites requiring remediation.

The Department of Planning, Industry and Environment (New South Wales) has developed Prioritisation Tool guidelines for the prioritisation of waterways requiring remediation. The guidelines specify weightings for approximately 20 prioritisation criteria. In conjunction with landholder inquiries, landholder requests and historical site performance, the guidelines are used to prioritise the sites identified through the boat inspections. Sites are categorised into three levels of priority (high, medium or low priority), with the results visualised through a spatial heat map, which is available through the agency's River Assets and Monitoring Database.

The options to address issues at the prioritised sites are informed by stakeholder engagement, such as engagement with adjacent public or private landholders or stakeholder advisory groups.

#### COST ASSESSMENT

The Department of Planning, Industry and Environment (New South Wales) has engaged Soil Conservation Services, a fully commercial business of the New South Wales Government, to complete this program. As such, the cost of undertaking this program is informed by Soil Conservation Services and reviewed by the Department of Planning, Industry and Environment (New South Wales). Annual real escalation for the three outyears of the future expenditure period ranges from 0.29% to 2.33%. However, the budgets for these outyears will be reviewed annually.

#### DELIVERY

Soil Conservation Services perform their own procurement, using sub-contractors where necessary. The Department of Planning, Industry and Environment (New South Wales) reviews the effectiveness of historical investment by comparing the work done at each site with the level of erosion experienced since.

#### CONCLUSION ON REASONABLENESS

This is a thorough process of works identification and prioritisation and we are satisfied the costs are reasonable.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

# Mundoo Barrages – Upgrade Concrete Deck Tauwitchere and Ewe Island – Construction

#### **PROJECT DETAILS**

| Activity Description     | Upgrade Concrete Deck Tauwitchere and Ewe Island – Construction |              |                          |
|--------------------------|---|--------------|--------------------------|
| Activity Number          | 11098     Project Stage     Ongoing Program                     |              |                          |
| Responsible Agency       | SA Water  |              |                          |
| Agreement Classification | Construction  | Service Type | Water Storage and Supply |

#### **PROJECT DESCRIPTION**

This project is part of an ongoing program to replace concrete deck units at the Tauwitchere and Ewe Island Barrages. The original replacement program commenced approximately a decade ago.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | 0.94    | 0.34    | 0.37    |
| Actual | 1.16    | 0.97    | 0.42    |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is the condition-based renewal of a key asset component. Annual inspections of the Tauwitchere and Ewe Island Barrages by SA Water's Dam Surveillance Unit have identified cracking and spalling of concrete deck units, along with corrosion of the associated reinforcement. Additionally, the concrete deck units at Tauwitchere and Ewe Island Barrages were originally installed in the 1940s, resulting in original design loads now being exceeded.

#### SOLUTIONS DEVELOPMENT

Like-for-like replacements will be used for the concrete deck units requiring replacement.

#### COST ASSESSMENT

As part of the existing replacement program, an ongoing arrangement is in place with a contractor for the supply of deck units. The total forward expenditure proposed by SA Water for this project was based on an estimated cost to complete the replacement program, staged over the current year (2019/20) and three outyears (2020/21 to 2022/23). This, in turn, was based on the supply contract and an allowance of approximately 15% for the installation of the deck units. However, we note that the forward expenditure reflected in the 2019/20 Annual Work Plan is less than that proposed by SA Water for 2019/20, with this reduction offset by increased expenditure in the outyears.

#### DELIVERY

While deck units are supplied by a contractor, installation of the deck units is undertaken by SA Water. The installation of deck units is constrained to times of low tides and low levels in Lake Alexandrina, with boat access and waders required to undertake work. The amount of work undertaken annually is, therefore, limited to the capacity of internal work crews, the capacity of SA Water to store deck units and the time of the year. These limitations are reflected in the forward budget for this project. As inspections

are undertaken annually, SA Water is satisfied that the staged delivery of works will not adversely affect the risk profile of the assets.

#### CONCLUSION ON REASONABLENESS

Given that this project is part of an ongoing replacement program that is informed by regular inspections, we consider that the project need, scope of works and overall cost estimates are reasonable. However, we note that the increased expenditure in the later outyears may exceed the internal capacity to deliver the remainder of the replacement program.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

05-tauwichere1208.pdf

## Lake Victoria – Outlet Regulator Upgrade – Stage 2

#### PROJECT DETAILS

| Activity Description                  | Outlet Regulator Upgrade – Stage 2 |               |                          |
|---------------------------------------|------------------------------------|---------------|--------------------------|
| Activity Number                       | 12768                              | Project Stage | Concept Design           |
| Responsible Agency                    | SA Water                           |               |                          |
| Agreement Classification Construction |                                    | Service Type  | Water Storage and Supply |

#### **PROJECT DESCRIPTION**

The scope of this project is the remediation of the wing walls, strengthening of the apron slab and works to address downstream erosion at the Lake Victoria Outlet Regulator. This project follows Stage 1 of the Lake Victoria Outlet Regulator Upgrade, which comprised the strengthening of the central abutment section, gate refurbishment, and the installation of a filter and drainage zone directly behind the abutment and downstream wing walls.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | 0.32    | 3.64    | 0.09    |
| Actual | 0.02    | 0.00    | 0.03    |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is the remediation of key asset components in order to reduce associated risks to acceptable levels. The 2007 Portfolio Risk Assessment for Lake Victoria concluded that the societal risks at this site were unacceptable, with the major contributors to these risks being failure modes associated with the Outlet Regulator.

