JM Environments
0427 893 668
37 Tooke St
COOKS HILL NSW 2300
ABN 67 166 341 288

JME20005-5 – 21D and 21F School Drive Tomago

Groundwater Contamination Assessment Report

28 April 2021

For and on behalf of JM Environments

James Mc

James McMahon PhD (Chem)
Principal Environmental Scientist
Certified Environmental Practitioner No 1235
Site Contamination Specialist No SC41110
Licensed Asbestos Assessor LAA001286

james@jmenvironments.com
Mobile: 0427 893 668

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Distributed to	Initials
1	JME20005-5 Groundwater SAQP 21D and 21F School Drive Tomago	Progressive	07/04/2021	JM Environments	JMc
1 x pdf	JME20005-5 Groundwater Contamination Assessment Report 21D and 21F School	Final	25/04/2021	Jackson Environment and Planning	RL

EXECUTIVE SUMMARY

This report presents a Groundwater Sampling and Analysis Quality Plan (SAQP) commissioned by Jackson Environment and Planning Pty Ltd on behalf of Remondis Australia Pty Ltd, and undertaken by JM Environments (JME) for 21D and 21F School Drive, Tomago NSW (the site). The site is identified as Lots 8 and 11 in Deposited Plan (DP) 270328 (as defined in the website maps.six.nsw.gov.au), and is approximately 3.9 hectares in area.

The objectives of this groundwater assessment are to:

- Assess the current groundwater contamination status of Lots 8 and 11; and
- Assess the groundwater flow direction.
- Improve understanding of the contamination status of groundwater beneath the site.

The objectives of the SAQP are to:

- Identify data gaps in the current Conceptual Site Model (CSM);
- Define the vertical and lateral study boundaries of the this phase of site assessment;
- Identify investigation criteria that groundwater results will be compared against;
- Describe the sampling methodologies to be undertaken in order to assess groundwater contamination across the site;
- Describe quality assurance/quality control (QA/QC) procedures to be undertaken while sampling;
- Describe Data Quality Indicators (DQIs) that will be adopted during the assessment; and
- Identify a contingency plan for unexpected conditions.

The site has had a two main industrial land use including sand mining and metal fabrication (steel and aluminium). A soil contamination assessment by JME indicated the site soil in the eastern portion of site was impacted with arsenic, copper, cadmium, lead and zinc. Lead exceeded the human health criteria whilst the remaining metals exceeded the ecological criteria. The RAP prepared by JME recommended the excavation and removal of the significant lead impacted areas with capping and stormwater management to mitigate potential offsite ecological impacts of arsenic, copper, cadmium and zinc.

Groundwater monitoring indicated that the impact of arsenic , cadmium and copper on the groundwater is negligible. Zinc appears to be significantly elevated at MW7 with a concentration of 89 µg/L compared to trigger value of 15 µg/L. The highest zinc soil impacts are associated with the highest lead soil impacts and, as such, are planned to be removed from the site in the remediation process.

PFOS was detected in the downgradient wells up to almost 30 times greater than the adopted DGVs. Although the concentrations in the wells nearer to the Varley site are slightly higher and gradually diminish across the site, the concentrations of PFOS are similar enough in the PFAS impacted wells to consider its presence is unlikely to be caused by onsite migration from the neighbouring site. Therefore, it is considered possible that PFAS was either previously used on site or a significant (bush)fire threatened the site. Either way, the primary source has been removed from site and the groundwater concentrations of PFAS should naturally attenuate with time. No PFOS was detected in the upgradient wells, MW9 and MW9. It is important to note that the PFOS detections were significantly lower than human health trigger values.

The site is within the TAC buffer zone. The TAC buffer zone is a special environment management zone and is define in the TAC conditions of consent and is derived from the ambient fluoride levels associated with TAC operations. Fluoride and aluminium concentrations were largest in the upgradient wells and appeared to diminish the further away from TAC the groundwater well was located. No further action is required for fluoride and aluminium because these will continue to migrate onto site whilst the TAC smelter is still operable. The concentration of fluoride does exceed the drinking water guidelines in some wells and therefore the drinking of groundwater should be strictly prohibited on site.

JME considers that the presences of arsenic, cadmium, copper and lead have not had a significant impact on the groundwater beneath site and do not require any further mitigation to protect the groundwater into the future. It is noted that zinc is significantly elevated in one monitoring well, MW7. The zinc impacted soils with the highest concentrations are associated with the lead impacted soils that are planned to be removed in accordance with the RAP prepared by JME. The RAP also recommends the placement of a cap over the remainder of site. The cap, in conjunction with a storm water system was intended to reduce stormwater percolation through the soil thereby reducing the metal leaching potential.

On this basis, it considered that groundwater specific remediation is not required.

CONTENTS

ATTACHMENTS

Figure 1	Site Location Plan
Figure 2	Groundwater Well Location Plan
Figure 3	Groundwater Contour Plan
Summary Table 1	
Appendix A	Borehole logs
Appendix B	Calibration Certificates
Appendix C	Laboratory Documents

ACRONYMS

ABC	ambient background concentration
ACM	asbestos containing material
AEC	Area of Environmental Concern
ANZECC	Australian and New Zealand Environment and Conservation Council
APHA	American Public Health Association
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BaP	benzo[a]pyrene
BaP TEQ	benzo[a]pyrene toxicity equivalent quotient
BTEX	benzene, toluene, ethylbenzene and xylene
COC	Contaminant of Concern
CoC	Chain of Custody
CSM	Conceptual Site Model
DEC	Department of Environment and Conservation
DO	dissolved oxygen
DP	Deposited Plan
DQI	Data Quality Indicator
DSI	Detailed Site Investigation
EC	electrical conductivity
EIL	ecological investigation level
ENM	Excavated Natural Material
EPA	Environment Protection Authority
ESL	ecological screening level
HIL	health investigation level
HSL	health screening level
HSE	health, safety and the environment
JME	JM Environments
LEP	Local Environmental Plan
LOR	limit of reporting
LTEMP	Long Term Environmental Management Plan
mbgl	metres below ground level
NATA	National Association of Testing Authorities

NEPM	National Environment Protection (Assessment of Site Contamination) Measure
OCP	organochlorine pesticides
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PID	photoionisation detector
PPE	personal protective equipment
PSH	phase separated hydrocarbons
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
RL	relative level
RPD	relative percentage difference
SAQP	Sampling and Analysis Quality Plan
SD	standard deviation
SGS	SGS Australia, Sydney
TPH	total petroleum hydrocarbons
SWMS	Safe Work Method Statement
TCLP	toxicity characteristic leaching procedure
TRH	total recoverable hydrocarbons
UCL	upper confidence limit
USEPA	United States Environment Protection Authority
UST	underground storage tank
VCH	volatile chlorinated hydrocarbons
VOC	volatile organic compounds
WA DoH	Western Australian Department of Health

1 INTRODUCTION

This report presents a Groundwater Sampling and Analysis Quality Plan (SAQP) commissioned by Jackson Environment and Planning Pty Ltd on behalf of Remondis Australia Pty Ltd, and undertaken by JM Environments (JME) for 21D and 21F School Drive, Tomago NSW (the site). The site is identified as Lots 8 and 11 in Deposited Plan (DP) 270328 (as defined in the website maps.six.nsw.gov.au), and is approximately 3.9 hectares in area. The site location is shown in Figure 1.

1.1 Background

1.1.1 General Area Information

The site is located in Tomago NSW. Beneath the site is the Tomago Sand Aquifer. Hunter Water extract water from this aquifer and following treatment the extracted water forms part of the Hunter regions reticulated drinking water supply. Hunter Waters groundwater extraction areas is the north and west of the site. It is expected the regional ground water flow would be toward the Hunter River and a s such groundwater from the site is not likely to affect the quality of groundwater extracted by Hunter Water.

The Williamtown RAAF base is located approximately 9.5km north west of the site. The per- and poly-fluoroalkyl substances (PFAS) groundwater contamination associated Williamtown RAAF base are unlikely to impact on the site's groundwater. Located to the west of the site the Varley Group manufacturing facility. Amongst the specialised vehicle manufactured include fire fighting trucks. On that basis it was considered that testing of new fire trucks, including spraying PFAS foams, feasible.

The Tomago Aluminium Company (TAC) is located just over 200m to the west of the site. It has been smelting aluminium since 1983. The "*Tomago Aluminium Company Pty Ltd Production Capacity Increase 585,000 to 600,000 tonnes Saleable Production Project Description and Statement of Environment Effects*", dated August 2016 reports that fluoride concentrations measured in its "eastern boundary bores" ranged from 5.2-6.6mg/L between 2011 and 2015. JME has assumed that the fluoride concentration are an average of six wells located off the TAC site and in proximity to the TAC eastern boundary.

1.1.2 Detailed Soil Assessment

A Detailed Contamination Assessment (DCA) was prepared by JME, dated 2 June 2020, (herein referred to as JME2005-2).. JME2005-2 reported the site was mostly flat, and divided into two parts. The western part of the site (Lot 11) was paved, and contained two large sheds, and some smaller buildings and water tanks. Beneath the pavement was brown gravelly sand, containing some concrete and brick rubble to a depth of between 1mbgl and 1.8mbgl and was interpreted to be fill. This material was assessed during the construction phase as meeting the criteria for excavated natural material, and for commercial/industrial land use. Light brown fine to medium grained sand beneath the fill was interpreted as representing in-situ, 'natural' material.

The eastern part of the site (Lot 8) was unpaved, and sparsely covered with grass and other low vegetation. Fill mounds including concrete, metal and timber were observed, and concrete beams and concrete-filled tyres had been stockpiled in the northern part of Lot 8.

Fill, comprising brown to black sand, and containing some plastic, road base gravel, brick, concrete, metal and rocks, was observed to a depth of approximately 0.5 - 1mbgl across much of Lot 8. Elevated zinc and copper concentrations in this material were considered to be consistent with the use of sandblasting in the metal manufacturing process.

Beneath the fill, brown sand, interpreted as representing in-situ material, appeared to be largely uncontaminated.

Elevated cadmium, arsenic and lead concentrations were observed in dark sandy material on the surface in the northeast corner of the site. These analytes are commonly found at high concentrations in slag from the Pasminco lead smelter.

Based on this assessment, it was considered that the site had been impacted by contamination comprising heavy metals at concentrations exceeding guideline values for commercial/ industrial land use. JME considers that the site could meet the environmental requirements for commercial/industrial land use subject to the development and successful implementation of an appropriate Remedial Action Plan. In Lot 8, the RAP recommended the excavation and removal of the human health impacted material, capping the remainder of site with a low permeable material and installation of a stormwater drainage system.

1.1.3 Groundwater Monitoring

At the request of Remondis, groundwater contamination was not considered in JME20005-2 for budgetary purposes at the early stages of this project. JME had conducted groundwater monitoring during construction and operational phase of the Midal Cables facility, the previous land use on Lot 11. Midal Cables produced electrical transmission cable from molten aluminium produced at TAC. Midal Cables operated from March 2014-April 2017.

Construction groundwater monitoring was required as part of the consent conditions for the Midal Project. Construction groundwater monitoring was aimed primarily at dewatering areas of the site for building sumps and footings and hence potential activation of potential acid sulfate soils. Hence depth to groundwater and pH were monitored. There was a drop of around 1.1-1.4 pH units in one month of the monitoring, May 2013, which was at the height of the construction dewatering. The pH returned to the normal range in the respective wells the following month.

Operational ground water monitoring was required to satisfy the Operational Environmental Management Plan (OEMP) and the Environmental Protection Licence 20254 (EPL) for the Midal Cables International plant.

The OEMP recognised that there were potential impacts on the local groundwater quality from use of the Waste Water Treatment Plant (WWTP) and spills entering the storm water infiltration system. The OEMP required that:

- Static water level, pH and electrical conductivity (EC) on a monthly basis for the first quarter of operation then quarterly thereafter; and
- Major ions (Ca, Mg, Na, K, Cl, CO_3^{2-}, HCO_3^-, SO_4^{2-}), dissolved metals (Al, As, Cr, Cd, Cu, Fe, Hg, Mn, Ni, Pb, Zn), nutrients (total nitrogen (including ammonia) and total phosphorous), and total petroleum hydrocarbons (TPH (C_6-C_{36})) on an annual basis,

be monitored in one up gradient well (OEMP monitoring well MW6, EPL Point 8) and two down gradient wells (monitoring well MW4/EPL Point 6 and monitoring well MW5/EPL Point 7). Well locations are shown in Figure 2.

The EPL required that:

- Static water level, pH and EC on a monthly basis; and
- Nutrients and hydrocarbons on a quarterly basis,

be monitored in MW4/EPL point 6, MW5/EPL Point 7 and MW6/EPL Point 8.

The final draft 2016 annual groundwater report prepared by JME reported that nutrient levels were analysed for increasing/decreasing trends using the Mann-Kendall module of the ProUCL 5.0 software. The confidence coefficient was set at 0.95 and the level of significance was set at 0.05.

Mann-Kendall analysis indicated:

- A decreasing trend in ammonia at MW4 and MW5;
- An increasing trend in nitrate at MW4 and MW5;
- A decreasing trend in TKN at MW5; and
- An increasing trend in total nitrogen at MW4.

The WWTP was decommissioned around April 2015. A sewage pump out tank system was used in its stead.

1.2 Objectives

The objectives of this groundwater assessment are to:

- Assess the current groundwater contamination status of Lots 8 and 11; and
- Assess the groundwater flow direction.
- Improve understanding of the contamination status of groundwater beneath the site.

The objectives of the SAQP are to:

- Identify data gaps in the current Conceptual Site Model (CSM);
- Define the vertical and lateral study boundaries of the this phase of site assessment;
- Identify investigation criteria that groundwater results will be compared against;
- Describe the sampling methodologies to be undertaken in order to assess groundwater contamination across the site;
- Describe quality assurance/quality control (QA/QC) procedures to be undertaken while sampling;
- Describe Data Quality Indicators (DQIs) that will be adopted during the assessment; and
- Identify a contingency plan for unexpected conditions.

2 CONCEPTUAL SITE MODEL

Based on the summary information above and previous reports a conceptual site model was prepared.

