REPORT TO

RSL LIFECARE LIMITED

ON

GROUNDWATER QUALITY SCREENING

FOR

ANZAC VILLAGE RENEWAL – STAGE 3A

AT

90 VETERANS PARADE, NARRABEEN, NSW

Date: 5 January 2026
Ref: E37444BTrpt7-GQS Stage 3A

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Attachments

Abbreviations

Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Chain of Custody	**COC**
Detailed Site Investigation	**DSI**
Environment Protection Authority	**EPA**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
JK Geotechnics	**JKG**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Per-and Polyfluoroalkyl Substances	**PFAS**
Perfluorooctanesulfonic Acid	**PFOS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Secretary's Environmental Assessment Requirements	**SEARs**
Standing Water Level	**SWL**
Standard Sampling Procedure	**SSP**
Trip Blank	**TB**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Volatile Organic Compounds	**VOC**
Work Health and Safety	**WHS**

Units	
Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Micrograms per litre	**µg/L**

1 INTRODUCTION

RSL LifeCare ('the client') commissioned JK Environments (JKE) to undertake a preliminary groundwater quality screening for the proposed ANZAC Village Renewal – Stage 3A at 90 Veterans Parade, Narrabeen, NSW ('the site'). The site forms part of the wider property as shown on Figure 1 and the screening was confined to the Stage 3A area of the wider Senior Living property as shown on Figure 2 attached in the appendices.

JKE were also commissioned to undertake a Detailed Site Investigation (DSI) (Ref: E37444BTrpt5)[1] in conjunction with this screening for the site and the entire masterplan area of the wider ANZAC Village Renewal. This report should be read in conjunction with the JKE DSI report. A number of investigations have been previously undertaken across the masterplan area of the wider ANZAC Village Renewal. A summary of key information relevant to this report is included in Section 2.

A geotechnical investigation was undertaken in conjunction with this screening by JK Geotechnics (JKG). The results of the geotechnical investigation are presented in a separate report (Ref: 37436PN1rpt)[2]. This report should be read in conjunction with the JKG report.

1.1 Proposed Development Details

JKE understand that the client is progressing a Masterplan for the Anzac Village Renewal which will include a staged development process. As part of this, the proposed development will include demolition of existing structures and redevelopment of the existing community, residential care, and retirement living buildings and will include some temporary and permanent relocation of residents and services across the wider ANZAC Village Renewal.

The Stage 3A site area, is proposed to include a new Maintenance Carpark Area with a three-level suspended carpark. Bulk excavation is not proposed in this section of the site, with the carpark entrance proposed to be at approximately RL38 in line with the existing ground levels.

1.2 Objectives

The primary objective of this screening was to provide preliminary groundwater quality data that could be used to support an application for a temporary construction dewatering license.

1.3 Scope of Work

The screening was undertaken generally in accordance with a JK proposal (Ref: P72873PN) of 29 September 2025 and written acceptance from the client. The scope of work included the following:

[1] JKE, (2025). Report to RSL LifeCare on Detailed Site Investigation for ANZAC Village Renewal at 90 Veterans Parade, Narrabeen, NSW. (Report ref: E37444BTrpt5-DSI) (referred to as DSI)

[2] Referred to as JKG report

- Installation and sampling from four monitoring wells (MW145, MW147, MW148 and MW193) installed at the site;
- Analysis of groundwater samples for a range of contaminants and parameters;
- Interpretation of the results with reference to relevant screening criteria;
- Data quality assessment; and
- Preparation of a report.

The analytical schedule was selected with reference to the 'mandatory' testing requirements outlined in the NSW DPIE Minimum requirements for building site groundwater investigations and reporting (2022)[3] document.

[3] NSW DPIE, (2022). *Minimum requirements for building site groundwater investigations and reporting.* (Referred to as DPIE 2022).

2 SITE INFORMATION

2.1 Summary of Previous Investigations

A high-level summary of previous investigation at the site and wider ANZAC Village Renewal property is provided in the table below:

Table 2-1: Summary of Previous Investigations

Preliminary Site Investigation (PSI) (JKE, 2025a)[4]	The JKE PSI was undertaken across the Masterplan Stage 1 and Stage 5 areas of the wider ANZAC Village Renewal property in early 2025. Carcinogenic polycyclic aromatic hydrocarbons (PAHs) in one location was reported above the health-based site assessment criteria (SAC) in fill soil and total recoverable hydrocarbons (TRH) fraction F3 in three locations was reported above the ecological SAC in fill soil. Copper, nickel and zinc were reported above the ecological SAC in surface and groundwater. The PSI did not identify contamination that would preclude the proposed development/use of the site. However, a Detailed Site Investigation (DSI) was recommended to facilitate development of a Remediation Action Plan (RAP), and remediation will be required to render the site suitable for the proposed development.
Preliminary Acid Sulfate Soils (ASS) and Dryland Salinity Assessment (JKE, 2025b)[5]	Concurrent with the PSI, a dryland salinity and ASS assessment was undertaken across the Stage 1 and Stage 5 development areas of the wider ANZAC Village Renewal property. A high-level summary of the ASS and salinity conditions encountered across these areas of the wider property are outlined below: • Potential ASS (PASS) was not detected in the samples analysed for the assessment; • Detectable concentrations of oxidisable sulfur are likely to be associated with organic interference and other inclusions; • As there is only limited information available regarding the development, and as the construction methods (particularly in terms of piling and excavations) are unknown, the above conditions should be reviewed when development details become available; and • The site is not located within the area included in the Salinity Potential Map and there is no National Dryland salinity data for the site. In the context of the proposed development, a Salinity Management Plan is not considered necessary. This should be reviewed when development details become available.
Surface Water and Groundwater Impact Assessment (JKE, 2025c)[6]	JKE were commissioned to prepare a SGIA for the Stage 1 and Stage 5 development areas of the wider ANZAC Village Renewal property. The assessment included the following: • Review of previous investigation reports prepared for the site by JKE; • Review of surface and groundwater conditions including: hydrology; hydro-geology; receiving water bodies: occurrence of groundwater; groundwater quality; groundwater dependent ecosystems (GDE); inflow dependent ecosystems (IDE); • Review of drainage lines, downstream groundwater users and watercourses in the immediate vicinity of the site; • Review of surface water and groundwater conditions at the site including: surface water flow; groundwater flow; groundwater permeability; surface and groundwater quality; groundwater contamination conditions; and other parameters; and

[4] JKE, (2025). *Report to RSL Lifecare Limited on Preliminary Site Investigation for Proposed Seniors Living Development at 90 Veterans Parade, Narrabeen, NSW*. (Report ref: E37444BTrptRev1-PSI) (referred to as PSI)

[5] JKE, (2025). *Report to RSL Lifecare Limited, on Preliminary Acid Sulfate Soils (ASS) and Salinity Assessment and ASS Management Plan for Proposed Seniors Living Development at 90 Veterans Parade, Narrabeen, NSW*. (Report ref: E37444BTrpt2Rev1-ASS DRAFT, dated 30 April 2025) (referred to as ASS)

[6] JKE, (2024c). *Report to RSL LifeCare on Surface and Groundwater Impact Assessment for Proposed Seniors Living Development at 90 Veterans Parade, Narrabeen, NSW* (Ref: E37444BTrpt3-SGIA) (referred to as JKE SGIA report).

	• Preparation of a report identifying the surface and groundwater conditions at the site and potential impacts associated with the proposed development. The SGIA identified a range of mitigation measures which will require addressing as part of individual development applications for the masterplan.
Detailed Site Investigation (SDSI) (JKE, 2025e)	In conjunction with this screening, JKE undertook a DSI on the site and wider ANZAC Village Renewal property for the masterplan. The DSI included a review of existing project information, a site inspection, soil sampling from 93 boreholes, and groundwater sampling from four groundwater monitoring wells. The following potential sources of contamination/AEC were identified for the site: fill material; historical agricultural use; fuel storage (Stage 3A area); use of pesticides around site; and hazardous building materials in former and existing buildings. The boreholes generally encountered fill materials to depths of approximately 0.1-5.0mBGL. A number of boreholes terminated in fill due to the use of hand equipment. It is noted that a majority of these boreholes were terminated on inferred bedrock. It is noted that deeper fill was encountered in the Stage 3A area of the site. Hydrocarbon odours were recorded in BH146, BH150 and BH193 from depths of 1mBGL. Fibre cement fragments (FCF) or asbestos containing material (ACM) were identified in BH120 (0-0.5) and in BH154 (0-0.4). A selection of soil and groundwater samples were analysed for the CoPC identified in the CSM. In fill soil, carcinogenic PAHs, lead, TRH F2 and asbestos were reported at concentrations above the health-based SAC; copper, and TRH F2 and F3 were reported at concentrations above the ecological SAC and; TRH fractions were reported above the management limits SAC. In groundwater, TRH F2 was reported above the health-based SAC, and arsenic, copper, nickel, and zinc were reported above the ecological SAC. Only the exceedances within the Stage 3A area have been shown on the Figure 3 attached in the appendices. The risk assessment established that there are potential health-based risks associated with asbestos, carcinogenic PAHs, lead, and TRH in fill/soil and TRH in groundwater if remediation does not occur in the context of the proposed development. Ecological risks associated with copper and TRH in fill/soil were assessed to be relatively low and the occurrence of heavy metals in groundwater is not considered to be associated with on-site contamination and the risks were assessed to be low and acceptable. Remediation of the site is required to render the site suitable for the proposed development, from a contamination viewpoint. We provided the following recommendations: 1. An asbestos management plan (AMP) should be prepared by a suitably qualified consultant and must be implemented by the current site users until the time remediation commences; 2. An interim environmental management plan (IEMP) should be prepared by a suitably qualified consultant and must be implemented by the current site users until the time remediation commences; 3. Preparation and implementation of a remediation action plan (RAP). The RAP is to include requirements for a post-demolition investigation(s) to adequately address the data gaps and outline a contingency for remediation if these investigations identify a trigger for alternative/additional remediation; 4. Preparation and implementation of a construction-phase AMP; and 5. Preparation of a validation assessment report for the remediation works undertaken at the site.

2.2 Site Identification and Description

Table 2-2: Site Identification

Site Address:	90 Veterans Parade, Narrabeen, NSW (also known as 4 Colooli Road, Narrrabeen, NSW)
Lot & Deposited Plan:	Part of Lot 1 in DP803645.
Current Land Use:	Residential aged care
Proposed Land Use:	Continued use as residential aged care
Local Government Authority (LGA):	Northern Beaches Council
Site Area (m^2) (approx.):	5,700
RL (AHD in m) (approx.):	34-38
Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -33.720534 Longitude: 151.283497
Site Plans:	Appendix A

The site is located in the central north of the wider ANZAC Village Renewal property, which itself is located in a predominantly residential of Narrabeen and is bound by Veterans Parade to the east, Colooli Road to the north and Lantana Avenue to the south. The site is located approximately 450m to the south and east of Narrabeen Lagoon at its closest points.

The site includes the maintenance sheds and building in the central north portion of the village. The immediate surrounding area generally slopes south-west, with a generally level section in the central portion of the site. The site contains a one and two storey brick building and multiple metal sheds around a concrete carpark. Sandstone outcrops were observed in the north eastern portion of the site within a garden bed. The sandstone was assessed to be of low to medium strength. To the west of the site is a grassed area with a steep bank, sloping westwards down to bushland.

The JKE DSI identified evidence of a bowser plinth in the north-east of the maintenance area. This was noted to be associated with the decommissioned underground fuel storage tank (UST) located beneath the driveway on the north-east of the maintenance building and in the north-west of the site (refer to Figure 2). A ground penetrating radar (GPR) scan undertaken during the DSI confirmed the presence of the UST. The DSI identified groundwater impacted by TRH in the vicinity of the UST as outlined in Section 2.1.

2.3 Regional Geology

Regional geological information was reviewed for the screening and indicated that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse grained quartz sandstone with minor shale and laminite lenses. The map indicates that the Newport Formation is located approximately 6m to the west of the site.

2.4 Registered Groundwater Bores

Hydrogeological information reviewed indicated that the regional aquifer on-site and in areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There was a total of 12 registered bores within 1,000m of the site boundary. In summary:

- The nearest registered bore was located approximately 750m from the site. This was registered for exploration purposes;
- The closest bore registered for water supply was located approximately 755m to the east of the site; and
- The drillers log information from the closest registered bores typically identified fill and/or sandy soil to depths of 0.5-26.6m, underlain by sandstone bedrock. Standing water levels (SWLs) in the bores ranged from 0.69m below ground level (BGL) to 3.6mBGL.

The development includes excavations which may require temporary construction phase dewatering. However, this is considered unlikely to impact the nearest bore located approximately 750m to the south-west of the site.

3 SCREENING CRITERIA

The client should obtain advice from the consent authority regarding specific groundwater disposal criteria based on the preferred disposal method. In the absence of this information, JKE have screened the groundwater against the following criteria in relation to potential disposal to stormwater:

- Groundwater Investigation Levels for 95% protection of 'marine species' were adopted based on the Default Guideline Values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[7]. The 99% trigger values were adopted where required to account for bioaccumulation. Low and moderate reliability trigger values were also adopted for some contaminants where high-reliability trigger values don't exist;
- The Australian Drinking Water Guidelines 2011 (updated 2021)[8] multiplied by a factor of 10 to assess potential risks associated with incidental/recreational-type exposure to groundwater (e.g. within down-gradient water bodies);
- The recreational water quality guideline value was adopted for PFAS assessment based on Table 1 in The PFAS National Environmental Management Plan (NEMP) Version 3.0 2025[9];and
- The ecological (interim marine) water quality guidelines were adopted for PFAS assessment based on NEMP 2025, based on 99% protection (slightly to moderately disturbed systems).

The screening criteria are referred to as Site Assessment Criteria (SAC).

Reference should be made to the tables attached in the appendices for the specific criteria.

[7] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

[8] National Health and Medical Research Council (NHMRC), (2021). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[9] Heads of EPAs Australia and New Zealand (HEPA), (2025). *PFAS National Environmental Management Plan Version 3.0 – 2025* (referred to as NEMP 2025)

4 INVESTIGATION PROCEDURE

4.1 Subsurface Investigation and Groundwater Sampling

Four groundwater monitoring wells MW145, MW147, and MW148 were installed in boreholes drilled for the JKG investigation between 22 to 23 October 2025. An additional groundwater monitoring well MW193 was installed in a borehole drilled primarily for the DSI on 31 October 2025. The sampling locations are shown on Figure 2 attached in the appendices.

A summary of the screening methodology is presented in the following table:

Table 4-1: Groundwater Sampling/Screening Methodology

Aspect	Input
Sampling Plan	Groundwater monitoring wells were installed in BH145 (MW145), BH147 (MW147), BH148 (MW148) and BH193 (MW193). The wells were positioned to establish baseline groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, MW193 and MW148 were considered to be in the up-gradient areas of the site and would be expected to provide an indication of groundwater flowing onto (beneath) the site from the north and east. MW145 and MW147 were considered to be in the intermediate to down-gradient areas of the site and would be expected to provide an indication of groundwater flowing across (beneath) the site and beyond the down-gradient site boundary.
Monitoring Well Installation Procedure	The monitoring well construction details are documented on the appropriate borehole logs attached in the appendices. The monitoring wells were installed to depths of approximately 5.86mBGL to 10mBGL below ground level. The wells were generally constructed as follows: • 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater; • 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed); • A 2mm sand filter pack was used around the screen section for groundwater infiltration; • A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and • A gatic cover was installed at the surface with a concrete plug to limit the inflow of surface water.
Monitoring Well Development	With the exception of MW193, all monitoring wells were developed on 22 October 2025. MW193 was developed on 31 October 2025. The wells were developed (i.e. water was pumped out) using a submersible electric pump/disposable plastic bailer. The field monitoring records and calibration data are attached in the appendices.
Groundwater Sampling	With the exception of MW193, groundwater samples were obtained on 29 October 2025 from all monitoring well locations. A groundwater sample was obtained from MW193 on 3 November 2025. Prior to sampling, the monitoring wells were checked for the presence of Light Non-Aqueous Phase Liquids (LNAPLs) using an inter-phase probe electronic dip meter. The monitoring well head space was checked for VOCs using a calibrated PID unit. The samples were obtained using a peristaltic pump/disposable plastic bailer. During sampling, the following parameters were monitored using calibrated field instruments: • Standing water level (SWL) using an electronic dip meter; and • pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) using a YSI Multi-probe water quality meter.

Aspect	Input
	Steady state conditions were considered to have been achieved when the difference in the pH measurements was less than 0.2 units, the difference in conductivity was less than 10%, and when the SWL was not in drawdown. Groundwater samples were obtained directly from the single use PVC tubing/bailer and placed in the sample containers. Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc. Groundwater removed from the wells during development and sampling was transported to JKE in jerry cans and stored in holding drums prior to collection by a licensed waste water contractor for off-site disposal. The field monitoring record and calibration data are attached in the appendices.
Sample Preservation	The samples were placed in appropriate plastic and glass containers (preserved as required). Samples for heavy metals analysis were field filtered. On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures.

4.2 Laboratory Analysis

Samples were analysed for a range of potential contaminants and water quality parameters based on the 'mandatory' analysis suite outlined in DPIE 2022. The analytes are outlined below:

- Heavy metals including: arsenic, cadmium, chromium (total), copper, lead, mercury, nickel, zinc, aluminium, antimony, boron, beryllium, cobalt, iron, lithium, manganese, molybdenum, selenium, silver, strontium, uranium and vanadium;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Total Recoverable Hydrocarbons (TRHs);
- Monocyclic aromatic hydrocarbons including benzene, toluene, ethylbenzene and xylene (BTEX);
- EC, pH, redox potential, dissolved oxygen (DO) and hardness;
- Total dissolved solids (TDS), total suspended solids (TSS) and turbidity;
- Total organic carbon (TOC), sodium adsorption ratio (SAR) and silica (SiO_2);
- Ammonia, nitrate, nitrite, total nitrogen and nitrogen oxides (NOx);
- Phosphorus and phosphate;
- Ionic balance including: calcium, potassium, sodium, magnesium, alkalinity, chloride and sulphate; and
- Faecal coliforms and Escherichia coli (E coli).

In addition to the above, groundwater samples were also analysed for per- and polyfluoroalkyl substances (PFAS) and a broader suite of volatile organic compounds (VOCs) to consider additional potential contaminants of concern, based on the information presented in Section 2.

Samples were analysed by Envirolab Services (NATA Accreditation Number – 2901. Reference should be made to the laboratory report (Ref: 394272, 394506, and MGK0024) attached in the appendices for further information regarding the laboratory methods and practical quantitation limits (PQLs) for each analyte.

5 RESULTS

5.1 Groundwater Levels and Screening

The relative heights of the ground surface at each monitoring well location were recorded using a Differential GPS (D-GPS) and the relative levels (RLs) of groundwater in each well were calculated based of the SWLs. The RL for MW193 was extrapolated from the client provided survey plan.

SWLs recorded during sampling ranged from approximately 4.83m to 12.25mBGL as outlined in the table below. Phase separated product (i.e. LNAPL) was not detected using the interphase probe during groundwater sampling, however during sampling organic (sewer) type odours, were recorded in MW147 and hydrocarbon odour were recorded in MW193 (vicinity of the UST).

Table 5-1: Summary of Groundwater Levels

MW reference	RL (mAHD)	SWL (m)	GW RL (mAHD)
MW145	37.44	4.83	32.61
MW147	39	6.24	32.76
MW148	38.57	12.25	26.32
MW193	37.8	5.22	32.58

A contour plot was prepared for the groundwater flow direction using Surfer v8.08 (Surface Mapping Program) as shown on Figure 4. Groundwater flow generally occurs in a down gradient direction perpendicular to the groundwater elevation contours. The contour plot indicates that groundwater generally flows towards the gully in the central portion of the site, which is consistent with expectations based on the topography, and down-gradient water bodies.

JKE note that in the vicinity of the UST, there is some localised variation in the flow which occurs towards the north. This could be due to interference in this area due to the presence of the UST and associated features. Also, localised mounding of groundwater is common in sites with shallow bedrock and undulating terrain.

5.2 Laboratory Results

Reference should be made to the attached Tables for a summary of the laboratory results compared to the screening criteria presented in Section 3. The following results were above the SAC:

- The arsenic and nickel concentrations in MW147 exceeded the ecological SAC;
- The copper concentrations in MW145 and MW148 exceeded the ecological SAC;
- The zinc concentrations in MW148 and MW193 exceeded the ecological SAC;
- The cobalt and chloride concentrations in MW145, MW147 and MW148 exceeded the ecological SAC;
- The PFOS concentration in MW145 and MW193 exceeded the ecological SAC; and
- The pH in all MW145, MW147 and MW148 was outside the range for recreational and freshwater.

JKE note that the groundwater samples from MW145, MW148 and MW193 also encountered concentrations of TRH fractions F1, F2 and F3, and VOCs (chloroform, bromodichloromethane and dibromochloromethane) and the groundwater sample from MW193 also encountered PAHs (naphthalene, acenaphthylene, acenaphthene, fluorene, and phenanthrene). Although the TRH and PAHs detections were below the

ecological SAC, a review of the Tier 1 risk assessment undertaken for the DSI identified that the TRH F2 concentrations in MW148 and MW193 were marginally above the site-specific human health screening criteria. The source of the TRH and PAHs was considered likely to be associated with the decommissioned UST and/or localised spills associated with the UST infrastructure, and the DSI noted that removal of the UST and any associated infrastructure during remediation, would remove the source of these detections/exceedances. However, this will need to be further evaluated and if required a site-specific Tier 2 human health risk assessment (HHRA) undertaken as part of the validation under provisions in the RAP.

