QUEENSLAND COMPETITION AUTHORITY

Final Report

Gladstone Area Water Board: Investigation of Contingent Water Supply Strategy Pricing Practices

Part B

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PREAMBLE

To accommodate unforeseen drought or additional demand, the Gladstone Area Water Board (GAWB) is developing a contingent supply strategy, and has sought to establish criteria for triggering any necessary augmentation.

This Final Report addresses the proposed criteria. The Ministers have accepted the Authority's related report regarding the recovery of preparatory expenditure, while GAWB is yet to make a submission in respect of pricing issues shortly.

GAWB's proposed criterion for triggering augmentation in response to drought is:

> *to enable the appropriate augmentation to commence operations in sufficient time to avoid emergency restrictions and defer supply failure for a target period (currently two years), after allowing for inflows, losses, current and contracted future demand, and other forecasts as set out in the Drought Management Plan (DMP).*

GAWB's criterion for augmentation in response to unexpected additional demand is:

> *to trigger construction of the appropriate augmentation when GAWB has entered into contracts with customers that exceed the capacity of its water sources, after allowing for distribution losses and contingency.*

The Authority considers that GAWB's proposed criteria are appropriate. This view is, however, contingent upon a separate trigger being applied for the purposes of triggering supply restrictions from that to apply for the purposes of triggering augmentation which should be based on a less conservative assumption relating to inflows.

The Authority also notes that GAWB's current target period for deferral of supply failure in the drought trigger (two years) is consistent with GAWB's current assumptions regarding the size of the augmentation, the time taken to construct and the expected inflows. The Authority agrees with GAWB that the assumptions need to be set in consultation with its customers as part of the annual review of its Drought Management Plan (now due). Changing assumptions following these reviews could well result in different target deferral periods from time to time.

So far as the current assumptions are concerned, the Authority's view is that, on the available information, the current inflow assumption is too conservative, a 3% distribution loss factor is more appropriate than the 5% proposed and the proposed contingency reserve of 5% is currently unnecessary.

GAWB's proposed process leading to a triggering of an augmentation was also considered appropriate provided that more time is allowed for customer consultation and evaluation of options. Where GAWB seeks assurance that the Authority would support its proposed response, the Authority recommends that it be notified at the time of the low supply alert in the case of drought or when GAWB becomes aware of unexpected contracted demand that could require an augmentation and, if the response is likely to increase aggregate revenues by more than 15%, an appropriately drafted Ministerial Direction should be sought.

Conformance with the proposed criteria, customers' acceptance of the relevant assumptions and support for the intended response and adequate lead time for consultation should provide GAWB with certainty in regard to any proposed response when required.

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GLOSSARY

ACTEW	ACTEW Corporation Limited (ACT)
AHD	Australian Height Datum
BOM	Bureau of Meteorology
CPM	Callide Power Management
CQRWSS	Central Queensland Regional Water Supply Strategy
CSE	CS Energy
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSO	Community Service Obligation
DBCT	Dalrymple Bay Coal Terminal
DMP	Drought Management Plan
DNRW	Department of Natural Resources and Water
DSE	Department of Sustainability and Environment (Victorian Government)
EL	Elevation Level
ERA	Economic Regulation Authority (WA)
ESC	Essential Services Commission (VIC)
ESCOSA	Essential Services Commission of South Australia (SA)
FOI	Freedom of Information
GAWB	Gladstone Area Water Board
GL	Gigalitre
GPN	Gladstone Pacific Nickel Limited
GOC	Government Owned Corporation
GRC	Gladstone Regional Council
HNFY	Historical No Fail Yield
ICRC	Independent Competition and Regulatory Commission (ACT)
IPART	Independent Pricing and Regulatory Tribunal (NSW)
LOS	Level of Service
ML	Megalitre
NPV	Net Present Value
NWC	National Water Commission
NWI	National Water Initiative
Ofwat	Office of Water Services, UK
QAL	Queensland Alumina Limited

QCA	Queensland Competition Authority
QCA Act	Queensland Competition Authority Act (1997)
QWC	Queensland Water Commission
ROP	Resources Operations Plan
RTA	Rio Tinto Alcan
SCADA	Supervisory Control and Data Acquisition
SEQ	South East Queensland
SLMP	System Leakage Management Plan
SMEC	Snowy Mountains Engineering Corporation
SWP	Strategic Water Plan
Synergies	Synergies Economic Consulting
the Authority	The Queensland Competition Authority

1. BACKGROUND

The Authority has been directed by the Ministers to review the appropriateness of the Gladstone Area Water Board's (GAWB's) proposed contingent supply strategy and associated pricing practices, in three parts, namely: (a) the recovery of proposed preparatory expenditure; (b) the criteria for triggering construction of the appropriate augmentation; and (c) the proposed changes to pricing to recover the efficient costs for augmentation.

This Final Report relates to Part (b) of the investigation.

1.1 Introduction

As part of its strategic water planning, GAWB developed a preferred contingent supply strategy that entails sourcing additional water required to address drought or unexpected additional demand, from the Fitzroy River near Rockhampton.

GAWB proposed undertaking preparatory expenditure to attain reasonable certainty that water can be sourced from the Fitzroy River within 24 months of events that might require supply augmentation. GAWB has also proposed a process that will allow the consideration of other options such as desalination, demand management, air and seawater cooling, curtailment strategies and other water sources that may be proposed by customers.

1.2 GAWB's Operations

GAWB is responsible for the supply of raw and treated water to industrial and local government customers in the Gladstone area.

GAWB owns and operates Awoonga Dam and an associated distribution network. Awoonga Dam has a storage capacity of 770,000ML. GAWB is currently restricted to supplying no more than 70,000ML per year under its Water Resource Plan (WRP);

GAWB currently supplies approximately 55,000ML per year to existing customers. Supplies to power stations in the Callide Valley comprise approximately 40% of total demand. Rio Tinto Alcan (RTA), Gladstone Power Station, Orica, Queensland Alumina Limited (QAL) and Boyne Smelters account for a further 40%. Residential and commercial customers within the Gladstone Regional Council (GRC) (including Calliope) account for the remaining 20%;

1.3 The Scope of the Current Investigation

The Ministerial Direction

On 23 February 2007, the Premier and the Treasurer (the Ministers), pursuant to section 23 of the *Queensland Competition Authority Act 1997* (the QCA Act), referred the declared government monopoly business activities of GAWB to the Authority for investigations regarding the appropriateness of:

(a) GAWB's recovery of proposed preparatory expenditure from existing and future customers, specifically having regard to:

   (i) the prudence of GAWB's contingent source strategy, including selection of a supply from the Fitzroy River as the appropriate contingent source;

   (ii) the level of efficient costs associated with the development of GAWB's contingent supply strategy that should be included in prices;

(iii) the timing of expenditures which are related to the implementation of the contingent supply strategy; and

(iv) the means by which efficient costs of the contingent supply strategy should be included in prices for subsequent years;

(b) GAWB's proposed criteria for triggering construction of the appropriate augmentation in the event of drought or unexpected additional demand; and

(c) GAWB's proposed changes to pricing practices related to declared activities required to enable GAWB to recover its efficient costs of the system as appropriately augmented.

Scope of Current Investigation

This Final Report relates solely to Part (b) of the Ministerial Direction.

The Ministers have already accepted the Authority's Final Report in respect of Part (a).

Timing Issues

Under the Ministerial Direction, the Authority was directed to:

(a) consult with GAWB, GAWB's customers and other relevant stakeholders;

(b) provide a Draft Report on the investigation within 120 days of receiving notification of GAWB's proposed criteria for triggering implementation, with the Final Report to be provided within 60 days of the Draft Report; and

(c) consult with the Queensland Water Commission (QWC) in regard to any implications that the findings of the investigation may have for pricing practices in South East Queensland (SEQ).

The required timelines are subject to the receipt of information acceptable to the Authority and its consultants, any subsequent changes agreed to between the Authority and GAWB, and exclude nominated consultation periods.

1.4 Changed Drought Conditions

Since the Authority's Final Report in respect of the Part (a) investigation, significant changes have occurred in relation to GAWB's drought circumstances.

On 3 September 2007, Awoonga Dam was at only 29.88m Australian Height Datum (AHD) or 36% of total capacity. Following significant rainfall during February 2008, it reached 34.43m or 59.08% of total capacity. As at 21 November 2008, the water levels had fallen to 32.81m or 50% of total capacity.

GAWB has subsequently withdrawn a low supply alert previously issued and advised that the timetable initially proposed to meet a construction trigger of October 2008 no longer applies.

Under GAWB's base case demand scenario, as at 21 November 2008, Awoonga Dam is 70 months from failure and 10 months from a Low Supply Alert. On GAWB's base case demand and supply projections, the triggering of a drought augmentation is now deferred until August 2010.

A particular implication of this changed scenario is that GAWB now has time to examine other options to the Fitzroy Pipeline.

1.5 Part (b) – GAWB's Proposed Criteria

The Ministerial Direction for Part (b) of the investigation requires the Authority to investigate the appropriateness of GAWB's proposed criteria for triggering construction of the appropriate augmentation in the event of drought or unexpected additional demand.

On 21 December 2007, the Authority received GAWB's submission *Gladstone Area Water Board: Submission to the Queensland Competition Authority, Fitzroy River Contingency Infrastructure Part (b) Augmentation Triggers.*

Following the release of its submission to Part (b) of the investigation, GAWB submitted on 30 January 2008 that, in response to drought:

> *GAWB's proposed criterion to trigger construction is to enable the appropriate augmentation to commence operations in sufficient time to avoid emergency restrictions and defer supply failure for a target period (currently two years), after allowing for inflows, losses, current and future contracted demand, and other forecasts as set out in the Drought Management Plan.*

GAWB noted that the application of the criterion was intended to be both generic and specific to the current drought as indicated in Table 1.1.

Table 1.1 Application of Criterion for Drought Trigger

Item	*Generic application*	*Application in the current drought*
Appropriate augmentation	The augmentation determined as a result of the process set out in Section (c) of GAWB's submission.	The Gladstone-Fitzroy Pipeline with a capacity of 3OGL per annum (subject to customers submitting alternative proposals that will defer or avoid the need for this augmentation).
Sufficient time	A reasonable period of time to develop, commission and make operational the appropriate augmentation to enable supply to GAWB's customers, including reasonable allowance for project delivery risks and the costs and benefits of fast-tracking.	Two years.
Target period	As described in GAWB's Drought Management Plans as amended or revised from time to time.	Extension of supply by at least two years, as described in chapter 3 of GAWB's submission.
Storage inflows and loss assumptions used to calculate the time to supply failure	The inflows and losses set out in GAWB's Drought Management Plan, as amended or reviewed over time.	The inflows and losses set out in GAWB's current Drought Management Plan – i.e. inflows of 23,633ML per annum.

GAWB also submitted that, in response to unexpected additional demand:

GAWB's proposed criterion to trigger construction of the appropriate augmentation is when GAWB has entered into contracts with customers that exceed the capacity of its water sources, after allowing for distribution losses and contingency.

1.6 Related Existing Regulatory Arrangements

Existing regulatory arrangements approved by the Ministers subsequent to the Authority's 2005 investigation are relevant to the consideration of criteria to trigger an augmentation.

In the 2005 investigation, the Authority recommended that a price review should be triggered if there was, or was expected to be, a sustained variation of 15% or more in GAWB's aggregate revenue (QCA, 2005:151). A sustained variation was considered to be a permanent change which has occurred, or was expected to occur with a high degree of certainty, such as significant demand changes (QCA, 2005:155). The Authority's recommendation was subsequently accepted by the Ministers.

GAWB's proposed contingent supply strategy, including the proposed criteria and process, provides guidance, in the form of generic criteria, to guide decisions relating to when new augmentation can be reasonably expected to be required for previously unplanned events such as droughts or additional demand. While it is possible that the finally preferred option may not increase GAWB's aggregate revenue requirement by more than 15% and therefore may not trigger a review of prices, an augmentation such as the Fitzroy Pipeline would. The Authority would need to be directed by the Ministers to commence such a review, most likely in response to a request by GAWB.

1.7 Approach to the Investigation

In undertaking the current investigation, the Authority has:

(a) released GAWB's submission in relation to Part (b) of the investigation for comment;

(b) released a Draft Report for comment;

(c) taken into consideration all customer and stakeholder submissions, including further submissions from GAWB in response to stakeholder submissions;

(d) commissioned advice from independent consultants on relevant technical issues;

(e) consulted with GAWB, GAWB's customers and all other relevant stakeholders to gain further understanding of matters relevant to the investigation; and

(f) consulted with the Queensland Water Commission (QWC) in regard to any findings in this investigation that had potential implications for pricing practices in South East Queensland.

In commenting upon the Draft Report, GAWB expressed concern about the focus upon parameter values, noting that a detailed examination of parameter values is not relevant to considering the appropriateness of the criteria, which are generic.

While the Authority accepts that the proposed criteria should form the focus of attention, given their generic nature it is not possible to gain an understanding of their implications without giving consideration to how the criteria might be applied by GAWB. It is in this context that comment has been made on the parameter values and underlying assumptions. Furthermore, parameter values were addressed by stakeholders in their submissions.

The Authority therefore considers that retaining its detailed findings in the Final Report will be of assistance to both GAWB and customers.

1.8 Other Issues

Under section 26 of the QCA Act, the Authority must have regard to a variety of matters including consumer protection, the costs of services, demand management and social welfare considerations. Any of these matters deemed relevant to the Authority's decision have been taken into account in the Authority's deliberations.

2. CRITERIA FOR DROUGHT TRIGGERS

GAWB proposed the following criterion for triggering augmentation in response to drought:

> *to enable the appropriate augmentation to commence operations in sufficient time to avoid emergency restrictions and defer supply failure for a target period (currently two years), after allowing for inflows, losses, current and contracted future demand, and other forecasts as set out in the Drought Management Plan (DMP).*

The Authority recommends acceptance of GAWB's proposed criterion.

In regard to the assumptions supporting the timing for triggering augmentation, the Authority agrees that the factors identified by GAWB are all relevant. Specifically, the Authority recommends that:

(a) the target period for deferral established at any point in time should reflect the size of the proposed augmentation proposed, the time it takes to construct the augmentation (including construction risks) and the expected inflows;

(b) with regard to inflow assumptions:

(i) different inflow assumptions should be applied for triggering supply restrictions and triggering augmentation, with the former being more conservative;

(ii) the most appropriate inflow assumption for each trigger should be established by GAWB in consultation with its customers; and

(iii) the inflow assumptions should be reviewed periodically, taking account of the most recent hydrological and climate information;

(c) GAWB's proposed approach in regard to storage losses (evaporation and seepage) should be accepted and that distribution system losses should also be recognised in the drought response trigger; and

(d) contracted demand should be confirmed within 90 days of a low supply alert and any voluntary demand reductions subsequently identified by customers prior to supply restrictions being applied should be reflected in the contracted demand volumes.

The Authority regards the DMP as an appropriate mechanism for defining the augmentation trigger arrangements having regard to:

(a) the most recent information relating to inflows, seasonal conditions, supply information and estimates of demand;

(b) customers' risk preferences reflecting their risk profiles as established through appropriate consultation; and

(c) the preferred option arrived at after consideration of all options including the Fitzroy Pipeline, desalination, air and water cooling and alternative supply.

2.1 GAWB's Proposed Criterion

GAWB proposed the following criterion for triggering augmentation in response to drought:

> *to enable the appropriate augmentation to commence operations in sufficient time to avoid emergency restrictions and defer supply failure for a target period (currently two years), after*

> *allowing for inflows, losses, current and contracted future demand, and other forecasts as set out in the Drought Management Plan (DMP).*

GAWB's criterion can be viewed in three parts.

The first part refers to the construction of the appropriate augmentation which GAWB has previously nominated to be a pipeline from the Fitzroy River. As noted by the Authority in its Part (a) Final Report, there are many other possible responses to the drought. GAWB, while seeking to ensure that necessary preparatory works and investigations have been undertaken to allow a preferred contingent supply strategy to be put in place if required, has also recognised that other possibilities exist and has proposed a process for identifying, and putting in place, the most appropriate response. This process is detailed and reviewed in chapter 4.

The second part of the criterion defines the standard to be achieved (objectives or 'target outcomes') – that is, the avoidance of emergency restrictions and deferral of supply failure for a target period (currently two years).

The third part of the criterion can be regarded as the assumptions which underpin the estimation of the target period for the deferral of supply failure.

2.2 The Objectives

General

Draft Report

In its initial submission, GAWB stated that the key objectives underpinning its criterion were the avoidance of emergency restrictions and the deferral of supply failure for a target period (currently two years).

GAWB noted that, under the DMP, a low supply alert is issued five years before projected dam failure. A mandatory 10% applies after 12 months. Emergency restrictions apply in the last six months before projected supply failure and involve 50% restrictions for municipal customers, and a total water ban for all other customers (including industry).

GAWB submitted that, during this time, customers may trade their allocations (at their own negotiated prices) and GAWB proposed to incorporate curtailment arrangements in contracts to temporarily reduce demand during drought. These arrangements would be specified in contracts in advance and triggered during drought, to either supplement or replace restrictions. The arrangements provide customers with greater discretion about their levels of service. GAWB advised it has written to individual customers to determine their interest in negotiating an individual restriction regime tailoring levels of service.

In many jurisdictions where drought has been an issue, the key stated objectives have been to avoid supply failure, and to avoid severe restrictions (defined in different ways). For example:

(a) the 2006 Metropolitan Water Plan for Sydney (NSW Government, 2006) stated its goal as the avoidance of severe supply restrictions. It proposed that, once extreme drought conditions emerge and storages fall to 30%, construction of a desalination plant would be triggered. The NSW Government indicated that such restrictions impose significant social and economic costs for end users;

(b) in Western Australia, the Economic Regulatory Authority (ERA, 2007) investigated the Water Corporation's proposed service standard based on ensuring that the probability of a total sprinkler ban would be below 0.5% (1 in 200 years). The ERA (2007) confirmed its

previous advice to Government that imposing such a standard may impose too high a cost on water customers and indicated a preference for a 1 in 50 target; and

(c) in the Australian Capital Territory (ACT), the Australian Capital Territory Electricity and Water (ACTEW, 2004) indicated that it considered that customers would expect that a complete ban on outdoor use should not be planned for.

In Queensland, the Draft SEQ Water Supply Strategy (QWC, 2008) established level of service (LOS) objectives relating to the duration, severity and frequency of water restrictions. The QWC noted that the social and economic consequences of an unreliable water supply or failure of supply are simply unacceptable and that severe restrictions would not be implemented. The Strategy also incorporated a Drought Response Plan (DRP) to ensure continuity of supply regardless of climatic conditions. Under this Plan:

(a) the T1 trigger level introduces medium level restrictions (15%) when there is nominally 36 months of water remaining in the drought storage reserve, taking into account climate resilient supplies such as desalination, recycled water and a minimum level of inflows equivalent to the second worst inflow year; and

(b) the T2 trigger level commences the construction of pre-planned drought infrastructure when 30 months of supply remains. The supply restrictions would remain at medium level (15%).

In response to GAWB's initial proposal, customers' comments focussed on the possibility that different customers had the potential to respond to drought differentially.

For example, Callide Power Management (CPM):

(a) submitted that, through its DMP, GAWB has only partially sought to define customer levels of service, and has not acknowledged that different customer(s) may require different levels of service; and

(b) argued that GAWB has dismissed representations from CPM and other customers for a differentiated level of service. CPM stated that this was illustrated by GAWB's intention to share the costs of any augmentation/contingency response across the entire customer base.

CPM also suggested that differentiated levels of service could be achieved by allowing customers to 'opt in' to a 'premium' reliability supply contract, where reliability is supplemented by any contingency response/augmentation. Other customers could elect to remain on a 'standard' reliability contract, receiving supply from Awoonga only, with a consequent higher exposure to drought risk and future supply restrictions.

RTA strongly supported the avoidance of emergency restrictions. RTA submitted that, without uninterrupted access to reliable water supplies, its ability to meet its customer requirements would be compromised. RTA advised that it would be unacceptable for it and its customers. RTA considered that the recent drought and low supply alert demonstrated that GAWB is unable to provide the certainty of supply required.

RTA also submitted that the rationale for the nominated two-year extension to supply was not clear and that customers may still be under supply restrictions even following augmentation. RTA was concerned about the adequacy of the target period of supply particularly when set against possible increases in demand and the higher cost of incremental supply.

RTA submitted that, if a customer participated in a curtailment initiative to prevent or delay an augmentation, it should not be penalised for reducing consumption below its reservation levels.

The Authority's Draft Report proposed that the criteria for triggering an augmentation in a drought should be consistent with:

(a) GAWB's corporate objectives and goals; and

(b) the criteria for augmentation more generally (that is, under normal circumstances).

The Authority identified that GAWB's key business objectives and goals are to meet the water requirements of current and future customers, to achieve commercial results, be regarded as a responsible corporate citizen, and ensure the organisation has the ability to carry out its mission (GAWB, 2007:16).