2.1 Site History Summary

The site lies on a former sand mine and hence it is likely that the top 3-4m has been disturbed and the heavy minerals been extracted. "Tailing slimes" often have low permeabilities and are enriched in iron. Post sand mining the site was previously part of larger steel fabrication site. Metal cleaning and polishing via sand blasting was common practice for such a land use. Heavy minerals extracted from sand mining such as rutile and ilmenite and, at times, Pasminco slag sand were used as sandblasting media. From 2012-2013 the western portion of site was redeveloped in the Midal Cables facility. The Midal Cables facility manufactured aluminium transmission cable from molten aluminium sourced from the nearby TAC. During construction the site surface was classified as insitu ENM by JME. Due to the thickness of the concrete slabs and relatively short life of the facility it is considered very unlikely that the Midal operations impacted on the groundwater quality of the site with the exception of a former septic system in the southern portion of Lot 11.

The site is adjacent to a specialised vehicle manufacturer and it is considered likely that hydrocarbons, degreasers and PFAS were used.

TAC is situated to the west of the site. TAC is likely to be up hydraulic gradient from the site.

2.2 Site Condition

The site appears to contain fill extended to approximately 0.3 to 1.0mbgl, and was observed to be primarily sand and include traces to some:

- Brick;
- Ceramics;
- Glass;
- Concrete;
- Coal;
- Ash; and
- Slag.

Contamination, above the adopted guidelines for industrial use, within the fill had been found to include heavy metals (arsenic, cadmium, copper, lead and zinc)

Beneath the fill, a layer of light grey to dark grey sand was observed, interpreted as representing reinstated sand mining tailings.

2.3 Source Zone Characteristics

2.3.1 Primary Groundwater Contaminant Sources

The primary source of impact on the site was considered to be heavy metal contamination resulting from sandblasting media and the metallic surface upon which they were used.

The primary source of offsite groundwater impact is the potential use of hydrocarbons, degreasers and fire fighting foams on the western neighbouring site and the smelting of aluminium further to the west.

2.3.2 Identified Contaminants of Concern

The groundwater chemicals of concern in clude site were considered to include:

- Hydrocarbons:
  - TRH F1
  - TRH F2
  - Benzo[a]pyrene (BaP)
  - Total PAH
- Degreasers (Chlorinated hydrocarbons, CHCs)
- Heavy metals
  - Aluminium
  - Arsenic
  - Cadmium
  - Copper
  - Lead and
  - Zinc
- PFAS

2.4 Contaminant Transport Mechanisms

Primary transport mechanism that were considered to have potential to cause the migration of contamination was predominantly the infiltration of stormwater and groundwater flow.

If present, volatile and semi volatile hydrocarbons (VHC and SVHC) in groundwater have the potential to partition into the air in the soil pore spaces and can move into buildings, ambient air, confined spaces or excavations on a site.

2.5 Contaminant Exposure Pathways

For contaminated soil to pose a risk to a receptor, a complete exposure pathway must exist between the source of the impact and the receptor. A complete exposure pathway consists of the following elements:

- A source and mechanism for release;
- A storage and/or transport medium (e.g. contaminants stored in groundwater and transported into the atmosphere via volatisation);
- An exposure point, where the receptor comes in contact with the contamination; and
- An exposure route (e.g. inhalation).

It was considered that construction and associated earthworks during the proposed redevelopment of the site had the potential to create human health exposure pathways, including:

- Exposure to excavation/construction workers on the proposed development via dermal contact and/or incidental ingestion of COCs in groundwater; and
- Soil gas during excavation could move into the atmosphere, creating an exposure pathway to inhalation by site workers and patrons of nearby premises.
- Inhalation by site users and visitors of soil vapour through joins or fissures in the concrete slab.

Other potential exposure pathways include groundwater dependent ecosystems and surface water at the groundwater discharge point.

2.6 Identification of Receptors at Risk

Potential sensitive receptors were considered to include:

- Site workers;
- Maintenance workers;
- Trespassers; and
- Neighbouring groundwater dependent ecosystems.

TABLE 1: DP2018 CONCEPTUAL SITE MODEL

Known and Potential Primary Sources	Contaminants of Concern	Release Mechanism	Potential Impacted Media	Potential Receptors	Exposure Pathways
Site surface soils	Arsenic, cadmium, copper, lead and zinc	Infiltration of storm water	Groundwater	Site workers Maintenance workers Trespassers Neighbouring groundwater dependent ecosystems	Inhalation Dermal contact Incidental ingestion Uptake of groundwater via the root system
Up hydraulic gradient groundwater	TRH, PAH, BTEX, CHC, PFAS, aluminium and fluoride	On site migration of groundwater	Groundwater and soil vapour		

3 DATA GAP ANALYSIS

The following gaps in the current data set were identified as needing to be addressed in order to gain a more complete understanding of the contamination status of the site.

3.1 Groundwater

The groundwater contamination status for a broad range of contaminants has been monitored on Lot 11 from 2013-2017. Although having a similar previous history, the groundwater contamination status of Lot 8 is unknown.

Additional groundwater assessment was required to increase confidence that groundwater contamination did not represent a significant AEC on the site. Groundwater assessment would assess:

- Depth and flow direction of groundwater beneath the site; and
- Contamination status of groundwater beneath the sites.

Collected data would be used to inform a decision on whether or not groundwater contamination (if present) represented regional contamination, or site-specific impact and whether remediation of groundwater, if required, is practical or not.

4 DATA QUALITY OBJECTIVES

4.1 Step 1 State the Problem

Previous assessments indicated that the site has been used for sand mining, steel manufacturing and aluminium smelting purposes, and that the surface of the site has been covered with uncontrolled fill. The previous site uses have caused the surface soils to be impacted with arsenic, cadmium, copper, lead and zinc. Offsite upgradient groundwater is known to be impacted with fluoride and potentially impacted with VHC, SVHC, CHC, PFAS and aluminium.

Problems to be addressed in this SAQP are:

- The contamination status of the groundwater beneath the site; and
- The extent, if any, of on-site migration of up gradient contamination;
- The impact of groundwater contamination on the proposed site use;
- The groundwater flow direction, hydraulic gradient and groundwater velocity.
- Potential impact of groundwater contamination on sensitive receptors.

4.2 Step 2 Identify the Decisions

The decisions that are required to be made are:

- What is the groundwater contamination status of the site?
- Is groundwater beneath the site being contaminated by on-site contamination;
- Is contamination being transported off site via groundwater migration;
- Is contamination being transported on site via groundwater migration; and
- Is remediation of the groundwater required?

4.3 Step 3 Identify the Inputs into the Decision

The primary inputs to the decision regarding soil contamination described in Step 2 are:

- Analytical results from groundwater samples collected by JME;
- Survey data and depth to groundwater data;
- Groundwater pump test data; and

- Assessment of analytical results against investigation criteria.

The primary inputs to the decision regarding groundwater contamination described in Step 2 are:

- Groundwater gradient obtained from current and proposed groundwater wells on and near the site;
- Groundwater analytical results from neighbouring locations (where available);
- Analytical results from groundwater samples collected by JME; and
- Assessment of analytical results against investigation criteria.

4.3.1 Groundwater Assessment Criteria

Drinking Water

Because the site is located in an area with a reticulated water supply, it is unlikely that groundwater would be used for domestic drinking purposes. No current registered bores exist for this purpose. Likewise, it was considered unlikely groundwater would be used for recreational purposes, such as the filling of swimming pools, in an area with a reticulated water supply.

Due to the shallow (<1m) depth of groundwater beneath the site, it was considered that trench workers may potentially contact and incidentally ingest groundwater seepage in trenches on the site.

Drinking water validation criteria were established from:

- National Health and Medical Research Council (NHMRC) Australian Drinking-Water Guidelines 6, Version 3.4 Updated October 2017. National Water Quality Management Strategy;
- World Health Organization (WHO)2017 Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum; and
- USEPA RSLs Residential Tap Water Criteria. Online database of assessment criteria that are current as of November 2017.

It was considered that incidental ingestion would only involve small amounts of groundwater, therefore a factor of 10 has been applied to non-carcinogenic contaminant criteria. It is noted that NHMRC guidelines for toluene, ethyl benzene and xylene were not adjusted by a factor of ten as they are based on the inhalation exposure pathway only. Criteria derived by the USEPA for carcinogenic compounds were multiplied by x10 to adjust the target cancer risk level from 1:1,000,000 to 1:100,000, to be consistent with Australia’s recommended target cancer risk level.

Groundwater Vapour

Due to the proposed redevelopment incorporating ground floor offices, vapour intrusion was considered to be a potential exposure pathway on the site.

Groundwater beneath the site is expected to be about 2m below ground surface. CRC CARE Technical Report No. 10 Health screening levels for petroleum hydrocarbons in soil and groundwater states that at depths of <2m, soil vapour measurements should be compared with soil vapour HSLs. Soil vapour HSLs have been sourced from Table 1A(3) Soil HSLs for vapour intrusion – Low-high density residential, in the NEPM Schedule B1, Guideline on Investigation Levels for Soil and Groundwater (see Section 5.3).

CRC CARE Technical Report No. 10 provides HSLs for contaminants in soil vapour in Table B1 Soil Vapour Health Screening Levels. Soil Vapour criteria were established for Intrusive Maintenance Worker (Shallow Trench) – 0m to <2m, as well as for HSL-D (Commercial/Industrial) use.

Adopted criteria are shown in Table 2 (below).

Protection of Aquatic Ecosystems

The investigation levels presented on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) website are considered applicable for the protection of the ecosystems of receiving waters. As these guidelines apply to receiving waters, it is generally conservative to apply these to groundwater on site.

ANZG advocates a site-specific approach to developing guideline trigger values, based on such factors as local biological effects data, the current level of disturbance of the ecosystem, etc. The guidelines provide detailed approaches and advice on identifying appropriate guideline values for selected indicators. These guideline values help to ensure that agreed community values and their management goals are protected.

The nearest surface water receptor is in the tidal zone of the Hunter River, approximately 890m south of site. The default guideline values from ANZG were based on slightly to moderately disturbed marine water.

Adopted criteria are shown in Table 2 (below).

TABLE 2: ADOPTED GROUNDWATER CONTAMINANT TRIGGER VALUES

Analyte Name	Units	Adopted Trigger Value	Reliability/Comment
Benzene	µg/L	500	moderate
Toluene	µg/L	180	unknown
Ethylbenzene	µg/L	80	unknown
m/p-xylene	µg/L	75	unknown
o-xylene	µg/L	350	unknown
Chloroform	µg/L	370	unknown
1,1,2,2-Tetrachloroethylene	µg/L	70	unknown
1,1,2-Trichloroethylene	µg/L	330	unknown
1,1-Dichloroethylene	µg/L	700	unknown
Chloroethylene	µg/L	100	unknown
1,1,1-Trichloroethane	µg/L	270	unknown
1,1,2,2-Tetrachloroethane	µg/L	400	unknown
1,1,2-Trichloroethane	µg/L	1,900	unknown
1,2-Dichloroethane	µg/L	1,900	unknown
1,1-Dichloropropane	µg/L	500	unknown
1,2-Dichloropropane	µg/L	900	unknown
1,3-Dichloropropane	µg/L	1,100	unknown
TRH C6-C10 (F1)	µg/L	50	unknown
TRH >C10-C16 (F2)	µg/L	60	LOR
TRH >C16-C34 (F3)	µg/L	500	LOR
TRH >C34-C40 (F4)	µg/L	500	LOR

Analyte Name	Units	Adopted Trigger Value	Reliability/Comment
Naphthalene	µg/L	50	moderate
Phenanthrene	µg/L	0.6	unknown
Anthracene	µg/L	0.01	unknown
Fluoranthene	µg/L	1.0	unknown
Benzo(a)pyrene	µg/L	0.1	unknown
Arsenic	µg/L	13*	unknown
Cadmium, Cd	µg/L	0.7	very high
Chromium, Cr (VI)	µg/L	4.4	very high
Copper, Cu	µg/L	1.3	very high
Lead, Pb	µg/L	4.4	low
Nickel, Ni	µg/L	7	very high
Zinc, Zn	µg/L	15	moderate
Aluminium (pH>6.5)	µg/L	55*	unknown
Mercury	µg/L	0.1	very high
PFOS	µg/L	0.00023	unknown
PFOA	µg/L	19	unknown
Fluoride	mg/L	15	Australian Drinking Water guideline x 10

4.4 Step 4 Define the Site Boundaries

The lateral extent of the site was defined as Lots 8 and 11 in Deposited Plan (DP) 270328 (as defined in the website maps.six.nsw.gov.au).

The vertical extent of assessment was defined as groundwater up to 2m below the apparent groundwater table.

This assessment was expected to take place within April 2021.

4.5 Step 5 Develop an Analytical Approach

The analytical approach will be as follows:

- DQIs will be applied as per Section 8.1. If the results of the analytical data validation are acceptable with respect to the DQIs, then the data will be deemed suitable for the purposes of this assessment; and
- Results from previously and newly installed groundwater monitoring wells will be assessed. If contaminant concentrations are less than the trigger values established in Section 4.3.1, or are considered to be comparable to regional values, then it will be considered that no groundwater-specific remediation is required. Otherwise, appropriate contingency measures will be assessed.

4.6 Step 6 Specify the Performance or Acceptance Criteria

The null hypothesis was that groundwater beneath the site has not been significantly contaminated by current and previous on and offsite activities.

Potential decision errors are considered to include:

- Sampling errors, which occur when collected samples are not representative of conditions within the investigation area; and
- Measurement errors, which occur during sample collection, handling, preparation, analysis and data production.

These errors may lead the decision maker to make the following errors:

- Deciding that the investigation area is suitable for industrial/commercial land use when it is actually not; and
- Deciding that the investigation area is not suitable for r industrial/commercial land use when it actually is.

An assessment will be made as to the likelihood of a decision error being made based on the results of the QA/QC assessment, and the closeness of analytical results to the investigation criteria outlined in Section 4.3. It is considered that a margin for error is accounted for by the level of conservatism built into guideline trigger values.

4.7 Step 7 Optimise the Design for Obtaining Data

In order to optimise the quality of data collected, JME will use:

- Licensed drillers and experienced JME field staff to install wells and collect samples;
- Registered surveyors to survey the wells;
- Calibrated equipment to collect field data; and
- NATA-accredited laboratories. Laboratory analysis will be in accordance with the requirements of the NEPM (Schedule B3) and will be referenced to USEPA or APHA methods.

Details of sampling methods and analytical requirements are discussed in Section 5.

