

Water security for South East Queensland

- discussion paper on the review of the level of service objectives

December 2013

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Foreword

South East Queensland (SEQ) residents and businesses are still paying a very high price for the failure of successive Queensland Governments' to plan, build and manage the region's water supply.

We should never forget SEQ was on the brink of running out of water just a few years' ago.

There are countless stories of the hardship SEQ residents and businesses faced during the water supply crisis, as well as the ongoing cost-of-living stress that is directly linked to paying for some of Australia's most expensive, now un-necessary, bulk water assets.

Because water supplies are near full, now is the right time for Seqwater (the owner of the bulk water supply infrastructure) to start planning to ensure water supplies can meet our regional demands well into the future.

The Queensland experience is that governments that fail to plan for today also fail the generations of Queenslanders that will follow. We must be proactive in our approach to planning.

The desired level of service objectives are a management tool that will help ensure future governments are not forced into making panic-hurried, highest-cost, crisis management decisions.

The review of the desired level of service objectives considers options that will enable a more flexible, adaptive and cost-effective management approach for our region's water supply.

While the objectives set the 'minimum' level of security, Seqwater will be responsible for planning the delivery of the desired level of service. These plans, which will be outlined in the South East Queensland water security program, will also reduce red tape.

The desired level of service objectives will guide Seqwater's planning processes so that we have adequate water supplies to meet the region's demands over the long term, and that our basic water needs can be met under all circumstances, including severe droughts.

We encourage you to read this discussion paper and have your say on our proactive approach to providing a more secure and affordable water supply for future SEQ residents and businesses.

Honourable Campbell Newman MP

Queensland Premier

Honourable Mark McArdle MP

Minister for Energy and Water Supply

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Definitions

Bulk water supply system — also referred to as the SEQ Water Grid – the water supplied from the South East Queensland bulk water supply system to water service providers in South East Queensland. Currently made up of 12 major storages (including Wivenhoe, Borumba and Leslie Harrison Dams), plus the main connecting pipelines (including the Northern Pipeline, Southern Regional Pipeline, Eastern Pipeline Connector), the Western Corridor Recycled Water Scheme, and the Gold Coast Desalination Facility.

Bulk water provider — in South East Queensland, the bulk water provider is Seqwater. Seqwater uses the bulk water supply system to provide and transport water, typically to water service providers within South East Queensland.

Drought response trigger – will be defined by Seqwater in the water security program. It will be the trigger for when drought response actions, such as imposing water restrictions and/or adding purified recycled water to Wivenhoe Dam start.

Drought response infrastructure – infrastructure that is constructed in response to drought within short timeframes, to ensure that essential water supplies are maintained. Drought response infrastructure is typically water supply infrastructure that does not rely on rain, such as manufactured water assets like desalination plants or purified recycled water plants.

Essential minimum supply volume — the volume of water necessary to provide for drinking and basic hygiene and for essential services such as hospitals, adequate food production and power generation in critical circumstances

LOS (Level of Service) objectives — describe the desired level of performance from the bulk water supply. Refer to section 1.1 for more detail.

Medium level water restrictions — is a term that is used in the LOS objectives. The new LOS objectives will define medium level water restrictions as those water restrictions imposed in response to drought, during the time when water levels are between the drought response trigger and the safe minimum storage.

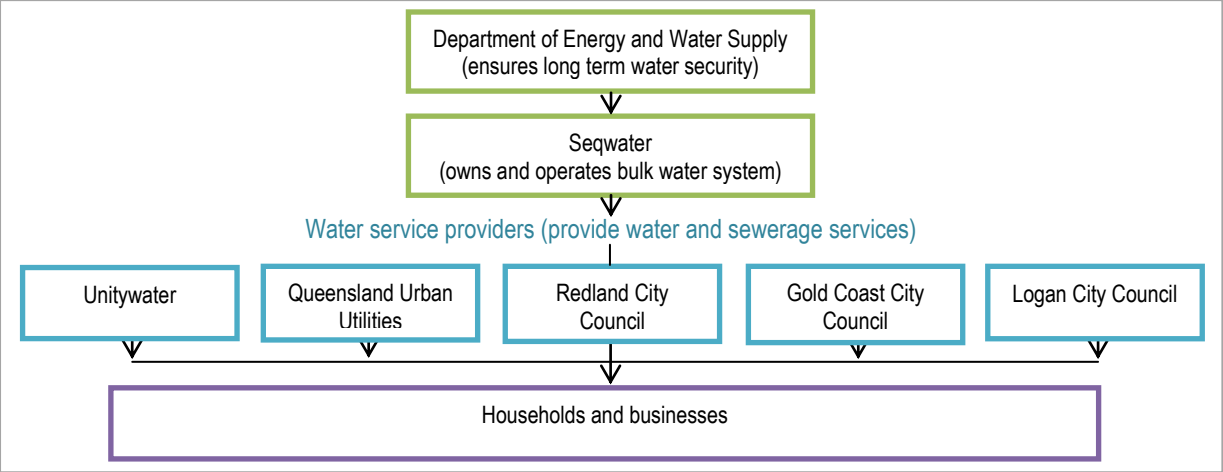
Minimum operating level — also referred to as the dead storage level, is prescribed for a water storage in the appropriate resource operations plan. When the water level in a storage is at or below its minimum operating level, the infrastructure owner must not release or supply water from that storage, unless authorised under exceptional circumstances.

Non-residential water use – is water use other than in the home. It includes water used by businesses, industry and power stations. Non-residential water use also includes system losses, that is ‘unaccounted’ water that might have been used for fire fighting, flushing systems, theft, or due to other unmetered water use, leakage losses or meter error. It is calculated using an estimate of the non-residential water use divided by the entire SEQ population (i.e. including those residents that have unreticulated water supplies).

Residential water use – is water use inside the home and for other domestic purposes, like watering a garden. It is calculated using estimates of the residential water use divided by the number of people with reticulated water supplies (i.e. provided water by a water service provider).

