

# Sydney Desalination Plant - Expenditure Review

Supplementary Report

IPART

25 May 2017

Contains *sensitive* information



## Notice

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## Glossary

Term	Definition
AIR	Annual Information Return
CARMS	Critical Asset Renewal Management System
CEO	Chief Executive Officer
CMA	Competition and Markets Authority, UK
CIP	Clean in Place
DBOM	Design, Build, Operate and Maintain
DWPS	Drinking Water Pumping Station
EfAM	Efficiency Adjustment Mechanism
E&W	England and Wales (water companies of)
FTE	Full Time Equivalent
GL	Giga (10 <sup>9</sup> ) litre
IPART	Independent Pricing and Regulatory Tribunal
MWP	Metropolitan Water Plan
ML/d	Megalitres per Day
NSW	New South Wales
NSW Health	NSW Department of Health
O&M	Operation and Maintenance
RAB	Regulatory Asset Base
RO	Reverse Osmosis
SDP	Sydney Desalination Plant
SIR	Special Information Return
SMBS	Sodium metabisulphite
SWC	Sydney Water Corporation
TDS	Total Dissolved Solids
WaterNSW	Water New South Wales which is the entity formed through the amalgamation of the Sydney Catchment Authority and State Water

# Executive Summary

This report presents the findings of our review of Sydney Desalination Plant Pty Ltd (SDP) representations on the capital and operating expenditure elements of the IPART Draft Report. IPART issued its Draft Determination and report in March 2017. SDP submitted a document in response to the Draft Report in April 2017. We were subsequently asked by IPART to review this submission and report our findings to the Tribunal. This report has been prepared in accordance with the Terms of Reference<sup>1</sup> set out in the contract between Atkins/Cardno and IPART dated 24 April 2017.

The scope of our review focused on those areas of expenditure challenged by SDP. This comprised future operating expenditure related to corporate costs, maintenance costs and related efficiencies applied to its October 2016 submission. The areas of capital expenditure related to replacement of permeate hoses and the provision of membrane test equipment. The energy requirements for the Restart Mode were also challenged

We reviewed the SDP Submission<sup>2</sup> insofar as it impacted on operating and capital expenditure and other areas within our Terms of Reference. We issued an Information Request to SDP to provide additional documents in support of its Submission. These were provided in a timely manner. We discussed our findings with the IPART Secretariat for presentation to the Tribunal on 17 May 2017. This Supplementary Report sets out our findings of the review. This report should be read in parallel with our Final Report on the Efficiency Review<sup>3</sup>.

## Operating Modes

The Metropolitan Water Plan was published in March and after our Final Report. The Plan has a material impact on the operating frequency of the desalination plant. The new rules require the SDP to restart when total reservoir water storage falls below 60% compared with the previous 70% rule. The SDP has an option to run the plant for a minimum of 14 months, whether or not the water storage has recovered to 70%, or shutdown when storage is at 70%.

The new MWP rules have a significant impact on the plant operation as the frequency of use is likely to be reduced. Given this low likelihood of operation, SDP should assess the likely frequency of operation based on the MWP modelling and, with IPART, consider the costs and benefits of placing the plant into a 'deeper' water security mode with greatly reduced or no operator presence. This could involve, for example, the removal and secure storage of pump impellers, shafts, and motors, variable speed drives and other critical assets. Different membrane storage methods could also be considered given that the importance of the condition of the existing RO membranes is reduced as new membranes are funded for restart. While we understand this may be too late to address in the Final Determination, the option should be considered in some detail over the next few months. These issues should be considered as part of a strategic management plan which takes a medium and long term view.

## Impact of our Review

There is a marginal increase in corporate expenditure compared with the IPART Draft Report because of double-counting of some efficiencies although other proposed increases have not been accepted. There is no change to adjustments for labour efficiency, replacement of end caps permeate connectors and hoses, and the membrane skid test unit. We have confirmed our original estimate of energy requirements for restart although the potable water volume assumed during restart has been reduced from the original assumption. There is no change to the assumed pipeline weighted asset life.

## Operating Expenditure

We summarise our findings and where appropriate present our view on efficient expenditure for the future price path. There are no changes to the findings on current price path operating expenditure from our Final Report.

### Future Operating Expenditure – Corporate

We reviewed our proposed efficiency adjustments in the context of the SDP April 2017 Submission. We concluded that

- There is some double counting of efficiencies applied to re-set the base expenditure at a ceiling of \$8m per annum and the 0.5% catch-up efficiency. We have therefore accepted the deletion of the

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<sup>1</sup> Scope of Work as included in Appendix A

<sup>2</sup> Revised Regulatory Proposal to IPART, SDP April 2017

<sup>3</sup> Sydney Desalination Plant Expenditure Review, Atkins Cardno February 2017

0.5% pa cumulative efficiency. The 0.25% continuing cumulative efficiency is retained and has been accepted by SDP;

- We have taken an overview of efficient expenditure over the period and have not specifically identified any inclusions or exclusions. These are areas where the management should make decisions based on its own expenditure priorities within a ceiling. We have not accepted the SDP proposed expenditure increases but reviewed our decision on the base year expenditure with a modest increase in the base year by \$0.15m/a;
- We have assumed there are no material changes in operating in Water Security mode from the current to the future price path;
- It is for the business to decide on its budget expenditure based on its own priorities within the expenditure ceiling;
- Expenditure related to the preparation of the next IPART submission has not been identified separately but included in the increase to the base annual operating expenditure. We consider with an ongoing business that these costs should be considered as business as usual. We have not carried out any re-profiling as this is a matter for the business.

We have also excluded energy related costs as these are addressed separately and outside our Terms of Reference. This includes '*market charges and ancillary services*' and '*energy forecasting*'. The cost of Business Interruption insurance is not included; this is not part of our Terms of Reference.

SDP originally requested total operating expenditure of \$41.98m which reduced to \$41.21m in its April 2017 submission. Our view is that efficient operating expenditure should be \$40.05m. Details of the adjustments are shown in Section 3.2.

#### **Future Operating Expenditure – Operation and Maintenance**

In our Final Report we commented that annual labour and other costs were forecast to continue at an average \$5.2m per annum, similar to the average in the current price path. There are no evident efficiency targets in the current price path to reflect improved productivity and new technology. The current staffing level comprises an average 17 FTEs<sup>4</sup> in process and maintenance roles. Further information was provided by SDP comprising an organisation chart identifying staff by position and showing the separation of the maintenance team from the rebuild services team.

We have not changed our view on the scope for efficiencies for the staff numbers in place to maintain the desalination plant. We believe that with the management resources SDP now have in place and the likelihood of a prolonged Water Security Mode, there is an opportunity to set and achieve realistic efficiency targets. The operator has flexibility to share staff across its operations. We detail our findings in Section 3.2.

#### **Restart Mode**

There are no changes to operating expenditure for the Restart Mode. SDP proposed an additional \$0.15m per annum operating expenditure for the Membrane Test Unit. We concluded that due to the change in the MWP Operating Rules, use of the kit is most unlikely until the subsequent price path period. We have therefore not accepted this proposed increase in expenditure.

We reviewed the power requirements for the restart activities and concluded that our original estimate was soundly based. This estimate includes for all power requirements for the RO plant.

During the eight month start up period, we consider that SDP should be allowed to export all the water that meets the export specification quality. For the first 10 GL actually exported the variable electricity cost could be deducted; this provides an incentive for the SDP to exceed the 10 GL production target during the 8 month start up period. However, the actual delivery of 10 GL is not certain as there are risks such as delays in the arrival of membranes to site or other issues could delay water production meeting the export specification during the eight month start up. Therefore, the variable charge power for 10 GL should not be deducted in advance from the 71000 MWh restart allowance. An ex-post adjustment should be made, where appropriate, based on the actual volume delivered.

