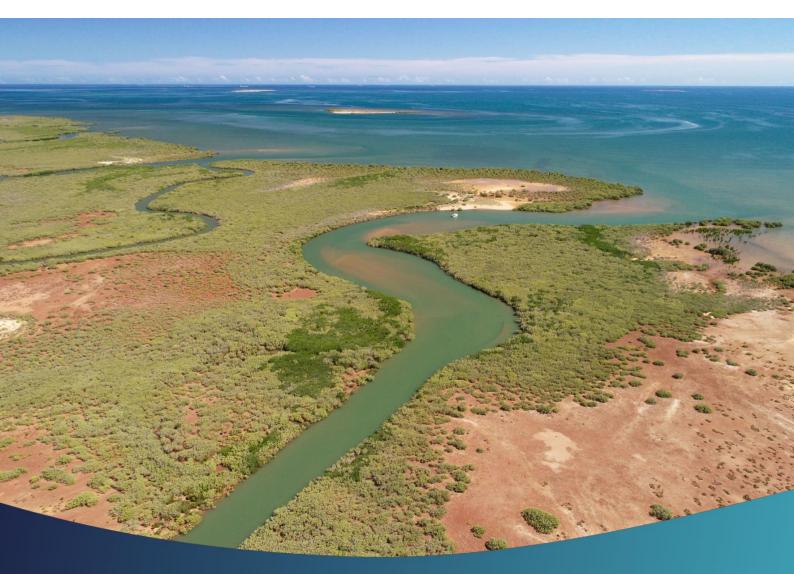


Eramurra Solar Salt Project Marine Water Quality Baseline Report





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Acronyms and Abbreviations

Acronyms/Abbreviation	Description		
ANZG	Australia and New Zealand Environment and Conservation Council Guidelines		
AWST	Australian Western Standard Time		
ВСН	Benthic Communities and Habitats		
ВоМ	Bureau of Meteorology		
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene		
CALM	Conservation and Land Management		
CTD	Conductivity, Temperature, Depth		
DLI	Daily Light Integral		
DO	Dissolved Oxygen		
DoE	Department of Environment		
DWER	Department of Water and Environmental Regulation		
EC	Electrical Conductivity		
EPA	Environmental Protection Authority		
EQC	Environmental Quality Criteria		
ESD	Environmental Scoping Document		
IMO	In-Situ Marine Optics		
LAT	Lowest Astronomical Tide		
LEP	Level of Environmental Protection		
LoR	Limit of Reporting		
MEQMP	Marine Environmental Quality Management Plan		
NATA	National Association of Testing Authorities		
NTU	Nephelometric Turbidity Units		
NTUSB	Nephelometric Turbidity Unit (plus Fluorometer)		
PAR	Photosynthetically Active Radiation		
pHiDO	pH and Dissolved Oxygen		
PSU	Practical Salinity Units		
QAQC	Quality Assurance/Quality Control		
SPL	Species Protection Levels		
SSC	Suspended Sediment Concentration		
TC	Tropical Cyclone		
TRH	Total Recoverable Hydrocarbons		
TSS	Total Suspended Sediment		
TOC	Total Organic Carbon		
TPH	Total Petroleum Hydrocarbons		
mg/L	Milligrams per liter		
ug/L	Micrograms per liter		
WA	Western Australia		
WAMSI	Western Australian Marine Science Institute		



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1. Introduction

1.1. Project description

Leichhardt Salt Pty Ltd (the proponent) propose to develop the Eramurra Solar Salt Project (the proposal) in the Cape Preston East area, Western Australia (Figure 1). The proposal will produce high purity industrial grade sodium chloride salt from seawater via a solar evaporation, crystallisation and raw salt purification operation. Salt will be shipped from the marine loading terminal to overseas markets. Key development areas associated with the proposal are identified in Figure 2. A short summary of the proposal is presented in Table 1.

O2 Marine have been engaged by the proponent to undertake marine environmental investigations to help identify environmental risks of the proposal, establish baseline conditions, guide appropriate monitoring and management to minimise potential environmental impacts and to inform proposal design.

Table 1 Short Summary of the Proposal

Project Title	Eramurra Solar Salt Project
Proponent Name	Leichhardt Salt Pty Ltd
Short Description	Leichhardt Salt Pty Ltd (Leichhardt) is seeking to develop a solar salt project in the Cape Preston East Area, approximately 55 kilometres(km) west-south-west of Karratha in Western Australia (WA) (the Proposal). The proposal will utilise seawater and evaporation to produce a concentrated salt product for export.
	The Proposal includes the development of a series of concentrator and crystalliser ponds and processing plant. Supporting infrastructure includes bittern's outfall, drainage channels, product dewatering facilities, desalination plant and/or groundwater bores, pumps, pipelines, power supply, access roads, administration buildings, workshops, laydown areas, landfill facility, communication facilities and other associated infrastructure. The Proposal also includes dredging in the Cape Preston East Port and either offshore disposal of dredge material or onshore disposal.

1.2. Objectives

The objectives of this document are to:

- Characterise the existing water quality conditions in the Eramurra/East Cape Preston region to provide a benchmark for interpretation of potential impacts due to activities associated with construction and operations of the Proposal;
- Document spatial and temporal variation of background marine water quality; and
- Review other water quality information collected for the area for comparison against baseline data collected in this report.

The requirements of the Environmental Scoping Document (ESD) together with key considerations / scope limitations are discussed in Table 2.



Table 2 Water Quality Monitoring Objectives and Key Considerations / Scope Limitations

Monitoring Objectives	Key Considerations / Limitations
Draft ESD Item 45 - Undertake a baseline water quality assessment at the intake and outfall locations including physiochemical parameters (e.g. salinity, pH, dissolved oxygen) and chemical parameters (e.g. metals, hydrocarbons, nutrients) for a minimum of 12 months;	
Draft ESD Item 46 - Collect adequate baseline water quality, sediment quality and benthic community data to document background marine environmental quality (including spatial and temporal variation) within the receiving marine environment. Baseline data acquisition will be adequate for the derivation of draft environmental quality criteria for indicators relevant to the discharge(s) e.g. water, sediment and/or infauna quality indicators;	Sediment quality and benthic community data are presented in a separate report.



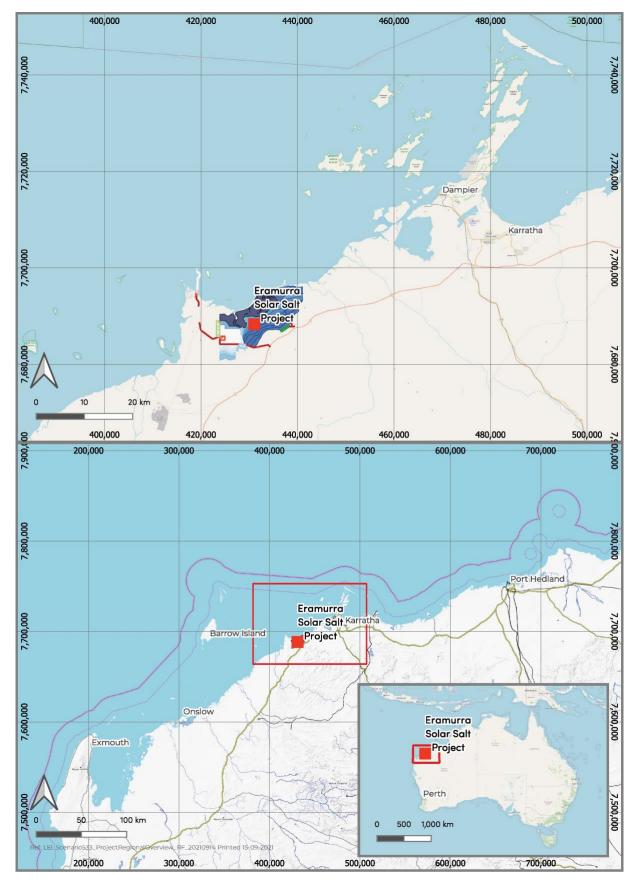


Figure 1 Regional location of the Proposal



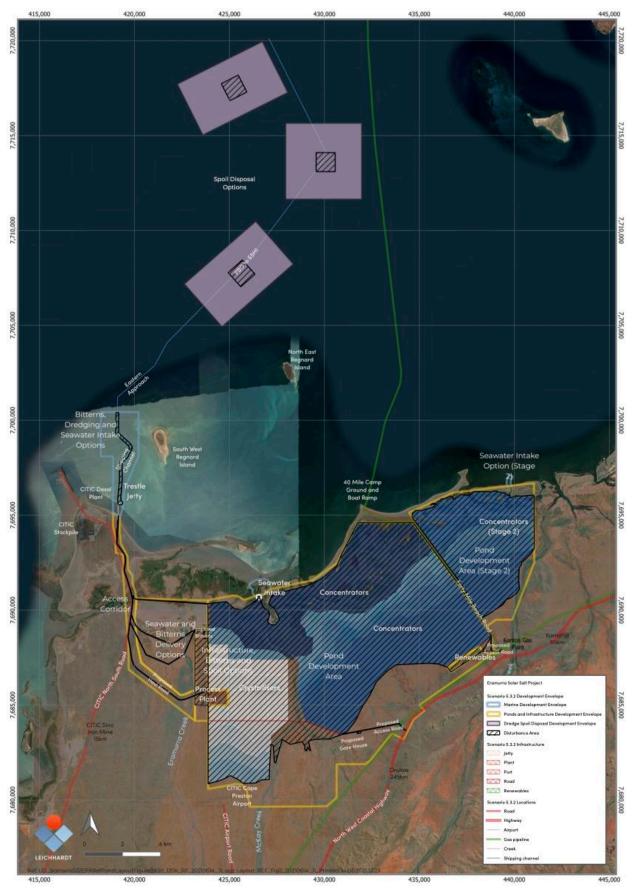


Figure 2 Proposed Development Envelopes and Indicative layout



2. Existing Environment

2.1. Climate

The region is characterised by very hot summers, mild winters and low and variable rainfall. The predominant large-scale climate driver is the sub-tropical ridge, which moves south between November and April causing monsoonal conditions to develop. As the subtropical ridge moves north from May to November, dry and clear conditions are experienced across the region. Hot, dry and sunny conditions mean the Pilbara is subject to very high evaporative demand. The western Pilbara receives more sunshine than anywhere else in Australia, averaging more than 10 hours a day (Sudmeyer 2016).