5 SAMPLING PLAN

5.1 Groundwater Assessment

In order to assess the contamination status of groundwater beneath the site, JME proposes to install three groundwater monitoring wells across the site – one up-gradient wells near the western boundary, and two down-gradient wells near the eastern boundary. JME will also utilise three existing wells used for the operational groundwater monitoring of the Midal Cables Facility. It is intended that the positioning of these wells will allow for:

- Assessment of groundwater gradient and flow direction;
- Comparison of the contamination status of groundwater entering and leaving site;
- Assessment of the impact of on-site contamination of groundwater;
- Comparison of current groundwater conditions with historic groundwater conditions; and
- Assessment of potential for off-site migration of groundwater to cause on-site contamination to impact a receiving body of water.

5.2 Installation of Wells

Boreholes will be drilled using a drilling rig fitted with hollow flight augers, and logged to record changes in lithology and sampling intervals. Particular note will be made of the base of fill, and depth at which groundwater is encountered, based on the driller's observations and visual observation of samples.

In each well, 3m of machine-slotted 50mm PVC screen will be installed over an interval from 2m below to 1m above the perceived top of groundwater. 50mm solid PVC casing will be installed from the top of the slotted screen to approximately 0.5m above the ground surface. The annulus around the casing will be filled with clean coarse sand and gravel to approximately 0.3m above the top of the slotted casing. Bentonite will be placed in the annulus above the sand, and protruding casing will be left in place as a standpipe.

Following installation, groundwater wells will be developed using a Typhoon™ submersible pump to surge the hole, and then to rapidly pump out accumulated groundwater. This procedure is designed to remove from the hole sediment and water stirred up during drilling operations.

5.3 Sampling Plan

Groundwater gauging and sampling collection will be conducted approximately one week after the installation of groundwater wells, to allow them to settle and equilibrate. Sampling will be conducted in accordance with the following protocols:

- Prior to purging, the presence or absence of phase separated hydrocarbons (PSH) and depth to groundwater will be measured using an oil-water interface probe;
- Prior to sampling, each well will be purged using a low flow peristaltic pump until uniform turbidity is (visually) obtained, and field water quality parameters (electrical conductivity (EC), pH and temperature) have stabilised to within 10% difference for three successive readings at least three minutes apart. If water quality parameters do not stabilise, groundwater will not be sampled until at least three times the volume of the sampling equipment has been purged; and
- Field measurements - pH, EC, temperature, dissolved oxygen (DO) and redox potential (Eh) – will be recorded during purging.

Sampling QA/QC protocols are described in Section 8.

6 HEALTH, SAFETY AND THE ENVIRONMENT

6.1 Hazards and Control Measures

During drilling and sampling operations, there is potential for hazards to be encountered that present risks to health, safety and the environment (HSE). These risks will be addressed via the use of Safe Work Method Statements (SWMS), including considerations as detailed in Table 3.

TABLE 3: HSE HAZARDS and CONTROL MEASURES

Activity	Hazard	Control
Set up on site	Interaction with other site users	Sign onto site register
		Demarcate work area, exclusion zone
Drilling	Noise	Hearing protection
	Interaction with rig/excavator	Exclusion zone
		Communicate with operators
Excavation	Dust	Air fibre monitoring
		Dust masks
	Open excavations	Fence site
		Backfill as soon as practicable
	Interaction with rig/excavator	Exclusion zone
		Communicate with operators
Sampling	Sharp/abrasive fill	Neoprene gloves
	Contaminated fill/groundwater	Nitrile gloves
Asbestos assessment	Airborne asbestos fibres	Suit and mask

6.2 Personal Protective Equipment

Personal Protective Equipment (PPE) for the site will include:

- Hard hat;
- Safety glasses;

- Hi-visibility workwear;
- Long sleeves and trousers;
- Steel-capped boots;
- Chemical resistant rubber gloves (for persons coming in contact with soil); and
- Dust resistant disposable overalls and P1 (minimum) dust masks (when handling potentially asbestos contaminated soil).

7 ANALYSIS PLAN

Groundwater samples will be analysed for the analytes listed in Table 2 above.

Primary and intra laboratory duplicate samples will be analysed by SGS Australia (SGS), Sydney. Laboratory analysis will be in accordance with the requirements of the NEPM (Schedule B3) and will be referenced to USEPA or APHA methods. Laboratory analytical methods are summarised in Table 4. Inter laboratory duplicate samples will be analysed by ALS Environmental (ALS) Sydney Laboratory. SGS and ALS are NATA accredited for the analysis to be undertaken.

TABLE 4: SUMMARY OF ANALYTICAL METHOD REFERENCES

Analysis	Medium	SGS Reference
TRH	Water	USEPA 5030B, 8020A, 8260, 3510B and 8015B
PAH	Water	USEPA 3500C and 8270D
Metals	Water	USEPA 6020A
Mercury	Water	APHA 3112 and 3500
VOC	Water	USEPA 5021A/8260 P&T/HS/GC/MS
PFAS	Water	In house LC-MS/MS
Fluoride	Water	APHA 4110 B

8 QUALITY ASSURANCE/QUALITY CONTROL PLAN

The QA/QC plan is designed to achieve predetermined DQIs that will demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated.

8.1 Data Quality Indicators for the Project

DQIs for the project will be based on field and laboratory considerations in the table in Appendix V of the NSW Department of Environment and Conservation (DEC) Guidelines for the NSW Site Auditor Scheme (2nd Edition) Contaminated Sites. Specific DQIs for field and laboratory QA/QC samples are shown in Table 5.

TABLE 5: DATA QUALITY INDICATORS

Type of Quality Control Sample	Control Limit
Duplicate Samples	RPDs within 50% for analyte concentrations greater than 5 x LOR.
Rinsate Samples (deionised water)	Analytes not detected at concentrations greater than the blank deionised water.
Laboratory Spikes	Laboratory spike acceptance limits are a "live" range and updated regularly. The laboratory acceptance limits at the time of analysis will be used.
Laboratory Blanks	Analytes not detected.

A review of the DQIs will be undertaken to assess the usability and representative nature of data generated from the project. The outcome of the DQI assessment will either:

- Recommend the data is suitable to be used for the project; or
- Limit the suitability of the data to be used, or

- Recommend further contamination/validation sampling.

8.2 Sampling Protocols

The following sampling protocols will be observed during the project:

- Dedicated sampling equipment (including the silicon tubing in the peristaltic pump) will be used for groundwater sample collection and will be changed between each sampling location.
- HDPE tubing will be used for groundwater sampling as it considered to present a lower risk of PFAS contamination of the samples.
- Groundwater samples will be collected in appropriate laboratory-supplied vessels;
- Samples will be placed on ice awaiting dispatch to the laboratory;
- Samples will be dispatched to the laboratory under chain of custody (CoC) conditions. CoC documentation will include:
    - sample identification of each sample;
    - date sampled; and
    - date dispatched to the laboratory; and
- Samples will be dispatched within two days of collection, to avoid holding time exceedances.

8.3 Field Quality Control Samples

The following quality control samples will be collected in the field:

- Intra and inter-laboratory duplicates will be collected at the rate of 1 per 20 primary samples collected; and
- A rinsate sample will be collected on every day that non-dedicated or non-disposable sampling equipment is utilised. Rinsate water will be deionised water purchased from a hardware store.

8.4 Laboratory Quality Control

Laboratory quality control protocols will include the following:

- Laboratory analysis of samples will be undertaken by a NATA-accredited environmental testing laboratory;
- The laboratory will implement a quality control plan conforming to the NEPM Schedule B3 Guidelines for Analysis of Potentially Contaminated Soils;
- The laboratory will analyse reagent blanks, spike samples, duplicate spikes, matrix spikes, and surrogate spikes and duplicates to assess the laboratory's quality control; and
- The laboratory will extract and/or analyse the samples within the required holding times.

9 POST-ASSESSMENT ACTION PLAN

9.1 Data Assessment

Field observations, particularly those related to depths of groundwater and fill, will be used to revise the CSM as described in Section 2.

Analytical results will be compared with assessment and validation criteria as outlined in Section 4.3.1.

9.2 Requirement for Groundwater Remediation

The consideration that the leaching of contamination from fill on the site to groundwater or on site migration of contaminated groundwater, and subsequent off-site movement of contamination via groundwater migration, does not represent a significant risk of environmental impact will be considered to be supported if:

- Analytes are not detected at concentrations above the laboratory limit of reporting, or above the trigger values listed in Section 4.3.2; OR
- Groundwater contamination is found to be consistent with samples collected from nearby locations in the same historic land use setting; OR
- The primary source of groundwater contamination has been removed or will be managed/remediated.

In this case, it will be considered that site contamination is not being transported off-site via groundwater migration, and that no groundwater-specific remediation is required.

If field observations and analytical results indicate that contamination is being transported off-site via groundwater migration, the CSM and RAP will be revised.

10 GROUNDWATER ASSESSMENT

10.1 Field Work

Three groundwater monitoring wells (MW7 – MW9) were installed on 6 April 2021 by the FICO group, under the guidance of a JME environmental scientist. The wells were installed as per the requirements of the SAQP.

Construction details of monitoring wells are represented graphically in Appendix A.

Groundwater monitoring wells were left for a week to allow them to settle and equilibrate. Groundwater gauging and sample collection from MW7 – MW9, plus pre-existing monitoring wells MW4-MW6, was conducted by a JME environmental scientist on 13 April 2021. Monitoring wells were sampled in accordance with the SAQP.

Groundwater depths and field parameters are recorded in Table 5 (below).

Following sampling monitoring wells MW7 and MW 8, a typhoon pump was placed down each well to maintain a constant groundwater head. The extracted water was collected in pre-weighed buckets over an 8-10 period. The time was kept with an iPhone stopwatch. The water in the bucket s was weighed on a top load balance. The groundwater head was measured using an interface probe.

10.2 Laboratory Analysis

Primary and inter duplicate and intra laboratory groundwater samples were analysed by SGS Australia (SGS), Sydney. The chain of custody did not direct SGS to forward the inter laboratory duplicate to ALS. This error was not noticed until after the analysis had been completed.

Samples were analysed for:

- PFAS;
- Fluoride
- Metals (Al, As, Cd, Cr, Cu, Ni, Pb, Zn, Hg);
- Volatile organic compounds (VOC);

- PAH; and
- TRH.

10.3 Quality Assurance and Quality Control

Groundwater monitoring wells were installed by drillers licensed to install such wells, and experienced JME field staff.

The interface probe and water quality meter were calibrated prior to use. Calibration certificates are attached in Appendix B.

Dedicated sampling equipment (excluding the flow cell) was used for groundwater sample collection and changed between each sampling location. The flow cell was purged between each sampling location, and not used during sample collection.

Groundwater samples were collected in appropriate laboratory-supplied vessels, kept on ice during transport, and received by the laboratory at a temperature of 3.1°C. Samples were transported under CoC conditions, and received by the laboratory with sufficient time to undertake analyses within specified holding times.

During the assessment, field duplicate (QC1) and triplicate (QC1A) groundwater samples were collected and analysed to assess whether field sampling procedures provided reproducible results. The relative percentage difference (RPD) of analyte concentrations between duplicates and their primary sample were calculated to be within the acceptance criterion of 50% for concentrations greater than 5x the laboratory limit of reporting.

RPD results are included in Summary Table 1 (attached).

An equipment blank sample (QCA) was not collected, However, identical sampling trains from the same supplier have previously assessed by JME and shown not to introduce PFOA or PFOS. In addition, PFOA or PFAS was not detected in two of the samples analysed. Hence it is considered unlikely that PFOA or PFOS were introduced by the sampling train.

Groundwater quality assurance/quality control (QA/QC) results are presented in Summary Table 1 (attached).

SGS is National Association of Testing Authorities (NATA)-accredited for the analyses requested. SGS conducted internal quality control using spikes, laboratory duplicates and method blanks. A review of SGS's Data Quality Objective (DQOs) for the analysis of soil samples indicated that DQOs were met, with the following exceptions:

- Surrogate analysis for PFAS in Aqueous Samples - Low Level for two items; and
- Surrogate analysis for PAH in Water for two items.

It should be noted that the surrogate recovery for the PFAS compounds of interest were within

Laboratory QA/QC documentation is included in Appendix C.

Based on a review of QA/QC results it is considered that analytical results are indicative of the contamination status of the site at the time of sampling.

10.4 Results

10.4.1 Field Observations

Groundwater depths are listed in Table 5, and borehole logs are included in Appendix A.

TABLE 5: MONITORING WELL GROUNDWATER PROPERTIES 27 February 2020

Well	Top of Case Elevation (mAHD)	Groundwater Depth (mbTOC)	Calculated Groundwater Elevation (mAHD)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)	Temperature (°C)
MW4	5.07	1.534	3.536	0.25	630	6.45	-149	23.5
MW5	5.19	1.636	3.554	0.98	617	6.78	-180	22.3
MW6	7.05	2.667	4.383	8.73	94.4	5.15	-118	20.9
MW7	6.04	2.199	3.841	2.02	244	5.96	-148	22.6
MW8	6.13	2.241	3.889	2.16	224	5.67	-150	22.5
MW9	7.22	2.904	4.316	2.45	200	5.73	-148	22.8

10.4.2 Groundwater Flow Direction Groundwater Gradient and Infiltration Rate

The tops of the casing of groundwater wells MW4 -MW9 were surveyed by registered surveyors DeWitt Consulting Pty Ltd. The survey results were combined with the depth to groundwater results obtained by JME to assess the altitude of the groundwater at each groundwater well location. Groundwater contours were generated using Surfer 13™. The groundwater contours indicate that the groundwater flows in a south south east direction. The groundwater contours are shown in Figure 3.

The groundwater gradient was estimated using the collected data for monitoring wells MW4 and MW9. Monitoring wells MW4 and MW9 are approximately 312m apart and the difference in the groundwater elevation is approximately 0.76m. Therefore, the hydraulic gradient is approximately 0.0024.

During the constant head test in monitoring well MW7, 64 kg (L) of water was collected in a ten-minute (600 second) period whilst maintaining a well head 0.112m below the standing groundwater level. Hence the inflow rate was 0.107 L/s

The slotted well casing in MW7 was set approximately 2.3m below the standing ground water level. The borehole annulus had a radius of 0.1m. Hence the area of the borehole annulus was 1.45m^2. Hence the flow rate of the aquifer at MW7 was approximately 0.074 L/s/m^2.

