

KERALE STUDY AREA – ECOLOGY, SEDIMENT AND WATER QUALITY ASSESSMENT

TO	Glencore Collinsville Open Cut (COL)
FROM	Environmental Resources Management (Australia) Pty Ltd (ERM)
DATE	08 June 2026
REFERENCE	0771228 Collinsville EA/NP
SUBJECT	Ecology, Sediment and Water Quality Assessment of Kerale Area - Collinsville Open Cut (Environmental Authority Amendment).

1. BACKGROUND CONTEXT AND PURPOSE

Environmental Resources Management Pty Ltd (ERM) was engaged by Collinsville Open Cut (COL) to undertake ecological surveys and sediment and water assessments within the Study Area.

The purpose of the work was to assess the ecological values of the Study Area and downstream areas to enable assessment of potential impacts on these values associated with historical activities. The assessment is intended to support an Environmental Authority (EA) amendment application for a final land use in the Kerale Area Domain.

The surveys and assessments were conducted from the 4 August to 8 August 2025. This technical memorandum summarises the methodology and findings of the survey effort.

2. SITE CONTEXT

COL is a NC Coal Company Pty Ltd operation located west of the Collinsville township, approximately 100 km south-west of Bowen, Central Queensland. COL operates under Environmental Authority (EA) EPML00332013 and is authorised for site specific mining activities on Mining Leases (ML) ML1005, ML1006, ML1007, ML1008, ML1009, ML10111, ML1015, ML10250, ML10333, ML1037, and ML1064 (Figure 2-1).

Prior to mining, the ML areas were grazed following the establishment of Strathmore Station in 1861 and a sheep and cattle run on Heidelberg (Department of the Environment, Tourism, Science and Innovation, 2025). Cattle grazing and other agricultural activities continue today within the areas surrounding COL.

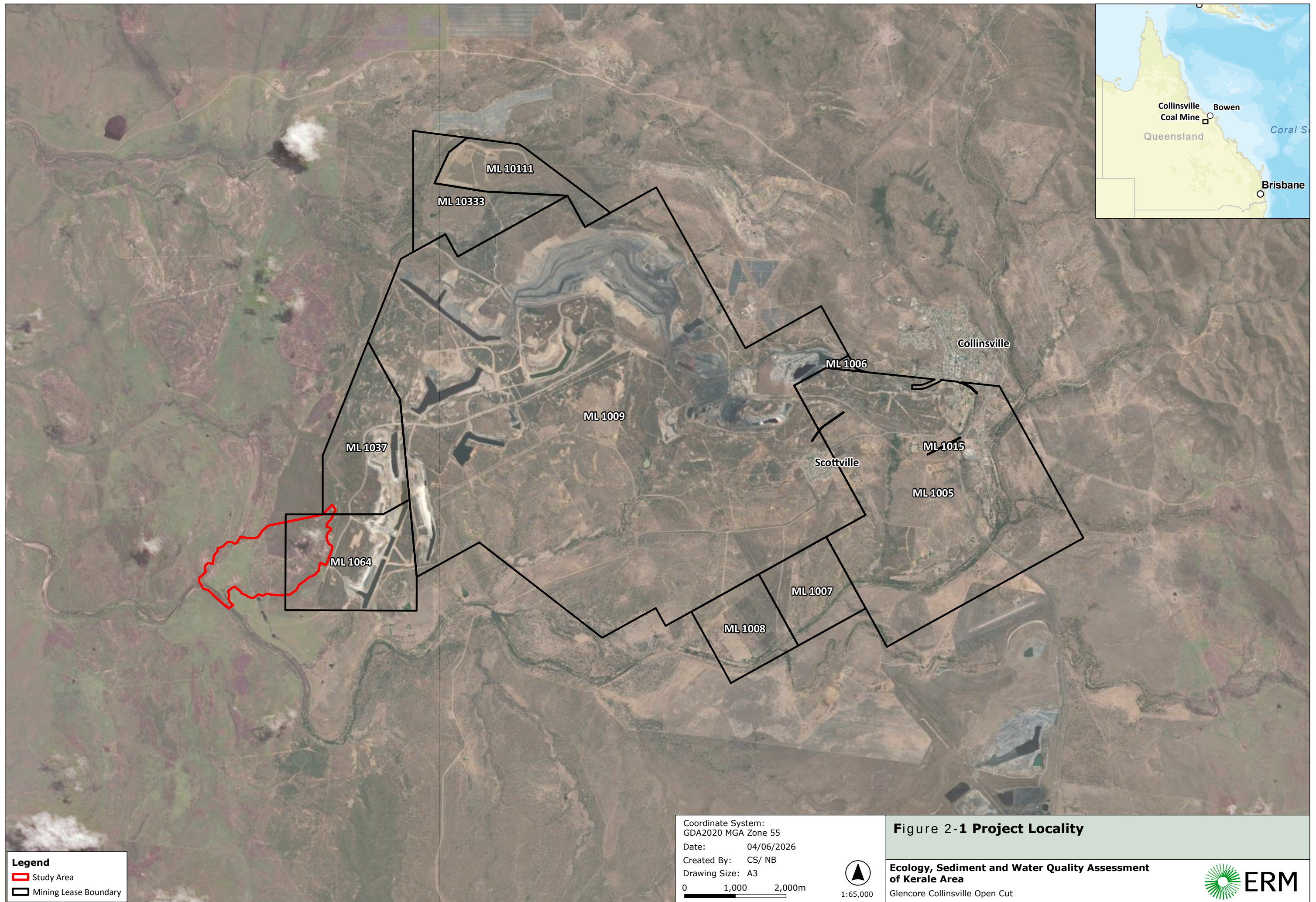
The Study Area is located within the south-west of COL on ML1064. The area drains to Pelican Creek to the south-west of the ML. The Study Area and surrounds consists of rocky sloping terrain, dominated by Rosewood (*Acacia rhodoxylon*), transitioning to open Eucalypt woodlands and pasture utilised for agricultural purposes (grazing).

The area surveyed (the Study Area) in August 2025 consists of the Kerale Dam, associated downstream areas, and surrounding environment, an area of approximately 285 ha. The Study Area and assessment locations are displayed in Appendix F2.

Prior to field surveys, a desktop review was undertaken of existing reporting, mapping, species and community databases to identify ecological values that may occur within the Study Area.

Approximately 32% of the Study Area is mapped as containing remnant vegetation, including 2% comprising 'Of Concern' Regional Ecosystems (RE) under the Queensland *Vegetation Management Act 1999* (VM Act), situated along the northern bank of Pelican Creek and an ephemeral tributary south of the Study Area. This tributary is defined as a Drainage Feature by the *Water Act 2000* (Water Act) and, discharges into Pelican Creek approximately 2.7km downstream of the Keralé Dam embankment.

The desktop review indicated that two Threatened Ecological Communities (TEC) and 20 listed threatened or migratory species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) have the potential to occur, while five listed threatened species are considered likely to occur within the Study Area or surrounds.



3. SURVEY METHODS

3.1 DESKTOP REVIEW

Several desktop sources were reviewed to identify ecological values that may occur within the Study Area and locality. Ecological values assessed included those protected under Commonwealth and State (Queensland) legislation as listed in Table F1-1 (Appendix F1).

The databases and other sources utilised included various open State, Commonwealth and public information sources (Table 3-1). A search area containing the Study Area and a minimum of 10 km buffer was used for database searches. The Protected Matters Search Tool (PMST) results were crosschecked using the Atlas of Living Australia (ALA) and WildNet database records in the context of the actual Study Area.

The desktop review was used to undertake a preliminary likelihood of occurrence assessment for potentially occurring threatened species. The likelihood of occurrence approach refines the desktop generated list using site-specific information and specific-species habitat information.

Desktop sources are indicative only and likelihood rankings, particularly regarding the presence of preferred habitat, are conservative. The assessment ranks the likelihood of the species occurring through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field surveys.

Under the EPBC Act, 2 TEC and 20 threatened or migratory species were considered potentially occurring, and 5 threatened species were considered likely to occur. The five species likely to occur in the Study Area are:

- *Eucalyptus raveretiana* (Black Ironbox);
- *Geophaps scripta scripta* (Southern Squatter Pigeon);
- *Cuculus optatus* (Oriental Cuckoo, horsefield's cuckoo);
- *Petauroides volans minor* (Greater Glider - northern, north-eastern Queensland); and
- *Petauroides volans volans* (Greater Glider - central).

Approximately 32% of the Study Area is mapped as containing remnant vegetation, including 2% comprising 'Of Concern' RE under the VM Act (Queensland Department of Environment, Science and Innovation, 2024). The Of Concern RE is 11.3.4 *Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains.

The desktop review indicated that six flora species threatened under the EPBC Act had the potential to occur within the Study Area:

Likely

- *Eucalyptus raveretiana* (Black Ironbox)

Potential

- *Dichanthium queenslandicum* (King Bluegrass);
- *Dichanthium setosum* (Bluegrass);
- *Polianthion minutiflorum* (no common name);
- *Solanum graniticum* (Granite Nightshade); and

- *Cerbera dumicola*.

The desktop review and likelihood of occurrence assessment identified 11 birds, 4 mammals, and 1 reptile species, classified as threatened under the EPBC Act, with the potential to occur within the Study Area:

Likely

- *Geophaps scripta scripta* (Southern Squatter Pigeon);
- *Petauroides volans* (Greater Glider – northern and central subspecies); and
- *Petauroides volans minor* (Greater Glider – northern, north-eastern Queensland).