This 10ML production target should be an incentive for SDP to produce potable water during the Restart Mode.

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<sup>4</sup> Desalination plant monthly reports (prior to the Tornado), Veolia

### Full Operation Mode

The only change to the operating expenditure in the Full Operation Mode is for the adjustments to corporate expenditure explained in the Water Security Model. There is a marginal increase in operating expenditure for this mode compared with water Security due to additional staff costs to manage water production and sales. This was unchanged from the final report. There is no change to our estimate of electricity usage. We present our detailed findings in Section 3.6.

### Transition to Water Security Shutdown

There are no changes to the proposed expenditure for transition to Water Security Mode.

### Capital Expenditure

We have focused our review on specific issues identified by SDP in section 6.1 of its submission where it disagrees with the Draft Report and proposes the inclusion of

- replacement of permeate hoses at an estimated \$[Redacted Information] which we considered should be replaced under warranty;
- a membrane test kit at an estimated \$1m.

SDP has accepted the capitalisation of membrane costs and periodic maintenance although it considers that this treatment is not consistent with Australian Accounting Standards.

### Permeate hoses

We still consider that it is inappropriate for this cost to be passed on to customers for the following reasons:

- Our experience elsewhere suggests that it is not normal to require such extensive and expensive replacement of permeate hoses and associated items so early in the life of a plant. This supports the view that this should be treated as a defect, deficiency or fault rather than be paid for by customers.
- The Durability Plan sets out specified *minimum* design lives<sup>5</sup> not an *average* life of subsets of assets within each category, so this element should have been designed to last at least 25 years. Even if the 25 year design life were an average for this asset class, we would not expect so many items to need replacing at such an early stage.
- The preferred material for pressure vessel connectors in the Durability Plan was [Redacted Information]. If these materials had been used instead of flexible hoses it is unlikely that large scale replacement of the hose component would have been required at this stage.

We have therefore made no change to our previous recommendation for this item.

### Membrane Skid Test Unit

SDP has proposed to use a membrane skid test unit while the plant is in the current Water Security Mode. We do not support funding of the purchase and operating of the membrane test kit in the current water security mode. This is because the test unit would only be needed is and when the new membranes are installed after a period of full operation.

The RO membranes of the existing plant will be 13 years old at the end of the determination period. In response to the SDP October 2016 proposals, we have recommended to IPART that having the funding available for full membrane replacement of the originally installed plant RO membranes on plant restart is prudent, a membrane test kit is therefore not needed in this Water Security Mode to assess membrane replacement numbers. Our view is that the Test Unit is unlikely to be required in the next price path. If required this \$1.0m expenditure can be reviewed for prudence and efficiency in an ex-post assessment.

### Water Security Mode

Total capital expenditure for the Water Security Mode is unchanged from the Final Report.

### Restart Mode

We explain our findings on the Membrane Skid Test Unit above and in Section 4.3.

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<sup>5</sup> see section 4.1.4.1 and Table 4-1 in the Durability Plan for example



### **Full Operation Mode**

Total capital expenditure for the Water Security Mode is unchanged from the Final Report. Detailed expenditure is shown in section 4.6.

### **Pipeline Asset Life**

The asset life is used to estimate a reasonable return for the rate of consumption of an asset over a period. There is an assumption that a desalination plant or a technical equivalent will be on the site in perpetuity to meet its obligations under the MWP.

There are uncertainties in the estimated life of pipeline assets but there is no technical justification to change the current 140 year asset life for land-based pipeline assets. Should the second stage of the desalination be built requiring an increase to the pipeline full capacity then the asset life assumption should be reviewed.

We have reviewed the reports provided by SDP and conclude that the land-based pipeline asset life should be unchanged at 140 years. A lower 100 year asset life for the length of main in twin under-sea pipelines, some 50% of total length, is appropriate. We conclude that a weighted life of 120 years should be used to take account the relative lengths of pipeline on land and under the sea.

# 1. Introduction

## 1.1. Terms of Reference

In October 2016, the Independent Pricing Tribunal of New South Wales (IPART) appointed the Atkins/Cardno consortium to carry out a strategic management and expenditure review of Sydney Desalination Plant Pty Ltd.'s (SDP) operations. The purpose of this review is to inform the Tribunal's decision on prices for the new determination period which applies from 1 July 2017 to 30 June 2022.

IPART issued its Draft Determination and Report in March 2017. SDP submitted a document in response to the Draft Report in April 2017. We were subsequently asked by IPART to review this submission and report our findings to the Tribunal. This report has been prepared in accordance with the Terms of Reference set out in the contract between Atkins/Cardno and IPART dated 24 April 2017. These are reproduced in Appendix A. The review addresses the SDP responses to the IPART decisions on capital and operating expenditure, operating modes and energy use.

## 1.2. SDP Submission to IPART

SDP submitted a report to IPART dated 18 April 2017 making representations on a range of issues in the IPART Draft Report. Our Terms of Reference asked us to review those areas of operating and capital expenditure which were challenged by SDP. There related to

- Water Security
  - Corporate costs –inclusions and exclusions;
  - Corporate catch up and continuing efficiencies;
  - Efficiency as applied to labour costs;
- Restart
  - Energy use;
- Full Operation Mode
  - Corporate costs –inclusions and exclusions;
- Capital Expenditure
  - Periodic Maintenance: adjustment for endcaps, end connectors and permeate hoses;
- Asset Lives
  - Pipeline asset life assumptions.

Our brief excludes the review of energy costs and additional expenditure proposed for energy trading and insurance.

## 1.3. Review Process

We, the Atkins/Cardno team, commenced our review on 21 April 2017. Following a review of the SDP submission, we identified the key areas of contention for review. Further information was provided by SDP following our request. We revisited all the main areas of contention. We discussed our findings with the IPART Secretariat and presented our findings to the Tribunal on 17 May 2017. We submitted this Supplementary Report on 17 May 2017 setting our findings on the SDP submission. This report should be read in parallel with our Final Report on the Efficiency Review<sup>6</sup>.

Atkins/Cardno would like to take the opportunity to thank SDP for making its staff available for the interview days and for the professional manner in which the organisation responded to our challenges and requests for further detail.

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<sup>6</sup> Sydney Desalination Expenditure Review, Atkins Cardno February 2017

## 2. Operating Modes

### 2.1. Background

The proposal to simplify the operating modes has been accepted by SDP. There are therefore four modes of operation.

- Water Security Mode;
- First and Subsequent Restart Modes;
- Full Operation Mode; and
- Transition to Water Security Shutdown.

The desalination plant is currently in Water Security Mode<sup>7</sup>. Given the current reservoir storage level 95.1% at 9 May 2017, we consider the probability that the plant will be required to restart before June 2020 to be low. By the end of the next price path period this would mean that it will be ten years since the last potable water was produced. We have therefore taken the Water Security Mode as the base case in reviewing efficient expenditure. We also include efficient expenditure for the first and subsequent Restart Modes, Full Operation Mode and Transition to Water Security Shutdown.

We found that the Operating Licence and MWP operating rules set out clear defined processes to be followed for changing between modes. However, SDP has yet to establish and agree a written protocol to determine the timing of a restart or shutdown including liaison with SWC and statutory bodies who have a role in the process.

In Water Security Mode, the cost driver is the licence requirement in A2 (a) (i) to maintain the plant in accordance with good industry practice. Expenditure should be limited to essential maintenance activities and any periodic expenditure such as membrane replacement and periodic maintenance need to be clearly justified in terms of scope, risk and time.

### 2.2. Metropolitan Water Plan Operating Rules

In Section 3 of the Terms of Reference, we are asked to provide recommendations on SDP's operating modes taking into account its drought response role as directed by the Metropolitan Water Plan and SDP's WICA licence conditions.