During the constant head test in monitoring well MW8, 65 kg (L) of water was collected in a\n eight-minute (480 second) period whilst maintaining a well head 0.121m below the standing groundwater level. Hence the inflow rate was 0.135 L/s

The slotted well casing in MW8 was set approximately 2.26m below the standing ground water level. The borehole annulus had a radius of 0.1m. Hence the area of the borehole annulus was 1.42m^2. Hence the flow rate of the aquifer at MW8 was approximately 0.095 L/s/m^2.

10.4.3 Laboratory Analysis

Laboratory results from groundwater monitoring wells were compared with adopted DGVs (as developed in the SAQP). The comparison is summarised in Summary Table 1 (attached). Note that PFAS results were only tabulated if the analyte was detected above the laboratory LOR.

BTEX, TRH and PAH were not detected at concentrations above the laboratory LOR.

CHCs were not detected at concentrations above the laboratory LOR, with the exception of chloroform, which was detected in sample MW5 at a concentration significantly below the adopted DGV.

Several PFAS compounds were detected in the six samples collected. The PFAS fingerprint in the samples collected from MW4, MW5, MW7 and MW8 appeared similar in the makeup of compounds and their concentrations. PFOS was detected at concentrations above the adopted DGV in monitoring wells MW4, MW5, MW7 and MW8. PFOA was detected at concentrations below the adopted DGV in in monitoring wells MW4, MW5, MW7 and MW8. PFOS and PFOA were not detected above the laboratory limit pf report in monitoring wells MW6 and MW9.

Fluoride was detected below the adopted DGV in monitoring wells MW4, MW5, MW6, and MW9.

Arsenic, cadmium, nickel, lead and mercury were either not detected at concentrations above the laboratory LOR or detected in some wells above the laboratory detection limit but below the adopted DGVs.

The following metals were detected in some samples at concentrations which exceeded adopted guideline values:

- Aluminium was detected at concentrations significantly greater than the adopted DGV in the each of the monitoring wells sampled;
- Copper was detected in monitoring wells MW4, MW5 and MW7;
- Chromium was detected in MW6; and
- Zinc was detected in monitoring wells MW4, MW5, MW7 and MW8.

Laboratory analytical reports are presented in Appendix C.

11 DISCUSSION

The site is situated in Tomago with the topography slow downward from north northwest to a south southeast. The groundwater flows in a similar direction.

The site has had a two main industrial land use including sand mining and metal fabrication (steel and aluminium). A soil contamination assessment by JME indicated the site soil in the eastern portion of site was impacted with arsenic, copper, cadmium, lead and zinc. Lead exceeded the human health criteria whilst the remaining metals exceeded the ecological criteria. The RAP prepared by JME recommended the excavation and removal of the significant lead impacted areas with capping and stormwater management to mitigate potential offsite ecological impacts of arsenic, copper, cadmium and zinc.

Groundwater monitoring indicated that the impact of arsenic , cadmium and copper on the groundwater is negligible. Zinc appears to be significantly elevated at MW7 with a concentration of 89 µg/L compared to trigger value of 15 µg/L. The highest zinc soil impacts are associated with the highest lead soil impacts and, as such, are planned to be removed from the site in the remediation process.

PFOS was detected in the downgradient wells up to almost 30 times greater than the adopted DGVs. Although the concentrations in the wells nearer to the Varley site are slightly higher and gradually diminish across the site, the concentrations of PFOS are similar enough in the PFAS impacted wells to consider its presence is unlikely to be caused by onsite migration from the neighbouring site. Therefore, it is considered possible that PFAS was either previously used on site or a significant (bush)fire threatened the site. Either way, the primary source has been removed from site and the groundwater concentrations of PFAS should naturally attenuate with time. No PFOS was detected in the upgradient wells, MW9 and MW9. It is important to note that the PFOS detections were significantly lower than human health trigger values.

The site is within the TAC buffer zone. The TAC buffer zone is a special environment management zone and is define in the TAC conditions of consent and is derived from the ambient fluoride levels associated with TAC operations. Fluoride and aluminium concentrations were largest in the upgradient wells and appeared to diminish the further away from TAC the groundwater well was located. No further action is required for fluoride and aluminium because these will continue to migrate onto site whilst the TAC smelter is still operable. The concentration of fluoride does exceed the drinking water guidelines in some wells and therefore the drinking of groundwater should be strictly prohibited on site.

12 CONCLUSION

JME considers that the presences of arsenic, cadmium, copper and lead have not had a significant impact on the groundwater beneath site and do not require any further mitigation to protect the groundwater into the future. It is noted that zinc is significantly elevated in one monitoring well, MW7. The zinc impacted soils with the highest concentrations are associated with the lead impacted soils that are planned to be removed in accordance with the RAP prepared by JME. The RAP also recommends the placement of a cap over the remainder of site. The cap, in conjunction with a storm water system was intended to reduce stormwater percolation through the soil thereby reducing the metal leaching potential.

On this basis, it considered that groundwater specific remediation is not required.

13 REFERENCES

Australian and New Zealand Water Quality Guideline website

JME20005-2 Detailed Contamination Assessment 21D and 21F School Drive Tomago, JM Environments, June 2020

JME20005-3 Remedial Action Plan 21D and 21F School Drive Tomago revision 1,June 2020.

National Environment Protection (Assessment of Site Contamination) Measure (1999, updated 2013) Schedule B1, Guideline on Investigation Levels for Soil and Groundwater

National Environment Protection (Assessment of Site Contamination) Measure (1999, updated 2013) Schedule B2, Guideline on Site Characterisation

National Environment Protection (Assessment of Site Contamination) Measure (1999, updated 2013) 1999 Errata Updated 30 April 2014

NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme (3rd Edition) Contaminated Sites

NSW Department of Environment and Conservation NSW (2007) Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Sites

Google Earth

PFAS National Environmental Management Plan January 2018, Heads of EPAs Australia and New Zealand

maps.six.gov.nsw.au

14 LIMITATIONS

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely, and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of data.

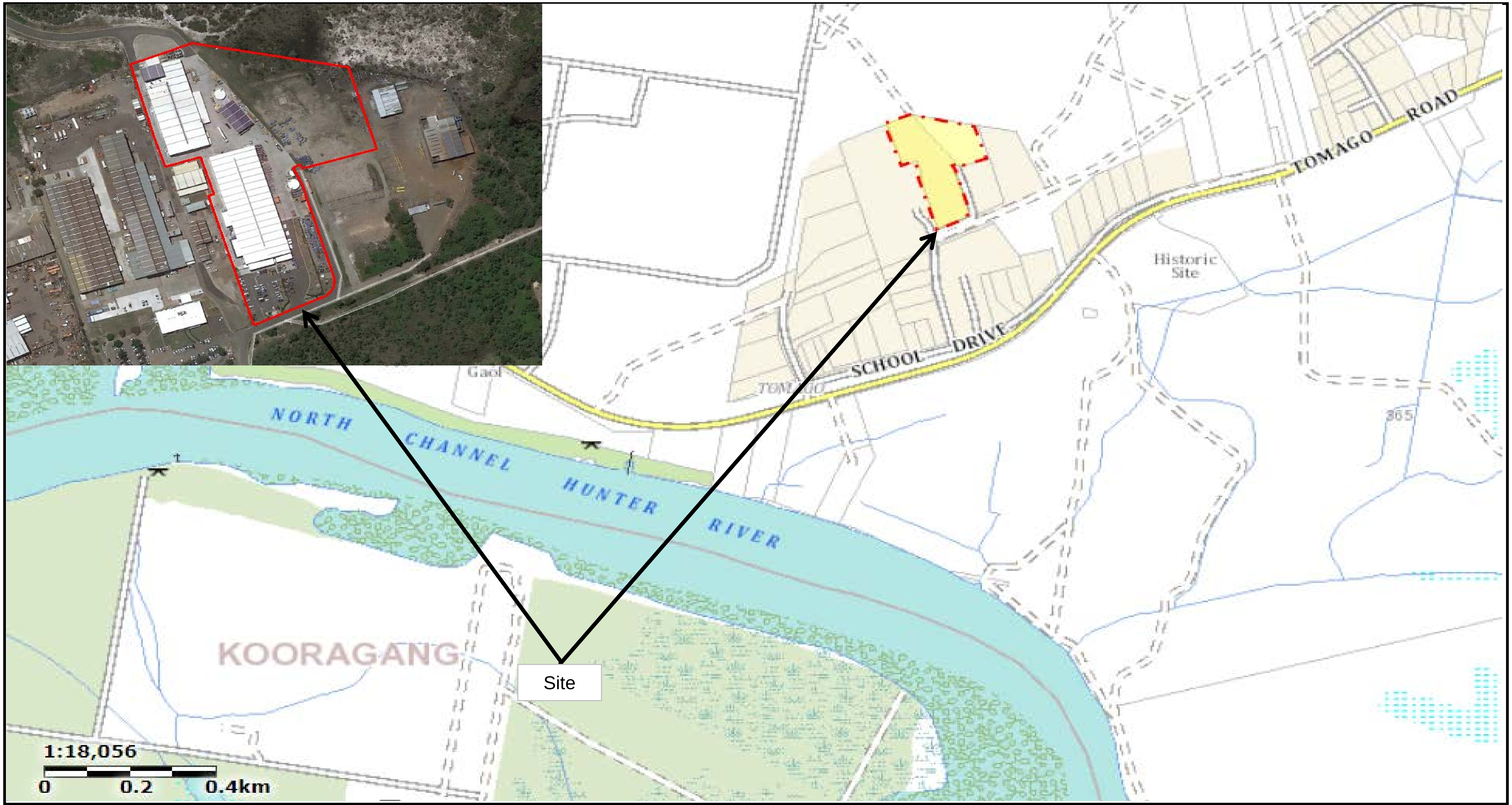
In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith, in accordance with JME's understanding of the client's brief, and general accepted practice for environmental consulting.

This report was prepared for Remondis Australia Pty Ltd, with the objective of refining the understanding of contamination on the site that could potentially impact on the development of the property for use as apartments. No warranty, expressed or implied, is made as to the information and professional advice included in this report. This report is not intended for other parties or other uses, except for the purpose of assessing a Development Application for the site. Anyone using this document does so at their own risk, and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation at the time.

This report is only applicable for the site's proposed redevelopment. If the proposed redevelopment is altered, the report may have to be altered accordingly.

This report does not comprise a geotechnical assessment and should not be used for geotechnical purposes.

Figures



ENVIRONMENTS

N

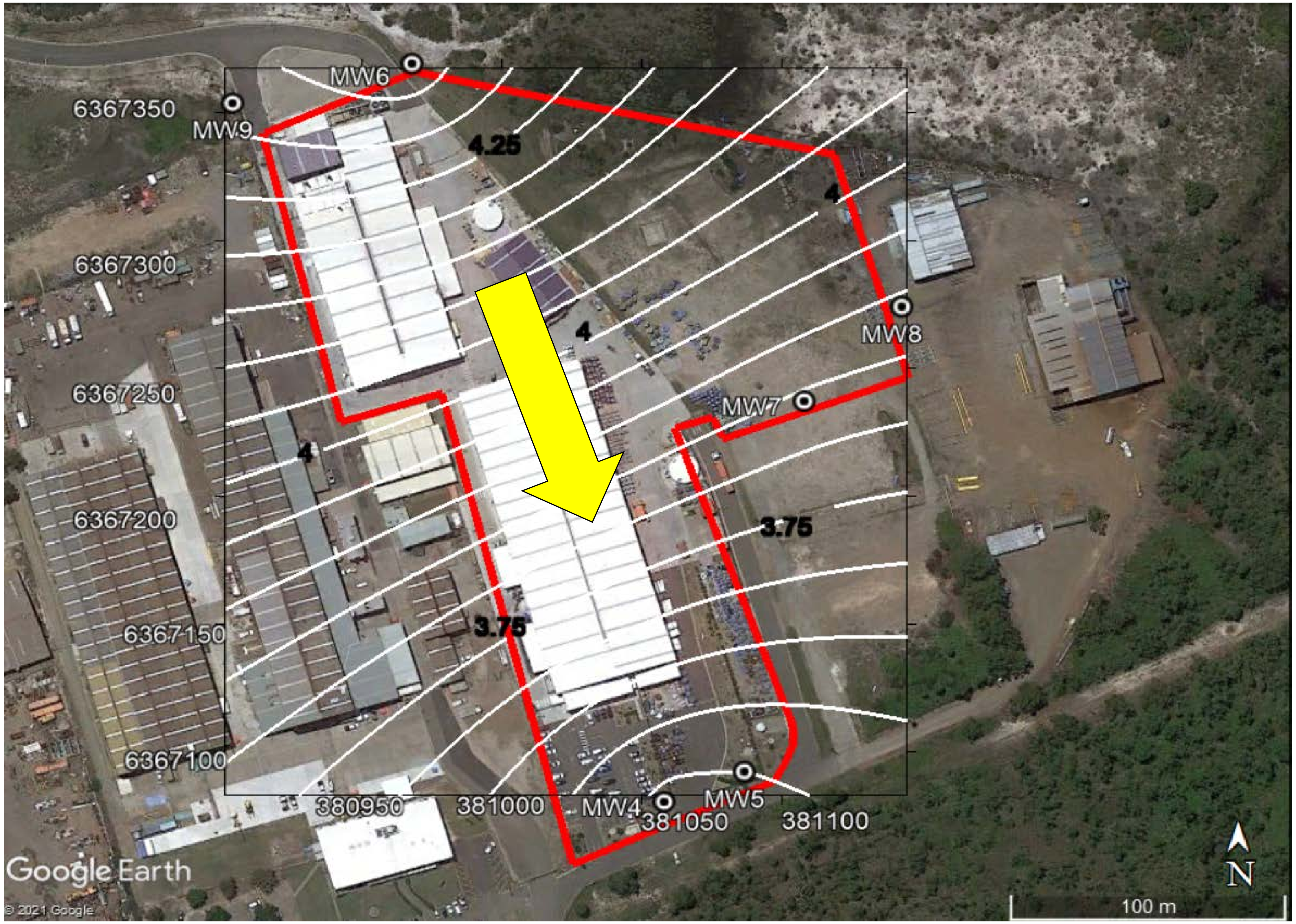
CLIENT: **Remondis**

PROJECT TITLE: **School Drive, Tomago**

PROJECT:	JME20005	DESIGNED:	JMc	FIGURE TITLE:
DWG #:	1	DRAWN:	JH	**Site Location Plan**
REVISION:	1	STATUS:	NFC	
SCALE:	As shown			
DATE:	2/06/2020			FIGURE NUMBER: **1**