Potential

- *Phascolarctos cinereus* (Koala);
- *Dasyurus hallucatus* (Northern Quoll);
- *Egernia rugosa* (Yakka Skink);
- *Calidris acuminata* (Sharp-tailed Sandpiper);
- *Calidris ferruginea* (Curlew Sandpiper);
- *Erythrorhynchus radiatus* (Red Goshawk);
- *Falco hypoleucos* (Grey Falcon);
- *Gallinago hardwickii* (Latham's Snipe);
- *Neochmia ruficauda ruficauda* (Star Finch);
- *Poephila cincta cincta* (Southern Black-throated Finch);
- *Rostratula australis* (Australian Painted Snipe); and
- *Tyto novaehollandiae* (Masked Owl).

4 migratory bird species as classified under the EPBC Act were also determined as potentially occurring within the Study Area following the likelihood of occurrence assessment:

Likely Migratory

- *Cuculus optatus* (Oriental Cuckoo)

Potential Migratory

- *Apus pacificus* (Fork-tailed Swift);
- *Motacilla tschutschensis* (Yellow Wagtail); and
- *Calidris melanotos* (Pectoral Sandpiper).

Table F1-1 (Appendix F1) provides an overview of relevant Commonwealth and State survey guideline documents that were consulted to inform the field survey program, following desktop analyses to determine potentially occurring Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) within the Study Area or locality.

TABLE 3-1 DESKTOP REVIEW SOURCES

Information Source	Name	Data Description
ala.org.au	Atlas of Living Australia (ALA)	Australia national biodiversity database (supported by the National Collaborative Research Infrastructure Strategy, CSIRO). Database contains records accessed through an interactive spatial portal. Threatened species are searched to identify known records in proximity to the Study Area.
DCCEEW	The Protected Matters Search Tool (PMST)	The search tool provides predictive results of Matters of National Environmental Significance based on mapping of known and potential species distribution, habitat, ecological communities and wetlands. The outputs are based on modelling results and do not necessarily reflect known records of species or communities.
DCCEEW	Species Profile and Threats Database (SPRAT)	The SPRAT profiles and associated conservation advice documents were consulted to provide detailed information for the Likelihood of Occurrence assessment on species distribution, general and preferred habitat.
GHD	<i>Collinsville Coal Terrestrial Ecological Assessment Report 2023</i>	Derived data - species records and observations, field verified regional ecosystems and general habitat types.
Queensland Government	Queensland Globe	A Google Earth based product that allows viewing of spatial data and imagery covering Queensland, including Regional Ecosystems as mapped by the Queensland Herbarium.
Queensland Government	Wildlife Online	List of species recorded within 10km radius around the centre of the Study Area (coordinates 147.722, -20.593), as held by the Queensland Government.

3.2 FIELD SURVEYS

Field surveys were undertaken between 4 August and 8 August 2025. The survey focused on areas of native vegetation and potential habitat for potentially occurring threatened species in the Study Area, as determined by the desktop and likelihood of occurrence assessment.

To accurately capture survey locations and vegetation mapping extents, field data and coordinates were collected utilising handheld devices with GIS capabilities (FieldMaps). Two suitably qualified ecologists carried out the fauna and vegetation assessments across the Study Area. Field survey locations are displayed in Appendix F2.

- While the timing of the field surveys was not suitable to directly observe many migratory species, it is considered appropriate for the purposes of identifying areas of potential habitat for both listed migratory and threatened species.

3.2.1 SURVEY TECHNIQUES

Surveys were undertaken in accordance with the survey guidelines listed below in Table 3-2.

Vegetation and Habitat Assessment

Vegetation community and habitat assessments were undertaken to describe the type and condition of the vegetation communities within and surrounding the Study Area. The outcomes of the vegetation and habitat field assessments are used to inform the final likelihood of occurrence assessment of listed threatened species and threatened ecological communities.

The assessments undertaken included:

- Representative sampling of REs. This included quaternary assessments in accordance with Neldner et al. (2023);
- Assessment of water features (such as waterways and dams) and habitat values;
- Recording of topographical features; and
- Defining barriers of both disturbed and undisturbed areas.

The parameters measured during habitat assessments, critical to identifying potential threatened species habitat, included:

- Context regarding landscape features (connectivity, proximity to water);
- Condition (weeds, evidence of disturbance, invasive species);
- Breeding and roosting habitat features (hollows, nests, caves);
- Foraging sources (flowering tree species, termite mounds);
- Microhabitat presence (woody debris, leaf litter specifically important for small mammals and reptiles);
- Wetland presence (presence of aquatic vegetation, water depth); and
- Signs of threatened species (such as scats, scratches and tracks).

A species list of incidental fauna observations was collated during the vegetation and habitat assessments and is provided in Appendix F3.

Targeted Flora Surveys

Meander surveys, in association with habitat quality and quaternary assessments, were conducted in accordance with the *Flora Survey Guidelines – Protected Plants* (Department of the Environment, Tourism, Science and Innovation, 2025) for the flora species identified as potentially occurring within the Study Area.

Targeted Fauna Surveys

The desktop review and likelihood of occurrence assessment identified 11 birds 4 mammals, and 1 reptile species, classified as threatened under the EPBC Act, with the potential to occur within the Study Area.

A targeted survey approach was implemented to assess the presence of these species in accordance with the guidelines detailed in Table 3-2.

Terrestrial and Arboreal Mammals

Species specific survey techniques were adopted to assess the presence of species identified as potentially occurring within the Study Area:

- Koala:
 - Diurnal habitat assessments looking for areas with key habitat values, such as koala feed trees;
 - Scat and sign searches looking at the base of koala food trees for presence of koala scats and the trunks of smooth bark gums for koala scratches;
 - Nocturnal spotlighting to determine presence and density; and
 - Camera trapping.
- Greater Glider:
 - Diurnal habitat assessments looking for areas with key habitat values, such as mature, hollow-bearing trees;
 - Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrats of the survey site, while scat searches are not a specific survey guideline recommendation for locating greater gliders, this method has been listed in the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022) as a means to locate cryptic and nocturnal species; and
 - Nocturnal spotlighting to determine presence and density.
- Northern Quoll:
 - Diurnal habitat assessments looking for areas with key habitat values for denning/shelter purposes and dispersal/foraging purposes;
 - Active searching for scats and latrine sites;
 - Camera trapping; and
 - Nocturnal spotlighting for smaller sites to determine presence and density.

Birds

Surveys for birds within the Study Area focused on identification of species listed as threatened or migratory, particularly those considered likely or potentially occurring within the Study Area.

Bird surveys were carried out to target listed threatened and migratory species. In lieu of species-specific guidelines, surveys were undertaken in consideration of the Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022), and included:

- Diurnal bird surveys involving six 5-10 min area searches within a 100 x 100 m survey area; and
- Diurnal Active Search - Two x 30 person-min searches within two different 50 x 50 m quadrants of the survey site.

Reptiles

The following survey techniques were adopted for potentially occurring reptiles within the Study Area:

- Spotlighting transects targeting areas of standing water, riparian habitats and surrounding environments and large logs between dusk and early morning hours;
- Opportunistic road surveys while driving along roadways in the Study Area and surrounds; and
- Microhabitat searches during the coolest parts of the day, including carefully turning woody debris, rocks and artificial debris, raking the soil surface or leaf litter beneath trees.

TABLE 3-2 RELEVANT SURVEY GUIDELINES

Guideline	Guideline Source
A review of koala habitat assessment criteria and methods (Prepared for the Department of Agriculture, Water and the Environment).	Youngentob et.al., 2021
BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland	Eyre et al., 2015
Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act	Department of the Environment, 2015
EPBC Act - Draft referral guidelines for nationally listed Brigalow Belt reptiles	Department of Climate Change, Energy, the Environment and Water, 2024
Flora Survey Guidelines – Protected Plants NC Act	Department of Technology, Environment, Science and Innovation, 2025
Guide to determining terrestrial habitat quality: Methods for assessing habitat quality under the Queensland Environmental Offsets Policy (Version 1.3)	Department of Environment and Science, 2020
Guide to greater glider habitat in Queensland	Eyre et.al., 2022
Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species	Department of Environment and Energy, 2017
Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland, Version 7.0.	Neldner et al., 2025
Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the EPBC Act	Department of the Environment, Water, Heritage and the Arts, 2010
Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act	Department of the Environment, Water, Heritage and the Arts, 2017
Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act	Department of Sustainability, Environment, Water, Population and Communities, 2011
Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act	Department of Sustainability, Environment, Water, Population and Communities, 2011
Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Version 4)	Eyre et al., 2022

3.2.2 WATER AND SEDIMENT MONITORING TECHNIQUES

Water and sediment samples from the Study Area and surrounds were opportunistically collected during the ecology survey. Two water samples were collected for laboratory analysis of a range of general physico-chemical parameters, dissolved and total metals, nutrients, and hydrocarbons. One water sample was collected from a small pool of water within Kerale dam with the second sample collected in a farm dam approximately 500 m south of Kerale dam and approximately 200 m from the drainage feature immediately downstream. No other standing water suitable for sampling was observed.

A total of five sediment samples were collected from within, upstream and downstream of the Kerale Area. Sediment samples were collected at the same two sites as the water samples, as well as at one location upstream of the dam and at two locations in the ephemeral tributary south of the dam. The sediment samples were analysed for physical and chemical parameters comprising pH, electrical conductivity (EC), particle size distribution, exchangeable cations, total metals, pesticides and hydrocarbons.

Water and sediment samples were collected in accordance with the *Environmental Protection (Water) Policy 2009 - Monitoring and Sampling Manual (DES, 2018)*. The assessed analytes are detailed in Table 3-3.