Safe minimum storage – will be defined by Seqwater in the water security program. It will be the trigger at which more severe drought response actions, including more severe restrictions, may need to be imposed. This is to minimise the risk of storages reaching minimum operating levels and consequentially supplying only the essential minimum supply volume.

Seqwater — the statutory authority, owned by the State, charged with providing bulk water supplies in South East Queensland. It owns and operates the bulk water supply system.



South East Queensland — includes the local government areas of Brisbane City Council, Moreton Bay Regional Council, Gold Coast City Council, Redland City Council, Ipswich City Council, Scenic Rim Regional Council, Lockyer Valley Regional Council, Somerset Regional Council, Logan City Council and Sunshine Coast Regional Council (see map on page 1 of this discussion paper for boundaries).

Water demand forecasts — estimates of how much water the community is likely to use over a given period in the future.

Water security —in 2013, the United Nations proposed the following definition of water security: *‘The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.’*

Water security program — the program that Seqwater must develop, implement and report against to facilitate the achievement of the LOS objectives.

Water service providers — also referred to as distributor-retailers, are the organisations that sell water directly to the community in South East Queensland (i.e. Queensland Urban Utilities, Unitywater, Logan City Council, Redland City Council, Gold Coast City Council)

1. Background

Water security is about ensuring that there is adequate water supply to meet the needs of the South East Queensland community over the long term, including during drought. At the same time, however, costs must be managed so that water remains affordable. In particular, it is important to ensure that we do not over-invest in the bulk water supply system with upgrades or costly bulk water infrastructure being built before it is required. It is for this reason that a review is being undertaken of our primary 'water security' planning framework, the Level of Service (LOS) objectives. Community support for the LOS objectives is important as many water security measures are dependent upon this support for their success.

1.1 What are 'Level of Service' (LOS) objectives?

LOS objectives specify the level of performance that South East Queensland residents can expect from their bulk water supply system. The objectives provide an indication of the volume of water that can be supplied (i.e. yield) at a given level of security.

LOS objectives ensure that:

- water supplies are adequate to meet regional residential and non-residential needs over the long term
- customers are aware of what water restrictions may be imposed during droughts
- the community's basic water needs can be met under all circumstances, including drought emergencies.

The LOS approach was first published by the Water Services Association of Australia in 2005 and is now being applied across Australian cities (refer to Appendix 1).

1.2 Why are we reviewing the desired LOS objectives in South East Queensland?

For the purposes of the LOS, South East Queensland stretches from the Sunshine Coast in the north to the Gold Coast in the south, west past Gatton, and includes the local government areas controlled by:

- Brisbane City Council
- Moreton Bay Regional Council
- Gold Coast City Council
- Redland City Council
- Ipswich City Council
- Scenic Rim Regional Council
- Lockyer Valley Regional Council
- Somerset Regional Council
- Logan City Council
- Sunshine Coast Regional Council.

See Figure 1 for more details.

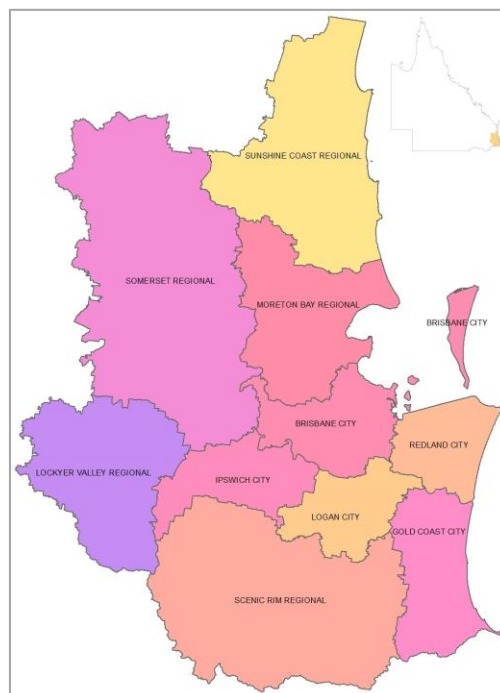


Figure 1: Map of South East Queensland

The region's population has grown steadily over the past decades and areas of settlement continue to spread. Planning now for future regional water use is an important task facing water service providers and the Queensland Government.

At present, the LOS objectives for South East Queensland are outlined in the South East Queensland System Operating Plan. The current LOS objectives state, that the South East Queensland bulk water supply system must be able to provide an average urban water allowance of 375 litres per person per day (this includes residential and non-residential demand and system losses) during non-drought times. This allowance has been in place since 5 March 2010. However, current data on actual water use in South East Queensland shows, that average daily demands have been substantially less than this allowance in recent years.

Therefore, the LOS objectives are being reviewed in order to:

- assess whether 375 litres per person per day is still an appropriate water allowance for planning purposes
- promote cost-effective operation of bulk water supplies by optimising existing assets and preventing over-capitalisation on existing and future infrastructure.

The LOS objectives will continue to apply to all communities in South East Queensland that are supplied reticulated water by a water service provider. The LOS applies only to town water supply, it does not apply to water supplied for agricultural use (this is unreticulated water).

The LOS objectives are only prescribed by the Government for South East Queensland as there are considered to be very high consequences if the region runs out of water due to the region's large population, extensive infrastructure and economic significance to the state of Queensland. Furthermore the interconnected bulk water supply system enables the LOS objectives to be provided for the region as a whole, rather than for particular areas that are dependent upon isolated water sources.

1.3 Who is carrying out the review?

The review of the LOS objectives is being undertaken by scientific and other technical staff from the Queensland Government's Department of Energy and Water Supply.

The Queensland Government no longer has a role in planning for bulk water supplies in South East Queensland. This role is now filled by a statutory authority, Seqwater. However, the Government maintains a strategic overview of Seqwater's operations to ensure long-term water security for South East Queensland. Therefore, the Queensland Government is the appropriate body to determine the new LOS objectives.

The review will be undertaken in consultation with Seqwater and the water service providers. It will inform the Queensland Government who will then set the new desired LOS objectives.