Detectable concentrations of faecal coliforms and E Coli were encountered in samples MW145 and MW148.

5.3 Assessment of Data Quality

For the purpose of the screening, JKE have undertaken a preliminary assessment of the data quality against the following Data Quality Indicators (DQIs): precision, accuracy, representativeness, completeness and comparability. In this regard, we are of the opinion that the data quality is suitable for the purpose of the screening based on the following:

- Standard sampling procedures (SSP) were complied with. The SSP is attached in the appendices;
- Representative groundwater samples were analysed for a broad range of potential contaminants;
- Field indicators were used as a screening tool;
- Samples were analysed by a NATA registered laboratory. Laboratory quality control/quality assurance (QA/QC) samples were analysed and were generally within the acceptance criteria adopted by the laboratory;
- Three duplicate samples were analysed. The relative percentage difference (RPD) was calculated for each analysed based on the formula provided in the appendices. Where applicable, the higher duplicate value has been adopted as a conservative measure (see attached report tables). The exceedances are not considered to have had an adverse impact on the data set as a whole and are outlined as follows:
    - Elevated RPDs were reported for several PFAS compounds in WDUP101/MW147;
    - Elevated RPDs were reported for several VOC compounds, TRH F1, F2 and F3, nickel and several PFAs compounds in WDUP102/MW148;
    - Elevated RPDs were reported for several PAH compounds in WDUP103/MW193;
- One trip blank sample was obtained for the investigation to demonstrate the adequacy of storage and transport methods. The trip blank results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur;
- One trip spike sample was obtained for the investigation to demonstrate adequacy of preservation, storage and transport methods. The trip spike results ranged from 84% to 93% and indicated that field preservation methods were appropriate;
- The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation; and
- A review of the laboratory QA/QC data identified that:

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- Turbidity was not reported for some samples due to high sediment present;
- Samples were out of samples were out of the recommended holding time for microbiology analysis. This is considered to be a minor non-conformance and does not materially impact the report findings;
- Percent recovery was not applicable for metals in water due to the high concentration of the element/s in the sample/s. However, an acceptable recovery was obtained for the LCS; and
- For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

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- For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s); and
- For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the screening objectives. We note that additional monitoring is required to fulfill the requirements of the DPE 2022 document (such monitoring is outside the scope of this report).

6 DISCUSSION AND RECOMMENDATIONS

Based on the results of the screening, the groundwater samples identified concentrations of heavy metals (arsenic, copper, nickel, zinc, and cobalt), chloride and PFOS above the screening criteria adopted for potential disposal to stormwater. The pH of the samples was also outside the acceptable range for marine waters ecosystems and recreational use. The DSI also identified TRH and VOCs in groundwater as discussed in Section 5.2.

Detectable concentrations of Faecal Coliforms and E Coli suggest that a possible leaking sewer may exist in the vicinity of MW145 and MW148. These wells are noted to be in alignment in the north-west of the site.

Based on the findings of the screening, treatment of the groundwater prior to discharge to stormwater will be required. Alternatively, the groundwater can be held on-site in holding cells prior to off-site disposal to a treatment facility licensed by the NSW EPA to accept the water.

The JKE DSI recommends preparation of a RAP for the masterplan which will outline remediation of the wider ANZAC Village Renewal property including the site. It is also understood that individual development applications will be prepared for the staged development of the wider ANZAC Village Renewal. As such, groundwater quality screenings will need to be undertaken for each staged area, and any elevations of the CoPC must be factored into the treatment process prior to the disposal of groundwater into the stormwater system.

Where temporary construction dewatering occurs, treatment of the groundwater prior to discharge to stormwater will be required. Council approval must be obtained prior to discharge to stormwater and conditions imposed by Council on the discharge must be complied with.

6.1 Recommendations

A specialist contractor must be engaged to design an appropriate water treatment system to facilitate the disposal of groundwater during temporary construction dewatering, should off-site disposal of groundwater to stormwater be required.

Use of a 'WETSEP' system or equivalent to hold and treat water prior to discharge could be considered to achieve the water quality standards imposed by the authority (e.g. Council) permitting the discharge of groundwater. The 'WETSEP' system combines treatment processes including flocculation which may reduce concentrations of heavy metals which are likely to be at least partly associated with sediment particles in the groundwater. The pH can be adjusted by passing through a dosing unit. The client will need to consider these site-specific factors, in addition to the potential volume of water being extracted, in consultation with the dewatering contractor and the manufacturers of any treatment system to be utilised for the project.

Turbidity and pH are parameters that can fluctuate depending on site conditions and activities such as excavation. JKE recommend that the extracted groundwater be held in a settlement tank or lined sump pit so that the turbidity and pH can be measured. If required (i.e. if the turbidity is greater than 50NTU or the pH

is outside the range of 6.5 and 8.5) the pH can be adjusted by passing through a dosing unit and the turbidity can be adjusted by use of a flocculent.

The relevant consent authorities must be contacted to clarify the requirements to obtain disposal approval to stormwater. In addition, a license from the WaterNSW may be required for temporary construction dewatering. The information required to support the license application can be onerous and JKE recommend that the client contact WaterNSW well before the start of construction in order to commence the application process.

In the event unexpected conditions are encountered during development work or during dewatering that may pose a contamination risk (e.g. odours in groundwater, oily sheens etc), all works should stop and an environmental consultant should be engaged to inspect the site and address the issue.

7 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Groundwater conditions may vary, especially after climatic changes and wet/dry periods;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of JKE. JKE has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;

- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of JKE; and
- Any third party who seeks to rely on this report without the express written consent of JKE does so entirely at their own risk and to the fullest extent permitted by law, JKE accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

Important Information about this Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE LOCATION PLAN**

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Project No: E37444BTrpt7-GQS

Figure No: 1

JKEnvironments

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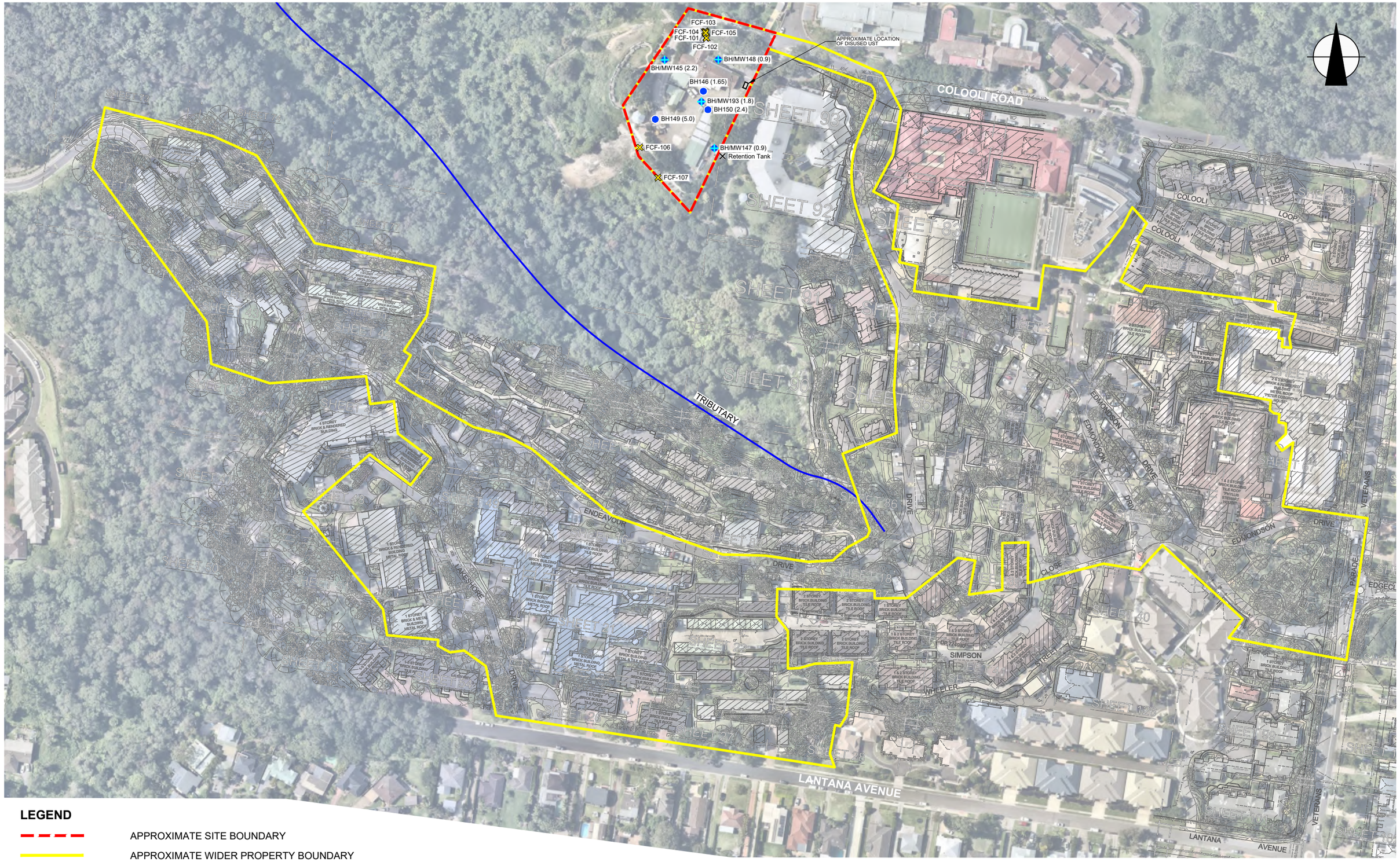

LEGEND

APPROXIMATE SITE BOUNDARY	
APPROXIMATE WIDER PROPERTY BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 20 40 60 80 100

SCALE 1:2000 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Project No: E37444BTrpt7-GQS

Figure No: 2

JKEnvironments

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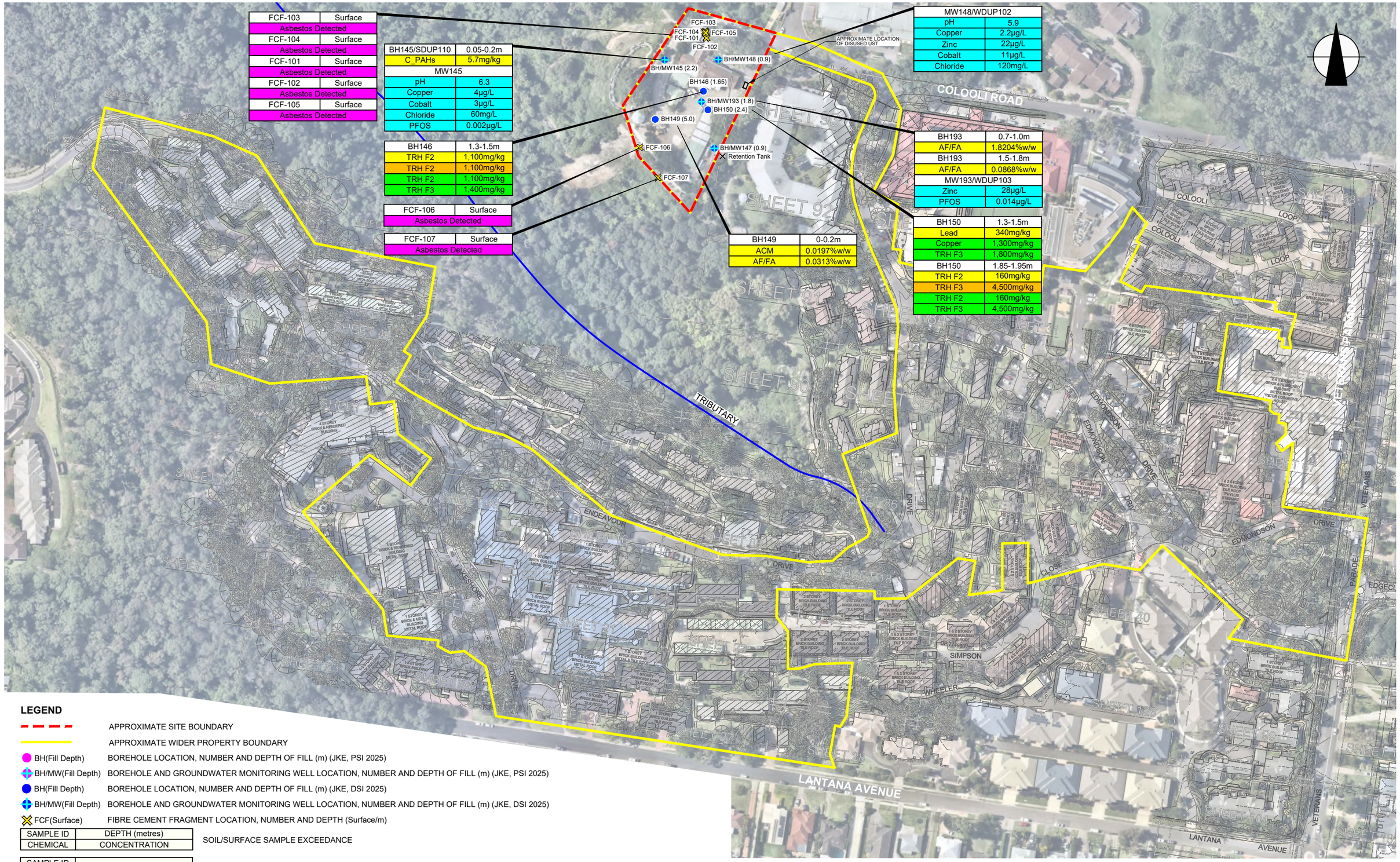

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE WIDER PROPERTY BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
- BH(Fill Depth) — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
- BH/MW(Fill Depth) — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
- FCF(Surface) — FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK
- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR ECOLOGICAL RISK
- SOIL/SURFACE CONTAMINATION ABOVE SAC FOR MANAGEMENT LIMITS
- GROUNDWATER CONTAMINATION ABOVE SAC
- ASBESTOS DETECTED - NOT ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 20 40 60 80 100

SCALE 1:2000 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAC EXCEEDANCE PLAN**

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Project No: E37444BTrpt7-GQS

Figure No: 3

JKEnvironments

PLOT DATE: 8/12/2025 10:12:02 AM DWG FILE: K:\SC EIS JOBS\37000'S\E37444BT NARRABEEN\CADIE37444BTRPT6-SGIA.DWG

LEGEND

APPROXIMATE SITE BOUNDARY	
APPROXIMATE WIDER PROPERTY BOUNDARY	
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, PSI 2025)
BH(Fill Depth)	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
BH/MW(Fill Depth)	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m) (JKE, DSI 2025)
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
31.00	GROUNDWATER CONTOUR INTERVALS (m)
	INFERRED GROUNDWATER FLOW DIRECTION

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 6 12 18 24 30

SCALE 1:600 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **GROUNDWATER CONTOUR PLOT**

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Project No: E37444BTrpt7-GQS

Figure No: 4

JKEnvironments

PLOT DATE: 8/12/2025 10:12:28 AM DWG FILE: K:\SC EIS JOBS\37000\SIE37444BT NARRABEEN\CADIE37444BTRPT6-SGIA.DWG

Appendix B: Laboratory Results Summary Tables

Abbreviations used in the Groundwater Tables:

ADWG: AustralianDrinking Water Guidelines
ANZG: Australian and New Zealand Guidelines
B(a)P: Benzo(a)pyrene
CRC: Cooperative Research Centre
ESLs: Ecological Screening Levels
FTS: Fluorotelomer sulfonic acid
GIL: Groundwater Investigation Levels
HILs: Health Investigation Levels
HSLs: Health Screening Levels
HSL-SSA: Health Screening Level-SiteSpecific Assessment
NA: Not Analysed
NC: Not Calculated
NEMP: National Environmental Management Plan
NEPM: National Environmental Protection Measure
NHMRC: National Health and Medical Research Council
NL: Not Limiting
NSL: No Set Limit
OCP: Organochlorine Pesticides
OPP: Organophosphorus Pesticides
PAHs: Polycyclic Aromatic Hydrocarbons
ppm: Parts per million
PCBs: Polychlorinated Biphenyls
PCE: Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PQL: Practical Quantitation Limit
RS: Rinsate Sample
RSL: Regional Screening Levels
PFAS: Per- and polyfluoroalkyl substances
PFHxS: Perfluorohexanesulfonic acid
PFOA: Perfluorooctanoic acid
PFOS: Perfluorooctanesulfonic acid
SAC: Site Assessment Criteria
SSA: Site Specific Assessment
SSHSLs Site Specific Health Screening Levels
TB: Trip Blank
TCA: 1,1,1 Trichloroethane (methyl chloroform)
TCE: Trichloroethylene (Trichloroethene)
TS: Trip Spike
TRH: Total Recoverable Hydrocarbons
UCL: Upper Level Confidence Limit on Mean Value
USEPA United States Environmental Protection Agency
VOCC: Volatile Organic Chlorinated Compounds
WHO: World Health Organisation

Table Specific Explanations:

PFAS Groundwater Ecology Tables:

- 99% refers to a concentration that has been derived to protect 99% of aquatic species