The Authority noted that criteria for water supply augmentation in normal circumstances generally include consideration of the following factors:

(a) level of service to be delivered (for example, water quality, probability of failure, risk levels and downtime). The Authority (2002) noted that certain customers may be prepared to pay for more assets to ensure that particular service standards are met;

(b) forecast demand including contractual demand (QCA, 2005:84);

(c) availability of water supply, taking account of identifiable and predictable hydrological revisions (QCA, 2005:80);

(d) least cost options of infrastructure to access supplies. The Authority's approach seeks to ensure that the least cost is incurred to provide the requisite level of service over the relevant period (QCA, 2005:95); and

(e) public interest matters such as resource allocation, protection of consumers, social and equity considerations, availability of goods and services, environmental impacts and economic development (QCA, 2005:168).

Avoidance of Emergency Restrictions

Draft Report

In considering GAWB's proposals, the Authority noted in its Draft Report that GAWB's criteria of avoidance of emergency restrictions and deferral of dam failure represent a worst case scenario and relate to a judgement concerning acceptable level-of-service objectives.

In its initial proposal, GAWB submitted that a number of its customers have limited ability to reduce demand. It reiterated previous advice from QAL that water is fundamental to QAL's production process, so that a 5% reduction in supply results in a 5% reduction in alumina output.

In this regard, the Authority noted previous submissions by stakeholders to GAWB's Drought Management Plan (DMP) that indicate that some customers (QAL, RTA) must have 100% reliability of supply and thus must avoid the total ban on the availability of water to industrial users associated with emergency restrictions. RTA's concern that GAWB's strategy may not extend the dam failure date sufficiently was particularly relevant. The economic cost of supply cessation for alumina processing facilities is likely to be significant relative to the cost of an augmentation strategy.

The Authority accepted that the economic costs of applying the emergency restrictions are unacceptable to some customers and, because of their potential broader implications for the regional economy, likely to be unacceptable to the Gladstone community.

Nevertheless, the Authority also noted:

(a) CPM's submission that customers should be provided with a choice as to how to respond in different circumstances; and

(b) that other customers (the two former councils and the power stations) may be prepared to consider more extensive restriction regimes to avoid the costs of augmentation.

In the absence of submissions from the councils, it was difficult to determine whether residential customers can tolerate the current emergency restrictions. However, the Authority noted that, in submissions to the Part (a) investigations, the then Calliope Shire Council supported the 50% emergency restrictions applied to residential customers. It was also noted that domestic consumers in SEQ have reduced consumption from pre-drought levels of nearly 300 litres per person per day to less than 140 litres per person per day in response to recent drought conditions (QWC, 2008).

The Authority considered that customers are in the best position to judge their own expected costs from drought and their tolerance of supply risks and that these can differ substantially between customers. However, customers will require information regarding the pricing impacts of various response options as an input to their own decisions. Unless this information is readily available, cruder responses such as supply restrictions may be required.

The QWC had noted that stakeholder preferences (in SEQ) are not always well aligned and has applied a single level of service objective across the region. The Authority considered that GAWB, as a bulk supplier to a small number of customers, has scope to implement different levels of service. Such an approach tailored to individual customers needs should enhance Gladstone's attractiveness for industrial development.

In its proposals, GAWB accepted that different levels of service quality should be provided and indicated that it is relying on the prospect of commercial trading and the proposed curtailment arrangements to facilitate these different service standards.

In its Part (a) investigation, GAWB indicated, and the Authority accepted, that trading opportunities may be limited due to the small number of customers and the particular circumstances of Gladstone's physical market. Nonetheless, the Authority accepted that the availability of a commercial framework for trading provides an option for some customers to address differential service standards under drought conditions.

The Authority also concluded in its Part (a) investigation that GAWB's proposed curtailment policy has merit as it recognises the differential capability of parties to reduce water consumption (QCA, 2007:30). The Authority continued to support this option, to enable unused contracted reservation volumes to be utilised to defer unnecessary further restrictions or augmentations. The pricing implications of curtailment should be negotiated as part of contractual arrangements, but the Authority noted that, unless charges on the reservation volume are adjusted, there may not be sufficient incentive to adopt a curtailment strategy.

While it received submissions from customers indicating a willingness to consider alternative levels of service quality and more extensive water restrictions, the Authority did not receive any indication that any industrial customer could tolerate the zero supply envisaged under the emergency restrictions for other than for a very short period of time.

The Authority concluded that, even if some industrial customers could tolerate zero supply, avoidance of the restrictions is necessary to address the needs of those customers who cannot operate under such severe restrictions. Not all will have the ability to consider alternative sources of supply (such as for example, a stand-alone desalination plant).

The Authority noted, however, that the response to drought will be affected by the volume of water required by those customers who could not access alternative sources and require water to continue to operate. The Authority's investigation into the appropriateness of GAWB's preferred augmentation strategy relating to the Fitzroy Pipeline was particularly relevant. In its Part (a) Final Report, the Authority concluded that there was a wide range of plausible options that need to be considered. Most of these are still relevant and more may be identified by GAWB and its customers over time.

The Authority considered that there was sufficient time available under the envisaged key assumptions, particularly those relating to inflows, for the most appropriate options to be considered and defined within the context of the consultation process proposed by GAWB.

Accordingly, the Authority accepted that avoidance of emergency restrictions was a relevant objective for triggering construction if, after considering all options, augmentation was the appropriate response. The pricing implications of the various options were considered likely to be a key input to the choice of response.

Stakeholder Submissions on the Draft Report

In its response to the Draft Report, CPM concurred with the Authority's view that GAWB's customers ultimately bear the economic risk of supply shortage arising from drought and, therefore, are in the best position to judge their expected costs from drought and their tolerance of supply risks.

CPM also reiterated its support for an 'opt in' arrangement under which GAWB would provide differentiated levels of service to its customers and customers would decide on the level of supply risk they were willing to assume. CPM indicated that timely provision of information regarding pricing impacts was vital in such an arrangement.

CPM agreed with the Authority's conclusion that GAWB's position as a bulk supplier to a small number of customers could allow it to implement service level differentiation effectively.

The Gladstone Regional Council (GRC) submitted that, while it would be difficult for GAWB to model and price different levels of service, this should not be a reason to dismiss such a strategy. In response to whether residential customers could tolerate the current emergency restrictions, GRC submitted that it would continue to support the 50% emergency restrictions. However, GRC stressed that achieving a 50% restriction would be significantly more difficult compared to 2002-03, as residential consumption in 2007-08 has not returned to the levels existing in 2002-03. GRC also submitted that GAWB's solution of allowing customers to trade has some merit, but stated that it would be difficult to see how an arms length side deal could form part of any drought management policy.

In response to the Authority's Draft Report, GAWB submitted that it had placed great emphasis on supply security in recognition of the consequences of supply interruptions or shortages to the majority of its customers. GAWB noted that the importance of supply security was confirmed by submissions from customers such as RTA, during and following the 2002 drought. GAWB also noted that 'given GAWB's largely industrial customer base, blanket restrictions are likely to destroy economic value'.

The Authority's Analysis

The Authority accepts that GAWB's industrial customers would not be able to tolerate the zero supply associated with emergency restrictions and that GRC would find achieving a 50% reduction significantly more difficult than in 2002-03.

Accordingly, as noted in its Draft Report, the Authority recommends that the avoidance of emergency restrictions be accepted as a relevant objective for triggering construction if, after considering all options, augmentation is the appropriate response.

The Authority also notes the support for differentiated service levels (CPM and GRC) and that this reflects different customers' own expected costs from drought and their tolerance of supply risks. Such preferences will be critical to establishing the time available to respond and the most appropriate response to drought. The pricing implications of the various options are likely to be a key input to the choice of the response. The importance of considering alternative supply restriction regimes and their pricing implications has already been noted in the Authority's Final Report on Part (a) of this investigation, and will be considered further in Part (c).

Deferral of Dam Failure

Draft Report

In its initial submission, GAWB proposed that supply augmentation should be timed to extend dam failure by a target period (currently at least two years).

The Authority accepted that any response, including augmentation, should seek to defer dam failure. In this regard, as part of its Part (a) investigation, the Authority accepted GAWB's conclusions from its experience with a previous drought that restrictions were applied too late.

The Authority noted that deferral of dam failure by two years would allow an additional two years during which further inflows, if sufficient, could avoid the need for further augmentations. However, the Authority considered that, in its initial submission, GAWB did not substantiate the basis for the two-year target period it set.

Factors such as the probability of continuing low inflows and the scale and cost of the particular augmentation option adopted were considered relevant. As an example, the Authority noted that a 60GL pipeline (larger than the currently preferred 30GL pipeline) or a desalination option could delay the need to commence construction until two years prior to failure as it could meet annual demand fully once constructed. Until demand increased, dam failure could be deferred indefinitely under such an option. By comparison, GAWB's proposed 30GL pipeline would need to be in place earlier to ensure a two-year deferral of dam failure as it can deliver only half of the current annual demand for water. The Authority also noted, however, that any deferral by more than two years foregoes the opportunity that rain could limit the need for expensive infrastructure augmentation.

The Authority concluded that, while the objective of deferral of dam failure is appropriate, many factors will be relevant to determining the lead time necessary to avoid dam failure. These factors need to be considered in the context of the planning process proposed by GAWB.

Stakeholder Submissions on the Draft Report

GAWB submitted that the Authority misinterpreted the target outcome, that it is a minimum standard (or threshold requirement) rather than a precise outcome to be achieved. Therefore, GAWB argued that its target outcome is to postpone dam failure by at least two years.

In separate advice to the Authority, GAWB considered that deferral of dam failure by exactly two years would not be prudent and that the Authority has not had sufficient regard to the risk or consequences for error. GAWB added that:

(a) the rationale for setting a target outcome was to generate sufficient deferral to allow further augmentation to be undertaken should severe drought continue beyond a five-year period. GAWB also submitted that the target period of at least two years is based on GAWB's current assessment for project delivery of source augmentations generally.

(b) the two year minimum is designed to account for inherent project risks beyond GAWB's reasonable control. Such risks include the availability of resources (personnel, equipment and materials) and disrupting factors (flood, industrial disputes or environmental concerns). GAWB also noted that the risk is greater if construction commenced mid-year because there would be only one dry season in which to carry out a significant portion of the project.

In a further subsequent submission, GAWB stated that the minimum deferral period of dam failure of two years was considered appropriate as a target outcome as:

(a) the chosen augmentation option must be operational with sufficient time to make a difference to the entire water supply network, allowing all customers to benefit from the augmentation regardless of their point of connection to the network;

(b) it provides further time for at least two additional wet seasons to break a prolonged drought, potentially delaying the need for further augmentation; and

(c) there must be sufficient deferral of dam failure to allow a further augmentation to be undertaken should severe drought conditions continue beyond a five-year period.

GAWB also noted that this target period would be reviewed as part of the review cycle for the DMP, in particular taking into account the expected timeframe to deploy further augmentation, if this is required due to prolonged drought.

The Authority's Analysis

In its Draft Report, the Authority concluded that GAWB's criterion should include a target period for deferral of dam failure.

The Authority accepts the information provided subsequently by GAWB that, should inflows continue to remain at the low levels postulated by GAWB, the two year deferral provides just sufficient time for GAWB to undertake a second augmentation before dam failure occurs. That is, if the second augmentation (such as desalination) requires a two-year construction period, it would need to be commenced within two years after completion of the first augmentation to be completed in time.

The Authority also noted in its Draft Report that the probability of continuing low inflows, size and cost of particular augmentation options and construction time (including associated risks) could all be expected to be relevant to the most suitable target deferral period and could be expected to vary over time.

The Authority also accepts GAWB's proposition that project delivery and construction risks are relevant and may vary according to the timing of the augmentation. The project delivery risk can be mitigated by a range of strategies including the existence of preparatory works as indicated in the Part (a) investigation. The risk of construction delays due to floods or wet season impacts should be addressed in the construction timeline. GAWB has not proposed to

alter the target date to reflect project delivery and construction risks. The Authority recognises that GAWB intends that the current two year deferral represents a minimum target.

The Authority therefore recommends that:

(a) GAWB's criterion include a target period for deferral of dam failure; and

(b) the target period for deferral established at any point in time should reflect the size of the proposed augmentation strategy proposed, the time it takes to construct the augmentation (including construction risks) and the expected inflows.

On the basis of GAWB's current assumptions, a two year deferral seems appropriate. However, the most appropriate target depends on which assumptions, related to the above factors, are accepted by customers.

2.3 Assumptions

GAWB's criterion also identified the various assumptions that underpin the timing of an augmentation in response to drought. These include inflows, losses, current and contracted future demand, and other forecasts set out in the DMP.

In commenting on the Draft Report, GAWB expressed concern about the focus on parameter values, noting that a detailed examination of parameter values is not relevant to considering the appropriateness of the criterion, which is generic.

While the Authority accepts that the proposed criterion should form the focus of attention, it is not possible to understand its implications without considering how it might be applied by GAWB. It is in this context that comment has been made on the parameter values and underlying assumptions. Furthermore, parameter values were addressed by stakeholders in their submissions.

For these reasons, the Authority has retained its discussion of parameter values and assumptions, and their implications for augmentation triggers.

Inflows

Draft Report

In its initial proposal, GAWB submitted that the assumed level of Awoonga Dam inflows is a key factor in its criterion for triggering construction in response to drought. GAWB referred to a report prepared by Synergies Economic Consulting (Synergies) that reviewed the inflow options.

The key variable in the inflow assumption is the period over which the historical worst sequence of inflows should be averaged. Synergies noted that prior to the current DMP, GAWB's inflow assumption was the average of the 10 worst consecutive years of inflow on record (from 1993 to 2002). This approach was based on advice from Hydro Tasmania Consulting that a 10-year period was appropriate for averaging inflows.

However, Synergies stated that there was a strong argument to reduce the time period for averaging inflows, given that the 10-year average includes one substantial inflow (1996) while the average of the remaining years is much lower. Synergies concluded there was significant scope for inflow sequences to occur over three to five years which would be well below the 10 year worst average.

This proposition was also supported by Connell Wagner, in its review of GAWB's drought model (AWSIM–D).

Synergies identified two alternative scenarios, based on:

(a) assuming zero inflows during the period going forward. Synergies indicated that this would trigger DMP actions while storage levels remain relatively high, which could result in unnecessarily early restrictions; and

(b) setting the trigger not on the basis of assumed inflows, but simply when Awoonga Dam has three years of supply left at current demand, regardless of inflows and after allowing for evaporation and seepage. Synergies indicated this would be at a storage level of 28.2m, equivalent to 225,060ML based on current demands.

Synergies noted that, in selecting a time period for averaging inflows:

(a) flow assumptions should draw from historical events, but be sufficiently conservative that there is a low probability of a lower flow occurring [Synergies did not quantify what it considered to be a low probability];

(b) it is desirable but not essential to avoid triggering a Low Supply Alert or supply restrictions above a dam level of elevation level (EL) 30m as it would be inappropriate to have restrictions while environmental releases continue to be made (environmental releases are discontinued once dam levels fall below EL 30m); and

(c) at the trigger point for a Low Supply Alert, it is desirable to have at least three years forward supply in reserve storage to enable a supply response to an extreme series of years (for example, zero inflows).

Synergies stated that inflow assumptions should:

(a) focus on conservative options, given the step down change in rainfall in the region since the 1970s. Synergies indicated that there is limited historical data available to GAWB and that worse inflow sequences could occur in future.

(b) attempt to achieve a balance between:

    (i) the risk of not applying restrictions early enough; and

    (ii) the risk of requiring supply alerts and restrictions on too frequent a basis, which can result from overly conservative inflow assumptions not reflecting actual inflows.

(c) include an assessment of the likelihood of various inflow assumptions using stochastic modelling and historical data.

(d) ensure that the risk of over-estimation is managed accordingly.

Synergies' analysis compared estimated inflows based on the worst 10 year (consecutive) average inflows, the average worst consecutive four years and the average worst consecutive three years. For each of these scenarios, and a worst case zero inflow assumption, Synergies identified the dam level for triggering a Low Supply Alert and the time to dam failure, based on dam levels as they existed at December 2007. Table 2.1 refers.

Table 2.1 Summary of Options (GAWB/Synergies)

Time Period for Averaging Inflows (Consecutive Years)	*Worst Average Annual Inflows (ML) May to April*	*Low Supply Alert Trigger (dam level, EL metres)*	*Time to Failure (months from May 2007)*
Lowest 10 years	69,243	23.6	150
Lowest 4 years	46,432	26.6	80
Lowest 3 years	23,633	30.4	60
Zero inflows	0	34.2	48

Note: Synergies examined the worst historical sequences (consecutive years) as well as the averages of the worst non-consecutive years. Only the consecutive sequences are noted here.

Synergies recommended that the time period for averaging the worst inflows should be three consecutive years on the basis that:

(a) it is relevant in terms of the current drought sequence, given the potential for a step change in inflows over recent years;

(b) it is prudently conservative, as:

  (i) it is assumed that the worst three-year sequence on record will continue for a period of five years[1], thus assuming that the five-year worst average will in future be lower than now; and

  (ii) stochastic modelling indicated a very low probability of lower inflows occurring, for example, Synergies estimated that the probability of an average consecutive inflow over three years of less than 19,000ML per year was only 1%[2]; and

(c) it triggers a Low Supply Alert at a dam level of EL 30.4m (296,000ML), with sufficient storage to support current demands for more than 36 months if the worst case (nil) inflows occurs over five years, and therefore provides a window for GAWB to augment supply to avoid storage failure in such an extreme event.

Synergies also indicated that it may be prudent to limit the time period for averaging consecutive inflows to, at most, the five-year forecast period used for the DMP.

The data indicated that the lowest three-year sequence in the three years leading up to 2007 is May 2004 to April 2007, with an annual average inflow of 23,633ML.

GAWB further justified this approach as being supported by:

(a) industry practice – augmentations under way in SEQ and Melbourne are based on drought inflows that are equivalent to, or more conservative than, that adopted by GAWB; and

[1] According to Synergies, the period of 5 years comprises the five-year life of the DMP.

[2] As discussed later, Cardno estimates that the 1% probability for inflows over three consecutive years is 29,750ML and not 19,000ML

(b) prudent risk management – the approach allows GAWB to adapt its response should more severe events emerge.

In the Draft Report, the Authority noted that, in Western Australia, the ERA (2007) has investigated the Water Corporation's assumptions in regard to triggering capital expenditure on a pipeline to the metropolitan area from South West Yarragadee. The ERA considered that the Water Corporation's assumptions, based on a six-year average worst consecutive inflow as against the previously used 10-year average, were overly conservative. However, the capital expenditure was considered reasonable in the face of climatic uncertainty.

Further, the Authority noted that, in the South East Queensland Water Strategy, the Queensland Water Commission (QWC) has proposed that, as part of the proposed Drought Response Plan, an augmentation would be triggered at dam levels when sufficient water is available in the drought storage reserve, including climate resilient supplies (such as desalination) to meet restricted demand for a period of 30 months. The QWC did not provide reasons for its inflow assumption.

Historically, the Victorian Government (DSE, 2007) used the average inflows from the past 100 years and the worst consecutive 10 years to guide their water supply planning for Melbourne. However, in response to climate change and rainfall uncertainty, the Victorian Government developed a new scenario that envisages a repeat of the past three years' inflows. The Victorian Government claimed that this approach was risk averse and prudent as a basis for water supply planning for Melbourne.

The NSW Government's Metropolitan Water Plan (2006) did not identify an assumed level of inflows for triggering a drought response. Rather, the trigger was related to a pre-determined dam level of 30%. However, the Plan recognised the impact of recent inflow data on annual water availability which was reduced by 30GL.

In response to GAWB's initial proposal, CPM submitted that the very low inflow assumption proposed by GAWB constrains the time available to identify, evaluate and develop supply augmentation or demand management options and biases the choice of contingent response towards larger (supply only) options.

CPM further considered that the DMP fails to allow for any consideration of whether, for a particular low supply situation, there is a different probability around future inflows, and hence a different cost/benefit trade-off for committing early to a contingency response. CPM stated that 'it effectively links a decision to incur significant contingency costs, with 100% certainty, to an inflow assumption that has proved in fact to be less than 100% certain'.

In its response to GAWB's initial proposal, CS Energy's view was that GAWB had chosen an unrealistically conservative measure for expected inflows. It considered that the Synergies' report for GAWB underplayed the importance of the occurrence of high inflow events. CSE also noted that, while the frequency and extent of the big inflows have reduced in recent years, they are still extensive and frequent enough to warrant a more optimistic view than the 23,000ML per year being assumed by GAWB.

RTA acknowledged in its response to GAWB's initial proposal that the assumption of the average worst consecutive three years of inflows is conservative. Nonetheless, RTA accepted the prudence of this assumption provided that any cancellation costs for augmentation that is commenced but is no longer warranted are managed efficiently. It noted that there was only three months between the imposition of supply restrictions and commencement of augmentation in response to drought, giving little time for customers to present demand (or supply) side alternatives.

In the Draft Report, the Authority accepted that the inflow assumption for triggering supply augmentation was an essential variable to avoid the imposition of emergency restrictions. Without any response, dam failure occurs in five years when assuming the average worst three consecutive year inflows. In general, the higher the assumed average inflow, the later restrictions are triggered. The earlier restrictions are triggered and the more stringent they are, the later augmentation will be required. The smaller the augmentation, the earlier construction needs to be commenced to meet the objective of at least a two-year deferral of dam failure. A larger augmentation may be deferred to closer to the time of expected dam failure although the effect of the size of the augmentation on the construction timetable would also need to be taken into account.