Bureau of Meteorology (BoM) data shows mean daily temperatures range from 25.1 °C - 38.0 °C during the warmest month of January and from 12.0 °C - 27.7 °C during the coolest month of July (Figure 3). Over the last 40-60 years, the region has experienced warming, although temperatures have increased most during winter and spring and cooled during autumn and summer. Warming during the largely cloudless winter and spring is in line with global trends, and summer cooling is likely caused by increasing summer rainfall and associated cloud cover over north-western Australia (Sudmeyer 2016).

Rainfall in the western Pilbara is influenced by tropical and monsoonal drivers, which are predominantly active in summer and autumn. Tropical cyclones (TCs) cause the most extreme rainfall events and generate 25–34% of the total annual rainfall near the Pilbara coast. The rainfall contribution from other events, such as tropical depressions and convective storms, makes up the rest of the summer rainfall totals (Charles *et al.* 2015). Rainfall is also influenced by southern mid-latitude drivers, such as frontal systems, during autumn and winter (Sudmeyer 2016). The annual average rainfall for the broader area is 128 mm, peaking in January to March and also May to June, with very little rainfall from July to December (Figure 3).

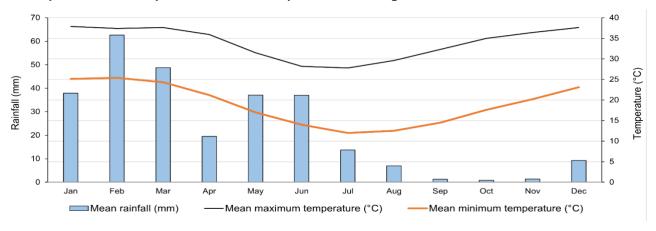


Figure 3 Climate statistics for Eramurra (BoM, 2021 - Mardie 005008).

Tropical cyclones and tropical low-pressure systems are associated with the monsoon season between November and April annually. The Karratha to Onslow coastline is the most cyclone prone section of the Australian coast, typically experiencing one landfalling event every two years. Most cyclones are generated in warm ocean waters to the north of WA and initially move west-south-west down the coast at 5–20km/h and then take a more southerly track as they continue south. These systems bring extreme conditions to coastal



areas, with damaging winds and wave action, along with cyclonic storm surge. A surge coinciding with a high tide can cause extensive flooding of low-lying coastlines. In addition, tropical cyclone events are strongly associated with flooding due to widespread heavy rainfall. Climate projections show medium confidence that TCs will become less frequent in future but will increase in intensity (Sudmeyer 2016).

Wind strength and direction varies seasonally across the Pilbara. During the dry season, a high-pressure ridge prevails over the region which drives easterly to south easterly winds. Winds are also affected by winter fronts which move through mid-latitudes and destabilise the high-pressure ridge. South-westerly winds are experienced briefly following the passage of frontal systems before the high-pressure ridge reforms and normal dry season wind pattern resumes. During the wet season, the high-pressure ridge moves south and the prevailing wind climate involves the development of a low-pressure trough inland, driving westerly and north-westerly winds across the coastal western Pilbara. Coastal areas are also affected by the land-sea breeze system, as the temperature differential between land and adjacent ocean changes during the day. As a result, onshore winds are often experienced during the afternoon, which decrease in strength during the early evening and night.

Tropical cyclones and depressions also have the capacity to bring strong and damaging winds to the area, with damaging winds affecting the Pilbara once every two years on average. The strongest wind gust recorded in the Pilbara was 259 km/h during Tropical Cyclone Trixie in 1975 (BoM 2021).

2.2. Geomorphology

The dominant geological features in the area are erosional basaltic outcrops, sedimentary rock formations including limestone reef platforms and islands and expansive areas of mud flats formed by tidal processes. The marine area is bounded to the west by Cape Preston, a basalt outcrop fringed by a limestone shore platform, which extends to the east. This shelf runs seaward of the Eramurra creek floodplain and an extensive network of tidal creeks and mudflats. Fine sediments are delivered to coastal areas from inland mudflats during tidal action and rainfall events (Eliot *et al.* 2013). Scattered hard and soft coral communities have developed on limestone shelves, particularly around Gnoorea Point. In general, marine areas inshore of South-West Regnard Island and extending northeast to nearby Eaglehawk Island are very shallow. Offshore, depth contours run in WSW-ENE orientation and a notable depth increase from approximately -3 m LAT to approximately -13m LAT is recorded on bathymetry charts. The Maitland River drains into Regnard Bay and the intertidal areas along this stretch of coast support large stands of mangrove habitat (LeProvost 2008).

2.3. Oceanography

At a regional scale, circulation on the northwest shelf of Australia is dominated by the west-south-westward alongshore Holloway Current forced by the monsoonal winds. The Holloway Current has its maximum transport during late austral autumn (May–June) (Marin and Feng, 2019). Localised currents in the vicinity of Cape Preston are largely tidal and wind driven. Tidal currents in the area around Cape Preston have been measured at up to 1.5 knots during Spring Tides. The flood tide generates a south-eastward current along the east side of Cape Preston, while ebb tide generates a net northward current (LeProvost 2008). The tide levels analysed from data near the project site indicates that the mean spring tide range exceeds 3.5 m and the maximum tide range is ≈ 5.1 m (O2 Marine 2019).



The northwest shelf of Western Australia experiences waves generated from three primary sources: Indian Ocean swell, locally generated wind-waves and tropical cyclone waves. Along the shoreline the ambient (non-cyclonic) wave climate is generally mild. In dry season months low amplitude swell originating in the Indian Ocean propagates to the site and occurs in conjunction with locally generated sea waves of short period (<5s). In the wet season the wave climate for the broader area is locally generated sea waves from the southwest, however it is noted that Cape Preston offers a barrier to wave action from the southwest.

In conjunction with collecting baseline water quality data, O2 Marine also captured baseline metocean data. Findings from this latter study are reported separately in O2 Marine (2022a)

2.4. Marine Environmental Quality

Marine waters adjacent to and inside the Project area have been assigned Levels of Environmental Protection (LEPs) as part of the Pilbara Coastal Waters Consultation Outcomes: Environmental Values and Environmental Quality Objectives (DoE 2006). A Maximum LEP has been assigned in coastal areas to 3 km offshore west of Devils Creek on the eastern side of Cape Preston. Additionally, a Maximum LEP has been assigned to a 5km wide corridor which extends approximately 15km from the coast, encompassing South-West Regnard Island. The adjacent coastal waters are assigned a 'High' level of ecological protection. Two small areas (<100m diameter) on the north and eastern sides of Cape Preston have been assigned a Low LEP (Figure 4).

Regionally significant arid zone mangrove is present in coastal areas and the area has been nominated as a proposed marine conservation reserve. These classifications infer that the "environmental condition for this area are essentially pristine, with no detectable change from natural background conditions and no effects on marine life as a result of waste inputs or contamination" (DoE 2006).



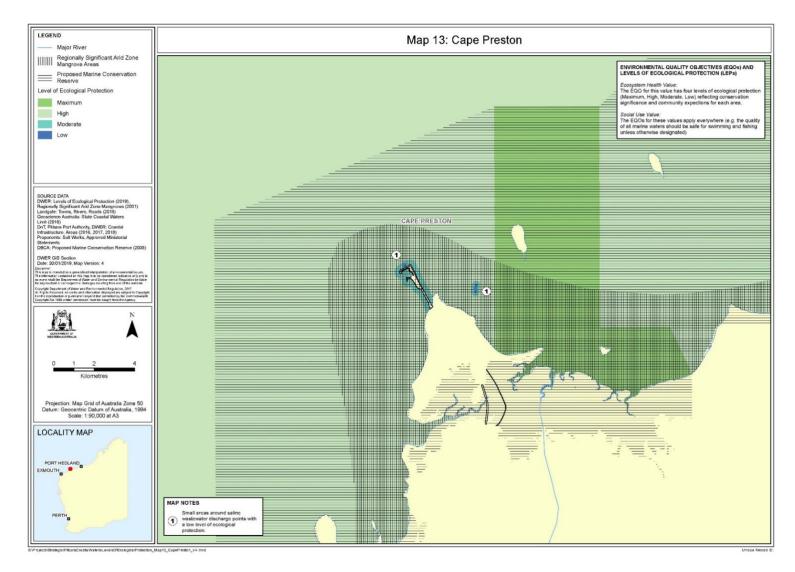


Figure 4 Current Levels of Ecological Protection in the Vicinity of the Eramurra Project (Source: DWER, 2019)



2.5. Water Quality

2.5.1. Temperature

Water temperatures in the region are affected by broader scales processes such as regional currents and marine heatwave events related to climate processes such as El Nino Southern Oscillation. Analysis of several decades of sea-surface temperatures in the western Pilbara shows that temperature variability has increased markedly over the last decade which has led to widespread coral bleaching in the area (Babcock *et al.* 2020). Localised factors that affect water temperature are ambient air temperature, solar radiation/cloud cover, as well as wind speed and direction. Offshore Pilbara waters experience more stable water temperatures than nearshore Pilbara waters, with CALM (2005) reporting temperature ranges from 18 °C in winter to 31.5 °C in the summer in relatively shallow areas around the Dampier Archipelago.

2.5.2. Salinity

Regional Currents transport warm low salinity water south-westward along the outer northwest shelf from February to June. In general, nearshore waters are more saline than those found on the outer shelf (Condie *et al.* 2006). Water quality studies of the nearshore Pilbara regions have shown surface water salinities to range between from 35.1 to 37.1 ppt (CALM 2005).

Studies undertaken during March 2002 around Dampier Archipelago documented an overall trend of surface salinity increase from inshore to offshore, with 36.7 ppt recorded in King Bay and 35.5 ppt recorded about 35 km north of East Intercourse Island (Pearce *et al.* 2003). Wenziker *et al.* (2006) reported salinities in the range of 34.5 – 36.3 ppt around the Dampier Archipelago.

Variable salinity is common in nearshore waters of the west Pilbara (Pearce *et al.* 2003). During the summer monsoonal season, salinity may be impacted by freshwater outflows from tidal creeks that connect the coast with large inland flats.

2.5.3. Turbidity/Suspended Sediments

LeProvost (2008) reports that turbidity in the region is generally high due to episodic high volume river flows, dominant marine sediment types, strong local winds, large tides and common occurrences of cyanobacterial blooms (*Trichodesmium* sp.). Nearshore waters are often more turbid than deeper offshore waters in the west Pilbara, findings supported by MScience (2009) for the Wheatstone Project, who also found that conditions are more turbid during November to April than May to October. MScience (2009) also reported the impact on local turbidity as a result of a Tropical Cyclone (TC Dominic), which was a sharp and extreme increase the turbidity for around one week.