Groundwater Quality Screening
4 Colooli Road, Narrabeen, NSW
E37444BT

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TABLE G1
SUMMARY OF COPC (except PFAS) CONCENTRATION IN GROUNDWATER - ECOLOGICAL & HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	ANZG 2018 Marine Waters	SAMPLES												
				MW145	MW145 - LAB DUP	MW147	MW147 - LAB DUP	MW148	MW148 - LAB DUP	MW193	WDUP101	WDUP101 - LAB DUP	WDUP102	WDUP103	WDUP103 - LAB DUP
Inorganic Compounds and Parameters															
pH		6.5 - 8.5	7 - 8.5	**6.3**	[NT]	**5**	NA	**5.9**	**5.9**	NA	NA	NA	NA	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	NSL	**400**	[NT]	**410**	NA	**590**	**600**	NA	NA	NA	NA	NA	NA
Turbidity (NTU)		NSL	NSL	**370**	[NT]	**50**	NA	**NT**	[NT]	NA	NA	NA	NA	NA	NA
Redox Potential (Eh)	-	NSL	NSL	**185**	[NT]	**135**	NA	**121**	[NT]	NA	NA	NA	NA	NA	NA
Total Dissolved Solids (TDS) (mg/L)	5	NSL	NSL	**280**	[NT]	**280**	NA	**390**	[NT]	NA	NA	NA	NA	NA	NA
Total Suspended Solids (TSS) (mg/L)	5	NSL	NSL	**530**	[NT]	**78**	NA	**3700**	[NT]	NA	NA	NA	NA	NA	NA
Total Organic Carbon (TOC) (mg/L)	1	NSL	NSL	**6**	[NT]	**6**	NA	**7**	[NT]	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (mg/L)	0.1	NSL	NSL	**7.6**	[NT]	**7.4**	NA	**7.7**	[NT]	NA	NA	NA	NA	NA	NA
Total Hardness (mg/L)	3	NSL	NSL	**67**	[NT]	**39**	NA	**85**	[NT]	NA	NA	NA	NA	NA	NA
Silica (SiO2) (mg/L)	0.1	NSL	NSL	**38**	[NT]	**8.5**	NA	**29**	[NT]	NA	NA	NA	NA	NA	NA
Phosphorus (mg/L)	0.05	NSL	NSL	**0.1**	NA	<0.05	<0.05	**0.1**	NA	NA	NA	NA	NA	NA	NA
Acidity (as CaCO3)	5	NSL	NSL	**56**	**55**	**110**	NA	**83**	[NT]	NA	NA	NA	NA	NA	NA
Metals and Metalloids															
Arsenic (As III)	1	100	2.3	<1	NA	**5**	NA	<1	NA	**2**	**5**	NA	<1.0	**2**	NA
Cadmium	0.1	20	0.7	<0.1	NA	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Chromium (total)	1	500	27	**7**	NA	**3**	NA	**11**	NA	**1**	**3**	NA	**12**	**1**	NA
Copper	1	20000	1.3	**4**	NA	<1	NA	**2**	NA	<1	<1	NA	**2.2**	<1	NA
Lead	1	100	4.4	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1	<1	NA
Total Mercury (inorganic)	0.05	10	0.1	<0.05	NA	<0.05	NA	<0.05	NA	<1	<0.05	NA	<0.050	<0.05	NA
Nickel	1	200	7	<1	NA	**25**	NA	**5**	NA	**1**	**24**	NA	**6.8**	**1**	NA
Zinc	1	30000	15	**12**	NA	**9**	NA	**21**	NA	**28**	**9**	NA	**22**	**28**	NA
Aluminium	10	NSL	NSL	**20**	NA	**300**	NA	**50**	NA	NA	NA	NA	NA	NA	NA
Antimony	1	30	NSL	<1	NA	<1	NA	<1	NA	NA	NA	NA	NA	NA	NA
Barium	1	20000	NSL	**31**	NA	**22**	NA	**80**	NA	NA	NA	NA	NA	NA	NA
Boron	20	40000	NSL	**30**	NA	**40**	NA	**100**	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.05	600	NSL	<0.5	NA	**3**	NA	<0.5	NA	NA	NA	NA	NA	NA	NA
Cobalt	1	NSL	1	**3**	NA	**22**	NA	**11**	NA	NA	NA	NA	NA	NA	NA
Iron	10	NSL	NSL	**10**	NA	**9000**	NA	**110**	NA	NA	NA	NA	NA	NA	NA
Lithium	1	NSL	NSL	**7**	NA	**2**	NA	**9**	NA	NA	NA	NA	NA	NA	NA
Manganese	5	5000	300	**36**	NA	**110**	NA	**130**	NA	NA	NA	NA	NA	NA	NA
Molybdenum	1	500	NSL	**1**	NA	<1	NA	<1	NA	NA	NA	NA	NA	NA	NA
Selenium	1	100	NSL	<1	NA	**3**	NA	<1	NA	NA	NA	NA	NA	NA	NA
Silver	1	1000	1.4	<1	NA	<1	NA	<1	NA	NA	NA	NA	NA	NA	NA
Strontium	1	NSL	NSL	**71**	NA	**19**	NA	**120**	NA	NA	NA	NA	NA	NA	NA
Uranium	0.5	200	NSL	<0.5	NA	<0.5	NA	<0.5	NA	NA	NA	NA	NA	NA	NA
Vanadium	1	NSL	100	**4**	NA	**5**	NA	**1**	NA	NA	NA	NA	NA	NA	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)															
Benzene	1	10	500	<1	NA	<1	NA	<1	NA	<1	<1	NA	<2.0	<1	NA
Toluene	1	8000	180	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Ethylbenzene	1	3000	5	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
m+p-xylene	2	NSL	75	<2	NA	<2	NA	<2	NA	<2	<2	NA	<1.0	<2	NA
o-xylene	1	NSL	350	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Total xylenes	2	6000	NSL	<2	NA	<2	NA	<2	NA	<2	<2	NA	<2	<2	NA
Total Recoverable Hydrocarbons (TRHs)															
TRH F1	10	NSL	NSL	**19**	NA	<10	NA	**11**	NA	<10	<10	NA	<1.0	<10	NA
TRH F2	50	NSL	NSL	<50	[NT]	<50	NA	**120**	NA	**270**	<50	NA	**56**	**270**	NA
TRH F3	100	NSL	NSL	<100	<100	<100	NA	**240**	NA	**510**	<100	NA	**110**	**650**	NA
TRH F4	100	NSL	NSL	<100	<100	<100	NA	<100	NA	<100	<100	NA	<100	<100	NA
Volatile Organic Compounds (VOCs), including chlorinated VOCs															
Dichlorodifluoromethane	10	NSL	NSL	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
Chloromethane	10	NSL	NSL	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
Vinyl Chloride	10	3	100	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
Bromomethane	10	NSL	NSL	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
Chloroethane	10	NSL	NSL	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
Trichlorofluoromethane	10	NSL	NSL	<10	NA	<10	NA	<10	NA	<10	<10	NA	<1.0	<10	NA
1,1-Dichloroethene	**1**	300	700	<1	NA	<1	NA	<1	NA	<1	<1	NA	<2.0	<1	NA
Trans-1,2-dichloroethene	1	600	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1-dichloroethane	1	NSL	250	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Cis-1,2-dichloroethene	1	600	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Bromochloromethane	1	2500	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Chloroform	1		370	**16**	NA	<1	NA	**8**	NA	**1**	<1	NA	<1.0	**1**	NA
2,2-dichloropropane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2-dichloroethane	1	30	1900	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1,1-trichloroethane	1	NSL	270	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1-dichloropropene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Cyclohexane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Carbon tetrachloride	1	30	240	<1	NA	<1	NA	<1	NA	<1	<1	NA	<10	<1	NA
Benzene	1	10	500	<1	NA	<1	NA	<1	NA	<1	<1	NA	<10	<1	NA
Dibromomethane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<10	<1	NA
1,2-dichloropropane	1	NSL	900	<1	NA	<1	NA	<1	NA	<1	<1	NA	<10	<1	NA
Trichloroethene	1	NSL	330	<1	NA	<1	NA	<1	NA	<1	<1	NA	<10	<1	NA
Bromodichloromethane	1	NSL	NSL	**7**	NA	<1	NA	**3**	NA	<1	<1	NA	**2.6**	<1	NA
trans-1,3-dichloropropene	1	1000	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
cis-1,3-dichloropropene	1	1000	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1,2-trichloroethane	1	NSL	1900	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Toluene	1	8000	180	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,3-dichloropropane	1	NSL	1100	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Dibromochloromethane	1	NSL	NSL	**2**	NA	<1	NA	<1	NA	<1	<1	NA	**8.3**	<1	NA
1,2-dibromoethane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Tetrachloroethene	1	500	70	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1,1,2-tetrachloroethane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Chlorobenzene	1	3000	55	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Ethylbenzene	1	3000	5	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Bromoform	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
m+p-xylene	2	NSL	75	<2	NA	<2	NA	<2	NA	<2	<2	NA	<1.0	<2	NA
Styrene	1	300	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,1,2,2-tetrachloroethane	1	NSL	400	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
o-xylene	1	NSL	350	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2,3-trichloropropane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Isopropylbenzene	1	NSL	30	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Bromobenzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
n-propyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
2-chlorotoluene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
4-chlorotoluene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,3,5-trimethyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Tert-butyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2,4-trimethyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,3-dichlorobenzene	1	200	260	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Sec-butyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,4-dichlorobenzene	1	400	60	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
4-isopropyl toluene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2-dichlorobenzene	1	15000	160	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
n-butyl benzene	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2-dibromo-3-chloropropane	1	NSL	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2,4-trichlorobenzene	1	300	20	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
1,2,3-trichlorobenzene	1	300	3	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Hexachlorobutadiene	1	7	NSL	<1	NA	<1	NA	<1	NA	<1	<1	NA	<1.0	<1	NA
Polycyclic Aromatic Hydrocarbons (PAHs)															
Naphthalene	0.2	NSL	50	<0.1	<0.1	<0.1	NA	<0.1	NA	**2.5**	<0.1	NA	<0.10	**2.6**	NA
Acenaphthylene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	**0.2**	<0.1	NA	<0.10	**0.2**	NA
Acenaphthene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	**1.3**	<0.1	NA	<0.10	**1.3**	NA
Fluorene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	**0.7**	<0.1	NA	<0.10	**0.7**	NA
Phenanthrene	0.1	NSL	0.6	<0.1	<0.1	<0.1	NA	<0.1	NA	**0.1**	<0.1	NA	<0.10	**0.1**	NA
Anthracene	0.1	NSL	0.01	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Fluoranthene	0.1	NSL	1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Pyrene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Benzo(a)anthracene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Chrysene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Benzo(b,j+k)fluoranthene	0.2	NSL	NSL	<0.2	<0.2	<0.2	NA	<0.2	NA	<0.2	<0.2	NA	<0.20	<0.2	NA
Benzo(a)pyrene	0.1	0.1	0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Indeno(1,2,3-c,d)pyrene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Dibenzo(a,h)anthracene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Benzo(g,h,i)perylene	0.1	NSL	NSL	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	NA	<0.10	<0.1	NA
Anions and Cations															
Calcium (mg/L)	0.5	NSL	NSL	**20**	[NT]	**2**	NA	**23**	[NT]	NA	NA	NA	NA	NA	NA
Potassium (mg/L)	0.5	NSL	NSL	**3**	[NT]	**1**	NA	**3**	[NT]	NA	NA	NA	NA	NA	NA
Sodium (mg/L)	0.5	NSL	NSL	**46**	[NT]	**49**	NA	**84**	[NT]	NA	NA	NA	NA	NA	NA
Magnesium (mg/L)	0.5	NSL	NSL	**4**	[NT]	**8.6**	NA	**6.8**	[NT]	NA	NA	NA	NA	NA	NA
Hydroxide Alkalinity (as CaCO3) (mg/L)	5	NSL	NSL	<5	[NT]	<5	NA	<5	<5	NA	NA	NA	NA	NA	NA
Bicarbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	NSL	**74**	[NT]	**9**	NA	**55**	**54**	NA	NA	NA	NA	NA	NA
Carbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	NSL	<5	[NT]	<5	NA	<5	**<5**	NA	NA	NA	NA	NA	NA
Total Alkalinity (as CaCO3) (mg/L)	5	NSL	NSL	**74**	[NT]	**9**	NA	**55**	**54**	NA	NA	NA	NA	NA	NA
Sulphate (mg/L)	1	NSL	NSL	**50**	[NT]	**41**	NA	**61**	**65**	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	1	NSL	10	**60**	[NT]	**92**	NA	**110**	**120**	NA	NA	NA	NA	NA	NA
Ionic Balance (%)	-	NSL	NSL	**-11**	[NT]	**-11**	NA	**-1**	[NT]	NA	NA	NA	NA	NA	NA
Sodium Adsorption Ratio (SAR)	0.01	NSL	NSL	**2.4**	[NT]	**3.4**	NA	**3.9**	[NT]	NA	NA	NA	NA	NA	NA
Nutrients															
Ammonia (mg/L) (pH dependent)	0.005	NSL	5.29 (pH 6.5) 4.55 (pH 6.8) 4.83 (pH 6.7)	**0.078**	[NT]	**0.2**	NA	**0.078**	**0.076**	NA	NA	NA	NA	NA	NA
Nitrate (mg/L)	0.005	500000	NSL	**0.25**	[NT]	<0.005	NA	**0.098**	**0.095**	NA	NA	NA	NA	NA	NA
Nitrite (mg/L)	0.005	30000	NSL	<0.005	[NT]	<0.005	NA	**0.006**	**0.006**	NA	NA	NA	NA	NA	NA
Nitrogen Oxides (NOX) (mg/L)	0.005	NSL	NSL	**0.25**	[NT]	<0.005	NA	**0.1**	**0.1**	NA	NA	NA	NA	NA	NA
Total Nitrogen (mg/L)	0.1	NSL	NSL	**1.3**	[NT]	**0.3**	NA	**0.4**	[NT]	NA	NA	NA	NA	NA	NA
Phosphate (mg/L)	0.005	NSL	NSL	**0.093**	[NT]	**0.02**	NA	**0.065**	**0.062**	NA	NA	NA	NA	NA	NA
Microbiological Organisms															
Faecal Coliforms (MPN/100mL)	1	NA	NSL	**110**	NA	<18	NA	**110**	NA	NA	NA	NA	NA	NA	NA
E Coli (MPN/100mL)	1	NA	NSL	**20**	NA	<18	NA	**20**	NA	NA	NA	NA	NA	NA	NA

Concentration above the SAC	**Bold**
Positive result	**Bold**
GIL >PQL	Red
Draft GIL	Orange

TABLE G2
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2025 Interim 99% Marine	SAMPLES MW145	MW147	MW148	MW193	WDUP101	WDUP102	WDUP103
PFAS Compound									
Perfluorobutanesulfonic acid	0.1	NSL	**0.0085**	**0.0091**	**0.011**	**0.025**	<0.01	<0.01	**0.02**
Perfluoropentanesulfonic acid	0.1	NSL	**0.002**	**0.002**	**0.001**	<0.001	NA	NA	NA
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.002**	**0.0048**	**0.0008**	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	0.1	NSL	<0.001	<0.001	<0.001	<0.001	NA	NA	NA
Perfluorooctanesulfonic acid PFOS	0.1	0.00023	**0.002**	<0.0002	<0.0002	**0.014**	<0.01	<0.01	**0.01**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorobutanoic acid	0.2	NSL	<0.01	<0.01	<0.01	<0.02	NA	NA	NA
Perfluoropentanoic acid	0.2	NSL	**0.032**	**0.026**	<0.02	**0.038**	NA	NA	NA
Perfluorohexanoic acid	0.1	NSL	**0.0066**	**0.004**	**0.0083**	**0.03**	NA	NA	NA
Perfluoroheptanoic acid	0.1	NSL	**0.002**	**0.0046**	**0.001**	**0.018**	NA	NA	NA
Perfluorooctanoic acid PFOA	0.1	19	**0.001**	**0.0021**	**0.0004**	**0.02**	<0.01	<0.01	**0.02**
Perfluorononanoic acid	0.1	NSL	<0.001	<0.001	<0.001	**0.001**	NA	NA	NA
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	NA	NA	NA
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	NA	NA	NA
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
4:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
6:2 FTS	0.1	NSL	**0.0079**	**0.004**	<0.0004	<0.0004	<0.01	<0.01	<0.01
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.02	<0.02	<0.02
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	NA	NA	NA
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Total Positive PFHxS & PFOS	0.1	NSL	**0.0035**	**0.0048**	**0.0008**	**0.014**	<0.01	<0.01	**0.1**
Total Positive PFOS & PFOA	0.1	NSL	**0.0031**	**0.0021**	**0.0004**	**0.034**	<0.01	<0.01	**0.3**
Total Positive PFAS	0.1	NSL	**0.063**	**0.056**	**0.022**	**0.15**	<0.01	<0.01	**0.5**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

TABLE G3
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2025 Recreational	SAMPLES MW145	MW147	MW148	MW193	WDUP101	WDUP102	WDUP103
PFAS Compound									
Perfluorobutanesulfonic acid - PFBS	0.1	NSL	**0.0085**	**0.0091**	**0.011**	**0.025**	<0.01	<0.01	**0.02**
Perfluoropentanesulfonic acid	0.1	NSL	**0.002**	**0.002**	**0.001**	<0.001	NA	NA	NA
Perfluorohexanesulfonic acid - PFHxS	0.1	NSL	**0.002**	**0.0048**	**0.0008**	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanesulfonic acid	0.1	NSL	<0.001	<0.001	<0.001	<0.001	NA	NA	NA
Perfluorooctanesulfonic acid - PFOS	0.1	NSL	**0.002**	<0.0002	<0.0002	**0.014**	<0.01	<0.01	**0.01**
Perfluorodecanesulfonic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorobutanoic acid	0.2	NSL	<0.01	<0.01	<0.01	<0.02	NA	NA	NA
Perfluoropentanoic acid	0.2	NSL	**0.032**	**0.026**	<0.02	**0.038**	NA	NA	NA
Perfluorohexanoic acid	0.1	NSL	**0.0066**	**0.004**	**0.0083**	**0.03**	NA	NA	NA
Perfluoroheptanoic acid	0.1	NSL	**0.002**	**0.0046**	**0.001**	**0.018**	NA	NA	NA
Perfluorooctanoic acid - PFOA	0.1	10	**0.001**	**0.0021**	**0.0004**	**0.02**	<0.01	<0.01	**0.02**
Perfluorononanoic acid	0.1	NSL	<0.001	<0.001	<0.001	**0.001**	NA	NA	NA
Perfluorodecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluoroundecanoic acid	0.5	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorododecanoic acid	0.5	NSL	<0.005	<0.005	<0.005	<0.005	NA	NA	NA
Perfluorotridecanoic acid	0.5	NSL	<0.01	<0.01	<0.01	<0.01	NA	NA	NA
Perfluorotetradecanoic acid	5	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
4:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
6:2 FTS	0.1	NSL	**0.0079**	**0.004**	<0.0004	<0.0004	<0.01	<0.01	<0.01
8:2 FTS	0.1	NSL	<0.0004	<0.0004	<0.0004	<0.0004	<0.02	<0.02	<0.02
10:2 FTS	0.1	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Perfluorooctane sulfonamide	1	NSL	<0.01	<0.01	<0.01	<0.01	NA	NA	NA
N-Methyl perfluorooctane sulfonamide	1	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
N-Ethyl perfluorooctanesulfon amide	1	NSL	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
N-Me perfluorooctanesulfonamid oethanol	1	NSL	<0.05	<0.05	<0.05	<0.05	NA	NA	NA
N-Et perfluorooctanesulfonamid oethanol	5	NSL	<0.5	<0.5	<0.5	<0.5	NA	NA	NA
MePerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
EtPerfluorooctanesulf-amid oacetic acid	0.2	NSL	<0.002	<0.002	<0.002	<0.002	NA	NA	NA
Total Positive PFHxS & PFOS	0.1	2	**0.0035**	**0.0048**	**0.0008**	**0.014**	<0.01	<0.01	**0.1**
Total Positive PFOS & PFOA	0.1	NSL	**0.0031**	**0.0021**	**0.0004**	**0.034**	<0.01	<0.01	**0.3**
Total Positive PFAS	0.1	NSL	**0.063**	**0.056**	**0.022**	**0.15**	<0.01	<0.01	**0.5**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

Groundwater Quality Screening
4 Colooli Road, Narrabeen, NSW
E37444BT

JKEnvironments

TABLE GQ1
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane	1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW147	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP101	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	MW193	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP103	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	WDUP102	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<10	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	8.3	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	99.1	93.6
laboratory	WM148	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4.25	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	1.75	nc	nc	nc	nc	nc	4.4	nc	nc	nc	nc	nc	1.8	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	49.8	47.05
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	176%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	143%	nc	nc	nc	nc	nc	177%	nc	nc	nc	nc	nc	89%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	198%	198%

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc	Perfluorobutanesulfonic acid	Perfluorohexanesulfonic acid - PFHxS	Perfluorooctanesulfonic acid PFOS	Perfluorooctanoic acid PFOA	6:2 FTS	8:2 FTS	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1.0*	*1.0*	*1.0*	*2.0*	*1.0*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	MW147	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	5	<0.1	3	<1	<1	<0.05	25	9	0.009	0.005	<0.0002	0.002	0.004	<0.0004	0.005	0.002	0.056
laboratory	WDUP101	<10	<50	<100	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	5	<0.1	3	<1	<1	<0.05	24	9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	5	nc	3	nc	nc	nc	24.5	9	0.03	0.027	nc	0.026	0.027	nc	0.027	0.026	0.053
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	0%	nc	nc	nc	4%	0%	138%	165%	nc	184%	170%	nc	165%	184%	11%
Intra	MW193	<10	270	510	<100	<1	<1	<1	<2	<1	2.5	0.2	1.3	0.7	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	2	<0.1	1	<1	<1	<1	1	28	0.025	<0.01	0.014	0.02	<0.0004	<0.0004	0.014	0.034	0.15
laboratory	WDUP103	<10	270	650	<100	<1	<1	<1	<2	<1	2.6	0.2	1.3	0.7	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	2	<0.1	1	<1	<1	<0.05	1	28	0.02	<0.01	0.01	0.02	<0.01	<0.02	0.1	0.3	0.5
duplicate	MEAN	nc	270	580	nc	nc	nc	nc	nc	nc	2.55	0.2	1.3	0.7	0.1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	2	nc	1	nc	nc	nc	1	28	0.023	nc	0.012	0.02	nc	nc	0.057	0.167	0.325
	RPD %	nc	0%	24%	nc	nc	nc	nc	nc	nc	4%	0%	0%	0%	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	nc	0%	nc	nc	nc	0%	0%	22%	nc	33%	0%	nc	nc	151%	159%	108%
Inter	WDUP102	<1.0	56	110	<100	<2.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<1.0	<0.10	12	2.2	<1	<0.050	6.8	22	0.011	8E-04	<0.0002	4E-04	<0.0004	<0.0004	8E-04	4E-04	0.022
laboratory	MW148	11	120	240	<100	<1	<1	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<1	<0.1	11	2	<1	<0.05	5	21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01
duplicate	MEAN	8	88	175	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	11.5	2.1	nc	nc	5.9	21.5	0.031	0.025	nc	0.025	nc	nc	0.025	0.025	0.036
	RPD %	75%	73%	74%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	9%	10%	nc	nc	31%	5%	128%	194%	nc	197%	nc	nc	194%	197%	78%
Field	TB-W101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01
Blank	29/10/2025																																										
Trip	TS-W101	-	-	-	-	85%	84%	89%	91%	93%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	29/10/2025																																										

Result outside of QA/QC acceptance criteria Value

Appendix C: Borehole Logs

JKGeotechnics

BOREHOLE LOG

Borehole No. 145 **1 / 2**

SDUP110: 0.05-0.2m

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN **Method:** SPIRAL AUGER **R.L. Surface:** 37.44 m

Date: 23/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked By:** T.F./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING						37				FILL: Sandy gravel, fine to coarse grained, grey, igneous gravel.	M			APPEARS WELL COMPACTED
					N = 16 10,8,8		1			FILL: Silty sand, fine to medium grained, grey brown, with fine to coarse grained igneous gravel, trace of fine to coarse grained ironstone and sandstone gravel, and glass fragments.				
						36				FILL: Silty sand, fine to medium grained, grey brown, with fine to coarse grained sandstone gravel, trace of fine to coarse grained igneous gravel, concrete fragments and ash.				APPEARS POORLY COMPACTED
					N = 5 2,2,3		2							
						35			-	SANDSTONE: fine to medium grained, light grey.	DW	VL - L		HAWKESBURY SANDSTONE HIGH 'TC' BIT RESISTANCE
						34	3			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 5.86m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 3.0m. CASING 0m TO 3.0m. 2mm SAND FILTER PACK 6.0m TO 2.8m. BENTONITE SEAL 2.8m TO 0.5m. BACKFILLED WITH CUTTINGS TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						33	4							
						32	5							
						31	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 145 **2 / 2**

SDUP110: 0.05-0.2m

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN **Core Size:** NMLC **R.L. Surface:** 37.44 m