TABLE 3-3 LABORATORY ANALYSES

Water Quality Analysis
• pH • EC • Total suspended solids • Sulfate • Dissolved Oxygen • Dissolved Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn, B, Mn, Se, Ag, V • Total Co, Mo, U • Ammonia • Nitrate • TPH (C6-C9) • TPH (C10-C36) • Total Fluoride
Sediment Analysis
• pH and EC (1:5 soil/water) • Sulfate as SO₄ • Chloride • Total nitrogen as N • Nitrate as N; • Total phosphorus as P • Exchangeable cations (Ca, Mg, K, Na) • Effective cation exchange capacity (eCEC) • Total organic carbon • Total Al, As, B, Cd, Cr, Co, Cu, Fe, Mn, Ni, Pb, Se, V, Zn, Hg • Leachate Al, As, B, Cd, Cr, Co, Cu, Fe, Mn, Ni, Pb, Se, V, Zn, Hg • PSD

3.3 WEATHER CONDITIONS

Weather conditions throughout the week comprised cool mornings and warm days. No rainfall was recorded during the survey period. Weather conditions recorded at Collinsville Post Office (Station #033013) during the survey period are provided in Table 3-4

TABLE 3-4 WEATHER CONDITIONS RECORDED AT COLLINSVILLE POST OFFICE

Date	Temps		Rain	9:00 AM			
	Min (C)	Max (C)		Temp (C)	RH (%)	Wind Dir	Wind Spd (km/h)
4/07/2025	5.6	28.1	0	13.4	61	-	-
5/07/2025	8.6	28.6	0	15.5	84	-	-
6/07/2025	8.9	28.9	0	14.8	81	-	-
7/07/2025	9.9	27.5	0	15.9	80	NE	4
8/07/2025	11.6	26.0	0	18.9	68	-	-

3.4 SURVEY LIMITATIONS

The field and desktop assessments undertaken provide an overview of the ecological values that exist within the Study Area. The surveys were focused on areas of native vegetation that contained potential habitat and areas downstream with the potential to be impacted by seepage from the Kerale Dam. Further assessment would be required to determine the full extent of potential habitat, the presence of threatened species and the identification and quantification of impacts.

The absence of a species from a database list or observational studies does not confirm its absence from the Study Area and may rather indicate a low historical sampling effort in the region.

4. RESULTS

The Study Area consists of rocky sloping terrain, dominated by Rosewood (*Acacia rhodoxylon*), becoming co-dominant with Eucalypt species towards the north. Within the broader Study Area, vegetation generally consisted of riparian vegetation along Pelican Creek and drainage lines, and reed and sedge species within farm dams. Open Eucalypt Forest, scattered Eucalypt trees and cleared pasture dominated the broader Study Area.

Mangrove Fern (*Acrostichum speciosum*) was recorded immediately downstream of the Kerale Area. Mangrove Fern is known to grow within estuarine and mangrove environments and is a salt tolerant species but can also grow in freshwater systems.

One EPBC Act and NC Act listed threatened species were observed downstream of the Kerale Area. Southern Squatter Pigeon was recorded at two locations throughout the southern portions of the Study Area, with each sighting within close proximity to permanent water. This species is listed as Vulnerable under the EPBC Act and NC Act.

Detailed survey findings are detailed in Table 4-1 below, while survey locations, species observations, and water and sediment sampling locations are shown in Appendix F2. Water and sediment sampling results are provided in Appendix F4.

Key ecological survey results include:

- Bird Census
 - Ongoing bird observations while moving across the Study Area;
 - 71 bird species observed in total, across 40 families (see Appendix F3 for full list); and
 - 1 threatened species observed – Southern Squatter Pigeon (see Plate 1 and Appendix F3).
- Vegetation and Habitat assessments
 - 8 habitat quality assessments completed;
 - Targeted areas with potential habitat value to threatened species;
 - 12 quaternary assessments completed;
 - Targeted areas of potential of concern/endangered regional ecosystems (Appendix F3); and
 - 40 Rapid Vegetation observations.
- Targeted species searches
 - 2 Camera Traps deployed across the Study Area;
 - Nocturnal targeted species searches (spotlighting) for Koala and Greater Glider along riparian vegetation completed. No threatened species were observed; and
 - Targeted species searches for other listed threatened species in suitable habitat completed.
- Water and Sediment Sampling
 - 6 sediment and water analysis sites were originally proposed;
 - Only two sites had surface water present at time of survey; and
 - A total of 5 sediment samples were collected from within, upstream and downstream of the Kerale Area.

Further water sampling may be required following suitable rainfall events.

TABLE 4-1 SURVEY EFFORT AND FINDINGS – AUGUST 2025 SURVEY

Survey Method	Target species	Applicable Guidelines	Effort	Findings
Bird Census Surveys Targeting bird species presence of the area.	Listed Threatened Birds with potential to occur in the Study Area. Overall census of birds and how they utilise the Study Area.	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022)	Roaming observations while moving through Study Area.	71 bird species observed 1 threatened species was observed: Southern Squatter Pigeon (see Plate 1 below).
Habitat Assessment Ground-truthing habitat features suitable for target species.	Determine threatened species habitat suitability.	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022)	8 assessments	Verification of listed threatened species habitat quality and distribution. Habitat quality was moderate-to-poor across Study Area. Impacts from weeds, cattle grazing and pest animals observed. As well as noise, light and dust pollution from adjacent mining activities.
Quaternary Assessment Ground-truthing flora species to confirm presence of Regional Ecosystems and identify the potential occurrence of threatened flora/threatened ecological communities.	Determine the suitability of the vegetation composition for listed threatened species. Verify remnant regional ecosystem mapping.	Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0. (Neldner et al., 2023)	12 assessments	Species habitat mapping to be developed utilising this additional data to support EA amendment. The small portion of Of Concern RE 11.3.4, alongside Pelican Creek was confirmed as present. 66 flora species observed
Rapid Vegetation Assessment Ground-truthing to detect the presence of Regional Ecosystems.	Determine the presence and quality of a regional ecosystem	Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0.	40 geo-referenced photo assessments	Species habitat mapping to be developed utilising this additional data to support EA amendment.

Survey Method	Target species	Applicable Guidelines	Effort	Findings
		(Neldner et al., 2023)		
Targeted threatened species surveys Targeted searches in suitable habitat for threatened species.	Threatened species with potential to occur in the Study Area	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2022)	3 spotlighting transects. 2 camera traps deployed.	No targeted threatened species were observed during nocturnal surveys. 1 threatened species was observed on the camera traps Southern squatter pigeon
Incidental Observations Incidental observations of species/notable features occurring throughout the Study Area.	Threatened fauna and flora incidentally found outside of targeted searching areas.	-	Roaming observations while moving through Study Area.	1 threatened species was observed incidentally Southern squatter pigeon (Plate 1 below). Introduced species observed; cattle, chital deer, rabbit, dog, cat, cane toad.
Sediment and Water Assessment			Effort	Comment
Water and Sediment Sampling	Determine the quality of water and sediment in the Study Area	Environmental Protection (Water) Policy 2009 - Monitoring and Sampling Manual (DES, 2018)	5 sediment and water analysis sites 3 sites downstream and 2 sites within Kerale Area sampled	Only 2 sites with surface water were present at time of survey Further sampling may be required following suitable rainfall events.



PLATE 1 SOUTHERN SQUATTER PIGEON

5. DISCUSSION

Overview

The threatened species Southern Squatter Pigeon was observed in the Study Area. The species are listed as vulnerable under the EPBC Act and NC Act. Southern Squatter Pigeon was recorded throughout the southern portions of the Study Area, within close proximity to permanent water.

During the survey period 71 species of birds, 3 species of amphibian, 13 mammals and 1 reptile species were observed.

No significant evidence of mine-related impacts to flora and fauna was observed in the Study Area. Specifically, there were no signs of vegetation dieback, indirect impacts such as dust deposition or other indicators of disturbance or impacts to flora and fauna outside of the Keralé Area. The Study Area supported a relatively broad range of species, despite the moderate to poor habitat quality. Impacts from grazing were readily observed, as shown by areas of bare ground and invasive species. These disturbances were particularly evident in areas adjacent to permanent water sources (such as farm dams) and pasture areas.

Vegetation and Habitat

Seven REs were identified and ground-truthed in the Study Area, including a small portion of the Of Concern RE 11.3.4 alongside Pelican Creek. Typically, the REs aligned with the State-mapping, with most waterway vegetation consisting of riparian species and exotic weeds.

The vegetation surrounding the Keralé Area was dominated by Rosewood, while the broader Study Area was dominated by open Eucalypt Forest and cleared pasture, particularly on gently sloping and level terrain.

A total of 66 plant species were observed across 28 families, including 24 introduced species. A full list of recorded flora species can be found in Appendix F3.

Rubber Vine (*Cryptostegia grandiflora*) was recorded throughout the riparian areas alongside Pelican Creek. Rubber Vine is classified as a restricted invasive species under the *Biosecurity Act 2014* and a Weed of National Significance.

Impacts to vegetation included an abundance of invasive ground cover species, and bare ground where cattle/fauna tracks have formed. Nocturnal surveys revealed a lack of arboreal mammal activity (i.e. Koala and Greater Glider) suggesting this location is of poor quality and/or may provide little available habitat to potentially occurring threatened fauna species, and dispersal and utilisation opportunities may be limited.

Fauna

Southern Squatter Pigeon was observed twice throughout the survey period, across within the Study Area. This species was typically observed near permanent water and within disturbed habitat types (i.e. agricultural grazing land, man-made drains). Suitable habitat for Southern Squatter Pigeon was observed across the off-lease portions of the Study Area, with impacts from agricultural activities likely contributing to the increase of observed bare ground cover and the availability of permanent water (such as farm dams).

Generally, habitat quality for the other listed species above was moderate-to-poor across the Study Area, with impacts from weeds, cattle grazing and pest animals observed readily.

