AMENDED REPORT

Item No: 3.4

Title: Water Security

Department: Water and Sewer

11 February 2019 Ordinary Council Meeting

Trim Reference: F2018/01339 - D13429083
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Report Purpose

At its meeting of 10 September 2018, Council resolved:

947/18 *That Council notes New South Wales is now declared 100% drought affected and that extreme weather patterns appear to be prevailing resulting in less (than traditionally expected) annual rainfall.*

948/18 *That in response, Council now proactively and responsibly consider all water security options to optimise:*

a *Water usage on the output side.*
b *Protect current and seek out alternate sources for water collection on the input side.*

949/18 *That Council review its water restrictions pathways with a view to adopting the most suitable and timely triggers for all levels of water restrictions.*

950/18 *That Council request the Chief Executive Officer report to Council on our general water security status and risk minimisation opportunities. Such a report should pay particular attention to the looming threats to our water security including:*

a *The possible approval of the Wallarah 2 Coal Mine and its effects on our water supply.*
b *Climate Change*

Summary

Council has a number of plans, measures and activities in place to respond to the following variances and risks to water security:

- future water demand requirements and population growth;
- climate risks and changes;
- development that could impact water quantity and/or quality in the drinking water

catchments;
- changes to regulatory requirements.

These plans are being reviewed and will be updated to enable Central Coast Council to respond to current and future needs.

Recommendation

1 That Council note the contents of this report in regards to current water resource planning activities and drought response.

2 That Council endorse the Chief Executive Officer to amend the trigger points for the introduction and removal of the existing stages of Central Coast water restrictions to those outlined in Table 1.

Context

Central Coast's Integrated Water Resources Plan, previously known as *WaterPlan 2050*, is the long term blueprint for managing the Central Coast's water resources that identified how to:

- further enhance the water supply system;
- continue to use water as efficiently as possible;
- develop additional future sources of water.

Council is undertaking a review of its Integrated Water Resources Plan as part of its ongoing planning, risk management activities and regulatory compliance. This is being undertaken in parallel and in close collaboration with the review of the Lower Hunter Water Plan being led by the NSW Department of Industry in conjunction with Hunter Water Corporation. The purpose of collaboration is to identify any mutual beneficial options available through greater cooperation between the two regions.

The Plan will also take into account NSW Department of Industry's *Greater Hunter Regional Water Strategy* which sets a foundation for better regional water management, covering the Central Coast, Hunter Valley and Mid-North Coast.

1. Water Demand

The long term water supply demand for the Central Coast is shown in Figure 1 below. Water restrictions were applied across the Central Coast from February 2002 to May 2012. Once water restrictions were removed, demand has not increased to pre-restriction levels even

though there has been considerable population growth over that period. Total system demand has dropped from an average of 329 L/person/day in 2001 to 262L/person/day in 2018.

