

17 April 2024

Attention: Les Egerton
Cleanaway Solid Waste Pty Ltd
171 Camboon Road
MALAGA WA 6090

SLR Project No.: 675.VX5831.00000

RE: Summary Report – December 2023

SLR Consulting (SLR) was commissioned by Cleanaway Solid Waste Management Pty Ltd (Cleanaway) to undertake licence compliance groundwater monitoring at the Banksia Road Waste Disposal Site, located at Lot 2, Banksia Road, Crooked Brook, WA ('the Site').

The December 2023 sampling is required to comply with the water monitoring requirements of the Prescribed Premises Licence No. L8904/2015/1 (issue date 3 August 2015, updated October 2021), issued by the Department of Water and Environmental Regulation (DWER).

Site Overview

Cleanaway has operated the Class III (mid-level) landfill site at the Banksia Road site in Dardanup since approval was granted in 2006. The Site is operational as an active Class II and III landfill (DWER Category 64) and a liquid waste facility (DWER Category 61) and contains liquid waste cells, solid waste cells, stormwater collection dams and leachate collection ponds.

The eastern portion of the Site has been operated as a landfill since approximately 2000 and received only Class II waste until approximately 2006. Since then, the landfill has been receiving both Class II and Class III waste comprising a mixture of municipal, commercial, and industrial waste, as well as residue from Water Corporation wastewater treatment plants.

A secondary waste disposal area exists at the top of Cells 3, 4, 4b, 5, 6 and 12 which is typically used for asbestos and quarantine waste placement.

An ephemeral watercourse, Crooked Brook, is located approximately 1 km south and southwest of the site. The brook flows in a north-westerly direction into the Preston River approximately 5.5 km to the west of the Site.

Drilling and installation of groundwater monitoring bores has confirmed the presence of two groundwater systems at the Site, a shallow superficial aquifer between 20 m and 50 m (shallower in the western portion and deeper in the in the eastern, higher elevation, portion of the site) below the surface and the permanent, confined aquifer (Leederville Aquifer) varying between 35 m and 45 m below the surface, across the Site.

Groundwater within the superficial formation generally flows westward. Previous investigations at the Site have reported minimal groundwater within the superficial formation (i.e., in shallow groundwater bores) and the likely interpretation is that the system is a combination of seasonally perched, discontinuous layers across the Site and a deeper continuous aquifer at the base of the superficial formation with limited recharge offsite to the east of the Site.

The Leederville aquifer generally serves as a domestic water supply for the Dardanup area and is the most utilised aquifer in the area. The Priority 1 Dardanup water reserve is located

approximately 2.5 km to the northwest of the site's north-western boundary, however the site itself is not located within a drinking water protection area.

Monitoring Sites

The groundwater monitoring network targets both the superficial and the Leederville aquifers through shallow and deep groundwater wells. Prior to the September 2021 groundwater monitoring event, several deep wells screened across the superficial and Leederville aquifers were decommissioned, and additional new monitoring wells were replaced/installed (4 new well pairs and 5 replacement deep wells) to monitor potential impacts to groundwater from operations. There are currently a total of 25 groundwater wells on-site, however, during the December 2023 monitoring program, only 19 wells were able to be sampled due to six (6) being dry.

The primary leachate pond (PLP), TDS Cell 1, PSD1, PSD2, LEP 1 and LEP 3 were also sampled in December 2023 as part of the license conditions.

Analytical Suite

The laboratory analytical suite for the 2023 December monitoring event complies with *Section 43 (d)* of the DWER License and comprises: major ions, metals, nutrients, inorganics, and radionuclides. All groundwater samples were submitted to laboratories that are National Association of Testing Authorities (NATA) accredited for the required analysis.

Key Findings

The key findings of the December 2023 groundwater monitoring program are summarised below.

Groundwater Flow Direction

Groundwater elevations were generally consistent with previous investigations. Onsite groundwater flow direction in the shallow superficial aquifer was north-westerly while the deeper Leederville aquifer was flowing more towards the west.

Groundwater Quality

Groundwater at the Site is acidic with pH reported at less than 6.04 pH units and below the lower pH range for drinking water guideline.

The electrical conductivity (EC) of the water at the site ranged between 182.6 $\mu\text{S}/\text{cm}$ and 959 $\mu\text{S}/\text{cm}$, indicating fresh to marginal water conditions at the site.