The MWP rules were updated in March 2017<sup>8</sup> after the submission of our Report. The plan has a material impact on the operating frequency of the desalination plant. The new rules require the SDP to restart when total reservoir water storage falls below 60% compared with the previous 70% rule. The SDP has an option to run the plant for a minimum of 14 months, whether or not the water storage has recovered to 70%, or shutdown when storage is at 70%.

The MWP rules are predominant in setting the mode of operation or shutdown rather than any need to maintain a higher level of shutdown to respond to any emergencies as defined in the Water Supply Agreement with SWC. In this latter case, the SDP response is to use best endeavours with arrangements for cost recovery to be agreed on an ex-post basis as the scope, duration and volume delivered are likely to be uncertain.

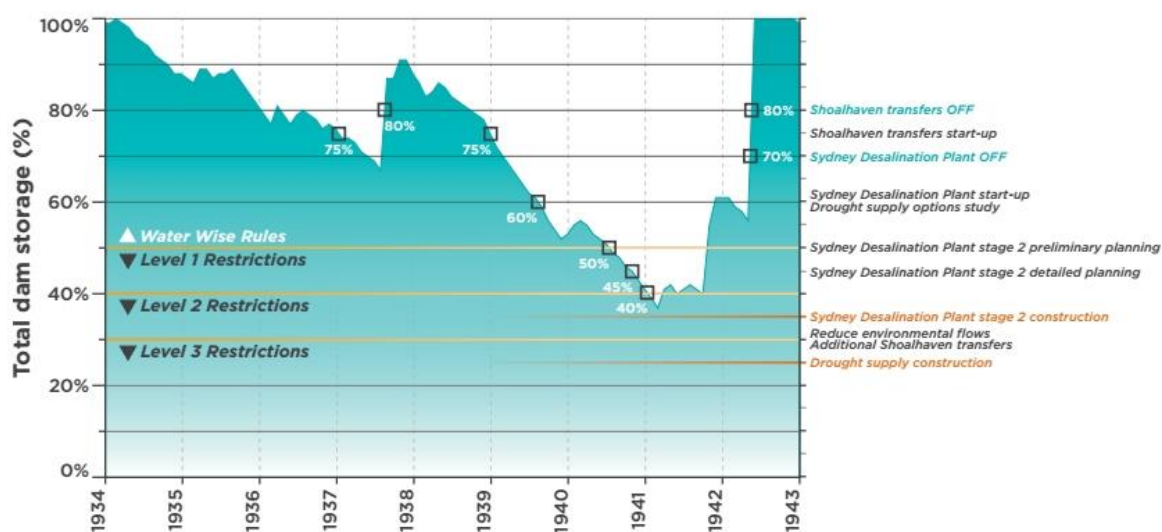
The new MWP rules have a significant impact on the plant operation as the frequency of use is likely to be less. The MWP shows the modelled performance of the 2017 portfolio against the worst drought on record which is the period 1941 to 1943. The triggers for all drought response measures including SDP operation are shown. This is shown in the figure on the next page which is from Figure 7 of the Metropolitan Water Plan. This shows the sequence for deploying the measures in the drought response strategy to the worst drought on record; that is over the last 100 years.

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<sup>7</sup> Water Security Mode is when the desalination plant is not in operation.

<sup>8</sup> Metropolitan Water Plan, Metropolitan Water, Government of NSW 2017

**Figure 2-1 Modelled performance of 2017 portfolio against worst drought on record**



Source: MWP 2017

With the new MWP trigger levels, the likelihood of a plant restart within the next ten years is low. The likely frequency should be confirmed through modelling using the MWP hydrological models. There will be a recurring large operating cost to maintain the plant for the likelihood of an eight-month restart. We therefore question whether a ‘deep’ shutdown can be achieved that protects plant and does not need the current level of process engineers, technicians and maintenance crews. This ‘deep’ shutdown would also include disassembly of pumps and motors and storing the components securely following manufacturers’ advice. In addition, the RO pressure vessels with de-ionised water and seal; the existing membranes would be replaced on any subsequent restart. Additional triggers should be considered for the hire of an operator and reactivate the plant in advance of the 60% trigger.

Up until now, the risk of a need for a restart for drought protection, value of existing membranes and high termination costs justify keeping the operating team on site. However, in the medium term, to 2027 the instrumentation and control systems are likely to be out of date and the variable speed drive internals may need to be replaced. The change in operating rules also question whether the form of the operator contract is appropriate.

Given this low likelihood of operation, SDP should assess the likely frequency of operation based on the MWP modelling and, with IPART, consider the costs and benefits of placing the plant into a ‘deeper’ water security mode, with greatly reduced or no operator presence. This could involve, for example, the removal and secure storage of pump impellers, shafts, and motors bearings, variable speed drives and other critical assets. Different membrane storage methods could also be considered given that the importance of the condition of the existing RO membranes is reduced as new membranes are funded for restart. While we understand this may be too late to address in the Final Determination, the option should be considered in some detail over the next few months. These issues should be considered as part of a strategic management plan which takes a medium and long term view.

## 3. Operating Expenditure

### 3.1. Scope of Review

We have focused our further review on specific issues identified by SDP in sections 5.1.1 and 5.2.1 of its submission related to future price path expenditure where it disagrees with the draft determination and proposes

- inclusion of a number of recurrent corporate costs such as professional fees associated with legal advice that the draft decision removed from its base year costs;
- inclusion of additional corporate expenditure associated with upfront and ongoing costs of undertaking a prudent form of energy trading;
- inclusion of additional corporate expenditure associated with membrane testing
- an ongoing efficiency target of 0.25% per annum on both labour and corporate costs rather than the 0.75% per annum efficiencies applied to corporate costs
- an ongoing efficiency target of 0.25% applied to operational labour compared with the 2.5% per annum assumed in the draft determination.

All these cost adjustments relate to the Water Security Mode. We comment in Section 3.2 below.

For the Restart Mode, the SDP has, in Section 5.1.3 of its submission, challenged the energy use for restart prior to producing potable water for sale to Sydney Water. We comment on this in Section 3.3 below.

In the Full Operation Modes, SDP has accepted the proposals for reductions in chemical costs, energy use and the cost of operating the drinking water pumping station. Adjustment to corporate costs are proposed which are the same as for the Water Security Mode. SDP also identifies additional Business Interruption insurance costs arising from changes to the abatement mechanism; the review of these costs is not within our brief. We comment in Section 3.4 below.

### 3.2. Water Security Mode – Corporate

Nearly all the proposed corporate expenditure is independent of the mode of operation. We discuss the efficient level of corporate expenditure for the Water Security Mode. We then discuss the changes to the level of expenditure in the Full Operation mode.

#### SDP Submission

In the SDP submission to the IPART Draft Report, it proposed several adjustments to operating expenditure

- an efficiency adjustment of 0.25% per annum cumulative compared with 0.75% per annum in the draft determination.
- an additional **[\$[Redacted Information]]** above the allowance in the draft determination to allow for a higher cost of preparing for the next price review;
- an additional **[\$[Redacted Information]]** to include for the cost of tax reviews in two years of the future price path.
- Business (BI) insurance costs of **[\$[Redacted Information]]** not in the original submission; total **[\$[Redacted Information]]**.

The net impact of these changes was to increase proposed expenditure by \$2.69m. Details of these changes were provided in supporting spreadsheets.

We have not addressed the Business (BI) insurance costs as this is outside our brief. In addition we have not made any allowance for the cost of energy trading referred to in the SDP April Submission. We have also excluded energy related costs as these are addressed separately and outside our Terms of Reference. This includes 'market charges and ancillary services' and 'energy forecasting'.

