

## Groundwater quality at DPI Mangrove Mountain poultry burial sites project

### Project information sheet No.25 – April 2023

#### Background

Poultry carcasses and shed materials were buried in three containment pits in response to the Newcastle Disease Virus of Poultry Emergency at Mangrove Mountain on the Central Coast Plateau in 1999.

A project comprising three to four monitoring bores surrounding each pit to monitor potential impact from the sites on groundwater quality commenced in 2001.

Routine project activities also include:

- Landfill gas monitoring.
- Design, installation and supervision of site maintenance works.
- Decision-support for impact mitigation options.

#### Key actions (2021-22)

1. Key results from Groundwater Monitoring Events (GME30 – Dec 2022) are reported in this information sheet.
2. Monitoring of pit surface soils for evidence of cracks, surface slumping or subsidence.

3. Extraction of waste-water (leachate) at the Waratah Road site (Total 01 Jan to 31 Dec 2022 = 63,625 litres).
4. Routine site maintenance, including slashing and grass mowing.

#### Monitoring results

Initial results for December 2022 Groundwater Monitoring Event (GME30) were received in January 2023.

#### General comments

Zinc concentrations reported in most project monitoring bores exceed the ANZECC (2000) trigger values for protection of freshwater aquatic ecosystems<sup>1</sup>. Concentrations are well below the Australian Drinking Water Guideline (ADWG, 2011) levels.<sup>1</sup>

The nickel concentration did not exceed the ADWG (2011) level or the ANZECC (2000) trigger value in any monitoring bore in this round.

The ANZECC (2000) trigger value for total nitrogen was exceeded in the majority of project monitoring bores, aside from BH4, BH5, BH6 and BH8 at the George Downes

Drive site, and BH17W at the Waratah Rd site.

Copper was not detected in any monitoring bores in this round.

<sup>1</sup>See notes on page 3 for background information relating to water quality guideline levels.

### **Bloodtree Road site**

Groundwater flow direction (calculated from the Standing Water Level of monitoring bores) is generally west.

The ANZECC (2000) trigger value was exceeded for nitrate in all bores. Levels increased slightly in BH2 and BH1B but remain below the ADWG (2011) (health) level.

Phosphorus exceeded the ANZECC (2000) trigger value in down-gradient monitoring bores BH2 and BH3.

Ammonia is present in all bores but below the ANZECC (2000) trigger value and ADWG (2011) (aesthetic) level.

### **George Downes Drive site**

Calculated groundwater flow direction in this round is generally to the north-west.

Aluminium exceeds the ADWG (2011) (aesthetic) level in bores BH5, BH6 and BH8.

The manganese concentration exceeds the ADWG (2011) (health) guideline level in BH6 and the ADWG (2011) (aesthetic) level in BH5 and BH7.

The nitrate and total nitrogen level exceeds the ANZECC (2000) trigger value in BH7. The nitrate level is well below the ADWG (2011) (health) level.

Phosphorus was present in all bores and exceeds the ANZECC (2000) trigger value in BH4.

### **Waratah Road site**

Calculated groundwater flow direction in this round was east-north-east.

Lead was below the detection limit in all bores on the site.

The manganese concentration in down-gradient bore BH5W exceeds the ADWG (2011) (health) guideline level. The ADWG (2011) (aesthetic) level is exceeded in BH12W.

Aluminium exceeds the ADWG (2011) (aesthetic) level in bores BH5W, BH9W and BH15W.

The ANZECC (2000) trigger value and ADWG (2011) (aesthetic) level for ammonia is significantly exceeded in BH5W and BH12W. Slight exceedances were reported in BH10W and up-gradient bore BH11W.

The ANZECC (2000) trigger value for nitrate is exceeded in all bores, aside from BH10W and BH17W. The ADWG (2011) (health) level for nitrate was approached in down-gradient bore BH15W. Total nitrogen exceeds the ANZECC (2000) trigger value in all bores aside from up-gradient bore BH17W.

Liquid seepage from the poultry shed litter containment pit, along with the nutrient legacy from previous land use on this site (intensive piggery), are potential sources of the contaminants reported.

Work on the pit cap enhancement project at Waratah Road has commenced.

### **Next steps**

- Groundwater Monitoring Event (GME31) (May/June 2023).

## More information

**Dr Brendon O'Rourke, A/Director Soil and Water**

[brendon.orourke@dpi.nsw.gov.au](mailto:brendon.orourke@dpi.nsw.gov.au)

**Or via DPI web-site** [Mangrove Mountain groundwater monitoring](#)

<sup>1</sup>The ANZECC (2000) trigger values for protection of freshwater aquatic ecosystems (95% level)(superseded); ANZECC (2018) ANZ freshwater guidelines were developed for surface waters, not groundwater. NSW EPA Guidelines for the Assessment and Management of Groundwater Contamination indicate that the trigger values should be used as Groundwater Investigation Levels (GILs). Exceedance of GILs indicates a need for detailed assessment. This is because natural background concentrations, diffuse regional contamination, the fate and transport of contaminants in groundwater and potential exposure pathways must all be considered. For example, there is diffuse regional contamination by nitrate in the Mangrove Mountain area.

Revisions to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality Toxicant default guideline values for water quality in aquatic ecosystems (revised 2018) can be viewed at:

<http://waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/toxicants>

**Note 1:** *An increase in soluble metals is often associated with a decline in groundwater pH. Minor increase or exceedance of GILs for metals is not assumed to relate to contamination from the burial pits. Seepage from the pits would likely also result in a significant increase in*

*ammonia, nitrate, Total Dissolved Solids and electrical conductivity, for example.*

**Note 2:** *The National Health and Medical Research Council's Australian Drinking Water Guidelines are not specifically for regulation of groundwater quality. They are an excellent source regarding the health issues related to drinking water. They can be viewed on-line or downloaded at [Australian Drinking Water Guidelines 2011 \(updated September 2022\)](#) Fact sheets provide background regarding health considerations of key water quality parameters.*

**Reference number:** INT23/14727

---

© State of New South Wales through the Department of Industry, Skills and Regional Development, 2023. You may copy, distribute and otherwise freely deal with this publication for any purpose, provided that you attribute the NSW Department of Primary Industries as the owner.

**Disclaimer:** The information contained in this publication is based on knowledge and understanding at the time of writing (April 2023). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.