1.4 What method was used to undertake the review?

Calculating the LOS objectives for a water supply system is a complex process. Five main factors were considered in undertaking the review and putting forward options for the proposed new requirements for South East Queensland's bulk water supply. These were:

- *Demand* - How much water is required to meet the community's needs?
- *Yield* - On average, how much water can be supplied by the bulk water supply system each year?
- *Infrastructure* - When might new bulk water supplies/ infrastructure be required to provide enough water to meet the community's needs?
- *Restrictions* - If water restrictions are introduced during drought periods, what impact would this have socially, environmentally and financially, including on future infrastructure expenditure?
- *Potential cost* - What are the possible broad cost implications of different LOS objectives?

Hydrological and economic modelling was used to examine future demand, yield, potential future infrastructure requirements and possible cost implications. Various scenarios were then compared. For example, modelling was used to compare the potential costs and benefits of imposing different levels of water restrictions during drought periods. For more details of the data and methodology used in the review, please refer to the fact sheet on the LOS review.

It is important to note that other factors, such as water quality requirements and water allocation limits, can also affect the timing of additional bulk water supply infrastructure being built. This review focuses only on the potential effect that altering the LOS objectives could have on the timing of infrastructure.

1.5 How will the review be finalised and new LOS objectives introduced?

This discussion paper is being released on the Government's 'Get involved' website for public comment. In particular, we are interested in hearing whether the proposed levels of restrictions meet community expectations.

In addition, the department is working with Seqwater and South East Queensland water service providers to seek feedback on the discussion paper. The water service providers are:

- Unitywater (which provides water and sewerage services to the northern part of South East Queensland, including the local government areas controlled by Sunshine Coast Regional Council and Moreton Bay Regional Council)
- Queensland Urban Utilities (which provides water and sewerage services to the central part of South East Queensland, including the local government areas controlled by Somerset Regional Council, Brisbane City Council, Lockyer Regional Council, Ipswich City Council and Scenic Rim Regional Council)
- Redland City Council
- Logan City Council
- Gold Coast City Council.

The department will also target feedback from existing Customer Reference Panels established by the water service providers. These panels comprise of members drawn from a range of backgrounds, including businesses and the general public.

Submissions on the discussion paper can be made until 31 December 2013. Feedback will then be considered as part of the review, and the new LOS objectives will be finalised. It is anticipated that the new objectives will be prescribed in regulation by mid-2014.

Within 12 months of the new regulation, Seqwater must develop a water security program for South East Queensland that outlines the arrangements and measures in place to facilitate the achievement of the revised LOS objectives. Seqwater's program will include information about:

- operation of the bulk water supply system
- potential future infrastructure needs
- possible demand management measures
- drought response.

Seqwater will be responsible for reporting annually on its performance against its water security program.

2. Review of LOS objectives in South East Queensland

2.1 Water demand

2.1.1 The importance of demand forecasts

Water demand forecasts are estimates of how much water the community is likely to use in the future. In water security planning, demand forecasts are required in order to:

- ensure water supply is sufficient to meet demand
- plan for adequate water infrastructure.

The primary goal of LOS objectives is to ensure adequate water is available to meet residential and non-residential demand during 'normal' (i.e. non-drought) times and that basic water needs can be met under all circumstances.

However, demand forecasting is also important because it significantly affects both the capital and operating costs of water infrastructure in the region — with potential flow-on effects to future water prices. For example, if demand is over-estimated infrastructure may be built unnecessarily or before it is needed (illustrated in Figure 2). If demand is under-estimated, we may not have enough water to supply SEQ, therefore requiring additional infrastructure to be built in shorter timeframes and at a higher cost. Either of these scenarios could have an impact on future water prices.

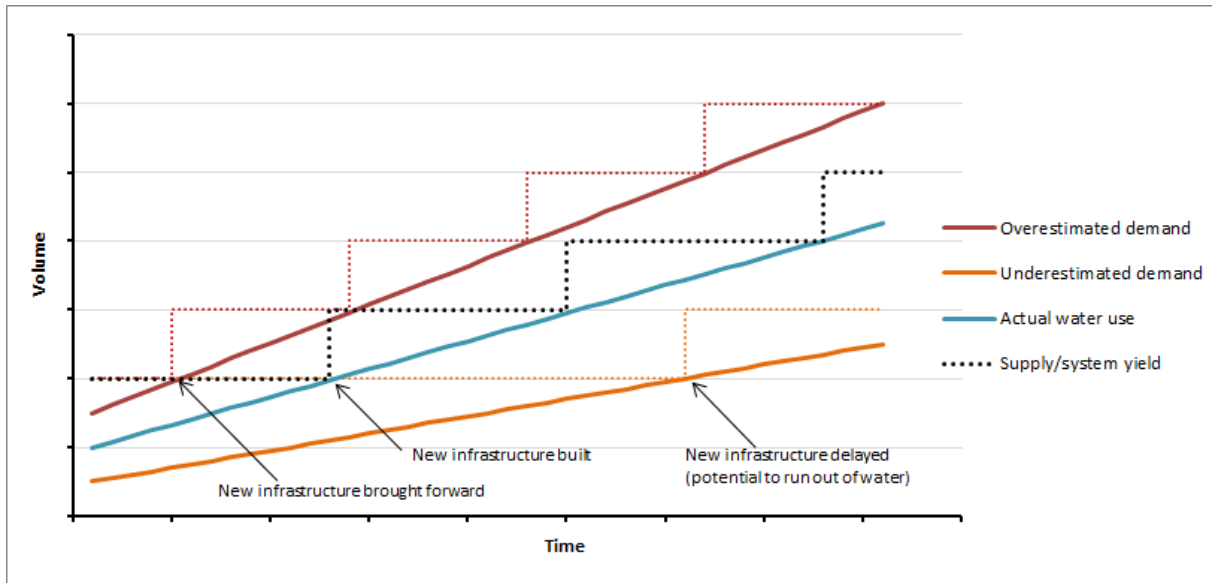


Figure 2: Graph showing relationship between demand forecasts and future new bulk water supply system infrastructure

2.1.2 Factors affecting demand

Total water demand is driven by a region's population and the average water use per person, including residential and non-residential use.