Tide is particularly influential on turbidity, which is naturally higher during spring than neap tides, due to increased current velocities (Jones *et al.* 2015). Large inshore areas of shallow, flat bathymetry are affected by wind driven waves and currents which easily resuspend fine sediments in the area.

Marine water quality studies conducted at nearby Cape Preston have recorded turbidity from 0-23 Nephelometric Turbidity Unit (NTU) (URS 2007) and Suspended Sediment Concentration (SSC) between 1.2-



48.1 mg/l (Maunsell 2006) and 2-10 mg/l (URS 2007). Mscience (2009) reported median turbidity of 1.0 - 2.1 NTU at Wheatstone.

2.5.4. pH/Dissolved Oxygen

Baseline data relating to pH is currently not available for the marine waters east of Cape Preston and limited data is available for the Pilbara marine waters. The pH of marine waters is generally close to 8.2, whereas most natural freshwaters have pH values in the range from 6.5 to 8.0 (OzCoasts 2021). Altered pH levels may increase the bioavailability of a range of heavy metals and other toxicants, while also affecting the ability of marine organisms to grow and maintain calcium carbonate structures. Major pathways to damaging pH levels include disturbance of onshore or intertidal Acid Sulfate Soils, which have potential to lower the pH of the water column.

Previous studies recording dissolved oxygen concentrations for the marine waters of the Pilbara are not publicly available, however, monitoring of dissolved oxygen is particularly important around areas of wastewater discharge, or where stratification of the water column is suspected. Oxygen has limited solubility in water, usually ranging from 6 to 14 mg/l. Solubility is affected by water temperature and density, as well as other factors including uptake by marine biota. Extensive algal blooms (i.e., *Trichodesmium* spp.) have the ability to cause low dissolved oxygen events through high demand.



Methods 3.

In-situ Physico-Chemical Stations

Physico-chemical parameters were measured via submersed sensors placed on the seabed at three monitoring locations (NCP05, UNS05 and SIC02). Deployment and data collection details for these sites are included in Table 3 and shown in Figure 5.

Table 3 Water Quality Instruments used during the deployment period at Eramurra.

Site	Instrument	Parameters	Latitude	Longitude	Details	Deployment Period
	IMO-CTD	Temperature (°C) Salinity (ppt) Depth (m)	20°49'25.9" S	116º13'22.0" E		August 2020- October 2021
NCP05	IMO-pHiDO	pH Dissolved Oxygen (mg/L + %)	20°49'25.9" S	116º13'22.0" E	NCP05. Nearshore Cape Preston [Trestle jetty; bitterns	August 2020- October 2021
	IMO-NTU	Turbidity (NTU)	20°49'25.9" S	116º13'22.0" E	discharge site]	August 2020- October 2021
	IMO-MS9	PAR Depth (m) Temperature (°C)	20°49'25.9" S	116º13'22.0" E		October 2020 – October 2021
	IMO-CTD	Temperature (°C) Salinity (ppt) Depth (m)	20°49'51.1" S	116º17'59.7" E		June 2020 – October 2021
UNS05	IMO-pHiDO	pH Dissolved Oxygen (mg/L + %)	20°49'51.1" S	116º17'59.7" E	UNS05. Nearshore north	June 2020 – October 2021
	IMO-NTU	Turbidity (NTU)	20°49'51.1" S	116º17'59.7" E	of estuary	June 2020 – October 2021
	IMO-MS9	PAR Depth (m) Temperature (°C)	20°49'51.1" S	116°17'59.7" E		October 2020 – October 2021
SIC02	WETLAB- NTU ¹	Turbidity (NTU)	20°52.815" S	116°17.730" E	SIC02. Located within intake creek (McKay Creek)	August 2020- October 2021

¹ Included for engineering purposes -results discussed in future sedimentation and coastal process studies.





Figure 5 $\,$ Baseline water quality (in situ and sample) monitoring locations



Water quality instruments were mounted on purpose designed frames, alongside metocean data acquisition equipment. A range of instruments recorded in-situ physico-chemical parameters including;

- Temperature
- Salinity + Electrical Conductivity
- Depth/Pressure
- pH
- Dissolved Oxygen
- Turbidity
- Photosynthetic Active Radiation (PAR)²

The purpose designed steel frames include mounting brackets to suit the various metocean and water quality instrumentation. The frames are designed to stand upright on the seabed, while maintaining the instruments at approximately 0.3 m above the seafloor and to reduce the likelihood of interaction of sensors with sediment, large rocks and rubble. The frame is weighted and attached to an approximately 30 metre ground line terminating in a Danforth anchor. A buoy is mounted on the frame which is operated by an acoustic release mechanism for ease of retrieval.

The frame configuration with location of instruments and equipment is shown in Figure 6 as deployed on the seabed at NCP05. Marine water quality baseline monitoring was conducted over a period between June 2020 to October 2021.

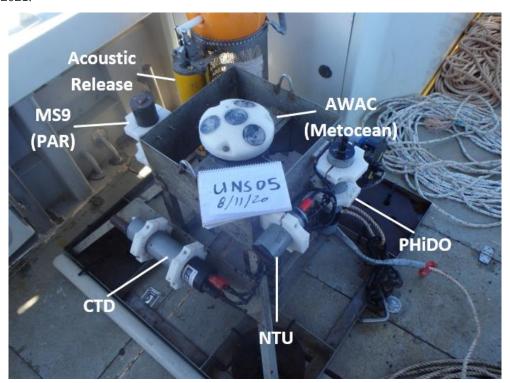


Figure 6 Water Quality and metocean frame deployment at site NCP05

² Photosynethic Active Radiation (PAR) is a proxy for bioavailable light for benthic communities such as Seagrass. Analysis and discussion of PAR data for this project is discussed in O2 Marine (2021b).



3.1.1. Instrument Configuration

Instrument settings were configured to maximise data resolution for a 4–6-week deployment period, as well as optimise battery performance. The IMO-CTD, IMO-pHiDO and IMO-NTU were configured to collect burst samples for 10 seconds (1 Hz) every 30 minutes during the deployment.

The IMO-MS9 was configured to collect burst samples (30 seconds, 1Hz) every 30 minutes from 0600 to 2200 Australian Western Standard Time (AWST) daily.

3.1.2. Water Quality Instrument Maintenance & Calibration

Retrieval, data download and instrument maintenance were carried out over a period of 12 months with field events occurring every 4-6 weeks (maintenance trips were weather dependant). Regular maintenance was carried out on each of these trips and involved cleaning and removal of biofouling on equipment. Biofouling is well known to compromise water quality data through the inhibition of probe/sensor function. During each field event, battery recharge, data check, data download and backup was carried out. Calibration and calibration checks were carried out in-line with manufacturer recommendations. Where calibration checks were not satisfactory, a new calibration was performed, or replacement manufacturer calibrated instrumentation was deployed.

Each maintenance service involved the retrieval of frames and return to land overnight where the above tasks were undertaken. Usually, redeployment occurred within a 24-hr period. Water quality instrument frames were deployed and retrieved using the commercial vessels Pseudorca III and Tin Thing.

A schedule of trips undertaken at Eramurra throughout the monitoring period related to water quality station retrieval, maintenance and deployment is included in Table 4 below.



Table 4 Field events and dates pertaining to Water Quality Stations at Eramurra.

Field trip	Dates	Objective
1	14-June-2020	Initial deployment of NCP05 and UNS05
2	21-Aug-2020	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery.
	23-Aug-2020	Deployment.
3	22-Sep-2020	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery
	23-Sep-2020	Deployment.
4	06-Nov-2020	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery.
	07-Nov-2020	Deployment.
5	15-Dec-2020	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery.
	16-Dec-2020	Deployment.
6	12-Jan-2021	Retrieval of NCP05 and UNS05, Maintenance, calibration checks and data recovery.
	13-Jan-2021	Deployment.
7	24-Feb-2021	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery.
	25-Feb-2021	Deployment.
8	22-Mar-2021	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery.
	23-Mar-2021	Deployment
9	9-May-2021	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery
	10-May-2021	Deployment.
10	9-June-2021	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery
	10-June-2021	Deployment
11	23-July-2021	Retrieval of NCP05 and UNS05. Maintenance, calibration checks and data recovery
	25-July-2021	Deployment
12	7-Oct-2021	Retrieval of NCP05 and UNS05. Data recovery and demobilisation of equipment.
	10-Oct-2021	



3.2. Marine Water Sampling

Water samples were collected for laboratory analysis over 12 monthly events at four locations (OCP20, NCP05, UNS05 and SIC02), water sample locations and details are displayed in Figure 5. The sampling program included four quarterly events and eight monthly events. The methods for these two regimes were the same, only the analytical suite differed. Details for these two sample regimes are included in Table 5.

Depth integrated marine water samples were collected monthly at the below sites during each field event. Water sampling was conducted before retrieval of the water quality frame in order to avoid disturbing benthic sediments and affect turbidity measurements. A weighted 12 volt water sampling pump and hose was lowered from the water surface to approximately 0.5 m above the seabed. Water was pumped to the topside and homogenised in a 10 L sampling container, before transferring the sample to laboratory supplied bottles and chilled on ice before being transferred to the Perth based laboratory via air freight. Samples were labelled with date, time and site name (as per list below). Sites with suffixes 'A' and 'B' are replicate samples in addition to standard QA/QC samples as requested by Leichhardt.

- OCP20
- NCP05
- SIC02 A
- SIC02 B
- UNS05 A
- UNS05 B

All chain of Custody (CoC) and laboratory reports are included in Appendix A.

3.2.1. Laboratory QA/QC

Samples with an accompanying Chain of Custody (CoC) form were sent to Analytical Reference Laboratory (WA) Pty Ltd (ARL) (refer Appendix A). Eurofins (a NATA accredited laboratory) was selected to provide a comprehensive best practice laboratory QA/QC program to provide highly defensible analytical data in accordance with ANZG (2018), NAGD (2009) and DER (2014), and as required by the Environmental Licence. Laboratory QA/QC results include Laboratory Control Samples, Matrix Spikes, Laboratory Duplicates and Certified Reference Materials (CRM). Laboratory QA/QC reports are included as Appendix B.

3.2.2. Field QA/QC

All sampling equipment was cleaned and treated with an appropriate decontamination solution (DECON) between each sampling site. The vessel area used for sample collection and processing was cleaned and any potential sources of contamination was removed from the area i.e., metal objects, fuel drums etc. Sampling protocols and QA/QC procedures recommended by the Australian and New Zealand Guidelines (ANZG 2018) were adhered to. Samples were sent to a National Association of Testing Authorities (NATA) accredited laboratory and analysed for a range of analytes (Table 5).