Date: 23/10/25 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** T.F./N.E.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION: Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Specific / General)	Formation
		35			START CORING AT 2.80m						
100% RETURN					NO CORE 0.17m						
		34	3		SANDSTONE: fine to medium grained, light grey, with occasional grey laminae, bedded at 0-10°.	SW	M	0.70			Hawkesbury Sandstone
		33	4					0.50		(3.78m) Be, 0°, Ir, R, Cn	
		32	5					0.40		(4.22m) Be, 0°, Ir, R, Cn	
								0.90		(4.50m) Be, 10°, Ir, R, Clay Vn	
							H	1.3		(5.21m) Be, 0°, Ir, R, Cn	
								1.0		(5.56m) Be, 0°, Ir, R, Cn	
		31	6		END OF BOREHOLE AT 5.86 m					BOREHOLE REAMED TO 6.0m DEPTH ON COMPLETION OF CORING	
		30	7								
		29	8								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKEnvironments

ENVIRONMENTAL LOG

Log No. **BH146**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: RSL LIFECARE LTD

Project: PROPOSED SENIORS LIVING DEVELOPMENT

Location: 4 COLOOLI ROAD, NARRABEEN, NSW

Job No.: E37444BT **Method:** SPIRAL AUGER **R.L. Surface:** 37.860m

Date: 24/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** C.B./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 180mm.t				CONCRETE PAVEMENT
									-	FILL: Silty sandy gravel, fine to medium grained, igneous, brown.	M			SCREEN: 2.76kg (<10L) 0.18-0.4m, NO FCF
						N = 4 1,2,2				FILL: Silty sandy clay, low to medium plasticity, with sub-angular igneous gravel, trace of concrete fragments and slag.	w<PL			SCREEN: 2.32kg (<10L) 0.4-0.7m, NO FCF
							1			FILL: Silty sandy clay, low to medium plasticity, brown, trace of igneous and sandstone gravel, slag and concrete fragments.	w>PL			SCREEN: 5.87kg (<10L) 0.7-1.2m, NO FCF
						N > 2 3,2/ 100mm REFUSAL				FILL: Silty clayey sand, fine to medium grained, light xxxx.	M			STRONG HYDROCARBON ODOUR
									CL-CI		w<PL			
							2		-	Sandy CLAY: low to medium plasticity, grey, trace of root fibres.				SCREEN: 3.21kg (<10L) 1.2-1.65m, NO FCF
										SANDSTONE sand: fine to medium grained, grey.				STONG HYDROCARBON ODOUR
										END OF BOREHOLE AT 1.8m				RESIDUAL
							3							HAWKESBURY SANDSTONE
														MODERATE 'TC' BIT RESISTANCE
							4							
							5							
							6							
							7							

JKGeotechnics

BOREHOLE LOG

Borehole No. 147

SDUP107: 0-0.1m

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN **Method:** SPIRAL AUGER **R.L. Surface:** 39.00 m

Date: 22/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked By:** T.F./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING					N = 8 2,2,6					FILL: Silty sand, fine to medium grained, brown, with fine to coarse grained igneous and sandstone gravel, trace of asphalt, concrete, glass and tile fragments, clay nodules and root fibres.	D			SCREEN: 11.42kg, 0-0.1m, NO FCF SCREEN: 10.91kg, 0.1-0.9m, NO FCF APPEARS MODERATELY COMPACTED
						38	1		-	SANDSTONE: fine to medium grained, light grey, with extremely weathered sandstone bands.	DW	L - M		HAWKESBURY SANDSTONE LOW TO MODERATE 'TC' BIT RESISTANCE
						37	2			Extremely Weathered sandstone: sandy CLAY, low plasticity, light grey, fine grained, with very low strength sandstone bands.	XW	Hd		VERY LOW TO LOW RESISTANCE WITH LOW TO MODERATE BANDS
						36	3			SANDSTONE: fine to medium grained, light grey, with extremely weathered sandstone bands.	DW	VL		
										REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 10.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 10.0m TO 4.0m. CASING 0m TO 4.0m. 2mm SAND FILTER PACK 10.0m TO 3.0m. BENTONITE SEAL 3.0m TO 0.5m. BACKFILLED WITH CUTTINGS TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						35	4							
						34	5							
						33	6							

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 147 **2 / 2**

SDUP107: 0-0.1m

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN **Core Size:** NMLC **R.L. Surface:** 39.00 m

Date: 22/10/25 **Inclination:** VERTICAL **Datum:** AHD

Plant Type: JK205 **Bearing:** N/A **Logged/Checked By:** T.F./N.E.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS SPACING (mm) DESCRIPTION Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness Specific / General	Formation
					START CORING AT 3.50m					
100% RETURN		35	4		NO CORE 1.70m					
		34	5		Silty CLAY: medium to high plasticity, grey, with very low strength, fine to medium grained, light grey sandstone bands.	RS	Hd	0.060 0.030	(5.20-5.77m) HP: 450, 400, 425 kPa	Hawkesbury Sandstone
0% RETURN		33	6		LAMINITE: Closely interbedded Sandstone, fine to medium grained, light grey, and Siltstone, grey, bedded at 0-15°.	MW	VL - L	0.30 0.20 0.10	(5.96m) J, 45°, Ir, R, Cn (6.42m) XWS, 0°, 15 mm.t (6.59m) XWS, 0°, 20 mm.t (6.65m) XWS, 0°, 30 mm.t (6.84m) XWS, 0°, 80 mm.t	
		32	7		Silty CLAY: medium to high plasticity, grey.	RS	VSt - Hd	0.010	(7.00-7.78m) HP: 350, 380, 450, 350, >600 kPa	
					NO CORE 0.17m					
100% RETURN		31	8		SANDSTONE: fine to medium grained, light grey, massive.	FR	M	0.40 0.40 0.40 0.60	(9.17m) CS, 0°, 430 mm.t	Hawkesbury Sandstone
		30	9		END OF BOREHOLE AT 10.00 m					

JK 9.02.4 LIB:GLB Log JK CORED BOREHOLE - MASTER 37436PN1 NARRABEEN.GPJ <<DrawingFile>> 01/12/2025 15:21 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: JK 9.02.4 2019-05-31 Prj: JK 9.01.0 2018-03-20

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

JKGeotechnics

BOREHOLE LOG

Borehole No. 148

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN **Method:** SPIRAL AUGER **R.L. Surface:** 38.57 m

Date: 23/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked By:** T.F./N.E.S.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION OF AUGERING									-	ASPHALTIC CONCRETE: 35mm.t	W			APPEARS MODERATELY COMPACTED
										FILL: Sandy gravel, fine to coarse grained, grey, igneous, fine to coarse grained sand.	M			
					N = 12 3,4,8	38				FILL: Silty sand, fine to medium grained, orange brown, trace of fine to medium grained ironstone and sandstone gravel.				0.038-0.15m INSUFFICIENT RETURN FOR BULK SCREEN SAMPLE
							1		-	FILL: Silty sand, fine to medium grained, dark grey, grey and grey brown.	XW	Hd		SCREEN: 3.06(<10L), 0.15-0.6m, NO FCF
										Extremely Weathered sandstone: clayey SAND, fine to medium grained, light grey.				SCREEN: 2.14(<10L), 0.6-0.9m, NO FCF
						37								HAWKESBURY SANDSTONE
							2			SANDSTONE: fine to medium grained, with extremely weathered bands.	DW	L - M		LOW TO MODERATE 'TC' BIT RESISTANCE
						36						M		MODERATE TO HIGH RESISTANCE
							3			REFER TO CORED BOREHOLE LOG				GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 3.0m. CASING 0m TO 3.0m. 2mm SAND FILTER PACK 6.0m TO 2.9m. BENTONITE SEAL 2.9m TO 0.4m. BACKFILLED WITH CUTTINGS TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						35								
							4							
						34								
							5							
						33								
							6							
						32								

JKGeotechnics

CORED BOREHOLE LOG

Borehole No. 148

Client: RSL LIFE CARE

Project: RSL ANZAC VILLAGE RENEWAL PROJECT

Location: 90 VETERANS PARADE, NARRABEEN, NSW

Job No.: 37436PN | **Core Size:** NMLC | **R.L. Surface:** 38.57 m

Date: 23/10/25 | **Inclination:** VERTICAL | **Datum:** AHD

Plant Type: JK205 | **Bearing:** N/A | **Logged/Checked By:** T.F./N.E.S.

Water Loss\Level	Barrel Lift	RL (m AHD)	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, texture and fabric, features, inclusions and minor components)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_s(50)$	DEFECT DETAILS: SPACING (mm)	DEFECT DETAILS: DESCRIPTION (Type, orientation, defect shape and roughness, defect coatings and seams, openness and thickness)	Formation
		36			START CORING AT 2.90m						
100% RETURN		35	3		SANDSTONE: fine to medium grained, light grey and orange brown, with occasional grey laminae, bedded at 0-10°.	SW	M	0.50, 0.30			Hawkesbury Sandstone
		34	4			FR		0.50, 0.60, 0.70, 0.40, 0.30		(3.60m) Be, 0°, P, R, Clay Vn; (5.17m) Be, 0°, Ir, R, Cn; (5.73m) Be, 0°, Ir, R, Cn	
		33	5								
		32	6		END OF BOREHOLE AT 5.92 m					BOREHOLE REAMED TO 6.0m DEPTH ON COMPLETION OF CORING	
		31	7								
		30	8								

FRACTURES NOT MARKED ARE CONSIDERED TO BE DRILLING AND HANDLING BREAKS

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ENVIRONMENTAL LOG

Log No. **BH149** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: RSL LIFECARE LTD

Project: PROPOSED SENIORS LIVING DEVELOPMENT

Location: 4 COLOOLI ROAD, NARRABEEN, NSW

Job No.: E37444BT **Method:** PUSH TUBE **R.L. Surface:** 37.984m

Date: 23/10/25 **Datum:** AHD

Plant Type: EZIPROBE **Logged/Checked by:** A.D./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			FILL: Silty sand, fine to medium grained, brown and grey, trace of igneous and sandstone gravel, concrete, tile and plastic fragments.	D			GRAVEL COVER SCREEN: 12.04kg 0-0.4m, NO FCF
										FILL: Clayey sand, fine to medium grained, dark grey, trace of igneous and sandstone gravel, brick fragments, decayed roots and bark.	M			SCREEN: 6.66kg (<10L) 0.4-1.0m, NO FCF
							1							SCREEN: 11.49kg 1.0-2.0m, NO FCF
							2							SCREEN: 2.28kg (<10L) 2.0-3.0m, NO FCF
							3							SCREEN: 4.29kg (<10L) 3.0-4.0m, NO FCF
							4							SCREEN: 3.69kg (<10L) 4.0-5.0m, NO FCF
							5			END OF BOREHOLE AT 5.0m				REFUSAL ON INFERRED SANDSTONE BEDROCK
							6							
							7							

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ENVIRONMENTAL LOG

Log No. **BH150**

1/1

Environmental logs are not to be used for geotechnical purposes

Client: RSL LIFECARE LTD

Project: PROPOSED SENIORS LIVING DEVELOPMENT

Location: 4 COLOOLI ROAD, NARRABEEN, NSW

Job No.: E37444BT **Method:** SPIRAL AUGER **R.L. Surface:** 38.065m

Date: 24/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** C.B./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0			CONCRETE: 190mm.t				CONCRETE PAVEMENT
									-	FILL: Silty sandy clay, low to medium plasticity, brown, with sub-angular igneous gravel, trace of sandstone gravel.	w≈PL			SCREEN: 2.12kg (<10L) 0.19-0.4m, NO FCF
						N = 7 4,4,3					D			
							1			FILL: Silty sand, fine to medium grained, grey brown, trace of igneous, sandstone and quartz gravel, concrete, metal, tile, glass and plastic fragments, clay nodules, slag, wood chips, metal rods and ash.				SCREEN: 8.13kg (<10L) 0.4-1.4m, NO FCF
											M			LIGHT HYDROCARBON ODOUR
						N = 16 3,8,8				FILL: Silty sand, fine to medium grained, light brown, trace of sandstone and igneous gravel.	M			SCREEB: 2.89kg (<10L) 1.4-1.7m, NO FCF
							2							SCREEN: 4.93kg 1.7-2.4m, NO FCF
									SC	Clayey SAND: fine to medium grained, orange brown and red brown.	M			STRONG HYDROCARBON ODOUR
									SP	SAND: fine to medium grained, orange brown and red brown, trace of clay.	M			POSSIBLY FILL
						N = 16 5,7,9	3							SCREEN: 1.99kg (<10L) 2.4-2.7m, NO FCF
									CL-CI	Silty CLAY: low to medium plasticity, grey, trace of root fibres.	w<PL			RESIDUAL
									-	SANDSTONE sand: fine to medium grained, grey.	DW			HAWKESBURY SANDSTONE
							4			END OF BOREHOLE AT 4.0m				MODERATE 'TC' BIT RESISTANCE
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH193**

SDUP111: 0.16-0.4m
PFAS: 0.16-0.4m

Client: RSL LIFECARE LTD

Project: PROPOSED SENIORS LIVING DEVELOPMENT

Location: 4 COLOOLI ROAD, NARRABEEN, NSW

Job No.: E37444BT **Method:** SPIRAL AUGER **R.L. Surface:** 37.8m

Date: 31/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** O.B./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
							0			CONCRETE: 160m.t				
			■			PID = 0.1			-	FILL: Silty sandy gravel, fine to coarse grained, brown, fine to medium grained sand.	M			SCREEN: 2.5kg(<10L), 0.16-0.7m, NO FCF
▼			■			N = 3 4,2,1	1			FILL: Silty gravelly sand, fine to medium grained, brown and dark brown, fine to coarse grained sandstone gravel, trace of concrete and metal fragments.				SCREEN: 3.1kg(<10L), 0.7-1.5m, NO FCF
▼			■			N = 8 4,5,3				FILL: Silty sandy clay, low to medium plasticity, dark grey mottled light grey, fine to medium grained sand, trace of slag.	w>PL			HYDROCARBON ODOUR
			■				2		-	Extremely Weathered sandstone: sandy CLAY, low to medium plasticity, grey, fine to medium grained sand.	XW			INSUFFICIENT RETURN FOR BULK SCREEN SAMPLE
										SANDSTONE: fine to medium grained, light grey.	DW			HAWKESBURY SANDSTONE
							3							LOW 'TC' BIT RESISTANCE
														MODERATE RESISTANCE
														HIGH RESISTANCE
														'TC' BIT REFUSAL AT 2.7m DEPTH
							4							
							5							
							6							
							7							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **BH193** **2/2**

SDUP111: 0.16-0.4m
PFAS: 0.16-0.4m

Client: RSL LIFECARE LTD

Project: PROPOSED SENIORS LIVING DEVELOPMENT

Location: 4 COLOOLI ROAD, NARRABEEN, NSW

Job No.: E37444BT **Method:** SPIRAL AUGER **R.L. Surface:** 37.8m

Date: 31/10/25 **Datum:** AHD

Plant Type: JK205 **Logged/Checked by:** O.B./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
										SANDSTONE: fine to medium grained, light grey.	DW			
							8							BACK FILLED SAND TO 7.35m DEPTH
										END OF BOREHOLE AT 8.1m				GROUNDWATER MONITORING WELL INSTALLED TO 7.35m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 7.35m TO 1.35m. CASING 0m TO 1.35m. 2mm SAND FILTER PACK 7.35m TO 1.1m. BENTONITE SEAL 1.1m TO 0.1m. BACKFILLED WITH SAND AND CUTTINGS TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
							9							
							10							
							11							
							12							
							13							
							14							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\,D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

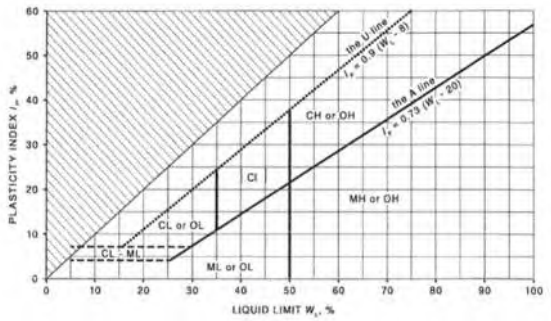
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

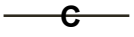
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix D: Laboratory Reports & COC Documents

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CERTIFICATE OF ANALYSIS 394272

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E37444BT, Narrabeen**
Number of Samples	12 Water
Date samples received	30/10/2025
Date completed instructions received	30/10/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	07/11/2025
Date of Issue	07/11/2025

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Priya Samarawickrama, Senior Chemist
Sean McAlary, Senior Chemist
Steven Luong, Senior Chemist
Tabitha Roberts, Senior Chemist
Timothy Toll, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		394272-7	394272-8	394272-9	394272-10
Your Reference	UNITS	MW145	MW147	MW148	WDUP101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water
Date Extracted	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Date Analysed	-	03/11/2025	03/11/2025	03/11/2025	03/11/2025
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	16	<1	8	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	7	<1	3	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	2	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference	UNITS	394272-7	394272-8	394272-9	394272-10
Your Reference		MW145	MW147	MW148	WDUP101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	102	102	102
Surrogate Toluene-d8	%	97	97	97	98
Surrogate 4-Bromofluorobenzene	%	102	101	101	102

vTRH(C6-C10)/BTEXN in Water						
Our Reference	UNITS	394272-7	394272-8	394272-9	394272-10	394272-12
Your Reference		MW145	MW147	MW148	WDUP101	TS-W101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Date analysed	-	03/11/2025	03/11/2025	03/11/2025	03/11/2025	03/11/2025
TRH C_6 - C_9	µg/L	17	<10	<10	<10	[NA]
TRH C_6 - C_{10}	µg/L	19	<10	11	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	19	<10	11	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	85%
Toluene	µg/L	<1	<1	<1	<1	84%
Ethylbenzene	µg/L	<1	<1	<1	<1	89%
m+p-xylene	µg/L	<2	<2	<2	<2	91%
o-xylene	µg/L	<1	<1	<1	<1	93%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	103	102	102	102	101
Surrogate Toluene-d8	%	97	97	97	98	96
Surrogate 4-Bromofluorobenzene	%	102	101	101	102	102

svTRH (C10-C40) in Water					
Our Reference		394272-7	394272-8	394272-9	394272-10
Your Reference	UNITS	MW145	MW147	MW148	WDUP101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water
Date extracted	-	03/11/2025	03/11/2025	03/11/2025	03/11/2025
Date analysed	-	04/11/2025	04/11/2025	04/11/2025	04/11/2025
TRH C_{10} - C_{14}	µg/L	<50	<50	81	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	240	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	320	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	120	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	120	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	240	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	360	<50
Surrogate o-Terphenyl	%	93	84	111	86

PAHs in Water					
Our Reference	UNITS	394272-7	394272-8	394272-9	394272-10
Your Reference		MW145	MW147	MW148	WDUP101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water
Date extracted	-	03/11/2025	03/11/2025	03/11/2025	03/11/2025
Date analysed	-	05/11/2025	05/11/2025	05/11/2025	05/11/2025
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	86	72	87	85

All metals in water-dissolved						
Our Reference		394272-1	394272-2	394272-3	394272-4	394272-5
Your Reference	UNITS	MW2	MW5	MW9	MW12	MW19
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Date analysed	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Arsenic-Dissolved	µg/L	<1	<1	<1	1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	2	2	4	2	<1
Copper-Dissolved	µg/L	8	22	66	9	1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	2	<1	2	1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	16	9	50	8	6

All metals in water-dissolved						
Our Reference		394272-6	394272-7	394272-8	394272-9	394272-10
Your Reference	UNITS	MW20	MW145	MW147	MW148	WDUP101
Date Sampled		29/10/2025	29/10/2025	29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Date analysed	-	31/10/2025	31/10/2025	31/10/2025	31/10/2025	31/10/2025
Arsenic-Dissolved	µg/L	<1	<1	5	<1	5
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	1	7	3	11	3
Copper-Dissolved	µg/L	<1	4	<1	2	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	<1	25	5	24
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	3	12	9	21	9
Aluminium-Dissolved	µg/L	[NA]	20	300	50	[NA]
Silver-Dissolved	µg/L	[NA]	<1	<1	<1	[NA]
Antimony-Dissolved	µg/L	[NA]	<1	<1	<1	[NA]
Barium-Dissolved	µg/L	[NA]	31	22	80	[NA]
Beryllium-Dissolved	µg/L	[NA]	<0.5	3	<0.5	[NA]
Boron-Dissolved	µg/L	[NA]	30	40	100	[NA]
Cobalt-Dissolved	µg/L	[NA]	3	22	11	[NA]
Iron-Dissolved	µg/L	[NA]	10	9,000	110	[NA]
Lithium-Dissolved	µg/L	[NA]	7	2	9	[NA]
Manganese-Dissolved	µg/L	[NA]	36	110	130	[NA]
Molybdenum-Dissolved	µg/L	[NA]	1	<1	<1	[NA]
Selenium-Dissolved	µg/L	[NA]	<1	3	<1	[NA]
Strontium-Dissolved	µg/L	[NA]	71	19	120	[NA]
Uranium-Dissolved	µg/L	[NA]	<0.5	<0.5	<0.5	[NA]
Vanadium-Dissolved	µg/L	[NA]	4	5	1	[NA]

Metals in Waters - Acid extractable				
Our Reference		394272-7	394272-8	394272-9
Your Reference	UNITS	MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Date prepared	-	03/11/2025	03/11/2025	03/11/2025
Date analysed	-	04/11/2025	04/11/2025	04/11/2025
Phosphorus - Total	mg/L	0.1	<0.05	0.1