Introduced species recorded within the Study Area comprised six mammals and one amphibian. Prominent species across the survey period were cattle, pigs, chital deer and cane toads:

- Deer rubbings and scat seen at multiple survey locations;
- Pigs were caught on the camera traps deployed by permanent water;
- Cattle observed grazing in the Study Area; and
- Cane toads seen while spotlighting at every transect location.

Despite the low quality of fauna habitat for threatened species, 71 species of birds, 3 species of amphibian, 13 mammals and 1 reptile species were observed. A full list of fauna species can be found in Appendix F3.

Sediment and Water

Sediment and water assessments were undertaken over the field survey at five locations. Only two sites contained surface water at time of survey, resulting in a limited data set. However, results were in general agreement with historical water monitoring.

To summarise, water within the Kerale Area was acidic (pH 3.6) and brackish (EC of 2,380 $\mu\text{S}/\text{cm}$), with elevated concentrations of some dissolved metals (e.g. Al, Co, Fe, Mn, Ni and Zn). The sample collected from the farm dam was near neutral (pH 7.4), fresh (EC of 156 $\mu\text{S}/\text{cm}$), with generally low concentrations of dissolved metals, with many metals at the laboratory limit of reporting (LOR). Dissolved Al (160 $\mu\text{g}/\text{l}$ which is similar to the 80% protection level from ANZECC 2000), As, Fe, Ni, Mn, and Li were detected above the limit of reporting (LOR).

The results from analysis of the sediment samples were variable with no clear trends identified. The two samples taken (one from the farm dam and one from the ephemeral watercourse south of the Kerale Area), returned a slightly alkaline pH, however the pH of the other three samples (within, immediately downstream and upstream of the dam) was acidic (around pH 4). The

sediment ranged from predominantly fine particle size (>90% clay and silt) to predominantly coarse particle size (>80% sand). Amongst other factors, the particle size of the material influences the ability for constituents (e.g. metals, nutrients) to adhere to sediment. Finer sediments have a greater capacity to adsorb metals than coarse sediments, due to their larger surface area-to-volume ratio. All samples collected were compared against the ANZG (2013) toxicant guidelines for sediment. When compared against the published default guideline values (DGVs) for metals, all samples returned concentrations below the DGVs except for Ni at three locations (within the dam, immediately downstream of the dam, and in the farm dam).

The data collected showed that surface water quality is spatially variable, with acidic water observed within Keralé Dam and neutral conditions in the farm dam which receives runoff from a separate catchment. Sediment chemistry is also spatially variable with no clear trends identified. Detailed analysis of historical and contemporary soil chemistry and water chemistry data is included in ERM (2026).

6. REFERENCES

- Bureau of Meteorology 2025. Collinsville, Queensland August 2025 Daily Weather Observations. Accessed on 19/08/2025, at: [Collinsville, Qld - Daily Weather Observations](#).
- Department of the Environment, Tourism, Science and Innovation. (2025). *Flora Survey Guidelines—Protected Plants*.
- DES. 2018. Monitoring and Sampling Manual: Environmental Protection (Water) Policy. Brisbane: Department of Environment and Science Government. Available at [Monitoring and Sampling Manual](#).
- ERM. 2026. Geochemical investigation of Kerale Area Interpretive Report.
- Eyre TJ, Ferguson DJ, Smith GC, Mathieson MT, Venz MF, Hogan, LD, Hourigan CL, Kelly, AL & Rowland, J. 2022. Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 4.0. Brisbane: Department of Environment and Science, Queensland Government. Available at [Terrestrial vertebrate fauna survey guidelines | Environment, land and water | Queensland Government](#).
- Eyre TJ, Smith GC, Venz MF, Mathieson MT, Hogan LD, Starr C, Winter J & McDonald K. 2022. Guide to greater glider habitat in Queensland, report prepared for the Department of Agriculture, Water and the Environment, Canberra. Department of Environment and Science, Queensland Government, Brisbane. CC BY 4.0.
- Department of the Environment, Water, Heritage and the Arts (DEWHA). 2010. *Survey Guidelines for Australia's Threatened Birds*. EPBC Act survey guidelines 6.2. Available at [Survey guidelines for Australia's threatened birds](#).
- Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Richter, D., Addicott, E.P., Appelman, C.N. 2023. *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland Version 7*. Available at https://www.qld.gov.au/data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf.
- Queensland Herbarium (2024) Regional Ecosystem Description Database (REDD). Version 13.1 (May 2024) (Queensland Department of Environment, Science and Innovation: Brisbane).
- Wildlife and Threatened Species Operations, Department of the Environment, Tourism, Science and Innovation (WTSODETSI). 2025. Flora Survey Guidelines - Protected Plants, Nature Conservation Act 1992. Available at [NCS/2016/2534 Flora survey guideline](#).
- Youngentob KN, Marsh, KJ, & Skewes, J. 2021. A review of koala habitat assessment criteria and methods. Available at: <https://www.dcceew.gov.au/environment/epbc/publications/review-koala-habitat-assessment-criteria-and-methods>.

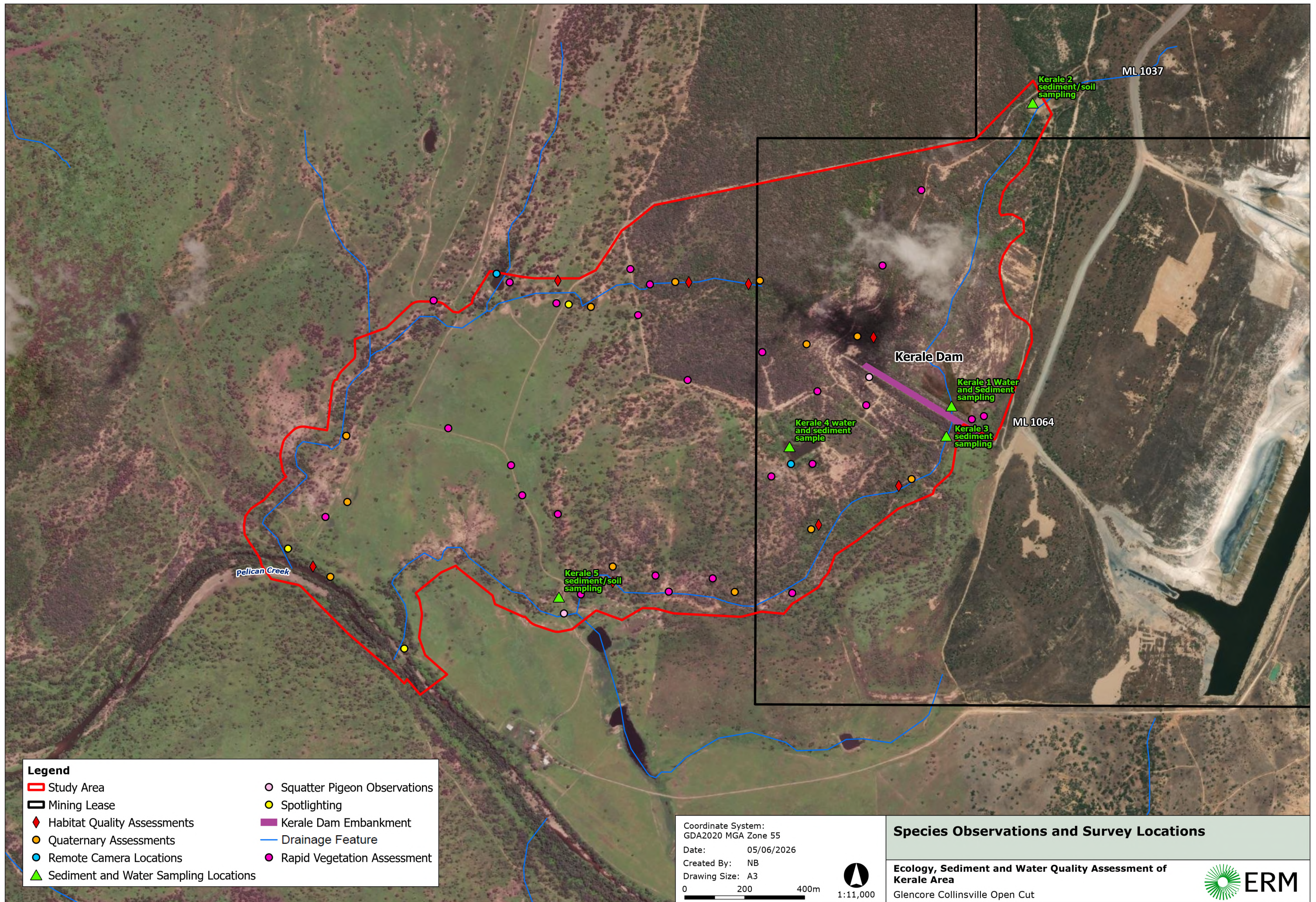
APPENDIX F1 KEY LEGISLATION

TABLE F1-1 KEY LEGISLATION RELEVANT TO THE SURVEY METHODOLOGY

Act/Policy	Administering Authority	Purpose
Commonwealth Legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	The EPBC Act provides a framework for the protection of MNES: • World heritage areas • National heritage places • Wetlands of international importance (listed under the Ramsar Convention) • Listed threatened species and ecological communities • Listed migratory species (protected under international agreements) • Commonwealth marine areas • Great Barrier Reef Marine Park • Nuclear actions (including uranium mines) • Water resources (that relate to unconventional gas development and large coal mining development).
State Legislation		
<i>Nature Conservation Act 1992</i> (NC Act)	Department of the Environment, Tourism, Science and Innovation (DETSI)	The NC Act regulates impacts on plants and animals through the protected plants framework and species. The Act provides a framework for the creation and management of protected areas and protection of native species and includes designation of threatened species status.
<i>Vegetation Management Act 1999</i> (VM Act)	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development	The VM Act outlines a vegetation management framework. This is designed to regulate the clearing of native vegetation not already controlled by the NC Act and the <i>Forestry Act 1959</i>. The VM Act is the act that establishes REs as a mechanism to classify remnant vegetation to effectively control clearing. REs are classifications of vegetation combined with geology, landform and soil. The Biodiversity Status of an RE is used in the designation of Environmentally Sensitive Areas (ESAs) and used for regulation of the petroleum industry through provisions in the <i>Environmental Protection Act 1994</i> (EP Act).
<i>Biosecurity Act 2014</i> (and Regulation) (Biosecurity Act and Biosecurity Regulation)	Department of Primary Industries (DPI)	The <i>Biosecurity Act 2014</i> provides biosecurity measures to safeguard Queensland's economy, agricultural and tourism industries, environment and way of life, from: • Pests (e.g. wild dogs and weeds); • Diseases (e.g. foot-and-mouth disease); and • Contaminants (e.g. lead on grazing land). The Act defines Prohibited Matter and Restricted Matter, in which specific actions are required to limit the spread and impact of these matters.