Under the current DMP, construction of the Fitzroy Pipeline commences at the time the 10% water restrictions are imposed (four years before dam failure). Construction is expected to take two years and defers dam failure by 36 months (on the basis of GAWB's assumptions and modelling). The Authority observed in the Draft Report that this exceeded GAWB's stated objective of deferring dam failure by two years.

In the Part (a) investigation, the Authority accepted that the use of the average worst consecutive three-year inflow was prudent for the purpose of triggering phased restrictions under the DMP (QCA, 2007:20). However, it noted that, under the current DMP, the construction of the 30,000ML Fitzroy pipeline could have been delayed by at least one year and still meet GAWB's preferred minimum two-year deferral of dam failure (on GAWB's assumptions). Factors other than the quantum of inflows were considered relevant to when the commencement of augmentation should be triggered.

The Draft Report noted that those other factors included the extent to which customers are prepared to reduce consumption (either during the phased restrictions period before the imposition of emergency restrictions or for the purpose of emergency restrictions) and the risk that customers are prepared to carry relating to delays in commencing construction, increased prospect of rain in the case of deferral and the costs involved.

As part of its Part (a) investigation, the Authority observed that supply augmentations are usually more costly than supply restrictions, particularly restrictions imposed on urban consumption. Further, while supply restrictions can be removed at no cost, the same is not the case for supply augmentations. New supply still has to be paid for even if it is no longer needed (QCA, 2007:20).

The Authority considered that the relevance of the above matters is that customers' preparedness to enter into curtailment arrangements and to contract to pay the costs of prospective augmentations are affected by their perceptions of the risks associated with deferral of augmentation and the price implications of various response strategies. These in turn depend upon the probabilities associated with projected inflows.

Customers' preferences in turn will affect GAWB's decisions related to its supply management responsibilities.

The Authority's Draft Report identified the factors relevant to the choice of inflow assumption to be as follows.

(a) Historical Background

For comparison, the historical worst inflow sequences, based on the available data, are detailed in Table 2.2 below.

Table 2.2 Historical Worst Inflow Averages (Consecutive Years)

Time Period for averaging inflows (years)	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
Period	***2004-2006***	***1998-2001***	***1997-2001***	***1996-2001***	***1994-2000***	***1994-2001***	***1993-2001***	***1992-2001***
Average Annual Inflow (ML)	24,161	46,432	42,994	52,055	80,722	73,660	74,151	71,739

Note: In its revised DMP, GAWB indicated its 'worst three year' inflow assumption is based on a May to April water year. The above average sequences therefore reflect a May to April water year. Further, the Authority had previously used GAWB's stated worst average three-year inflow of 23,633 ML, as stated in its DMP. The worst average consecutive three-year inflow of 24,161ML per year, as stated above, now reflects actual recorded inflows for 2007.

Worst consecutive inflow averages taken over seven to 10 years fall into a range of around 70,000ML to 80,000ML and typically incorporate a major inflow event. The averages over four to six years generally fall into the 40,000ML to 60,000ML range, while the three-year average is much lower at 24,161ML per year. It is noted that the five-year average is less than the four-year average, as both only include one significant inflow event.

As stated by GAWB, the previous DMP used the worst average 10-year inflow sequence, which is considerably longer than the five year period managed by the DMP. The Authority noted that the historical worst 10-year inflow sequence occurred between 1993 and 2002 and included a significant inflow (258,000ML) in 1996. Excluding this inflow, the average for the remaining nine years of the sequence is 52,301ML per year. A major inflow event may not be expected to recur within the five-year period after the DMP is triggered. A time period for averaging inflows which includes a major inflow event would not provide a prudently conservative approach for deriving a drought response trigger, given how infrequently major inflows occur. The Authority considered that, in principle, the inflow assumption should not include significant inflow events.

The Authority noted that the scope of Synergies' review of the DMP inflow assumption was limited to trigger points for the low supply alert and water supply restrictions and did not specifically address supply augmentation.

(b) Climate Change

In the Draft Report, the Authority noted that, with respect to climate change, variations in average annual rainfall in the order of -15% to +7% over much of Queensland are expected by 2030 (BOM 2007, CSIRO 2005), and that the most likely change in mean annual inflows for the Fitzroy River due to climate change would be -15% to +5% by 2030 (CSIRO, 2005). No specific information was available in relation to the Boyne River catchment.

To analyse recent rainfall trends, the Authority reviewed historical trends using available inflow data. The trend lines for the five-year historical moving averages were downward sloping for the data since 1938. For the subset of data since 1980, a downward trend remains (Figures 2.1 and 2.2).

The Authority found that, projecting forward based on these linear trends, average annual inflows could decline to the 60,000 to 80,000ML range over the next five years. However, as

trend-based forecasts reflect overall averages, rather than the average inflows during the dry periods, they were not considered to be conservative enough for establishing drought triggers.

Figure 2.1 Awoonga Dam Inflows – 1938-2007, five-year moving average

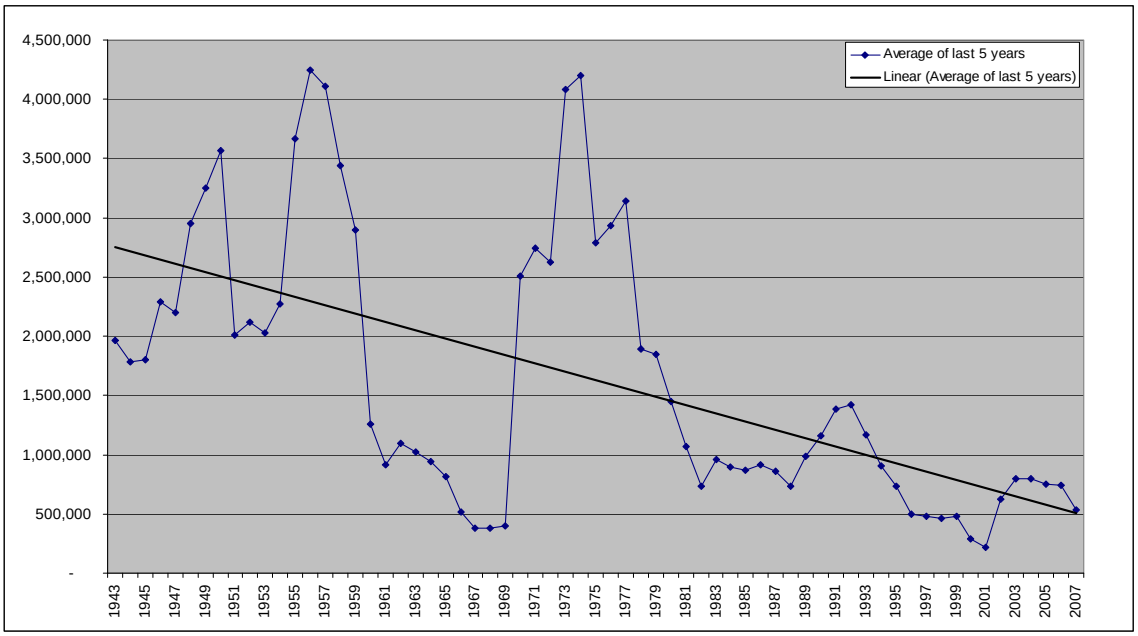
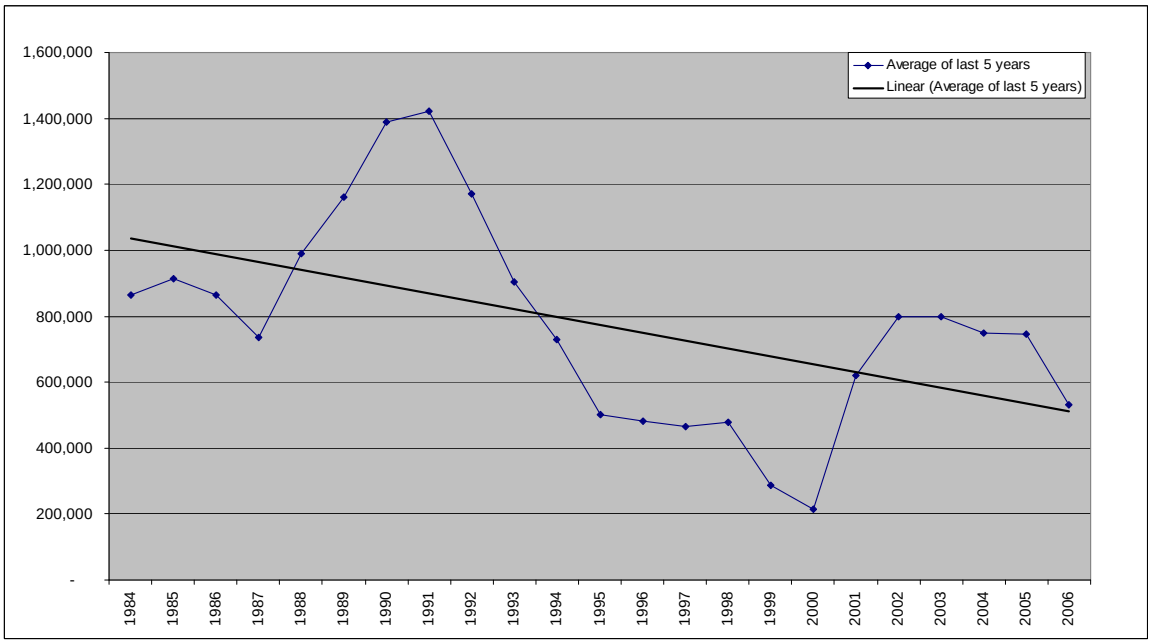


Figure 2.2 Awoonga Dam Inflows 1980-2007, five-year moving average



The Authority noted Synergies' concerns about climate change impacts on future inflows given the limited history currently available to GAWB. In addition, it was noted that the QWC has adopted a climate change scenario for SEQ based on a mid-range estimate of a 10% reduction in available yield from current storages as compared to already reduced levels. The Authority therefore concluded that it was prudent to account for the risk of long term variations in rainfall

patterns that could be due in part or in whole to climate change. In general, this analysis strengthened the case for a shorter more conservative time period for averaging inflows.

(c) Probabilities

In response to GAWB's initial submission, CPM expressed concern that GAWB's inflow assumption was not based on a sufficient probability weighted assessment of the risks and corresponding costs. In a submission in response to stakeholder comments, GAWB agreed that a probabilistic approach to inflows may be a factor in future for determining the appropriate augmentation options.

As part of its review of GAWB's initial submission, the Authority engaged Cardno to review Synergies' stochastic modelling, provide advice on the probability of inflows over the period of the DMP and recommend appropriate inflow assumptions, in particular, for a drought supply augmentation.

Cardno indicated that drought modelling based on averaged annual worst inflow (as used by GAWB) is adequate. However, Cardno considered that using a worst average inflow sequence greater than five years to be inappropriate due to the variability of the annual inflow.

Cardno supported the use of stochastic modelling as prudent when historical data are limited, as is the case with meteorological data, and when risks are high and consequences severe. Stochastic modelling is a way of creating more data with the same statistical properties to overcome the constraint of limited historical data in considering the duration and variability of droughts with more severe consequences.

Cardno's stochastic modelling regenerated data using a program called Syngen2h from the Department of Natural Resources and Water (DNRW).

While GAWB used historical data from 1984 to 2006 in its modelling, Cardno chose data from 1939 to 2008 arguing truncation of downward trending data was not as beneficial as the greater reliability of the statistical properties of the larger data set. However, Cardno excluded data for the period from October 1964 to August 1966, as zero flow data for much of this period was considered inconsistent with rainfall data.

Cardno's stochastic modelling evaluated the probability of various inflows occurring over different durations, as detailed in Table 2.3.

Table 2.3 Results of Stochastic Modelling

	5%	***2%***	***1%***	***0.5%***	***0.1%***	***0.05%***
3 Years	55,176	38,189	29,750	23,683	14,667	12,216
4 Years	69,454	50,210	39,896	33,746	21,404	16,536
5 Years	82,654	60,209	49,470	40,310	28,304	23,688

Note: This table indicates, for example, that there is a 1% probability that the average of the worst consecutive inflows over a four-year period would be less than 39,896 ML per year.

Cardno's modelling indicated that there was a 0.5% probability that average consecutive inflows would be less than GAWB's assumed inflows of 23,633ML/year over a three-year period. The probability that average inflows would be less than 23,633ML per year over five years was only 0.05% (or once in every 2000 years). Cardno considered that this assumption was a very conservative assumption even with regard to accounting for climate variability.

In view of the costs of an augmentation, Cardno concluded that a less conservative inflow assumption should be used as a trigger for augmentation. Cardno considered that, if the trigger for an augmentation was not required to coincide with a trigger for supply restrictions, the worst consecutive average five-year inflows or the 1% probability (once in every 100 years) worst consecutive five-year inflows (whichever is the lower) would be more suitable than the worst three-year assumption proposed by GAWB, particularly as the inflows are assumed by GAWB to apply for five years. The actual worst consecutive five-year inflow is 42,994ML per year and is lower than the 1% probability worst consecutive five-year inflows of 49,470ML per year.

However, Cardno also indicated that stochastic data are sensitive to prolonged years of low flow such as might occur during drought. To account for further possible climate variability, Cardno advised that it would be advisable to err on the conservative side and proposed either the average worst consecutive inflow for a period less than four years (e.g. 3 years), or the 1% probability flow (of stochastic data) for the worst consecutive four-years inflow. Cardno noted that the former is more conservative than the latter (24,161ML c.f. 39,869ML) and does not require regular generation of new stochastic data.

The Authority's Draft Report provided an analysis of the impact of alternative scenarios, based on the dam level as at 30 April 2008 (432,193ML) including:

(a) the three-year average worst consecutive inflows proposed by GAWB (24,161ML per year);

(b) the 0.5% (once in every 200 years) four-year average worst consecutive inflows identified by Cardno (33,746ML per year);

(c) the 1% four-year average worst consecutive inflows as suggested by Cardno (39,896ML per year); and

(d) the five-year worst average worst consecutive inflows initially suggested by Cardno (42,994ML per year).

The Authority used GAWB's hydrology model, adjusted to ensure that the modelling only incorporated environmental releases as approved over the EL 30m dam level, to assess alternative inflow assumptions. For the purposes of the analysis, the inflow assumptions were assumed to prevail over the whole of the modelling period. This meant, in effect, that in GAWB's proposed assumption, inflows would be limited to 24,161ML per year for the five-year period of the DMP, plus the two years targeted for deferral of dam failure. Clearly, the probability of inflows based on the worst three years continuing for five years or more would be very low.

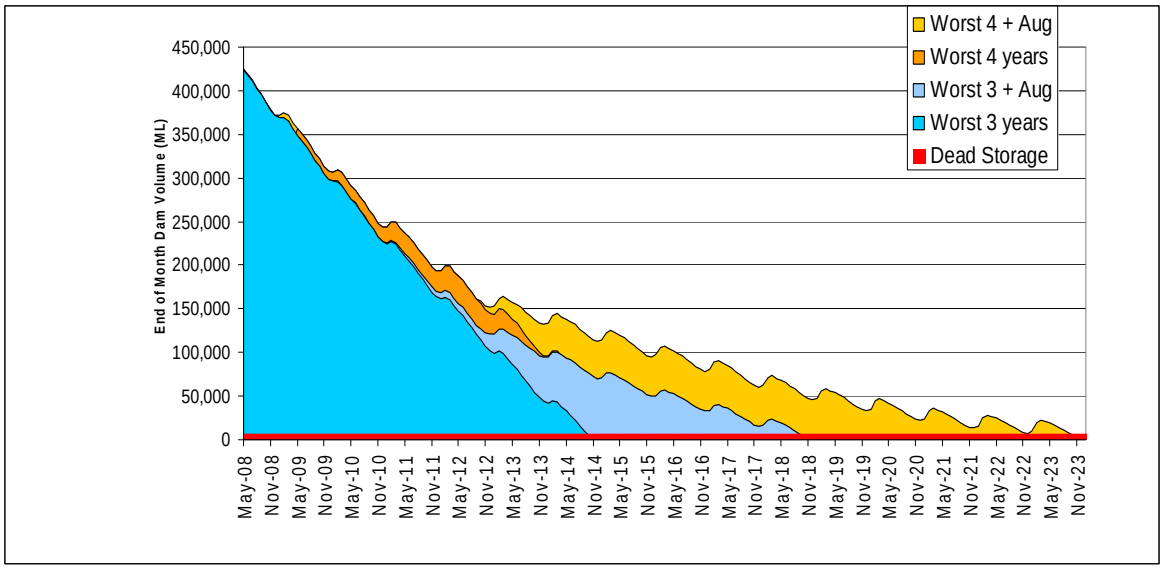
The implications for the date of dam failure of the alternative inflow assumptions were estimated without augmentation or restrictions (Column 1 of Table 2.4) and with augmentation and restrictions (Column 3). Also estimated were the trigger dates for construction of the augmentation (Column 2). For the purposes of the analysis, the augmentation was the Fitzroy 30,000ML pipeline, and demand growth was as identified in the Part (a) investigation (that is, limited to the demand of existing customers at the time the low supply alert is triggered).

Table 2.4 Implications of Alternative Inflow Assumptions

Inflow Assumption	*Expected dam failure (no augmentation)* *(Column 1)*	*Trigger date for commencement of construction to facilitate at least 2 year deferral of dam failure (based on DMP)* *(Column 2)*	*Expected failure date with augmentation and 10% restrictions*[1] *(Column 3)*
Worst 3 years (actual) (24,161 ML)	October 2014	October 2010	October 2018
Worst 4 years (0.5% chance inflows will be lower) (33,746 ML)	August 2016	August 2012	October 2021
Worst 4 years (1% chance inflows will be lower) (39,896 ML)	August 2017	August 2013	>2030
Worst 5 years (actual) (42,994 ML)	September 2017	September 2013	>2030

1. It is assumed that supply restrictions are triggered assuming the worst consecutive three-year average inflows, 12 months after the low supply alert, for all cases.

Figure 2.3 Lake Awoonga Storage Projections (three-year and four-year one in 200 years Worst Average Inflow Assumptions, with 10% restrictions under the DMP)[1]



1. Note that this Figure does not incorporate all the scenarios presented in Table 2.4.above.

The Authority's analysis found that, on the basis of GAWB's proposed worst average consecutive three-year inflow, dam failure (without augmentation) would be expected to occur in October 2014, and the commencement of construction of the augmentation (and supply

restrictions) would be triggered in October 2010 (one year after the low supply alert is triggered). If the Cardno recommendation for the five-year average worst consecutive inflow assumption is adopted in place of the three-year average worst inflow, the trigger date for construction would be delayed by almost three years, from October 2010 to September 2013. Similarly, adoption of the 0.5% probability four-year worst consecutive inflows would delay the trigger date for construction by almost two years to August 2012.

The Authority also found that, even using GAWB's assumptions, the 30,000ML per year Fitzroy Pipeline results in a deferral of dam failure of more than the two years targeted by GAWB. This is because, under GAWB's DMP, the trigger date is determined by the inflow assumption not the specified target of a two-year deferral.

After taking into account the size of the Fitzroy Pipeline, adjusting GAWB's model to ensure that environmental flows are not incorporated when dam levels fall below EL 30m and limiting demand to the level contracted at the time the low supply alert is triggered, a deferral of dam failure of 48 months occurs.

On this basis alone, the Authority concluded that the trigger date for construction could be delayed for almost a further two years and still achieve the targeted deferral of dam failure by two years.

The trigger dates for construction of the 30,000ML per year Fitzroy Pipeline, on the basis of the Authority's modelling, but which result in a deferral of dam failure of exactly two years are as shown in Table 2.5 (assuming the 10% restrictions are applied).

On Cardno's 0.5% probability four-year average worst consecutive inflow assumption, the trigger date for commencement of construction would be delayed until February 2014.

Table 2.5 Augmentation triggered to extend expected dam failure by 24 months

Inflow Assumption	***Expected dam failure (no augmentation)***	***Trigger date for commencement of construction to facilitate exactly 2 year deferral of dam failure, allowing for supply restrictions[1]***	***Expected failure date with augmentation (extra 30,000 ML) and 10% restrictions1***
Worst 3 years (actual) (24,161 ML)	October 2014	September 2012	October 2016
Worst 4 years (0.5% chance inflows will be lower) (33,746 ML)	August 2016	February 2014	October 2018
Worst 4 years (1% chance inflows will be lower) (39,896 ML)	September 2017	April 2015	December 2020
Worst 5 years (actual) (42,994 ML)	September 2017	July 2015	>2030

1: It is assumed that supply restrictions are triggered assuming the worst three-year average consecutive inflows, 12 months after the low supply alert, for all cases.

The Authority also considered a scenario in which the assumed inflows for the augmentation trigger are based on Cardno's 0.5% probability four-year worst consecutive inflow (33,746ML per year), but inflows that are actually recorded (that is, realised) in the year before the trigger

date for augmentation are equivalent to the worst consecutive three-year average (24,161ML/year) and are then assumed to apply into the future.