Miscellaneous Inorganics				
Our Reference	UNITS	394272-7	394272-8	394272-9
Your Reference		MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Date prepared	-	30/10/2025	30/10/2025	30/10/2025
Date analysed	-	30/10/2025	30/10/2025	30/10/2025
Acidity as $CaCO_3$	mg/L	56	110	83
pH	pH Units	6.3	5.0	5.9
Electrical Conductivity	µS/cm	400	410	590
Redox Potential*	mV	185	135	121
Dissolved Oxygen*	mg/L	7.6	7.4	7.7
Turbidity	NTU	370	50	NT
Total Dissolved Solids (grav)	mg/L	280	280	390
Total Suspended Solids	mg/L	530	78	3,700
Total Organic Carbon	mg/L	6	6	7
Sodium Adsorption Ratio	-	2.4	3.4	3.9
Silica (Reactive - SiO_2)	mg/L	38	8.5	29
Ammonia as N in water	mg/L	0.078	0.20	0.078
Nitrate as N in water	mg/L	0.25	<0.005	0.098
Nitrite as N in water	mg/L	<0.005	<0.005	0.006
NOx as N in water	mg/L	0.25	<0.005	0.10
Total Nitrogen in water	mg/L	1.3	0.3	0.4
TKN in water	mg/L	1.0	0.3	0.3
Phosphate as P in water	mg/L	0.093	0.02	0.065
Organic Nitrogen as N	mg/L	1	<0.2	0.2

Ion Balance				
Our Reference	UNITS	394272-7	394272-8	394272-9
Your Reference		MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Date prepared	-	30/10/2025	30/10/2025	30/10/2025
Date analysed	-	30/10/2025	30/10/2025	30/10/2025
Calcium - Dissolved	mg/L	20	2	23
Potassium - Dissolved	mg/L	3	1	3
Sodium - Dissolved	mg/L	46	49	84
Magnesium - Dissolved	mg/L	4	8.6	6.8
Hardness (calc) equivalent $CaCO_3$	mg/L	67	39	85
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5	<5	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	74	9	55
Carbonate Alkalinity as $CaCO_3$	mg/L	<5	<5	<5
Total Alkalinity as $CaCO_3$	mg/L	74	9	55
Sulphate, SO4	mg/L	50	41	61
Chloride, Cl	mg/L	60	92	110
Ionic Balance	%	-11	-11	-1.0

Microbiologocal Testing				
Our Reference	UNITS	394272-7	394272-8	394272-9
Your Reference		MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Date of testing	-	31/10/2025	31/10/2025	31/10/2025
Thermotolerant Coliforms	MPN/100mL	110	<18	110
E. coli	MPN/100mL	20	<18	20

PFAS in Waters Trace Extended				
Our Reference		394272-7	394272-8	394272-9
Your Reference	UNITS	MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Date prepared	-	03/11/2025	03/11/2025	03/11/2025
Date analysed	-	03/11/2025	03/11/2025	03/11/2025
Perfluorobutanesulfonic acid	µg/L	0.0085	0.0091	0.011
Perfluoropentanesulfonic acid	µg/L	0.002	0.002	0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.002	0.0048	0.0008
Perfluoroheptanesulfonic acid	µg/L	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	0.002	<0.0002	<0.0002
Perfluorodecanesulfonic acid	µg/L	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluoropentanoic acid	µg/L	0.032	0.026	<0.02
Perfluorohexanoic acid	µg/L	0.0066	0.004	0.0083
Perfluoroheptanoic acid	µg/L	0.002	0.0046	0.001
Perfluorooctanoic acid PFOA	µg/L	0.001	0.0021	0.0004
Perfluorononanoic acid	µg/L	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	<0.05	<0.05	<0.05
4:2 FTS	µg/L	<0.002	<0.002	<0.002
6:2 FTS	µg/L	0.0079	0.004	<0.0004
8:2 FTS	µg/L	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	µg/L	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002
Surrogate $^{13}C_8$ *PFOS*	%	99	101	101
Surrogate $^{13}C_2$ *PFOA*	%	83	81	83
Extracted ISTD $^{13}C_3$ *PFBS*	%	39	45	41
Extracted ISTD $^{18}O_2$ *PFHxS*	%	52	61	48
Extracted ISTD $^{13}C_4$ *PFOS*	%	87	83	92
Extracted ISTD $^{13}C_4$ *PFBA*	%	25	25	#

PFAS in Waters Trace Extended				
Our Reference	UNITS	394272-7	394272-8	394272-9
Your Reference		MW145	MW147	MW148
Date Sampled		29/10/2025	29/10/2025	29/10/2025
Type of sample		Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	#	#	#
Extracted ISTD $^{13}C_2$ *PFHxA*	%	68	76	62
Extracted ISTD $^{13}C_4$ *PFHpA*	%	32	35	31
Extracted ISTD $^{13}C_4$ *PFOA*	%	99	110	98
Extracted ISTD $^{13}C_5$ *PFNA*	%	73	78	72
Extracted ISTD $^{13}C_2$ *PFDA*	%	61	64	56
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	65	71	63
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	55	56	73
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	44	45	64
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	33	33	33
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	100	97	108
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	101	125	91
Extracted ISTD $^{13}C_8$ *FOSA*	%	111	100	88
Extracted ISTD d_3 *N MeFOSA*	%	112	115	116
Extracted ISTD d_5 *N EtFOSA*	%	110	113	120
Extracted ISTD d_7 *N MeFOSE*	%	93	104	97
Extracted ISTD d_9 *N EtFOSE*	%	103	103	105
Extracted ISTD d_3 *N MeFOSAA*	%	47	59	52
Extracted ISTD d_5 *N EtFOSAA*	%	80	99	63
Total Positive PFHxS & PFOS	µg/L	0.0035	0.0048	0.0008
Total Positive PFOS & PFOA	µg/L	0.0031	0.0021	0.0004
Total Positive PFAS	µg/L	0.063	0.056	0.022

PFAS in Waters Short			
Our Reference	UNITS	394272-10	394272-11
Your Reference		WDUP101	TB-W101
Date Sampled		29/10/2025	29/10/2025
Type of sample		Water	Water
Date prepared	-	31/10/2025	31/10/2025
Date analysed	-	31/10/2025	31/10/2025
Perfluorobutanesulfonic acid	µg/L	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01
6:2 FTS	µg/L	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	100	104
Surrogate $^{13}C_2$ *PFOA*	%	84	100
Extracted ISTD $^{13}C_3$ *PFBS*	%	96	99
Extracted ISTD $^{18}O_2$ *PFHxS*	%	106	105
Extracted ISTD $^{13}C_4$ *PFOS*	%	103	101
Extracted ISTD $^{13}C_4$ *PFOA*	%	132	108
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	120	108
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	135	117
Total Positive PFHxS & PFOS	µg/L	<0.01	<0.01
Total Positive PFOA & PFOS	µg/L	<0.01	<0.01
Total Positive PFAS	µg/L	<0.01	<0.01

Method ID	Methodology Summary
Ext-008	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-005	Acidity - determined titrimetrically in accordance with APHA latest Edition, 2310-B.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation below:- TDS = EC * 0.6
Inorg-019	Suspended Solids - determined gravimetricially by filtration of the sample. The samples are dried at 104+/-5°C.
Inorg-022	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130-B.
Inorg-035	Analysed using an electrode. Please note that the results for water analyses are indicative only, samples are ideally analysed on collection.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%.
Inorg-055	Nitrate - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-055/062/127	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen. Alternatively analysed by combustion and chemiluminescence.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-060	Phosphate determined colourimetrically based on EPA365.1 and APHA latest edition 4500 P E. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a water extraction.
Inorg-062	TKN - determined colourimetrically based on APHA latest edition 4500 Norg. Alternatively, TKN can be derived from calculation (Total N - NOx).
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Inorg-112	Dissolved Oxygen using membrane electrode. Note this analysis should ideally be carried out immediately after sampling.
INORG-120	Reactive Silica (SiO2) determined colorimetrically. Waters samples are filtered on receipt prior to analysis.

Method ID	Methodology Summary
Metals-020	Determination of various metals/elements by ICP-AES. Total Phosphate determined stochiometrically from Phosphorus (assumed to be present as Phosphate). Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation. Submission of low masses of sample e.g. for dust samples, may result in raised PQLs. Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form.
Metals-020	Calcium and Magnesium analysed by ICP-AES and SAR calculated.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date Extracted	-			31/10/2025	[NT]	[NT]	[NT]	[NT]	31/10/2025	[NT]
Date Analysed	-			03/11/2025	[NT]	[NT]	[NT]	[NT]	03/11/2025	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	119	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	125	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	115	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Toluene-d8	%		Org-023	95	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			31/10/2025	[NT]	[NT]	[NT]	[NT]	31/10/2025	[NT]
Date analysed	-			03/11/2025	[NT]	[NT]	[NT]	[NT]	03/11/2025	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	113	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	115	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Toluene-d8	%		Org-023	95	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			03/11/2025	7	03/11/2025	03/11/2025		03/11/2025	[NT]
Date analysed	-			04/11/2025	7	04/11/2025	04/11/2025		04/11/2025	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	7	<50	<50	0	118	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	7	<100	<100	0	113	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	7	<100	<100	0	114	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	7	<50	<50	0	118	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	7	<100	<100	0	113	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	7	<100	<100	0	114	[NT]
Surrogate o-Terphenyl	%		Org-020	103	7	93	91	2	114	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			03/11/2025	7	03/11/2025	03/11/2025		03/11/2025	[NT]
Date analysed	-			05/11/2025	7	05/11/2025	05/11/2025		05/11/2025	[NT]
Naphthalene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	89	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	87	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	104	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	98	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	91	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	96	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	90	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	7	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	83	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	7	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	82	7	86	79	8	89	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	394272-3
Date prepared	-			31/10/2025	1	31/10/2025	31/10/2025		31/10/2025	31/10/2025
Date analysed	-			31/10/2025	1	31/10/2025	31/10/2025		31/10/2025	31/10/2025
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	90	89
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	89	92
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	81	83
Copper-Dissolved	µg/L	1	Metals-022	<1	1	8	8	0	85	82
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	95	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	83	85
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	93	92
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	16	16	0	85	86
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	99	#
Silver-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	91	74
Antimony-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	86	85
Beryllium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	89	91
Boron-Dissolved	µg/L	20	Metals-022	<20	[NT]	[NT]	[NT]	[NT]	90	87
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	84	87
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	83	76
Lithium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	90
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	82	78
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	80	70
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	88	92
Strontium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	80	82
Uranium-Dissolved	µg/L	0.5	Metals-022	<0.5	[NT]	[NT]	[NT]	[NT]	92	88
Vanadium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	81	85

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	394272-4
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	31/10/2025
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	31/10/2025
Arsenic-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	96
Cadmium-Dissolved	µg/L	0.1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	97
Chromium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	88
Copper-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	90
Nickel-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	89
Lead-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	99
Zinc-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	93
Aluminium-Dissolved	µg/L	10	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	#
Antimony-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	99
Barium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	93
Beryllium-Dissolved	µg/L	0.5	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	99
Boron-Dissolved	µg/L	20	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	91
Cobalt-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	92
Iron-Dissolved	µg/L	10	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	84
Lithium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	99
Manganese-Dissolved	µg/L	5	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	84
Molybdenum-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	79
Selenium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	99
Strontium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	83
Vanadium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]	92

QUALITY CONTROL: Metals in Waters - Acid extractable						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			03/11/2025	8	03/11/2025	03/11/2025		03/11/2025	[NT]
Date analysed	-			04/11/2025	8	04/11/2025	04/11/2025		04/11/2025	[NT]
Phosphorus - Total	mg/L	0.05	Metals-020	<0.05	8	<0.05	<0.05	0	116	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/10/2025	7	30/10/2025	30/10/2025		30/10/2025	[NT]
Date analysed	-			30/10/2025	7	30/10/2025	30/10/2025		30/10/2025	[NT]
Acidity as $CaCO_3$	mg/L	5	Inorg-005	<5	7	56	55	2	112	[NT]
pH	pH Units		Inorg-001	[NT]	7	6.3	[NT]		101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	7	400	[NT]		101	[NT]
Redox Potential*	mV		Inorg-035	[NT]	7	185	[NT]		116	[NT]
Dissolved Oxygen*	mg/L	0.1	Inorg-112	<0.1	7	7.6	[NT]		[NT]	[NT]
Turbidity	NTU	0.1	Inorg-022	<0.1	7	370	[NT]		97	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	7	280	[NT]		98	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	<5	7	530	[NT]		94	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	7	6	[NT]		96	[NT]
Sodium Adsorption Ratio	-	0.01	Metals-020	<0.01	7	2.4	[NT]		97	[NT]
Silica (Reactive - SiO_2)	mg/L	0.1	INORG-120	<0.1	7	38	[NT]		108	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	7	0.078	[NT]		102	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	7	0.25	[NT]		101	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	7	<0.005	[NT]		93	[NT]
NOx as N in water	mg/L	0.005	Inorg-055	<0.005	7	0.25	[NT]		101	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	<0.1	7	1.3	[NT]		113	[NT]
TKN in water	mg/L	0.1	Inorg-062	<0.1	7	1.0	[NT]		[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	<0.005	7	0.093	[NT]		114	[NT]
Organic Nitrogen as N	mg/L	0.2	Inorg-055/062/127	<0.2	7	1	[NT]		[NT]	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	9	30/10/2025	30/10/2025		[NT]	[NT]
Date analysed	-			[NT]	9	30/10/2025	30/10/2025		[NT]	[NT]
Acidity as $CaCO_3$	mg/L	5	Inorg-005	[NT]	9	83	[NT]		[NT]	[NT]
pH	pH Units		Inorg-001	[NT]	9	5.9	5.9	0	[NT]	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	[NT]	9	590	600	2	[NT]	[NT]
Redox Potential*	mV		Inorg-035	[NT]	9	121	[NT]		[NT]	[NT]
Dissolved Oxygen*	mg/L	0.1	Inorg-112	[NT]	9	7.7	[NT]		[NT]	[NT]
Turbidity	NTU	0.1	Inorg-022	[NT]	9	NT	[NT]		[NT]	[NT]
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	[NT]	9	390	[NT]		[NT]	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	[NT]	9	3700	[NT]		[NT]	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	[NT]	9	7	[NT]		[NT]	[NT]
Sodium Adsorption Ratio	-	0.01	Metals-020	[NT]	9	3.9	[NT]		[NT]	[NT]
Silica (Reactive - SiO_2)	mg/L	0.1	INORG-120	[NT]	9	29	[NT]		[NT]	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	[NT]	9	0.078	0.076	3	[NT]	[NT]
Nitrate as N in water	mg/L	0.005	Inorg-055	[NT]	9	0.098	0.095	3	[NT]	[NT]
Nitrite as N in water	mg/L	0.005	Inorg-055	[NT]	9	0.006	0.006	0	[NT]	[NT]
NOx as N in water	mg/L	0.005	Inorg-055	[NT]	9	0.10	0.10	0	[NT]	[NT]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062/127	[NT]	9	0.4	[NT]		[NT]	[NT]
TKN in water	mg/L	0.1	Inorg-062	[NT]	9	0.3	[NT]		[NT]	[NT]
Phosphate as P in water	mg/L	0.005	Inorg-060	[NT]	9	0.065	0.062	5	[NT]	[NT]
Organic Nitrogen as N	mg/L	0.2	Inorg-055/062/127	[NT]	9	0.2	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/10/2025	7	30/10/2025	30/10/2025		30/10/2025	[NT]
Date analysed	-			30/10/2025	7	30/10/2025	30/10/2025		30/10/2025	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	7	20	[NT]		96	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	<0.5	7	3	[NT]		95	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	<0.5	7	46	[NT]		94	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	7	4	[NT]		92	[NT]
Hardness (calc) equivalent $CaCO_3$	mg/L	3	Metals-020	[NT]	7	67	[NT]		[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	7	<5	[NT]		[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	7	74	[NT]		[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	7	<5	[NT]		[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	7	74	[NT]		116	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	7	50	[NT]		118	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	7	60	[NT]		104	[NT]
Ionic Balance	%		Inorg-040	[NT]	7	-11	[NT]		[NT]	[NT]

QUALITY CONTROL: Ion Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	9	30/10/2025	30/10/2025		[NT]	[NT]
Date analysed	-			[NT]	9	30/10/2025	30/10/2025		[NT]	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	[NT]	9	23	[NT]		[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	Metals-020	[NT]	9	3	[NT]		[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	Metals-020	[NT]	9	84	[NT]		[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	[NT]	9	6.8	[NT]		[NT]	[NT]
Hardness (calc) equivalent $CaCO_3$	mg/L	3	Metals-020	[NT]	9	85	[NT]		[NT]	[NT]
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	[NT]	9	<5	<5	0	[NT]	[NT]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	9	55	54	2	[NT]	[NT]
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	9	<5	<5	0	[NT]	[NT]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	[NT]	9	55	54	2	[NT]	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	[NT]	9	61	65	6	[NT]	[NT]
Chloride, Cl	mg/L	1	Inorg-081	[NT]	9	110	120	9	[NT]	[NT]
Ionic Balance	%		Inorg-040	[NT]	9	-1.0	[NT]		[NT]	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			03/11/2025	[NT]	[NT]	[NT]	[NT]	03/11/2025	[NT]
Date analysed	-			03/11/2025	[NT]	[NT]	[NT]	[NT]	03/11/2025	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	110	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	79	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	90	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	81	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	89	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	64	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	130	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	91	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	89	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	118	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	114	[NT]
4:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	109	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	104	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	85	[NT]
10:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	124	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	77	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	118	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	112	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	117	[NT]
MePerfluorooctanesulf-amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	100	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	84	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	95	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	118	[NT]	[NT]	[NT]	[NT]	115	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	106	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	84	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	121	[NT]	[NT]	[NT]	[NT]	129	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	122	[NT]	[NT]	[NT]	[NT]	119	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	81	[NT]	[NT]	[NT]	[NT]	70	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	116	[NT]	[NT]	[NT]	[NT]	125	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	83	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	72	[NT]	[NT]	[NT]	[NT]	64	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	58	[NT]	[NT]	[NT]	[NT]	54	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	177	[NT]	[NT]	[NT]	[NT]	153	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	160	[NT]	[NT]	[NT]	[NT]	145	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	182	[NT]	[NT]	[NT]	[NT]	155	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	107	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	109	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	111	[NT]	[NT]	[NT]	[NT]	108	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	89	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	123	[NT]	[NT]	[NT]	[NT]	124	[NT]

QUALITY CONTROL: PFAS in Waters Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	394272-11
Date prepared	-			31/10/2025	10	31/10/2025	31/10/2025		31/10/2025	31/10/2025
Date analysed	-			31/10/2025	10	31/10/2025	31/10/2025		31/10/2025	31/10/2025
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	10	<0.01	<0.01	0	114	117
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	10	<0.01	<0.01	0	103	86
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	10	<0.01	<0.01	0	105	96
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	10	<0.01	<0.01	0	105	98
6:2 FTS	µg/L	0.01	Org-029	<0.01	10	<0.01	<0.01	0	98	100
8:2 FTS	µg/L	0.02	Org-029	<0.02	10	<0.02	<0.02	0	98	91
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	104	10	100	106	6	98	101
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	97	10	84	89	6	98	92
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	100	10	96	94	2	98	106
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	102	10	106	102	4	106	104
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	96	10	103	93	10	103	96
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	116	10	132	116	13	111	116
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	111	10	120	111	8	117	113
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	128	10	135	126	7	121	120

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Report Comments

Turbidity for #9 not reported due to high sediment present.

All metals in water-dissolved - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

PFAS in water TRACE Extended - For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Microbiology analysed by Sonic Food & Water Testing. Report No. W2524685
The time between collection and the commencement of testing should not exceed 24 hours. Samples tested outside this time may have their results compromised

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E37444BT, Narrabeen
Envirolab Reference	394272
Date Sample Received	30/10/2025
Date Instructions Received	30/10/2025
Date Results Expected to be Reported	07/11/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	All metals in water-dissolved	Metals in Waters - Acid extractable	Acidity as CaCO3	pH	Electrical Conductivity	Redox Potential*	Dissolved Oxygen*	Turbidity	Total Dissolved Solids (grav)	Total Suspended Solids	Total Organic Carbon	Sodium Adsorption Ratio	Silica (Reactive - SiO2)	Ammonia as N in water	Nitrate as N in water	Nitrite as N in water	NOx as N in water	Total Nitrogen in water	TKN in water	Phosphate as P in water	Organic Nitrogen as N	Calcium - Dissolved	Potassium - Dissolved	Sodium - Dissolved	Magnesium - Dissolved	Hardness (calc) equivalent CaCO3	Hydroxide Alkalinity (OH-) as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulphate, SO4	Chloride, Cl	Ionic Balance
MW2					✓																																	
MW5					✓																																	
MW9					✓																																	
MW12					✓																																	
MW19					✓																																	
MW20					✓																																	
MW145	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW147	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW148	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WDUP101	✓	✓	✓	✓	✓																																	
TB-W101																																						
TS-W101		✓																																				

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Sample ID	Microbiologocal Testing	PFAS in Waters Trace Extended	PFAS in Waters Short
MW2			
MW5			
MW9			
MW12			
MW19			
MW20			
MW145	✓	✓	
MW147	✓	✓	
MW148	✓	✓	
WDUP101			✓
TB-W101			✓
TS-W101			

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

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Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

We acknowledge receipt of your samples and Purchase Order (PO) (if provided). If a PO includes your terms & conditions, Envirolab hereby expressly rejects and will not be bound by any external or third-party terms and conditions, including those referenced or attached to a PO.

All services to be performed by Envirolab will be governed exclusively by Envirolab's General Terms and Conditions attached to this acknowledgement (Envirolab Terms) via hyperlink or found on our websites.