The following field QA/QC Samples should be collected as described below:

• **Duplicate samples** are collected at the same site as three of the primary monitoring samples. The purpose of the sample is to confirm that the primary laboratory can produce consistent results when



analysing the same sample. The site where it was taken is to be recorded but not reported to the laboratory. Ideally it should be collected at a site that is expected to have higher levels of contamination (based on historic data and potential sources of contamination) as this will confirm a wider range of analytes and reduce the level of instrument error when comparing larger concentrations.

Table 5 Marine water sampling program

Analysis Suite						
Monthly Suite ³	Monthly Suite ³ Dissolved metals, total metals, nutrients, cations and anions, alkalinity, total suspended solids (TSS), specific gravity, total organic carbon (TOC).					
Quarterly Suite	Total recoverable hydrocar	Total recoverable hydrocarbons, BTEXN and microplastics.				
Event Number	Date	Monthly Suite	Quarterly Suite			
Event 1	15/7/20	✓				
Event 2	23/8/20	✓				
Event 3	28/9/20	✓	✓			
Event 4	8/11/20	✓				
Event 5	15/12/20	✓				
Event 6	15/01/21	✓				
Event 7	25/02/21	✓	✓			
Event 8	24/03/21	✓				
Event 9	11/05/21	✓				
Event 10	11/6/21	✓				
Event 11	22/6/21	✓	✓			
Event 12	30/8/21	✓	✓			

³ For a full break down of individual parameters please refer to Appendix A



3.3. Data Analysis

3.3.1. Physico-chemical Sensors

Following data download, preliminary data QA/QC checks were undertaken to assess the data integrity and ensure the instrument was operating correctly. The dataset was examined for outliers by scanning for any anomalous recordings, and prolonged identical or unrealistic elevated readings. All available QA/QC checked data was compiled from the various downloaded events. Outliers, irrelevant and erroneous data points (e.g., data recorded after retrieval/before deployment or data affected by biofouling) were identified and removed from the dataset.

3.3.2. Water Depth, Temperature & Salinity

Data for the period was compiled and plotted along the full time series. Temperature and salinity datasets underwent statistical analysis to determine monthly and seasonal means, medians, minimums, maximums, as well as 20th and 80th percentiles. Data was also compared to meteorological and tidal data collected for the baseline periods to identify natural trends at the monitoring stations.

3.3.3. Turbidity and PAR

Turbidity data was analysed to calculate mean, median, 80th, 95th and 99th percentile values for the monitoring period. Both turbidity (NTU) and light (PAR) data are required for the purpose of comparison against the recently published Western Australian Marine Science Institution (WAMSI) criteria for coral mortality described in Jones *et al.* (2019). These criteria use a combination of turbidity (or SSC) and Daily Light Integral (DLI) (derived from PAR) over time, to determine possible and probable mortality thresholds for BCH (including seagrass, coral and sponges) (Jones *et al* 2019). This document summarises baseline turbidity and PAR data, seasonal trends, and comparisons against regional data. Detailed discussion and comparison against WAMSI criteria and the implications on BCH in relation to dredge plume modelling is included in O2 Marine (2022b).

3.3.4. QA/QC Assessment

Field water quality analysis included one random duplicate sample and two duplicates at designated sites. Duplicates were sub-sampled from a single homogenised sample with both samples sent to a NATA accredited laboratory (ARL) for analysis. Duplicate samples are used to test the precision (or repeatability) of the analysis. The relative percentage difference (RPD) between the primary and duplicate sample is calculated as:

%RPD = (sample result - duplicate result) * 100(sample result + duplicate result)/2

If the RPDs are less than 35% then field and laboratory procedures are considered of acceptable quality and meaningful conclusions can be drawn from the data.



4. Results and Discussion

4.1. Physico-chemical Parameters

Results from the IMO-CTD (temperature, depth & salinity), IMO-pHIDO (pH & Dissolved Oxygen and IMO-NTU (Nephelometric Turbidity Units), and IMO-MS9 (light/PAR) are presented below for sites NCP05 and UNS05.

4.1.1. Data collection period

The full data collection period ran from 15th July 2020 to 10th October 2021 across an approximate 15-month (64 week) period. Site UNS05 was deployed on the first day of the monitoring period, while NCP05 was first deployed on the 27th August 2020. Data gaps were experienced during the long-term water quality monitoring program (Table 6). At NCP05, failure of instrument battery (CTD) was determined to be the cause upon retrieval, with logging suspended due to battery failure. UNS05 experienced multiple data gaps, with causes attributed to excessive biofouling, sensor water ingress, battery failure and other reasons. These causes were investigated and resolved where possible

Table 6 Periods of time between 15-07-2020 and 10-10-2021 where data gaps were experienced for each parameter at sites UNS05 and NCP05. Note - several gaps cover the same time periods with slightly different start and end dates.

	Start	End	Temperature	Salinity	рН	Dissolved Oxygen	Turbidity
NCP05	18/01/2021	26/02/2021	У	у	у	У	у
	25/07/2021	9/8/2021				У	
	16/9/2021	10/10/2021		У	у		
Number of weeks data collected			53	50	50	51	53
UNS05	6/11/2020	13/01/2021					у
	30/11/2020	14/01/2021				У	
	15/12/2020	14/01/2021	У	У			
	1/01/2021	13/01/2021			у		
	25/02/2021	17/03/2021				У	у
	24/02/2021	26/03/2021		у	у		
Number of weeks data collected			60	56	58	55	54

4.1.2. Temperature

Water temperature data was recorded at NCP05 and UNS05 for 53 and 60 weeks respectively over the monitoring period. Monthly, seasonal and overall summary statistics including median and percentile calculations for each site are provided in Table 7. Temperature fluctuations were comparable for both sites, which are < 10km apart and in similar depth.

Overall, temperature ranged from 20.19°C – 32.45°C (UNS05) and 20.15°C – 32.53°C (NCP05), with mean temperatures of 26.61°C (UNS05) and 27.12°C (NCP05). The warmest waters were experienced during January, with only a slight decline until end of March, when water temperature declined more rapidly to the coolest months of June, July and August. No significant difference between temperature at each site was observed. Water temperatures at both sites were warmer during the wet season than the dry season, with the average temperatures approximately 5°C warmer during the wet season.



Both sites are located in shallow nearshore waters (~6 metres) and are expected to show higher temperature variability than offshore waters, largely due to the influence of solar radiation (Pearce *et al.* 2003). The effect of solar radiation is clear in Figure 8 which displays diurnal changes in water temperature at each site of around 0.8°C. Water temperature is seen to be highest during the mid-afternoon and lowest in the early morning, with a lag-time behind the daily solar cycle.

Several sharp (less than 5 days) decreases in water temperature (3-4°C) were observed simultaneously at both sites on the 8^{th} October 2020, 10^{th} December 2020, 23^{rd} January 2021 and 5^{th} of March (Figure 7). The latter three of these events coincided with tropical low-pressure systems (Section 4.1.5), which are generally associated with a drop in air temperature and increased cloud cover.

 Table 7
 Summary Water Temperature Statistics recorded at NCP05 and UNS05

Site	Period	Minimum	Maximum	Average	Median	20th Percentile	80th Percentile	95th Percentile
UNS05	Jan	28.23	32.45	30.67	31.38	29.15	31.87	32.18
	Feb	28.02	31.06	29.38	29.21	28.74	30.14	30.64
	Mar	26.88	31.23	29.12	29.13	28.19	29.94	30.62
	Apr	26.30	30.94	29.01	29.37	27.49	30.23	30.63
	May	21.18	27.57	25.34	25.15	23.98	26.92	27.33
	Jun	20.83	22.71	21.67	21.57	21.30	22.17	22.54
	Jul	20.66	22.21	21.57	21.57	21.35	21.82	22.08
	Aug	20.19	24.91	21.85	21.55	21.05	22.66	24.05
	Sep	22.94	26.60	24.67	24.64	24.05	25.37	25.87
	Oct	21.77	26.91	24.45	24.65	23.48	25.21	26.02
	Nov	24.13	29.38	26.54	26.07	25.13	28.38	28.75
	Dec	27.44	30.31	29.07	29.06	28.31	29.94	30.19
	Dry	20.19	27.57	23.76	24.09	21.62	25.34	26.96
	Wet	24.13	32.45	28.86	29.03	27.81	30.15	31.62
	Total	20.19	32.45	26.61	26.99	23.72	29.50	30.73
NCP05	Jan	29.51	32.53	31.25	31.38	30.52	31.94	32.25
	Feb	30.12	31.34	30.69	30.70	30.42	30.90	31.22
	Mar	27.80	30.63	29.48	29.52	29.07	29.97	30.27
	Apr	26.27	30.53	28.76	29.01	27.24	29.97	30.30
	May	22.08	27.56	25.23	25.82	23.52	26.48	27.14
	Jun	20.15	22.69	21.38	21.38	20.96	21.74	22.30
	Aug	22.85	25.02	23.95	23.93	23.49	24.50	24.86
	Sep	23.09	26.66	24.75	24.66	24.23	25.32	26.02
	Oct	21.84	26.74	24.54	24.78	23.69	25.26	26.06
	Nov	24.91	30.04	26.90	26.38	25.63	28.56	29.34
	Dec	28.20	31.95	29.93	29.84	29.21	30.79	31.23
	Dry	20.15	27.56	24.50	24.67	23.42	25.83	26.60
	Wet	24.91	32.53	29.12	29.46	27.74	30.35	31.51
	Total	20.15	32.53	27.12	26.81	24.58	29.88	31.14



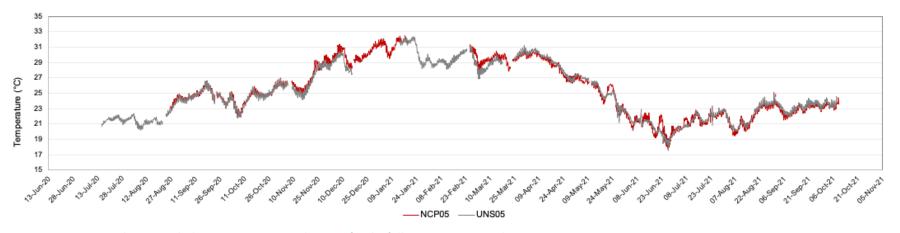


Figure 7 Temperature data recorded in-situ at NCP05 and UNS05 for the full monitoring period.