#### SOLUTIONS DEVELOPMENT

For Stages 1 and 2 of the Lake Victoria Outlet Regulator Upgrade, two options were initially identified by URS (2010) – remedial works and replacement of the entire regulator. The net present values of each option were compared, and the remedial works option was selected on the basis of a lower net present value and a lower detrimental impact on cultural heritage. A preliminary design cost estimate was subsequently prepared by GHD (2013).

#### COST ASSESSMENT

The forward expenditure in the 2019/20 Annual Work Plan was based on the original URS cost estimate (2010) and was not indexed to a real 2019/20 price base. However, the GHD (2013) cost estimate forecasted a total construction cost of approximately quadruple the current budget for 2020/21, including design, supervision, project management and 30% contingencies. The significant difference in cost estimates is due to the uncertainty in climatic conditions and associated constructability, with the GHD cost estimate representing the construction of a coffer dam in wet conditions.

#### DELIVERY

This project is at the concept design stage. The concept design and associated refinement of the cost estimate are scheduled to be completed by the end of 2019/20. Seeing as the concept design will not be completed until this date, and expenditure for this project has previously been underspent, we consider that it is unlikely the bulk of the expenditure planned for this project will be realised in 2021/22 as scheduled.

#### CONCLUSION ON REASONABLENESS

Given that this project is informed by a Portfolio Risk Assessment and several concept designs, we consider that the project need is reasonable. However, we note that significant refinement of the concept design and associated cost estimate is required in order to provide budget certainty for the three outyears (2020/21 to 2022/23).

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

Business Case - Lake Vic Outlet Regulator Remedial Works (Stage 1) - Aug....pdf

### Lock and Weir 10 – Wentworth – Downstream River Bank Stabilisation

#### **PROJECT DETAILS**

| Activity Description                  | Downstream River Bank Stabilisation |              |                     |
|---------------------------------------|-------------------------------------|--------------|---------------------|
| Activity Number                       | 13507Project StageFinal B           |              | Final Business Case |
| Responsible Agency                    | WaterNSW                            |              |                     |
| Agreement Classification Construction |                                     | Service Type | Support Services    |

#### **PROJECT DESCRIPTION**

The scope of this project is the remediation and stabilisation of 145 metres of eroded river bank sections at Lock and Weir 10 – Wentworth through the placement of rock protection.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | -       | -       | -       |
| Actual | -       | -       | 0.00    |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is remediation and renewal to reduce risks to the safety of WaterNSW staff and the public, reduce sediment loads due to erosion, maintain function of the lock chamber and reduce potential future rectification costs. The erosion at this location resulted in the failure of a gabion wall in 2016 and, from 2011 to 2016, the continued relocation of fencing for a nearby heritage-listed homestead. The justification for this project is supported by a Preliminary Business Case (2018), a site assessment report prepared by Shirley Consulting Engineers (2012), and concept design drawings and an accompanying cost estimate prepared by Aurecon (2018).

#### SOLUTIONS DEVELOPMENT

Based on the benefits identified for this project, a cost comparison and multi-criteria analysis were performed to distinguish between the 'do nothing' option and remediation and stabilisation option. The results of this comparison and analysis were summarised in the Preliminary Business Case (2018). Concept design cost estimates were subsequently prepared by Aurecon (2018) for six specific remediation and stabilisation options, including a rock buttress option (the preferred option) and a gabion wall and rock berm option.

#### COST ASSESSMENT

The Preliminary Business Case was based on the original concept design cost estimate prepared in 2012, which included planning, design, construction, internal costs and a project-level contingency. However, the Aurecon (2018) concept design cost estimate forecasted, for construction alone, a cost of more than double the 2012 estimate, including 15% contingencies but excluding WaterNSW costs, approvals and professional fees.

#### DELIVERY

This project is at the Final Business Case stage, with WaterNSW in the process of developing tender documentation for the design and construction of the preferred option. Project status reports are used internally to document any cost variances, schedule variances and risks associated with the delivery of this project.