If you do not object in writing within two (2) business days of the date of this acknowledgement, you will be deemed to have accepted the Envirolab Terms. In addition, your provision of further instructions, additional samples, payment of any invoice, or acceptance of services or results from Envirolab will constitute acceptance of the Envirolab Terms. For clarity, Envirolab's commencement or continuation of work following receipt of the PO is performed solely under the Envirolab Terms and does not constitute acceptance of any external terms. All rights are expressly reserved.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	JKE Job Number: E37444BT	JKEnvironments
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067		MACQUARIE PARK, NSW 2113
P: (02) 99106200	Date Results Required: STANDARD	P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201		Attention: Katrina Taylor
Attention: Aileen	Page: 1 of 1	ktaylor@jkenvironments.com.au

Location: Narrabeen

Sampler: CB/AR

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Alkalinity suite + Acidity	EC, pH, reddox, DO	Turbidity	TDS, TSS, TOC, SAR	Ionic balance, including hardness	#3	Additional metals: Al, Ag, Sb, Ba, Be, B, Co, Fe, Li, Mn, Mo, Se, Sr, U, V	Silica (reactive) dissolved silica	Nutrient suite	Faecal coliforms + Escherichia (E) coli	VOCs	PFAS (trace - extended)	8 metals	PFAS (short suite)	BTEX
29/10/2025	1	MW2	1x HNO3	-	Water													X		
29/10/2025	2	MW5	1x HNO3	-	Water													X		
29/10/2025	3	MW9	1x HNO3	-	Water													X		
29/10/2025	4	MW12	1x HNO3	-	Water													X		
29/10/2025	5	MW19	1x HNO3	-	Water													X		
29/10/2025	6	MW20	1x HNO3	-	Water													X		
29/10/2025	7	MW145	##	0.1	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	8	MW147	##	0.1	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	9	MW148	##	0.8	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	10	WDUP101	2x amber, 4x BTEX, 1x HNO3, 2xPFAS	-	Duplicate						X					X			X	
[redacted]																				
29/10/2025	11	TB-W101	2x amber, 2x BTEX, 1x HNO3	-	Trip Blank														X	
29/10/2025	12	TS-W101	1x BTEX	-	Trip Spike															X

Remarks (comments/detection limits required):

[redacted] Please send to Envirolab VIC

Sample Containers:

Each sample includes: x2 amber bottles, x4 HCl preserved glass vials, x1 unpreserved plastic bottles, x2 nitric acid preserved bottles (1 is field filtered), x1 sulphuric acid preserved bottle, x1 sterile container and 2x PFAS bottles

Relinquished By: AD	Date: 30/10/25	Time: 10am	Received By: ETS SYD K.chavez	Date: 30/10/25

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 394272

Date Received: 30/10/25
Time Received: 1230
Received By: KC
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

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CERTIFICATE OF ANALYSIS 394506

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E37444BT Narrabeen**
Number of Samples	2 Water
Date samples received	03/11/2025
Date completed instructions received	03/11/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	10/11/2025
Date of Issue	10/11/2025

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Sean McAlary, Senior Chemist
Tabitha Roberts, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

VOCs in water			
Our Reference		394506-1	394506-2
Your Reference	UNITS	MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Date Extracted	-	05/11/2025	05/11/2025
Date Analysed	-	06/11/2025	06/11/2025
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	1	1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1

VOCs in water			
Our Reference	UNITS	394506-1	394506-2
Your Reference		MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	101	99
Surrogate Toluene-d8	%	99	100
Surrogate 4-Bromofluorobenzene	%	95	96

vTRH(C6-C10)/BTEXN in Water			
Our Reference	UNITS	394506-1	394506-2
Your Reference		MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Date extracted	-	05/11/2025	05/11/2025
Date analysed	-	06/11/2025	06/11/2025
TRH C_6 - C_9	µg/L	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	3	2
Surrogate Dibromofluoromethane	%	101	99
Surrogate Toluene-d8	%	99	100
Surrogate 4-Bromofluorobenzene	%	95	96

svTRH (C10-C40) in Water			
Our Reference	UNITS	394506-1	394506-2
Your Reference		MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Date extracted	-	04/11/2025	04/11/2025
Date analysed	-	04/11/2025	04/11/2025
TRH C_{10} - C_{14}	µg/L	150	150
TRH C_{15} - C_{28}	µg/L	610	720
TRH C_{29} - C_{36}	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	760	870
TRH >C_{10} - C_{16}	µg/L	270	270
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	270	270
TRH >C_{16} - C_{34}	µg/L	510	650
TRH >C_{34} - C_{40}	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	780	920
Surrogate o-Terphenyl	%	95	98

PAHs in Water			
Our Reference	UNITS	394506-1	394506-2
Your Reference		MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Date extracted	-	04/11/2025	04/11/2025
Date analysed	-	05/11/2025	05/11/2025
Naphthalene	µg/L	2.5	2.6
Acenaphthylene	µg/L	0.2	0.2
Acenaphthene	µg/L	1.3	1.3
Fluorene	µg/L	0.7	0.7
Phenanthrene	µg/L	0.1	0.1
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5
Total +ve PAH's	µg/L	4.7	4.9
Surrogate p-Terphenyl-d14	%	76	82

HM in water - dissolved			
Our Reference		394506-1	394506-2
Your Reference	UNITS	MW193	WDUP103
Date Sampled		03/11/2025	03/11/2025
Type of sample		Water	Water
Date prepared	-	06/11/2025	06/11/2025
Date analysed	-	06/11/2025	06/11/2025
Arsenic-Dissolved	µg/L	2	2
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	1	1
Copper-Dissolved	µg/L	<1	<1
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	1	1
Zinc-Dissolved	µg/L	28	28

PFAS in Waters Trace Extended		
Our Reference		394506-1
Your Reference	UNITS	MW193
Date Sampled		03/11/2025
Type of sample		Water
Date prepared	-	05/11/2025
Date analysed	-	05/11/2025
Perfluorobutanesulfonic acid	µg/L	0.025
Perfluoropentanesulfonic acid	µg/L	<0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluoroheptanesulfonic acid	µg/L	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	0.014
Perfluorodecanesulfonic acid	µg/L	<0.002
Perfluorobutanoic acid	µg/L	<0.02
Perfluoropentanoic acid	µg/L	0.038
Perfluorohexanoic acid	µg/L	0.030
Perfluoroheptanoic acid	µg/L	0.018
Perfluorooctanoic acid PFOA	µg/L	0.020
Perfluorononanoic acid	µg/L	0.001
Perfluorodecanoic acid	µg/L	<0.002
Perfluoroundecanoic acid	µg/L	<0.002
Perfluorododecanoic acid	µg/L	<0.005
Perfluorotridecanoic acid	µg/L	<0.01
Perfluorotetradecanoic acid	µg/L	<0.05
4:2 FTS	µg/L	<0.002
6:2 FTS	µg/L	<0.0004
8:2 FTS	µg/L	<0.0004
10:2 FTS	µg/L	<0.002
Perfluorooctane sulfonamide	µg/L	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf-amid oacetic acid	µg/L	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.002
Surrogate $^{13}C_8$ *PFOS*	%	101
Surrogate $^{13}C_2$ *PFOA*	%	81
Extracted ISTD $^{13}C_3$ *PFBS*	%	103
Extracted ISTD $^{18}O_2$ *PFHxS*	%	37
Extracted ISTD $^{13}C_4$ *PFOS*	%	102
Extracted ISTD $^{13}C_4$ *PFBA*	%	#

PFAS in Waters Trace Extended		
Our Reference		394506-1
Your Reference	UNITS	MW193
Date Sampled		03/11/2025
Type of sample		Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	#
Extracted ISTD $^{13}C_2$ *PFHxA*	%	47
Extracted ISTD $^{13}C_4$ *PFHpA*	%	35
Extracted ISTD $^{13}C_4$ *PFOA*	%	62
Extracted ISTD $^{13}C_5$ *PFNA*	%	55
Extracted ISTD $^{13}C_2$ *PFDA*	%	53
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	68
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	111
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	64
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	39
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	81
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	73
Extracted ISTD $^{13}C_8$ *FOSA*	%	44
Extracted ISTD d_3 *N MeFOSA*	%	116
Extracted ISTD d_5 *N EtFOSA*	%	118
Extracted ISTD d_7 *N MeFOSE*	%	96
Extracted ISTD d_9 *N EtFOSE*	%	106
Extracted ISTD d_3 *N MeFOSAA*	%	69
Extracted ISTD d_5 *N EtFOSAA*	%	52
Total Positive PFHxS & PFOS	µg/L	0.014
Total Positive PFOS & PFOA	µg/L	0.034
Total Positive PFAS	µg/L	0.15

PFAS in Waters Short		
Our Reference		394506-2
Your Reference	UNITS	WDUP103
Date Sampled		03/11/2025
Type of sample		Water
Date prepared	-	04/11/2025
Date analysed	-	04/11/2025
Perfluorobutanesulfonic acid	µg/L	0.02
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	0.01
Perfluorooctanoic acid PFOA	µg/L	0.02
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99
Surrogate $^{13}C_2$ *PFOA*	%	100
Extracted ISTD $^{13}C_3$ *PFBS*	%	101
Extracted ISTD $^{18}O_2$ *PFHxS*	%	112
Extracted ISTD $^{13}C_4$ *PFOS*	%	102
Extracted ISTD $^{13}C_4$ *PFOA*	%	134
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	170
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	173
Total Positive PFHxS & PFOS	µg/L	0.01
Total Positive PFOA & PFOS	µg/L	0.03
Total Positive PFAS	µg/L	0.05

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date Extracted	-			05/11/2025	[NT]	[NT]	[NT]	[NT]	05/11/2025	[NT]
Date Analysed	-			06/11/2025	[NT]	[NT]	[NT]	[NT]	06/11/2025	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	119	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	113	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			05/11/2025	[NT]	[NT]	[NT]	[NT]	05/11/2025	[NT]
Date analysed	-			06/11/2025	[NT]	[NT]	[NT]	[NT]	06/11/2025	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	114	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	113	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/11/2025	[NT]	[NT]	[NT]	[NT]	04/11/2025	[NT]
Date analysed	-			04/11/2025	[NT]	[NT]	[NT]	[NT]	04/11/2025	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	90	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/11/2025	[NT]	[NT]	[NT]	[NT]	04/11/2025	[NT]
Date analysed	-			05/11/2025	[NT]	[NT]	[NT]	[NT]	05/11/2025	[NT]
Naphthalene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	87	[NT]	[NT]	[NT]	[NT]	82	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date prepared	-			06/11/2025	[NT]	[NT]	[NT]	[NT]	06/11/2025	[NT]
Date analysed	-			06/11/2025	[NT]	[NT]	[NT]	[NT]	06/11/2025	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	110	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			05/11/2025	[NT]	[NT]	[NT]	[NT]	05/11/2025	[NT]
Date analysed	-			05/11/2025	[NT]	[NT]	[NT]	[NT]	05/11/2025	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	109	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	96	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	108	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	110	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	88	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	71	[NT]
4:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	104	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	117	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	95	[NT]
10:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	95	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	67	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	63	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	109	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	93	[NT]
MePerfluorooctanesulf-amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	112	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	96	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	91	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	74	[NT]	[NT]	[NT]	[NT]	74	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	79	[NT]	[NT]	[NT]	[NT]	79	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	87	[NT]	[NT]	[NT]	[NT]	74	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	90	[NT]	[NT]	[NT]	[NT]	83	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	75	[NT]	[NT]	[NT]	[NT]	80	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	82	[NT]	[NT]	[NT]	[NT]	82	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	83	[NT]	[NT]	[NT]	[NT]	85	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	89	[NT]	[NT]	[NT]	[NT]	87	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	78	[NT]	[NT]	[NT]	[NT]	74	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	69	[NT]	[NT]	[NT]	[NT]	53	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	116	[NT]	[NT]	[NT]	[NT]	123	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	127	[NT]	[NT]	[NT]	[NT]	128	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	86	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	119	[NT]	[NT]	[NT]	[NT]	123	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	117	[NT]	[NT]	[NT]	[NT]	124	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	104	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	112	[NT]	[NT]	[NT]	[NT]	111	[NT]

QUALITY CONTROL: PFAS in Waters Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	394506-2
Date prepared	-			04/11/2025	2	04/11/2025	04/11/2025		04/11/2025	04/11/2025
Date analysed	-			04/11/2025	2	04/11/2025	04/11/2025		04/11/2025	04/11/2025
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	2	0.02	0.02	0	111	111
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	97	86
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	2	0.01	0.01	0	104	99
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	2	0.02	0.02	0	101	97
6:2 FTS	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	110	113
8:2 FTS	µg/L	0.02	Org-029	<0.02	2	<0.02	<0.02	0	98	88
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	102	2	99	97	2	104	100
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	111	2	100	97	3	110	101
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	103	2	101	104	3	98	99
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	114	2	112	114	2	113	112
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	104	2	102	103	1	103	99
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	114	2	134	140	4	115	131
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	136	2	170	173	2	134	161
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	150	2	173	182	5	140	167

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Report Comments

PFAS in Water Short - For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

PFAS in water TRACE Extended - For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Envirolab Services Pty Ltd
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customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E37444BT Narrabeen
Envirolab Reference	394506
Date Sample Received	03/11/2025
Date Instructions Received	03/11/2025
Date Results Expected to be Reported	10/11/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	2 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	HM in water - dissolved	PFAS in Waters Trace Extended	PFAS in Waters Short
MW193	✓	✓	✓	✓	✓	✓	
WDUP103	✓	✓	✓	✓	✓		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

We acknowledge receipt of your samples and Purchase Order (PO) (if provided). If a PO includes your terms & conditions, Envirolab hereby expressly rejects and will not be bound by any external or third-party terms and conditions, including those referenced or attached to a PO.

All services to be performed by Envirolab will be governed exclusively by Envirolab's General Terms and Conditions attached to this acknowledgement (Envirolab Terms) via hyperlink or found on our websites.

If you do not object in writing within two (2) business days of the date of this acknowledgement, you will be deemed to have accepted the Envirolab Terms. In addition, your provision of further instructions, additional samples, payment of any invoice, or acceptance of services or results from Envirolab will constitute acceptance of the Envirolab Terms. For clarity, Envirolab's commencement or continuation of work following receipt of the PO is performed solely under the Envirolab Terms and does not constitute acceptance of any external terms. All rights are expressly reserved.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E37444BT Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location:	Narrabeen					Sample Preserved in Esky on Ice										
Sampler:	AD					Tests Required										
Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 3	VOCs	PFAS (trace - extended)	PFAS (short suite)							
3/11/2025	1	MW193	2x amber, 4x BTEX, 2x PFAS	20.1	Water	X	X	X								
3/11/2025	2	WDUP103	2x amber, 4x BTEX, 2x PFAS	-	Duplicate	X	X		X							

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

ENVIROLAB GROUP

Job No. 394506
Date Received: 3/11/25
Time Received: 1525
Received By: RH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers: G1 - 500mL Amber Glass Bottle G2 - 1L Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By: AD	Date: 03/11/25	Time: 12pm	Received By: RH	Date: 3/11/25

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Certificate of Analysis MGK0024

Client Details

Client	JK Environments
Contact	Katrina Taylor
Address	115 Wicks Road, Macquarie Park, NSW, 2113

Sample Details

Your Reference	E37444BT
Number of Samples	1 Water
Date Samples Received	05/11/2025
Date Instructions Received	05/11/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	11/11/2025
Date of Issue	11/11/2025

Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Azrin Akram, Senior Chemist Maggie Hu, Organics Supervisor Tara White, Metals Supervisor Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

Certificate of Analysis MGK0024

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGK0024-01	WDUP102	Water	29/10/2025	05/11/2025

Sample Comments

General Comment	Sample(s) received in sample containers that don't conform to recommended containers. Hence the analytical data may be affected.

Volatile Organic Compounds - Fumigants (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
2,2-Dichloropropane	µg/L	1.0	<1.0
1,2-Dichloropropane	µg/L	1.0	<1.0
cis-1,3-Dichloropropene	µg/L	1.0	<1.0
trans-1,3-Dichloropropene	µg/L	1.0	<1.0
1,2-Dibromoethane	µg/L	1.0	<1.0

Volatile Organic Compounds - MAH (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Benzene	µg/L	1.0	<1.0
Toluene	µg/L	1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0
Styrene	µg/L	1.0	<1.0
ortho-Xylene	µg/L	1.0	<1.0
Isopropylbenzene	µg/L	1.0	<1.0
n-Propylbenzene	µg/L	1.0	<1.0
1,3,5-Trimethylbenzene	µg/L	1.0	<1.0
tert-Butylbenzene	µg/L	1.0	<1.0
1,2,4-Trimethylbenzene	µg/L	1.0	<1.0
sec-Butylbenzene	µg/L	1.0	<1.0
4-Isopropyltoluene	µg/L	1.0	<1.0
n-Butyl benzene	µg/L	1.0	<1.0

Volatile Organic Compounds - Halogenated Aliphatics (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Dichlorodifluoromethane (Freon-12)	µg/L	10	<10
Chloromethane	µg/L	10	<10
Vinyl chloride	µg/L	10	<10
Bromomethane	µg/L	10	<10
Chloroethane	µg/L	10	<10
Trichlorofluoromethane (Freon-11)	µg/L	10	<10
1,1-Dichloroethene	µg/L	1.0	<1.0
trans-1,2-Dichloroethene	µg/L	1.0	<1.0
1,1-Dichloroethane	µg/L	1.0	<1.0
cis-1,2-Dichloroethene	µg/L	1.0	<1.0
Bromochloromethane	µg/L	1.0	<1.0
Chloroform	µg/L	1.0	8.3
1,1,1-Trichloroethane	µg/L	1.0	<1.0
1,1-Dichloropropene	µg/L	1.0	<1.0
Carbon Tetrachloride	µg/L	1.0	<1.0
1,2-Dichloroethane	µg/L	1.0	<1.0
Trichloroethene	µg/L	1.0	<1.0
Dibromomethane	µg/L	1.0	<1.0
Bromodichloromethane	µg/L	1.0	2.6
1,1,2-Trichloroethane	µg/L	1.0	<1.0
1,3-Dichloropropane	µg/L	1.0	<1.0
Tetrachloroethene	µg/L	1.0	<1.0
Dibromochloromethane	µg/L	1.0	<1.0
1,1,1,2-Tetrachloroethane	µg/L	1.0	<1.0
Bromoform	µg/L	1.0	<1.0
1,1,2,2-Tetrachloroethane	µg/L	1.0	<1.0
1,2,3-Trichloropropane	µg/L	1.0	<1.0
1,2-Dibromo-3-chloropropane	µg/L	1.0	<1.0
Hexachlorobutadiene	µg/L	1.0	<1.0

Volatile Organic Compounds - Halogenated Aromatics (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Chlorobenzene	µg/L	1.0	<1.0
Bromobenzene	µg/L	1.0	<1.0
2-Chlorotoluene	µg/L	1.0	<1.0
4-Chlorotoluene	µg/L	1.0	<1.0
1,3-Dichlorobenzene	µg/L	1.0	<1.0
1,4-Dichlorobenzene	µg/L	1.0	<1.0
1,2-Dichlorobenzene	µg/L	1.0	<1.0
1,2,4-Trichlorobenzene	µg/L	1.0	<1.0
1,2,3-Trichlorobenzene	µg/L	1.0	<1.0

Volatile Organic Compounds - Other VOCs (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Cyclohexane	µg/L	1.0	<1.0

Volatile Organic Compounds - Surrogates (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Surrogate Dibromofluoromethane	%		*99.1*
Surrogate Toluene-D8	%		*93.6*
Surrogate 4-Bromofluorobenzene	%		*103*

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
TRH C6-C9	µg/L	10	<10
TRH C6-C10	µg/L	10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0
Benzene	µg/L	1.0	<1.0
Toluene	µg/L	1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0
Surrogate Dibromofluoromethane	%		*99.1*
Surrogate Toluene-D8	%		*93.6*
Surrogate 4-Bromofluorobenzene	%		*103*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	100	130
TRH C29-C36	µg/L	100	<100
Total +ve TRH C10-C36	µg/L	50	130
TRH >C10-C16	µg/L	50	56
TRH >C10-C16 less Naphthalene F2	µg/L	50	56
TRH >C16-C34 (F3)	µg/L	100	110
TRH >C34-C40 (F4)	µg/L	100	<100
Total +ve TRH >C10-C40	µg/L	50	170
Surrogate o-Terphenyl	%		*74.8*

Polycyclic Aromatic Hydrocarbons (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Naphthalene	µg/L	0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10
Fluorene	µg/L	0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10
Anthracene	µg/L	0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10
Pyrene	µg/L	0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10
Chrysene	µg/L	0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10
Surrogate p-Terphenyl-D14	%		*102*

Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Arsenic	µg/L	1.0	<1.0
Cadmium	µg/L	0.10	<0.10
Chromium	µg/L	1.0	12
Copper	µg/L	1.0	2.2
Mercury	µg/L	0.050	<0.050
Nickel	µg/L	1.0	6.8
Lead	µg/L	1.0	<1.0
Zinc	µg/L	1.0	22

PFAS Short List (Water)