#### Our View

In our Final Report, the methodology assumed a utility operating in an open market where there would be cost pressures applied to limit costs compared with other similar agencies. Taking the average annual expenditure over the current price path provides a realistic basis for future costs given there are no changes in outputs and

performance over the future price path. While there are cost pressures for additional activities driving cost increases we consider that these should be absorbed through re-prioritising activities. We would also expect that efficiencies would be gained through the period from improved procurement, business practices and innovation. This is common across all utilities in the public and private sectors.

We also concluded that the base year should be \$8m per annum. This amount was also the average expenditure over the current price path and over 40% above the 2012 Determination.

SDP produced its forecast from a bottom-up estimate of future expenditure across its corporate functions and we have not seen any evidence of internal challenge to these forecasts. A greater part of corporate expenditure is procured from professional providers and we considered there was scope for efficiencies here. Given that the Water Security Mode assumes no change in outputs or performance over the future period, there is no justification for increasing the corporate expenditure above the base year costs at the 2016-2017 price base.

We made one exception for a one-off expenditure related to the preparation of the Price Review submission in 2021.

We reviewed our proposed efficiency adjustments in the context of the SDP April 2017 Submission. We concluded that

- There is some double counting of efficiencies applied to re-set the base expenditure of \$8m per annum and the 0.5% catch-up efficiency. We have therefore accepted the deletion of the 0.5% pa cumulative efficiency. The 0.25% continuing cumulative efficiency is retained and has been accepted by SDP;
- We should take an overview of efficient expenditure over the period and not specifically identify any inclusions or exclusions which are areas where the management should make decisions based on its own expenditure priorities. We have therefore removed any specific adjustments for the next periodic review costs but increased the base year expenditure to \$8.15m/a;
- We have assumed there are no material changes in operating in Water Security mode from the current to the future price path;
- It is for the business to decide on its budget expenditure based on its own priorities within the expenditure ceiling;
- Expenditure related to the preparation of the next IPART submission has not been identified separately but included in the increase to the base annual operating expenditure. We consider with an ongoing business that these costs should be considered as business as usual. We have not carried out any re-profiling as this is a matter for the business.

### **Impact**

There is a marginal (1.2%) increase in corporate operating expenditure from \$39.58m to \$40.05m but still below the \$41.98m originally proposed by SDP. The efficient corporate expenditure and how this related to the SDP October 2016 and April 2017 submissions is shown in Table 3-1.



**Table 3-1 Efficient Corporate Expenditure**

<b>SDP OPERATING EXPENDITURE: FUTURE PRICE PATH: EFFICIENT CORPORATE EXPENDITURE</b>						
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022	Total
<b>SDP October 2016 Submission</b>						
SDP October 2016						41.98
<b>SDP April 2017 Submission</b>						
Atkins Efficient Corporate	7.94	7.88	7.82	8.00	7.94	
Adjust efficiency						
Add for IPART submission						
Add for tax review						
Total SDP April 2017						41.21
<b>Atkins May 2017 Efficient expenditure</b>						
Atkins Final Report and DD	7.94	7.88	7.82	8.00	7.94	
Remove one-off adjustments						
Exclude electricity related costs						
Increase Base year						
Adjust Efficiency						
Efficient Corporate	8.05	8.03	8.01	7.99	7.97	40.05

### 3.3. Water Security Mode – Operations and Maintenance

#### SDP Submission

In the SDP submission to the IPART Draft Report, it proposed several adjustments to operations and maintenance expenditure.

- an ongoing efficiency target of 0.25% applied to operational labour compared with the 2.5% per annum assumed in the draft determination;
- the inclusion of operating expenditure for the membrane test kit.

There were also proposals to include energy trading expenditure and some adjustments to proposed electricity costs. These are outside our scope of works.

#### Our View

In our Final Report, we commented that annual labour and other costs were forecast to continue at an average \$[Redacted Information] per annum, similar to the average in the current price path. There are no evident efficiency targets in the current price path to reflect improved productivity and new technology. The current staffing level comprises an average [Redacted Information] in process and maintenance roles.

Further information was provided by SDP comprising an organisation chart identifying staff by position and showing the separation of the maintenance team from the rebuild services team. The staff numbers at June 2014, 2015 and 2016 were provided; these showed permanent staff, job share staff and part time employees.

With the continuing Water Security Mode, likely to extend through the future price path, and excluding the impact of the tornado damage, we consider there is scope for efficiencies to be made over time through improved productivity and innovation. There is no change to the findings presented in the Final Report.

We believe that with the management resources SDP now have in place and the likelihood of a prolonged Water Security Mode, there is an opportunity to set and achieve realistic efficiency targets through greater productivity and the application of innovation and new technology. We consider that, in the medium term, with a continuing Water Security Mode, there is potential for efficiency savings.

We assume a modest reduction in staffing levels from [Redacted Information] to about [Redacted Information] FTEs tapered over a five-year period. This is equivalent to a 2.5% per annum efficiency over the period from year 2 to 5 in the future price path. We have not found any direct comparisons with other desalination plants of similar size in a non-operational mode. Our findings are based on our team's experience of operational requirements of a desalination plant.

SDP has included the operating expenditure for the membrane test kit in the current Water Security Mode. We comment that these costs should not be included in the current Water Security Mode, but would be prudent for inclusion in the funding for a subsequent water security mode following a restart. This can be addressed in an ex-post review in the next price determination period if a restart has occurred by then.

### Impact

There is no change to our view on the efficient operation and maintenance expenditure. The efficient expenditure and how this related to the SDP October 2016 and April 2017 submissions is shown in insurance expenditure.

Table 3-2. These costs exclude any electricity or additional Business Interruption insurance expenditure.

**Table 3-2 Efficient Operation and Maintenance Expenditure in Water Security Mode**

<b>SDP EFFICIENT OPERATING EXPENDITURE: FUTURE PRICE PATH: WATER SECURITY MODE</b>						
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022	Total
<b>SDP October 2016 Submission</b>						
SDP October 2016						
<b>SDP April 2017 Submission Labour and Other Fixec Costs</b>						
Draft Determination						
Efficiency savings adjustment						
Membrane test kit	0.15	0.15	0.15	0.15	0.15	
Total SDP April 2017						
<b>Atkins May 2017 Efficient expenditure</b>						
Labour costs October 2016						
Efficiency adjustment						
Membrane test kit	0.00	0.00	0.00	0.00	0.00	
Efficient Labour costs						
<b>TOTAL EXPENDITURE excluding electricity and pipeline</b>						
Total \$m						
<b>efficient Expenditure Pipeline</b>						
Fixed pipeline costs	0.31	0.32	0.32	0.32	0.32	1.59
<b>TOTAL EXPENDITURE excluding electricity</b>						
Total \$m						

Source: Atkins Cardno analysis

## 3.4. Water Security Mode – Total Operating Expenditure

The efficient expenditure for the Water Security Mode in the future price path is summarised in Table 3-3.

**Table 3-3 Efficient Expenditure Water Security Mode**

<b>SDP EFFICIENT OPERATING EXPENDITURE: FUTURE PRICE PATH: WATER SECURITY MODE</b>						
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022	Total
<b>Efficient expenditure</b>						
Corporate	8.05	8.03	8.01	7.99	7.97	40.05
Plant						
Pipeline	0.31	0.32	0.32	0.32	0.32	1.59
<b>Efficient Electricity Usage (MWh)</b>						
SDP Proposals	5000	5000	5000	5000	5000	
Atkins proposals	5000	5000	5000	5000	5000	
Adjustment to efficient electricity u	0	0	0	0	0	
<b>TOTAL EXPENDITURE excluding electricity</b>						
Total \$m						

Source: Atkins Cardno analysis



## 3.5. Restart Modes

### SDP Submission

For the Restart Mode, the SDP has, in Section 5.1.3 of its submission, challenged the energy use for restart prior to producing potable water for sale to Sydney Water.