Analytical Results

Laboratory analytical results are summarised below:

Groundwater

- Water Quality Parameter: pH values were reported below the range of criteria (6.5 pH units - 8.5 pH units) for non-potable use (NPUG), Australian Drinking Water Guidelines (ADWG) 2018 Health, ANZECC 2000 long-term irrigation, and ANZECC 2000 livestock at all the groundwater bores sampled.
- Chloride was reported below the NPUG (250 mg/L) in all the bore locations.
- Aluminium was reported below the NPUG (0.2 mg/L) in all the bore locations.



- Lead was reported below the ADWG (0.01 mg/L) in all the bore locations.
- Manganese reported below the ADWG (0.5 mg/L) in all the bore locations and exceeded the NPUG (0.1 mg/L) at GW3D and GW6D.
- Total nitrogen was reported above the LTI (5 mg/L) at SE6S, SE10S and GW7S, and Total phosphorus was reported above the LTI (0.05 mg/L) at GW1S, GW6D, GW7S and SE4D. Limited and isolated occurrences of other heavy metals (As, Cd, Cr, Cu, Fe, Ni, Se, and Zn) were reported above the limit of reporting (LOR), but below assessment criteria indicating concentrations do not pose a risk to potential receptors.
- Thorium was reported below the LOR of 0.05 mg/L in all the bore locations.
- Uranium was reported below the LOR of 0.001mg/L in all the bore locations.

Surface water

- All the surface water locations reported pH at near neutral or alkaline pH values.
- Manganese was reported above the NPUG (0.1mg/L) in all locations except for PSD1 and PSD2. Manganese was reported above ADWG (0.5 mg/L) at TDS Leachate Cell 1, LEP1 and LEP3 and above LTI (0.2 mg/L) in PLP.
- Aluminium was reported below all the guidelines (NPUG, ADWG, LTI and ANZECC Livestock DW) in all locations and above LOR (0.05 mg/L) in PSD1.
- Arsenic was reported below all the guidelines (NPUG, ADWG, LTI and ANZECC Livestock DW) and above LOR (0.001 mg/L) in TDS Leachate Cell 1, PLP, LEP1 and LEP3.
- Cadmium was reported below all the guidelines (NPUG, ADWG, LTI and ANZECC Livestock DW) and equal to LOR (0.0002 mg/L) in TDS Leachate Cell 1.
- Copper was reported below LOR (0.001mg/L) in all locations.
- Lead was reported above AGWG guidelines (0.01mg/L) in PLP only.
- Selenium was reported above the ADWG guidelines (0.01 mg/L) in LEP and LEP3 only.
- Nickel was reported above the NPUG (0.2 mg/L) in PLP and equal to ADWG (0.02 mg/L) in TDS Leachate Cell 1.
- Thorium was reported below the LOR of 0.05 mg/L in all locations.
- Uranium was reported below the LOR of 0.001mg/L in all locations with exception of TDS Leachate Cell 1.

Interpretation

- Based on the monitoring results, there continues to be limited evidence of hydraulic connectivity between leachate ponds and the groundwater beneath the site.
- Spatially across the site it is noted that:
 - Except for those analytes that can be naturally occurring in the environment (e.g., major ions, metals, and nutrients), detections of analytes are low in concentration and spatially isolated indicating an absence of source associated with the landfill operations.
 - The groundwater quality has not significantly changed since the previous monitoring round.



- The more recent monitoring wells increase the understanding of the groundwater at the site and especially on the western down-gradient boundary. They all report concentrations consistent with other areas of the site, indicating that no inputs to groundwater are happening along the flow path from the up-gradient landfill cells.

Conclusions

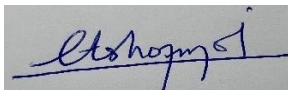
Based on the December 2023 and historical groundwater and leachate pond analysis there is little evidence to suggest that the landfill operations have adversely impacted the underlying groundwater aquifer. The minor guideline exceedances are generally in up or cross-gradient monitoring locations that would not be impacted by landfill operations, indicating they are representative of background conditions.

Closure

Thank you for retaining SLR to provide this service. Should you have questions or require additional information, please do not hesitate to contact the below.

Regards,

SLR Consulting Australia



Phuntsho Wangdi MSc.
Project Consultant
pwangdi@slrconsulting.com



Shane Hyde CEnvP SC
Technical Director
Shane.hyde@slrconsulting.com