Water use can fluctuate depending on a number of factors. Some of the most common factors are rainfall, temperature, water restrictions, changes in consumers' water behaviours over time, the price of water and household income. All of these factors are taken into account in developing water demand forecasts.

Figure 3 shows the variation in South East Queensland's residential water use from January 2009 to June 2012, and various factors (e.g. rainfall, temperature, water restrictions) affecting it.

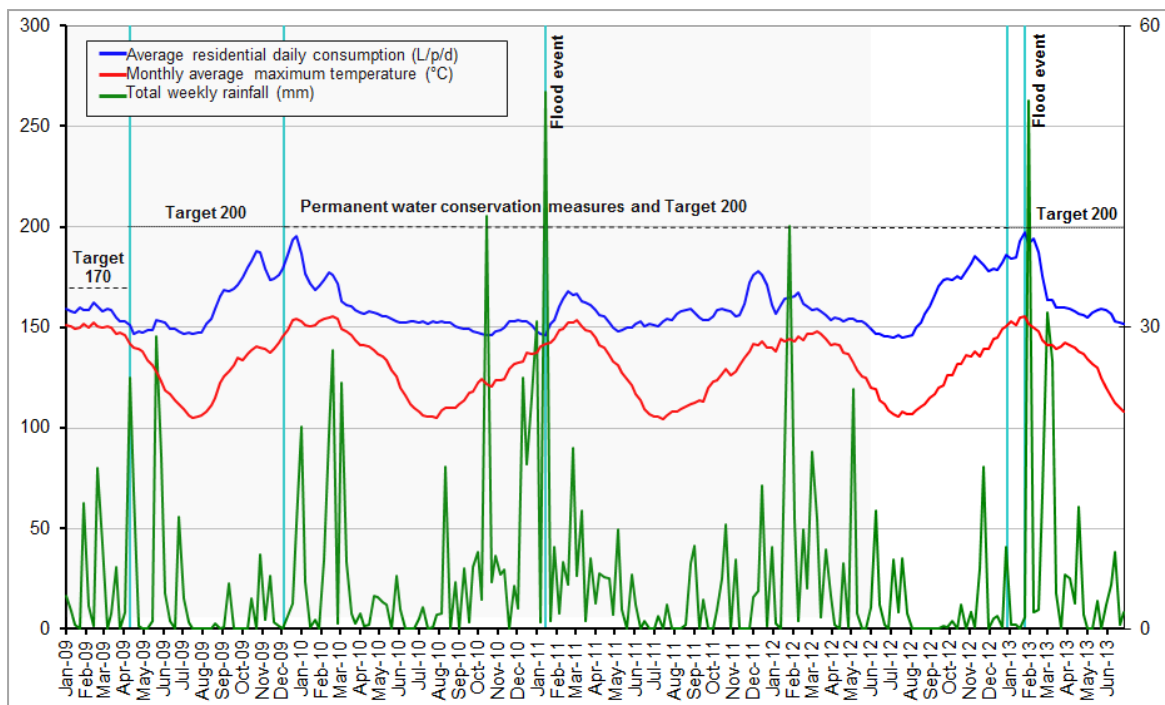


Figure 3: Graph showing relationship between residential water use and weather conditions

2.1.3 What the current LOS objectives say

The current LOS objectives (contained in the South East Queensland System Operating Plan) are based on an average urban water allowance for South East Queensland of 375 litres per person per day. This total includes residential and non-residential use and system losses. The amount allowed for residential use makes up 230 litres of the 375 litres per person per day.

This allowance was set on 5 March 2010, when South East Queensland was just exiting the drought. Prior to the drought, urban water use in South East Queensland averaged 450 litres per person per day, with residential use making up 300 litres of that total. Water restrictions, advertising campaigns and community cooperation dramatically reduced water use during the drought. At the height of the drought, from mid-2007 to mid-2009, urban water use dropped to an average of 230 litres per person per day, with residential water use falling below 140 litres per person per day.

When the planning allowance was set at 375 litres per person per day, it was not clear how much of the drought-induced reduction in water use would be sustained after the drought ended. Therefore, a daily allowance of 375 litres per person per day represented a significant reduction on what was considered 'normal' (i.e. pre-drought) daily water consumption.

2.1.4 Actual recent water demand in South East Queensland

However, recent data shows that water use in South East Queensland has remained low, despite the easing of water restrictions after the end of the drought in 2009. Water use in South East Queensland averaged 253 litres per person per day, with residential water use making up around 168 litres per person per day from July 2012 to June 2013. This is still well below the allowance in the current LOS objectives.

Table 1 shows trends in water use in South East Queensland over the past decade and how actual use compares to the allowance set in the current LOS objectives. It appears that water use has changed significantly since the drought.

Table 1: Water use in South East Queensland over the past decade

	Water use					
	Prior to drought (before 2004)	During drought (Jun 07 – Nov 08)	2010–11	2011–12	2012–13*	Current LOS objectives
Average urban water use - residential plus non-residential (litres per person per day)	450	230	239	244	253	375
Average residential water use (litres per person per day)	300	≤140	153	157	168	230

Source: Department of Energy and Water Supply

*This is approximate water use as the data has a 6-month verification period.

2.1.5 Proposed new LOS objectives

Accurate demand forecasts are critical to effective water planning.

Demand forecasts that are too low can lead to inadequate planning to meet the community's water needs. They can also affect the setting of future water prices for the community. At the same time, a demand forecast that is too high can result in unnecessary or badly timed expenditure on water infrastructure, resulting in increased or accelerated water prices.