SDP also made representations on energy costs which are outside our brief.

### Our View of Energy Use

We have reviewed our estimate of energy use which we reported in our Final Report. We confirm that there is no change to our estimate of 71,000 MWh in any year. This excludes the energy requirement for production of any potable water supplied and charged to SWC.

The SDP October proposal provided a timeline of the activities for the restart under different scenarios, the same timelines were provided to support the SDP submission. None of these time lines account for the scenario where all new membranes are ordered from the restart trigger date. We envisage the timeline would include:

- Month 1: pre-treatment and wastewater plant commissioning;
- Month 1-2: emptying, pressure testing, and flushing of each RO trains;
- Month 2: RO train start up and short duration operation to check instruments, pumps, and train control;
- Month 2-3: run RO trains all together for short time;
- Month 3: testing of remineralisation, and DWPS;
- Month 4 and 5: waiting for RO membranes; and
- Months 6, 7 and 8: install new membranes and export water.

The SDP proposed power use for restart is 79652 MWh. This is calculated from the “[Redacted Information]” time line to from day [Redacted Information].

We have estimated the total power demand for restart be 71000 MWh with the following approximate breakdown of the power use as:

- (i) Day [Redacted Information], 2700 MWh (Pre-treatment plant and waste treatment);
- (ii) Day [Redacted Information], 17000 MWh (RO train, pumps, instrument, control, power integrity test, wait);
- (iii) Day [Redacted Information], 51300 MWh (Operation with new RO membranes ramping up production).

The following key assumptions and issues form the basis our assumptions.

- 10 GL water produced in the period of month 6-8 (day [Redacted Information]) should be capable of the being exported because new membranes have been used;
- There should be no need for CIP actions during the restart period;
- Flow to pre-treatment would be generally minimised to match actual flows need by the RO trains and the minimum flow needed to keep the dual media filters stable;
- The power consumed have been estimated from the pump curves and motor datasheets for the plant;
- Power factor correction has not been applied;
- Plant running at 250 ML/d nominal capacity assumed at end of restart period.

We consider that, during the eight-month restart period, SDP should be allowed to export all of the water that meets the export specification quality. For the first 10 GL exported, the variable electricity cost could be deducted, providing an incentive for the SDP to exceed the 10 GL production target during the start-up period. However, the actually delivery of 10 GL is not certain, as the membranes’ arrival to site could be delayed or other issues could delay water production meeting the export specification during the eight- month restart. Therefore, the variable charge power for 10 GL should not deducted in advance from the 71000 MWh restart allowance in advance of the actual export of water achieved during the eight-month restart period. An ex-post adjustment could be made, where appropriate, based on the actual volume delivered.

This 10GL production target should be an incentive for SDP to produce potable water during the Restart Mode.

### Impact

There are no changes to energy requirements in our Final Report.

We propose that the allowance made by IPART for potable water to be supplied to SWC is reduced from 15 GL to 10 GL to allow for reasonable losses and outages during plant start-up. SDP is therefore incentivised to produce potable water greater than 10 GL. This is good for a drought response.

The variable charge for power to deliver 10 GL potable water should not be deducted in advance from the restart allowance. An ex-post adjustment should be made, where appropriate, based on the actual volume delivered. No change to energy requirements.

We summarise proposed efficient operating expenditure and power use in Table 3-4. This includes the operating expenditure for the membrane test rig over the period of restart.

**Table 3-4 Efficient Expenditure and Power Use Restart Mode**

<b>SDP EFFICIENT OPERATING EXPENDITURE: RESTART MODE</b>						
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022	
<b>O&amp;M and asset replacement in any one year</b>						
SDP Proposed expenditure less electricity						
Capitalise membranes	-19.76	-20.89	-21.86	-22.72	-23.47	to capex
Adjust chemical costs						
Efficient expenditure excluding power costs	6.87	6.87	6.87	6.87	6.87	
<b>Electricity usage (MWh)</b>						
SDP Proposed power use	79652	79652	79652	79652	79652	
Atkins estimated power use	71000	71000	71000	71000	71000	
Adjustment to power use (MWh)	-8,652	-8,652	-8,652	-8,652	-8,652	

Source: SDP submission appendix 6 table 6.6

## 3.6. Full Operation Mode

### SDP Submission

In the Full Operation Modes, SDP has accepted the proposals for reductions in chemical costs, energy use and the cost of operating the drinking water pumping station. SDP also identifies additional Business Interruption insurance costs arising from changes to the abatement mechanism; the review of these costs is not within our scope of works.

### Our View

Adjustments to corporate costs have been made which are the same as for the Water Security Modes. Please refer to Section 3.2 for our findings on efficient corporate operating expenditure.

### Impact

There is a marginal increase in corporate operating expenditure of \$0.09m in any year over the future price path, consistent with the adjustments applied to the Water Security Mode expenditure. The efficient expenditure is presented in Table 3-5 below.

**Table 3-5 Efficient Expenditure Full Operation Mode**

<b>SDP EFFICIENT OPERATING EXPENDITURE: FULL OPERATION MODE</b>						
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022	Totals
Efficient Corporate	8.90	8.88	8.86	8.84	8.82	44.30
Efficient Fixed Plant						
Total Fixed Pipeline	0.31	0.32	0.32	0.32	0.32	1.59
Total Variable Costs \$m (excl. electricity)						
<b>Fixed inputs: Efficient electricity usage (MWh)</b>						
SDP Electricity usage fixed						
Adjust for efficient operation						
Efficient fixed electricity usage MWh	7665	7665	7665	7665	7665	
<b>Variable inputs: Efficient electricity usage (MWh)</b>						
SDP Electricity usage						
Adjust for efficient operation						
Efficient electricity usage MWh	320835	320835	320835	320835	320835	
<b>Total Efficient Expenditure (excluding electricity and related costs)</b>						
Total excluding electricity						
Total excluding electricity and pipeline						

Source: Atkins Cardno analysis

### 3.7. Transition to Water Security Shutdown

There are no changes to the proposed expenditure for transition to Water Security Mode which is summarised in Table 3-6 below.

**Table 3-6 Efficient Expenditure for Transition to a Water Security Shutdown**

<b>SDP OPERATING EXPENDITURE: SHUTDOWN TRANSITION TO WATER SECURITY MODE</b>					
(\$m 2016/17) year ending June	2018	2019	2020	2021	2022
<b>O&amp;M and asset replacement in any one year</b>					
Operation and Maintenance Plant	1.69	1.69	1.69	1.69	1.69
Operation and Maintenance Pipeline	0.00	0.00	0.00	0.00	0.00
Energy costs	0.00	0.00	0.00	0.00	0.00
Other Operating Costs	0.00	0.00	0.00	0.00	0.00
Total costs	1.69	1.69	1.69	1.69	1.69

Source: SDP Submission Appendix 6 Table 6.9

### 3.8. Capitalisation of periodic maintenance and membranes

In response to the SDP comments on capitalisation we repeat below the section of our Final Report to support our proposal to capitalise periodic maintenance and membrane expenditure.

SDP states that it capitalises expenditure consistent with Australian Accounting Standards Board (AASB) 116<sup>9</sup>. Articles 7 and 8 of this standard imply that costs should be recognised as an asset if they generate benefits over more than one year.

SDP's price submission treats membrane replacement and periodic maintenance as operating expenditure. This is consistent with the 2012 Determination. However, our interpretation of the definition of capital expenditure is that it relates to expenditure which is expected to generate benefits over more than year (see box below for example).