Act/Policy	Administering Authority	Purpose
<i>Environmental Protection Act 1994 (EP Act)</i>	DETSI	The EP Act provides protection for Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). The Act also lists obligations and duties to prevent environmental harm, nuisances and contamination. The two primary duties that apply are: • General environmental duty - whereby a person must not carry out any activity that causes or is likely to cause environmental harm, unless all reasonable and practical measures to prevent or minimise the harm have been taken by that person (Section 319(1) of the EP Act); and • Duty to notify of environmental harm - to inform the administering authority and landowner or occupier when an incident has occurred that may have caused or threatens serious or material environmental harm that is not authorised.
<i>Fisheries Act 1994</i>	DPI	The Fisheries Act provides the principal legislative framework for the regulation around fishing activities and areas that are fish habitat within a given area. This outlines how activities are to be conducted given the importance of the habitat for fish. All waters are protected against degradation by direct or indirect impacts associated with development activities. Measures designed to protect fisheries resources include the declaration of fish habitat areas, protection of marine plants and designation of waterways for fish passage.
<i>Water Act 2000</i>	DETSI	The Water Act provides the framework for the planning and sustainable use and management of groundwater and surface water in Queensland. It also sets conditions and controls the activities that may impact upon water resources and quality. The Queensland Globe Watercourse Identification Map identifies watercourses and drainage features mapped under the Water Act.

APPENDIX F2 SURVEY EFFORT



APPENDIX F3 SPECIES RECORDED

TABLE F3-1: SUMMARY OF SPECIES

	Order	Family	Species
Birds	17	40	71
Amphibians	1	3	3
Mammals	6	11	13
Reptiles	1	1	1
Flora	18	28	65

TABLE F3-2: SPECIES LIST - BIRDS

Order	Family	Scientific Name	Common Name	NCA	EPBC
Accipitriformes	Accipitridae	<i>Haliastur sphenurus</i>	Whistling kite	LC	LC
		<i>Ichthyophaga leucogaster</i>	White-bellied sea eagle	LC	LC
		<i>Aquila audax</i>	Wedge-tailed eagle	LC	LC
		<i>Circus assimilis</i>	Spotted harrier	LC	LC
Anseriformes	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	LC	LC
		<i>Chenonetta jubata</i>	Australian wood duck	LC	LC
Caprimulgiformes	Caprimulgidae	<i>Caprimulgus macrurus</i>	Large-tailed nightjar	LC	LC
Columbiformes	Columbidae	<i>Geopelia cuneata</i>	Diamond Dove	LC	LC
		<i>Geophapa scripta scripta</i>	Southern squatter pigeon	VU	V
		<i>Geopelia placida</i>	Peaceful dove	LC	LC
Charadriiformes	Charadriidae	<i>Vanellus miles</i>	Masked lapwing	LC	LC
		<i>Charadrius melanops</i>	Black-fronted dotterel	LC	LC
	Burhinidae	<i>Burhinus grallarius</i>	Bush stone-curlew	LC	LC
Coraciiformes	Alcedinidae	<i>Dacelo leachii</i>	Blue-winged kookaburra	LC	LC
		<i>Todiramphus pyrrhopygius</i>	Red-backed kingfisher	LC	LC
		<i>Todiramphus sanctus</i>	Sacred kingfisher	LC	LC

Order	Family	Scientific Name	Common Name	NCA	EPBC
	Meropidae	<i>Merops ornatus</i>	Rainbow bee-eater	LC	LC
Casuariiformes	Casuariidae	<i>Dromaius novaehollandiae</i>	Emu	LC	LC
Cuculiformes	Cuculidae	<i>Centropus phasianinus</i>	Pheasant coucal	LC	LC
Falconiformes	Falconidae	<i>Falco berigora</i>	Brown falcon	LC	LC
		<i>Falco cenchroides</i>	Nankeen kestrel	LC	LC
Galliformes	Numididae	<i>Numida meleagris</i>	Guinea fowl	Y	Y
Gruiformes	Otididae	<i>Ardeotis australis</i>	Australian bustard	LC	LC
Passeriformes	Acanthizidae	<i>Gerygone olivacea</i>	White-throated gerygone	LC	LC
	Artamidae	<i>Artamus cinereus</i>	Black-faced woodswallow	LC	LC
		<i>Artamus leucorhynchus</i>	White-breasted woodswallow	LC	LC
		<i>Cracticus nigrogularis</i>	Pied butcherbird	LC	LC
		<i>Gymnorhina tibicen</i>	Australian magpie	LC	LC
		<i>Strepera graculina</i>	Pied currawong	LC	LC
	Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced cuckooshrike	LC	LC
	Corvidae	<i>Corvus orru</i>	Torresian Crow	LC	LC
		<i>Corvus coronoides</i>	Australian raven	LC	LC
	Cisticolidae	<i>Cisticola exilis</i>	Golden-headed cisticola	LC	LC

Order	Family	Scientific Name	Common Name	NCA	EPBC
	Dicruridae	<i>Dicrurus bracteatus</i>	Spangled drongo	LC	LC
	Estrildidae	<i>Taeniopygia bichenovii</i>	Double-barred finch	LC	LC
		<i>Aidemosyne modesta</i>	plum-headed finch	LC	LC
	Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	LC	LC
		<i>Petrochelidon ariel</i>	Fairy martin	LC	LC
	Locustellidae	<i>Cincloramphus mathewsi</i>	Rufous songlark	LC	LC
	Maluridae	<i>Malurus melanocephalus</i>	Red-backed fairywren	LC	LC
	Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced honeyeater	LC	LC
		<i>Lichmera indistincta</i>	Brown honeyeater	LC	LC
		<i>Manorina melanocephala</i>	Noisy miner	LC	LC
		<i>Philemon citreogularis</i>	Little Friar Bird	LC	LC
		<i>Philemon corniculatus</i>	Noisy friarbird	LC	LC
	Monarchidae	<i>Grallina cyanoleuca</i>	Magpie lark	LC	LC
		<i>Myiagra rubecula</i>	Leaden flycatcher	LC	LC
	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit	LC	LC
	Sturnidae	<i>Acridotheres tristis</i>	Common myna	Y	Y
	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	LC	LC

Order	Family	Scientific Name	Common Name	NCA	EPBC
	Pardalotidae	<i>Pardalotus striatus</i>	Striated pardalote	LC	LC
	Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned babbler	LC	LC
	Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	LC	LC
		<i>Rhipidura leucophrys</i>	Willie Wagtail	LC	LC
Pelecaniformes	Ardeidae	<i>Egretta novaehollandiae</i>	White-faced heron	LC	LC
		<i>Ardea pacifica</i>	white-necked heron	LC	LC
		<i>Ardea intermedia</i>	Intermediate egret	LC	LC
		<i>Ardea alba</i>	Great egret	LC	LC
	Treskiornithidae	<i>Threskiornis moluccus</i>	Australian white ibis	LC	LC
		<i>Threskiornis spinicollis</i>	Straw-necked ibis	LC	LC
	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	LC	LC
Podicipediformes	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	LC	LC
Psittaciformes	Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested cockatoo	LC	LC
		<i>Eolophus roseicapilla</i>	Galah	LC	LC
		<i>Calyptorhynchus banksii</i>	Red-tailed black cockatoo	LC	LC
	Psittaculidae	<i>Aprosmictus erythropterus</i>	Red-winged parrot	LC	LC
		<i>Platycercus adscitus</i>	Pale-headed rosella	LC	LC

Order	Family	Scientific Name	Common Name	NCA	EPBC
		<i>Trichoglossus moluccanus</i>	Rainbow lorikeet	LC	LC
Strigiformes	Strigidae	<i>Ninox boobook</i>	Australian boobook	LC	LC
Suliformes	Anhingidae	<i>Anhinga novaehollandiae</i>	Australian darter	LC	LC
	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little pied cormorant	LC	LC

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern; Y = Introduced

TABLE F3-3: SPECIES LIST - AMPHIBIANS

Order	Family	Scientific Name	Common Name	NCA	EPBC
Anura	Bufonidae	<i>Rhinella marina</i>	Cane Toad	Y	Y
	Hylidae	<i>Litoria nasuta</i>	Striped Rocket Frog	LC	LC
	Limnodynastidae	<i>Platyplectrum ornatum</i>	Ornate Burrowing Frog	LC	LC

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern; Y = Introduced

TABLE F3-4: SPECIES LIST - REPTILES

Order	Family	Scientific Name	Common Name	Status
Squamata	Elapidae	<i>Cryptophis boschmai</i>	Carpentaria snake	LC