Envirolab ID	Units	PQL	MGK0024-01
Your Reference			WDUP102
Date Sampled			29/10/2025
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020
Surrogate 13C8 PFOS	%		*90.6*
Surrogate 13C2 PFOA	%		*101*
Total +ve PFHxS+PFOS	µg/L	0.010	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	<0.010
Total +ve PFAS	µg/L	0.010	<0.010
Extraction Internal Standard 13C3 PFBS	%		*97.4*
Extraction Internal Standard 18O2 PFHxS	%		*90.1*
Extraction Internal Standard 13C4 PFOS	%		*91.2*
Extraction Internal Standard 13C4 PFOA	%		*94.9*
Extraction Internal Standard 13C2 6:2FTS	%		*99.2*
Extraction Internal Standard 13C2 8:2FTS	%		*97.6*

Method Summary

Method ID	Methodology Summary
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-022_PAH	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and solids using DCM/Acetone/Methanol. For PAHs:- Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, for Total +ve calculations, the PQL is reflective of the lowest individual PQL and therefore, for example, "Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-023	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Soils are extracted with Methanol, diluted and analysed by purge and trap GC-MS.
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
ORG-029	Soil/solid and sorbent samples are extracted with basified Methanol. Waters and soil/sorbent extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MSMS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGK0024

Client Details

Client	JK Environments
Your Reference	E37444BT
Date Issued	11/11/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	Yes	No Outliers

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGK0024

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
Fumigants | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
VOC - MAH | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
Halogenated Aliphatics | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
Halogenated Aromatics | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
Other VOC | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
VOC - Surrogates | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
vTRH&MBTEXN | Water	1	29/10/2025	10/11/2025	10/11/2025	Yes
sTRH | Water	1	29/10/2025	06/11/2025	06/11/2025	No
PAH | Water	1	29/10/2025	06/11/2025	06/11/2025	No
Dissolved Metals (LL) | Water	1	29/10/2025	06/11/2025	06/11/2025	Yes
Dissolved Metals (LL)-Hg | Water	1	29/10/2025	06/11/2025	07/11/2025	Yes
PFAS - ISTD (Short) | Water	1	29/10/2025	07/11/2025	07/11/2025	Yes
PFAS-Short | Water	1	29/10/2025	07/11/2025	07/11/2025	Yes

Quality Control MGK0024

ORG-023|Volatile Organic Compounds - Fumigants (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
2,2-Dichloropropane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2-Dichloropropane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	102	103
cis-1,3-Dichloropropene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	102	105
trans-1,3-Dichloropropene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.7	102
1,2-Dibromoethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.9	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-023_F1_TOT|Volatile Organic Compounds - MAH (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	94.2	94.1
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	105	107
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	111	109
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	120	122
Styrene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	118	118
Isopropylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
n-Propylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,3,5-Trimethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
tert-Butylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2,4-Trimethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
sec-Butylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
4-Isopropyltoluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
n-Butyl benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGK0024

ORG-023|Volatile Organic Compounds - Halogenated Aliphatics (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
Dichlorodifluoromethane (Freon-12)	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
Chloromethane	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
Vinyl chloride	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
Bromomethane	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
Chloroethane	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
Trichlorofluoromethane (Freon-11)	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	[NA]	[NA]
1,1-Dichloroethene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
trans-1,2-Dichloroethene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,1-Dichloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	108	105
cis-1,2-Dichloroethene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Bromochloromethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Chloroform	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	105	96.9
1,1,1-Trichloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	108	106
1,1-Dichloropropene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Carbon Tetrachloride	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2-Dichloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	106	108
Trichloroethene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	103	100
Dibromomethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Bromodichloromethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	103	104
1,1,2-Trichloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,3-Dichloropropane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Tetrachloroethene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	107	105
Dibromochloromethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.3	105
1,1,1,2-Tetrachloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Bromoform	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	94.2	95.1
1,1,2,2-Tetrachloroethane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2,3-Trichloropropane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2-Dibromo-3-chloropropane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Hexachlorobutadiene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-023|Volatile Organic Compounds - Halogenated Aromatics (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
Chlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Bromobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
2-Chlorotoluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
4-Chlorotoluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,3-Dichlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,4-Dichlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	107
1,2-Dichlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
1,2,4-Trichlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	95.1	95.7
1,2,3-Trichlorobenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-023|Volatile Organic Compounds - Other VOCs (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
Cyclohexane	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	104	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGK0024

ORG-023|Volatile Organic Compounds - Surrogates (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % MGK0024-01
Surrogate Dibromofluoromethane	*%*		*94.7*	*102 | 101*	*101 | 101*	*93.8*	*92.5*
Surrogate Toluene-D8	*%*		*83.2*	*94.4 | 94.2*	*93.9 | 94.0*	*99.8*	*98.1*
Surrogate 4-Bromofluorobenzene	*%*		*96.1*	*104 | 104*	*104 | 104*	*100*	*101*

Analyte	Units	PQL	Blank	LCS %	Spike % BGK1102-MS2#
Surrogate Dibromofluoromethane	*%*			*98.7*	*100*
Surrogate Toluene-D8	*%*			*101*	*99.2*
Surrogate 4-Bromofluorobenzene	*%*			*100*	*101*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGK1102

Analyte	Units	PQL	Blank	DUP1 BGK1102-DUP1# Samp | QC | RPD %	DUP2 BGK1102-DUP2# Samp | QC | RPD %	LCS %	Spike % BGK1102-MS2#
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	108	100
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	106	98.8
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	96.9	96.3
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	98.9	97.1
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	108	106
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	116	114
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	112	111
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*94.7*	*102 | 101*	*101 | 101*	*98.7*	*100*
Surrogate Toluene-D8	*%*		*83.2*	*94.4 | 94.2*	*93.9 | 94.0*	*101*	*99.2*
Surrogate 4-Bromofluorobenzene	*%*		*96.1*	*104 | 104*	*104 | 104*	*100*	*101*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-020|Semi-volatile TRH (Water) | Batch BGK0668

Analyte	Units	PQL	Blank	DUP1 BGK0668-DUP1# Samp | QC | RPD %	LCS %	Spike % BGK0668-MS1#
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	80.8	63.2
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	76.6	88.1
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	86.3	96.4
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	67.6	65.0
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	78.9	91.0
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	87.0	82.8
Surrogate o-Terphenyl	*%*		*70.7*	*77.1 | 68.0*	*89.8*	*95.9*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGK0024

ORG-022_PAH | Polycyclic Aromatic Hydrocarbons (Water) | Batch BGK0668

Analyte	Units	PQL	Blank	DUP1 BGK0668-DUP1# Samp | QC | RPD %	LCS %	Spike % BGK0668-MS2#
Naphthalene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	99.2	83.2
Acenaphthylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Acenaphthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	110	91.0
Fluorene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	109	90.6
Phenanthrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	110	91.5
Anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Fluoranthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	116	92.5
Pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	121	95.9
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Chrysene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	102	97.4
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20 | <0.20 | [NA]	[NA]	[NA]
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	62.1	80.6
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	[NA]	[NA]
Surrogate p-Terphenyl-D14	*%*		*116*	*121 | 103*	*90.9*	*90.7*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-021 | Dissolved Low Level Metals (Water) | Batch BGK0690

Analyte	Units	PQL	Blank	DUP1 MGK0024-01 Samp | QC | RPD %	LCS %	Spike % BGK0690-MS1#
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	103	100

METALS-022 | Dissolved Low Level Metals (Water) | Batch BGK0692

Analyte	Units	PQL	Blank	DUP1 BGK0692-DUP1# Samp | QC | RPD %	LCS %	Spike % BGK0692-MS1#
Arsenic	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	103	98.9
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	105	98.5
Chromium	µg/L	1.0	<1.0	1.82 | 1.65 | [NA]	104	98.3
Copper	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	102	96.6
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	81.0	80.8
Nickel	µg/L	1.0	<1.0	1.05 | 1.27 | [NA]	103	95.6
Zinc	µg/L	1.0	<1.0	4.10 | 4.88 | [NA]	103	96.8

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-029 | PFAS Short List (Water) | Batch BGK0868

Analyte	Units	PQL	Blank	DUP1 MGK0024-01 Samp | QC | RPD %	LCS %	Spike % BGK0868-MS1#
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	116	92.1
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	123	122
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	122	115
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	111	116
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	116	119
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	119	118
Surrogate 13C8 PFOS	*%*		*93.5*	*90.6 | 91.8*	*91.8*	*90.8*
Surrogate 13C2 PFOA	*%*		*97.4*	*101 | 98.3*	*97.9*	*102*
Extraction Internal Standard 13C3 PFBS	*%*		*88.6*	*97.4 | 98.3 | 0.838*	*[NA]*	*[NA]*
Extraction Internal Standard 18O2 PFHxS	*%*		*87.1*	*90.1 | 91.5 | 1.54*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFOS	*%*		*90.0*	*91.2 | 93.9 | 3.00*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFOA	*%*		*96.3*	*94.9 | 97.3 | 2.51*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 6:2FTS	*%*		*98.4*	*99.2 | 101 | 1.36*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 8:2FTS	*%*		*91.6*	*97.6 | 93.6 | 4.14*	*[NA]*	*[NA]*

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melbourne@envirolab.com.au
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Sample Receipt Advice MGK0024

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your Reference	E37444BT
Envirolab Reference	MGK0024
Date Sample Received	05/11/2025
Date Instructions Received	05/11/2025
Date Final Results Expected	11/11/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
Number of Samples	1 Water
Turnaround Time	4 Days
Temperatures / Cooling Methods	17.6°C Ice Pack

Additional Info

Sample storage - waters are routinely disposed at approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Where no sampling date has been supplied for some or all samples, the date of sample receipt has been used as the associated sampling date. The sampling dates are used to assess compliance to recommended Technical Holding Times.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable

Samples will be analysed per our T&C's.

Please direct any queries to:

Chris De Luca

Phone 03 9763 2500
Email cdeluca@envirolab.com.au

Tianna Milburn

Phone 03 9763 2500
Email tmilburn@envirolab.com.au

Analysis underway, details on the following page

Sample Receipt Advice MGK0024

Comments

General Comment	Sample(s) received in sample containers that don't conform to recommended containers. Hence the analytical data may be affected.

Analysis Grid

The • indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS.***

	Combination 3 (D)	PFAS-Short	VOC Suite
MGK0024-01 Water | 29/10/2025 WDUP102	•	•	•

Suite Details

Suite Name	Suite Analyses
Combination 3 (D) |Water	vTRH&MBTEXN, sTRH, PAH, As - Dissolved (LL), Cd - Dissolved (LL), Cr - Dissolved (LL), Cu - Dissolved (LL), Hg - Dissolved, Ni - Dissolved (LL), Pb - Dissolved (LL), Zn - Dissolved (LL)
PFAS-Short |Water	PFAS - ISTD (Short), PFAS-Short
VOC Suite |Water	Fumigants, VOC - MAH, Halogenated Aliphatics, Halogenated Aromatics, Other VOC, VOC - Surrogates

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E37444BT Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location: Narrabeen
Sampler: CB/AR

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Alkalinity suite + Acidity	EC, pH, reddox, DO	Turbidity	TDS, TSS, TOC, SAR	Ionic balance, including hardness	#3	Additional metals: Al, Ag, Sb, Ba, Be, B, Co, Fe, Li, Mn, Mo, Se, Sr, U, V	Silica (reactive) dissolved silica	Nutrient suite	Faecal coliforms + Escherichia (E) coli	VOCs	PFAS (trace - extended)	8 metals	PFAS (short suite)	BTEX
29/10/2025	1	MW2	1x HNO3	-	Water													X		
29/10/2025	2	MW5	1x HNO3	-	Water													X		
29/10/2025	3	MW9	1x HNO3	-	Water													X		
29/10/2025	4	MW12	1x HNO3	-	Water													X		
29/10/2025	5	MW19	1x HNO3	-	Water													X		
29/10/2025	6	MW20	1x HNO3	-	Water													X		
29/10/2025	7	MW145	##	0.1	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	8	MW147	##	0.1	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	9	MW148	##	0.8	Water	X	X	X	X	X	X	X	X	X	X	X	X			
29/10/2025	10	WDUP101	2x amber, 4x BTEX, 1x HNO3, 2xPFAS	-	Duplicate						X					X			X	
29/10/2025	5/0	**WDUP102	2x amber, 4x BTEX, 1x HNO3, 2xPFAS	-	Duplicate						X					X			X	
29/10/2025	11	TB-W101	2x amber, 2x BTEX, 1x HNO3	-	Trip Blank														X	
29/10/2025	12	TS-W101	1x BTEX	-	Trip Spike															X

Remarks (comments/detection limits required):
** Please send to Envirolab VIC

Sample Containers:
Each sample includes: x2 amber bottles, x4 HCl preserved glass vials, x1 unpreserved plastic bottles, x2 nitric acid preserved bottles (1 is field filtered), x1 sulphuric acid preserved bottle, x1 sterile container and 2x PFAS bottles

Relinquished By: AD	Date: 30/10/25	Time: 10am	Received By: ETS SYD K. Chavez	Date: 30/10/25

Relinquished by: ETS SYD
Katherine Chavez
4/11/25 1120
K.C

Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

Job No: MGK0024

Date Received: 5/11/25
Time Received: 13:30
Received By: JJ
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

17.6°C

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 394272

Date Received: 30/10/25
Time Received: 1230
Received By: KC
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Appendix E: Fieldwork Document

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Environmental Services for SEARS		
Location:	4 Colooli Road, Narrabeen, NSW		
Job	E37444BT		
PID			
Make: Rae systems	Model: MiniRAE	Unit: PID 2	Date of last factory calibration: 4/7/25
Date of calibration: 22/10/25		Name of Calibrator: CB	
Calibration gas: Iso-butylene		Calibration Gas Concentration:	100.0 ppm
Measured reading: 100.4 ppm		Error in measured reading: ± 0.4	ppm
Measured reading Acceptable (Yes/No):			
PID			
Make: Honeywell	Model: MiniRAE Lite+	Unit: 3	Date of last factory calibration: 9/9/25
Date of calibration: 22/10/25		Name of Calibrator: CB	
Calibration gas: Iso-butylene		Calibration Gas Concentration:	100.0 ppm
Measured reading: 100.7 ppm		Error in measured reading: ± 0.7	ppm
Measured reading Acceptable (Yes/No):			
PID			
Make: Honeywell	Model: MiniRAE Lite+	Unit: 3	Date of last factory calibration: 9/9/25
Date of calibration: 24/10/25		Name of Calibrator: CB	
Calibration gas: Iso-butylene		Calibration Gas Concentration:	100.0 ppm
Measured reading: 100.1 ppm		Error in measured reading: ± 0.1	ppm
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration:	100.0 ppm
Measured reading: ppm		Error in measured reading: ±	ppm
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration:	100.0 ppm
Measured reading: ppm		Error in measured reading: ±	ppm
Measured reading Acceptable (Yes/No):			

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Environmental Services for SEARS		
Location:	4 Colooli Road, Narrabeen, NSW		
Job Number:	E37444BT		
DISSOLVED OXYGEN			
Make: YSI 1		Model: —	
Date of calibration: 22/10/25		Name of Calibrator: CB	
Span value: 70% to 130%			
Measured value: 105.1%			
Measured reading Acceptable (Yes)/No):			
pH			
Make: YSI 1		Model: —	
Date of calibration: 22/10/25		Name of Calibrator: CB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 12/25	Lot No: CL031224
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 04/25	Lot No: CC020425
Measured reading of Buffer 1: 7.07			
Measured reading of Buffer 2: 4.11			
Slope: —		Measured reading Acceptable (Yes)/No):	
EC			
Make: YSI 1		Model: —	
Date: 22/10/25	Name of Calibrator: CB		Temperature: 23.2 °C
Calibration solution: Rowe Scientific		Expiry date: 3/26	Lot No: OL120325
Theoretical conductivity at temperature (see solution container): 1359 µS/cm			
Measured conductivity: 1354 µS/cm		Measured reading Acceptable (Yes)/No):	
REDOX			
Make: YSI 1		Model: —	
Date of calibration: 22/10/25		Name of Calibrator: CB	
Calibration solution: Hanna Instruments		Expiry date: 4/25	Lot No: 0675
Theoretical redox value: 240mV			
Measured redox reading: 249.9 mV		Measured reading Acceptable (Yes)/No):	

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Environmental Services for SEARS		
Location:	4 Colooli Road, Narrabeen, NSW		
Job Number:	E37444BT		
DISSOLVED OXYGEN			
Make: YSI 1		Model: 1	
Date of calibration: 23/10/25		Name of Calibrator: CB	
Span value: 70% to 130%			
Measured value: 95.8			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 1		Model: —	
Date of calibration: 23/10/25		Name of Calibrator: CB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 12/25	Lot No: CL031224
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 4/25	Lot No: CC020425
Measured reading of Buffer 1: 6.97			
Measured reading of Buffer 2: 3.97			
Slope: —		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI 1		Model: —	
Date: 23/10/25	Name of Calibrator: CB		Temperature: 26.3 °C
Calibration solution: Rowe Scientific		Expiry date: 3/26	Lot No: DL120325
Theoretical conductivity at temperature (see solution container): 1410 µS/cm			
Measured conductivity: 1462 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI 1		Model: —	
Date of calibration: 23/10/25		Name of Calibrator: CB	
Calibration solution: Hanna Instruments		Expiry date: 4/26	Lot No: 0675
Theoretical redox value: 240mV			
Measured redox reading: 242.0 mV		Measured reading Acceptable (Yes/No):	

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WATER QUALITY METER CALIBRATION FORM

Client: RSL Lifecare Ltd			
Project: Environmental Services fo SEARS			
Location: 4 Calooli Rd, Narrabeen. NSW			
Job Number: E37444 BT			
DISSOLVED OXYGEN			
Make: YSI 1	Model: /		
Date of calibration: 24/10/25	Name of Calibrator: CB		
Span value: 70% to 130%			
Measured value: 99.6 %			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 1	Model: /		
Date of calibration: 24/10/25	Name of Calibrator: CB		
Buffer 1: Theoretical pH = 7.01± 0.01	Expiry date: 12/25	Lot No: CL031224	
Buffer 2: Theoretical pH = 4.01± 0.01	Expiry date: 04/25	Lot No: CC02425	
Measured reading of Buffer 1: 6.94			
Measured reading of Buffer 2: 3.93			
Slope: /	Measured reading Acceptable (Yes/No):		
EC			
Make: YSI 1	Model: /		
Date: 24/10/25	Name of Calibrator: CB	Temperature: 25.2 °C	
Calibration solution: Rowe Scientific	Expiry date: 3/26	Lot No: DL120325	
Theoretical conductivity at temperature (see solution container): 1413 µS/cm			
Measured conductivity: 1419 µS/cm	Measured reading Acceptable (Yes/No):		
REDOX			
Make: YSI 1	Model: /		
Date of calibration: 24/10/25	Name of Calibrator: CB		
Calibration solution: Hanna Instruments	Expiry date: 4/26	Lot No: 0675	
Theoretical redox value: 240mV			
Measured redox reading: 243.1 mV	Measured reading Acceptable (Yes/No):		

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Proposed Seniors Living Development		
Location:	4 Colooli Road, Narrabeen, NSW		
Job Number:	E37444BT		
DISSOLVED OXYGEN			
Make: YSI 4		Model: /	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Span value: 70% to 130%			
Measured value: 102%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI4		Model: /	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 12/25	Lot No: CL03/224
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 4/25	Lot No: CC020425
Measured reading of Buffer 1: 7.14			
Measured reading of Buffer 2: 4.07			
Slope: /		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI 4		Model:	
Date: 29/10/25	Name of Calibrator: CB		Temperature: 15.1 °C
Calibration solution: Rowe Scientific		Expiry date: 3/26	Lot No: 10L120325
Theoretical conductivity at temperature (see solution container):		1143	µS/cm
Measured conductivity: 1018 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI4		Model: /	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Calibration solution: Hanna Instruments		Expiry date: 4/26	Lot No: 0675
Theoretical redox value:	240mV		
Measured redox reading: 239.5 mV		Measured reading Acceptable (Yes/No):	

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Proposed Seniors Living Development		
Location:	4 Colooli Road, Narrabeen, NSW		
Job Number:	E37444BT		
DISSOLVED OXYGEN			
Make: YSI 1		Model: —	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Span value: 70% to 130%			
Measured value: 101.4%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 1		Model: —	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 12/25	Lot No: CL03124
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 4/26	Lot No: CC020425
Measured reading of Buffer 1: 7.02			
Measured reading of Buffer 2: 4.01			
Slope: —		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI 1		Model: —	
Date: 29/10/25	Name of Calibrator: CB		Temperature: 15.1 °C
Calibration solution: Rowe Scientific		Expiry date: 3/26	Lot No: DL12 0325
Theoretical conductivity at temperature (see solution container): 1018 µS/cm			
Measured conductivity: 1193 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI 1		Model: —	
Date of calibration: 29/10/25		Name of Calibrator: CB	
Calibration solution: Hanna Instruments		Expiry date: 4/26	Lot No: 0675
Theoretical redox value: 240mV			
Measured redox reading: 240.8 mV		Measured reading Acceptable (Yes/No):	