The current practice of specifying a daily water allowance in the LOS objectives and requiring Seqwater to plan using that allowance may result in less than optimal water planning. For example, the current allowance of 375 litres per person per day is clearly greater than current actual water use. Continuing to specify an allowance in the LOS objectives is likely to unnecessarily increase or bring forward expenditure on water infrastructure, with potential increases to future water prices. Such increases to water prices will mostly affect future water customers.

A more flexible approach to setting water allowances would be preferable to allow more adaptive, cost-effective planning. Rather than including a specific figure in the LOS objectives, we propose that Seqwater be required to establish and justify water demand for planning purposes, for a period of at least 20 years. The process for calculating and reviewing the demand forecast would be included in the water security program developed by Seqwater.

This will provide an adaptive management approach, enabling the planning demand to be more realistic and based on current assumptions. Adopting a flexible demand approach would reduce the likelihood of significantly over- or under- estimating demand, and reduce the chance of unnecessary infrastructure expenditure. Refer to Table 2 for a comparison between setting demand in the LOS objectives and the proposed demand approach.

Table 2: Overview of LOS options: demand

Fixed demand allowance	'Flexible' demand approach
<ul style="list-style-type: none"> - A fixed demand allowance is specified in the LOS objectives - No flexibility in the planning approach - Bulk water infrastructure may be built unnecessarily, or before it is needed - Could lead to unnecessary price increases in the future 	<ul style="list-style-type: none"> - Seqwater establish, monitor and annually review demands - Adaptive management approach - Planning approach informed by current demand data and up-to-date assumptions on predicted water use - Cost effective planning

The Department of Energy and Water Supply would ensure that infrastructure planning included in the water security program is appropriate to provide long term water security for the region. An economic regulator would ensure associated costs were appropriate.

Seqwater’s annual report on the water security program would include data on how current demand is tracking against forecast demand and whether any revision of the forecast is required.

2.2 Water restrictions

2.2.1 The importance of restrictions – when necessary

Water restrictions have been shown to be an effective way to reduce demand and prolong water supplies during drought.

With the LOS objectives specifying what restrictions may be imposed during drought gives residential and non-residential water customers a clear expectation about the reliability of the water supply and what changes may be necessary during drought periods. In addition, planning for water restrictions during drought periods could result in significant cost savings from deferring the upgrade or construction of costly drought response water supply infrastructure (e.g. manufactured water facilities, such as desalination and purified recycled water plants).

It is important to note that water restrictions can affect your lifestyle: potentially impacting things like when you water your garden and how you use water inside the home.

2.2.2 What the current LOS objectives say

The current LOS objectives specify the permitted frequency, duration and severity of medium-level water restrictions.

The current objectives specify that medium level restrictions:

- will not occur more than once every 25 years on average
- will only reduce consumption by 15% below total consumption during normal operations
- are expected to last longer than 6 months no more than once every 50 years on average.

As they stand, the current LOS objectives do not define what should be regarded as 'normal operations' and whether restrictions apply to both residential and non-residential water users equally. This leads to some ambiguity about how much the community should reduce water consumption by.

2.2.3 New drought restrictions considered

The LOS objectives review looked at the effect of maintaining drought restrictions similar to what is outlined in the current LOS objectives, but providing greater clarity around targets for volume reduction. One of the main options looked at having medium-level water restrictions that:

- will be no more severe than limiting residential customers to 150 litres per person per day, with no restrictions on non-residential customers
- are imposed not more than once every 25 years on average
- would last no longer than 6 months once every 40 years on average.

Restricting water use to 150 litres per person per day would mean total water consumption would be reduced by around 12% and to achieve this, residential water use would be reduced by almost 20%, assuming current most likely demands¹.

The potential implications of imposing more severe restrictions were also considered. The second main option that was considered was having medium-level water restrictions that:

- will be no more severe than limiting residential customers to 140 litres per person per day with no restrictions on non-residential customers
- are imposed not more than once every 10 years on average
- would last an average of one year.

Residential restrictions of 140 litres per person per day would mean approximately a 16% reduction in total water use, meaning an almost 25% reduction in residential water use, based on current most likely demands¹. Having medium level restrictions that limit people to 140 litres per person per day was considered achievable as this level of water use was achieved during the 2001-2009 Millennium drought. Such water restrictions are likely to involve limitations on outside water use and changes to water use inside the home (e.g. shorter showers).

¹ Seqwater has recently reviewed demands and projected that the urban average will be approximately 285 litres per person per day, which includes an average of 185 litres per person per day for residential water use. Having projected demands higher than current demands allows for some 'rebound' should changes to water use behavior occur, particularly during drier weather conditions.

Medium-level water restrictions will be defined in the LOS objectives as those water restrictions imposed in response to drought, during the time when water levels are between the drought response trigger and safe minimum storage. When the safe minimum storage is reached, it is expected that more severe restrictions may need to be imposed. A diagram illustrating the various trigger levels is provided in Figure 4.

The safe minimum storage will be defined by Seqwater in the water security program for South East Queensland. It will represent the level at which more severe drought response actions, including more severe water restrictions may need to be imposed to minimise the risk of storages reaching minimum operating levels and consequentially supplying only the essential minimum supply volume.

Seqwater will outline the overall restriction regime in the water security program and will also be required to outline any other water demand strategy that may be implemented during droughts or at any other time necessary. The LOS objectives will not specify these other demand strategies.