JM ENVIRONMENTS

CLIENT: **Remondis**	PROJECT:	JME20005	DESIGNED:	JMc		FIGURE TITLE:
	DWG #:	1	DRAWN:	JMc		**Monitoring Well Locations**
	REVISION:	1				
PROJECT TITLE: **School Drive, Tomago**	SCALE:	NTS	STATUS:	NFC		
	DATE:	28/04/2021				FIGURE NUMBER: **2**



Inferred groundwater flow direction

ENVIRONMENTS

CLIENT:	**Remondis**	PROJECT:	JME20005	DESIGNED:	JMc
		DWG #:	1	DRAWN:	JMc
		REVISION:	1		
PROJECT TITLE:	**School Drive, Tomago**	SCALE:	NTS	STATUS:	NFC
		DATE:	28/04/2021		

FIGURE TITLE:
Groundwater Contours

FIGURE NUMBER: 3

Summary Table

Summary Table 1

		Adopted	**Description**	MW4	MW5	MW6	MW7	QC1	Relative	QC1A	Relative	MW8	MW9
		Trigger	**Sample Date**	13/4/2021	13/4/2021	13/4/2021	13/4/2021	13/4/2021	percentage	13/4/2021	percentage	13/4/2021	13/4/2021
		Value	**Matrix**	Water	Water	Water	Water	Water	difference	Water	difference	Water	Water
Analyte Name	**Units**		**Reporting Limit**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Vinyl chloride (Chloroethene)	µg/L	100	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0%	<0.3	0%	<0.3	<0.3
1,1-dichloroethene	µg/L	700	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Chloroform (THM)	µg/L	370	0.5	<0.5	**0.9**	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
1,2-dichloroethane	µg/L	1900	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
1,1,1-trichloroethane	µg/L	270	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Benzene	µg/L	500	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
1,2-dichloropropane	µg/L	900	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Trichloroethene (Trichloroethylene,TCE	µg/L	330	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
1,1,2-trichloroethane	µg/L	1900	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Toluene	µg/L	180	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
1,3-dichloropropane	µg/L	1100	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Tetrachloroethene (Perchloroethylene,P	µg/L	70	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
m/p-xylene	µg/L	75	1	<1	<1	<1	<1	<1	0%	<1	0%	<1	<1
1,1,2,2-tetrachloroethane	µg/L	400	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
o-xylene	µg/L	350	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	0%	<0.5	<0.5
Total VOC	µg/L	-	10	<10	<10	<10	<10	<10	0%	<10	0%	<10	<10
TRH C6-C10 (F1)	µg/L	50	50	<50	<50	<50	<50	<50	0%	<50	0%	<50	<50
TRH >C10-C16 (F2)	µg/L	60	60	<60	<60	<60	<60	<60	0%	<60	0%	<60	<60
TRH >C16-C34 (F3)	µg/L	500	500	<500	<500	<500	<500	<500	0%	<500	0%	<500	<500
TRH >C34-C40 (F4)	µg/L	500	500	<500	<500	<500	<500	<500	0%	<500	0%	<500	<500
Naphthalene	µg/L	50	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Phenanthrene	µg/L	0.6	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Anthracene	µg/L	0.01	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Fluoranthene	µg/L	1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Fluortide	mg/L	15	0.1	4.6	1.5	8.7	<0.1	<0.1	0%	0.15	40%	<0.1	12
Aluminium	µg/L	55	5	**770**	**270**	**7100**	**250**	**260**	4%	**240**	4%	**190**	**8800**
Arsenic, As	µg/L	13	1	**2**	<1	<1	<1	<1	0%	<1	0%	<1	<1
Cadmium, Cd	µg/L	0.7	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	0%	<0.1	<0.1
Copper, Cu	µg/L	1.3	1	**3**	**3**	**1**	**3**	**2**	40%	<1	100%	<1	<1
Chromium, Cr	µg/L	4.4	1	**3**	**3**	**6**	**4**	**4**	0%	**4**	0%	**3**	**3**
Nickel, Ni	µg/L	7	1	**2**	**2**	<1	<1	<1	0%	<1	0%	<1	<1
Lead, Pb	µg/L	4.4	1	<1	<1	<1	<1	<1	0%	<1	0%	<1	<1
Zinc, Zn	µg/L	15	5	**34**	**33**	**6**	**89**	**83**	7%	**77**	14%	**18**	<5
Mercury	mg/L	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0%	<0.0001	0%	<0.0001	<0.0001
Perfluorobutanoic acid (PFBA)	µg/L	-	0.0005	**0.020**	**0.022**	<0.0005	**0.0030**	**0.0024**	22%	**0.0021**	35%	<0.0005	<0.0005
Perfluoropentanoic acid (PFPeA)	µg/L	-	0.0005	**0.0079**	**0.0055**	<0.0005	**0.0034**	**0.0023**	39%	**0.0021**	47%	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	µg/L	-	0.0005	**0.0095**	**0.0072**	<0.0005	**0.0048**	**0.0039**	21%	**0.0036**	29%	<0.0005	<0.0005
Perfluoroheptanoic acid (PFHpA)	µg/L	-	0.0005	**0.0053**	**0.0022**	<0.0005	**0.0014**	**0.0020**	35%	**0.0015**	7%	<0.0005	<0.0005
Perfluorooctanoic Acid (PFOA)	µg/L	19	0.0005	**0.0067**	**0.0023**	<0.0005	**0.0052**	**0.0040**	26%	**0.0045**	14%	**0.0031**	<0.0005
Perfluorobutane sulfonate (PFBS)	µg/L	-	0.001	**0.003**	**0.002**	<0.001	**0.001**	**0.001**	0%	**0.001**	0%	**0.002**	<0.001
Perfluoropentane sulfonate (PFPeS)	µg/L	-	0.001	**0.003**	**0.002**	<0.001	<0.001	<0.001	0%	<0.001	0%	**0.002**	<0.001
Perfluorohexane sulfonate (PFHxS)	µg/L	-	0.0002	**0.028**	**0.015**	**0.0006**	**0.0043**	**0.0033**	26%	**0.0042**	2%	**0.023**	**0.0003**
Perfluoroheptane sulfonate (PFHpS)	µg/L	-	0.0002	**0.0006**	<0.0002	<0.0002	**0.0002**	<0.0002	0%	<0.0002	0%	**0.0004**	<0.0002
Perfluorooctane sulfonate (PFOS)	µg/L	0.00023	0.0002	**0.0063**	**0.0057**	<0.0002	**0.0043**	**0.0030**	36%	**0.0038**	12%	**0.0040**	<0.0002
1H,1H,2H,2H-Perfluorooctane sulfonate	µg/L		0.0005	<0.0005	**0.0050**	<0.0005	<0.0005	<0.0005	0%	<0.0005	0%	<0.0005	<0.0005

Appendix A

Borehole Logs

Appendix B

Calibration Certificate

9/4/21

Multi Parameter Water Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument **YSI Quatro Pro Plus**
Serial No. **10E101052**

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		355386	pH 9.98
2. pH 7.00		pH 7.00		355072	pH 7.04
3. pH 4.00		pH 4.00		351412	pH 4.03
4. mV		227.4mV		357172/357173	227.5 mV
5. EC		2.76mS		350510	2.76mS
6. D.O		0.00ppm		10959	0.03ppm
7. Temp		23.1°C		MultiTherm	22.2°C

Calibrated by: **Eloise Carroll**

Calibration date: **9/04/2021**

Next calibration due: **9/05/2021**

Appendix B

Laboratory Documents

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Sample Date: 13/04/2021

SGS Environmental Services Sydney
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Facsimile No: (02) 85940499
Telephone No: (02) 85940400
Email:
au.samplereceipt.sydney@sgs.com

Company Name:	JM Environments	Project Name/No:	JME20006
Address:	37 Tooke St COOKS HILL NSW 2300	Purchase Order No:	JME20006
		Results Required By:	21/04/2021
Contact Name:	James McMahon	Telephone:	0427 893 6688
Telephone	0427 893 668	Email:	james@jmenvironments.com

Reliquinshed by: J McMahon	Date /Time 15/3/21 4pm	Received by:	TNT	Date /Time
Reliquinshed by:	Date /Time	Received by:		Date /Time 16/04/21 @10:30
Samples intact: [✓ Yes]/No	Temperature 3.1°C	Sample Cooler Sealed	Yes/No	Labortaory Quotation 170719EA

Lab ID	Lab Sample ID	Water	Soil	Other	Preservative	No. of Containers	VOC/TPH PAH/8HM	Fluoride		PFAS										Comments
1	MW4	x					x	x		x										
2	MW5	x					x	x		x										
3	MW6	x					x	x		x										
4	MW7	x					x	x		x										
5	MW8	x					x	x		x										
6	MW9	x					x	x		x										
7	QC1	x					x	x		x										
8	QC1A	x					x	x		x										

SGS EHS Sydney COC
SE218617

SAMPLE RECEIPT ADVICE

SE218617

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 15/4/2021
Report Due	Wed 21/4/2021
SGS Reference	**SE218617**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Thursday 15/4/2021. Results are expected to be ready by COB Wednesday 21/4/2021. Please quote SGS reference SE218617 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	8 Water
Date documentation received	15/4/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	3.1°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

PFAS subcontracted to SGS Melbourne, 10/585 Blackburn Road, Notting Hill, VIC, NATA Accreditation Numbe. 2562/14420.

SAMPLE RECEIPT ADVICE

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME20006

SUMMARY OF ANALYSIS

No.	Sample ID	Anions by Ion Chromatography in Water	Mercury (dissolved) in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	MW4	1	1	22	7	9	78	7
002	MW5	1	1	22	7	9	78	7
003	MW6	1	1	22	7	9	78	7
004	MW7	1	1	22	7	9	78	7
005	MW8	1	1	22	7	9	78	7
006	MW9	1	1	22	7	9	78	7
007	QC1	1	1	22	7	9	78	7
008	QC1A	1	1	22	7	9	78	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE218617

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME20006

SUMMARY OF ANALYSIS

No.	Sample ID	Per- and Polyfluoroalkyl Substances (PFAS) in
001	MW4	55
002	MW5	55
003	MW6	55
004	MW7	55
005	MW8	55
006	MW9	55
007	QC1	55
008	QC1A	55

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE218617 R0**
Date Received	15/4/2021
Date Reported	22/4/2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

PFAS subcontracted to SGS Melbourne, 10/585 Blackburn Road, Notting Hill, VIC, NATA Accreditation Numbe. 2562/14420. Report Numbers ME319993 & ME319993A

MA1523: Some PFAS surrogate recovery values are out of acceptance range due to matrix interference

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Ly Kim HA
Organic Section Head

Shane MCDERMOTT
Inorganic/Metals Chemist

VOCs in Water [AN433] Tested: 20/4/2021

			MW4	MW5	MW6	MW7	MW8
			WATER	WATER	WATER	WATER	WATER
			-	-	-	-	-
			13/4/2021	13/4/2021	13/4/2021	13/4/2021	13/4/2021
PARAMETER	UOM	LOR	SE218617.001	SE218617.002	SE218617.003	SE218617.004	SE218617.005
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	<5	<5	<5
Chloromethane	µg/L	5	<5	<5	<5	<5	<5
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Bromomethane	µg/L	10	<10	<10	<10	<10	<10
Chloroethane	µg/L	5	<5	<5	<5	<5	<5
Trichlorofluoromethane	µg/L	1	<1	<1	<1	<1	<1
Acetone (2-propanone)	µg/L	10	<10	<10	<10	<10	<10
Iodomethane	µg/L	5	<5	<5	<5	<5	<5
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acrylonitrile	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	<5	<5	<5
Allyl chloride	µg/L	2	<2	<2	<2	<2	<2
Carbon disulfide	µg/L	2	<2	<2	<2	<2	<2
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	<2	<2	<2
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl acetate	µg/L	10	<10	<10	<10	<10	<10
MEK (2-butanone)	µg/L	10	<10	<10	<10	<10	<10
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromochloromethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform (THM)	µg/L	0.5	<0.5	0.9	<0.5	<0.5	<0.5
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-nitropropane	µg/L	100	<100	<100	<100	<100	<100
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	<5	<5	<5
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-hexanone (MBK)	µg/L	5	<5	<5	<5	<5	<5
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1	<1
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	<1	<1
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5	<1.5
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	<1	<1
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

VOCs in Water [AN433] Tested: 20/4/2021 (continued)

			MW4 WATER - 13/4/2021	MW5 WATER - 13/4/2021	MW6 WATER - 13/4/2021	MW7 WATER - 13/4/2021	MW8 WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.001**	**SE218617.002**	**SE218617.003**	**SE218617.004**	**SE218617.005**
n-propylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total BTEX	µg/L	3	<3	<3	<3	<3	<3
Total VOC	µg/L	10	<10	<10	<10	<10	<10

VOCs in Water [AN433] Tested: 20/4/2021 (continued)

PARAMETER	UOM	LOR	MW9 WATER - 13/4/2021 SE218617.006	QC1 WATER - 13/4/2021 SE218617.007	QC1A WATER - 13/4/2021 SE218617.008
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	<5
Chloromethane	µg/L	5	<5	<5	<5
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	<0.3
Bromomethane	µg/L	10	<10	<10	<10
Chloroethane	µg/L	5	<5	<5	<5
Trichlorofluoromethane	µg/L	1	<1	<1	<1
Acetone (2-propanone)	µg/L	10	<10	<10	<10
Iodomethane	µg/L	5	<5	<5	<5
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5
Acrylonitrile	µg/L	0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	<5
Allyl chloride	µg/L	2	<2	<2	<2
Carbon disulfide	µg/L	2	<2	<2	<2
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	<2
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5
Vinyl acetate	µg/L	10	<10	<10	<10
MEK (2-butanone)	µg/L	10	<10	<10	<10
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5
Bromochloromethane	µg/L	0.5	<0.5	<0.5	<0.5
Chloroform (THM)	µg/L	0.5	<0.5	<0.5	<0.5
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	<0.5
Benzene	µg/L	0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	0.5	<0.5	<0.5	<0.5
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	<0.5
2-nitropropane	µg/L	100	<100	<100	<100
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	<5
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5
2-hexanone (MBK)	µg/L	5	<5	<5	<5
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	<0.5
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	<0.5
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	<0.5
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	<0.5
Bromobenzene	µg/L	0.5	<0.5	<0.5	<0.5