<sup>9</sup> 'Australian Accounting Standard AASB 116 Property, Plant and Equipment

Definition of capital assets

In response to our question about capitalisation policy, SDP stated that it capitalises consistent with Australian Accounting Standards Board (AASB) 116. Articles 7 and 8 of this standard imply that costs should be recognised as an asset if they generate benefits over more than one year, as demonstrated by the excerpt below:

*7 The cost of an item of property, plant and equipment shall be recognised as an asset if, and only if:*

*(a) it is probable that **future economic benefits** associated with the item will flow to the entity; and*

*(b) the cost of the item can be measured reliably.*

*8 Spare parts and servicing equipment are usually carried as inventory and recognised in profit or loss as consumed. However, major spare parts and stand-by equipment qualify as property, plant and equipment when an entity expects to use them during **more than one period**....<sup>1</sup>*

We therefore consider that the following expenditures should be treated as capital rather than operating expenditure.

- (i) Periodic maintenance. We have reviewed the proposed periodic maintenance expenditure over the next price path period. It is clear from this, **[Redacted Information]** that, unlike routine asset maintenance, periodic maintenance expenditure relates to significant expenditures involving replacement, renewal and/or refurbishment of items which are proposed to take place on a cycle of multiple years. The inclusion of a *de-minimus* threshold also reinforces the fact that it relates only to significant non-routine maintenance work and therefore the appropriateness of classifying periodic maintenance as capex.
- (ii) Membrane replacement. Membranes have a warranted life of up to eight years in full operation. Thus, they clearly provide benefits over a number of years and should not be treated as operational consumables.

We consider that capitalisation of membrane replacement is preferable to a cost pass-through mechanism as setting a prudent and efficient capex allowance *ex-ante* provides a strong efficiency incentive to SDP without requiring the detailed hands-on regulation associated with administering a significant cost pass-through item.

Our experience of cost pass-through is that it has been applied where a regulated entity is exposed to items or areas of expenditure which are uncertain and where it has no control over the likely costs so there is little potential to drive efficiencies. We consider that SDP has significant influence on membrane replacement expenditure and should therefore be incentivised to spend prudently and efficiently without allocating adverse cost-risk wholly to SDP's customers through a cost-pass through mechanism.

## 4. Capital Expenditure

This section presents the results of our review of the prudence and efficiency of SDP's capital expenditure in the future price path.

### 4.1. Scope of review

We have focused our review on specific issues identified by SDP in section 6.1 of its submission where it disagrees with the draft determination and proposes the inclusion of

- replacement of endcaps, end connectors and permeate hoses at an estimated \$[Redacted Information] which we considered should be replaced under warranty;
- a membrane test kit at an estimated \$1m.

SDP has accepted the capitalisation of membrane costs and periodic maintenance although it considers that this treatment is not consistent with Australian Accounting Standards.

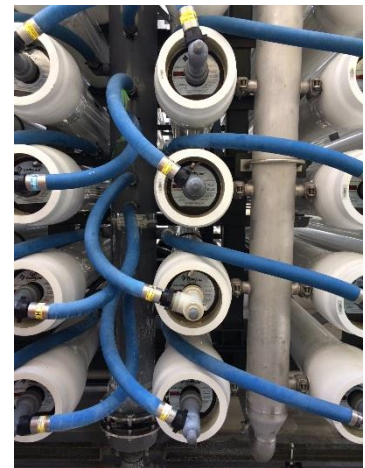
SDP has accepted the deferment of the additional pump at the drinking water pumping station.

### 4.2. Replacement of permeate hose

In our Final Report, we made it clear that we agreed with SDP's view that the endcaps, end connectors and permeate hoses will need to be replaced. However, we considered that, based on the plant design durability requirements, these items should generally still be in reasonable condition at this stage (i.e. seven years after installation) and should not yet need to be replaced in such large numbers. We considered that the cost should not be passed on to customers, but should be dealt with as a defect, fault or deficiency under [Redacted Information] other mechanism.

In its Revised Regulatory Proposal, SDP has included the \$[Redacted Information] of expenditure for permeate hoses. SDP has stated its view that "these are clearly general wear and tear and are not covered by warranty". Furthermore, SDP states:

*The warranty in the O&M contract covers defects, deficiencies and faults. Our view is that the permeate hoses (or more correctly the refurbishment of the RO Trains) are neither a defect, fault nor a deficiency. Although the RO Trains have a life of 25 years, they require regular maintenance and replacement of individual items within the train that experience wear and tear, much like the seals on a pump. Furthermore, asset lives for a category of assets (in this instance mechanical assets) are based on average lives of all subsets of assets within the category. Some asset subsets will have shorter lives, and some will have longer lives. We have confirmed through the permeate pipework supplier that the hoses have an expected operating life of around 10 years and therefore will meet the design life during the 2017-22 regulatory period. Flexible hoses of this nature are unlikely to have a 25 year operating life. Therefore, it is reasonable to expect some refurbishment of the RO Trains for them to meet their design life. To promote efficient cost recovery and provide efficient price signals regarding the cost of providing our services and these costs should be included in the forecast capital expenditure.*



We still consider that it is inappropriate for this cost to be passed on to customers for the following reasons:

- Our experience elsewhere suggests that it is not normal to require such extensive and expensive replacement of permeate connection pipework and associated end connection hoses and associated items so early in the life of a plant. This supports the view that this should be treated as a design defect, deficiency or fault rather than be paid for by customers;



- The Durability Plan sets out specified *minimum* design lives<sup>10</sup> not an *average* life of subsets of assets within each category, so this element should have been designed to last at least 25 years. Even if the 25-year design life were an average for this asset class, we would not expect so many items to need replacing at such an early stage;
- The preferred material for pressure vessel connectors [Redacted Information] was [Redacted Information]. If these materials had been used instead of flexible hoses it is unlikely that large scale replacement of the hose component would have been required at this stage.

#### Impact

We have made no change to our previous recommendation for this item.

### 4.3. Membrane Skid Test Unit

SDP has proposed to use a membrane skid test unit while the plant is in the current Water Security Mode. We do not support funding of the purchase and operating of the membrane test kit in the current water security mode.

The SDP Submission 6.2.3.4 states

*“SDP notes, however, that IPART has also stated (Draft Decision p.68) that it will review actual membrane replacement costs if the plant is triggered to restart in the 2017-22 regulatory period, at the next price review (i.e. it will conduct an ex post prudency and efficiency review of the expenditure on membrane replacement). In these circumstances, SDP considers it important to be in a position to make a prudent decision on the quantum of membranes to replace when it is next called to restart (rather than simply replace all the membranes at that time).”*

The RO membranes of the existing plant will be 13 years old at the end of the determination period. In response to the SDP October 2016 proposals, we have recommended to IPART that having the funding available for full membrane replacement of the originally installed plant RO membranes on plant restart is prudent, a membrane test kit is therefore not needed in this Water Security Mode to assess membrane replacement numbers. The SDP submission refers to *“ex-post prudency and efficiency review of the expenditure on membrane replacement”*. Our view is that the Test Unit is unlikely to be required in the next price path (2017-2022). In the very unlikely event of the new water security mode occurring in the period 2017-2022 this \$1.0m expenditure can be reviewed for prudency and efficiency in an ex-post assessment.

On trigger of restart the existing originally installed membranes will still serve very useful functions in the first few months while waiting for manufacture and delivery of a full set of new replacement RO membranes. These functions include:

- Allow the pumps of all the RO trains to be tested;
- Allowing all the instruments and control loops to be tested;
- Allowing large power use integrity test;
- Allowing new operator training of RO train start up and shut downs with no risk to production RO membranes;
- Allow faster RO plant testing because lower water quality can be accepted from pre-treatment filtration;
- Providing water for testing of remineralisation treatment.