Under this scenario, the Authority found that an extension of dam failure by at least three years would still be possible. This was because the trigger date would be brought forward (about one year) earlier than the expected date of August 2012 under the 0.5% probability four-year consecutive inflow assumption (see Table 2.4) once the lower than expected falls are identified by GAWB.

In summary, the Authority considered that:

(a) GAWB's inflow assumption implies that the three-year worst inflows will continue for five years or more. The Authority's modelling indicated that this has a less than a 0.05% chance of occurring;

(b) based on a 30,000ML per year Fitzroy Pipeline option and the average worst consecutive three year inflows:

  (i) even on GAWB's demand assumptions and modelling, the date for triggering the commencement of construction could be deferred by one year;

  (ii) on the Authority's assumptions and modelling (which incorporate corrections to the modelling of environmental flows and demand which is consistent with the Authority's Part (a) investigation), the date of triggering the commencement of construction could be deferred by almost two years;

(c) based on the 30,000ML per year Fitzroy Pipeline and, for example, Cardno's 0.5% probability four-year worst consecutive inflow, the date of triggering the commencement of construction could be deferred by almost four years.

The Authority considered that a number of alternative inflow assumptions could achieve GAWB's stated objectives and at the same time:

(a) allow construction to be deferred providing time for any further rainfall to occur; and

(b) with appropriate monitoring of inflows by GAWB, should inflows turn out to be lower than assumed, still allow sufficient time to trigger augmentation and defer dam failure by at least two years.

An example of such an alternative is Cardno's four-year worst consecutive inflows assumption which has a 0.5% chance of occurring.

A key feature of the Authority's proposed approach was that it differentiated between the trigger for commencement of augmentation and the trigger for restrictions under the DMP.

However, the Authority concluded that, given appropriate information about the price of various supply/demand options and adequate time to consider the issues, customers are ultimately best placed to assess the implications of the risks involved. Therefore, the Authority considered that:

(a) which inflow assumption to apply is ultimately a matter for customers and other stakeholders; and

(b) as demand estimates and inflow assumptions will change over time, GAWB and its customers should from time to time review which assumptions are most appropriate from their collective perspectives. This issue is discussed further in chapter 4.

(d) Benchmarks in other Jurisdictions

GAWB placed some emphasis on the conservative approaches for inflow assumptions used in water plans such as those for SEQ and Melbourne. The Draft SEQ Water Strategy adopted a particularly severe assumption that inflows would be limited to the second worst single year's inflow as the basis for estimating climate resilient supplies.

The Authority accepted that conservative inflow assumptions are now the industry norm notwithstanding that the ERA adopted a six-year worst consecutive inflow average for WA.

Stakeholder Submissions on the Draft Report

CPM supported the Authority's suggestion that GAWB should consider its customers and stakeholders' input regarding the inflow assumption used for triggering drought responses. CPM also noted that, ultimately, customers will be required to support the costs of any drought response and therefore have a valid opinion as to the appropriate assumptions used to trigger a drought response.

GRC supported the Authority's comments that, given the differences between the cost of augmentation and restrictions, different triggers were appropriate. In particular, GRC supported conservative inflow assumptions for triggering low supply alerts and water restrictions, but less conservative inflow assumptions to trigger supply augmentation.

GRC also noted the significant difference that exists between the worst three year average and the worst four year average. According to GRC, the difference reflected the region's rainfall pattern and should not be ignored when considering a major supply augmentation.

RTA submitted that it was comfortable with GAWB's inflow assumptions. However, RTA also supported further analysis to identify higher probability inflow assumptions that would permit a delayed augmentation without comprising security of water supply.

GAWB expressed concern regarding the Authority's view that 'supply augmentations are usually more costly than supply restrictions, particularly restrictions imposed upon urban customers.' GAWB reiterated previous submissions from RTA and QAL that, if supply restrictions inhibit production, their costs are much greater than that associated with supply augmentation. GAWB further noted that the current inflow and other assumptions should be viewed within a commercial framework, providing flexibility for those customers who are willing to do so to reduce supply security.

In regard to a particular inflow assumption, GAWB submitted that:

(a) although it was not clear whether the Authority had arrived at a conclusion or recommended an alternative inflow assumption, GAWB's interpretation is that it understood that the Authority sought to present alternative scenarios, rather than recommendations, and has left the final decisions to GAWB;

(b) there is a relatively minor difference between its inflow of 23,633ML per year and the Authority's 'alternative' of 33,746ML per year. Rather, the selection of an inflow assumption should be based on analysis, risk management and judgement, including the risk of error, in potentially overestimating assumed drought inflows;

(c) the selection of an inflow assumption should be based on analysis, risk management and judgement, including the risk of error, in potentially overestimating assumed drought inflows; and

(d) the Authority's analysis and commentary implies a level of precision in the forecasting of drought inflows that simply cannot exist. There is no single 'correct' value for the inflow assumption and the Authority should not contrast GAWB's forecasts with the Authority's own estimates. Rather, the Authority should comment on whether GAWB's forecasts are within a reasonable range of outcomes.

In regard to Cardno's probability based assessment, GAWB submitted that:

(a) Cardno's approach to inflow selection gives emphasis to the cost of augmentation and relies on stochastic modelling to quantify risk and predict the likelihood of future inflow events;

(b) Cardno's approach was flawed as it did not take into account the risk of error in over-estimating drought inflows, the consequences of which are clearly substantial where they lead to supply failure or emergency restrictions being required; and

(c) reliance upon stochastic modelling to predict extremely low flow periods is problematic. Connell Wagner advised GAWB that they would not recommend using Cardno's proposed stochastic sequence to determine the inflow regime for drought modelling, as there is considerable uncertainty in the values generated for low probability events. Further, Connell Wagner advised that uncertainty arises because confidence limits become wide when calculating very low and very high probability events that move further away from the mean.

GAWB also noted that the Authority's Draft Report referred to an error in GAWB's hydrology model in relation to environmental flows. GAWB stated that the model had been reviewed externally by both Connell Wagner (for GAWB) and Cardno (for the Authority). GAWB submitted that the model now incorporates the cessation of environmental releases as required by the Resource Operations Plan.

In subsequent discussions with the Authority, GAWB expressed concern about the Authority's view that the inflow assumption is ultimately a matter for customers. GAWB indicated that it has to make decisions for all customers amidst different view points and risk profiles. GAWB emphasised that it sought the Authority's view on whether its inflow assumption lies within a reasonable range.

The Authority's Analysis

In its Draft Report, the Authority concluded that the inflow assumption is an essential variable within the criterion for triggering augmentation.

The Authority also concluded in its Draft Report that:

(a) there is a significant difference between the cost imposed by restrictions and the cost of augmentation options. Supply augmentations are usually more costly than supply restrictions, particularly restrictions imposed on urban consumption. Further, while supply restrictions can be removed at no cost, the same is not the case for supply augmentations. New supply still has to be paid for even if it is no longer needed;

(b) different inflow assumptions are appropriate for triggering supply restrictions and should be more conservative than those used in triggering supply augmentation because of the lower relative cost of impact of restrictions;

(c) customers are best placed to assess the implications of the risks involved; and

(d) the appropriateness of these assumptions would need to be reviewed over time.

In response to GAWB's specific concerns:

(a) the Authority's statement that 'supply augmentations are usually more costly than supply restrictions, particularly restrictions imposed upon urban customers', is predicated on the current restrictions regime which involves quite mild initial restrictions and the relative costs of augmentation options being proposed. Further, the Draft Report explicitly recognised that the economic costs of applying emergency restrictions are unacceptable to some customers while others are more able to tolerate variations in supply. Hence, the Authority concluded that customers are best placed to assess the implications of the risks involved (and, as noted by CPM, should be appropriately consulted);

(b) it is not the Authority's intention to establish an alternative inflow assumption that should be adopted to trigger augmentation and GAWB's interpretation that the Authority sought to present alternative assumptions is correct. The final decisions are for GAWB and its customers. At the same time, in the absence of general agreement with customers, the Authority would have regard for the reasonableness of the parameters adopted by GAWB in any future review of pricing practices;

(c) the Authority considers that the difference in the scenarios, that is between 23,633ML and 33,746ML is not minor. As noted by customers, at least one scenario (the four year stochastic worst average) would defer augmentation by almost two years and this would increase the possibility that additional rainfall would remove the need for augmentation that would have already occurred under more conservative scenarios; and

(d) the Authority's analysis is not intended to imply that there is a single correct value for the inflow assumption. However, in view of the Authority's modelling and customer comments, GAWB's current inflow assumption is considered to be too conservative for the purposes of triggering augmentation.

In respect to stochastic modelling, the Authority notes that GAWB itself proposed that a probabilistic approach to inflows may be a factor in the future for determining the appropriate augmentation options. GAWB's suggestion was considered appropriate as it would assist GAWB and its customers to identify an appropriate inflow assumption. On this basis, the Authority undertook the stochastic modelling analysis. In respect of GAWB's concerns regarding Cardno's stochastic modelling, the Authority considers that:

(a) the trade-off between the cost of failure and the cost of augmentation is a relevant consideration, for reasons identified in its Part (a) report and noted above, and one best for customers to make; and

(b) while noting the risks in any overestimation of drought inflows and the problems in applying stochastic modelling, the Authority has proposed close monitoring of inflows once the low supply alert has been triggered to ensure that such risks are effectively managed.

In relation to hydrology, the Authority accepts that GAWB's model has been appropriately adjusted to account for environmental flows consistent with the Authority's analysis.

Accordingly, the Authority recommends that an inflow assumption be accepted as an essential variable within the criterion for triggering augmentation. In particular:

(a) different inflow assumptions should be applied for the purpose of triggering supply restrictions and triggering augmentation, with the former being more conservative;

(b) the most appropriate inflow assumptions for each trigger should be established by GAWB in consultation with its customers. At the same time, the Authority considers that GAWB's current inflow assumption is too conservative for the purposes of triggering augmentation; and

(c) the inflow assumptions should be reviewed periodically, taking account of the most recent hydrological and climate information

Storage Losses

Draft Report

In its initial submission, GAWB indicated that dam losses were an issue to be considered in the criteria. GAWB's DMP indicated that losses include environmental releases, evaporation and seepage that vary subject to the level of water stored in Awoonga Dam.

GAWB submitted that environmental releases are halted when water levels are below 30m (around 282,000ML).

GAWB used a water balance model to assess the long term performance of Awoonga Dam. To estimate the evaporation loss from the surface of the lake, the model uses evaporation pan data from Biloela and Rockhampton and applies calibrated correction factors to convert the regional evaporation data into site specific Awoonga evaporation data. Although the Awoonga weather station has a pan, this has only been in operation for four years.

Average evaporation over the period from 1984 to 2007 was 125mm per month or approximately 1500mm per year. Seepage through and under the dam was estimated at 30mm per month, giving a total loss from the dam of 1860mm per year. GAWB indicated that losses would increase with increasing reservoir level.

In its Draft Report, the Authority noted that the Draft SEQ Water Strategy (QWC, 2008) indicated that evaporation losses were allowed for in establishing the drought storage reserve. The QWC identified the reduction of evaporation from dams and weirs as an area for further research.

In the Draft Report, the Authority sought advice from Cardno to assess GAWB's assumptions about storage evaporation and seepage losses. Cardno noted that it is important to estimate evaporation and seepage loss reliably in the model as it accounts for a large portion of the outflow from the dam. Cardno concluded that the approach adopted by GAWB was in common with other water balance studies and was acceptable. The Authority therefore accepted GAWB's proposed approach.

GAWB indicated that only storage related losses were incorporated into the DMP and that distribution system losses may be considered in any future review.

The Authority concluded that distribution system losses should be recognised also, and for the purposes of a drought response trigger, may appropriately be incorporated in the total demand projection. The efficient level of distribution system losses is reviewed in chapter 3.

Stakeholder Submissions on the Draft Report

GAWB noted that the Authority accepted GAWB's proposed approach to storage losses.

GAWB also acknowledged that distribution system losses should be taken into account for the purposes of the drought trigger (but considered that such an allowance would have minimal impact).

The Authority's Analysis

The Authority proposes no change to the Draft Report conclusion and recommends that GAWB's proposed approach in regard to storage losses (evaporation and seepage losses) be accepted. However, the Authority also recommends that distribution system losses should be recognised in the drought response trigger as they reflect a legitimate, albeit small, volume adjustment that could have an impact on the timing of an augmentation response.

Demand Assumptions

Draft Report

In its initial submission, GAWB provided an updated demand scenario for its base case in an attachment to its submission prepared by Synergies. This indicated that the revised demand forecasts are lower than previously assumed in GAWB's drought model used in developing the DMP. Synergies indicated that this was due to updated information being available and noted that the lower demand projections have the effect of reducing the likely impact of drought and extending the period to supply failure.

Synergies also noted that the current DMP required the forward water demand projection to be reviewed based on customer commitment to reservation volumes within 30 days of the triggering a low supply alert (five years from dam failure). Synergies considered that this arrangement warranted reconsideration given that the low inflow assumption is more conservative and triggers a low supply alert when storage levels remain relatively high, at 296,000ML. Synergies proposed that the date of the imposition of supply restrictions under the DMP (four years from dam failure) be adopted as the threshold date for customers to confirm their contracted reservation volumes. GAWB's revised DMP incorporated Synergies' recommendation.

In the Draft Report, the Authority noted that the New South Wales (NSW) Government's Metropolitan Water Plan (2006) adopted a demand assumption based on usage per capita per day of 426 litres. The NSW Government proposed that, once the drought was over and restrictions were lifted, a more accurate understanding of demand would be possible. The key factors seen to be influencing future water demand were population growth and demand trends such as the effects of urban consolidation, demographic and housing mix changes, improving appliance efficiencies and new technologies. It further proposed regular re-assessments of demand projections as part of its adaptive management approach.

In its State Water Plan 2007, the Western Australian Government identified relevant factors that could increase water demand from irrigated agriculture, the resources sector and the household sector. Further, WA modelled a high and moderate growth scenario for each sector until 2030. The report does not address the issue of unexpected additional demand.

The QWC's Draft Water Strategy incorporated comprehensive demand forecasts over a 50-year period. Medium series population growth projections were derived from the Queensland Government Population Projections 2051, and a high series forecast was used for sensitivity testing. The QWC's demand forecasts took account of:

(a) permanent water savings arising as a result of the drought;

(b) effectiveness of potential demand management measures;

(c) changing demographic patterns, including the trend to smaller households; and

(d) ongoing compliance with rules and regulations.

The QWC's demand forecasts reflect a relatively smooth upward trend over time, from 478,000ML per year in 2005 (based on pre-drought trends) to 985,000ML per year in 2056. The forecasts also allowed for an increase in total urban demand (residential, industrial and commercial) on a per capita basis, from 468 litres per person per day in 2005 to around 500 litres by 2056. This compares with QWC's residential only target of 230 litres per person per day under non-drought conditions, and the target of 140 litres per person per day achieved under severe restrictions during the current drought.

The QWC proposed that the assumptions underpinning the demand projections continue to be reassessed and refined on an ongoing basis.

In the Final Report regarding Part (a), the Authority concluded that low and high demand scenarios needed to be considered to establish the circumstances under which GAWB's contingent supply strategy was prudent. The Authority generated demand scenarios based on information from GAWB and expert advice from Marsden Jacob Associates, with the lower demand scenario reflecting a preliminary assessment of new demands considered to have a high probability of proceeding.

The Authority noted that:

(a) while it is important to have water available to meet the needs of current and prospective customers, overestimation of demand leading to earlier than needed augmentation (and consequent price rises) can adversely impact on the attractiveness of Gladstone as an industrial location; and

(b) there is a significant potential for demand forecasts to be inaccurate and it is appropriate that this uncertainty be taken into account.

The Authority recognised that GAWB's demand profile is different to other urban water supply entities, with potentially large and lumpy demand variations, and only about 20% of demand accounted for by residential and commercial use. Hence, GAWB's demand forecasts do not reflect a smooth trend line such as applies in SEQ. Particular observations made by the Authority in Part (a) were that:

(a) based on historical precedent, high demand scenarios are less likely; and

(b) there could be demand responses arising as a result of the price impacts of the proposed augmentation.

In the Draft Report regarding Part (b), the Authority noted that, although the revised Synergies demand forecast was for lower demand growth than in GAWB's previous drought model, the forecast remains higher than the Authority's low and high demand scenarios for 2008-09 and 2009-10 (Table 2.6).

Table 2.6 Comparison of Demand Scenarios

Demand Scenario	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2015-16*	*2020-21*
QCA Demand 2005	49,906	52,764	58,177	60,459	61,197	64,307	67,762
Low Demand 2007	50,966	51,024	51,208	57,143	57,448	65,535	72,644
High Demand 2007	53,337	52,775	53,682	63,260	78,654	88,036	104,079
GAWB Initial Drought Model	56,607	60,733	70,000	70,000	70,000	70,000	70,000
GAWB Revised (Synergies)	53,056	53,229	56,970	61,955	64,559	70,000	70,000

The Authority noted that there is little difference in the low and high 2007 demand scenarios over the period to 2009-10. However, demand projections vary more substantially from 2010-11 onwards.

The Authority previously recommended that the appropriate demand scenario for long-term planning should reflect the low demand scenario (that is, planned demand – which includes the most likely amount that existing and prospective customers can be expected to contract) as well as an amount for future demand nominated by GAWB (for which GAWB carries the commercial risks) (QCA, 2005).

The Authority observed that this would also seem appropriate for the purpose of triggering the low supply alert under the DMP.

However, the Authority noted that, under the DMP, upon declaration of a supply restriction (four years before projected failure), GAWB provides notice to customers who do not have reservations, but who have demand included in forward projections, to elect to either secure their identified water demand by contract, or allow their identified water demand to lapse.

In addition, GAWB undertakes not to increase the volume of water it is obligated to supply upon the declaration of a low supply alert, until the low supply alert has ended.

In the Draft Report, the Authority noted that GAWB's criterion for commencing construction seeks to reflect current and future contracted demand. It appears likely that some of the planned demand may not have been contracted at the time restrictions are triggered under the DMP.

Accordingly, at the time supply restrictions are triggered, the forward demand projection should be adjusted to reflect contracted actual demand, including any curtailment arrangements and any known, contracted new demand.

In recognition that demand forecasts, when adjusted to reflect contracted actual demand, are likely to be lower than those for long term planning, the Authority concluded that the relevant estimate of demand for triggering commencement of construction is the contracted actual demand at the time water restrictions are imposed. This can only be established at that time.

Stakeholder Submissions on the Draft Report

GAWB stated that the current DMP bases forward demand projections on contracted demand at the time of setting supply restrictions, including existing customers' revisions of their water reservations into the future and incorporating negotiated or mandated curtailment arrangements.

However, GAWB submitted that, under a current review of the DMP, it intends to define contracted demand at the time of the low supply alert to provide better information earlier on timeframes to failure. In a subsequent submission, GAWB stated that it intends to allow customers that do not have a contracted reservation a 90-day period to commit to reservations, when the low supply alert is issued.

The Authority's Analysis

In the Draft Report, the Authority noted that GAWB's criterion for commencing construction sought to reflect current and future contracted demand and that some of the planned demand may not have been contracted at the time restrictions were triggered under the DMP.

GAWB now proposes that the contracted demand volumes would be determined within 90 days of the date the low supply alert is triggered. GAWB has advised that the rationale for this change is to establish at an earlier stage the customer base requiring water over the ensuing five-year period that the DMP could be in force.

GAWB has subsequently advised the Authority that customers with contracted volumes locked in at the time of the low supply alert will still have the opportunity to identify voluntary demand reductions prior to supply restrictions being applied and an augmentation being triggered. Such an approach would allow GAWB to undertake initial planning based on current contracted demand, with customers having a further opportunity to respond to proposed responses (whether these be demand reductions or an augmentation) to a drought. The planning is discussed in further detail in chapter 4.

In summary, the Authority recommends that contracted demand should be confirmed within 90 days of a low supply alert and that any voluntary demand reductions subsequently identified by customers prior to supply restrictions being applied should be reflected in the contracted demand volumes.

2.4 Drought Management Plan

Draft Report

In its initial proposal, GAWB submitted that, as a water service provider, the *Water Act 2000* requires it to register and comply with its Drought Management Plan (DMP). GAWB submitted that the DMP is the relevant mechanism for determining the trigger point for a supply augmentation in response to drought as:

(a) the DMP determines the timing of drought responses; and

(b) the DMP is designed to provide for the timely least cost augmentation of supply to mitigate the effects of drought.

Accordingly, GAWB considered that the DMP substantially reduces the likelihood of circumstances arising that would require the imposition of restrictions.

GAWB noted that the DMP must:

(a) be prepared in accordance with guidelines issued by the regulator (DNRW);

(b) have been developed in consultation with customers;

(c) be registered if it satisfies certain criteria;

(d) be reviewed by GAWB and updated periodically; and

(e) be subject to regulatory review and amendment.

GAWB acknowledged that registration does not constitute formal approval of the contents of the DMP. However, as the *Water Act 2000* stipulates that water service providers must comply with the drought management plan, GAWB argued that the DMP is therefore legally binding.

In response to GAWB's initial submission, CPM submitted that GAWB's DMP is presented as a 'legally binding' plan 'approved' by the relevant regulator. CPM was concerned that the parameters in the DMP are inappropriate, and that GAWB 'unilaterally amended its DMP in mid-2007, providing only a limited window for customer consultation'.

