

## **WATER BALANCE SHEET – ACTUAL AND ASSUMPTION DATA**

### **PURPOSE**

The purpose of this report is to detail the actual data and assumptions utilised in the Eastern Irrigation Water Balance Sheet. The Water Balance Sheet is the key tool used to calculate seasonal allocations.

### **BACKGROUND**

In the 2000-2001 irrigation season, the Eastern Irrigation Business (EIB) experienced difficulty in applying historic operational practice in placing restrictions due to lower than forecast inflows. This exposed the business to a risk of not being able to supply customer entitlements.

As a result EIB established a clear set of written operational management rules that minimises the business risks, as well as providing more certainty to customers regarding the allocation of their individual entitlements. These rules included the development of a Water Balance Sheet to calculate and report the available water to allocate. Attachment 1 shows the main page from the balance sheet.

In 2010 EIB undertook an Internal Audit on its water accounting practise and procedures to ensure that appropriate controls were in place. This audit was conducted by an independent auditor, PKF Chartered Accountants and Advisors (PKF) who made a number of recommendations.

One of their findings was that key assumptions utilised in the Water Balance Sheet could not be supported by historical data; rather they were based on the knowledge and experience of staff. PKF's recommendation was for management to review the model and formally substantiate assumptions with appropriate documented evidence.

### **ACTUAL DATA – WATER BALANCE SHEET**

#### **Glenmaggie Volume**

A capacity survey was undertaken in late 2007 and as a result a new storage rating table developed.

#### **Thomson Drought Reserve**

SRW currently holds a Bulk Entitlement for the Thomson and Macalister river systems. This includes a share of storage capacity and inflows into the Thomson Reservoir. The maximum storage capacity available is 45,000ML, with 6% of all inflows allocated to SRW.

Melbourne Water forwards an interim weekly report to the Operations Manager who updates the "Thomson Inflows" spreadsheet. These figures are then verified at the end of each month from the "Melbourne Water Customers Report Southern Rural Water"

The Thomson Operating Rules, which are included in the "EIB Allocation management Procedure" details when the available volume in the Thomson Reservoir is to be included in the allocation model.

### **Thomson Peak Usage (5 Year Average)**

This figure is based on the previous 5 years data.

If the Thomson Reservoir Drought Reserve has been included into the allocation model during this period this data should be excluded and the preceding year/s information used for this calculation.

### **Thomson Usage to date**

This figure is the actual usage as ordered and supplied from the Thomson Reservoir. The updated figure can be found on the above file and are verified at the end of each month from the “Melbourne Water Customers Report Southern Rural Water”

### **High and Low Reliability Water Shares**

This figure is detailed in the Water Register and SRW’s Irrigation Planning Module (IPM); it also includes the current Environmental Entitlement.

### **Total Usage to date**

This figure is obtained from the IPM system; it includes actual usage (meter readings) and usage estimate since the last meter reading and orders lodged in the system.

The report is located in the IPM system under Reports – Usage – District Distribution – Report Type “Delivery volumes to Current Date” – Report On “Area” – Operational Area “M.I.D. / THOM / RAIN / MAC”

## **ASSUMPTION DATA – WATER BALANCE SHEET**

### **River Flows – Thomson (Harvest Rights)**

These flows are calculated by using the difference between the “Thomson River-Environment Bulk Entitlement” requirement at the Coopers Creek gauging station (upstream of Cowwarr Weir) and what SRW is required to supply at the Wandocka gauging station (downstream of Cowwarr Weir). In calculating these figures, the daily flow available has been reduced by 10ML/day to allow for river losses. These figures are located in the Water Balance Sheet.

### **Current Glenmaggie inflows minimum, excluding passing flow requirements**

Following a significant rain event the flow will initially increase, peak and then decrease back to a base flow volume. A recession curve is utilised to record the reduction in flows back to a base flow. Each river has its own unique and consistent recession curve. The water balance sheet allows for future inflows based on actual inflows at the time of assessing allocations. These inflows are calculated for the next 30 days using a simplified and conservative recession inflow estimate. The method to set this value is to use the current daily inflow data and deduct the passing flow requirements, for the first 10 day period. The second 10 day period is 50% of the first period and the third 10 day period is 50% of the second period.

### **Measurement and Efficiency Safety Factor**

These figures are an assumption and are based on the experience and judgement of operational staff, which have been reviewed and refined in the Water Balance Sheet over the last 8 years. The figures below are used to reduce the risk of non supply to customers.