VOCs in Water [AN433] Tested: 20/4/2021 (continued)

			MW9 WATER - 13/4/2021	QC1 WATER - 13/4/2021	QC1A WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.006**	**SE218617.007**	**SE218617.008**
n-propylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	<0.3
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	<0.5
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5
n-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	<0.5
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5
Total BTEX	µg/L	3	<3	<3	<3
Total VOC	µg/L	10	<10	<10	<10

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 20/4/2021

PARAMETER	UOM	LOR	MW4 WATER - 13/4/2021 SE218617.001	MW5 WATER - 13/4/2021 SE218617.002	MW6 WATER - 13/4/2021 SE218617.003	MW7 WATER - 13/4/2021 SE218617.004	MW8 WATER - 13/4/2021 SE218617.005
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C9	µg/L	40	<40	<40	<40	<40	<40
TRH C6-C10	µg/L	50	<50	<50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	<50	<50

PARAMETER	UOM	LOR	MW9 WATER - 13/4/2021 SE218617.006	QC1 WATER - 13/4/2021 SE218617.007	QC1A WATER - 13/4/2021 SE218617.008
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5
TRH C6-C9	µg/L	40	<40	<40	<40
TRH C6-C10	µg/L	50	<50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 19/4/2021

PARAMETER	UOM	LOR	MW4 WATER - 13/4/2021 SE218617.001	MW5 WATER - 13/4/2021 SE218617.002	MW6 WATER - 13/4/2021 SE218617.003	MW7 WATER - 13/4/2021 SE218617.004	MW8 WATER - 13/4/2021 SE218617.005
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200	<200
TRH >C10-C16	µg/L	60	<60	<60	<60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500	<500
TRH C10-C40	µg/L	320	<320	<320	<320	<320	<320

PARAMETER	UOM	LOR	MW9 WATER - 13/4/2021 SE218617.006	QC1 WATER - 13/4/2021 SE218617.007	QC1A WATER - 13/4/2021 SE218617.008
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200
TRH >C10-C16	µg/L	60	<60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500
TRH C10-C40	µg/L	320	<320	<320	<320

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 19/4/2021

PARAMETER	UOM	LOR	**MW4** WATER - 13/4/2021 **SE218617.001**	**MW5** WATER - 13/4/2021 **SE218617.002**	**MW6** WATER - 13/4/2021 **SE218617.003**	**MW7** WATER - 13/4/2021 **SE218617.004**	**MW8** WATER - 13/4/2021 **SE218617.005**
Naphthalene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	μg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	μg/L	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	**MW9** WATER - 13/4/2021 **SE218617.006**	**QC1** WATER - 13/4/2021 **SE218617.007**	**QC1A** WATER - 13/4/2021 **SE218617.008**
Naphthalene	μg/L	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	μg/L	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	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)fluoranthene	μg/L	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	μg/L	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	μg/L	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	μg/L	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	μg/L	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	μg/L	0.1	<0.1	<0.1	<0.1
Total PAH (18)	μg/L	1	<1	<1	<1

Anions by Ion Chromatography in Water [AN245] Tested: 20/4/2021

			MW4	MW5	MW6	MW7	MW8
			WATER	WATER	WATER	WATER	WATER
			-	-	-	-	-
			13/4/2021	13/4/2021	13/4/2021	13/4/2021	13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.001**	**SE218617.002**	**SE218617.003**	**SE218617.004**	**SE218617.005**
Fluoride	mg/L	0.1	4.6	1.5	8.7	<0.10	<0.10

			MW9	QC1	QC1A
			WATER	WATER	WATER
			-	-	-
			13/4/2021	13/4/2021	13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.006**	**SE218617.007**	**SE218617.008**
Fluoride	mg/L	0.1	12	<0.10	0.15

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 19/4/2021

PARAMETER	UOM	LOR	MW4 WATER - 13/4/2021 SE218617.001	MW5 WATER - 13/4/2021 SE218617.002	MW6 WATER - 13/4/2021 SE218617.003	MW7 WATER - 13/4/2021 SE218617.004	MW8 WATER - 13/4/2021 SE218617.005
Arsenic, As	µg/L	1	2	<1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper, Cu	µg/L	1	3	3	1	3	<1
Chromium, Cr	µg/L	1	3	3	6	4	3
Nickel, Ni	µg/L	1	2	2	<1	<1	<1
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Zinc, Zn	µg/L	5	34	33	6	89	18

PARAMETER	UOM	LOR	MW9 WATER - 13/4/2021 SE218617.006	QC1 WATER - 13/4/2021 SE218617.007	QC1A WATER - 13/4/2021 SE218617.008
Arsenic, As	µg/L	1	<1	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1
Copper, Cu	µg/L	1	<1	2	<1
Chromium, Cr	µg/L	1	3	4	4
Nickel, Ni	µg/L	1	<1	<1	<1
Lead, Pb	µg/L	1	<1	<1	<1
Zinc, Zn	µg/L	5	<5	83	77

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 19/4/2021

			MW4 WATER - 13/4/2021	MW5 WATER - 13/4/2021	MW6 WATER - 13/4/2021	MW7 WATER - 13/4/2021	MW8 WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.001**	**SE218617.002**	**SE218617.003**	**SE218617.004**	**SE218617.005**
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

			MW9 WATER - 13/4/2021	QC1 WATER - 13/4/2021	QC1A WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.006**	**SE218617.007**	**SE218617.008**
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level [MA-1523] Tested: 20/4/2021

PARAMETER	UOM	LOR	MW4 WATER - 13/4/2021 SE218617.001	MW5 WATER - 13/4/2021 SE218617.002	MW6 WATER - 13/4/2021 SE218617.003	MW7 WATER - 13/4/2021 SE218617.004	MW8 WATER - 13/4/2021 SE218617.005
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	0.020	0.022	<0.0005	0.0030	<0.0005
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	0.0079	0.0055	<0.0005	0.0034	<0.0005
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	0.0095	0.0072	<0.0005	0.0048	<0.0005
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	0.0053	0.0022	<0.0005	0.0014	<0.0005
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	0.0067	0.0023	<0.0005	0.0052	0.0031
Perfluorononanoic acid (PFNA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	0.003	0.002	<0.001	0.001	0.002
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	0.003	0.002	<0.001	<0.001	0.002
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	0.028	0.015	0.0006	0.0043	0.023
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	0.0006	<0.0002	<0.0002	0.0002	0.0004
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	0.0063	0.0057	<0.0002	0.0043	0.0040
Sum of PFHxS and PFOS	µg/L	0.0002	0.035	0.020	0.0006	0.0086	0.027
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005	<0.0005	0.0050	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level [MA-1523] Tested: 20/4/2021 (continued)

			MW9	QC1	QC1A
			WATER	WATER	WATER
			-	-	-
			13/4/2021	13/4/2021	13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617.006**	**SE218617.007**	**SE218617.008**
Perfluorobutanoic acid (PFBA)	µg/L	0.0005	<0.0005	0.0024	0.0021
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	<0.0005	0.0023	0.0021
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	<0.0005	0.0039	0.0036
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	<0.0005	0.0020	0.0015
Perfluorooctanoic Acid (PFOA)	µg/L	0.0005	<0.0005	0.0040	0.0045
Perfluorononanoic acid (PFNA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluoroundecanoic acid (PFUnA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorododecanoic acid (PFDoA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorobutane sulfonate (PFBS)	µg/L	0.001	<0.001	0.001	0.001
Perfluoropentane sulfonate (PFPeS)	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorohexane sulfonate (PFHxS)	µg/L	0.0002	0.0003	0.0033	0.0042
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonate (PFOS)	µg/L	0.0002	<0.0002	0.0030	0.0038
Sum of PFHxS and PFOS	µg/L	0.0002	0.0003	0.0063	0.0080
Perfluorononane sulfonate (PFNS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
Perfluorodecane sulfonate (PFDS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
Perfluorododecane sulfonate (PFDoS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.0005	<0.0005	<0.0005	<0.0005
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.002	<0.002	<0.002	<0.002
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.0025	<0.0025	<0.0025	<0.0025
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.0025	<0.0025	<0.0025	<0.0025
2-(N-Methylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	<0.0025	<0.0025	<0.0025
2-(N-Ethylperfluorooctane sulfonamido)-ethanol	µg/L	0.0025	<0.0025	<0.0025	<0.0025
N-Methylperfluorooctanesulfonamidoacetic acid	µg/L	0.0025	<0.0025	<0.0025	<0.0025
N-Ethylperfluorooctanesulfonamidoacetic Acid	µg/L	0.0025	<0.0025	<0.0025	<0.0025

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoveerable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
MA-1523	This method covers the analysis of per- and polyfluoroalkyl substances (PFAS) in aqueous, solid and biosolid samples and solvent extracts, determined as the total of linear and branched isomers. After spiking with isotopically labelled quantification surrogates and clean-up via SPE cartridges sample extracts are analysed by liquid chromatography/mass spectrometry (LC-MS/MS). PFAS concentrations are determined by isotope dilution quantification.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:
a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or

STATEMENT OF QA/QC PERFORMANCE

SE218617 R0

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE218617 R0**
Date Received	15 Apr 2021
Date Reported	22 Apr 2021

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Surrogate	PAH (Polynuclear Aromatic Hydrocarbons) in Water	3 items
	Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level	2 items

SAMPLE SUMMARY

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
MW5	SE218617.002	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
MW6	SE218617.003	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
MW7	SE218617.004	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
MW8	SE218617.005	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
MW9	SE218617.006	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
QC1	SE218617.007	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021
QC1A	SE218617.008	LB222913	13 Apr 2021	15 Apr 2021	11 May 2021	20 Apr 2021	11 May 2021	20 Apr 2021

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
MW5	SE218617.002	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
MW6	SE218617.003	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
MW7	SE218617.004	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
MW8	SE218617.005	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
MW9	SE218617.006	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
QC1	SE218617.007	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021
QC1A	SE218617.008	LB222817	13 Apr 2021	15 Apr 2021	11 May 2021	19 Apr 2021	11 May 2021	19 Apr 2021

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW5	SE218617.002	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW6	SE218617.003	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW7	SE218617.004	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW8	SE218617.005	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW9	SE218617.006	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
QC1	SE218617.007	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
QC1A	SE218617.008	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
MW5	SE218617.002	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
MW6	SE218617.003	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
MW7	SE218617.004	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
MW8	SE218617.005	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
MW9	SE218617.006	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
QC1	SE218617.007	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021
QC1A	SE218617.008	LB222814	13 Apr 2021	15 Apr 2021	10 Oct 2021	19 Apr 2021	10 Oct 2021	19 Apr 2021

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW5	SE218617.002	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW6	SE218617.003	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW7	SE218617.004	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW8	SE218617.005	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
MW9	SE218617.006	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
QC1	SE218617.007	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021
QC1A	SE218617.008	LB222820	13 Apr 2021	15 Apr 2021	20 Apr 2021	19 Apr 2021	29 May 2021	20 Apr 2021

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW5	SE218617.002	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW6	SE218617.003	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW7	SE218617.004	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW8	SE218617.005	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW9	SE218617.006	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
QC1	SE218617.007	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021

HOLDING TIME SUMMARY

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC1A	SE218617.008	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617.001	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW5	SE218617.002	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW6	SE218617.003	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW7	SE218617.004	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW8	SE218617.005	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
MW9	SE218617.006	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
QC1	SE218617.007	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021
QC1A	SE218617.008	LB222924	13 Apr 2021	15 Apr 2021	20 Apr 2021	20 Apr 2021	30 May 2021	21 Apr 2021

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	MW4	SE218617.001	%	40 - 130%	29 ④
	MW5	SE218617.002	%	40 - 130%	58
	MW6	SE218617.003	%	40 - 130%	63
	MW7	SE218617.004	%	40 - 130%	48
	MW8	SE218617.005	%	40 - 130%	54
	MW9	SE218617.006	%	40 - 130%	65
	QC1	SE218617.007	%	40 - 130%	52
	QC1A	SE218617.008	%	40 - 130%	55
d14-p-terphenyl (Surrogate)	MW4	SE218617.001	%	40 - 130%	45
	MW5	SE218617.002	%	40 - 130%	89
	MW6	SE218617.003	%	40 - 130%	90
	MW7	SE218617.004	%	40 - 130%	65
	MW8	SE218617.005	%	40 - 130%	73
	MW9	SE218617.006	%	40 - 130%	88
	QC1	SE218617.007	%	40 - 130%	81
	QC1A	SE218617.008	%	40 - 130%	82
d5-nitrobenzene (Surrogate)	MW4	SE218617.001	%	40 - 130%	24 ④
	MW5	SE218617.002	%	40 - 130%	48
	MW6	SE218617.003	%	40 - 130%	50
	MW7	SE218617.004	%	40 - 130%	39 ①
	MW8	SE218617.005	%	40 - 130%	43
	MW9	SE218617.006	%	40 - 130%	50
	QC1	SE218617.007	%	40 - 130%	44
	QC1A	SE218617.008	%	40 - 130%	47