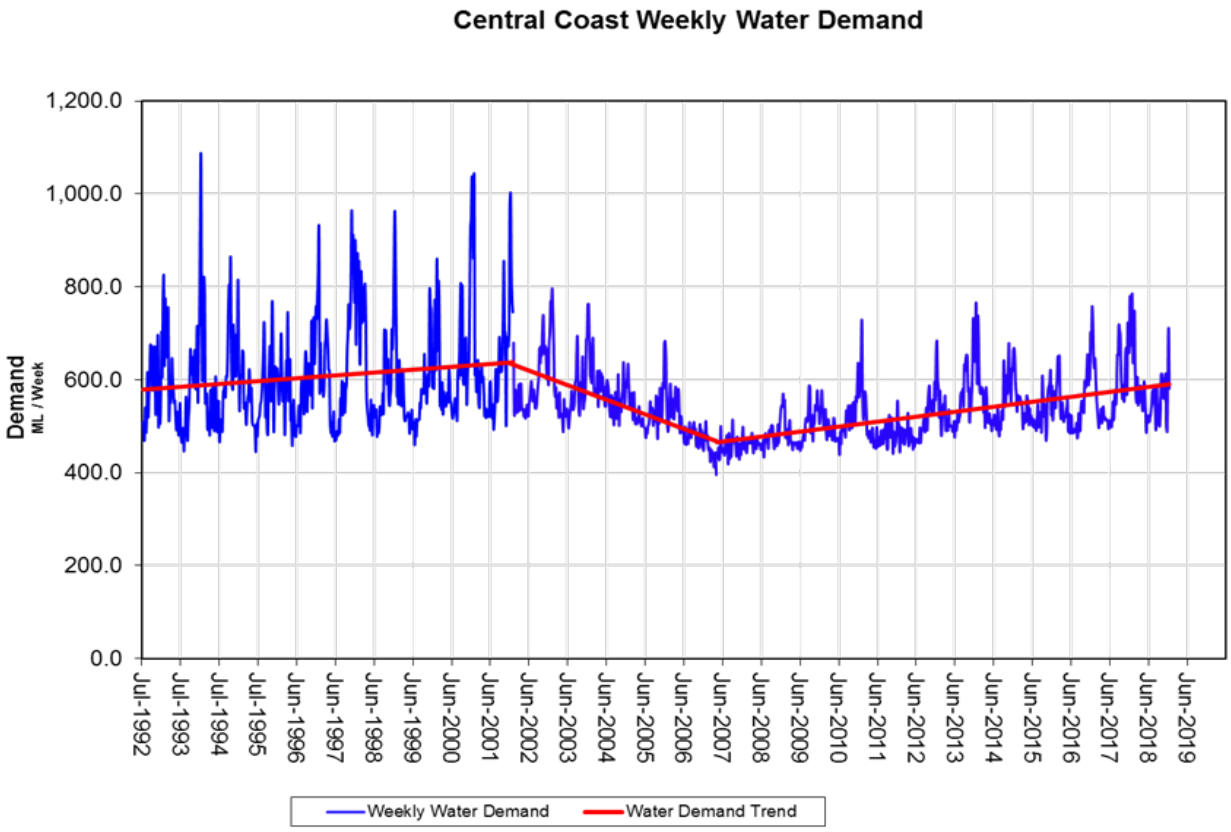

Figure 1 Central Coast water demand

2. Water Supply

Most of NSW is currently affected by drought including the Central Coast. Council has entered the current declared drought in a better position than when it entered the Millennium Drought .

This is reflected in the Water Storage Level in Figure 2 below which shows current storage levels are approximately 60% at the commencement of this potential drought phase as compared to levels approximately 45% prior to the Millennium Drought.

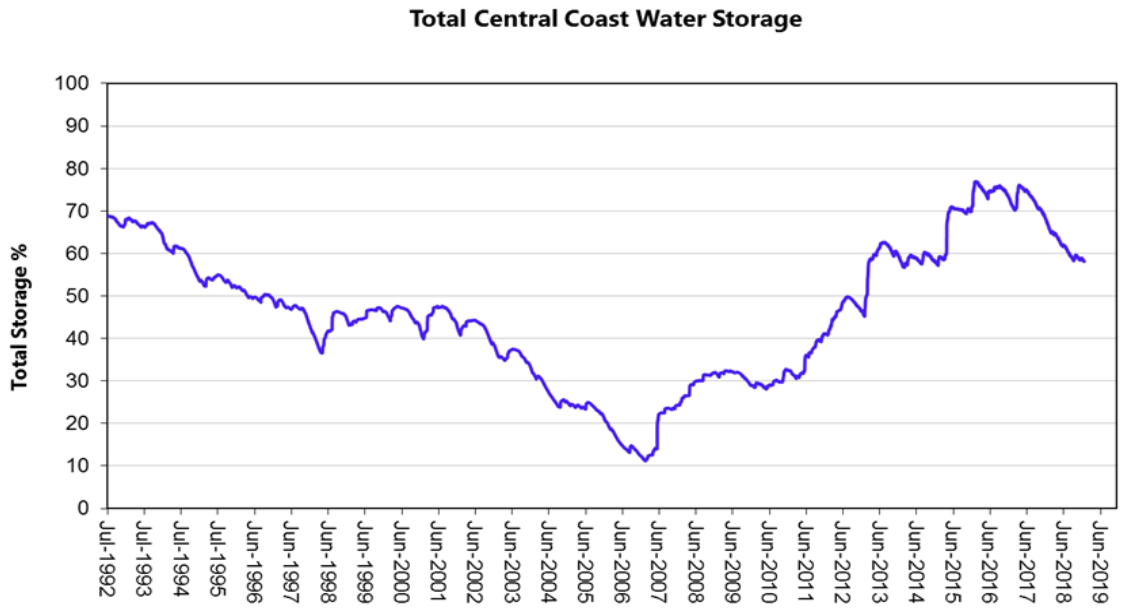

Figure 2: Central Coast water storage level

A number of improvements have also been made to the system that enables it to perform relatively better than during the Millennium Drought. Key improvements are shown in Figure 3, and include the following:

- A transfer main between Hunter Water and the Central Coast;
- A major link between the Mardi Dam and Mangrove Creek Dam including a new Wyong River pump station and fishway, Mardi to Mangrove Pump Station;
- Mardi Water Treatment Plant - Dual Power Supply;
- Mardi Dam to Mardi Treatment Plant Transfer system, including pump station and dam tower;
- The establishment of a number of small groundwater sources.