The current Sydney dam storage levels are at 95.1% as at 9 May 2017. The latest Metropolitan Water Plan lowers the dam storage levels that would trigger a restart of the desalination plant to 60%. This makes it more unlikely than with the previous trigger levels that the desalination plant will be called on to restart in this determination period. The SDP has the option to operate the plant for a minimum of 14 months following a restart. Therefore, the earliest that next water security mode would occur is very unlikely to be in the next determination period. It is prudent to defer funding until the next price review. In the unlikely event that this test unit is needed then the decision and costs can be considered in an ex-post assessment of prudent and efficient expenditure.

#### Impact

We have made no change to our previous recommendation for this item.

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<sup>10</sup> see section 4.1.4.1 and Table 4-1 in the Durability Plan for example

## 4.4. Water Security Mode - Prudent and efficient expenditure

Our view of the total level of prudent and efficient capital expenditure in the Water Security Mode in the future price path is summarised in Table 4-1 below.

**Table 4-1 Prudent and Efficient Capital Expenditure in Water Security Mode**

<b>SDP CAPITAL EXPENDITURE: FUTURE PRICE PATH: WATER SECURITY MODE</b>						
(\$M 2016/17) year ending June	2018	2019	2020	2021	2022	Total
<b>SDP Proposal</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total proposed expenditure</b>	<b>0.32</b>	<b>0.02</b>	<b>2.12</b>	<b>0.02</b>	<b>0.02</b>	<b>2.48</b>
<b>SDP Submission to Draft Report</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total proposed expenditure</b>	<b>2.71</b>	<b>3.92</b>	<b>3.69</b>	<b>4.48</b>	<b>3.67</b>	<b>18.47</b>
<b>ATKINS/CARDNO ASSESSMENT OF PRUDENT EFFICIENT EXPENDITURE</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total efficient expenditure</b>	<b>1.53</b>	<b>2.64</b>	<b>2.87</b>	<b>3.75</b>	<b>3.67</b>	<b>14.46</b>

Source: SDP Information Return 2016 and Atkins/Cardno analysis

This is unchanged from our previous recommendation.

## 4.5. Restart Modes

We propose that the membrane test kit would be prudent capital expenditure, at a cost of \$1.0m, in the next water security mode. However, due to the low probability of this event in next price path, we recommend that this \$1.0m expenditure be reviewed as an ex-post prudent and efficient expenditure. Expenditure for the first and subsequent restarts are shown in Table 4-2.

**Table 4-2 Prudent and Efficient Capital Expenditure for First and Subsequent Restart Modes**

Item	First restart	Subsequent restart
(\$m 2016/17)		
<b>SDP October 2016 Submission</b>		
Membrane replacement		Treated as opex
Skid test unit		Not requested
<b>SDP Submission to Draft Report</b>		
Membrane replacement	\$30.0m	Depends on duration of shutdown. Not required if subsequent restart within three years of first (unlikely in the future price path)
Skid test unit		Incorporated in Water Security Capex
<b>Atkins/Cardno Assessment of Prudent Efficient Expenditure</b>		
Membrane replacement	\$30.0m	Depends on duration of shutdown. Not required if subsequent restart within three years of first (unlikely in the future price path)
Skid test unit	Not required	As required but unlikely in next price path. If required this \$1.0m expenditure can be reviewed as an ex-post prudent and efficient expenditure.

### Impact

The only change to our previous recommendations is to increase the allowance for the skid test unit by \$0.2m to \$1.0m.

## 4.6. Full Operation Mode

The capital expenditure for Full Operation Mode is unchanged and consistent with those for water security mode, as summarised in Table 4-3 below.

**Table 4-3 Prudent and Efficient Capital Expenditure in Full Operation Mode**

<b>SDP CAPITAL EXPENDITURE: FUTURE PRICE PATH: FULL OPERATING MODE</b>						
(\$M 2016/17) year ending June	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>Total</b>
<b>SDP Proposal</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total proposed expenditure</b>	0.32	0.02	2.12	0.02	0.02	2.48
<b>SDP Submission to Draft Report</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total proposed expenditure</b>	2.71	3.92	3.69	4.48	3.67	18.47
<b>ATKINS/CARDNO ASSESSMENT OF PRUDENT EFFICIENT EXPENDITURE</b>						
Corporate						
Plant						
Pipeline	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total efficient expenditure</b>	1.53	2.64	2.87	3.75	3.67	14.46

Source: SDP Information Return 2016 and Atkins/Cardno analysis

## 4.7. Transition to Water Security Shutdown

We consider that no additional capital expenditure is required for shutdown of the plant.



## 5. Asset Lives

### 5.1. Scope of review

SDP does not agree with pipeline asset life of 120 years in the draft determination. SDP considers the assumed asset life for the pipeline does not reflect its design life. In Section 7.6 of its submission it proposes an asset life of 100 years compared with the 120 years in the draft determination. We discuss this issue in Section 5.2 below.

### 5.2. Pipeline Asset Life

The pipeline carries potable water from the Kurnell desalination plant and discharges into the Sydney Water network at Erskineville. The pipeline comprises land based sections north and south of Botany Bay and an under-sea crossing of the Bay. The location of the pipeline is shown on Figure 5-1 below.

Figure 5-1 Pipeline route



### SDP Submission

SDP does not agree with the draft decision to set the asset life for the pipeline infrastructure at 120 years. It comments that it does not reflect the pipeline design life which is 100 years for both the land-based and below-sea sections of the pipeline.

In Section 7.6 of its submission it proposes an asset life of 100 years compared with the 120 years in the draft determination.

It comments that the 120 year life assumption is not supported by any evidence that an appropriate asset life for the land-based section of the pipeline is 140 years. It then comments that it has provided IPART with design documentation that supports a 100-year life for all parts of the pipeline.

### Atkins findings

We accepted the 100-year design life for the under-sea pipeline in our Final Report. We did not accept that this design life can be equally applied to land-based sections of the pipeline. There are several reasons for this which we detail below.

- (i) The current assumption of 140 years is the same as SWC<sup>11</sup> applies to its water mains of a similar diameter. It would be inconsistent to apply varying design lives to assets in similar locations and environments within the Sydney Area;
- (ii) The under-sea section of pipeline is in a more aggressive environment than the land-based sections and we have accepted this assumption;
- (iii) SDP referred us to a report<sup>12</sup> which sets out the design criteria for the pipeline. This refers to the pipeline asset life as 100 years for the complete length and references the WSA Code<sup>13</sup>. The WSA Code paragraph 1.2.6 states that 'distribution systems shall be designed for a nominal asset life of at least 100 years and table 1.2 refers to typical asset design lives of 100 years for pipelines;
- (iv) The pipeline is designed for an ultimate flow of 500 MI/d when the second stage of a desalination plant is constructed. Under the current Full Operation Mode, the design flow is 250 MI/d with a lower pumping head. This means that the pipeline is not under full design flows and pressures until the second stage of the desalination plant is operational. There is no indication that this will be needed in the short run;
- (v) SDP has demonstrated that it is applying good asset management practice for the pipeline with appropriate condition monitoring. This should give adequate warning of any deterioration in condition. Asset life can be extended through replacement of ancillaries such as cathodic protection under periodic maintenance;

The asset life is used to estimate a reasonable return for the rate of consumption of an asset over a period. There is an assumption that a desalination plant or a technical equivalent will be on the site in perpetuity to meet its obligations under the MWP.

There are uncertainties in the estimated life of pipeline assets but there is no technical justification to change the current 140 year asset life for land-based pipeline assets. Should the second stage of the desalination be built requiring an increase to the pipeline full capacity then the asset life assumption should be reviewed.

