Background paper
Main channel factors

January 2012

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1 Introduction

The Authority has asked SunWater to provide more information on the methodology used to determine the main channel factors that were used to estimate cost transfers from distribution systems into bulk water schemes. The cost transfers are applied in three water supply schemes where channel distribution system assets are used to transfer water from one stream to another for the purpose of supplying bulk water.

The three water supplies schemes are:

The Burdekin WSS where water is transferred from the Burdekin to the Haughton River,

The Bundaberg WSS where water is transferred from the Kolan River to the Burnett River and

The Lower Mary WSS where water is transferred from the Mary River to Tinana Creek.

In these cases the channel distribution assets, ie pump stations and main channels, are used intermittently to transfer water and the operation and maintenance costs of these assets are recorded against the channel distribution systems, thereby raising the need to apply a cost transfer.

Recognising that a cost transfer was required, SunWater proposed main channel factors that were estimates based on Integrated Quantity and Quality Model (IQQM) modelling that quantified the volume of water moved from one stream to another relative to the total volume of water moving through the channels. These factors were used to transfer a portion of main channel and pumpstation costs away from the distribution systems and into the bulk water supply scheme.

In its third round of consultation the Authority received feedback from stakeholders that the IQQM modelling methodology was not appropriate for estimating the main channel factors and has subsequently asked SunWater to provide further background information to justify the methodology.

2 Methodology

The Authority asked SunWater to outline the model inputs used so that the Authority could independently verify the IQQM outputs if necessary.

The inputs to the IQQM model have been prepared by the Department of Environment and Resource Management (DERM), not SunWater. These would have been based on historical records of streamflows. SunWater has used data as it is found in the model.

SunWater sought to apply a methodology that was repeatable, based on verifiable data and was reflective of the long-term utilisation of the main channel assets under modern-day operating conditions. For this reason, SunWater dismissed options such as short-term historic averages (as these will be biased by fluctuations in streamflows over the period as well as demand), or original design assumptions (as these may not reflect current operating conditions).

SunWater's simple calculation methodology is described below.

(a) The Main Channel is identified in the model and the component flows are identified as follows:

X = total channel flow volumes at channel intake in the simulation period (ML)

Y = total channel outflows to supplemented watercourses in the simulation period (ML)

(b) The Main Channel Operations Factor is calculated using the following formula:

$$\text{Main Channel Operational Factor (MCOF)} = \frac{Y}{X}$$

The results are as shown in the table below.

Table1 : *Main Channel Factors*

Water Supply Scheme	**Main Channel**	**IQQM used**	**Main Channel Factor**
Burdekin Haughton	Haughton Main Channel	BH020R.sys	4%
Lower Mary	Owanyilla	PO45CW. sys	27%
Bundaberg	Gin Gin Main Channel	T206A.syl & T206B.syl	8%

3 Justification

The Authority asked SunWater to explain why IQQM is the best method for determining the channel allocation, when the Authority understands that IQQM is typically used to model hydrological outcomes, not channel capacity/utilisation.

SunWater view is that the utilisation of a main channel for bulk water supply is in fact a hydrologic matter relevant to assessing and maintaining water access entitlement performance, through the Resource Operation Plan (ROP) process.

In using the IQQM methodology SunWater sought to apply a simple and repeatable methodology that estimated the longer term average volume of water transfers required under existing ROP rules.

The IQQM model uses simulated streamflow data over a long timeframe (around 100 years or more), and mimics the application of the operating rules under the ROP that would have occurred over that period. This includes the volume of water released from main channels into streams to meet the needs of water access entitlements (that is, to supplement streamflows). This means the model reflects current operating arrangements, applied to historic streamflows over 100 years or more. The model uses

externally-verified and accepted streamflow data and is maintained by an independent party, DERM.

4 Conclusions

SunWater's view is the methodology applied is the most appropriate for estimating the longer term volume of water transfers under existing ROP rules and is an appropriate basis for allocating the cost transfer.

SunWater believes that it is appropriate to use the IQQM data for this purpose. It contains the best data available.