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd		
Project:	Proposed Seniors Living Development		
Location:	4 Colooli Road, Narrabeen, NSW		
Job Number:	E37444BT		
DISSOLVED OXYGEN			
Make: YSI 1		Model:	
Date of calibration: 03/11/25		Name of Calibrator: AD	
Span value: 70% to 130%			
Measured value: 99%			
Measured reading Acceptable (Yes/No):			
pH			
Make: YSI 1		Model:	
Date of calibration: 03/11/25		Name of Calibrator:	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date: 12/25	Lot No: CL031224
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date: 04/26	Lot No: CC020425
Measured reading of Buffer 1: 7.01			
Measured reading of Buffer 2: 4.02			
Slope:		Measured reading Acceptable (Yes/No):	
EC			
Make: YSI 1		Model:	
Date: 03/11/25	Name of Calibrator: AD		Temperature: 21.8 °C
Calibration solution: Conductivity standard		Expiry date: 03/26	Lot No: DL120325
Theoretical conductivity at temperature (see solution container): 1332 µS/cm			
Measured conductivity: 1324 µS/cm		Measured reading Acceptable (Yes/No):	
REDOX			
Make: YSI 1		Model:	
Date of calibration: 03/11/25		Name of Calibrator: AD	
Calibration solution: ORP Test Solution		Expiry date: 10/29	Lot No: 0675
Theoretical redox value: 240mV			
Measured redox reading: 236.8 mV		Measured reading Acceptable (Yes/No):	

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WATER QUALITY METER CALIBRATION FORM

Client:	RSL Lifecare Ltd			
Project:	Proposed Seniors Living Development			
Location:	4 Colooli Road, Narrabeen, NSW			
Job Number:	E37444BT			
DISSOLVED OXYGEN				
Make:	YSI	Model:	4	
Date of calibration:	30/10/25	Name of Calibrator:	CB	
Span value: 70% to 130%				
Measured value:	90%			
Measured reading Acceptable (Yes/No):	Yes			
pH				
Make:	YSI	Model:	4	
Date of calibration:	30/10/25	Name of Calibrator:	CB	
Buffer 1: Theoretical pH = 7.01± 0.01		Expiry date:	12/25	Lot No: CL03177A
Buffer 2: Theoretical pH = 4.01± 0.01		Expiry date:	4/26	Lot No: CL020425
Measured reading of Buffer 1:	4.01			
Measured reading of Buffer 2:	3.97			
Slope:		Measured reading Acceptable (Yes/No):	Yes	
EC				
Make:	YSI	Model:	4	
Date:	30/10/25	Name of Calibrator:	CB	Temperature: 19 °C
Calibration solution:	Rowe Scientific	Expiry date:	03/26	Lot No: PL120325
Theoretical conductivity at temperature (see solution container):		900	µS/cm	
Measured conductivity:	µS/cm	Measured reading Acceptable (Yes/No):		
REDOX				
Make:	YSI	Model:	4	
Date of calibration:	31/10/25	Name of Calibrator:	CB	
Calibration solution:	30/10/25	Expiry date:	10/29	Lot No: 0675
Theoretical redox value:	240mV			
Measured redox reading:	mV	Measured reading Acceptable (Yes/No):	Yes	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW2
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	2.97m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development pump	SWL – Before (m):	2.11
Date:	22/10/25	Time – Before:	10.30am
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	2.5L	Time – After:	10.48am
PID Reading (ppm):	0.1		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	2.30	23.7	5.59	629	4.70	1083
2.5	dry	22.8	1.33	598	4.83	1030

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
YSI Used: 1

silty, no recharge

Tested By:	CB
Date Tested:	22/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW5
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	7.7m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development pump	SWL – Before (m):	4.52
Date:	22/10/25	Time – Before:	12.15
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	15L	Time – After:	12.25
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	4.60	19.9	1.67	313.9	5.41	113.3
5		18.2	0.51	287.7	5.49	107.4
10	7.0	18.1	0.49	285.5	5.52	104.0
15	dry	18.1	0.73	287.1	5.48	101.4

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

YSI Used: 1

slow / no recharge

Tested By:	CB
Date Tested:	22/10/25
Checked By:	KT
Date:	26.11.2

Remarks:

- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW9
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	6.35

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev. pump	SWL – Before (m):	5.39
Date:	22/10/25	Time – Before:	11.55
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	2.5	Time – After:	12.10
PID Reading (ppm):	0.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	5.44	21.0	5.34	409.3	5.00	110.9
2.5	dry	20.7	4.43	212.4	4.90	130.2

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
YSI Used: 1

no recharge

Tested By:	CB
Date Tested:	22/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

Client:	RSL Lifecare Ltd	**Job No.:**	E37444BT
Project:	Environmental Services for SEARS	**Well No.:**	MW17
Location:	4 Colooli Road, Narrabeen, NSW	**Depth (m):**	3.86

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev. pump	**SWL – Before (m):**	2.10
Date:	22/10/25	**Time – Before:**	12.30
Undertaken By:	CB	**SWL – After (m):**	dry
Total Vol. Removed:	5L	**Time – After:**	12.46
PID Reading (ppm):	00		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	2.19	19.8	1.77	372.1	5.30	38.9
5	dry	18.7	0.46	398.1	5.48	33.0

Comments:Odours (YES / (NO)), NAPL/PSH (YES (NO)), Sheen (YES (NO)) Steady State Achieved (YES (NO))
YSI Used: 1

no / very slow recharge

Tested By:	CB	**Remarks:**
Date Tested:	22/10/25	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KT	
Date:	26.11.2	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW19
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	5.38

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Development pump	SWL – Before (m):	1.76
Date:	22/10/25	Time – Before:	10.50am
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	15L	Time – After:	10.25am
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	–	23.3	9.59	6.8	5.71	149.2
5		19.9	0.24	3532	5.54	-2.9
10		20.5	0.09	357.6	5.82	-50.8
15	dry	20.6	0.10	351.2	5.83	-53.9

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
YSI Used: 1

very silty, no/slow recharge

Tested By:	CB	**Remarks:**
Date Tested:	22/10/25	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KT	
Date:	26.11.25	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW20
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	4.08

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev-pump	SWL – Before (m):	2.02
Date:	22/10/25	Time – Before:	11.40
Undertaken By:	CR	SWL – After (m):	dry
Total Vol. Removed:	3.5L	Time – After:	11.50am
PID Reading (ppm):	0.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	2.10	22.6	1.82	348.1	5.73	604
3.5	dry	21.6	8.13	341.6	6.07	1097
	✓					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 1

no recharge, silty

Tested By:	CR	**Remarks:**
Date Tested:	22/10/25	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KT	
Date:	26.11.2	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW.147
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	10m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev. pump	SWL – Before (m):	2.65
Date:	23/10/25	Time – Before:	10.30am
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	50L	Time – After:	11.15am
PID Reading (ppm):	0.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5		19.0	3.75	213.9	5.85	-87.5
5		19.1	2.70	276.0	5.70	36.4
10		18.8	2.44	281.0	5.64	26.2
15		18.2	2.57	260.1	5.48	7.0
20	7.33	18.5	1.87	268.2	5.78	-0.2
25		18.6	1.77	271.0	5.83	-1.7
30	8.29	18.6	1.80	294.4	5.86	-3.2
35	9.44	18.8	1.66	250.9	6.05	-12.0
40		19.0	1.51	284.8	5.89	-6.4
45		19.2	0.24	337.2	5.80	-12.2
50	dry	19.3	0.22	320.3	5.75	-23.5

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

YSI Used: 1

recharge observed (slow)

Tested By:	CB	**Remarks:**
Date Tested:	23/10/25	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KT	
Date:	24.11.25	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Environmental Services for SEARS	Well No.:	MW148
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	6m

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev. pump	SWL – Before (m):	1.10
Date:	23/10/25	Time – Before:	2:00 pm
Undertaken By:	CB	SWL – After (m):	dry
Total Vol. Removed:	15 l	Time – After:	2:15 pm.
PID Reading (ppm):	0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	1.31	23.7	6.50	217.4	6.71	273.9
5		20.0	6.92	210.0	6.97	274.8
10	4.35	21.7	6.99	218.2	6.94	275.6
15		20.7	6.78	217.0	6.97	255.1
	dry					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))

YSI Used: 1

slow/no recharge

Tested By:	CB
Date Tested:	23/10/25
Checked By:	KT
Date:	24.11.2

Remarks:

- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

Client:	RSL Lifecare Ltd	**Job No.:**	E37444BT
Project:	Environmental Services for SEARS	**Well No.:**	MW245
Location:	4 Colooli Road, Narrabeen, NSW	**Depth (m):**	6m

WELL FINISH DETAILS

	Gatic Cover ☑	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	New. pump	**SWL – Before (m):**	1.24m
Date:	24/10/25	**Time – Before:**	7.00am
Undertaken By:	CB	**SWL – After (m):**	dry
Total Vol. Removed:	15L	**Time – After:**	7.30
PID Reading (ppm):	0.0		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	–	20.2	6.44	276.6	6.91	274.8
5		19.8	7.86	246.2	6.84	262.1
10	4.38	19.4	7.11	231.1	6.85	272.7
15	dry	19.0	6.28	208.1	6.64	247.2
	✓					

Comments: Odours (YES / (NO)) NAPL/PSH (YES / (NO)) Sheen (YES / (NO)) Steady State Achieved (YES / (NO))

YSI Used: 1

→ no / very slow recharge

Tested By:	CB
Date Tested:	24/10/25
Checked By:	KT
Date:	24.11.25

Remarks:

- Steady state conditions
- Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown
- Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry

JKEnvironments

Client:	RSL Lifecare Ltd	**Job No.:**	E37444BT
Project:	Proposed Seniors Living Development	**Well No.:**	MW193
Location:	4 Colooli Road, Narrabeen, NSW	**Depth (m):**	7.35

WELL FINISH DETAILS

	Gatic Cover ☒	Standpipe ☐	Other (describe) ☐

WELL DEVELOPMENT DETAILS

Method:	Dev Pump	**SWL – Before (m):**	1.07
Date:	31/10/25	**Time – Before:**	12:46
Undertaken By:	OB	**SWL – After (m):**	1.22
Total Vol. Removed:		**Time – After:**	13:36
PID Reading (ppm):	4.6		

Comments:

DEVELOPMENT MEASUREMENTS

Volume Removed (L)	SWL	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0.5	1.15	22.2	7.4	717	7.24	62.3
5		20.9	4.7	819	7.16	60.9
10		20.7	3.5	726	7.36	52.1
15		20.5	5.6	645	7.37	49.0
20	3.05	20.4	6.7	754	7.39	42.1
25		20.9	7.3	835	7.27	29.1
30		20.8	5.9	817	7.21	36.9
35		20.6	6.6	794	7.22	37.3
40	4.58	20.7	6.3	639	7.22	30.1
45		20.5	8.1	807	7.18	26.4
50		20.2	7.9	702	7.13	18.5
55		20.2	7.0	769	7.17	18.5
60	5.20	20.1	6.9	646	7.18	21.2
65		20.4	8.9	812	7.13	20.2
70		20.7	8.1	838	7.11	17.6
75		20.4	8.2	808	7.10	16.7
80	6.10	20.0	8.4	723	7.11	16.0
85		20.5	9.3	852	7.08	15.8
90		20.4	8.8	837	7.07	13.6
95	5.67	20.2	8.1	820	7.07	13.6
100						
		steady	stable	achieved		

silt load lighter

Comments:Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)

YSI Used: 4

grey brown

m silt load hydrocarbon odour

Recharge observed

m recharge

Tested By:	OB	**Remarks:**
Date Tested:	31/10/25	- Steady state conditions - Difference in the pH less than 0.2 units, difference in the conductiveity less than 10% and SWL stable/not in drawdown - Minimum 3 monitoring well volumes purged, unless well purged until it is effectively dry
Checked By:	KT	
Date:	26.11.25	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW2
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	2.97

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer (grab Sample)	SWL – Before:	2.21
Date:	29/10/25	Time – Before:	[illegible]
Undertaken By:	CB	Total Vol Removed:	0.5
Pump Program No:	/	PID (ppm):	/

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	/	0.25		21.0	1.7	691	5.27	84.0
/	/	0.5		21.0	0.8	679	5.23	84.9

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES (NO))
Sampling Containers Used: x glass amber, x BTEX vials, 1 x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4

Tested By: CB	**Remarks:**
Date Tested: 29/10/25	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Checked By: KT	
Date: 26.11.25	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW5
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	7.7

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer (grab sample)	SWL – Before:	4.59
Date:	29/10/25	Time – Before:	11.45
Undertaken By:	CB	Total Vol Removed:	0.75
Pump Program No:	—	PID (ppm):	—

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	—	0.25		17.6	3.7	430.4	5.41	84.3
—	—	0.5		17.6	3.9	424.4	5.36	84.4
—	—	0.75		17.6	3.6	428.1	5.34	84.3

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)
Sampling Containers Used: x glass amber, x BTEX vials, 1 x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4

Tested By: CB	Remarks:
Date Tested: 29/10/25	- Steady state conditions
Checked By: KT	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 26.11.25	

4.59

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW9
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	6.35

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer + peri pump	SWL – Before:	5.34m
Date:	29/10/25	Time – Before:	10.35am
Undertaken By:	CB	Total Vol Removed:	0.75
Pump Program No:		PID (ppm):	/

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	/	0.25		19.4	5.5	598	4.73	90.4
/	/	0.5		19.8	5.8	624	4.71	94.4
/	/	0.75		19.8	5.5	621	4.71	95.7

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4

- bailer in well

Tested By:	CR
Date Tested:	29/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW12
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	3.86

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer (grab sample)	SWL – Before:	2.10
Date:	29/10/25	Time – Before:	10:15
Undertaken By:	CB	Total Vol Removed:	0.75
Pump Program No:	—	PID (ppm):	—

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
—	—	0.25		18.2	6.5	485.4	5.21	96.2
—	—	0.5		18.2	6.3	480.1	5.06	94.7
—	—	0.75		18.1	4.7	480.5	5.05	93.7

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4

Tested By:	CB
Date Tested:	29/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	BH19
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	5.38

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer (grab sample)	SWL – Before:	1.94m
Date:	29/10/25	Time – Before:	9.55
Undertaken By:	CB	Total Vol Removed:	0.75
Pump Program No:	/	PID (ppm):	/

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	-	0.25		19.2	4.7	384.9	5.24	169.3
-	-	0.5		19.1	3.9	388.6	5.15	10.67
-	-	0.25		19.1	7.0	387.4	5.13	105.6

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)
Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4 — L filtered

Tested By:	CB
Date Tested:	29/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW 20
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	4.08

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Bailer (grab sample)	SWL – Before:	@ 2.14m
Date:	29/10/25	Time – Before:	9.30
Undertaken By:	CB	Total Vol Removed:	0.25L
Pump Program No:	/	PID (ppm):	/

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	/	0.25		20.1	3.1	592	5.31	151.8
1	/	0.5		20.0	2.7	480.5	5.41	132.4
3	/	0.75		20.5	2.5	482.7	5.40	128.1

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)
Sampling Containers Used: x glass amber, x BTEX vials, x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: Y1

Silty — Filtered

Tested By:	CB
Date Tested:	29/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

JKEnvironments

Client:	RSL Lifecare Ltd		
Project:	Proposed Seniors Living Development	Job No.:	E37444BT
Location:	4 Colooli Road, Narrabeen, NSW	Well No.:	145
		Depth (m):	5m

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri Pump	SWL – Before:	4.83
Date:	29/10/25	Time – Before:	12:15
Undertaken By:	AR	Total Vol Removed:	2.75
Pump Program No:	—	PID (ppm):	0.1

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	4.92	0.5L	Boiler	18.1	4.68	309.9	6.12	95.0
4	4.95	1.25L		17.6	5.22	318.5	6.10	79.4
8	5.00	2L	YSI Battery died	-	-	-	—	—
12	5.05	2.75		17.5	5.12	321.2	6.02	88.3
			started sampling					
			running out of water					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 2x HNO3 plastic, 1 x H2SO4 plastic, 1 x unpreserved plastic 2 x P FAS
1 x Micro jar
YSI used: 1

Tested By:	AR
Date Tested:	29/10/29
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

Behind shed

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	147
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	10m

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri Pump	SWL – Before:	6.29
Date:	29/10/25	Time – Before:	9:42 am
Undertaken By:	AR	Total Vol Removed:	14.5L
Pump Program No:	—	PID (ppm):	0.1

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	6.31	0.5	Bailer	16.6	5.43	354.1	4.61	24.4
4	6.38	1L	Pump faster	17.4	6.21	345.8	4.42	13.6
8	6.40	1L		18.0	5.95	347.5	4.36	9.8
12	6.42	3.5		18.1	5.68	347.8	4.38	5.5
16	6.43	5		18.1	6.40	347.7	4.43	-0.1
20	6.49	6.5		18.1	5.88	347.9	4.42	-2.0
24	6.50	8		18.0	5.37	346.2	4.44	-2.3
28	6.53	9.5	Pump slow	17.9	4.52	345.0	4.49	-3.3
32	6.45	11		18.6	4.77	347.1	4.53	-6.5
36	6.45	12.5		17.9	4.11	346.9	4.59	-8.6
40	6.45	13.5		17.9	3.77	346.3	4.58	-8.7
44	6.45	14.5		17.9	3.36	346.2	4.59	-9.8
			Started sampling					

Comments: Odours (YES / NO), NAPL/PSH (YES / NO), Sheen (YES / NO), Steady State Achieved (YES / NO)
Sampling Containers Used: 2x glass amber, 4x BTEX vials, 2x HNO3 plastic, 1 x H2SO4 plastic, 1 x unpreserved plastic 2x PFAS 1x Micro jar
YSI used: 1 Sewer odour, Dark blue/grey colour

WOUDIDI: 2x glass amber, 4x BTEX vial, 2x HNO3, 2x PFAS

Tested By: AR	Remarks:
Date Tested: 29/10/25	- Steady state conditions
Checked By: KT	- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Date: 26.11.25	

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW148
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	6

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peri pump	SWL – Before:	12.25
Date:	29/10/25	Time – Before:	4.59
Undertaken By:	CB	Total Vol Removed:	24
Pump Program No:	—	PID (ppm):	0.8

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
0	4.68	0.25		18.5	8.1	626	5.58	79.4
4	4.76	0.35		17.7	4.6	625	5.60	72.5
8	4.84	0.45		17.8	4.4	623	5.59	73.8
12	/	0.55		18.8	5.4	606	5.58	77.6
16	/	0.65		17.4	5.1	609	5.56	77.7
20	5.01	0.75		17.6	5.2	611	5.58	77.4
24	5.07	0.85		17.7	4.5	614	5.58	51.8
			started sampling					
			running out of water					

Comments: Odours (YES / (NO)), NAPL/PSH (YES / (NO)), Sheen (YES / (NO)), Steady State Achieved (YES / (NO))
Sampling Containers Used: x glass amber, x BTEX vials, 1 x HNO3 plastic, x H2SO4 plastic, x unpreserved plastic
YSI used: 4

WDUP102 - #3 - VOC + PFAS

Tested By:	CB
Date Tested:	29/10/25
Checked By:	KT
Date:	26.11.25

Remarks:
- Steady state conditions
- difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown

JKEnvironments

Client:	RSL Lifecare Ltd	Job No.:	E37444BT
Project:	Proposed Seniors Living Development	Well No.:	MW193
Location:	4 Colooli Road, Narrabeen, NSW	Depth (m):	7.35m

WELL FINISH

X	Gatic Cover		Standpipe		Other (describe)

WELL PURGE DETAILS:

Method:	Peristaltic Pump	SWL – Before:	5.22m
Date:	03/11/25	Time – Before:	8:45AM
Undertaken By:	MD	Total Vol Removed:	~7.5L
Pump Program No:	-	PID (ppm):	20.1

PURGING / SAMPLING MEASUREMENTS

Time (min)	SWL (m)	Vol (L)	Notes	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Eh (mV)
8:58	5.32	0.5		20.9	1.81	800	6.79	47.8
9:02	5.47	1.0		20.4	0.66	767	6.72	41.5
9:06	5.61	1.5		20.4	0.44	761	6.70	33.1
9:10	5.66	2.0		20.5	0.49	759	6.69	28.6
9:14	5.70	2.5		20.6	0.58	761	6.70	25.1
9:18	5.74	3.0		20.6	0.75	761	6.69	23
9:22	5.77	3.5		20.7	0.69	759	6.65	20.4
9:26	5.79	4.0		20.8	0.87	753	6.64	18.7
9:30	5.99	4.5		20.2	1.04	738	6.65	18.3
9:34	5.97	5.0		20.6	1.04	743	6.65	17.8
9:38	5.98	5.5		20.7	1.07	748	6.65	17.6
9:42	5.98	6.0		20.9	1.14	750	6.63	17.6
9:46	5.98	6.5		21.0	1.18	754	6.63	17.7

Comments: Odours (YES / NO), NAPL/PSH (YES / NO) Sheen (YES / NO) Steady State Achieved (YES / NO)
Sampling Containers Used: 2 x glass amber, 4 x BTEX vials, 1 x HNO3 plastic, x H2SO4 plastic, 1 x unpreserved plastic
YSI used: 1 Hydrocarbon odour

Tested By: AD	**Remarks:**
Date Tested: 03/11/25	- Steady state conditions - difference in the pH less than 0.2 units, difference in conductivity less than 10% 10% and SWL stable/not in drawdown
Checked By: KT	
Date: 26.11.25	

Appendix F: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by JKE.

The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

A. Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
  - Filter paper for Micropore filtration system; Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/T meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow pump pack and associated tubing; and

- Groundwater sampling forms.

- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

B. <u>Decontamination Procedures for Groundwater Sampling Equipment</u>

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[10] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991)[11].

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.

"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" Keith 1991.

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

[10] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[11] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms; Sample receipt form;
- All sample results reported; All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{\text{(D1 – D2) x 100}}{\{(D1 + D2)/2\}}$$