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C2_PFTeDA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	116
	MW5	SE218617.002	%	10 - 150%	95
	MW6	SE218617.003	%	10 - 150%	102
	MW7	SE218617.004	%	10 - 150%	118
	MW8	SE218617.005	%	10 - 150%	132
	MW9	SE218617.006	%	10 - 150%	93
	QC1	SE218617.007	%	10 - 150%	110
	QC1A	SE218617.008	%	10 - 150%	91
(13C2-4:2 FTS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	61
	MW5	SE218617.002	%	10 - 150%	60
	MW6	SE218617.003	%	10 - 150%	78
	MW7	SE218617.004	%	10 - 150%	72
	MW8	SE218617.005	%	10 - 150%	73
	MW9	SE218617.006	%	10 - 150%	73
	QC1	SE218617.007	%	10 - 150%	79
	QC1A	SE218617.008	%	10 - 150%	73
(13C2-6:2 FTS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	67
	MW5	SE218617.002	%	10 - 150%	67
	MW6	SE218617.003	%	10 - 150%	81
	MW7	SE218617.004	%	10 - 150%	67
	MW8	SE218617.005	%	10 - 150%	78
	MW9	SE218617.006	%	10 - 150%	78
	QC1	SE218617.007	%	10 - 150%	91
	QC1A	SE218617.008	%	10 - 150%	82
(13C2-8:2 FTS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	93
	MW5	SE218617.002	%	10 - 150%	64
	MW6	SE218617.003	%	10 - 150%	73
	MW7	SE218617.004	%	10 - 150%	90
	MW8	SE218617.005	%	10 - 150%	96
	MW9	SE218617.006	%	10 - 150%	78
	QC1	SE218617.007	%	10 - 150%	85
	QC1A	SE218617.008	%	10 - 150%	84
(13C2-PFDoA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	116
	MW5	SE218617.002	%	10 - 150%	96

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level (continued)

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C2-PFDoA) Isotopically Labelled Internal Recovery Standard	MW6	SE218617.003	%	10 - 150%	98
	MW7	SE218617.004	%	10 - 150%	111
	MW8	SE218617.005	%	10 - 150%	131
	MW9	SE218617.006	%	10 - 150%	99
	QC1	SE218617.007	%	10 - 150%	111
	QC1A	SE218617.008	%	10 - 150%	94
(13C2-PFHxDA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	142
	MW5	SE218617.002	%	10 - 150%	88
	MW6	SE218617.003	%	10 - 150%	100
	MW7	SE218617.004	%	10 - 150%	151 †
	MW8	SE218617.005	%	10 - 150%	163 †
	MW9	SE218617.006	%	10 - 150%	93
	QC1	SE218617.007	%	10 - 150%	117
	QC1A	SE218617.008	%	10 - 150%	86
(13C3-PFBS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	90
	MW5	SE218617.002	%	10 - 150%	90
	MW6	SE218617.003	%	10 - 150%	98
	MW7	SE218617.004	%	10 - 150%	86
	MW8	SE218617.005	%	10 - 150%	85
	MW9	SE218617.006	%	10 - 150%	95
	QC1	SE218617.007	%	10 - 150%	97
	QC1A	SE218617.008	%	10 - 150%	91
(13C3-PFHxS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	101
	MW5	SE218617.002	%	10 - 150%	95
	MW6	SE218617.003	%	10 - 150%	91
	MW7	SE218617.004	%	10 - 150%	94
	MW8	SE218617.005	%	10 - 150%	95
	MW9	SE218617.006	%	10 - 150%	100
	QC1	SE218617.007	%	10 - 150%	103
	QC1A	SE218617.008	%	10 - 150%	90
(13C4_PFOA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	107
	MW5	SE218617.002	%	10 - 150%	101
	MW6	SE218617.003	%	10 - 150%	107
	MW7	SE218617.004	%	10 - 150%	102
	MW8	SE218617.005	%	10 - 150%	99
	MW9	SE218617.006	%	10 - 150%	105
	QC1	SE218617.007	%	10 - 150%	108
	QC1A	SE218617.008	%	10 - 150%	106
(13C4-PFBA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	100
	MW5	SE218617.002	%	10 - 150%	102
	MW6	SE218617.003	%	10 - 150%	99
	MW7	SE218617.004	%	10 - 150%	100
	MW8	SE218617.005	%	10 - 150%	100
	MW9	SE218617.006	%	10 - 150%	99
	QC1	SE218617.007	%	10 - 150%	101
	QC1A	SE218617.008	%	10 - 150%	99
(13C4-PFHpA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	102
	MW5	SE218617.002	%	10 - 150%	96
	MW6	SE218617.003	%	10 - 150%	106
	MW7	SE218617.004	%	10 - 150%	98
	MW8	SE218617.005	%	10 - 150%	95
	MW9	SE218617.006	%	10 - 150%	103
	QC1	SE218617.007	%	10 - 150%	101
	QC1A	SE218617.008	%	10 - 150%	101
(13C5-PFHxA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	99
	MW5	SE218617.002	%	10 - 150%	95
	MW6	SE218617.003	%	10 - 150%	107
	MW7	SE218617.004	%	10 - 150%	91
	MW8	SE218617.005	%	10 - 150%	89
	MW9	SE218617.006	%	10 - 150%	104
	QC1	SE218617.007	%	10 - 150%	105

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level (continued)

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(13C5-PFHxA) Isotopically Labelled Internal Recovery Standard	QC1A	SE218617.008	%	10 - 150%	97
(13C5-PFPeA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	116
	MW5	SE218617.002	%	10 - 150%	99
	MW6	SE218617.003	%	10 - 150%	97
	MW7	SE218617.004	%	10 - 150%	105
	MW8	SE218617.005	%	10 - 150%	107
	MW9	SE218617.006	%	10 - 150%	95
	QC1	SE218617.007	%	10 - 150%	97
	QC1A	SE218617.008	%	10 - 150%	96
(13C6-PFDA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	96
	MW5	SE218617.002	%	10 - 150%	98
	MW6	SE218617.003	%	10 - 150%	94
	MW7	SE218617.004	%	10 - 150%	92
	MW8	SE218617.005	%	10 - 150%	107
	MW9	SE218617.006	%	10 - 150%	101
	QC1	SE218617.007	%	10 - 150%	102
	QC1A	SE218617.008	%	10 - 150%	95
(13C7-PFUdA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	116
	MW5	SE218617.002	%	10 - 150%	101
	MW6	SE218617.003	%	10 - 150%	103
	MW7	SE218617.004	%	10 - 150%	108
	MW8	SE218617.005	%	10 - 150%	135
	MW9	SE218617.006	%	10 - 150%	97
	QC1	SE218617.007	%	10 - 150%	108
	QC1A	SE218617.008	%	10 - 150%	96
(13C8-PFOS) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	98
	MW5	SE218617.002	%	10 - 150%	105
	MW6	SE218617.003	%	10 - 150%	103
	MW7	SE218617.004	%	10 - 150%	108
	MW8	SE218617.005	%	10 - 150%	106
	MW9	SE218617.006	%	10 - 150%	115
	QC1	SE218617.007	%	10 - 150%	114
	QC1A	SE218617.008	%	10 - 150%	107
(13C8-PFOSA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	56
	MW5	SE218617.002	%	10 - 150%	93
	MW6	SE218617.003	%	10 - 150%	108
	MW7	SE218617.004	%	10 - 150%	71
	MW8	SE218617.005	%	10 - 150%	63
	MW9	SE218617.006	%	10 - 150%	110
	QC1	SE218617.007	%	10 - 150%	104
	QC1A	SE218617.008	%	10 - 150%	104
(13C9-PFNA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	101
	MW5	SE218617.002	%	10 - 150%	90
	MW6	SE218617.003	%	10 - 150%	97
	MW7	SE218617.004	%	10 - 150%	96
	MW8	SE218617.005	%	10 - 150%	100
	MW9	SE218617.006	%	10 - 150%	104
	QC1	SE218617.007	%	10 - 150%	92
	QC1A	SE218617.008	%	10 - 150%	107
(D3-N-MeFOSA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	65
	MW5	SE218617.002	%	10 - 150%	93
	MW6	SE218617.003	%	10 - 150%	113
	MW7	SE218617.004	%	10 - 150%	81
	MW8	SE218617.005	%	10 - 150%	73
	MW9	SE218617.006	%	10 - 150%	100
	QC1	SE218617.007	%	10 - 150%	100
	QC1A	SE218617.008	%	10 - 150%	95
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	55
	MW5	SE218617.002	%	10 - 150%	77
	MW6	SE218617.003	%	10 - 150%	101
	MW7	SE218617.004	%	10 - 150%	68

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level (continued)

Method: MA-1523

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
(D3-N-MeFOSAA) Isotopically Labelled Internal Recovery Standard	MW8	SE218617.005	%	10 - 150%	56
	MW9	SE218617.006	%	10 - 150%	90
	QC1	SE218617.007	%	10 - 150%	95
	QC1A	SE218617.008	%	10 - 150%	98
(D5-N-EtFOSA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	73
	MW5	SE218617.002	%	10 - 150%	104
	MW6	SE218617.003	%	10 - 150%	103
	MW7	SE218617.004	%	10 - 150%	85
	MW8	SE218617.005	%	10 - 150%	69
	MW9	SE218617.006	%	10 - 150%	115
	QC1	SE218617.007	%	10 - 150%	113
	QC1A	SE218617.008	%	10 - 150%	89
(D5-N-EtFOSAA) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	69
	MW5	SE218617.002	%	10 - 150%	69
	MW6	SE218617.003	%	10 - 150%	80
	MW7	SE218617.004	%	10 - 150%	74
	MW8	SE218617.005	%	10 - 150%	85
	MW9	SE218617.006	%	10 - 150%	81
	QC1	SE218617.007	%	10 - 150%	102
	QC1A	SE218617.008	%	10 - 150%	86
(D7-N-MeFOSE) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	62
	MW5	SE218617.002	%	10 - 150%	102
	MW6	SE218617.003	%	10 - 150%	98
	MW7	SE218617.004	%	10 - 150%	76
	MW8	SE218617.005	%	10 - 150%	67
	MW9	SE218617.006	%	10 - 150%	101
	QC1	SE218617.007	%	10 - 150%	102
	QC1A	SE218617.008	%	10 - 150%	98
(D9-N-EtFOSE) Isotopically Labelled Internal Recovery Standard	MW4	SE218617.001	%	10 - 150%	64
	MW5	SE218617.002	%	10 - 150%	94
	MW6	SE218617.003	%	10 - 150%	104
	MW7	SE218617.004	%	10 - 150%	96
	MW8	SE218617.005	%	10 - 150%	68
	MW9	SE218617.006	%	10 - 150%	115
	QC1	SE218617.007	%	10 - 150%	104
	QC1A	SE218617.008	%	10 - 150%	100

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW4	SE218617.001	%	40 - 130%	98
	MW5	SE218617.002	%	40 - 130%	97
	MW6	SE218617.003	%	40 - 130%	99
	MW7	SE218617.004	%	40 - 130%	98
	MW8	SE218617.005	%	40 - 130%	99
	MW9	SE218617.006	%	40 - 130%	98
	QC1	SE218617.007	%	40 - 130%	100
	QC1A	SE218617.008	%	40 - 130%	99
d4-1,2-dichloroethane (Surrogate)	MW4	SE218617.001	%	40 - 130%	103
	MW5	SE218617.002	%	40 - 130%	103
	MW6	SE218617.003	%	40 - 130%	105
	MW7	SE218617.004	%	40 - 130%	103
	MW8	SE218617.005	%	40 - 130%	105
	MW9	SE218617.006	%	40 - 130%	106
	QC1	SE218617.007	%	40 - 130%	104
	QC1A	SE218617.008	%	40 - 130%	105
d8-toluene (Surrogate)	MW4	SE218617.001	%	40 - 130%	97
	MW5	SE218617.002	%	40 - 130%	96
	MW6	SE218617.003	%	40 - 130%	98
	MW7	SE218617.004	%	40 - 130%	98
	MW8	SE218617.005	%	40 - 130%	97
	MW9	SE218617.006	%	40 - 130%	97

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	QC1	SE218617.007	%	40 - 130%	98
	QC1A	SE218617.008	%	40 - 130%	98

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW4	SE218617.001	%	40 - 130%	98
	MW5	SE218617.002	%	40 - 130%	97
	MW6	SE218617.003	%	40 - 130%	99
	MW7	SE218617.004	%	40 - 130%	98
	MW8	SE218617.005	%	40 - 130%	99
	MW9	SE218617.006	%	40 - 130%	98
	QC1	SE218617.007	%	40 - 130%	100
	QC1A	SE218617.008	%	40 - 130%	99
d4-1,2-dichloroethane (Surrogate)	MW4	SE218617.001	%	60 - 130%	103
	MW5	SE218617.002	%	60 - 130%	103
	MW6	SE218617.003	%	60 - 130%	105
	MW7	SE218617.004	%	60 - 130%	103
	MW8	SE218617.005	%	60 - 130%	105
	MW9	SE218617.006	%	60 - 130%	106
	QC1	SE218617.007	%	60 - 130%	104
	QC1A	SE218617.008	%	60 - 130%	105
d8-toluene (Surrogate)	MW4	SE218617.001	%	40 - 130%	97
	MW5	SE218617.002	%	40 - 130%	96
	MW6	SE218617.003	%	40 - 130%	98
	MW7	SE218617.004	%	40 - 130%	98
	MW8	SE218617.005	%	40 - 130%	97
	MW9	SE218617.006	%	40 - 130%	97
	QC1	SE218617.007	%	40 - 130%	98
	QC1A	SE218617.008	%	40 - 130%	98

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB222913.001	Fluoride	mg/L	0.1	<0.10

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB222817.001	Mercury	mg/L	0.0001	<0.0001

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB222820.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		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(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	50
		2-fluorobiphenyl (Surrogate)	%	-	56
		d14-p-terphenyl (Surrogate)	%	-	72

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB222814.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB222820.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB222924.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		Iodomethane	µg/L	5	<5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB222924.001	Halogenated Aliphatics	1,1-dichloroethene	µg/L	0.5	<0.5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		cis-1,4-dichloro-2-butene	µg/L	1	<1
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		o-xylene	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	2	<1
		Vinyl acetate	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	97
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		Dibromochloromethane (THM)	µg/L	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB222924.001	Trihalomethanes	Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB222924.001		TRH C6-C9	µg/L	40	<40
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	99
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	97

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218617.006	LB222820.024		Naphthalene	µg/L	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthylene	µg/L	0.1	<0.1	<0.1	200	0
			Acenaphthene	µg/L	0.1	<0.1	<0.1	200	0
			Fluorene	µg/L	0.1	<0.1	<0.1	200	0
			Phenanthrene	µg/L	0.1	<0.1	<0.1	200	0
			Anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Chrysene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.2	0.2	30	11
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.3	30	15
			d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.4	30	8

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218657.006	LB222814.014		Lead, Pb	µg/L	1	<1	<1	200	0