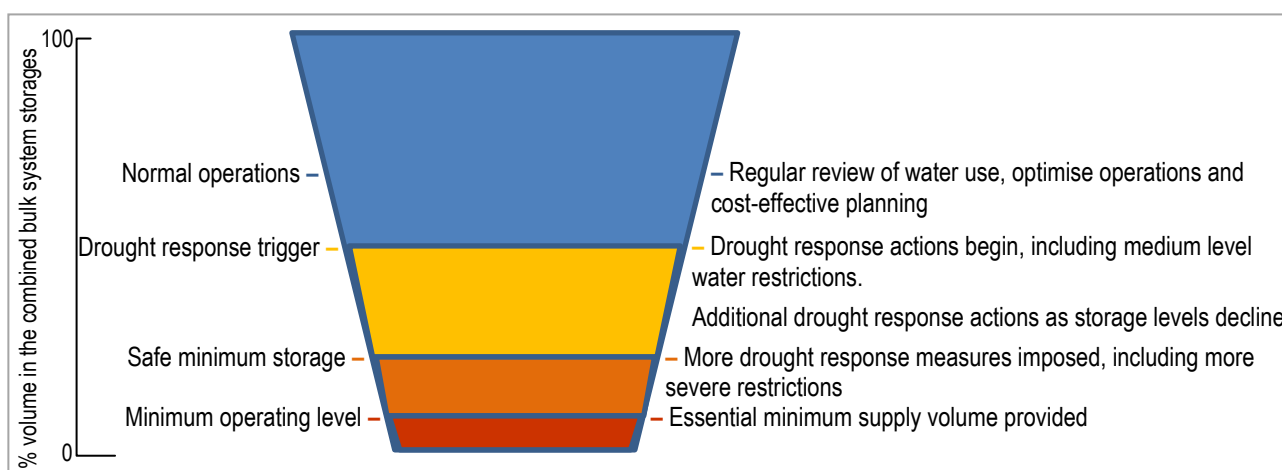


Figure 4: Diagram illustrating various trigger levels for drought response actions*

* Note the percentage volumes indicated in the combined bulk system storages is for illustrative purposes only. Seqwater will specify the drought response trigger and safe minimum storage in the water security program. The minimum operating level is defined in the appropriate resource operations plan.

Computer modelling² was used to compare the potential costs and benefits of having more severe restrictions. With regard to cost, modelling suggested that increasing the frequency of restrictions had a relatively small impact on infrastructure costs. In comparison, increasing the severity of restrictions (that is, reducing the restricted allowance) resulted in more significant potential cost savings by deferring infrastructure costs for a longer period.

It is noted that delaying planned augmentation will have no immediate impact on bulk water prices. Rather the avoided or delayed costs will mostly benefit future customers. It is estimated that adopting more severe water restrictions could lead to a cost saving for Seqwater, which could then have flow-on effects to future water prices.

² Hydrological and economic modelling was used to compare various restriction scenarios. For more details of the assumptions and methodology used in this modelling, see the fact sheet on the LOS review.

2.2.4 Proposed new LOS objectives

At this stage, no particular set of medium level water restrictions are preferred. Rather, we are seeking public comment on whether more severe medium level water restrictions would be acceptable to the community as a way to possibly defer the need for drought response infrastructure and associated costs.

Medium-level water restrictions could be imposed when water levels in storages reach the drought response trigger. When the lower level of the ‘safe minimum storage’ is reached, it is expected that more severe restrictions would need to be imposed. Table 3 gives an indication of the potential impacts of adopting different levels of restrictions.

Table 3: Overview of LOS options: demand and restrictions

	Fixed demand allowance	‘Flexible’ demand approach
Similar medium level restrictions	<ul style="list-style-type: none"> - The fixed demand allowance could lead to higher future water prices - Restrictions based on targeting a specified volume of 150 litres per person per day for residential use 	<ul style="list-style-type: none"> - Flexible approach leads to more adaptive, cost effective planning - Restrictions based on targeting a specified volume of 150 litres per person per day for residential use
More severe medium level restrictions	<ul style="list-style-type: none"> - The fixed demand allowance could lead to higher future water prices - Restrictions based on targeting a specified reduction in volume of 140 litres per person per day (what was achieved in the Millennium Drought) - More severe restrictions reduce the chance of requiring costly drought response infrastructure 	<ul style="list-style-type: none"> - Flexible approach leads to more adaptive, cost effective planning - Restrictions based on targeting a specified reduction in volume of 140 litres per person per day (what was achieved in the Millennium Drought) - More severe restrictions reduce the chance of requiring costly drought response infrastructure

2.3 Water security

2.3.1 The importance of water security

Water security is critical to all communities. The United Nations has recently proposed the following definition of the term:

“The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.”

Water security is the primary goal of the LOS objectives. The most critical aspect of water security is ensuring that South East Queensland does not run out of water.

2.3.2 What the current LOS objectives say

The current LOS objectives specify a number of minimum operating conditions that must be met to ensure that South East Queensland does not run out of water (explained in more detail below). The LOS objectives currently state that:

- major storages (Wivenhoe, Hinze and Baroon Pocket Dams) should not reach minimum operating levels more frequently than 1 in 10,000 years
- the total water volume must not decline below 10% more frequently than 1 in 1,000 years and not below 5% more frequently than 1 in 10,000 years
- drought response infrastructure will not be triggered more than once every 100 years on average.

These objectives relate to operational requirements that are more appropriately specified as part of the drought response in the water security program, provided that an appropriate objective in the LOS ensures continued water security.

Minimum operating level

The minimum operating level for each water storage is specified in the relevant resource operations plan. When the water level in a given storage is at or below its minimum operating level, or volume, the infrastructure owner must not release or supply water from that storage.

This objective recognises that there is always a risk that the bulk water supply system might not have adequate supplies to supply each of the major sub-regions (central, south and north) in South East Queensland. If Wivenhoe, Hinze or Baroon Pocket Dams reached their minimum operating level, it would likely mean that the water supply to that sub-region would likely 'fail,' that is water supplies would not be able to meet demands in that sub-region. It is important to know that if such an event ever did eventuate, there would be a contingency plan to ensure that water supplies for drinking water and public health were maintained under all circumstances. This contingency plan would be specified in the water security program that is being developed by Seqwater.

Drawdown to 5% combined capacity

To help mitigate the risk that water supplies could not be maintained across South East Queensland, Seqwater was given the objective of maintaining at least 5% capacity in storages across South East Queensland.

This objective provides an additional reserve of water above the minimum operating level. There are several reasons for maintaining an additional reserve in storages including:

- some storages may have water quality issues at low levels
- helping alleviate anxiety of a potential water scarcity issue
- lowering the probability of breaching the 'failure' objective of reaching the minimum operating level of Wivenhoe, Baroon Pocket and Hinze Dams.