CS Energy (CSE) stated that it is not clear whether directions given by GAWB under its DMP are really binding on CSE. CSE also questioned the validity of a poorly constructed and implemented DMP, especially if it considers that there are demonstrably better alternatives.

In the Draft Report, the Authority noted that GAWB's criteria rely heavily on various assumptions which are set out in its DMP. As GAWB argued that the DMP is legally binding and is the relevant mechanism for considering supply augmentation in response to drought, the Authority considered that the legal status of the DMP must be clarified. For example, any recommendations by the Authority regarding GAWB's criteria may be constrained if the DMP has legal precedence.

Legal advice to the Authority was that the *Water Act 2000 (Qld)* does require a water service provider to develop and comply with their DMP when supplying water services to the service provider's customers.

The legal advice also indicated that, while the *Water Act 2000* makes the DMP binding upon GAWB, the *Water Act 2000* does not restrict the Authority's recommendations regarding GAWB's pricing practices. Further, the Authority was advised that it was "perfectly permissible for the Authority to make recommendations about GAWB's pricing practices … which if accepted and implemented would require changes to GAWB's DMP."

Following receipt of this advice, GAWB further advised the Authority that GAWB must comply with the DMP and failure may result in a contravention of the *Water Act 2000* and possible imposition of a prescribed penalty. GAWB suggested that the prime purpose of the DMP is to articulate how GAWB would exercise its powers under the *Water Act 2000*, and that customers are contractually required to comply with the DMP.

Based on further legal advice, the Authority considered that, technically, it is section 388 of the *Water Act 2000* that allows GAWB to impose water restrictions on customers rather than the DMP. Section 388 does not deal with drought supply augmentation.

However, the Authority accepted that the DMP, once in place, is contractually binding on those customers who have agreed to the terms of the standard contract.

In conclusion, the Authority accepted its legal advice that the registration by DNRW of a DMP does not imply approval of the contents of the DMP. Therefore, subject to the Ministers acceptance of them, the Authority considered that the DMP should be amended to reflect the Authority's conclusions.

Stakeholder Submissions on the Draft Report

GAWB submitted that the Authority has not clearly stated in the Draft Report whether or not the DMP is the appropriate mechanism to determine the parameter values that determine the drought trigger.

GAWB maintained that the DMP is the appropriate mechanism, as outlined in its initial proposal regarding Part (b). GAWB further stated that the annual review process for the DMP enables GAWB and customers to consult and respond to change as it occurs.

GAWB also did not accept the Draft Report conclusion that the DMP should be amended to reflect the Authority's conclusions. GAWB submitted that the DMP was prepared in accordance with the requirements of the legislation and in consultation with customers. GAWB also submitted that the Authority should not take upon itself responsibility for reviewing and recommending changes to the DMP.

The Authority's Analysis

GAWB has indicated in its DMP that the DMP will be reviewed following the conclusion of the regulatory review and that, depending on the outcomes, may lead to adjustments to the restrictions regime and trigger points.

In its Draft Report, the Authority concluded that the registration by DNRW of a DMP does not imply approval of the contents of the DMP and that the DMP should be amended to reflect the Authority's conclusions, subject of course to their acceptance by the Ministers. The Authority's legal advice was that it was permissible for the Authority to make recommendations about GAWB's pricing practices which, if accepted and implemented, would require changes to GAWB's DMP. That advice has not been challenged.

GAWB's key concerns relate to whether the DMP is the appropriate mechanism for triggering augmentation in response to drought and whether the Authority should recommend amendments to the DMP.

In respect of the concerns raised by GAWB in relation to the Authority's Draft Report, the Authority notes that:

(a) while GAWB could establish an augmentation trigger in customer contracts, or within a strategic planning process, on the basis of Authority's legal advice, DNRW's *Guidelines for the Preparation of a Drought Management Plan* (2007) are sufficiently broad that a trigger for a major augmentation could be incorporated into a DMP. Hence, a DMP can be an appropriate mechanism; and

(b) GAWB's concern that the Authority should not recommend amendments to the DMP can be reconciled with GAWB's own recognition in its DMP of the potential need to make adjustments to the restrictions regime and trigger points upon conclusion of this review, by incorporating the necessary adjustments in the next annual review of the DMP which is now due.

GAWB has also indicated in its submission in response to the Draft Report that it will undertake an annual review process of its DMP which would enable GAWB and customers to consult and

respond to change as it occurs. The Authority considers that such changes can, be accommodated in GAWB's proposed annual process.

GAWB's detailed assessment of the options, including its preferred option, should be incorporated in its Strategic Water Plan with annual updates reflected in the DMP.

By incorporating (and complying) with those Authority recommendations accepted by the Ministers within the DMP, GAWB and the Authority should be able to be undertake any price review consequent upon any proposed augmentation expeditiously. In this regard, it should be noted that the Authority previously recommended and Ministers approved that a price review should be triggered if there is, or expected to be, a sustained variation in aggregate revenues of at least 15%.

In conclusion, the Authority recommends the DMP as an appropriate mechanism for defining the augmentation trigger arrangements having regard to:

(a) the most recent information relating to inflows, seasonal conditions, supply information and estimates of demand;

(b) customers' risk preferences reflecting their risk profiles as established through appropriate consultation; and

(c) the preferred option arrived at after consideration of all options including the Fitzroy Pipeline, desalination, air and water cooling and alternative supply restrictions.

3. CRITERIA FOR UNEXPECTED ADDITIONAL DEMAND TRIGGERS

GAWB's criterion for augmentation in response to unexpected additional demand is:

> *to trigger construction of the appropriate augmentation when GAWB has entered into contracts with customers that exceed the capacity of its water sources, after allowing for distribution losses and contingency.*

The Authority recommends acceptance of the proposed criterion.

In relation to the assumptions underpinning GAWB's criterion, the Authority has found and recommends that:

(a) supply capacity is a relevant factor in establishing unexpected additional demand and should reflect the amount of water available for supply, presently the current interim HNFY of 70,000ML, as set by the Department of Natural Resources and Water (DNRW);

(b) the level of the system distribution losses should reflect the targeted level of performance in the near term (as set out in the SLMP) as well as recent historic performance, and should be subject to periodic analysis – currently, a distribution loss of 3% is considered appropriate; and

(c) in principle, it is appropriate for a contingency allowance to be taken into account in triggering construction of an augmentation in response to unexpected additional demand. However, in the current circumstances, GAWB's proposed reserve of 5% of HNFY is unnecessary.

3.1 Definitions, Objectives and the Criterion

GAWB's Initial Submission and Authority's Draft Report

In its initial submission, GAWB submitted that it has a predominantly industrial customer base and lumpy new demand. GAWB considered that this environment poses challenges for water planning and investment.

For the purposes of the criterion, GAWB:

(a) **defined** unexpected additional demand as:

> *demand that is beyond the available capacity of sources*[3] *(taking into account distributional losses and contingency) that have been approved by the Authority for inclusion in GAWB's regulated asset base for pricing purposes;*

(b) sought to ensure that the following **objectives** are achieved in the event of unexpected additional demand:

(i) water will be available to current and prospective customers when required; and

(ii) GAWB can invest in the source augmentation to meet these demands and recover its costs; and

[3] In its initial submission GAWB referred to 'existing' sources. This has since been clarified as referring to any sources (existing or within the planning period) that have been approved by the Authority.

(c) proposed the following **criterion** for responding to unexpected additional demand:

> *to trigger construction of the appropriate augmentation when GAWB has entered into contracts with customers that exceed the capacity of its water sources, after allowing for distribution losses and contingency.*

GAWB further indicated that preparatory expenditure was required to have a readily deployable water source available to meet the two to three-year period between contracts becoming binding, and the customers' requirement for water.

In the Draft Report, the Authority noted that it had not identified any comparable statements of objectives or criteria for managing unexpected additional demand in other jurisdictions.

In other major urban centres, demand is typically projected in a smooth trend over a designated planning period, with unexpected variations to planned growth mainly addressed through regulatory reset processes. Augmentations to infrastructure considered necessary to meet planned growth are typically identified by:

(a) reference to a desired level of service. For example, the Draft SEQ Water Strategy (QWC, 2008) has a level of service (LOS) objective under normal operations of ensuring that sufficient grid water is available to meet a benchmark average total urban demand per capita; and

(b) adaptive planning. For example, the NSW Metropolitan Water Plan (2006) indicated that, given the unavoidable level of uncertainty in key parameters, an adaptive approach is essential. Regular re-assessments are required of demand projections, estimates of supply availability and other factors in the supply and demand balance. The focus of the NSW Water Plan was to secure Sydney's growing water needs in the face of drought and potential climate change.

In some jurisdictions, there is a particular focus on continued monitoring of climate change and its impacts (see for example, the South Australian Government's *Waterproofing Adelaide* (2005) and the *Sustainable Water Strategy for the Central Region of Victoria* (Victorian Government, 2005).

In response to GAWB's initial submission, CSE stated that it was concerned that GAWB's term 'unexpected additional demand' implies there would be insufficient time in which to take steps to deal with additional demand and so extra water must be arranged before it is required or anticipated. CSE considered this had the appearance of a contrived justification.

RTA submitted that GAWB should be limited in its capacity to contract for new demand that would result in acceleration of dam failure and interruption of supply to existing customers.

GAWB's Operating Environment

In the Draft Report, the Authority noted its prior commentary on the lumpy nature of demand (and supply) confronting GAWB (QCA, 2002, 2005). The Authority accepted that GAWB's demand environment with its strong industrial focus and lumpy demand increments represents a planning challenge as there is the potential for unexpected additional demand to represent a substantial diversion from (then) current demand forecasts.

The Authority noted that these characteristics indicated that the timing of an augmentation is a key issue. The gestation period for new projects has historically allowed sufficient time for GAWB to plan, procure and manage construction of necessary capacity augmentation. However, the Authority accepted that circumstances could require planned options to be reconsidered where demand changes unexpectedly and significantly.

GAWB's Objectives

Essentially, GAWB objective is to ensure that demand and supply are met over the longer term and that GAWB can confidently invest to achieve this outcome. Such objectives are consistent with GAWB's charter and responsibilities.

Definition of Unexpected Additional Demand

In the Draft Report, the Authority noted that GAWB's definition of unexpected additional demand focused on demand beyond the capacity of sources that have been approved by the Authority.

The Authority noted that while it is the Ministers (and not the Authority) who 'approve' pricing practices and by implication the sources of supply and associated infrastructure, it has in the past recommended that the most cost effective infrastructure sufficient to meet planned demand over a 20-year period be incorporated in prices. Planned demand has been defined to include anticipated customers' contractual requirements (that is, the most likely amount that existing and prospective customers can be expected to contract) as well as an amount for future demand nominated by GAWB (for which GAWB carries the commercial risks) (QCA, 2005). Current pricing practices do incorporate existing and future infrastructure relevant to planned demand over the next 20 years.

In response to CSE's comment that the term 'unexpected demand' has the appearance of a contrived justification, the Authority noted that GAWB's proposed construction trigger required that new demand be contracted and that GAWB was proposing to augment supplies only when there was a firm commitment from new customers. The Authority added that this commitment from new customers must justify the augmentation on commercial grounds. As GAWB proposed to commence the process for responding at the time the low supply alert was triggered, it was considered that there should in the future be sufficient time to consider all relevant options, as outlined in chapter 2.

In summary, the Authority accepted that unexpected additional demand is, by definition, demand that exceeds planned demand at a point in time. However, the Authority considered that whether the unexpected additional demand requires changes in the timing, scale or type of infrastructure (temporary or permanent augmentation) required consideration (see below and chapter 4).

The Criterion

In the Draft Report, the Authority indicated that, in order to achieve GAWB's objectives, it was essential that sufficient supply was available in the event of unexpected demand.

For this purpose, sufficient time is required to assess the most appropriate response and sufficient commitment from customers is required to warrant the expenditure (particularly where the required response imposes unexpected costs on existing and committed future customers). In respect of this latter matter, it was noted GAWB proposed that any augmentation only occur after GAWB has entered contracts for customers for this purpose.

As indicated above, the Authority added that this commitment from new customers must be sufficient to commercially justify the augmentation. That is, the impact of the proposed augmentation on GAWB's viability and ability to recover costs, as well as any potential impact on the prices charged to other existing customers, need to be taken into account. Pricing issues are to be considered in Part (c) of the investigation.

The Authority also noted that, under the current Boyne River Basin ROP, GAWB can only contract for additional demand from currently available supply as defined by the safe yield. This could constrain the response options to:

(a) sales from the balance of currently uncontracted supplies from Awoonga Dam;

(b) manufactured water such as desalination and recycling; and

(c) water from the Fitzroy Basin for which GAWB has current allocations.

However, the Authority's legal advice indicated that it is was a reasonable interpretation of the wording of the ROP that GAWB could enter into water supply agreements, provided that such agreements were contingent upon the yield reaching the required level (or the ROP being amended to allow such supply).

In regard to RTA's comment that GAWB should be limited in its ability to contract for new demand that would bring forward supply restrictions or dam failure, the Authority noted that GAWB reserved the right not to contract for new demand once the low supply alert is triggered under the DMP. Whether new demand should be contracted was considered to be a commercial decision and one which should be taken in the light of all other factors being considered as part of GAWB's proposed process for triggering the commencement of construction.

In summary, the Authority concluded that GAWB's criterion for triggering augmentation in response to unexpected new demand once contracted was appropriate, provided that the commitment from new customers was sufficient to justify the augmentation.

Stakeholder Submissions on the Draft Report

GAWB submitted that it was not clear whether the criterion is considered appropriate by the Authority, or whether the reference to a contingency in the criterion should be deleted or qualified.

The Authority's Analysis

In its 2005 Final Report, the Authority accepted that the principle that GAWB should provide for undetermined projects in its forecast demand – effectively establishing the principle that some allowance for contingency is appropriate.

The Authority therefore proposes no change to the Draft Report conclusion and recommends acceptance of GAWB's criterion for triggering an augmentation in response to unexpected demand, provided that the commitment from new customers is sufficient to justify the augmentation This includes in principle support for the provision of a contingency allowance where appropriate (see discussion below).

3.2 Assumptions

The assumptions underlying GAWB's criterion for augmentation in response to unexpected additional demand relate to supply capacity, distribution losses and a contingency allowance. Assumptions identified as relevant to drought such as inflows and storage losses are just as relevant, but are accepted as being taken into account in the consideration of supply capacity in the case of unexpected additional demand.

In commenting upon the Draft Report, GAWB expressed concern about the focus upon parameter values, noting that a detailed examination of parameter values is not relevant to considering the appropriateness of the criterion, which is generic.

As in the case of drought triggers, the Authority accepts that the proposed criterion should form the focus of attention, but believes that it is not possible to understand its implications without considering how the criterion might be applied by GAWB. Hence, the Authority has retained its discussion of parameter values and assumptions, and their implications for augmentation triggers.

Supply Capacity

Draft Report

In its initial proposal, GAWB indicated that its supply capacity is limited to the current HNFY of 70,000ML, which increases to 78,000ML when the dam first fills to 40m. GAWB further submitted that, if the HNFY is revised downward in the Water Resources Plan for the Boyne River Basin, GAWB's allocation is likely to be correspondingly reduced. It suggested that the 70,000ML allocation should be adjusted to allow for distribution losses and contingency.

In the Draft Report, the Authority noted that the consideration of supply capacity was a key focus of the Draft SEQ Water Strategy (2008), which identified an available yield from existing dams and weirs of 416,000ML per year, or 20% less than previously thought available. A scenario of a 10% reduction to 374,000ML per year due to climate change was also considered.

Further, the NSW Metropolitan Water Plan (2006) indicated that available annual supply from the storage system was reduced from 605,000ML per year to 575,000ML per year in recognition of lower inflows and more accurate modelling.

In response to GAWB's initial proposal, Callide Power Management (CPM) submitted that it was concerned that the trigger definition may result in an augmentation being developed to meet aggregate contracted customer demand of just more than 70,000ML per year, when the additional supply requirement could have been delivered using existing assets.

In the Draft Report the Authority noted that, in other jurisdictions, the system safe yields have been reduced mainly as a result of reduced inflow expectations. In GAWB's case, the Awoonga Dam safe yield was reduced by DNRW from 87,900ML per year to 78,000ML per year in 2003 due to reduced inflows. In 2003, DNRW set the interim HNFY at 70,000ML to reflect the available supply of water. Therefore, the implications of lower inflows in the years leading up to 2003 have been taken into account by DNRW in the full and interim HNFY. The risk of future downgrades remains, due to the lower inflows recorded since (2005-2007), ongoing climate variability and improved modelling. The Authority noted that any changes to inflows arising from these factors should be taken into account by DNRW as they occur.

In regard to CPM's comment, the Authority noted in the Draft Report that GAWB's proposal allows for a prudent consideration of alternative responses (rather than only augmentation) such as demand management or curtailment and needs to be considered in the context of their costs and benefits. Also of relevance is whether demand is temporary or permanent.

Accordingly, in the Draft Report, the Authority concluded that supply capacity was relevant and that it should reflect the amount of water established by DNRW as being available for supply, rather than the amount of water that could be available once the dam fills. The relevant benchmark for supply capacity is the HNFY as set by DNRW. Currently, this is the interim HNFY at 70,000ML per year. When the dam fills, the HNFY will rise to 78,000ML per year.

The Authority also noted that, should further downgrades be considered necessary due to the further impact of climate variability, then this latter amount would be most relevant.

Stakeholder Submissions on the Draft Report

GAWB noted that the Authority's conclusions in relation to defining the capacity of water sources appeared to align with its proposal.

The Authority's Analysis

The Authority proposes no change to the Draft Report conclusion and therefore recommends that supply capacity is a relevant factor in establishing unexpected additional demand and should reflect the amount of water available for supply (presently the current interim HNFY of 70,000ML, as set by DNRW).

Distribution Losses

Draft Report

In its initial submission, GAWB stated that its criterion for triggering construction in response to unexpected demand incorporated an allowance for distribution losses. GAWB proposed distribution losses of 5% of the total volume supplied through GAWB's distribution system. Currently, the total allocation supplied is 42,000ML per year, 5% of which is 2,100ML. In effect, GAWB proposed an average distribution efficiency of 95%.

GAWB noted that this contrasts with the present loss allowance of 10% submitted to DNRW in its SLMP. However, GAWB proposed that the 5% allowance was consistent with loss factors applied for other bulk industrial pipeline systems owned by SunWater. GAWB suggested that loss allowances may be reviewed at price resets using updated performance data and benchmarks.

The Authority sought additional information from GAWB in relation to its SLMP, which indicated that:

(a) system losses arise from unauthorised water usage, authorised but unmetered water usage, meter error (estimated at 2%) and physical loss of water from leaks and evaporation; and

(b) in 2006-07, total system losses were 9.3% of water released from Awoonga Dam. In separate advice, GAWB noted that the level of system losses varies from year to year, and was 6.3% in 2005-06.

GAWB indicated that the replacement of mechanical flow meters with electro-magnetic flow meters should allow more accurate metering across the system. GAWB also proposed pipeline pressure reduction as another strategy to reduce losses, while segmentation of metering by sector would assist in identifying leakages and unauthorised use. Overall, according to the SLMP, GAWB aims to reduce losses to about 3% of dam release volume over a five-year period to 2013.

In the Draft Report, the Authority noted that the Draft SEQ Water Strategy (QWC, 2008) established a bulk transport and network distribution system loss target of no more than 8% of total urban water use. The Strategy identified system losses from fire fighting, theft, inaccurate metering and leakage as accounting for 14% of urban demand in 2005, and that this would be reduced through pressure and leakage reduction and the design and management of new

distribution infrastructure. It was noted that the 8% target represented best practice based on industry benchmarking for system losses.

In response to GAWB's initial proposal, CPM submitted that a supply augmentation trigger should be based on an allowance for reasonable and efficient distribution losses. CPM expected that the level of allowance for such losses would be considered by the Authority.

RTA was concerned that GAWB's assumption of a reduction in distribution losses from the current 10% to 5% may not be achieved, and that this could delay augmentation.

In the Draft Report, the Authority noted that the issue of distribution losses was reviewed in the 2005 investigation. In that investigation, the Authority commissioned the Snowy Mountains Engineering Corporation (SMEC) to optimise GAWB's asset base and identify efficient operations costs. SMEC's report included an assessment of losses within the system.

In the 2005 investigation, SMEC benchmarked losses within other Australian Water Authorities. According to then available data, bulk water supply systems with roofed, tank type storages, similar to GAWB's system, normally exhibit very low system losses, in the order of less than 1% to 2% (SMEC, 2005).

While GAWB has focused on distribution losses within its own supply system, the losses in the GRC's reticulation system will also be relevant to identifying a demand response trigger. For example, a reduction in Council's system losses would reduce their demand on GAWB's supply. For this reason, a more holistic approach to system losses which reviews the prospects for improved leakage management across the supply chain to customers is desirable.