Since the Millennium Drought, increased environmental flow requirements for Wyong River have reduced Council's access to water during low to medium stream flows.

To address this, the Mardi Mangrove Link project included a larger pump station on Wyong River to extract more water during wet periods for storage in Mangrove Creek Dam. A new low flow fishway was also installed on the Wyong Weir to improve fish passage. This means that, on average, more water can be harvested for the water supply which it is done in a more environmentally sustainable manner.

Figure 3: New assets and improvements since start of millennium drought

3. Risk mitigation opportunities

Council is currently undertaking a number of activities to proactively ensure water security for the Central Coast water supply.

The Water and Sewer Directorate has established the Drought Management Working Group whose functions are to:

- Monitor water demand and the effects of drought conditions on the Central Coast water supply;
- Review and advise on actions to manage emerging drought conditions.

Council is also investing in capital works such as:

- The $7.8M Mangrove Creek Dam Spillway Upgrade and Capacity Restoration project which will enable Mangrove Creek Dam to be filled to 100% (from its current maximum operating limit of 80%) Under current plans this work would be completed by 2022.
- The $61M Mardi to Warnervale Trunk Water Pipeline programmed to commence construction in 2020.

Please note: These capital works are subject to the IPART determination expected in May 2019.

4. Other Risks

Whilst improvements to the water supply system have been made and are continuing, a number of other risks that have the potential to negatively impact the security of the supply, such as:

1. Wallarah 2 Coalmine.
2. Greater climate variability than previously recognised and changes to the hydrologic cycle and demand.
3. Future water demand requirements.
4. Changes to regulatory requirements.

4.1. Wallarah 2 Coalmine

The proposed Wallarah 2 Coalmine presents a risk to the streamflows that the Central Coast water supply sources from Wyong River. Council formally objected to the proposed coalmine proceeding on the basis of this and other risks and impacts.

Notwithstanding the risks the mine poses to the water supply, the conditions of consent contain compensatory water arrangements for the Central Coast water supply to offset the impacts on the amount of water available for the water supply. A no net loss of water condition was sought by Council and is considered essential. As the compensatory water would be used as a raw water supply, the discharge water quality would need to meet broader parameters than just the usual environmental parameters.

4.2. Climate Variability

There is emerging research indicating that the climatic conditions in eastern Australia are more variable than the relatively short instrument records indicate (approximately 130 years). This has the potential to impact our understanding of the yield and security of the water supply as the duration, frequency and severity of dry periods may be more extreme than has been previously captured in the instrument records on which the system has been designed.

As part of the review of the Integrated Water Resource Plan, Council is reassessing the historical hydrology of the source catchments. To achieve this, a new rainfall runoff model is being developed for the source catchments using the eWater hydrology tools. These tools were established by the eWater Cooperative Research Centre (CRC) which established the National Hydrologic Modelling Platform. This is being applied in conjunction with more advanced rainfall data analysis that is now available.

The development of the new rainfall runoff model for the catchments will provide a better tool for modelling the impacts of changes to climatic parameters on the available stream flows and system behaviour. However, there is still significant uncertainty as to the level of change and rate of change of specific climatic parameters, particularly at the local scale.

To address the inherent uncertainties regarding future climate conditions, it is proposed that the analysis and options assessment incorporate system resilience criteria and identify possible future development pathways. This will allow for the ongoing development of a system that can accommodate and adapt to future conditions and opportunities as required.

4.3. Future Water Demands

Due to the long lead times involved with developing water supply infrastructure, a good understanding of the future water demands under various climatic conditions is required. There are a number of factors that influence demands including: population size/ demographics, socio economic factors, industrial/commercial activities, development patterns, housing types, water use behaviour, appliance efficiencies, customer service level expectations, development requirements, local climatic attributes and community response under drought conditions.

To better assess future demands, Council:

- has recently developed a water supply demand model to inform future water demand needs;
- is collaborating with other water supply organisations to improve understanding of water use behaviour and trends.