It is noted that Sydney Water adopts a similar approach and also uses 5% combined capacity as an indicator for failure.

Drawdown to 10% combined capacity

The 10% combined capacity could be considered the 'safe minimum storage' level, the point at which more severe drought response is required to ensure continuity of water supplies. This level was included in the current objectives essentially to reduce the risk of storages falling to 'failure' levels (5% combined capacity). It is considered that the water security program is the most appropriate mechanism to identify this 'safe minimum storage' level.

Drought response infrastructure

Drought response infrastructure is constructed in response to drought within short timeframes to ensure that water supplies are maintained. The cost of such infrastructure is in the magnitude of hundreds of millions of dollars, the cost of which is likely to significantly increase when shortened timeframes are imposed during drought circumstances. It is therefore prudent to minimise the risk of having to construct such infrastructure during a drought through appropriate planning.

Seqwater is required to consider its drought response plan as part of the water security program. The triggers for starting the construction of this infrastructure will also be outlined in the program. Therefore it is thought that this objective is no longer required.

2.3.3 Proposed new LOS objectives

A new approach is proposed under the revised LOS objectives. As part of the requirements for the water security program, Seqwater will be required to identify the safe minimum storage as well as other trigger levels at which further drought response would be required to provide continued water security. In the water security program, Seqwater would specify under what circumstances (e.g. demand forecasts, demand management measures and/or revised modelling) these levels and triggers would need to be revised.

Therefore we are considering not specifying any of the previous 'operational' parameters. Rather, we are proposing to specify an essential minimum supply volume. As part of its operations, Seqwater would undertake risk assessments to determine appropriate plans to ensure that this essential water supply volume can be supplied under all circumstances. Table 4 highlights the major differences between specifying less security objectives.

Essential minimum supply volume

The essential minimum supply volume is the minimum volume of water necessary to provide for drinking and basic hygiene, and for essential services such as hospitals, adequate food production and power generation in extreme circumstances.

In the case of South East Queensland, 'extreme circumstances' might arise in the case of a very long drought that leave water storages empty and with little to no rainfall. Such a circumstance is extremely unlikely (less than 1 in 10,000 chance), however it is important to ensure that we are prepared in case this ever eventuates. In this scenario, Seqwater must still be able to provide sufficient water for basic domestic use and essential services.

International research indicates that the minimum residential use to sustain life is approximately 50 litres per person per day for residential water use. Recent regional estimates for minimum non-residential use range from 15–20 litres per person per day (based on actual water use from January to March 2013). The lower end of the estimate includes water use for hospitals, power stations, caravan parks and particular industries that must continue to operate to ensure public safety. The higher end of the estimate includes water use for other heavy industries, oil refineries, and hotels/motels. Figure 5 provides an indication of the various types of water use that make up the total average urban demand.

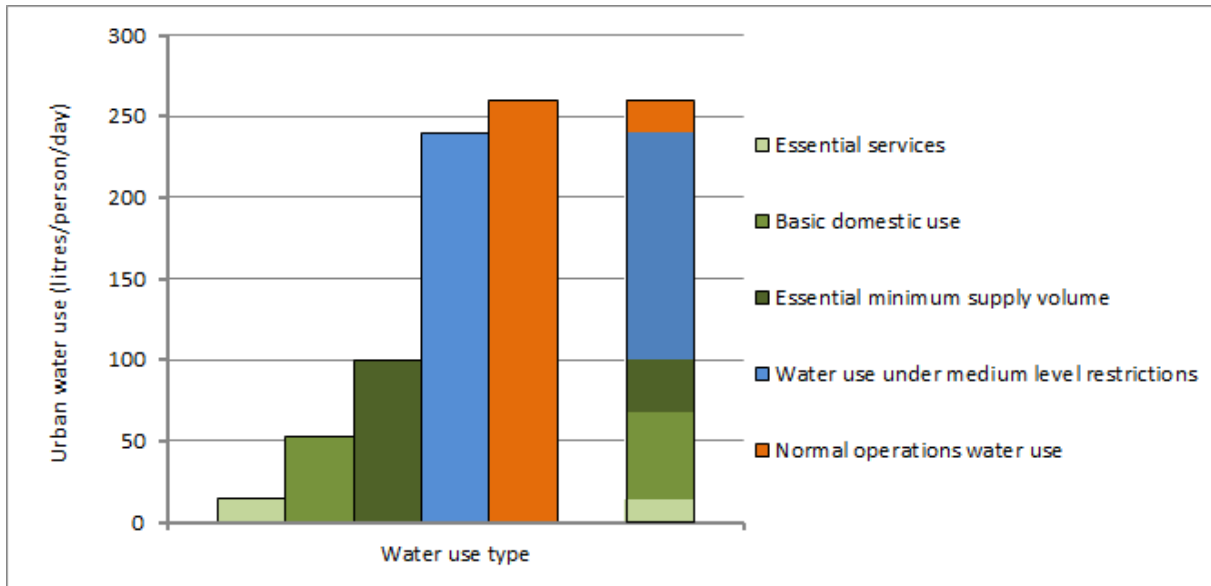


Figure 5: Graph indicating components of average urban water use

The LOS objectives are set to avoid South East Queensland’s water storages ever being emptied completely and it is considered highly unlikely that this scenario would ever occur. However, as a matter of sound planning, the LOS objectives need to include an essential minimum supply volume. This volume would drive planning to ensure that adequate climate-resilient, manufactured water supplies (e.g. desalinated water, purified recycled water) were operational should such an event occur.