In its assessment of GAWB's system losses, SMEC indicated that:

(a) GAWB's main conveyance pipe was in excellent to good condition and various inspections did not identify any noticeable signs of leakage;

(b) GAWB's 2.0 breakages per 100 kilometres of pipeline compared to the national average of 25.7. This suggested that GAWB's system was in good condition and well maintained and operated; and

(c) GAWB's losses could not be precisely measured until more accurate metering was installed.

In the 2005 investigation, the Authority used SMEC's conservative benchmark of system losses of 2% in its modelling for its recommended pricing practices.

The Authority noted that SMEC's benchmarked system losses took into account system leakages and evaporation only. SMEC did not take into account meter inaccuracy or unauthorised use.

The Authority re-commissioned SMEC to provide comment on GAWB's SLMP in light of SMEC's previous analysis. The advice from SMEC was that GAWB does not appear to have a leakage problem, but rather a meter accuracy problem. SMEC suggested that the key is to improve the operation of the meters, including possibly installing two new meters, and to have a leakage monitoring system properly developed including pressure and flow Supervisory Control and Data Acquisition (SCADA).

SMEC concluded that, for planning purposes, the leakage allowance should be a maximum of 3% which it considered is already being attained, based on a pro-rata assessment of losses recorded so far in 2007-08. The 3% allowance comprises a 2% allowance for meter

inaccuracies with the balance for unauthorised consumption, authorised unbilled consumption and actual leakage.

The Authority noted that GAWB's proposed 5% distribution losses are:

(a) less than current total losses of 10% as set out in its SLMP; and

(b) higher than GAWB's own longer term target of 3% and apparent current distribution system losses of 3%.

The difference between 5% and 3% of potential distributed volume is 840ML.

The Authority concluded that a more accurate allowance for system losses of 3% as suggested by SMEC should be adopted for this purpose. This would be accounted for in estimating the demand trigger.

Stakeholder Submissions on the Draft Report

GRC agreed with the Authority's conclusion that 3% system losses would be the most appropriate allowance for distributional losses. GRC stated that while the difference between 3% and 5% may not seem substantial, it still represents approximately 1,000ML per annum which may be significant during a drought situation.

RTA stated that system water loss should be based on recent historical performance rather than a desired performance indicator (e.g. 3%). RTA also stated that the allowance should be regularly reviewed to reflect system performance.

GAWB submitted that its most recent assessment is that physical loss of water is around 2% from its distributional system. Losses from its water treatment plants are additional to this. GAWB maintained that meter error is a legitimate distribution loss and that based on best practice meters are accurate to +/-2%. GAWB reiterated its position that 5% is a reasonable maximum loss allowance for planning purposes.

GAWB argued that the Authority's recommendations in effect 'lock in' a loss allowance. However, GAWB's proposal was to set a ceiling but make decisions regarding augmentation based on actual losses at the time. This approach provided scope for investments to reduce losses where this could defer augmentation and allow for the likely increase in leakage from GAWB's assets as they age.

GAWB argued that for planning purposes, there should be greater flexibility in defining distributional losses. GAWB's submitted approach:

(a) provides incentives to reduce losses;

(b) allows for further investments in reducing losses to be considered in light of augmentation options; and

(c) allows for increased losses from ageing assets.

The Authority's Analysis

The Authority considers that the level of losses should reflect the targeted level of performance in the near term (as set out in the SLMP) as well as recent performance. As was the case in the Draft Report, the Authority accepts that meter error is a relevant component of the distribution loss allowance.

Currently, GAWB's SLMP defines a target total system loss allowance, including treatment plant and meter losses, of 3%, while actual losses since mid-2007 have been within this target loss allowance, based on recent loss information provided by GAWB. The Authority considers that, under current circumstances, a distribution loss of 3% therefore remains appropriate. Nevertheless, it accepts that the level of loss allowance should be subject to periodic review, and that it may increase over time as assets age.

Contingency

Draft Report

In its initial submission, GAWB stated that its criterion for triggering construction in response to unexpected additional demand incorporates a provision for contingency reserve (headroom). GAWB proposed a contingency reserve of 5% of GAWB's current HNFY (70,000ML, 5% of which is 3,500ML).

GAWB considered that a contingency reserve is necessary because:

(a) it is common practice for water service providers to retain a small surplus above allocation to account for day-to-day variations in demand;

(b) it provides scope for customers to use more than their water reservation in a particular year, given that customers can use up to 10% more than their reservation volume without incurring penalty charges;

(c) it enables GAWB to meet a sudden unforeseen spike in demand; and

(d) there is a risk that GAWB's volumetric entitlement from Awoonga Dam could be revised downwards.

GAWB proposed that, if the trigger for augmentation was breached by only a small volume, and there was no or little prospect of additional short-term demand, it may be prudent to supply the new small demands from the contingency volume or from an alternative small volume source.

In the Draft Report, the Authority noted that the Metropolitan Water Plan for Sydney (NSW Government, 2006) compared supply and demand forecasts for Sydney. It applied a safety margin of 30,000ML to the total supply of 575,000ML (5.2%). The Plan estimated that Sydney has sufficient water to meet its needs until 2015, when demand is estimated at 542,000ML and supply at 575,000ML. The safety margin was intended to offset the risk of error in estimates of demand and supply.

The Draft SEQ Water Strategy (QWC, 2008) did not include a contingency reserve. However, the estimated safe yield of 416,000ML per year reflected a 'cautious' approach in the new planning framework. A scenario was also reviewed incorporating a 10% reduction in yield to take account of possible effects of climate change.

The concept of headroom is used in the United Kingdom, where water businesses must report to the regulator, Office of Water Services (Ofwat), on target and available headroom as part of the security of supply index. Target headroom is defined as the threshold or minimum acceptable level of difference between dry year demand and available supply. Surplus headroom exists where the available headroom exceeds the target level. Deficit headroom exists where available headroom is smaller than the target level, which triggers an increase in supply.

In response to GAWB's initial proposal, CPM submitted that GAWB's proposed 5% contingency reserve appeared somewhat arbitrary. It noted that, if maintained in perpetuity, the

contingency reserve would require GAWB to permanently hold, and for customers to pay for, more capacity than is required at any point in time.

CPM further proposed that, at a minimum, GAWB should demonstrate that the contingency reserve is reasonable and appropriate, by quantifying each of its reasons (as listed above). While these were considered by CPM to be uncontroversial, it was not clear that they collectively required GAWB to hold a 5% contingency. For example, CPM noted that some customers historically used less than their full contracted reservation volume.

In the Draft Report, the Authority indicated that the key purposes for GAWB's contingency reserve were to manage short-term variations in customer demand, new demand growth and supply downgrades.

(a) Short Term Variations in Existing Customers' Demands

In the 2005 investigation, the Authority recommended, and the Ministers accepted, that GAWB should apply load factors or penalty charges where industrial customers' demands exceeded contracted volumes on an annual basis. These load factors were:

(a) 25% to apply to the total charge for incremental volumes where actual consumption is between 110% and 125% of the contracted amount; and

(b) 50% to apply to the total charge for incremental volumes where actual consumption is higher than 125% of the contracted amount.

For councils, the Authority recognised the greater inherent difficulties in forecasting demand. The Authority therefore recommended that a 10% load factor apply where actual consumption exceeds 125% of contracted volumes.

The basis for this approach was to provide certainty for GAWB in regard to contracted volumes and to shift the risk of short-term demand variations to the customers. In this way, the cost of managing customer demand variations is attributed to the relevant customer, rather than across all customers as would be the case if the cost of a contingency allowance was shared across all customers.

It was noted, however, that customers could increase demand by up to 10% without triggering a penalty charge (or by up to 25% in the case of the councils). Where customers repeatedly increase demand up to the threshold, GAWB should actively manage contracts to ensure that reservation volumes are adjusted appropriately. The Authority recognised that there could be an incentive for customers to understate their demand needs by up to 10% and that a contingency provision may be a prudent approach to manage this risk.

However, it was noted that, based on available data, actual demand has been 13% to 29% less than that contracted from 2001-02 to 2007-08. This may reflect prevailing take-or-pay arrangements which are set at varying levels below 100% for many of GAWB's customer contracts. Only one customer's actual demand has exceeded the contracted demand. When this occurred, the additional demand was accommodated by the lower contracted demand from other customers. Customers bear the risk of actual demand being less than that contracted under existing take-or-pay contracts.

The Authority noted that, in essence, it appears that some customers ensure water is available by having a large buffer in their own contracted demand. They typically use much less than contracted. GAWB can use this buffer to meet short term daily and annual variations in other customers' demand.

The Authority therefore concluded in the Draft Report that available data did not support the need for a contingency reserve to deal with short-term variations in customer demand.

At the same time, the Authority accepted that it was possible that, in the future, under new contractual arrangements, the aggregate of customers' short term needs may exceed aggregate reservation volumes.

(b) New Demand

In the Draft Report, the Authority indicated that, in the case of unexpected new permanent increases in demand, the critical issues are:

(a) the lead time required for planning, approvals, construction and filling to provide additional water;

(b) the time for a new customer to reach full contracted demand levels; and

(c) the volume of demand growth. Unlike most water businesses, GAWB's demand growth can be lumpy and represent a substantial percentage increase on current demand. However, demand growth may comprise only a small percentage of the next planned augmentation.

The Authority considered that a contingency reserve is not required where the lead time for augmentation (including filling) is less than (or equal to) the lead time for new customer demand. Where preparatory works are already in place, potential augmentation on a just-in-time basis can be a quicker and cheaper way of dealing with the risk of new unexpected demand. Furthermore, as noted above, demand has typically been between 13% and 29% below contracted levels and can assist in meeting short term supply imbalances.

In the current circumstances, the Authority noted that the proposed Fitzroy pipeline can deliver a significant volume of water in a relatively short timeframe – within two years of the decision to commence construction once preparatory works are in place. It is unlikely that an unexpected new customer would need more than 30,000ML supply within two years, particularly in view of the short-term surpluses identified above.

Given the current situation, the Authority therefore considered that a 5% contingency reserve of 3500ML/year to manage unexpected new demand would be a 'doubling up' of the currently proposed contingent supply strategy, adding unnecessarily to service costs.

The Authority accepted that a contingency reserve may be required where the lead time for augmentation is much longer. The level (or percentage) of contingency reserve should take into account the probability of new demand, its volume and the lead time to the next augmentation. The required contingency allowance may be greater than 5% (or 3,500ML) in some instances.

In the 2002 investigation, GAWB's next augmentation was a further raising of Awoonga Dam. A total lead time of six to eight years was required to ensure that the raising was completed and filled before the need to meet demand. On this basis, the Authority noted that a 'capacity cushion' of 5,500ML/year remained available by 2020-21 under the demand and supply assumptions of the time. This provided a sufficient planning window for future augmentation.

In the 2005 investigation, the Authority recommended a 'just-in-time' approach in regard to lead times for storage capacity augmentation. Under this approach, an augmentation would be commenced to allow sufficient time for planning and construction, and filling if relevant, just in time to meet increasing demand.

In summary, the Authority accepted the principle of a contingency allowance in the augmentation trigger to deal with unexpected demand, but this should be established taking into account relevant timing and volume risks and other prevailing arrangements. However, given the relatively short lead time and significant supply volume of the proposed Fitzroy pipeline, a contingency reserve was not considered necessary in the current circumstances.

(c) Downgrades in Supply

As noted above, in the Draft Report the Authority accepted that a hydrological downgrade could result from climate change or changes to the method used for estimating safe yield.

If a contingency reserve of 5% is provided to cover a potential downgrade, as proposed by GAWB, this implies a permanent de facto downgrade with costs met by all customers.

The Authority considered that GAWB should be able to monitor the potential for any downgrades in safe yields in conjunction with DNRW, to provide some early warning of an impending revision. Moreover, as noted above, hydrological changes occur infrequently and ex-post responses are generally appropriate.

(d) Other Issues

In response to GAWB's initial proposal, CPM suggested that GAWB quantify how the contingency reserve is justified by each factor GAWB has raised. In the Draft Report, the Authority indicated that, while provision of a 5% contingency is not necessary under current circumstances, where circumstances change and a contingency reserve is justifiable then the level of contingency attributable to each legitimate risk factor should be identified. At that time, the fact that the risks and their responses are not necessarily additive but may be mitigated by a single contingency provision would need to be taken to account.

In regard to the issue raised by CPM that existing customers would have to meet the cost of the contingency allowance, the Authority considered that the costs of an augmentation attributable to existing customers as against new customers should be further reviewed in Part (c) of the investigation.

Stakeholder Submissions on the Draft Report

(a) Short Term Variations to Demand

GAWB submitted that a review of past usage was not sufficient to dismiss the risk of short-term demand variations. This view was also shared by RTA which considered that augmentation is more likely to be triggered by emergent demand that could effectively materialise 'overnight'. Further, GAWB stated that the Authority's suggestion that customers are deliberately contracting for volumes in excess of their actual requirements is speculative and does not reflect that customer behaviour cannot or will not change in the future.

GAWB stated that, given the absence of alternatives, it is commercially imprudent for GAWB to be placed in a position where its contractual obligations could conflict with its statutory limits on safe yield. GAWB argued that contractual provisions provide for water use over and above reservation. This flexibility comes at a cost and GAWB must be satisfied it has sufficient reserves to meet these additional demands as they arise.

(b) New Demand

GAWB submitted that it accepts its contingent supply strategy is designed to respond to increases in demand. GAWB also submitted that circumstances may arise where it is prudent to dedicate part of this allowance to meeting a relatively small demand that would otherwise trigger augmentation.

GRC submitted that there is generally at least two years notice of any increase in water demand and due to the long lead times it is doubtful there would ever be any unexpected increases in demand.

(c) Downgrades in Supply

GAWB submitted that its water entitlement is subject to review at the setting of the Boyne River Basin Water Resource Plan (WRP). GAWB submitted that, as historic records lengthen, the greater the change that a new 'worst drought on record' will occur, resulting in a downgrade of the HNFY. GRC submitted that there is no justification for GAWB's proposed 5% contingency reserve as the risk of a further reduction of the volumetric entitlement is unnecessarily pessimistic.

The Authority's Analysis

In response to GAWB's concerns, the Authority considers that

(a) there is a possibility that customers may use more than their contracted volume. However, there is no automatic right of customers to access more than their contracted volume and available historical data provided no evidence of actual demand exceeding contracted demand. Having regard to the potential cost implications of additional capacity, it is GAWB's responsibility to manage customer usage relative to contracted volumes and ensure that it is not placed in a position where its contractual obligations could conflict with its statutory limits on diversion;

(b) GAWB should take account of the lead time for the required augmentation as compared to the lead time for new demand from new and existing customers in determining whether a contingency provision is required. Given the relatively short lead time and significant supply volume of the proposed Fitzroy pipeline, a contingency reserve is not necessary to be included in the augmentation trigger at this time; and

(c) GAWB should also monitor the risk of supply downgrades. An ex-post response to a downgrade in hydrology is more appropriate way of managing this risk than a permanent downgrade through a contingency reserve.

In conclusion, the Authority proposes no change to the Draft Report conclusions.

The Authority recommends that, in principle, it is appropriate for a contingency allowance to be taken into account in triggering construction of an augmentation in response to unexpected additional demand. However, in the current circumstances, GAWB's proposed reserve of 5% of HNFY is unnecessary.

4. REVIEW OF GAWB'S PROPOSED PROCESS

GAWB proposed a general process to be applied when assessing the appropriate response to drought or unexpected additional demand.

GAWB's proposed process and the Authority's recommendations are:

(a) Planning – that GAWB's proposed process of five-yearly reviews of strategic water plans and an adaptive and consultative management approach involving annual updates if required, is appropriate;

(b) Notice – the notice to customers setting out augmentation options and price impacts and inviting customer responses for demand reduction proposals should be provided at the time of the low supply alert as originally proposed by GAWB and a copy of the notice should also be provided to the Authority at that time;

(c) Customer responses – that up to 120 days should be allowed to provide sufficient time for customers to prepare detailed responses and for GAWB to then analyse options and have up to six months lead time to undertake any necessary preparatory work and reach contractual agreement;

(d) Evaluation and option selection – that the process should require customers to provide any submissions which could forestall the need for augmentation in a cost effective manner. GAWB's analysis should be supported by an NPV of the commercial benefits of each option. Where Ministers propose that GAWB undertake a less-commercial option, GAWB should be provided with a relevant CSO. Otherwise, GAWB should implement the most commercially beneficial option. All options should be evaluated from a broader perspective not only when they generate a similar quantum of [commercial] benefit. The Authority also recommends that GAWB should allow a period of 90 days for the process of evaluation and negotiation;

(e) Ex-ante evaluation – if GAWB wants some assurance that the Authority would support its proposed response, the Authority recommends that it be notified at the time of the low supply alert or when contracted demand leads to commencement of the process leading to the triggering of augmentation and, if the response is likely to increase aggregate revenues by more than 15% an appropriately drafted Ministerial Direction sought;

(f) Under Part 3 of the QCA Act, the Authority cannot provide GAWB with binding ex-ante guidelines to assist with GAWB's direction, although broad guidelines have been provided in some of the Authority's previous reviews; and

(g) Construction trigger - that it is GAWB's responsibility to demonstrate compliance with the process leading up to the construction trigger. In addition, GAWB's proposal for a second notice to customers 60 days prior to commencement of construction to inform them of the selected augmentation option and the pricing implications is appropriate.

4.1 Background

As part of its initial submission relating to the criteria for triggering the commencement of construction of an augmentation, GAWB proposed a general process to be applied to either drought or unexpected demand (with only minor differences in application). The process focused upon planning and procedural issues (including consultation), and option evaluation and selection.

GAWB also identified specific timings and actions for its proposed process to respond to the drought prevailing at the time of its submission. Since its initial submission, GAWB has confirmed that the low supply alert has been withdrawn and the timetable initially proposed for the drought response no longer applies. Accordingly, the Authority's analysis focuses on the key steps relating to the general process.

GAWB's submission in response to the Authority's Draft Report proposes a refined process to apply after the strategic planning process (SWP) is completed, that is after the SWP is reviewed every five years. The next SWP is due in 2009. The proposed process applies after a low supply alert is triggered in the case of drought (after which GAWB has proposed that customers should lock in contracted demand volumes within 90 days) or when contracted demand is increased in response to unexpected additional demand. GAWB's proposed process is then as follows:

(a) Notice to customers – six months before the forecast trigger point for an augmentation response to drought or demand – first notice is to be provided to customers setting out augmentation options and price impacts and inviting customer responses for demand reduction proposals;

(b) Customer Responses – five months before the forecast trigger point – customers' responses to be submitted, including any demand reduction responses. Where the price increase is above defined thresholds as expressed in contracts, customers may give notice to terminate their contracts;

(c) GAWB Evaluation – four months before the forecast trigger point – GAWB evaluates demand reduction proposals and considers preferred responses;

(d) Authority Consultation and GAWB Decision – three months before the forecast trigger point – the Authority may be given a period of 30 days to comment and/or endorse an approach. If this does not occur, GAWB will make a decision; and

(e) Second GAWB Notice to customers – two months before forecast trigger point – GAWB notifies customers of preferred approach and advises customers of updated pricing impacts.

GAWB submitted that this process represented an improvement of the original proposal, noting that the 30 day period for customer notice is considered reasonable given that customers will have six months advance warning after the declaration of a low supply alert.

The Authority notes that the steps in the refined process are in line with GAWB's initial proposal, apart from the inclusion of a second notice to customers two months prior to triggering the augmentation. However, the initial notice to customers is provided six months after the low supply alert, whereas previously GAWB proposed initial notice at the time of the low supply alert. The steps are reviewed in more detail in the ensuing sections.

4.2 Planning

Draft Report

In the Draft Report, the Authority noted that GAWB's planning process has in the past responded to events such as increases in demand on an as needs basis. In its initial submission regarding Part (b), GAWB had proposed that planning be undertaken on a regular basis aligning with five-yearly price reviews. Nevertheless, GAWB also proposed that plans may be revised more frequently or involve updates as new information emerges.

As part of the planning process, GAWB proposed that cost benefit analysis be applied to determine the most appropriate augmentation at any given time, and that customers be provided with information on the timing, cost and price impacts of possible augmentations. Further, GAWB proposed that the planning process include consultation with customers and calling for non-infrastructure proposals.

In the Draft Report, the Authority noted that, throughout Australia, the role of government agencies and water service providers in relation to planning varies. In some cases, water service providers are directed by State Governments as to the planning framework within which services are to be provided. In other instances, water service providers submit plans for consideration by State Government.

In general, due to the impacts of the recent drought and concerns about possible climate change, State Governments have played a more directive role. For example, the NSW Government's Metropolitan Water Plan (2006) provided an overarching planning framework, which included specifying the nature of the infrastructure to be provided.

The length of the planning period also varies. However, there has been a recent trend to the adoption of more adaptive planning processes. For example:

(a) the Sydney Metropolitan Water Plan (2006) covers a 25-year period and is expected to be reviewed every four years;

(b) the Waterproofing Adelaide Plan (2005) extends for 20 years and is to be reviewed every five years; and

(c) a 50-year planning horizon was adopted by the QWC for the Draft SEQ Water Strategy (2008) and by the Victorian Government for the Central Region Sustainable Water Strategy (2006). The QWC proposed that the Plan would be reviewed on a five-yearly cycle, but would apply an adaptive approach to planning and regular updating of water balance assessments.