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern; Y = Introduced

TABLE F3-5: SPECIES LIST - MAMMALS

Order	Family	Scientific Name	Common Name	Status
Artiodactyla	Bovidae	<i>Bos taurus</i>	Cattle	Y
	Suidae	<i>Sus scrofa</i>	Pig	Y
	Cervidae	<i>Axis axis</i>	Chital Deer	Y
Carnivora	Canidae	<i>Canis familiaris</i>	Dog	Y
	Felidae	<i>Felis catus</i>	Cat	Y
Diprotodontia	Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	LC
		<i>Notamacropus parryi</i>	Whiptail Wallaby	LC
		<i>Notamacropus agilis</i>	Agile Wallaby	LC
	Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum	LC
	Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	LC
Chiroptera	Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying-Fox	LC
Lagomorpha	Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit	Y
Monotremata	Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-Beaked Echidna	LC

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern; Y = Introduced

TABLE F3-6: SPECIES LIST - FLORA

Order	Family	Confirmed Species	NC	EPBC
Asparagales	Orchidaceae	<i>Cymbidium canaliculatum</i>	SLC	LC
Asterales	Asteraceae	<i>Ageratum houstonianum</i>	Y	Y
Brassicales	Capparaceae	<i>Capparis anomala</i>	LC	LC
Caryophyllales	Amaranthaceae	<i>Alternanthera ficoidea</i>	Y	Y
		<i>Gomphrena globosa</i>	Y	Y
	Cactaceae	<i>Harrisia sp.</i>	Y	Y
Fabales	Fabaceae	<i>Acacia harpophylla</i>	LC	LC
		<i>Acacia rhodoxylon</i>	LC	LC
		<i>Acacia salicina</i>	LC	LC
		<i>Chamaecrista rotundifolia</i>	Y	Y
		<i>Leuceana leucophylla</i>	Y	Y
		<i>Lysiphyllum carronii</i>	LC	LC
		<i>Lysiphyllum sp.</i>	LC	LC
		<i>Stylosanthes hamata</i>	Y	Y
		<i>Stylosanthes scabra</i>	Y	Y
Fagales	Casuarinaceae	<i>Casuarina cunninghamiana</i>	LC	LC
Gentianales	Apocynaceae	<i>Carissa ovata</i>	LC	LC

Order	Family	Confirmed Species	NC	EPBC
		<i>Cascabela thevetia</i>	Y	Y
		<i>Cryptostegia grandiflora</i>	Y	Y
Lamiales	Lamiaceae	<i>Mesosphaerum suaveolens</i>	Y	Y
	Scrophulariaceae	<i>Eremophila mitchellii</i>	LC	LC
	Verbenaceae	<i>Lantana camara</i>	Y	Y
		<i>Stachytarpheta jamaicensis</i>	Y	Y
Malpighiales	Erythroxylaceae	<i>Erythroxylum australe</i>	LC	LC
	Euphorbiaceae	<i>Alchornea ilicifolia</i>	Y	Y
	Phyllanthaceae	<i>Phyllanthus sp.</i>	LC	LC
	Picrodendraceae	<i>Petalostigma pubescens</i>	LC	LC
Malvales	Malvaceae	<i>Brachychiton australis</i>	LC	LC
		<i>Grewia asciatia</i>	Y	Y
		<i>Grewia latifolia</i>	LC	LC
		<i>Sida cordifolia</i>	Y	Y
		<i>Waltheria indica</i>	LC	LC
Myrtales	Combretaceae	<i>Terminalia oblongata subsp oblongata</i>	LC	LC
	Myrtaceae	<i>Corymbia tessalaris</i>	LC	LC
		<i>Eucalyptus brownii</i>	LC	LC

Order	Family	Confirmed Species	NC	EPBC
		<i>Eucalyptus crebra</i>	LC	LC
		<i>Eucalyptus platyphylla</i>	LC	LC
		<i>Eucalyptus tereticornis</i>	LC	LC
		<i>Lophostemon suaveolens</i>	LC	LC
		<i>Melaleuca bracteata</i>	LC	LC
		<i>Melaleuca leucadendra</i>	LC	LC
		<i>Melaleuca viminalis</i>	LC	LC
Poales	Poaceae	<i>Aristida personata</i>	LC	LC
		<i>Aristida caput-medusae</i>	LC	LC
		<i>Cenchrus ciliaris</i>	Y	Y
		<i>Chloris gayana</i>	Y	Y
		<i>Chloris inflata</i>	Y	Y
		<i>Chrysopogon fallax</i>	LC	LC
		<i>Cynodon dactylon</i>	Y	Y
		<i>Megathyrsus maximus</i>	Y	Y
		<i>Melinis repens</i>	Y	Y
		<i>Panicum queenslandicum</i>	LC	LC
		<i>Setaria surgens</i>	LC	LC

Order	Family	Confirmed Species	NC	EPBC
		<i>Sporobolus jacquemontii</i>	Y	Y
Polypodiidae	Pteridaceae	<i>Acrostichum speciosum</i>	LC	LC
Proteales	Proteaceae	<i>Grevillea striata</i>	LC	LC
Rosales	Moraceae	<i>Ficus opposita</i>	LC	LC
	Rhamnaceae	<i>Ziziphus mauritiana</i>	Y	Y
		<i>Alphitonia excelsa</i>	LC	LC
Santalales	Santalaceae	<i>Exocarpus cupressiformis</i>	LC	LC
Sapindales	Anacardiaceae	<i>Pleiogynium timoriense</i>	LC	LC
Sapindales	Meliaceae	<i>Turraea pubescens</i>	LC	LC
	Sapindaceae	<i>Alectryon diversifolius</i>	LC	LC
		<i>Alectryon tomentosus</i>	LC	LC
		<i>Alectryon oleifolius</i>	LC	LC

Note: E/EN = Endangered; V/VU = Vulnerable; NT = Near Threatened; SLC = Special Least Concern; LC = Least Concern; Y = Introduced

APPENDIX F4 WATER AND SEDIMENT LABORATORY RESULTS



CERTIFICATE OF ANALYSIS

Work Order : **EB2527658**
Client : **COLLINSVILLE COAL CO PTY LTD**
Contact : **MIFANWY PRESS**
Address : **LOCKED BAG 6015 HUNTER REGION MC
NEWCASTLE NSW 6015**
Telephone : **----**
Project : **Glencore Tender ERM-077128**
Order number : **6000983266**
C-O-C number : **----**
Sampler : **JYE DALTON**
Site : **Collinsville**
Quote number : **BN/043/21 - Collinsville Coal**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 29
Laboratory : Environmental Division Brisbane
Contact : Kelly Schafer
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61 7 4978 7944
Date Samples Received : 11-Aug-2025 08:40
Date Analysis Commenced : 11-Aug-2025
Issue Date : 20-Aug-2025 16:27



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Beatriz Llarinas	Senior Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Beatriz Llarinas	Senior Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Soil Preparation, Stafford, QLD
Kirsty Watson	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Kirsty Watson	Senior Chemist - Organics	Brisbane Soil Preparation, Stafford, QLD
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Tatijana Markoska	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Timothy Creagh	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Aluminium and Exchange Acidity in soils when performed under ALS Method ED005.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenzo(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenzo(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- The presence of high SO4 may bias the EC low on sample 1(Keral 1).
- EP075(SIM) – PAH/Phenols (SIM): High LCS recovery has been deemed acceptable as all associated analyte results are less than LOR.
- It is recognised that EG020T (Total Metals by ICP-MS) is less than EG020F (Dissolved Metals by ICP-MS) for 'Keral 1' (EB2527658-001). However, the difference is within experimental variation of the methods.
- EG035T (Total Mercury): The high failing laboratory control standard is deemed acceptable as all results are less than the limit of reporting.
- EG005T (Total Metals by ICP-AES): EB2524804-094 shows poor duplicate results due to sample heterogeneity. This has been confirmed by visual inspection.
- EG048G (Hexavalent Chromium by Alkaline Digest): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- ED006 (Exchangeable Cations on Alkaline Soils): Unable to calculate Magnesium/Potassium Ratio results for some samples as required Exchangeable Potassium results are less than the limit of reporting.
- ED006 (Exchangeable Cations on Alkaline Soils): Keral 4 (EB2527658-006) shows poor duplicate results due to sample heterogeneity. This has been confirmed by visual inspection.
- ED006 (Exchangeable Cations on Alkaline Soils): EB2528017-005 shows poor duplicate results due to sample heterogeneity. This has been confirmed by visual inspection.
- EP066 – Polychlorinated Biphenyls (PCB): The LOR for Total PCB has been raised in sample 'Keral 1' (EB2527658-008) due to matrix interference.



- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity ($H^+ + Al^{3+}$).
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25	
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012	
				Result	Result	Result	Result	Result	
EA001: pH in soil using 0.01M CaCl extract									
pH (CaCl2)	----	0.1	pH Unit	4.0	3.9	4.2	7.5	7.0	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	4.3	4.3	4.3	8.2	8.5	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	597	106	1710	166	95	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%	45.9	1.1	37.7	24.1	<1.0	
EA150: Particle Sizing									
+75µm	----	1	%	7	78	3	49	82	
+150µm	----	1	%	5	52	2	36	66	
+300µm	----	1	%	4	24	2	20	40	
+425µm	----	1	%	4	11	2	15	26	
+600µm	----	1	%	4	6	1	14	20	
+1180µm	----	1	%	3	2	<1	11	10	
+2.36mm	----	1	%	<1	<1	<1	7	6	
+4.75mm	----	1	%	<1	<1	<1	4	3	
+9.5mm	----	1	%	<1	<1	<1	<1	<1	
+19.0mm	----	1	%	<1	<1	<1	<1	<1	
+37.5mm	----	1	%	<1	<1	<1	<1	<1	
+75.0mm	----	1	%	<1	<1	<1	<1	<1	
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%	53	12	65	33	7	
Silt (2-60 µm)	----	1	%	40	8	32	17	9	
Sand (0.06-2.00 mm)	----	1	%	6	79	2	42	77	
Gravel (>2mm)	----	1	%	1	1	1	8	7	
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1	
ED005: Exchange Acidity									



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
				Result	Result	Result	Result	Result
ED005: Exchange Acidity - Continued								
Exchange Acidity	----	0.1	meq/100g	5.1	1.4	0.9	----	----
Exchangeable Aluminium	----	0.1	meq/100g	4.3	0.9	0.6	----	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	----	----	----	5.3	2.5
Exchangeable Magnesium	----	0.2	meq/100g	----	----	----	1.6	0.7
Exchangeable Potassium	----	0.2	meq/100g	----	----	----	0.3	<0.2
Exchangeable Sodium	----	0.2	meq/100g	----	----	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g	----	----	----	7.2	3.2
Exchangeable Sodium Percent	----	0.2	%	----	----	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-	----	----	----	3.3	3.6
Magnesium/Potassium Ratio	----	0.2	-	----	----	----	5.8	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	1.8	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	0.4	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	0.2	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	<0.1	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	3.8	----	----	----
Exchangeable Sodium Percent	----	0.1	%	----	0.7	----	----	----
Calcium/Magnesium Ratio	----	0.1	-	----	4.5	----	----	----
Magnesium/Potassium Ratio	----	0.1	-	----	2.3	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	4.6	----	4.0	----	----
Exchangeable Magnesium	----	0.1	meq/100g	2.2	----	1.9	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.6	----	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g	<0.1	----	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g	12.5	----	7.0	----	----
Exchangeable Sodium Percent	----	0.1	%	0.2	----	1.4	----	----



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
				Result	Result	Result	Result	Result
ED008: Exchangeable Cations - Continued								
Calcium/Magnesium Ratio	----	0.1	-	2.1	----	2.1	----	----
Magnesium/Potassium Ratio	----	0.1	-	3.9	----	8.3	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)								
Bicarbonate Extractable K (Colwell)	----	100	mg/kg	558	149	397	297	224
ED040: Sulfur as SO4 2-								
Sulfate as SO4 2-	14808-79-8	100	mg/kg	7520	700	2450	350	<100
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	30	<10	40	30	10
ED092: DTPA Extractable Metals								
ø Copper	7440-50-8	1	mg/kg	3	<1	2	3	<1
ø Iron	7439-89-6	1	mg/kg	97	15	170	81	12
ø Manganese	7439-96-5	1	mg/kg	33	4	36	105	11
ø Zinc	7440-66-6	1	mg/kg	42	<1	5	<1	<1
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	<5	8	<5	<5
Barium	7440-39-3	10	mg/kg	320	80	140	350	50
Beryllium	7440-41-7	1	mg/kg	2	<1	3	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	13	5	10	16	9
Cobalt	7440-48-4	2	mg/kg	15	<2	14	10	5
Copper	7440-50-8	5	mg/kg	25	<5	9	11	<5
Lead	7439-92-1	5	mg/kg	25	6	22	8	6
Manganese	7439-96-5	5	mg/kg	80	13	102	239	184
Nickel	7440-02-0	2	mg/kg	39	3	27	22	8
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg	22	10	27	25	14



Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES - Continued									
Zinc	7440-66-6	5	mg/kg		184	14	60	18	13
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)									
Hexavalent Chromium	18540-29-9	0.5	mg/kg		<2.0	<2.0	<2.0	<0.5	<2.0
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	1	mg/kg		2	<1	<1	<1	<1
EK055-P: Ammonia as N									
Ammonia as N	7664-41-7	20	mg/kg		20	<20	<20	<20	<20
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg		<0.1	<0.1	<0.1	0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg		<0.1	<0.1	0.3	0.1	1.2
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	0.3	0.2	1.2
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		3400	360	1140	620	190
EK062: Total Nitrogen as N (TKN + NOx)									
Total Nitrogen as N	----	20	mg/kg		3400	360	1140	620	190
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		457	71	194	145	63
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		<5	<5	<5	7	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		6.3	0.7	2.0	1.0	0.6
Total Organic Carbon	----	0.5	%		3.6	<0.5	1.2	0.6	<0.5
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.3	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC - (Lindane)	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5-0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068C: Triazines								
Atrazine	1912-24-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
				Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued								
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	-----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	-----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	-----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	-----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2



Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP094A: Synthetic Pyrethroids									
Bifenthrin	82657-04-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		112	35.6	64.3	78.8	50.1



Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-008	EB2527658-009	EB2527658-010	EB2527658-011	EB2527658-012
					Result	Result	Result	Result	Result
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		63.3	27.8	58.2	67.2	67.4
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		71.0	31.2	66.4	76.2	72.5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		85.3	94.9	120	79.4	96.0
2-Chlorophenol-D4	93951-73-6	0.5	%		82.8	95.8	101	75.5	95.8
2,4,6-Tribromophenol	118-79-6	0.5	%		68.8	93.7	61.3	70.0	91.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		83.6	99.1	73.7	86.6	101
Anthracene-d10	1719-06-8	0.5	%		84.3	106	73.0	88.4	107
4-Terphenyl-d14	1718-51-0	0.5	%		83.8	97.8	69.9	85.9	99.0
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		57.2	69.2	75.3	71.3	83.2
Toluene-D8	2037-26-5	0.2	%		61.4	60.9	67.7	66.7	77.4
4-Bromofluorobenzene	460-00-4	0.2	%		78.2	76.5	83.7	81.9	88.3
EP094S: Pesticide Surrogate									
DEF	78-48-8	0.05	%		88.0	40.3	79.0	44.8	45.3

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25	
Compound	CAS Number	LOR	Unit	EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007	
				Result	Result	Result	Result	Result	
EA001: pH in soil using 0.01M CaCl extract									
pH (CaCl2)	----	0.1	pH Unit	4.0	4.0	4.0	7.1	7.5	
EA002: pH 1:5 (Soils)									
pH Value	----	0.1	pH Unit	4.3	4.4	4.4	7.9	8.6	
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	----	1	µS/cm	594	102	439	166	60	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%	44.2	17.6	44.1	28.0	15.9	
EA150: Particle Sizing									
+75µm	----	1	%	1	68	4	55	88	
+150µm	----	1	%	1	47	4	39	76	
+300µm	----	1	%	<1	22	4	22	43	
+425µm	----	1	%	<1	12	4	18	21	
+600µm	----	1	%	<1	7	3	16	10	
+1180µm	----	1	%	<1	2	2	13	2	
+2.36mm	----	1	%	<1	<1	1	10	<1	
+4.75mm	----	1	%	<1	<1	<1	7	<1	
+9.5mm	----	1	%	<1	<1	<1	<1	<1	
+19.0mm	----	1	%	<1	<1	<1	<1	<1	
+37.5mm	----	1	%	<1	<1	<1	<1	<1	
+75.0mm	----	1	%	<1	<1	<1	<1	<1	
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%	55	16	76	21	8	
Silt (2-60 µm)	----	1	%	44	13	19	23	3	
Sand (0.06-2.00 mm)	----	1	%	1	70	3	45	88	
Gravel (>2mm)	----	1	%	<1	1	2	11	1	
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1	
ED005: Exchange Acidity									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
					Result	Result	Result	Result	Result
ED005: Exchange Acidity - Continued									
Exchange Acidity	----	0.1	meq/100g		5.7	2.0	3.6	----	----
Exchangeable Aluminium	----	0.1	meq/100g		5.7	1.5	3.1	----	----
ED006: Exchangeable Cations on Alkaline Soils									
Exchangeable Calcium	----	0.2	meq/100g		----	----	----	5.2	2.0
Exchangeable Magnesium	----	0.2	meq/100g		----	----	----	1.6	0.6
Exchangeable Potassium	----	0.2	meq/100g		----	----	----	0.3	<0.2
Exchangeable Sodium	----	0.2	meq/100g		----	----	----	<0.2	<0.2
Cation Exchange Capacity	----	0.2	meq/100g		----	----	----	7.1	2.5
Exchangeable Sodium Percent	----	0.2	%		----	----	----	<0.2	<0.2
Calcium/Magnesium Ratio	----	0.2	-		----	----	----	3.2	3.5
Magnesium/Potassium Ratio	----	0.2	-		----	----	----	4.7	----
ED007: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	1.7	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g		----	0.7	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		----	0.2	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		----	<0.1	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		----	4.6	----	----	----
Exchangeable Sodium Percent	----	0.1	%		----	1.0	----	----	----
Calcium/Magnesium Ratio	----	0.1	-		----	2.4	----	----	----
Magnesium/Potassium Ratio	----	0.1	-		----	3.3	----	----	----
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		1.5	----	2.1	----	----
Exchangeable Magnesium	----	0.1	meq/100g		0.7	----	1.2	----	----
Exchangeable Potassium	----	0.1	meq/100g		0.2	----	0.3	----	----
Exchangeable Sodium	----	0.1	meq/100g		<0.1	----	<0.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g		8.1	----	7.2	----	----
Exchangeable Sodium Percent	----	0.1	%		<0.1	----	1.0	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
					Result	Result	Result	Result	Result
ED008: Exchangeable Cations - Continued									
Calcium/Magnesium Ratio	----	0.1	-		2.1	----	1.8	----	----
Magnesium/Potassium Ratio	----	0.1	-		3.6	----	4.8	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)									
Bicarbonate Extractable K (Colwell)	----	100	mg/kg		505	178	471	366	173
ED040: Sulfur as SO4 2-									
Sulfate as SO4 2-	14808-79-8	100	mg/kg		4810	1670	1180	280	220
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	10	mg/kg		20	<10	100	60	<10
ED092: DTPA Extractable Metals									
ø Copper	7440-50-8	1	mg/kg		3	<1	2	2	<1
ø Iron	7439-89-6	1	mg/kg		157	16	646	144	18
ø Manganese	7439-96-5	1	mg/kg		34	6	62	101	9
ø Zinc	7440-66-6	1	mg/kg		15	1	7	<1	<1
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		7	<5	6	<5	<5
Barium	7440-39-3	10	mg/kg		410	120	110	260	60
Beryllium	7440-41-7	1	mg/kg		3	<1	1	<1	<1
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		14	6	6	14	6
Cobalt	7440-48-4	2	mg/kg		14	<2	6	10	7
Copper	7440-50-8	5	mg/kg		23	7	<5	10	<5
Lead	7439-92-1	5	mg/kg		32	10	16	8	<5
Manganese	7439-96-5	5	mg/kg		91	31	57	211	307
Nickel	7440-02-0	2	mg/kg		36	4	12	21	11
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	<5
Vanadium	7440-62-2	5	mg/kg		25	13	17	24	10