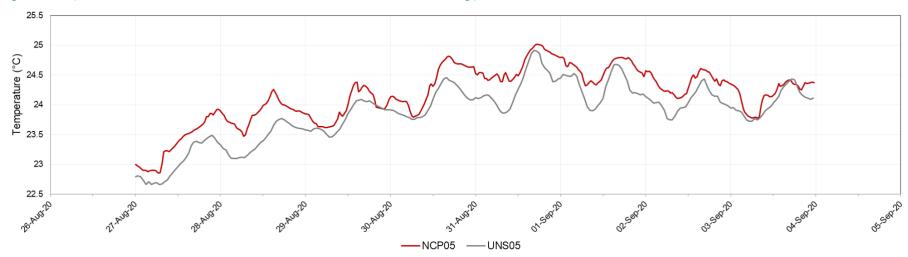


Figure 8 Randomly selected excerpt of temperature data recorded in-situ at NCP05 and UNS05 for the 27-August 2021 to 04-September 2021.



4.1.3. Salinity

Salinity data was recorded at NCP05 and UNS05 for 50 and 56 weeks respectively over the monitoring period. Monthly, seasonal and overall summary statistics for salinity (practical salinity units (psu)) including median and percentile calculations for each site are provided in Table 8. Salinity for the full monitoring period is provided in Figure 9. No significant long-term trends were noted at either site, although some seasonality may be observed, with both sites exhibiting slightly lower salinity concentrations during the wet season.

Overall, salinity ranged from 32.83 psu – 38.61 psu (UNS05) and 32.01 psu – 37.12 psu (NCP05), with mean salinities of 35.96 psu (UNS05) and 35.07 psu (NCP05). If seasonal trends were present, they were not consistent between sites. Higher salinities of approximately 2 psu were recorded at UNS05 than NCP05 during September and December 2020. The levels of salinity at NCP05 were more reflective of offshore Pilbara waters (IMCRA Pilbara Offshore - ANZG, 2018) than UNS05 during that particular time period. A possible explanation is a greater influence of offshore waters due to regional current circulation at NCP05, while UNS05 may have experienced greater exchange with inshore evaporative tidal flats, where salinity can reach higher levels.

Summary statistics for salinity did not indicate significant differences between wet and dry season at either site (Table 10). However, salinity levels were below 35 psu at both sites for several months from the beginning of December (Table 8), following a tropical low-pressure system which caused significant rainfall in the Eramurra area (Figure 12). This was followed by several other low-pressure systems over summer.

An excerpt of salinity data was examined to investigate short term (daily) changes in salinity (Figure 10). Daily variability showed correlation between sites for two of seven days examined, while the other five days showed little to no correlation. The limited correlation may be related to tidal exchanges with inshore waters.

Overall, data recorded during the monitoring period were similar to the salinity range (i.e., 35.1 to 37.1 ppt) previously reported by CALM (2005) for the coastal Pilbara region, which is slightly lower than the range recorded at Mardie (36.6 - 38.3 psu) (O2 Marine, 2019).



Table 8 Summary statistics for salinity (psu) recorded at UNS05 and NCP05.

Site	Period	Minimum	Maximum	Average	Median	20th Percentile	80th Percentile	95th Percentile
UNS05	Jan	33.90	34.87	34.24	34.18	34.09	34.41	34.59
	Feb	32.83	34.44	33.74	33.65	33.48	34.10	34.25
	Mar	35.44	37.22	36.30	36.30	36.16	36.35	36.74
	Apr	34.16	36.93	35.79	35.70	35.45	36.19	36.57
	Мау	33.23	35.81	34.69	34.81	34.04	35.23	35.41
	Jun	33.37	34.99	34.64	34.79	34.51	34.87	34.94
	Jul	35.90	36.94	36.27	36.23	36.07	36.43	36.74
	Aug	35.48	38.08	36.25	35.94	35.71	36.83	37.66
	Sep	37.13	38.61	37.84	37.84	37.62	38.05	38.31
	Oct	36.92	38.34	37.80	37.90	37.52	38.04	38.15
	Nov	35.81	38.27	37.40	37.36	37.14	37.72	38.03
	Dec	35.66	38.10	36.88	36.90	36.51	37.24	37.52
	Dry	33.23	38.61	36.27	36.16	34.83	37.84	38.09
	Wet	32.83	38.27	35.67	35.87	34.11	37.17	37.68
	Total	32.83	38.61	35.96	36.03	34.35	37.48	38.02
NCP05	Jan	33.06	34.29	33.57	33.58	33.39	33.75	33.92
	Feb	35.85	36.81	36.36	36.40	36.02	36.60	36.75
	Mar	35.01	36.77	36.17	36.25	35.93	36.47	36.60
	Apr	34.85	37.12	36.07	36.11	35.57	36.52	36.87
	May	33.18	36.63	34.99	35.01	34.37	35.69	36.27
	Jun	32.01	34.17	33.03	33.06	32.46	33.62	33.92
	Aug	34.47	35.46	35.24	35.26	35.18	35.32	35.37
	Sep	34.43	36.10	35.34	35.35	35.06	35.67	35.87
	Oct	34.80	36.35	35.62	35.60	35.37	35.89	36.07
	Nov	34.17	35.84	35.00	35.01	34.66	35.33	35.52
	Dec	32.64	35.33	33.75	33.43	33.15	34.60	34.92
	Dry	32.01	36.63	35.13	35.35	34.67	35.74	36.03
	Wet	32.64	37.12	35.02	35.17	33.58	36.24	36.58
	Total	32.01	37.12	35.07	35.30	33.92	35.96	36.50



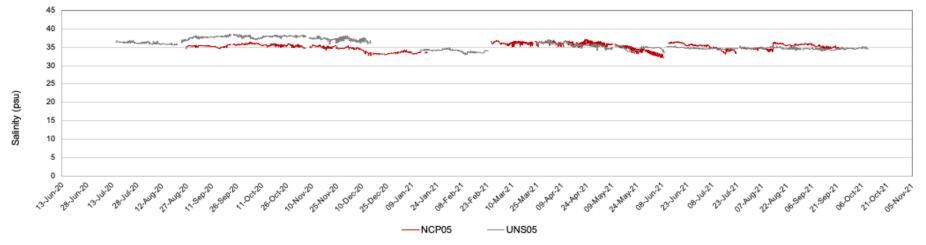


Figure 9 Salinity data recorded in-situ at NCP05 and UNS05 for the full monitoring period

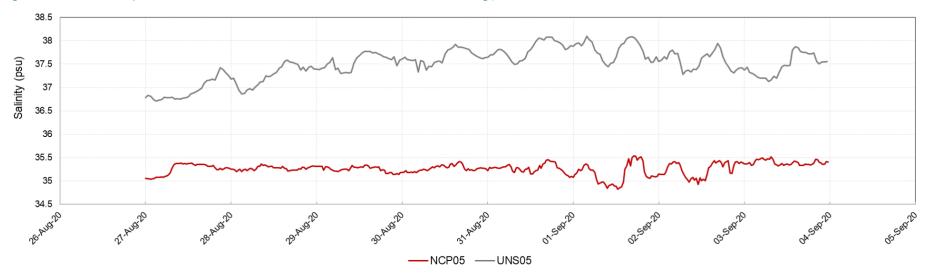


Figure 10 Randomly selected excerpt of salinity (psu) data recorded in-situ at NCP05 and UNS05 for the 27-August 2021 to 04-September 2021.



4.1.4. Turbidity

Turbidity (NTU) data was recorded at UNS05 and NCP05 for 53 and 54 weeks respectively, with summary statistics tabulated in Table 9 and median data presented in Figure 11. To enable comparison of baseline turbidity data against the Jones et al. (2019) coral thresholds, turbidity data was converted to SSC using the surrogate correlation coefficient (i.e. 1 NTU: 1.1 mg/L SSC), that was derived via linear correlation of NTU and SSC from a recent dredging project offshore of Onslow (Fisher & Jones 2019). SSC values derived from the NTU data are summarised presented in Table 9. Low turbidity (< 3 NTU) was measured from July – December 2020 at both sites, with no major high turbidity events until 10-December-2020. Several high turbidity events were concentrated during the wet season. Turbidity ranged from 0.14 – 173.85 NTU (NCP05) and 0.00 – 105.43 NTU (UNS05). Note that Figure 14 does not display these maximum readings as it plots the 24-hour rolling mean rather than individual recordings. Median turbidity levels at both sites were 0.65 NTU.

24 hour rolling mean of turbidity at the monitoring sites UNS05 and NCP05 was generally below 3 NTU, with a number of sharp increases associated with intense weather events. As turbidity is a proxy for suspended sediment concentration, turbidity is expected to increase during events that lift benthic sediments into the water column. These events are associated with high period and size waves, strong winds and increased current strength. These systems also commonly bring rainfall to the Pilbara. A brief analysis of low-pressure systems (including tropical cyclones) and rainfall events during the monitoring period was conducted with data provided by BoM (2021). Figure 12 shows the timing of rainfall during the monitoring period, with almost all high turbidity events (> 5 NTU) associated with significant rainfall. The entrainment of fine terrigenous sediment particles by freshwater runoff is a major source of suspended sediment to the nearshore marine areas, while strong winds and wave action associated with low-pressure systems resuspend benthic sediments causes high turbidity at the monitoring sites. This can cause elevated turbidity from days to weeks, as seen in Figure 14.

Table 9 Summary statistics for Turbidity (NTU) and Suspended Sediment Concentration - SSC (mg/L) at UNS05 and NCP05.

	NCP05 Turbidity (NTU)	UNS05 Turbidity (NTU)	NCP05 SSC (mg/l)	UNS05 SSC (mg/l)
Min	0.14	0.00	0.16	0.00
Max	173.85	105.43	191.24	115.97
Median	0.65	0.65	0.72	0.72
Average	2.35	1.85	2.59	2.04
20th percentile	0.40	0.41	0.44	0.45
80th percentile	1.25	1.26	1.38	1.39
95th percentile	7.68	6.88	8.45	7.56
99th percentile	41.48	30.53	45.63	33.58

The 14-day rolling mean of natural baseline SSC exceeded the Jones *et al.* (2019) thresholds for possible effects on corals once for UNS05 and twice at NCP05. The probable effects threshold determined by Jones *et al.* (2019) was not exceeded during the monitoring period at either site (Figure 15). This indicates that guideline SSC



thresholds may not be appropriate criteria for dredge monitoring. WAMSI are currently undertaking studies to develop turbid water thresholds which will be evaluated for use if available.