We conclude that the land-based pipeline asset life should be 140 years. A lower 100 year asset life for the length of main in twin under-sea pipelines, some 50% of total length, should be appropriate. We conclude that a weighted life of 120 years should be used to take account the relative lengths of pipeline on land and under the sea.

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<sup>11</sup> Review of prices for Sydney Water Corporation from 1 July 2016, IPART June 2016

<sup>12</sup> Basis of Design Report – Works As Constructed, Water Delivery Alliance December 2009

<sup>13</sup> Water Supply Code of Australia, WSA 2011

# Appendices

# Appendix A. Terms of Reference

## SCOPE OF WORK

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**PROJECT NAME: 2017 SDP Price Review – Expenditure Review – Flow on engagement**

### 1. BACKGROUND

IPART is seeking to extend Atkins Cardno's engagement for the review of SDP's expenditure for the 2017 determination period.

The purpose of this flow on engagement is for Atkins Cardno to review SDP's submission to IPART's draft report, including any additional material and consultant reports presented by SDP in support of its submission.

The scope of this flow on engagement covers SDP's:

- efficient operating and capital expenditure
- efficient operating, shutdown and transition modes
- efficient energy usage (in MWh), and
- any relevant implications resulting from the recently released [2017 Metro Water Plan](#).

For the avoidance of doubt, this review does not include insurance costs and energy prices.

#### **2017 Price Review**

IPART is conducting a review of SDP's maximum charges to apply from 1 July 2017. The maximum charges determined by IPART for the upcoming determination period will cover a period of five years from 1 July 2017.

In setting prices, we are required to consider the matters set out in section 15 of the *Independent Pricing and Regulatory Tribunal Act 1992*, which include the standards for quality, reliability, and safety.

In February 2017, Atkins Cardno delivered its Final Report to IPART on its review of SDP's operating and capital expenditure.

In March 2017, IPART released its Draft Report and Draft Determination. In setting prices for the Draft Report, IPART accepted all of Atkins Cardno's recommendations.

IPART's Draft Report and Draft Determination are available at:  
<https://www.ipart.nsw.gov.au/Home/Industries/Water/Reviews/Metro-Pricing/Sydney-Desalination-Plant-prices-from-1-July-2017>

### 2. OBJECTIVES

The objectives of this consultancy are a review of SDP's submission to IPART's Draft Report, along with any material and consultant reports provided by SDP in support of its submission, with respect to:

- SDP's responses to IPART's draft decisions on:
  - efficient operating and capital expenditure
  - operating modes, and
  - energy usage.
- Any changes SDP proposes to expenditure allowances and/or operating modes to take account of the recently released [2017 Metro Water Plan](#). The key changes that SDP may respond to in response to IPART's Draft Report and Determination are:
  - The 70/80 triggers have been lowered to 60/70 triggers (ie, SDP is now triggered on when dams hit 60% and triggered off when dams subsequently hit 70%).
  - An optional minimum run time of 14 months has been introduced (ie, 8 months start up and 6 months operation). If dams reach 70% within 14 months of the start of a drought (ie, when dams hit 60%), SDP now has an option to continue to operate during the rest of the 14 month window).

For the avoidance of doubt, this review does **not** include insurance costs and energy prices.

### 3. DESCRIPTION OF SERVICES

IPART requires the consultant to provide the following services:

#### **Task 1: Review of SDP's response to IPART's draft report**

Atkins Cardno must undertake a review of SDP's submission to IPART's Draft Report and Draft Determination, with respect to:

- IPART's draft decisions on capital and operating expenditure
- IPART's draft decisions on operating modes
- IPART's draft decisions on energy usage, and
- Any changes SDP proposes to expenditure allowances and/or operating modes to take account of the recently released [2017 Metro Water Plan](#).

Atkins Cardno is required to review SDP's arguments and any further material including consultant reports provided by SDP on both capital and operating expenditure. This may include:

- reductions to SDP's proposed expenditure
- treatment of membrane costs
- positions on operating modes
- the appropriateness of the continuing and catch-up efficiency factors.

Atkins Cardno must provide recommendations on:

- a) SDP's operating modes, taking into account its drought response role as per the Government's Metropolitan Water Plan and SDP's WICA licence conditions
- b) The level of efficient operating expenditure it recommends for SDP between 2017-18 and 2021-22 for IPART's Final Report and Determination.
- c) The level of efficient capital expenditure it recommends for SDP between 2017-18 and 2021-22 for IPART's Final Report and Determination.

- d) Any other adjustments deemed appropriate, as necessary.

#### 4. REQUIRED OUTPUT

The primary output items from the project are set out below.

##### 4.1 Reports

###### Final Report on the review of SDP's submission

The consultant will be required to produce a Final Report, which addresses Task 1 above. The report must include:

- Revised recommended operating and capital expenditure tables (ie, updating and restating the recommended operating and capital expenditure tables that were included in Atkin Cardno's February 2017 Final Report for its 2017 SDP expenditure review).
- Clear explanation of the consultant's reasons or rationale for each recommendation (whether that is to maintain or amend a recommendation in Atkin Cardno's February 2017 Final Report), including its information sources, approach and any key assumptions used.
- All values in \$2016-17.

Furthermore:

- all tables and calculations in the reports must also be provided in Excel format to facilitate the transfer of the consultant's output to IPART's pricing models (to avoid rounding errors introduced through text-only formats), and
- the consultant must conduct a thorough Quality Assurance check of all outputs to eliminate errors and inconsistencies.

The Final Report should be clearly and logically set out and written in plain English, avoiding the unnecessary use of technical terms. The report should incorporate appendices for supporting information and evidence where necessary.

The consultant should note that the Final Report may be released as a public document and made available on the IPART website. SDP may identify information that it considers to be commercial-in-confidence. The consultant must provide a version of the Final Report suitable for publication without commercial-in-confidence information, subject to IPART's instructions as to whether it agrees that the identified information is commercial-in-confidence. Therefore, the consultant must provide two versions of the Final Report:

- one confidential version.
- one public version suitable for publication without confidential information (with confidential information moved into a separate confidential addendum).

Both the confidential and public versions of the Final Report must be provided in word format.

The public version of the Final Report must also be provided in PDF format suitable for publication on IPART's website.

##### 4.2 Presentation

## Presentation to Tribunal

The consultant must prepare and deliver a presentation to the Tribunal which covers:

- Key findings
- Reasons for findings

## 5. SOURCES OF INFORMATION

The list of documents below is provided as a guide only, it should not be considered exhaustive.

### Task 1: Review of SDP's submission to IPART's Draft Report

SDP's submission will set out its arguments and reasons for its proposed changes to IPART's draft decisions on operating and capital expenditure.

SDP may also collate and produce further documents and evidence (including consultant reports) which support its submission, but are not in the public domain.

In addition to its own analysis of available information provided, the consultant is required to source and report analysis of other inputs through:

- interviews with SDP staff
- comparisons with relevant comparator organisations, and
- the consultant's relevant experience with similar businesses and in undertaking similar tasks.

In the event that the consultant identifies gaps in the information, it is the responsibility of the consultant to take the necessary steps to acquire the required information and to liaise promptly with IPART to ensure that the consultancy outputs are delivered on time. Should the reliability of the information be in doubt, the consultant is expected to source 'second best information', apply sound judgement and provide detail and justification for assumptions made.

## 6. LIAISON/CONSULTATION

The consultant may be required to attend and participate in meetings, have involvement in consultation, and attend and present at workshops or Tribunal meetings as circumstances dictate.

## 7. TIMETABLE

The consultant must meet the following work schedule:

Date	Activity
Tuesday 18 April 2017	Receive submissions and engage expenditure consultant
Monday 8 May 2017	Expenditure Draft Report
Friday 12 May 2017	Expenditure Final Report
Wednesday 17 May 2017	Present Final Report recommendations to Tribunal





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