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218617.006	LB222820.024		TRH C10-C14	µg/L	50	<50	<50	200	0
			TRH C15-C28	µg/L	200	<200	<200	200	0
			TRH C29-C36	µg/L	200	<200	<200	200	0
			TRH C37-C40	µg/L	200	<200	<200	200	0
			TRH C10-C40	µg/L	320	<320	<320	200	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	<60	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	<500	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	<500	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218617.001	LB222924.027	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	200	0
			Chloromethane	µg/L	5	<5	<5	200	0
			Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	200	0
			Bromomethane	µg/L	10	<10	<10	200	0
			Chloroethane	µg/L	5	<5	<5	200	0
			Trichlorofluoromethane	µg/L	1	<1	<1	200	0
			Iodomethane	µg/L	5	<5	<5	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	200	0
			Allyl chloride	µg/L	2	<2	<2	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Bromochloromethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218617.001	LB222924.027	Halogenated Aliphatics	1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	200	0
			Dibromomethane	µg/L	0.5	<0.5	<0.5	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			Bromobenzene	µg/L	0.5	<0.5	<0.5	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
			Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	200	0
			n-propylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	200	0
			n-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	<0.5	200	0
		Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10	<10	200	0
			MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<0.5	200	0
			Vinyl acetate	µg/L	10	<10	<10	200	0
			MEK (2-butanone)	µg/L	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	200	0
			2-hexanone (MBK)	µg/L	5	<5	<5	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	<0.5	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	<2	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.3	9.6	30	6
			d8-toluene (Surrogate)	µg/L	-	9.7	9.6	30	1
			Bromofluorobenzene (Surrogate)	µg/L	-	9.8	9.4	30	4
		Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	200	0
			Bromoform (THM)	µg/L	0.5	<0.5	<0.5	200	0
SE218680.003	LB222924.028	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	200	0
			Chloromethane	µg/L	5	<5	<5	200	0

DUPLICATES

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218680.003	LB222924.028	Halogenated Aliphatics	Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	200	0
			Bromomethane	µg/L	10	<10	<10	200	0
			Chloroethane	µg/L	5	<5	<5	200	0
			Trichlorofluoromethane	µg/L	1	<1	<1	200	0
			Iodomethane	µg/L	5	<5	<5	200	0
			1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	200	0
			Allyl chloride	µg/L	2	<2	<2	200	0
			trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	200	0
			Bromochloromethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	200	0
			Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	200	0
			Dibromomethane	µg/L	0.5	<0.5	<0.5	200	0
			Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5	<0.5	200	0
			1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	200	0
			trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	200	0
			1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	200	0
			Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	200	0
		Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			Bromobenzene	µg/L	0.5	<0.5	<0.5	200	0
			2-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			4-chlorotoluene	µg/L	0.5	<0.5	<0.5	200	0
			1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	200	0
			1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	200	0
		Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
			Toluene	µg/L	0.5	<0.5	<0.5	160	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
			Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	200	0
			n-propylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			tert-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			sec-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	200	0
			n-butylbenzene	µg/L	0.5	<0.5	<0.5	200	0
		Nitrogenous	Acrylonitrile	µg/L	0.5	<0.5	<0.5	200	0
		Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10	<10	200	0
			MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<0.5	200	0
			Vinyl acetate	µg/L	10	<10	<10	200	0
			MEK (2-butanone)	µg/L	10	<10	<10	200	0
			MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	200	0
			2-hexanone (MBK)	µg/L	5	<5	<5	200	0
		Polycyclic	Naphthalene	µg/L	0.5	<0.5	<0.5	200	0
		Sulphonated	Carbon disulfide	µg/L	2	<2	<2	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.5	10.0	30	5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218680.003	LB222924.028	Surrogates	d8-toluene (Surrogate)	μg/L	-	9.8	9.7	30	1
			Bromofluorobenzene (Surrogate)	μg/L	-	9.9	9.7	30	2
		Trihalomethanes	Chloroform (THM)	μg/L	0.5	<0.5	<0.5	200	0
			Bromodichloromethane (THM)	μg/L	0.5	<0.5	<0.5	200	0
			Dibromochloromethane (THM)	μg/L	0.5	<0.5	<0.5	200	0
			Bromoform (THM)	μg/L	0.5	<0.5	<0.5	200	0

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE218617.001	LB222924.027		TRH C6-C10	μg/L	50	<50	<50	200	0
			TRH C6-C9	μg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	μg/L	-	10.3	9.6	30	6
			d8-toluene (Surrogate)	μg/L	-	9.7	9.6	30	1
			Bromofluorobenzene (Surrogate)	μg/L	-	9.8	9.4	30	4
		VPH F Bands	Benzene (F0)	μg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	μg/L	50	<50	<50	200	0
SE218680.003	LB222924.028		TRH C6-C10	μg/L	50	<50	<50	200	0
			TRH C6-C9	μg/L	40	<40	<40	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	μg/L	-	10.5	10.0	30	5
			d8-toluene (Surrogate)	μg/L	-	9.8	9.7	30	1
			Bromofluorobenzene (Surrogate)	μg/L	-	9.9	9.7	30	2
		VPH F Bands	Benzene (F0)	μg/L	0.5	<0.5	<0.5	200	0
			TRH C6-C10 minus BTEX (F1)	μg/L	50	<50	<50	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222913.002		Fluoride	mg/L	0.1	2.0	2	80 - 120	98

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222820.002		Naphthalene	µg/L	0.1	27	40	60 - 140	67
		Acenaphthylene	µg/L	0.1	27	40	60 - 140	67
		Acenaphthene	µg/L	0.1	27	40	60 - 140	67
		Phenanthrene	µg/L	0.1	29	40	60 - 140	71
		Anthracene	µg/L	0.1	30	40	60 - 140	76
		Fluoranthene	µg/L	0.1	28	40	60 - 140	71
		Pyrene	µg/L	0.1	30	40	60 - 140	75
		Benzo(a)pyrene	µg/L	0.1	29	40	60 - 140	71
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.5	40 - 130	52
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	64
		d14-p-terphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	66

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222814.002		Arsenic, As	µg/L	1	19	20	80 - 120	95
		Cadmium, Cd	µg/L	0.1	20	20	80 - 120	102
		Chromium, Cr	µg/L	1	21	20	80 - 120	103
		Copper, Cu	µg/L	1	21	20	80 - 120	106
		Lead, Pb	µg/L	1	22	20	80 - 120	111
		Nickel, Ni	µg/L	1	21	20	80 - 120	107
		Zinc, Zn	µg/L	5	22	20	80 - 120	111

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222820.002		TRH C10-C14	µg/L	50	1200	1200	60 - 140	96
		TRH C15-C28	µg/L	200	1400	1200	60 - 140	115
		TRH C29-C36	µg/L	200	1400	1200	60 - 140	121
	TRH F Bands	TRH >C10-C16	µg/L	60	1300	1200	60 - 140	108
		TRH >C16-C34 (F3)	µg/L	500	1400	1200	60 - 140	113
		TRH >C34-C40 (F4)	µg/L	500	770	600	60 - 140	128

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222924.002	Halogenated Aliphatics	1,1-dichloroethene	µg/L	0.5	49	45.45	60 - 140	107
		1,2-dichloroethane	µg/L	0.5	51	45.45	60 - 140	113
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	50	45.45	60 - 140	109
	Halogenated	Chlorobenzene	µg/L	0.5	53	45.45	60 - 140	117
	Monocyclic Aromatic	Benzene	µg/L	0.5	42	45.45	60 - 140	92
		Toluene	µg/L	0.5	46	45.45	60 - 140	102
		Ethylbenzene	µg/L	0.5	48	45.45	60 - 140	106
		m/p-xylene	µg/L	1	97	90.9	60 - 140	106
		o-xylene	µg/L	0.5	48	45.45	60 - 140	106
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.5	10	60 - 140	105
		d8-toluene (Surrogate)	µg/L	-	10.0	10	70 - 130	100
		Bromofluorobenzene (Surrogate)	µg/L	-	9.8	10	70 - 130	98
	Trihalomethan	Chloroform (THM)	µg/L	0.5	54	45.45	60 - 140	118

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB222924.002		TRH C6-C10	µg/L	50	780	946.63	60 - 140	83
		TRH C6-C9	µg/L	40	690	818.71	60 - 140	84
	Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	10.5	10	60 - 140	105
		d8-toluene (Surrogate)	µg/L	-	10.0	10	70 - 130	100
		Bromofluorobenzene (Surrogate)	µg/L	-	9.8	10	70 - 130	98
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	500	639.67	60 - 140	79

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE218617.008	LB222913.018	Fluoride	mg/L	0.1	2.0	0.15	2	91

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE218617.001	LB222817.004	Mercury	mg/L	0.0001	0.0018	<0.0001	0.008	91

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE218567RE.0	LB222814.004	Zinc, Zn	µg/L	5	560	540	20	119

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE218680.004	LB222924.029	Monocyclic Aromatic	Benzene	µg/L	0.5	44	<0.5	45.45	96
			Toluene	µg/L	0.5	46	<0.5	45.45	101
			Ethylbenzene	µg/L	0.5	47	<0.5	45.45	104
			m/p-xylene	µg/L	1	95	<1	90.9	104
			o-xylene	µg/L	0.5	48	<0.5	45.45	105
		Polycyclic	Naphthalene	µg/L	0.5	47	<0.5	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	0.0	10.4	-	98
			d8-toluene (Surrogate)	µg/L	-	0.0	9.7	-	100
			Bromofluorobenzene (Surrogate)	µg/L	-	0.0	9.8	-	97

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE218680.004	LB222924.029		TRH C6-C10	µg/L	50	720	<50	946.63	76
			TRH C6-C9	µg/L	40	650	<40	818.71	79
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	0.0	10.4	-	98
			d8-toluene (Surrogate)	µg/L	-	0.0	9.7	-	100
			Bromofluorobenzene (Surrogate)	µg/L	-	0.0	9.8	-	97
		VPH F Bands	Benzene (F0)	µg/L	0.5		<0.5	-	-
			TRH C6-C10 minus BTEX (F1)	µg/L	50	440	<50	639.67	69

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

FOOTNOTES

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

Yin, Emily (Sydney)

From:	james@jmenvironments.com
Sent:	Monday, 26 April 2021 1:25 PM
To:	AU.SampleReceipt.Sydney (Sydney)
Cc:	AU.Environmental.Sydney (Sydney)
Subject:	[EXTERNAL] RE: Report Job SE218617, your reference JME20006, order number JME20006

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Hi All,

Any chance I could get the dissolved aluminium results as well?

Kind Regards

James McMahon
0427 893 668
james@jmenvironments.com
Licenced Asbestos Assessor LAA001286
Certified Environmental Practitioner CEnvP 1235
Site Contamination Specialist SC41110

SGS EHS Alexandria Laboratory
SE218617A COC
Received: 26-Apr-2021

From: AU.Samplereceipt.Sydney@SGS.com <AU.Samplereceipt.Sydney@SGS.com>
Sent: Thursday, 22 April 2021 2:40 PM
To: james@jmenvironments.com
Subject: Report Job SE218617, your reference JME20006, order number JME20006

Dear Valued Customer,

Please find attached the report for SGS job SE218617, your reference JME20006, order number JME20006.

How are we doing? Please take a quick online Survey

If you have any questions or concerns, please don't hesitate to contact your SGS Client Services representative.

Best Regards,
SGS Alexandria Customer Service Team
SGS Australia Pty Ltd
Phone: +61 (0)2 8594 0400

Information in this email and any attachments is confidential and intended solely for the use of the individual(s) to whom it is addressed or otherwise directed. Please note that any views or opinions presented in this email are solely

SAMPLE RECEIPT ADVICE

SE218617A

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006 - Additionsl**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Mon 26/4/2021
Report Due	Tue 27/4/2021
SGS Reference	**SE218617A**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Monday 26/4/2021. Results are expected to be ready by COB Tuesday 27/4/2021. Please quote SGS reference SE218617A when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	8 Water
Date documentation received	26/4/2021@1:25pm	Type of documentation received	Email
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	3.1°C	Sufficient sample for analysis	Yes
Turnaround time requested	Next Day		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

SAMPLE RECEIPT ADVICE

SE218617A

CLIENT DETAILS

Client JM ENVIRONMENTS

Project JME20006 - Additionsl

SUMMARY OF ANALYSIS

No.	Sample ID	Trace Metals (Dissolved) in Water by ICPMS
001	MW4	1
002	MW5	1
003	MW6	1
004	MW7	1
005	MW8	1
006	MW9	1
007	QC1	1
008	QC1A	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006 - Additional**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE218617A R0**
Date Received	26/4/2021
Date Reported	26/4/2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 26/4/2021

			MW4 WATER - 13/4/2021	MW5 WATER - 13/4/2021	MW6 WATER - 13/4/2021	MW7 WATER - 13/4/2021	MW8 WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617A.001**	**SE218617A.002**	**SE218617A.003**	**SE218617A.004**	**SE218617A.005**
Aluminium, Al	µg/L	5	770	270	7100	250	190

			MW9 WATER - 13/4/2021	QC1 WATER - 13/4/2021	QC1A WATER - 13/4/2021
PARAMETER	**UOM**	**LOR**	**SE218617A.006**	**SE218617A.007**	**SE218617A.008**
Aluminium, Al	µg/L	5	8800	260	240

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law .

This report must not be reproduced, except in full.

STATEMENT OF QA/QC PERFORMANCE

SE218617A R0

CLIENT DETAILS

Contact	James McMahon
Client	JM ENVIRONMENTS
Address	37 TOOKE STREET COOKS HILL NSW 2300
Telephone	0427 893 668
Facsimile	(Not specified)
Email	james@jmenvironments.com
Project	**JME20006 - Additional**
Order Number	**JME20006**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE218617A R0**
Date Received	26 Apr 2021
Date Reported	26 Apr 2021

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW4	SE218617A.001	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
MW5	SE218617A.002	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
MW6	SE218617A.003	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
MW7	SE218617A.004	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
MW8	SE218617A.005	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
MW9	SE218617A.006	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
QC1	SE218617A.007	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021
QC1A	SE218617A.008	LB223349	13 Apr 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021	10 Oct 2021	26 Apr 2021

SURROGATES

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

METHOD BLANKS

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB223349.001	Aluminium, Al	µg/L	5	<5

DUPLICATES

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

No duplicates were required for this job.

LABORATORY CONTROL SAMPLES

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB223349.002	Aluminium, Al	μg/L	5	21	20	80 - 120	106

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

FOOTNOTES

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.