4.1.5. Rainfall and weather events

Rainfall data for the monitoring period (June 2020 – July 2021) was retrieved from BoM (2021) for nearby weather stations to gather perspective of regional rainfall events across the catchment for the Eramurra coastal areas and creek systems. The stations selected were Eramurra Pool (station number: 5082), Balmoral (station: 5040) and Dampier Salt (station: 5061), with the daily rainfall data presented in Figure 12.

Rainfall was markedly higher than the annual average rainfall of 128 mm (BoM, 2021). Total rainfall during the 12-month period is listed for nearby weather stations below.

Eramurra Pool 316.2mm
 Balmoral 171.3 mm
 Dampier Salt 382.9 mm

Most of the rainfall occurred during the wet season and early dry season, although there were several rainfall events during the dry season. Five events when a station or multiple stations recorded more than 50mm daily were observed; 19-July 2020, 11-December-2020, 30-January-2021, 4-March-2021 and 19-May-2021. The latter date was the highest recorded daily rainfall during the monitoring period, with 92 mm recorded at Balmoral and 68 mm at Eramurra Pool. Synoptic charts are shown for the five >50mm daily rainfall events in Figure 14 (wet season) and Figure 15(dry season). Events during the wet season were associated with low-latitude tropical low-pressure systems, while dry season events were associated with higher latitude low pressure fronts originating from the Southern Indian Ocean. These conditions reflect expected seasonal climatic pattens.

Major tropical weather systems that affected or transited nearby the project area at Eramurra are displayed in Table 10. Weather systems during both the wet and dry season have potential to affect water quality at the project site through storm surge, rainfall and associated terrestrial run-off, increased wind speeds and increased wave action.

Table 10 Tropical cyclones and Tropical low-pressure systems influencing the project area during the water quality monitoring period.

Cyclone Name	Cyclone Date	Eramurra rainfall		
Tropical Cyclone Odette	3 - 10 April 2021	No		
Severe Tropical Cyclone Seroja	3 - 12 April 2021	Yes		
Tropical Low 12U	27 January - 7 February 2021	Yes		
Tropical Low 08U	18 - 23 January 2021	Yes		
Tropical Low 02U	5 - 12 December 2020	Yes		
Tropical Low 09U	9 - 13 March 2020	Yes		



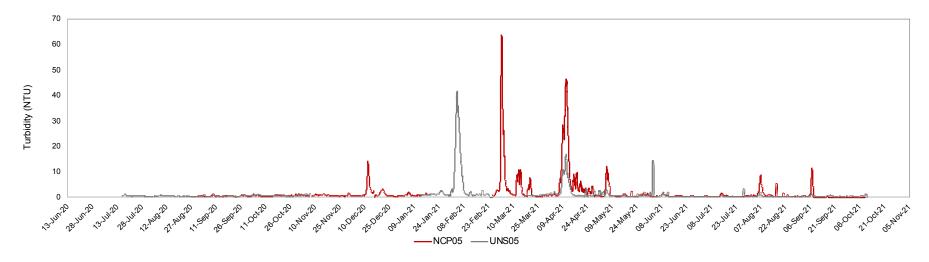


Figure 11 24 hour rolling median of Turbidity (NTU) recorded at Water Quality Station between June 2020 and July 2021 for NCP05 and UNS05

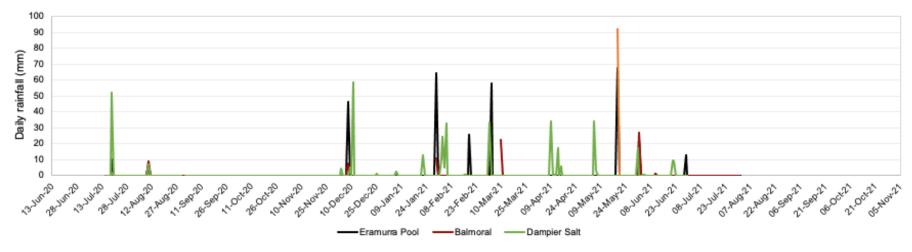


Figure 12 Daily Rainfall (mm) at three BoM weather stations nearby project site (Eramurra Pool 005082, Balmoral 005040 and Dampier Salt 005061).



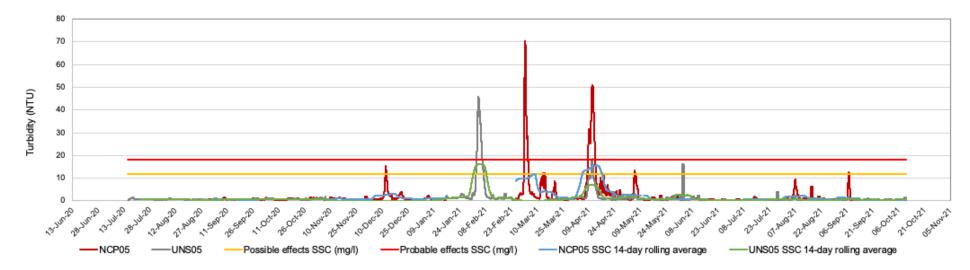


Figure 13 14 day rolling median of Suspended Sediment Concentration (SSC) (mg/l) derived from NTU recorded at Inshore location between July 2020 and June 2021 using surrogate calibration derived for the Wheatstone dredging project (Fisher & Jones 2019)



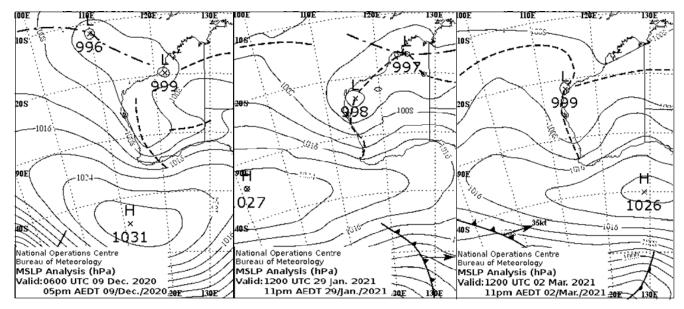


Figure 14 Three wet season rainfall events over 50mm affecting the Eramurra area during the monitoring period (BoM, 2021).

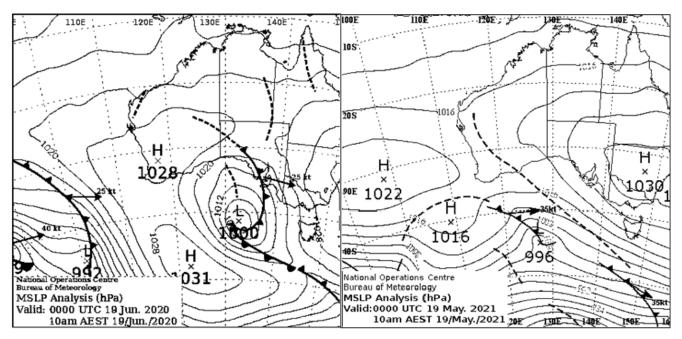


Figure 15 Two dry season rainfall events over 50mm affecting the Eramurra area during the monitoring period (BoM, 2021)



4.1.6. Photosynthetically Active Radiation (PAR)

Photosynthetically Active Radiation (PAR) sensors were added to the NCP05 and UNS05 in-situ frames during the October 2020 maintenance event, with data recorded from 9th November 2020 to 10th October 2021. PAR is used to calculate the Daily Light Integral (DLI), the recommended parameter used (along with turbidity or SSC) to assess possible and probable mortality thresholds for coral, seagrass and sponges (EPA 2021). Baseline DLI data is used to inform dredge plume modelling to determine spatial and temporal zones of impact (High, Moderate and Influence). The Eramurra Solar Salt Project Dredge Plume Modelling Report (O2 Marine 2022) discusses in detail baseline DLI characteristics, and delineates the zones of impact based on the current proposed dredge activities.

This Baseline Water Quality Report provides a summary of DLI results at NCP05 and UNS05 between November 2020 and October 2021. Figure 16 and Figure 17 show raw and 'rolling average' DLI data compared against recommended coral and seagrass mortality thresholds (possible and probable) as per EPA (2021). Results show that natural DLI conditions at both NCP05 and UNS05 are regularly below the possible effects criteria during the 7, 14 and 28 day periods, particularly between February and July 2021. Both sites recorded several, brief periods where natural DLI conditions were below the probable effects criteria.

Figure 16 and Figure 17 show direct correlation between low DLI levels and the two tropical lows and one cyclone (TC Odette) that had impacts on the marine environment around NCP05 and UNS05. During each of these occasions, DLI levers were seen to decline for brief periods of time, typically lasting for less than one week.

Guidance in EPA (2012) suggests that possible and probable effect thresholds are best applied to offshore, clear water communities, and when applied to near-shore, turbid waters, the thresholds would be conservative and likely overestimate impacts. This guidance appears accurate for the DLI data recorded at the near shore sites NCP05 and UNS05, where increased turbidity exists, and therefore may be reliably comparable to the offshore guidance criteria. Detailed discussion on threshold criteria and possible and probable effects on BCH is included in O2 Marine (2022b).