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
					Result	Result	Result	Result	Result
EG005(ED093)T: Total Metals by ICP-AES - Continued									
Zinc	7440-66-6	5	mg/kg		131	24	19	17	11
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)									
Hexavalent Chromium	18540-29-9	0.5	mg/kg		<2.0	<0.5	<2.0	<2.0	<0.5
EK028SF: Weak Acid Dissociable CN by Segmented Flow Analyser									
Weak Acid Dissociable Cyanide	----	1	mg/kg		1	<1	2	<1	<1
EK055-P: Ammonia as N									
Ammonia as N	7664-41-7	20	mg/kg		30	<20	30	<20	<20
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg		<0.1	<0.1	<0.1	0.2	<0.1
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg		<0.1	<0.1	0.3	0.1	0.8
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	0.3	0.3	0.8
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		1870	490	1990	730	190
EK062: Total Nitrogen as N (TKN + NOx)									
Total Nitrogen as N	----	20	mg/kg		1870	490	1990	730	190
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		416	91	282	186	55
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	5	mg/kg		12	<5	<5	7	<5
EP004: Organic Matter									
Organic Matter	----	0.5	%		3.2	1.0	2.1	1.0	<0.5
Total Organic Carbon	----	0.5	%		1.8	0.6	1.2	0.6	<0.5
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC - (Lindane)	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5-0-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued								
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP068C: Triazines								
Atrazine	1912-24-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit	EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
				Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued								
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	-----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	-----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	-----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	-----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP094A: Synthetic Pyrethroids									
Bifenthrin	82657-04-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		66.2	36.6	76.7	58.7	79.0



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	Kerale 1	Kerale 2	Kerale 3	Kerale 4	Kerale 5
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 11:48	07-Aug-2025 11:07	07-Aug-2025 13:50	07-Aug-2025 14:25
Compound	CAS Number	LOR	Unit		EB2527658-003	EB2527658-004	EB2527658-005	EB2527658-006	EB2527658-007
					Result	Result	Result	Result	Result
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		45.9	27.6	63.0	47.9	60.8
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		38.3	25.5	53.8	45.5	60.2
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		84.6	93.1	81.6	58.2	87.2
2-Chlorophenol-D4	93951-73-6	0.5	%		84.8	93.2	81.4	55.6	83.8
2,4,6-Tribromophenol	118-79-6	0.5	%		91.2	94.6	70.8	49.0	76.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		91.0	96.2	87.2	63.3	86.5
Anthracene-d10	1719-06-8	0.5	%		98.4	100	90.5	65.2	89.2
4-Terphenyl-d14	1718-51-0	0.5	%		90.4	93.0	87.5	61.6	86.0
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		64.8	75.1	65.7	60.6	78.5
Toluene-D8	2037-26-5	0.2	%		60.9	69.9	62.1	65.1	73.4
4-Bromofluorobenzene	460-00-4	0.2	%		73.5	82.2	72.7	86.1	85.6
EP094S: Pesticide Surrogate									
DEF	78-48-8	0.05	%		92.3	99.6	72.8	60.1	83.5



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Kerale 1	Kerale 4	----	----	----
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----
Compound	CAS Number	LOR	Unit		EB2527658-001	EB2527658-002	-----	-----	-----
					Result	Result	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		3.61	7.44	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		2380	156	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		2090	118	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		9	15	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		4.1	11.2	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L		<1	<1	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L		<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L		<1	48	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L		<1	48	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L		1390	8	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		16	18	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		314	9	----	----	----
Magnesium	7439-95-4	1	mg/L		113	5	----	----	----
Sodium	7440-23-5	1	mg/L		25	14	----	----	----
Potassium	7440-09-7	1	mg/L		32	7	----	----	----
ED093F: SAR and Hardness Calculations									
Total Hardness as CaCO ₃	----	1	mg/L		1250	43	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	10	µg/L		20000	160	----	----	----
Antimony	7440-36-0	1	µg/L		<1	<1	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Kerale 1	Kerale 4	----	----	----
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----
Compound	CAS Number	LOR	Unit	EB2527658-001	EB2527658-002	-----	-----	-----
				Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Arsenic	7440-38-2	1	µg/L	2	1	----	----	----
Beryllium	7440-41-7	1	µg/L	26	<1	----	----	----
Cadmium	7440-43-9	0.1	µg/L	5.7	<0.1	----	----	----
Chromium	7440-47-3	1	µg/L	1	<1	----	----	----
Cobalt	7440-48-4	1	µg/L	905	<1	----	----	----
Copper	7440-50-8	1	µg/L	22	<1	----	----	----
Lead	7439-92-1	1	µg/L	3	<1	----	----	----
Lithium	7439-93-2	1	µg/L	72	2	----	----	----
Manganese	7439-96-5	1	µg/L	14300	24	----	----	----
Molybdenum	7439-98-7	1	µg/L	<1	<1	----	----	----
Nickel	7440-02-0	1	µg/L	1440	2	----	----	----
Selenium	7782-49-2	10	µg/L	<10	<10	----	----	----
Silver	7440-22-4	1	µg/L	<1	<1	----	----	----
Uranium	7440-61-1	1	µg/L	2	<1	----	----	----
Vanadium	7440-62-2	10	µg/L	<10	<10	----	----	----
Zinc	7440-66-6	5	µg/L	2270	<5	----	----	----
Boron	7440-42-8	50	µg/L	160	<50	----	----	----
Iron	7439-89-6	50	µg/L	600	180	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	19.6	0.43	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.003	0.002	----	----	----
Beryllium	7440-41-7	0.001	mg/L	0.026	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0054	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	0.916	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	0.022	<0.001	----	----	----

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Kerale 1	Kerale 4	----	----	----
Sampling date / time				07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----	
Compound	CAS Number	LOR	Unit	EB2527658-001	EB2527658-002	-----	-----	-----	
				Result	Result	----	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Lead	7439-92-1	0.001	mg/L	0.003	<0.001	----	----	----	
Lithium	7439-93-2	0.001	mg/L	0.079	0.002	----	----	----	
Manganese	7439-96-5	0.001	mg/L	14.6	0.042	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	----	----	----	
Nickel	7440-02-0	0.001	mg/L	1.37	0.004	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	----	----	
Uranium	7440-61-1	0.001	mg/L	0.002	<0.001	----	----	----	
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Zinc	7440-66-6	0.005	mg/L	2.27	0.013	----	----	----	
Boron	7440-42-8	0.05	mg/L	0.17	0.06	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.59	1.00	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.1	µg/L	<0.1	<0.1	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	0.1	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	5.29	<0.01	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.04	<0.01	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.04	<0.01	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Kerale 1	Kerale 4	----	----	----
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----
Compound	CAS Number	LOR	Unit		EB2527658-001	EB2527658-002	-----	-----	-----
				Result	Result		----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser - Continued									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		5.4	1.0	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		5.4	1.0	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.01	0.02	----	----	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		29.4	1.63	----	----	----
ø Total Cations	----	0.01	meq/L		26.9	1.65	----	----	----
ø Ionic Balance	----	0.01	%		4.47	----	----	----	----
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L		10.1	9.9	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Kerale 1	Kerale 4	----	----	----
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----
Compound	CAS Number	LOR	Unit		EB2527658-001	EB2527658-002	-----	-----	-----
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	60	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	190	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	250	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	190	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	190	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Kerale 1	Kerale 4	----	----	----
Sampling date / time					07-Aug-2025 09:35	07-Aug-2025 13:50	----	----	----
Compound	CAS Number	LOR	Unit		EB2527658-001	EB2527658-002	-----	-----	-----
					Result	Result	----	----	----
ED038P: Acidity by Auto Titrator									
Acidity as CaCO3	----	1	mg/L		139	2	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		35.8	21.7	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		73.8	52.4	----	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		59.8	92.9	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		56.6	73.4	----	----	----
Anthracene-d10	1719-06-8	1.0	%		72.0	104	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		74.1	101	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		86.5	91.8	----	----	----
Toluene-D8	2037-26-5	2	%		102	98.7	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		103	103	----	----	----



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	16	134
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	138
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	23	134
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	154
2-Chlorophenol-D4	93951-73-6	42	153
2,4,6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	156
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127
EP094S: Pesticide Surrogate			
DEF	78-48-8	23	134

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	16	134
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	138
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	23	134
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	154
2-Chlorophenol-D4	93951-73-6	42	153
2,4,6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	156
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			



Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates - Continued			
1,2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127
EP094S: Pesticide Surrogate			
DEF	78-48-8	23	134

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2,4,6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118