While planning in most States generally involves a high level of stakeholder consultation, predominantly through the release of draft reports and a formal consultation process, some variation does exist. For example, plans such as the Central Region Sustainable Water Strategy (Victorian Government, 2006), Waterproofing Adelaide (SA Government, 2005) and the SEQ Water Strategy (QWC, 2008) were released initially in draft form for consultation. The NSW Metropolitan Water Plan, on the other hand, is subject to review by an independent panel in regard to its progress in implementation.

The various plans typically define a series of actions or strategies in relation to water conservation, demand management, surface water or groundwater augmentation, recycling options and desalination.

Most water service providers and their state regulators adopt co-incident planning intervals of five years with some variations.

The Authority also noted that regulators' roles in reviewing and approving proposed augmentations in response to drought or demand vary between the States. Independent Pricing and Regulatory Tribunal (IPART), Independent Competition and Regulatory Commission (ICRC) and the Essential Services Commission (ESC) have powers to approve or not approve proposed augmentations, although in the case of Government directed drought responses, these regulators focus on the efficiency of the cost incurred rather than the nature of the augmentations.

In submissions to the Authority in response to GAWB's initial proposal, RTA recommended that GAWB prepare a far more detailed project development plan for augmentation, with further definition and refinement of project scope, cost estimates, execution strategy and implementation plan, in the light of the price risk exposure presented to customers.

CPM commented that, due to substantial rainfall, there is no near-term requirement for the Fitzroy River Pipeline project, on either supply augmentation or drought contingency grounds and therefore submitted that GAWB must re-evaluate its timetable for the Fitzroy River Pipeline and immediately discontinue any planned construction or significant preparatory expenditures.

CSE also limited comments to the process preceding the construction of the Fitzroy River Pipeline and submitted that the recent rains have provided GAWB with a useful opportunity to spend more time discussing options with its customers, selecting and pricing augmentation options, as well as ensuring that it has thoroughly costed the Fitzroy River Pipeline option.

In the Draft Report, the Authority indicated that, under the *Water Act 2000*, GAWB is clearly required to plan future water supply capacity, reliability and quality.

The Authority has previously recognised that GAWB's demand growth is driven by (potentially) large and lumpy industrial demand with uncertain timing (2002). These circumstances have not changed. The Authority remained of the view that long term (20 year) demand and capital investment planning is essential for GAWB.

The Authority considered that long term planning should be based on clear assumptions, supported by historical trends and incorporating informed views about future technological and climate implications, and recognising the limitations of broader regional resource capabilities.

The updating of those plans for review every five years (in line with the price reviews) is consistent with such a process. Price reviews are dependent upon assumptions relating to planning and the most appropriate infrastructure responses. Ensuring that such a planning process is completed prior to each price review would ensure their relevance to the price review.

The Authority noted GAWB's suggestion that plans may need to be updated in the interim to take account of new information. This adaptive approach is similar to that proposed by other jurisdictions. Further, the lead times related to triggering augmentation for both drought and demand should ensure that such plans are current for most of any five-year price review cycle and such a possibility should not impose unnecessary costs.

The Authority also noted that the emphasis accorded by GAWB to consultation with customers (including pricing information). Such consultation is considered to be particularly important for the effectiveness of the planning process as it ensures that the most recent information is incorporated on all possible demand management and supply options (QCA, 2007). It also allows the customers to respond to potential changes in prices and to consider their requirements and contractual implications. At the same time, the consultation must be effective and provide sufficient time for an iterative process to be undertaken.

In the Draft Report, the Authority also noted that the National Water Initiative (NWI), an intergovernmental agreement between the Commonwealth and the States (NWC, 2004), set some principles and guidelines for water planning. Under these principles, the duration of a plan should be consistent with the level of knowledge and the development of the particular water source. In the case of ongoing plans, there should be a review process that allows for changes to be made in the light of improved knowledge.

GAWB's SWP was prepared in 2004. The Authority considered that GAWB now had an opportunity to develop a new Strategic Water Plan, taking account of recent information, and to

be completed in time for the 2010 regulatory review. In a submission to the Authority in response to stakeholder comments, GAWB indicated that it proposes to release a new SWP in 2008-09. The Authority considered this to be appropriate and consistent with the NWI given the potential for changed information since the 2004 Plan.

Therefore, in the Draft Report, the Authority concluded that long term strategic water planning, with major reviews at five-yearly intervals, in line with regulatory reviews, was appropriate. The Authority also supported an adaptive and consultative management approach involving updates of the strategic plan to accommodate significant new information, such as may emerge in regard to climate change.

Stakeholder Submissions on the Draft Report

GAWB noted the Authority's conclusion that the proposed planning regime was appropriate.

GAWB also stated that it still intends to provide customers with a project development plan. However, the urgency for this plan has abated with recent inflows to Awoonga Dam.

The Authority's Analysis

The Authority supports GAWB's intention to provide customers with a project development plan once a preferred response to drought or unexpected additional demand is formulated. Consistent with the Part (a) conclusions, GAWB has advised the Authority that this plan will include the execution schedule for the preparatory works for the Fitzroy Pipeline.

The Authority proposes no change to the Draft Report conclusion. The Authority recommends that GAWB's proposed process of five-yearly reviews of strategic water plans, and an adaptive and consultative management approach involving annual updates, if required, be accepted. The Authority also recommends that the strategic water plan be updated prior to the commencement of the next pricing review by the Authority scheduled for July 2010. That strategic water plan should include the most recent information of alternative supply options and associated costs.

4.3 Notice

Draft Report

In its initial proposal, GAWB submitted that, where circumstances indicate that a departure from a five-yearly plan is required, customers are to be notified of the event, the proposed response and the estimated pricing implications. In addition to the notification, GAWB would invite customers to submit proposals for alternatives that might deter augmentation.

In regard to drought, the timing of this notice was proposed to coincide with the triggering of the DMP (the low supply alert), five years before expected dam failure.

In regard to unexpected additional demand, GAWB proposed that notice would be given when GAWB forms the view that demand would reach the trigger level (as defined by their criterion outlined in Chapter 3). This would arise from GAWB's regular planning cycle or from a sudden change in circumstances.

In the Draft Report, the Authority indicated that it had been unable to identify any similar practice to that proposed by GAWB in other jurisdictions. The Authority noted that, in preparing its Draft SEQ Water Strategy, the QWC (2008) appraised the community of the options necessary to address the prevailing drought conditions. Similar approaches were

adopted by the SA Government (Waterproofing Adelaide, 2005) and the Victorian Government in its Sustainable Water Strategy for the Central Region (2005).

In the case of the NSW Government's Metropolitan Water Plan (2006), appropriate responses were developed using a collaborative process relying on cross agency planning, commissioning specific strategy assessments and extensive work by the service providers. Under the adaptive management approach adopted by the NSW Government, rather than provide notice to customers to provide responses, the Government relied on a Metropolitan Water Independent Review Panel to provide expert input on planning matters.

In the Draft Report, the Authority noted that GAWB proposed to provide customers with notice of a potential augmentation, which incorporates details of the proposed response, the estimated pricing implications and which provides customers with an opportunity to respond. As proposed, the notice should be issued at the time the low supply alert is issued under the DMP (for drought). For the purposes of unexpected additional demand, notice should be given as soon as it is reasonably expected by GAWB that contractual arrangements will eventuate. In this regard, the Authority noted that there is usually sufficient time available for the necessary consultation about the appropriate nature and size of the augmentation (or other response) due to the lead times associated with constructing the new customers' plant and facilities (and associated approval processes).

The Authority also noted GAWB's particular circumstances, that is, supplying a small number of bulk water customers, permit such a consultative approach.

The Authority concluded that the proposed nature of the notice was appropriate. Further, the Authority noted that, for the proposed response to be relevant, it was essential that the 20 year plans be updated every five years. These plans should also incorporate details of other possible supply and demand management responses (including their price and cost implications) to allow their evaluation for the circumstances prevailing at a particular point in time.

In regard to drought, the Authority concluded that, consistent with the Authority's conclusions regarding the DMP (Chapter 2), the notice to customers could be widened to invite customer feedback on the timing of the trigger, taking account of the key assumptions such as the latest inflow data, supply information, and most recent demand forecasts.

Stakeholder Submissions on the Draft Report

Under its refined process, GAWB identified the first notice to customers as occurring 6 months before the forecast trigger points. During this stage:

(a) the notice will set out the specific actions to be taken regarding restrictions, supply options and GAWB's preferred augmentation response;

(b) GAWB will provide information on the estimated price impact of the response; and

(c) customers will be invited to submit proposals to reduce demand to enable augmentation to be deferred.

The Authority's Analysis

In the Draft Report, the Authority accepted that the notice should be issued for drought at the time the low supply alert is issued under the DMP and for unexpected additional demand as soon as it is reasonably expected by GAWB that contractual arrangements will eventuate. The Authority concluded that the proposed nature of the notice was appropriate. However, the Authority also concluded that the notice to customers could be widened to invite customer

feedback on the timing of the trigger, taking account of the key assumptions such as the latest inflow data, supply information, and most recent demand forecasts.

Under its refined process for the drought trigger process, GAWB proposes to issue the notice to customers six months before the restrictions and augmentation would be triggered, that is, six months after the low supply alert is commenced.

This approach effectively compresses the process into six months rather than the 12 months originally proposed by GAWB. The Authority considers that this substantially reduces the time available for customers to provide alternative proposals and for these options to be evaluated.

In coming to this conclusion, the Authority accepts that the initial information required by GAWB in regard to demand and the available augmentation options (including GAWB's preferred option), as well as indicative pricing implications, should be available as a result of the ongoing strategic planning process.

Nevertheless, and particularly as GAWB envisages an iterative process to formulating the most appropriate augmentation, the initiation of the required processes at the earliest possible time is appropriate. In this regard, once a low supply alert is triggered:

(a) the most appropriate (for example, inflow) assumptions for triggering augmentation need to be agreed;

(b) customers need to formulate their own responses;

(c) customer demand needs to be firmed up; and

(d) the nature (and cost) of the most appropriate response to prevailing conditions (augmentation, if necessary) needs to be developed.

The Authority therefore recommends that the notice to customers setting out augmentation options and price impacts and inviting customer responses for demand reduction proposals should be provided at the time the low supply alert as originally proposed by GAWB. This corresponds with the timing of the initial request to customers asking them to firm up contracted demand (see Chapter 2).

For reasons outlined further below, the Authority also recommends that the notice to customers inviting customer responses setting out augmentation options be provided to the Authority at this time.

4.4 Customer Responses

Draft Report

In its initial proposal, GAWB indicated that customers may respond to the notice of the potential augmentation by:

(a) making no change to water demands;

(b) examining bypass options or efficiency savings;

(c) trading part or all of their water reservations and applying to GAWB for a reduction; and

(d) submitting proposals to GAWB for funding of investments to reduce demand and therefore defer the need for augmentation. In drought circumstances, curtailment arrangements would apply in accordance with the DMP and customer contracts.

Customer responses would be required within a 30 to 60 day period, on the basis that customers will have already developed information on the technical and commercial issues. For the previously prevailing drought, GAWB indicated that commercial proposals should be lodged with GAWB by 30 March 2008 (about 60 days after pricing implications of the augmentation option are known).

In the Draft Report, the Authority noted that the Waterproofing Adelaide Strategy (2005) was finalised following two rounds of consultation, the first between December 2003 and March 2004, and the second between November 2004 and January 2005. Supply and demand options were also evaluated through consultation forums and a random survey of customers.

The Victorian Government's Sustainable Water Strategy for the Central Region (2005) followed an 18-month consultation process with the community and included a discussion paper, a draft strategy, public meetings and scrutiny by independent experts.

The QWC's Draft SEQ Water Strategy (2008) is proposed to be refined after considering feedback from the community. The Draft Water Strategy was released in March 2008, with comments due by 31 July 2008, providing a period of at least four months for consultation. The QWC noted that the proposed supply and demand responses outlined in the Draft Strategy would be reviewed in the light of community input.

In response to GAWB's initial proposal, stakeholder submissions in the first instance focused on the implications of the significant February inflows in delaying the need for the current drought response and therefore the proposed timing of customer responses. However, stakeholders commented adversely on the short time frames proposed under the current drought for fully costed proposals including proposed contractual arrangements.

Further, CPM noted that it intended to submit a proposal in response to GAWB's proposed strategy for the Fitzroy Pipeline, but was challenged by the tight timeframes specified by GAWB. RTA was concerned about the limited time for customers to present demand or supply side alternatives.

(a) Timing Issues

In the Draft Report, the Authority noted that GAWB had proposed that customers provide fully costed demand management or supply substitution options within 30 to 60 days of notice being given.

The Authority also noted that, in the recent drought, GAWB provided notice of its proposed appropriate augmentation and the likely timing at the time of the low supply alert in September 2007, but proposed not to provide pricing implications until 31 January 2008, leaving little time for customers to respond to GAWB's proposed pricing implications. This situation arose in part due to the continuing drought and the timing of the current investigation.

The Authority agreed with GAWB that, under a robust and ongoing future planning process, both customers and GAWB should be aware of most of the available options thereby reducing the time and amount of additional work needed to be undertaken by customers. Further, the more comprehensive and up to date the strategic planning, the less likely customers would identify a hitherto unknown drought responses as a result of the Low Supply Alert notice.

Further, once the process and timetable is established, customers would be aware in advance of any potential timing constraints and can either ensure that options of interest are fully examined as part of the normal planning process or commence preliminary work of options in advance of notice.

Nevertheless, the Authority noted that GAWB proposed to issue the notice for drought to be given at the Low Supply Alert. Even on GAWB's preferred 'worst three year' inflow assumption, there is 12 months before a construction trigger. For unexpected additional demand, the time available depends on the lead-time for the new customer demand, which typically should be known two to three years in advance.

The Authority therefore concurred with RTA and CPM that the timelines proposed by GAWB for the response to the notice were unnecessarily short. It is also noted that longer consultation periods have applied in other planning processes in other jurisdictions.

The Authority considered that 120 days should provide sufficient time for customers to prepare detailed responses and for GAWB to then analyse options and have up to six months lead time to undertake any necessary preparatory work and reach contractual agreement. If earlier implementation of a proposed customer option was required, the onus would be on the customer to submit proposals earlier within the 120-day period to make the option workable.

(b) Scope of Customer Responses

In the Draft Report, the Authority noted that the range of possible customer responses identified by GAWB was considered to be comprehensive. However, for their implications to be assessed by GAWB and customers, the trading framework needed to be fully developed and curtailment options clear.

In regard to drought, the Authority considered that customers' responses may provide further information regarding forward demand projections and their risk attitudes regarding inflows. Consistent with the Authority's preferred more flexible DMP arrangements, it was concluded that customers should have the opportunity to respond not only to the proposed augmentation or other solution, but also to the assumptions underlying the trigger process.

Stakeholder Submissions on the Draft Report

Timing Issues

GPN supported GAWB's proposal for customers to respond to the potential augmentation notice within 60 days. GPN argued that the Authority's proposed extension of time for customers to respond to the notice was inconsistent with GAWB's proposed management strategy and that water demand reduction strategies should be an integral part of the operating plans of all industrial users. GPN therefore implied that customers should already have demand reduction strategies under consideration at the time notice is issued.

In contrast, CPM, GRC and RTA supported the Authority's conclusion that the consultation period between GAWB and its customers should be increased.

According to CPM, the increased timeframe would provide customers with more time to form a considered view on any GAWB proposal and allow GAWB to engage its customers and stakeholders in more comprehensive discussions. GRC agreed that it would provide greater opportunity for assessment of alternative options.

RTA argued that GAWB's proposed 30 days were insufficient for RTA to develop and commit to robust, viable alternatives. However, it also expressed concern about the impact a longer response period would have on GAWB's contracting strategy and construction price certainty.

RTA also submitted that it considered augmentation is more likely triggered by emergent demand that could effectively materialise 'overnight'. Therefore, it would be difficult for customers to develop alternative supply options in the short time period proposed by GAWB.

GAWB submitted that it does not believe a 30-day period is unreasonable given the information from prior planning studies that will have preceded any notice.

In its refined process, GAWB identified the customer response process as taking place one month from GAWB's first notice. During this stage:

(a) customers consider the price impacts and any alternative options;

(b) customers may submit, on a voluntary basis, any demand reduction proposals, to include details and terms to enable assessment by GAWB and potentially the Authority; and

(c) if the price increase is above a defined threshold, customers have the option to terminate their contract, without payment of early termination fees.

GAWB submitted that the timing for customer responses should ultimately be a matter of negotiation in finalising standard contracts, although GAWB intends to apply its refined process across its entire customer base as an improvement to the process outlined in its original Part (b) submission.

GAWB further noted that one month provides reasonable notice given that declaration of a low supply alert would provide six months advance warning of the need to consider options.

Scope of Customer Responses

CPM stated that it remains of the view that a reduction in power station water consumption, achieved through the retrofitting of hybrid dry-cooling capacity, is a feasible and cost-effective alternative to GAWB's preferred Fitzroy River Pipeline. According to CPM, dry-cooling:

(a) could be implemented within the timeframe required by GAWB's Demand Management Plan;

(b) is comparable, or better than, the Fitzroy River Pipeline on a consistent dollar-per-megalitre basis; and

(c) is suitable as either a short-term drought response initiative or longer-term alternative to supply augmentation.

CPM stated it is prepared to engage in further discussions with GAWB regarding its dry-cooling proposal.

GRC submitted that some possible options in response to drought could include:

(a) some customers taking a larger reduction and being compensated for the water they do not use;

(b) major water replacement projects such as air-cooling; or

(c) mobile desalination plants.

RTA stated that their likely response would be for customers to invest in developing and maintaining alternative supply options well in advance of a possible augmentation trigger, without any certainty of deployment.

The Authority's Analysis

Timing Issues

In the Draft Report, the Authority considered that 120 days should provide sufficient time for customers to prepare detailed responses and for GAWB to then analyse options and have up to six months lead time to undertake any necessary preparatory work and reach contractual agreement. If earlier implementation of a proposed customer option was required, the onus would be on the customer to submit proposals earlier within the 120 day period to make the option workable.

The Authority notes that most customers supported the Draft Report conclusions that more time for consultation is desirable. However, GAWB's revised process allows only one month for customers to submit demand reduction proposals or to determine whether or not to terminate a contract. GAWB's original proposal was to allow 30 to 60 days.

On the basis of most customer submissions, the Authority retains a view that a longer period of consultation is required for customers to effectively respond to GAWB's notice.

The Authority does not accept that, as the low supply alert will have been issued six months earlier, all customers will be in a position to respond quickly. The Authority's experience is that many stakeholders are unlikely to give the matters detailed consideration, or consider alternatives, until the implications of then prevailing conditions are fully understood.

Accordingly, the Authority recommends that up to 120 days should be allowed to provide sufficient time for customers to prepare detailed responses - this is consistent with the Authority's preceding recommendation (Chapter 2) for the notices to customers setting out augmentation options and price impacts to be provided at the time the low supply alert (as originally proposed by GAWB).

Such an approach would then allow GAWB more time to consider the most appropriate response (see below).

Scope of Customer Responses

In the Draft Report, the Authority considered that customers' responses may provide further information regarding forward demand projections and their risk attitudes regarding inflows. Consistent with the Authority's preferred more flexible DMP arrangements, it was concluded that customers should have the opportunity to respond not only to the proposed augmentation or other solution, but also to the assumptions underlying the trigger process.

On the basis of submissions received, the Authority notes the scope of issues that customers wish to incorporate in any response to GAWB's notice. This demonstrates the range of options that GAWB and its customers should review in the planning stage.

The Authority proposes no change to the Draft Report conclusion regarding the scope of customer responses. It recommends that customers should have the opportunity to respond not

only to the proposed augmentation or other solution, but also to the assumptions underlying the trigger process.

4.5 Evaluation and Option Selection

Draft Report

In its initial submission, GAWB proposed that it would evaluate the proposals based on pre-determined criteria and using cost benefit analysis. It would then either enter into negotiated arrangements with customers to reduce their water reservation or construct the appropriate source augmentation. GAWB indicated that it would conclude this evaluation within 30 days.

GAWB requested that the Authority review GAWB's proposed assessment criteria, namely that:

(a) the proposal must generate reductions to water demand that GAWB is contractually obligated to meet;

(b) the costs of the alternative proposal must be less than the benefits of deferral to customers, expressed as the net present value (NPV) of their water costs; and

(c) where competing alternatives generate 'a similar quantum of benefit', a further evaluation would be undertaken to investigate the 'broader economic costs and benefits' including externalities and social impacts.

GAWB suggested that, in determining the costs and benefits, the analysis should take account of:

(a) the time value of deferral;

(b) a comparable cash flow period (20 years or longer), and including a value for 'enduring costs and benefits' beyond the cash flow period; and

(c) the existing 20-year demand and augmentation profile used to calculate prices.

GAWB indicated that proposals should include the commitments that the proponent is prepared to enter into, the costs to GAWB, the commencement date and amount of demand reduction, the allocation of risks between GAWB and the proponent, and arrangements for ongoing water charges. GAWB indicated that, if it was to invest $50 million to reduce contracted demand, for example by retrofitting a power station to allow partial air-cooling, then this sum should be added to GAWB's asset base for pricing purposes.