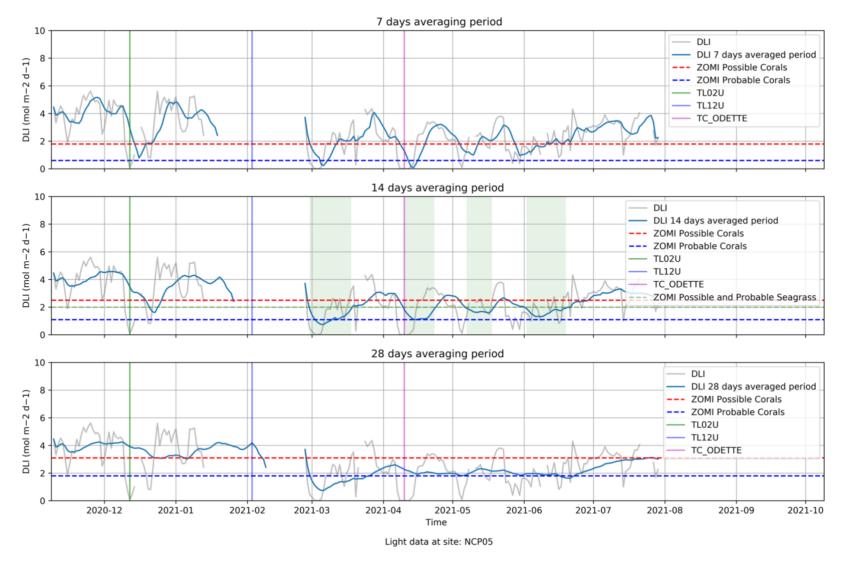


Figure 16 DLI Recorded at NCP05, raw and rolling average results are compared against BCH mortality thresholds



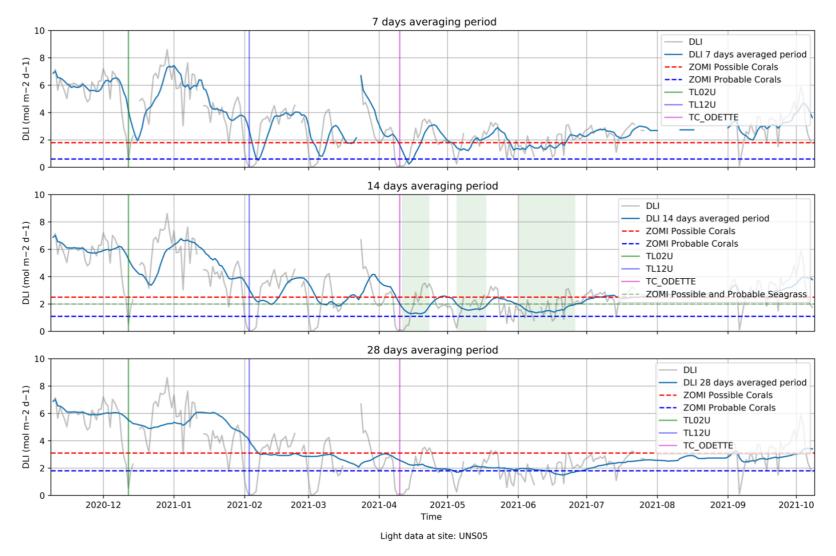


Figure 17 DLI Recorded at UNS05, raw and rolling average results are compared against BCH mortality thresholds



4.1.7. PH

pH data was recorded at NCP05 and UNS05 for 54 and 58 weeks respectively over the monitoring period. Overall summary statistics for pH including median and percentile calculations for each site are provided in Table 11. pH data for the full monitoring period is provided in Figure 18.

OzCoasts (2021) note that the pH of marine waters is close to 8.2, whereas most natural freshwaters have pH values in the range from 6.5 to 8.0. Water quality stations recorded baseline pH at NCP05 (mean: 8.27) and UNS05 (mean: 8.18). Both sites exhibited relatively stable pH levels throughout the monitoring period, with a slight decline in pH from April to June 2021. It is possible that this is related to a slight reduction in salinity during to this period associated with freshwater input from rainfall and terrestrial runoff. Long term monitoring data for both sites are provided in Figure 18. The pH at NCP05 experienced sharp declines to ~7.5 around the times of two rainfall events (Figure 13) on the 10th of December 2020 and 20th May 2021. UNS05 was more stable throughout the monitoring period and no trends are observed.

Table 11 Summary statistics for pH at UNS05 and NCP05.

	NCP05	UNS05
	рН	рН
Min	7.39	7.53
Max	8.45	8.39
Median	8.31	8.22
Average	8.27	8.18
20th percentile	8.21	8.14
80th percentile	8.36	8.29
95th percentile	8.40	8.32

4.1.8. Dissolved Oxygen

Dissolved Oxygen (DO) concentration was recorded at NCP05 and UNS05 for 52 and 54 weeks respectively over the monitoring period. Overall summary statistics for dissolved oxygen in mg/l and percent saturation (% Sat.), including median and percentile calculations for each site are provided in Table 12. Dissolved Oxygen (% Sat.) for the full monitoring period is provided in Figure 19. No significant long-term or seasonal trends were noted at either site.

Overall, DO (% Sat.) ranged from 65 – 103 % (UNS05) and 61 % – 105 % (NCP05), with mean DO of 85 % at both sites. DO concentration showed no trends and were not correlated between sites, indicating that factors influencing DO are likely to be localised and different at each site.



Table 12 Summary statistics for Dissolved Oxygen (mg/l and % saturation) at UNS05 and NCP05.

	NCP05	UNS05	NCP05	UNS05
	Dissolved Oxygen (mg/l)	Dissolved Oxygen (mg/l)	Dissolved Oxygen (% Saturation)	Dissolved Oxygen (% Saturation)
Min	4.85	3.46	63.74	70.25
Max	9.74	7.87	115.81	114.17
Median	6.56	6.51	95.98	94.29
Average	6.59	6.48	94.67	93.89
20th percentile	5.93	5.91	87.01	89.10
80th percentile	7.39	6.99	101.80	99.88
95th percentile	7.42	7.36	108.45	105.65



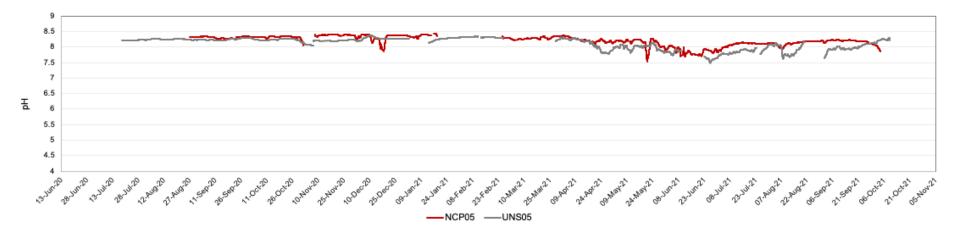


Figure 18 24 hour rolling median of pH recorded at Water Quality Stations between June 2020 and July 2021 for NCP05 and UNS05.

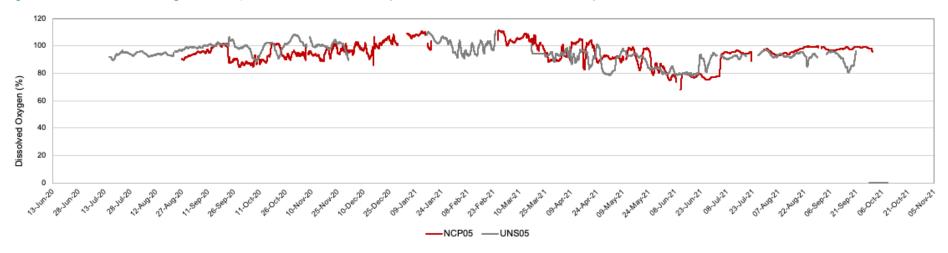


Figure 19 24 hour rolling median of Dissolved Oxygen (% saturation) recorded at Water Quality Stations between June 2020 and July 2021 for NCP05 and UNS05.



4.2. Laboratory Results

Water samples were collected over 12 sampling events between July 2020 and August 2021. Included in this sampling program was four 'quarterly events' in which additional parameters were tested for on top of the standard monthly suite. The tested parameters, and sampling dates are included above in Table 5.

Most results reported by the NATA certified laboratory were below the ANZG (2018) 99% species protection guidelines for all analytes with stated guideline values, and predominantly below the laboratory Limit of Reporting (LoR). For this reason, individual results are not tabulated in this report, but are included in detailed laboratory reports as Appendix A. Table 13 below summarises parameters and their respective Species Protection Levels (SPLs), identifying occasions where results were above any of the SPLs.

Table 13 Analytes tested for during baseline water quality sampling at Eramurra, Western Australia, with ANZG (2018) species protection levels for marine water quality. Analytes that exceeded SPLs for any sample or site are marked.

Analyte grouping/ Analyte	Unit	LoR	Spe	ecies Protectio	n Levels (ANZG	2018)	Exceedance reported
Anatyte			99%	95%	90%	80%	
Dissolved Metals o	and Metall	oids					
Aluminium	mg/L	0.01					
Antimony	mg/L	0.001					
Arsenic	mg/L	0.001					
Barium	mg/L	0.01					
Beryllium	mg/L	0.01					
Bismuth	mg/L	0.01					
Boron	mg/L	0.005					
Cadmium	mg/L	0.0001	0.0007	0.0055	0.014	0.036	
Chromium	mg/L	0.001	0.00014	0.0044	0.0486	0.0906	
Chromium (VI)	mg/L	0.002					
Cobalt	mg/L	0.001	0.000005	0.001	0.014	0.15	
Copper	mg/L	0.001	0.0003	0.0013	0.003	0.008	Х
Iron	mg/L	0.01					
Lead	mg/L	0.001	0.0022	0.0044	0.0066	0.012	
Lithium	mg/L	0.01					
Manganese	mg/L	0.01					
Mercury	mg/L	0.0001	0.0001	0.0004	0.0007	0.0014	
Molybdenum	mg/L	0.001					
Nickel	mg/L	0.001	0.007	0.07	0.2	0.56	
Selenium	mg/L	0.001	0.005	0.011	0.018	0.034	X
Silver	mg/L	0.001	0.0008	0.0014	0.0018	0.0026	
Strontium	mg/L	0.01					
Thallium	mg/L	0.01					
Thorium	mg/L	0.001					
Tin	mg/L	0.01					
Titanium	mg/L	0.01					
Uranium	mg/L	0.001					

Analyte grouping/	Unit	LoR	Sp	ecies Protection	n Levels (ANZG	2018)	Exceedance reported
Analyte			99%	95%	90%	80%	
Vanadium	mg/L	0.01	0.05	0.1	0.16	0.28	
Zinc	mg/L	0.005	0.007	0.015	0.023	0.043	
Nutrients							
Ammonia as N	mg/L	0.003	500	910	1200	1700	
Nitrate-N	mg/L	0.002					
Nitrite as N	mg/L	0.002					
Nitrite + Nitrate as ม	mg/L	0.002					
Total Kjeldahl	mg/L	0.1					
Total Nitrogen as	mg/L	0.1					
Total Phosphorus	mg/L	0.005					
BTEXN							
Benzene	μg/L	1	0.7	0.9	0.9	1.3	
Toluene	μg/L	1					
Ethylbenzene	μg/L	1					
Total Xylenes	μg/L	3					
Naphthalene	μg/L	5	0.07	0.09	0.09	0.12	
Total Recoverable H	lydrocar	bons (TRH)					
TRH C ₆₋₁₀	mg/L	0.02					
TRH C ₆₋₁₀ minus	mg/L	0.02					
TRH C>10-16	mg/L	0.05					
TRH C>10-16	mg/L	0.05					
TRH C>16-34	mg/L	0.1					
TRH C>34-40	mg/L	0.1					
Total Petroleum Hy	drocarbo	ons (TPH)					
TPH C ₆₋₉	mg/L	0.02					
TPH C ₁₀₋₁₄	mg/L	0.02					
TPH C ₁₅₋₂₈	mg/L	0.04					
TPH C ₂₉₋₃₆	mg/L	0.04					
TPH C>36	mg/L	0.04					
Dissolved Major Ani	ons & Ha	lides					
Sulphate	mg/L	1					
Bromide	mg/L	0.1					
Chloride	mg/L	5					
Fluoride	mg/L	0.4					
Iodide	mg/L	0.01					
Dissolved Major Cat	ions						
Calcium	mg/L	10					
Magnesium	mg/L	10					
Sodium	mg/L	10					
Potassium	mg/L	10					
Alkalinity/Hardness							
Alkalinity	mg	5					
Bicarbonate	mg	5					
Carbonate	mg	5					