The measurement component safe guards SRW against over allocation due to incorrect measurement for example the head gauge at Lake Glenmaggie would only need to creep up slightly for us to announce an increase in allocation, when the water resources are not actually available.

While the best available information is used to calculate efficiencies as detailed in the “Delivery Losses” section these do vary from year to year.

- 5% - 1 July to 28 February;
- 3% - 1 March to 15 April; and
- 0% - 16 April to 15 May.

### **Dead storage and Evaporation**

Current rating tables indicate that with the storage level at about 7,000ML the Northern and Southern offtake valves would be inoperative, therefore not included in the allocation model.

Evaporation is not deducted from the reservoir on a daily basis as any losses are offset by inflows. Inflows are calculated by the differences in storage levels from one day to the next, plus outflows. In other words any evaporation in the reservoir is substituted by inflows. During periods when inflows are very low, evaporation may exceed inflows; therefore the estimates below are based on the experience and judgement of operational staff and take dead storage and evaporation into consideration.

- 10,000ML - 1 July to 28 February;
- 9,000ML - 1 March to 15 April; and
- 8,000ML - 16 April to 15 May.

### **Delivery Losses**

Prior to channel automation, delivery losses were set at 30%. Delivery losses vary each year depending on weather conditions, for example over the last ten years this figure has been as high as 37% in 2004-05 to a low of 26% in 2007-08. The introduction of Total Channel Control (Channel Automation) has seen this figure decrease with the average over the past three seasons of 29%.

Therefore to ensure we have the most up to date information in the Water Balance Sheet the delivery loss figure will be the average of the three previous seasons. This figure is to be determined each year prior to the opening allocation being announced on 1<sup>st</sup> July. The figure for 2011-12 will be 29%.

The only exemption to this will be if the allocation is less than 50% on the 15 August the delivery losses are to be adjusted to 35% until the reservoir spills or the allocation reaches 100%. This exemption has been adopted to ensure supply in seasons of low allocations. History has shown that there is significant change in delivery patterns in seasons where the seasonal allocations are low and as a result delivery losses increase.

**Unused Entitlement**




This item should be reviewed on or before the 16 April to ensure all the available resources are being allocated. While some assumptions are made, history shows that not all allocated water is utilised every year. Therefore given that the maximum increase for this item is 5% the risk of non supply of allocated water is rated very low.

This item is also used in conjunction with clause 5.12 of the “EIB Allocation Model” which states:

*If Lake Glenmaggie storage volume, less 13,000ML for dead storage and evaporation exceeds the deliverable volume of 1,700ML per day, then the allocation can be increased.*

**RECOMMENDATION**

That management accepts the actual data and assumptions that support the calculation of the MID allocation.

Recommended	Endorsed	Approved
		
<b>Ken Bates Operations Manager</b>	<b>John Tesoriero General Manager Water Supply</b>	<b>Clinton Rodda Managing Director</b>

## Attachment 1

Date 19-Aug-10

### WATER BALANCE SHEET

#### Supply

Glenmaggie Volume	163000
River Flow - Thomson ( August to May)	21447
Thomson Drought Reserve Allocation	<b>18173</b>
Current inflow minimum (30 Days), excluding Environmental Flows	28500
Thomson peak usage (5 year Average)	3767
Thomson usage to date	
<b>Total</b>	<b>216714</b>

#### Less Storage Losses & Environmental Reserve

Measurement and Efficiency Safety Factor	5%	10836
Dead storage + Evaporation		10000
<b>Total</b>		<b>20836</b>

#### Total Resources

**195878**

#### Delivery Loss

Channel distribution loss (30%) Which includes outfalls, seepage/leakage, measurement error and evaporation.	<b>-58763</b>
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#### Nett water available to customers

**137115**

Available Allocation	HRWS	90		
	LRWS	FALSE		

#### Demand

High Reliability Water Share	152156
Unused Entitlement	
<b>Total</b>	<b>152156</b>

#### Total Usage to date

Actual Usage (Meter Readings)	1.8
Estimate Usage (Orders Only)	8
<b>Total</b>	<b>9.8</b>

#### Less

Spill Entitlement Usage	9.8
Outfall Spill Entitlement	
<b>Total</b>	<b>9.8</b>

#### WR/LV delivered to date

**0**

#### Max. remaining demand

**152156**

#### Water Available %

**90.1**

Sales Delivered to date MID only		
Water delivered as Spill Entitlement	9.8	0%

Announced Allocation	HRWS	80%		
	LRWS			