In the Draft Report, the Authority noted that the process of evaluation and option selection applied by the QWC in its Draft SEQ Water Strategy (2008) involved an initial screening of demand and supply options prior to a more detailed economic assessment of alternative portfolios of the options. The screening process focused on hydrological performance, indicative cost and social and environmental impacts.

The portfolio analysis incorporated the principles of least cost planning to compare the costs and benefits of different suites of water supply and demand initiatives.

In response to GAWB's initial proposal, CPM submitted that GAWB's previous evaluation of future supply options/contingency strategies was not robust. Further, CPM had concerns that

GAWB's proposed evaluation process may not allow for proper consideration of all possible options.

CPM stated that the evaluation process ensures that sufficient discretion remains with GAWB. For example, it questioned:

(a) what constitutes a 'similar quantum of benefit' and how much cheaper does a demand management option have to be as compared to the Fitzroy River Pipeline before it is considered superior?

(b) what constitutes 'broader economic costs and benefits' and "qualitative assessments of social impacts"? and

(c) how does GAWB intend to account for any 'enduring costs and benefits'?. For example, CPM queried whether, in the case of air-cooling, GAWB would consider the future decommissioning of a power station an advantage or disadvantage.

CPM stated that, given GAWB's public and high-profile promotion of the Fitzroy River Pipeline as its preferred project, it would seem difficult for GAWB to assess a competing and mutually-exclusive proposal objectively.

CSE concluded that, in relation to GAWB's proposed Fitzroy River Pipeline, the need has not been demonstrated and the alternatives have not been properly considered.

In the Draft Report, the Authority noted that GAWB is a category 1 Water Authority and, under the *Water Act 2000* (s640), is required to be commercially successful in its business activities and efficient and effective in providing goods and services, including CSOs.

The Authority considered that the evaluation of all options must therefore be undertaken from the perspective of these responsibilities. Accordingly, it was noted in the Draft Report that all options, including those submitted by customers at the time notice is provided, must be evaluated on the basis of commonly accepted principles for the evaluation of commercial projects.

These would include taking into account:

(a) the time value of any deferral;

(b) ensuring a comparable cash flow period (20 years or longer), and including a value for 'enduring costs and benefits' beyond the cash flow period; and

(c) the existing 20-year demand and augmentation profile used to calculate prices.

In addition, other underlying assumptions include that the capital expenditures are assessed as being 'fit for the purpose' and represent the least-cost approach to meeting the future supply shortfall.

In respect to the individual criteria proposed by GAWB, the Authority's comments and conclusions in the Draft Report were as follows.

(a) Reductions to contractual obligations

In its initial submission to the Authority, GAWB submitted that the proposal in response to a notice must generate reductions to water demand that GAWB is contractually obligated to meet.

In the Draft Report, the Authority indicated that some situations could be envisaged in which a proposal should be considered that does not result in a reduction of demand contracted by GAWB to a particular party. For example, this could occur where trading of water is enabled by demand management by a particular party. Alternatively, current customers may be able to generate supplementary supplies such as through recycling or stormwater management.

Accordingly, the Authority recommended that this criterion could more appropriately be defined as requiring customers to provide any submissions which could forestall the need for augmentation in a cost-effective manner.

(b) Benefits of deferral must exceed costs

In its initial submission, GAWB proposed that the costs of the alternative proposal must be less than the benefits of deferral to customers, expressed as the net present value (NPV) of their water costs.

The Authority accepted that GAWB's proposal to consider the benefits to customers and the costs associated with a proposal should ensure the viability of an investment. Reliance on an appropriately specified NPV analysis is a well recognised methodology for commercial decision-making.

While in the formal planning process, the full cost of each alternative needs to be taken into account, where preparatory costs for the preferred contingent supply strategy have already been incurred, only the incremental costs of the augmentation option should be compared to an alternative proposal.

The Authority noted that GAWB is required to establish asset plans into the future and is well informed of possible non-commercial implications of various options. GAWB should therefore seek to identify broader economic issues of potential relevance to the appropriateness of various infrastructure options. These issues should be brought to the attention of the relevant Ministers.

Consistent with the requirements of the *Water Act 2000*, unless directed by Ministers to do otherwise, GAWB, as a category 1 water authority, must adopt that option which generates the most commercial benefit to GAWB. GAWB would need to be compensated by a CSO were an option other than that considered most commercially appropriate to be adopted. GAWB's proposal for a 30-day timeline to evaluate customer proposals may well be insufficient for such an analysis and for government to determine whether it wishes for an alternate less-commercial proposal to be adopted and supported through an appropriate CSO.

Accordingly, the Authority accepted that adoption of an NPV approach would assist in the evaluation of the commercial attractiveness of alternative proposals. However, the Authority concluded that GAWB should also undertake a broader analysis of the relevant options and where a less-commercial proposal is considered most appropriate, then GAWB should proceed with it provided it receives a relevant CSO. To facilitate such a process, sufficient time needed to be made available for the Government to consider whether a less commercial option should be adopted.

(c) Broader Economic Costs and Benefits (including externalities and social impacts)

In its initial submission, GAWB proposed that, where competing alternatives generate 'a similar quantum of benefit', a further evaluation would be undertaken to investigate the 'broader economic costs and benefits' including externalities and social impacts.

As noted above, as GAWB is responsible for the planning of water supply within the region, it must adopt a broader perspective and evaluate all options, not only when they generate a similar

quantum of [commercial] benefit. As also noted, unless Ministers direct a less-commercial alternative and provide a CSO, GAWB would be obliged to undertake only the most commercially attractive option.

Stakeholder Submission on the Draft Report

GAWB submitted that the evaluation process would commence two months after GAWB's first notice. During this stage GAWB will:

(a) evaluate any demand reduction proposal (particularly in terms of deferral of augmentation);

(b) take into account reduced demand that would occur from customer termination of contracts should augmentation proceed; and

(c) consider its preferred least cost response and may present this to the Authority.

Reductions in Contractual Obligations

GAWB submitted that, in order for any customer proposal to forestall augmentation, it must result in a reduction in contracted demand that GAWB is obligated to meet. Therefore, GAWB submitted that the Authority's recommended change to the criterion was not necessary.

Benefits of Deferral Must Exceed Costs

GAWB noted that the Authority accepted the adoption of a NPV approach, but suggested that GAWB undertake a broader analysis incorporating non-commercial proposals that could attract a community service obligation (CSO) payment. GAWB submitted that this was a matter for government rather than GAWB.

While supporting the concept, GAWB submitted that the Authority's suggestion would potentially serve to delay decision making, and create further uncertainty and risk to the process, particularly given GAWB will already have a commercially-viable proposal in place.

Broader Economic Costs and Benefits

GAWB accepted that cost benefit analysis should consider broad impacts. However, it stated that its interpretation of the Authority's conclusion was that the preferred option should be measured in terms of least cost to customers, unless Government's preference is to secure, through a CSO 'purchase', benefits that arise from other options. GAWB sought clarity on this issue.

The Authority's Analysis

Reductions in Contractual Obligations

In the Draft Report, the Authority indicated that some situations could be envisaged in which a proposal should be considered that does not result in a reduction of demand contracted by GAWB to a particular party. The Authority therefore recommended that GAWB's criterion could more appropriately be defined as requiring customers to provide any submissions which could forestall the need for augmentation in a cost-effective manner.

GAWB suggested that customer proposals submitted in response to a notice must generate reductions to water demand that GAWB is otherwise contractually obligated to meet.

However, the Authority maintains the view that not all options will reduce demand but some such as trading, and proposals which generate supplementary supplies such as through recycling and stormwater management, can forestall the need for augmentation. Since this is the ultimate objective of the process, this would seem to be the appropriate criterion.

The Authority therefore recommends that customers should be requested to provide any submissions which could forestall the need for augmentation in a cost-effective manner.

Benefits of Deferral Must Exceed Costs

In the Draft Report, the Authority concluded that adoption of an NPV approach would assist in the evaluation of the commercial attractiveness of alternative proposals. However, it was concluded that GAWB should undertake a broader analysis of the relevant options and, where a less-commercial proposal is considered most appropriate, GAWB should proceed with it provided it receives a relevant CSO from government. The Authority also noted that the 30 days proposed by GAWB may provide insufficient time to complete the evaluation of options and assessment of potential CSOs by government.

The Authority notes GAWB's view that a broader analysis incorporating non-commercial elements that could attract a CSO is a matter for the Government. The Authority accepts that whether a CSO is warranted is a matter for Government.

The Authority also notes that the Government will be aware of GAWB's proposed options both from GAWB's strategic planning process and its annual updates of the DMP, and further that GAWB's revised process still allows only 30 days for evaluation of options and identification of CSOs. Even if all necessary information has been made available throughout the initial stages of the process, the Authority considers that a period of 90 days would still be required for GAWB and the Government to complete this process.

The Authority recommends that GAWB's analysis should be supported by an NPV of the commercial benefits of each option. Where Ministers propose that GAWB undertake a less-commercial option, GAWB should be provided with a relevant CSO. Otherwise, GAWB should implement the most commercially beneficial option.

Broader Economic Costs and Benefits

In the Draft Report, the Authority considered that all options should be evaluated from a broader perspective regardless of whether or not they generate a similar quantum of [commercial] benefit. However, as noted above, unless Ministers direct a less-commercial alternative and provide a CSO, GAWB should undertake the most commercially attractive option.

The Authority notes GAWB's request for clarity regarding its conclusion. Essentially, the Authority considers that GAWB, as it is responsible for the planning of water supply within the region, should always take broader economic benefits and costs into account when comparing investment options not just where they generate a similar level of net benefit (as originally proposed by GAWB). This would enable all information regarding the broader impacts of the alternative options to be available as a basis for determining whether a CSO is applicable.

GAWB should implement the least cost option that is consistent with a full commercial return on investment unless otherwise directed by the responsible Ministers, in which case the Government can choose to direct GAWB to undertake a sub-commercial investment and compensate GAWB (either through a CSO or by requiring a lower rate of return on investment). In regard to GAWB's understanding of the Authority's Draft Report position, the Authority notes that the preferred option would typically result in the least cost to customers.

The Authority therefore proposes no change to its Draft Report conclusions and recommends that GAWB adopt a broader perspective and evaluate all options, not only when they generate a similar quantum of [commercial] benefit. However, unless Ministers direct a less-commercial alternative and provide a CSO, GAWB should undertake only the most commercially attractive option.

The Authority also recommends that GAWB should allow a period of 90 days for the process.

4.6 Ex-Ante Approval

Draft Report

In its initial proposal, GAWB submitted that it may seek ex-ante (regulatory) approval of the scope of a response and/or the standard and cost of the asset, subject if necessary to a referral from the Ministers. GAWB suggested that approval would need to be provided within a 30 to 60 day timeframe, having regard to the construction trigger date set in the DMP.

GAWB requested that the Authority develop guidelines to be employed under such an approval process.

In the Draft Report, the Authority noted that, in NSW, IPART (2005) approved initial costs for the then proposed Sydney desalination plant, but noted that actual expenditure would be reviewed in the next review. However, the NSW Government subsequently directed Sydney Water to construct the desalination plant. In June 2007, the NSW Government directed IPART to include the efficient costs of constructing the desalination plant when determining the maximum price for services provided by Sydney Water.

In other jurisdictions, ex-ante approval by regulators is typically limited to forecast capital expenditure over an ensuing regulatory period. In WA, the ERA (2008) considered that the Bunbury and Busselton Water Boards' forecasts for capital works were necessary and appropriate. The ICRC's 2007 draft decision for the ACTEW water and wastewater price review reduced the forecast capital expenditure on the basis that they were higher than would be incurred by an efficient business.

In Victoria, the ESC's Guidance Paper (2007) for the 2008 water price review indicated that the proposed capital expenditure is independently assessed by experts to ensure that forecasts are efficient and account for a planning horizon that extends beyond the five-year regulatory period.

In SA, Essential Services Commission of South Australia (ESCOSA) (2007) noted that in the case of SA Water's capital program, little or no information was provided to demonstrate that forecast capital costs are efficient.

In the Draft Report, the Authority noted GAWB's request for the Authority to provide guidelines that could be employed as part of an ex-ante approval process.

The current pricing principles applying to GAWB already allow for a review trigger if there are sustained variations in aggregate revenues of 15% or more (QCA, 2005). Such a review could incorporate an assessment of the appropriate scale and cost of a proposed augmentation. However, as noted by GAWB, a referral from the Ministers is required for the Authority to instigate such an investigation.

The Authority's legal advice indicated that, under section 23(2)(a) of the QCA Act, the Ministers can refer GAWB for an investigation about pricing practices, including the regulatory asset base.

In such an investigation, the Authority could develop guidelines for approval of capital expenditure which, if followed by GAWB, the Authority would be likely to include in the regulatory asset base. The nature of the guidelines would be likely to depend on the degree of urgency in the situation to which GAWB is responding. In this regard, the Authority has previously developed principles in its investigations including the DBCT Draft Access Undertaking (2006) and the Draft Report General Pricing Principles for Infrastructure Investments made in response to Extraordinary Circumstances (2004).

However, the advice further stated that it goes beyond the Authority's powers under Part 3 of the QCA Act to bind itself in terms of future consideration of GAWB's regulatory asset base. That is, while the Authority can provide guidance, it cannot provide a binding ex ante approval of the type sought by GAWB under the current provisions of the QCA Act. Under the monopoly oversight provisions of the QCA Act, the ultimate decision on the conduct of the government monopoly business activity is left to the Ministers.

Recent amendments to the QCA Act do not provide any additional scope for the Authority to provide a binding ex-ante approval for GAWB.

In summary, the Authority concluded that:

(a) the previously approved review trigger arrangements may apply where the investment results in an increase in aggregate revenue greater than 15%. However, a Ministerial Direction would be required to allow the Authority to proceed with such a review; and

(b) guidelines have been provided in some of the Authority's previous reviews. However, the Authority cannot give a binding ex-ante guideline under Part 3 of the QCA Act.

Stakeholder Submission on the Draft Report

In relation to its revised process, GAWB submitted that Authority consideration and GAWB decision would occur three months after GAWB's first notice. During this stage:

(a) the Authority will be given the opportunity to comment and provide its endorsement to an approach; and

(b) if the Authority does not endorse an approach or the Authority cannot respond in the timeframes, GAWB will make a decision.

Under GAWB's revised process, customers would then be notified of the decision within one month.

GAWB submitted that, while the Authority may be unable to bind itself in terms of ex-ante approval, it can provide guidelines as to how it would be likely to treat expenditure on an augmentation in terms of GAWB's asset base. GAWB argued that such guidelines would significantly improve the timeliness and predictability of the regulatory process.

GPN submitted that it strongly endorsed GAWB's proposal to have guidelines prepared for the approval of capital expenditure.

The Authority's Analysis

GAWB's proposal for the Authority to make a determination on the appropriateness of a proposed augmentation within one month is unworkable. The Authority would need to be involved from the time of the low supply alert if GAWB wanted some assurance that the Authority would support its proposed response, for example, the incorporation of the cost of an

augmentation into the regulated asset base for pricing purposes. And even this presumes that the Authority has been kept apprised of changes to key parameters in the DMP. Furthermore, the Ministers have already approved that GAWB's pricing practices should be reviewed by the Authority if aggregate revenues are likely to increase by at least 15%. Such a review is possible only within the desired timeframe for augmentation if the Authority is involved from the time of the low supply alert. Ideally, the Authority should limit its focus on GAWB's compliance with approved criteria and proposed process and the reasonableness of the parameter assumptions. An appropriate Ministerial Direction to this effect would be required.

Accordingly, the Authority recommends that the Authority be notified at the time of the low supply alert or when contracted demand leads to the commencement of the process leading to the triggering of augmentation, and an appropriately drafted Ministerial Direction sought.

As indicated in the Draft Report, under Part 3 of the QCA Act, the Authority cannot provide GAWB with binding ex-ante guidelines to assist with GAWB's direction, although broad guidelines have been provided in some of the Authority's previous reviews.

4.7 Construction Trigger

Draft Report

In its initial proposal, GAWB submitted that, as the final part of the process, it would commence construction upon the relevant trigger event, subject to its board and other approvals. GAWB also stated that it will be responsible for demonstrating that it has complied with the trigger points outlined in this process.

In the recent drought, construction was expected to be triggered in October 2008, or 13 months after the issue of the low supply alert. However, GAWB submitted that the trigger point may be deferred if:

(a) demand reductions, voluntary or mandated as curtailment arrangements are achieved; or

(b) acceptable alternative proposals are submitted by customers, such as a reduction in demand facilitated by retrofitting power stations to facilitate partial air cooling.

In the Draft Report, the Authority noted that the NSW Government's Metropolitan Water Plan (2006) indicated that the desalination plant construction would commence when existing supplies reach 30%. However, under its adaptive management approach, the NSW Government has since proceeded to commence construction of the desalination plant even though reserves are higher than 30%.

The QWC's Draft SEQ Water Strategy (2008) identified the range of current projects being implemented to meet the region's needs until 2028. It indicated that further sources would be required between 2028 and 2042, unless brought forward as a response to severe drought. The Strategy is intended to provide an adaptive management framework to prevent supply gaps developing.

Other Plans such as Waterproofing Adelaide (2005) and the Victorian Government's Central Region Sustainable Water Strategy (2005) identify a range of responses to prevailing drought and increasing demand without any specific detail in relation to construction triggers.

In the Draft Report, the Authority noted GAWB's proposal that it is responsible for demonstrating it has complied with the process leading up to the trigger point and that, subject to Board and other approvals, it would then initiate construction.

The Authority agreed it is GAWB's responsibility to demonstrate compliance with the process.

Stakeholder Submission on the Draft Report

In its response to the Draft Report, GAWB noted the Authority's agreement with its proposal. However, it raised concerns about the Authority's proposal that customer feedback be sought regarding the proposed timing of the drought trigger, taking into account assumptions such as inflows and demand.

GAWB submitted that it does not support a process that could lead to a substantial change to the underlying assumptions for augmentation just prior to the point when augmentation might otherwise be triggered. GAWB argued this process would create uncertainty, particularly for those customers who have chosen to rely upon the existing approach in assessing and managing their risk profile.

GAWB proposed a further step involving a second GAWB notice (commencing four months after GAWB's first notice) and two months prior to triggering construction. During this stage:

(a) GAWB will notify customers of the approach GAWB has decided to adopt or that which was recommended by the Authority;

(b) customers will be given an updated assessment of the price impacts of augmentation based on the final selected response; and

(c) any contract terminations will take effect.

GAWB argued that its approach reflects the adaptive management approached endorsed by the Authority.

The Authority's Analysis

In the Draft Report, the Authority supported GAWB's proposal that it is responsible for demonstrating it has complied with the process leading up to the trigger point and that, subject to Board and other approvals, it would then initiate construction.

In response to issues raised by GAWB, the Authority notes that its Draft Report does not imply that the underlying assumptions for such parameters as inflows system losses or demand forecasts would be changed just prior to the trigger for construction.

Rather, the Authority proposes that the most recent available information at the time of the low supply alert would be used to establish the trigger date for augmentation. The Authority does, however, consider that just prior to commitment to construct the validity of those assumptions should be checked to ensure that they still apply.

Such an approach is consistent with adaptive management strategies allowing timely information to be taken into account.

The Authority notes the step proposed by GAWB to inform customers of the outcome of its process and the pricing implications before proceeding to the augmentation. Under GAWB's process, customers have 60 days to respond by terminating contracts prior to commencement of construction.

In summary, the Authority recommends that:

(a) it is GAWB's responsibility to demonstrate compliance with the process leading up to the construction trigger; and

(b) GAWB's proposal for a second notice to customers to inform them of the selected augmentation option and the pricing implications is appropriate.

4.8 Summary of Process and Timeframes

Figure 4.1 provides a comparison of GAWB's proposed process and timings, commencing six months after the low supply alert in the case of drought, and the Authority's indicative timeframes which allow a full 12 months process.

Figure 4.1. Summary of Process for Response to Drought

Month	*GAWB's Process*	*QCA Recommended Process*
1	Low Supply Alert triggered.	Low Supply Alert triggered.
	Confirmation of demand sought from customers (90 days for response).	Confirmation of demand sought from customers.
		Notice sent to customers re demand reduction strategies and other options.
		Notice provided to QCA with relevant available information.
2		
3		
4	Customer advice due relating to confirmation of demand.	Customer advice due relating to confirmation of demand.
5		Customer responses due re demand reduction strategies and other options.
		GAWB commences final evaluation of options.
		GAWB to provide relevant information to Government for review of potential CSOs.
6		
7	First Notice is sent to customers re demand reduction strategies and other options.	
8	Customer Responses to demand reduction strategies and other options due.	GAWB Evaluation of options completed.
		Relevant CSOs identified by Government.
9	GAWB Evaluation of options completed.	
10	QCA review completed. If no QCA review, GAWB reaches a decision.	QCA review completed. If no QCA review, GAWB reaches a decision.
11	Second Notice of preferred option provided to customers (4 months after first notice issued).	Second Notice of preferred option provided to customers.
12	Customers required to lock in contracted demand volumes.	Customers required to lock in contracted demand volumes.
13	Commencement of construction	Commencement of construction.

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