



Groundwater quality at DPI Mangrove Mountain poultry burial sites project

Project information sheet No.22 – March 2021

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 (2020-21)

1. Key results from Groundwater Monitoring Events (GME27 – Nov-Dec 2020) 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 2020 = 50,750 litres) (Total 01 Jan to 08 Apr 2021 = 18,100 litres).
4. Routine site maintenance, including minor landscaping and grass mowing.

Monitoring results

Initial results for November-December 2020 Groundwater Monitoring Event (GME27) were received in February 2021.

General comments

Zinc concentrations reported in all project monitoring bores exceed the ANZECC (2000) trigger values for protection of freshwater aquatic ecosystems.¹

Concentrations are well below the Australian Drinking Water Guideline (ADWG, 2011) levels.¹

The nickel concentration did not exceed the ADWG (2011) level in any monitoring bore in this round and the ANZECC (2000) trigger value was exceeded in only one bore (BH5 at George Downes Drive).

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, BH1B at the Bloodtree Road site and BH10W and BH17W (new bore) at the Waratah Rd site.

¹See 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.

Although aluminium concentrations were higher in this round, the concentrations of aluminium and nickel remain well-below the ADWG (2011) level and the ANZECC (2000) freshwater trigger value.

The ANZECC (2000) trigger value was exceeded for nitrate in all bores, aside from down-gradient bore BH1B. The highest level is in up-gradient bore BH3, reflecting an apparent regional trend.

Phosphorus was below detection limits, aside from BH3, and less than the ANZECC (2000) trigger value in all Bloodtree Rd monitoring bores.

George Downes Drive site

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

Groundwater samples were taken from BH5 after the blockage in the well was successfully removed.

The iron concentration exceeds the ADWG (2011) (aesthetic) level in BH5 and BH8. Concentrations increased since GHM26 (June 2020) but was less than the detection limit (50 micrograms/L) in BH7.

The manganese concentration exceeds the ADWG (2011) (aesthetic) level in BH5 and BH7. Levels reported were below the

ADWG (2011) (health) level and ANZECC (2000) trigger value.

The nitrate level exceeds the ANZECC (2000) trigger value in BH7, only. Levels are well below the ADWG (2011) (health) level.

Phosphorus was reported below detection limits in all site bores.

Waratah Road site

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

The lead level in down-gradient bore BH5W exceeds the ANZECC (2000) trigger value and is just below the ADWG (2011) (health) level. Lead was reported at low levels in BH9W, BH12W and BH14W and was below the detection limit in other bores on the site.

The ADWG (2011) (health) level for manganese was exceeded in the down-gradient bores BH5W, BH9W and BH12W in this event. The concentrations in BH5W and BH9W also exceed the (higher) ANZECC (2000) trigger value for manganese. The ADWG (2011) (aesthetic) level was exceeded in new bore BH16W.

Aluminium exceeds the ADWG (2011) (aesthetic) level in down-gradient bores BH5W, BH11W, BH12W, BH14W, BH15W and BH16W. Levels in BH5W and BH9W remain very high.

The ANZECC (2000) trigger value and ADWG (2011) (aesthetic) level for ammonia is exceeded in the down-gradient groundwater monitoring bores, BH5W and BH12W.

The ANZECC (2000) trigger value for nitrate is exceeded in all bores, aside from down-gradient bore BH14W and BH17W. The ADWG (2011) (health) level for nitrate was exceeded in down-gradient bores BH9W and BH16W.

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.

Next steps

- Groundwater Monitoring Event (GME28) (June/July 2021).

More information

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

¹The 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 \(2011; updated 2018\)](#) Fact sheets provide background regarding health considerations of key water quality parameters.*

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