4.4. Regulatory Changes

Council's water business is highly regulated. Many standards and regulations have the potential to impact on the water security through changes in requirements affecting the ongoing development and operation of the water supply. Examples of issues that impact the water supply include:

- Changes to the assessment of extreme flood hydrology limiting the ability to fill Mangrove Creek Dam until it is upgraded;
- Regulations impacting Council's development and funding of the water supply.

Council manages these risks by keeping abreast of emerging regulatory changes, providing input to review process and amending plans as appropriate. A key consideration in developing longer term water supply strategies and options is to assess their resilience to a range of regulatory changes.

5. Water Restrictions

The Central Coast Council's water restriction rules and guidelines were last reviewed in 2011 following the completion of the Mardi to Mangrove Link project and partial storage recovery after the millennium drought. A copy of the current Water Restrictions Rules Matrix is shown in Appendix 1.

The level at which the water restrictions are triggered mainly involves balancing the duration/frequency at which restrictions are likely to be required against the risk of the storages declining to low levels.

Previous optimisation analysis (2010) for the water supply identified that in the longer term the initiation of level 1 water restrictions should occur when Mangrove Creek Dam storage level dropped to 50%. Similar increases were also identified for the other restriction levels, with the increases to occur as customer demand approached the water supply system's capacity (yield).

In light of emerging information on climate variability being more extreme than recognised in the previous analysis (likely lower yield), it is considered prudent to increase the restriction guideline triggers to the longer term levels identified in the 2010 optimisation analysis. In effect this would allocate the current excess yield capacity (while demands are lower) to

reducing the risk of running out of water, rather than the current approach of allocating it to reducing the amount of time spent on restrictions. The consequences of increased time on restrictions are significantly less for a community than reaching critically low storage levels. The current water restriction guidelines along with proposed changes to these restriction level triggers is shown in Table 1 below.

Table 1: Current Water Restriction Guidelines (Endorsed 2011) and Proposed New Levels

Restriction Level	Initiate Restriction when Mangrove Creek Dam reduces to	Remove Restriction when Mangrove Creek Dam rises to	Target Reduction during restriction level	Proposed New Restriction Level. Mangrove Creek Dam reduces to	Remove Restriction Level when Mangrove Creek Dam rises to
	2012	2012		2019	2019
Level 1	42%	44%	8%	50%	52%
Level 2	34%	36%	16%	40%	42%
Level 3	30%	32%	24%	35%	37%
Level 4	26%	28%	27%	30%	32%
Level 5	22%	24%	30%	25%	27%

The restrictions are presented as guidelines that should be applied within the overall context of the relevant factors influencing the security of the supply such as:

- The seasonal outlook (for stream flows, rainfall and temperature);
- Achievement of the current restriction target;
- The timing and risk associated with any contingency water supplies, and
- Any other relevant information.

It should be noted that the trigger to remove restrictions is 2% higher than the trigger to introduce that restriction level. For example level 2 water restrictions would be introduced when Mangrove Creek Dam (MCD) dropped to 40 % but would change to level 1 water restrictions when MCD rose to 42%.

6. Drought Management Response

Council operates the water supply system to perform over a range of climatic conditions. This includes normal ongoing activities to reduce water demands on the system such as leak management and community engagement and education.

The operating rules incorporate triggers for utilising various sources to provide water security for the Central Coast. These include stream flows, water stored in dams, groundwater, inter regional water transfers and water restrictions.

However, in the event that the system was to undergo a prolonged and consistent decline associated with severe drought conditions, additional actions could be undertaken to extend the remaining supplies until storage levels were to recover. These include consideration of:

- The establishment of a drought management forum with the NSW Government to coordinate agency drought responses;
- Introducing rebate programs to invest in water saving appliances and practices;
- Increased community engagement and education to further reduce water consumption;
- Consider desalination as a last option.

7. Link to Community Strategic Plan

Theme 4: Responsible

We're a responsible Council and community, committed to building strong relationships and delivering a great customer experience in all our interactions.

It is recognised that a secure water supply is essential for economic development and a liveable community.

Goal H: Delivering essential infrastructure
R-H4: Plan for adequate and sustainable infrastructure to meet future demand for transport, energy, telecommunications and a secure supply of drinking water.

Attachments

1	Water Restriction Rules	D02968729
2	Wallarah Coal Project Compensatory Agreements	D13429551