3. Overview of LOS options: restrictions and security objectives

	Fewer security objectives	More security objectives
Similar medium level restrictions	<ul style="list-style-type: none"> - Restrictions based on targeting a specified volume of 150 litres per person per day for residential use - Specify essential minimum supply volume to ensure SEQ never runs out of water 	<ul style="list-style-type: none"> - Restrictions based on targeting a specified volume of 150 litres per person per day for residential use - Specify essential minimum supply volume to ensure SEQ never runs out of water - Added water security objectives to avoid more severe water restrictions
More severe medium level restrictions	<ul style="list-style-type: none"> - Restrictions based on targeting a specified reduction in volume of 140 litres per person per day (what was achieved in the Millennium Drought) - More severe restrictions reduce the chance of requiring costly drought response infrastructure - Specify essential minimum supply volume to ensure SEQ never runs out of water 	<ul style="list-style-type: none"> - Restrictions based on targeting a specified reduction in volume of 140 litres per person per day (what was achieved in the Millennium Drought) - More severe restrictions reduce the chance of requiring costly drought response infrastructure - Specify essential minimum supply volume to ensure SEQ never runs out of water - Added water security objectives to avoid more severe water restrictions

Summary of proposed new LOS objectives for bulk water suppliers in South East Queensland

Criteria	Existing LOS objective	Proposed new LOS objective	Reason for change
Demand	Urban demand of 375 L/p/d, including residential, non-residential and system losses. Residential demand component is 230 L/p/d.	Allow Seqwater to determine the urban water demand in collaboration with water service providers, reporting and updating on this annually under arrangements specified in the water security program.	- Water use varies: still unclear what further increase there will be after end of drought - More flexible, responsive drought projections result in more cost-effective, optimised water grid.
Restrictions	Medium-level restrictions will:	- Seqwater will provide sufficient water so that demand will not be restricted under medium level restrictions so that: - depending on feedback, the frequency of restrictions could increase to occur not more than once every 10 years on average, depending on feedback. - depending on the severity of restrictions would increase to not more than a targeted average residential water use of 140 L/p/d, depending on feedback - the most severe medium level water restrictions that will be imposed will be specified volumetrically (as L/p/d) - non-residential water use would not be restricted during medium level restrictions - the duration is dependent upon the frequency and severity of water restrictions. - restrictions can be expressed as an average duration, or the frequency that the restriction will last longer than a specified period.	- Increasing the frequency could reduce the chance of requiring drought response infrastructure. Having more severe restrictions can defer the need for additional infrastructure. Specifying a volume for restricted demand enables: - better drought preparedness - simple education campaigns - the duration of restrictions is dependent upon the frequency and severity of restrictions (as well as 'normal time' demand). - providing for longer duration can reduce the chance of requiring costly drought response infrastructure.
- frequency	- not occur more than once every 25 years on average.		
- severity	- achieve a targeted reduction in consumption of 15% below the total consumption volume in normal operations.		
- duration	- last no more than 6 months at a frequency greater than once every 50 years.		
Minimum operating level	Wivenhoe, Hinze and Baroon Pocket Dam do not reach minimum operating level more than once every 10,000 years on average.	Depending on feedback, this objective may not be prescribed in the future. If not prescribed, relevant security criteria would be specified by Seqwater as part of the water security program.	- These three storages provide majority of supply and if they draw down to this low level, water supply in the sub-region could 'fail'.
Drawdown to 5% combined capacity	The total volume of water stored in all key water grid storages will not decline to 5% more than once every 10 000 years.	Depending on feedback, this objective may not be prescribed in the future. If not prescribed, relevant security criteria would be specified by Seqwater as part of the water security program.	- Provides additional reserve above minimum operating level to account for uncertainty and provide for additional security. - It is considered that Seqwater could determine appropriate triggers and levels in the water security program
Essential minimum supply volume	Not specified	The bulk water supply system will be able to supply an essential minimum supply volume of at least 100 L/p/d for residential and non-residential water use (excluding losses) that is fit for purpose. Supplies will not be reduced to such levels more than 1 every 10,000 years on average.	- Ensure there is planning for a 'worst case' scenario - Ensure sufficient climate resilient supplies to provide essential supplies
Drawdown to 10% combined capacity	The total volume of water stored in all key water grid storages will not decline to 10% their combined total water storage capacity more than once every 1000 years on average	Remove as considered to be the safe minimum storage level, which is more appropriately identified by Seqwater as part of the water security program.	- Provides additional buffer above the identified 'failure' triggers. - Under the water security program Seqwater will be able to determine the most prudent and cost-efficient mode of operations to minimise risk.
Drought response infrastructure	Drought response infrastructure will not be triggered more than once every 100 years	Remove as appropriate for Seqwater to determine the most cost effective drought response in the water security program	- The triggers for the construction of drought response infrastructure will be specified in the water security program

Appendix 1 - Examples of interstate LOS objectives

State or Territory	Metropolitan water area	Summary of Level of Service objectives
ACT	Canberra	Restrictions should not occur more than one year in 20. Severe water restrictions target 150 litres per person per day (which is about a 45% reduction in summer water demands).
NSW	Sydney	Storages do not approach 5% capacity more often than 0.001% of the time. Restrictions occur no more often than once in every ten years on average and last no longer than 3% of the time on average.
	Shoalhaven	Restrictions not to occur more than once every 10 years on average and should not last, in total, for more than 5% of the time. Restrictions should not be greater than a 20% reduction in unrestricted demand.
Victoria	Melbourne	95% reliability of supply (i.e. restrictions should be no required no more than 1 in 20 years). Restrictions should be no longer than 12 months and no more severe than stage three restrictions (targeted reduction of 155 litres per person per day in 2008).
	Grampians	Proposed: Unrestricted urban demand will be met in 93 years out of 100 (93% reliability). Stage 4 restrictions will not be greater than a 50% reduction in unrestricted demand.
Western Australia	Perth*	3% probability of needing a total sprinkler ban (or 1 in 30 years).

*Perth is currently reviewing their water security planning.

Appendix 2 - Consultation Regulatory Impact Statement on the review of the Level of Service objectives for South East Queensland

The Consultation Regulatory Impact Statement builds on the Discussion Paper by providing an assessment of the impacts of the options being considered as part of the review of the Level of Service (LOS) objectives.