

Responses to Questions on Notice part 2 – Linda Bowden November 2020

1.The University of Newcastle has been engaged to develop a paleo-informed synthetic data set for rainfall and streamflow for the Hunter and Central Coast. This data will create a climate informed calculation of system yield which will be applied in the Hunter-Central Coast WATHNET water supply system model for the development of the next LHWP.

Has this been completed and will Hunter Water publish it? If not, why not?

Response: The work is currently underway, but has not been completed to date and has not been included in the portfolio analysis in the current review of the LHWP. The LHWP is an iterative process and this data will be included when it is available.

An important finding from earlier work by the University of Newcastle is that there is evidence of drought periods in palaeo records (tree rings, cave deposits, ice cores, etc.) being substantially longer than anything seen since modern rainfall and streamflow records began.

This risk is dealt with by requiring all LHWP portfolios to include corresponding drought management strategies, and ensuring system augmentations occur before the risk of triggering drought contingency actions becomes unacceptable.

Sensitivity analysis will also be conducted to test LHWP portfolios against the potential impact of climate change on streamflow and demand. This testing will be based on NSW government assessments of potential changes in rainfall and temperature patterns.

2.Desalination technology

As noted in the 2016 MERI evaluation report, the CSIRO is seeking funding to undertake research into forward osmosis/reverse osmosis (FO/RO) desalination to treat mine water at Centennial Coal's Newstan colliery. FO/RO has the potential to significantly reduce the costs and emissions of desalination and result in higher potable water recovery rates. If feasible, this technology could make desalination options more feasible for consideration as options for future iterations of the LHWP. Could you please give an update on this research?

Response: The CSIRO have been investigating Forward Osmosis as a pre-treatment option in the desalination of saline minewater using Reverse Osmosis (FO-RO). Although promising in both minewater and seawater desalination applications, the process has not yet been proven to be a commercially viable alternative to a standard micro- or nano-filtration pre-treatment processes.

The 2017 and 2018 MERI reports indicated that the option of FO-RO at Centennial Coal Newstan would be reviewed as part of the consideration of minewater options in the 2021 LHWP. The mine water source at Centennial Coal Newstan was considered less preferable than a seawater desalination facility given the reliability of the mine water supply during a drought, the costs in adding a desalination process to the current water treatment facility, and capacity of the water network to receiving water from that site. Several other saline minewater options have been investigated, however to date these options remain less preferable than a seawater desalination

approach. As such, Hunter Water have not had further involvement on the CSIRO research which is specifically targeted at minewater.

Given the better suitability of seawater desalination as a drought response the Department of Planning, Industry and Environment did not invest funding for CSIRO's FO/RO research at Newstan Colliery. The CSIRO continue to undertake research in the area of desalination technology.

3. When will the HW 2020 annual report be published?

Response:

Hunter Water prepares an Annual Report in accordance with the *State Owned Corporations Act 1989* and the *Annual Reports (Statutory Bodies) Act 1984*.

Earlier in the year, the Parliament amended the legislation for all NSW Departments and Agencies due to the impacts of COVID-19, extending the deadline for preparation of Annual Reports for the 2019-20 financial year to 30 April 2021.

Hunter Water intends to present its Annual Report before the end of the calendar year 2020. The Report will be publicly released once it is tabled in Parliament.

4. Will there be a MERI done in 2020?

Response: A MERI report for the period 1 July 2019 to 30 June 2020 is currently being prepared by the *Department of Planning, Industry and Environment – Water*, based on information supplied by Hunter Water. We expect this to be finalised in early 2021 at which time it will be made publicly available. The report this year will have a strong focus on Hunter Water's response to the drought over this period.

5. The volume of water lost through evaporation from dams each year in South East Queensland is roughly equal to that supplied through the distribution system, 300GL according to the Urban Water Security Research Alliance (Yao X et al. 2010). By contrast, Sydney's evaporation rate is approximately 100 GL/yr (or 20% of volume supplied), by virtue of the deep storages and low surface area to volume ratios. (Water services association of Australia)

How much water is lost to evaporation from HW storages annually?

Response: Evaporation from Grahamstown Dam is in the order of 35 GL/year, evaporation from Chichester Dam is in the order of 2 GL/year, and evapotranspiration (direct evaporation and transpiration by trees) from the Tomago Borefield is in the order of 20 to 30 GL/year. Net evaporative losses from Hunter Water storage is therefore in the order of 60 GL/year (around 90% of average supply), with the primary reason being large surface area to storage ratios for Grahamstown Dam and Tomago Sandbeds.

6. How much treated waste water is discharged each year into the Williams River above Seaham Weir?

Response:

There are two Hunter Water wastewater treatment plants that discharge into the Williams River upstream of the Seaham Weir Pool, they are Clarence Town WWTW and Dungog WWTW. Discharges from our WWTWs are regulated under strict EPA licence requirements.

Clarence Town WWTW reuses close to 100% through an agricultural reuse scheme and only releases treated wastewater to the river in very large rainfall events. Dungog also has an agricultural reuse scheme that reuses around 85% of inflow. Based on plant operating data from 2014 an average of 0.17 ML/yr is discharged from Clarence Town WWTW and 106 ML/yr is discharged from Dungog WWTW.

Hunter Water has recently completed a major upgrade of the Dungog WWTW including state of the art membrane technology. The upgrade improves the quality of treated effluent to maximise reuse opportunities and provides capacity to service future growth. Based on modelling for the Dungog WWTW a current expansion plan for the reuse irrigation area from 30ha to 62ha, the average annual discharge volume to the Williams River will reduce from 112 ML/y to 45ML/yr.

The annual discharge volumes from the Dungog and Clarence Town WWTWs to the Williams River are summarised below:

Year	Dungog (ML)	Clarence Town WWTW (ML)
2014	69	0
2015	318	1
2016	113	0
2017	0	0
2018	133	0
2019	0	0
Average	106	0.17

7. How much water was transferred from Seaham Weir to Grahamstown Dam in each of the last 5 years?

Response:

Calendar year	Balickera transfers (ML)
2015	50,069
2016	31,468
2017	44,149
2018	49,949

2019	2,449
2020 (to 12 Nov 2020)	71,905