#### CONCLUSION ON REASONABLENESS

Given that this project is informed by a site assessment and supported by a high-level risk assessment, we consider that the project need is reasonable. However, with the majority of expenditure budgeted for 2019/20 and 2020/21, we note that increased certainty is required around the cost estimate. Given this uncertainty and the stage of the project, a contingency of 15% also appears to be low.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

Wentworth Lock 10 - Riverbank Stabiliation Works - Preliminary Business Case.pdf

Revised Cost Estimate 3 October 2018.xls

Wentworth Embankment Stabilisation - client review.pdf

Wentworth Riverbank Stabilisation Project - Final Business Case.msg

RE\_Lock 10 Bank stabilisation \_SEC\_UNCLASSIFIED\_.msg

## Lock and Weir 26 - Torrumbarry – Upgrade Telemetry

#### PROJECT DETAILS

| Activity Description     | Upgrade Telemetry  |              |                          |
|--------------------------|--|--------------|--------------------------|
| Activity Number          | 12154     Project Stage     Construction and<br>Commissioning Complete |              |                          |
| Responsible Agency       | Goulburn-Murray Water  |              |                          |
| Agreement Classification | Construction   | Service Type | Water Storage and Supply |

#### PROJECT DESCRIPTION

The scope of this project is the replacement, upgrade and installation of telemetry and associated electrical and building assets at Lock and Weir 26 – Torrumbarry.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | 1.22    | 0.71    | 0.00    |
| Actual | 1.07    | 0.50    | 0.01    |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The main driver for this project is renewal to meet current standards and practice, including the recommendations made by the 2010 Victorian Auditor-General Office audit into the Security of Information and Communication Technology Infrastructure. The original electrical control system at Lock and Weir 26 was commissioned in 1998, with some technologies no longer supported or able to serviced with spare parts. The age and obsolescence of the electrical control system posed a risk to the efficient and effective operation of this site.

#### SOLUTIONS DEVELOPMENT

Three options were considered at the concept design stage of the project, comprising a 'do nothing' option, partial upgrade of the electrical control system (manual control only) and a full upgrade of the electrical control system. The 'do nothing' option was subsequently excluded due to an unacceptable risk to lock and weir operations. The partial upgrade option was also excluded due to a resulting loss in site operability and cascading impacts on the operation of the Gunbower and Barmah-Millewa Environmental Works and Measures Programs, which are serviced by the same operations staff.

#### COST ASSESSMENT

We note that, in our 2014 review, the total budget for this project was \$1.33 million (in a real 2014/15 price base) at the concept design stage and based on actual costs for a similar project at Yarrawonga Weir. However, this budget was later revised by Goulburn-Murray Water to a total of \$1.84 million (nominal) following the completion of the detailed design stage. Goulburn-Murray Water advised that this increase was largely due to increases in scope and complexity since the concept design stage of the project. In particular, this related to the complexity of the system control design, implementation and commissioning processes, which were further developed through the detailed design.

#### DELIVERY

For the three major components of this project (design of the electrical control system, supply of electrical cubicles and site installation works, and system integration works), quotes were sought from a minimum of three experienced service providers. The risks to project delivery were documented in the Business Cases for each stage of the project.

#### CONCLUSION ON REASONABLENESS

Given the risk posed by the age and obsolescence of the electrical control system, we consider that the project need is reasonable.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

TORRUMBARRY WEIR - ELECTRICAL CONTROL SYSTEM UPGRADE - STAGE 2 (DETAILED DESIGN) PAC PROJECT BUSINESS CASE.DOCX

TORRUMBARRY WEIR - ELECTRICAL CONTROL SYSTEM UPGRADE PROJECT - STAGE 3 (IMPLEMENTATION) - PAC PROJECT BUSINESS CASE (A2830802).DOCX

TORRUMBARRY WEIR - CONTROL SYSTEM UPGRADE - MDBA CONSTRUCTION REPORT (A3309933).pdf

MDBA Efficiency Review - GMW additional information.msg

### Water Data – Asset Infrastructure/Instrument Maintenance and Replacement

#### **PROJECT DETAILS**

| Activity Description     | Asset Infrastructure/Instrument Maintenance and Replacement |               |                          |
|--------------------------|---|---------------|--------------------------|
| Activity Number          | 13348   | Project Stage | Ongoing Program          |
| Responsible Agency       | Department for Environment and Water (South Australia)      |               |                          |
| Agreement Classification | Construction  | Service Type  | Water Storage and Supply |

#### **PROJECT DESCRIPTION**

This project is part of an ongoing program to renew monitoring assets and supporting structures across 71 monitoring sites.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | -       | -       | -       |
| Actual | -       | -       | -       |

#### \* Notes:

1. This activity was previously combined with activity 13308 – 'DEWNR Gauging South Australian Murray Darling Basin Previous'. As such, past period expenditure was recorded against a separate activity.

2. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is the renewal of monitoring assets and supporting structures to maintain service levels for the provision of monitoring data. Service levels are outlined in the Memorandum of Understanding between the MDBA and Minister for Water and the River Murray, South Australia (2017), which contains targets for data availability and fault rectification times. Different targets are set for each of the three types of sites: hydrometric data – key stations, secondary stations and flood gauging.

#### SOLUTIONS DEVELOPMENT

The need for renewal is identified through inspections, which are opportunistically conducted as part of asset operation and recorded in Hydstra, data returned by the monitoring instruments, and the Department for Environment and Water (South Australia)'s understanding of typical useful lives.

#### COST ASSESSMENT

Cost estimates are based on the Department for Environment and Water (South Australia)'s recent procurement of infrastructure development and renewal programs.

#### DELIVERY

Boat access is required for most sites. Where activities are water-based, the Department for Environment and Water (South Australia)'s work health and safety policies require two staff to be present.

#### CONCLUSION ON REASONABLENESS

The costs are assessed as reasonable and the increased budget for 2020/21 and 2021/22 required to address end-of-life assets. Alternate data collection methods may be available in the future, but the transition would be significant and would not negate the need for the works as budgeted.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

SA MDB Monitoring Project Plan.pdf

### Lake Victoria – Replace Truck Mack Granite S602-AQR

#### **PROJECT DETAILS**

| Activity Description     | Replace Truck Mack Granite S602-AQR |              |                  |
|--------------------------|-------------------------------------|--------------|------------------|
| Activity Number          | 13374   Project Stage   Planning    |              |                  |
| Responsible Agency       | SA Water                            |              |                  |
| Agreement Classification | Construction                        | Service Type | Support Services |

#### **PROJECT DESCRIPTION**

The scope of this project is the changeover of two Mack Granite trucks to Mack Trident trucks.

#### PROJECT EXPENDITURE PROFILE (real 2019/20 millions)\*

|        | 2016/17 | 2017/18 | 2018/19 |
|--------|---------|---------|---------|
| Budget | -       | -       | -       |
| Actual | -       | -       | -       |

#### \* Notes:

1. In order to avoid unduly influencing market expectations of the value of these projects, project expenditure is only shown for the past period (2016/17 to 2018/19).

#### DRIVERS AND STANDARDS OF SERVICE

The driver for this project is to increase the cost efficiency of operating the Mack Granite truck fleet. In operating their fleet, SA Water found that it was performing significant maintenance on its Mack Granite trucks, at an approximate cost of \$30,000 to \$50,000 per year in addition to the cost of downtime.

#### SOLUTIONS DEVELOPMENT

The net present values of the 'business as usual' (ongoing maintenance) option, 'replace early' option and 'changeover to Mack Trident' options were compared and documented in a memorandum. The identification of the 'changeover to Mack Trident' option was based on discussions with Mack Australia, Vetech (SA Water's heavy vehicle provider) and a number of quarry and haulage operators, who confirmed the increased suitability of Mack Trident trucks for use in civil construction when compared to Mack Granite trucks. The options comparison demonstrated that it was more cost efficient for SA Water to changeover its Mack Granite trucks than to continue with its current levels of maintenance. In addition, the changeover to Mack Trident trucks provides alignment with the truck used at Lock and Weir 6 – Murtho.

#### COST ASSESSMENT

SA Water compared the net present value of each identified option based on estimates of maintenance and refurbishment costs. The cost estimates were also informed by advice from Mack Australia.

#### DELIVERY

The parts required for the changeover of Mack Granite trucks to Mack Trident trucks will be sourced from SA Water's existing heavy vehicle provider.

#### **CONCLUSION ON REASONABLENESS**

Given that this project is relatively low in value and informed by a net present value comparison, we consider that the project need, scope of works and cost estimation approach are reasonable.

#### **KEY DOCUMENTS REVIEWED**

3608xx-REG - RFI Register\_01-00 (002) - 3608-xx-RFI-050.xlsx

Copy of Attachment B - 2019 2020 Budget notification - including carryo....xlsx

Memorandum from Tim Kruger to Garry Fyfe, 'Budget Modification - Lake Victoria', 15 October 2014

# APPENDIX



# SPATIAL DISTRIBUTION OF 2019/20 BUDGET



# Cardno<sup>®</sup>



Figure C-1 Overview of total budgeted 2019/20 expenditure at major water storages only

Source: Screenshot from Tableau with site labels added

# C Cardno



Figure C-2 Overview of total budgeted 2019/20 expenditure at locks, weirs and barrages only

Source: Screenshot from Tableau with site labels added



Figure C-3 Overview of total budgeted 2019/20 expenditure at salt interception schemes only

Source: Screenshot from Tableau with site labels added



 Figure C-4
 Overview of total budgeted 2019/20 expenditure at Environmental Works and Measures Program sites only

 Source:
 Screenshot from Tableau with site labels added