Analyte grouping/	Unit	LoR	Sp	ecies Protectior	n Levels (ANZG :	2018)	Exceedance reported
Analyte			99%	95%	90%	80%	
Hydroxide	mg	5					
Hardness	mg	5					
Other analytes							
Reactive Silica	mg/L	0.1					
Total Suspended	mg/L	5					
Density*	g/mL	0.01					
Total Organic	mg/L	1					

4.2.1. Dissolved Metals

Two analytes (Copper and Selenium) were found to be elevated above Species Protection Levels (ANZG, 2018) during two of the monitoring events. The first round of sampling on the 15th of July 2020 returned exceedances for copper at all sites (Table 14). Copper concentrations were highest in the creek at SIC02, exceeding the 80% SPL for Copper of 0.008 mg/l, while other sites also experienced elevated copper levels, including the offshore site (OCP20) which reported 0.001 mg/l. Copper was recorded below the laboratory LoR during all other water sampling rounds apart from 11^{th} of May 2021, when it was recorded at all sites except NCP05. The levels of 0.001 – 0.008 mg/l are an order of magnitude above baseline levels previously reported for Pilbara marine waters. Wenziker *et al.* (2006) reported dissolved copper concentrations in the range of 0.068 – 0.164 μ g/l. At Eramurra, it appears that elevated dissolved copper concentrations occur rarely, but the elevation spans over a wide area. This may be related to regional processes or broadscale events. Highest copper levels were recorded within the creek at SIC02, which may indicate that the origins of the copper are terrestrial.

Elevated Selenium levels were recorded on the 15th of July 2020 (Round 1) at sites UNS05 and SIC02. Levels exceeded the 95% SPL at UNS05 and 99% SPL at SIC02. Selenium was not elevated at any sites during any other sampling round. Occasional elevated copper and selenium concentrations may be taken into consideration when setting management targets for Marine Environmental Quality Management Planning.

Multiple dissolved metal analytes (Boron, Iron, Lithium and Strontium) recorded minimum concentrations across all sites on the 24/3/2021 sampling event. While the majority of dissolved metals that recorded results consistently above LoR recorded maximum concentrations during the 28/9/2020 monitoring event.

Overall, these results indicate that the current allocation of maximum and high levels of ecological protection are appropriate for the marine waters of the Eramurra Project area.

Table 14 Sampling events and analytes that exceeded Species Protection Levels.

		Copper (Cu)	Selenium (Se)
Unit		mg/L	mg/L
Practical Quantitation	on Limit (LoR)	0.001	0.001
Species Protection Levels	99%	0.0003	0.005
(ANZG 2018)	95%	0.0013	0.011
	90%	0.003	0.018
	80%	0.008	0.034
15/07/2020	OCP20	0.001	<0.001
	UNS05-A	0.006	0.011
	UNS05-B	0.002	0.009
	NCP05	0.002	0.003
	SIC02-A	0.008	0.004
	SIC02-B	0.008	0.008
11/05/2021	OCP20	0.002	
	UNS05-A	0.002	
	UNS05-B	0.002	
	NCP05	<0.001	
	SIC02-A	0.002	
	SIC02-B	0.002	

4.2.2. Hydrocarbons and BTEXN

Quarterly sampling results for total recoverable hydrocarbons (TRH) and Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene (BTEXN) showed that all concentrations were below the laboratory LoR. These results reflect marine conditions which have had little anthropogenic impacts. Hydrocarbon and BTEXN results are included in Appendix A.

4.2.3. Nutrients

The inshore marine monitoring sites (NCP05 and USN05) and creek location (SIC02) in general, recorded TN and TKN at higher levels (and more consistently above LoR) when compared to the offshore monitoring location (OCP20). Maximum TN and TKN concentrations of 1.8 mg/L were recorded at UNS05-A during the 3/9/2021 sampling event. NH4 levels were also more regularly recorded above LoR at near shore sites, however, OCP20 did record the single maximum reading of 1.5 mg/L on 22/6/2021. It is likely mobilised matter was inadvertently collected within the sample to give this high, on off reading.

On multiple sampling events (15/7/2020, 8/11/2020) and 16/12/2020) TP levels at SIC02 were recorded at levels notably higher than all other monitoring sites. NCP05 recorded comparable TP results to SIC02 on the 16/12/2020 event.

The general increased nutrient levels recorded at near shore sampling locations is likely related to the tidal exchange with creek systems, which will contribute nutrient inputs via organic matter such as vegetation decomposition and animal wastes etc.

4.2.4. Total Suspended Solids (Laboratory)

Inshore areas (particularly creek location SIC02) recorded TSS concentrations above the LoR more consistently, and at higher magnitude compared to OCP20. One exception was a high reading at OCP20 of 44 mg/L during the 15/1/2021 sampling event. These findings are consistent with tidal interaction with the coastline, creek systems and mudflats which will continuously introduce fine silts to these nearshore areas.

4.3. QA/QC Assessment

4.3.1. Laboratory QA/QC Procedures

The laboratory QC results for the chosen NATA accredited laboratory (Eurofins) are presented in Appendix B and summarised below.

- > All Certified Reference Materials (CRM) are within acceptable reported surrogate recovery levels.
- > All laboratory control sample spikes for all analytes are within acceptable reported recovery levels.
- > Blank analysis all reported result below LoR.
- > Matrix spike samples for all analytes are within acceptable reported surrogate recovery levels.
- > Laboratory duplicate samples for all analytes are within acceptable RPD criteria.

4.3.2. Field QA/QC Samples

RPD calculations for the majority of dissolved metals, nutrients and physical parameters are summarised in Appendix C. RPD's were not calculated for certain analytes (several dissolved metals, all TRH's, BTEXN, and Carbonate and Hydroxide) as concentrations for both the primary and duplicate samples were recorded below the LoR. In instances where one value was recorded below the LoR the value was halved and compared with the primary/duplicate sample.

For several analytes, recorded concentrations are relatively low, therefore small changes in concentration for these analytes and values can yield large RPD values, this was particularly the case for analytes recorded below the LoR where values were halved and used in RPD calculations (i.e., Nickel result for UNSO5-A [0.002] and DUP [<0.001] from 15/12/2020 yield an RPD of 120%), thus interpretation of such cases should be treated independently.

5. Conclusion

A marine water quality monitoring program was implemented in coastal waters adjacent to the proposed Eramurra solar salt development to document baseline water quality in the area. Two in-situ monitoring stations collected physico-chemical data (temperature, salinity, dissolved oxygen, pH, turbidity and light) over a 15-month period from July 2020 to October 2021. 12 marine water sampling events were implemented during the monitoring period, to test for a range of analytes and potential toxicants. The following key observations were made:

- > Inshore monitoring sites showed diurnal temperature variation and appeared to be affected by ambient air temperature/solar radiation. Temperature declines at both sites of 3-4 °C in the space of a few days was associated with the timing of low-pressure systems passing through the area. Mean water temperature in nearshore areas was ~24°C during the dry season and ~29°C during the wet season.
- > Salinity levels were comparable to previous studies from nearshore Pilbara waters. Higher salinity was recorded at UNS05 than NCP05 between September and December 2020, which may indicate that evaporative inshore waters have greater exchange with UNS05, while NCP05 is more influenced by offshore waters.
- > Salinity at both sites appeared to be reduced by a series of low-pressure systems that caused significant rainfall across the area between December 2020 and March 2021.
- > High turbidity events that lasted several days were generally associated with intense weather systems that caused high wind and wave conditions and rainfall.
- > Increased turbidity (and TSS) levels at the creek (SIC02) and near shore monitoring stations (NCP05 and UNS05) compared to the offshore location (OCP20), is likely related to tidal influences across mudflats continuously introducing fine silts to these nearshore areas. For this same reason, nutrient concentrations, in general, were found to be in higher concentrations at nearshore sampling sites when compared to OCP20, a result of proximity to nutrient sources such as decomposing vegetation and fauna matter and fresh water runoff.
- > The WAMSI (Jones *et al.* 2019) DLI thresholds for possible and probable effects on coral were found to be unsuitable as criteria for monitoring dredging effects in the nearshore areas adjacent to Cape Preston, with natural baseline conditions exceeding the possible effects thresholds for corals on three occasions. It is noted that Jones *et al.* (2019) recognises these potential limitations of the thresholds and advises that WAMSI is in the process of developing thresholds for turbid water coral communities. Once these new turbid water thresholds are available, they should be evaluated against the baseline data collected in this program.
- > Comprehensive sampling of marine waters at four locations at monthly intervals over the monitoring period has established a database of 70 analytes including metals/metalloids, nutrients, hydrocarbons and other analytes at background levels for the waters adjacent to the project. This provides valuable baseline data to inform modelling, planning and aid the identification of potentially harmful levels of toxicants.
- > No significant temporal patterns were identified from the laboratory analysis. There were two sampling events where multiple analytes recorded minimum concentrations (24/3/2021) and

- maximum concentrations (28/9/2020), however, no natural events (rainfall/tide/swell) were observed during these times that would have influenced these results
- > Laboratory analysis of marine water samples showed minimal evidence of contamination and the current allocation of maximum and high levels of ecological protection are appropriate for the marine waters at Eramurra.

O2 Marine recommends the development of an operational Marine Environmental Quality Management Plan (MEQMP). Further tasks related to baseline marine water quality should include:

Marine Environmental Quality Management Plan

- Compile all baseline data and derive site specific EQC using the methods outlined in ANZG (2018).
- Consider inclusion of suitable reference monitoring locations for comparison against data collected at the proposed (outfall) location.

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Appendix A. Chain of Custody and Laboratory Analysis Reports

Page 1 of 1 .

Project:	Eramurra Sa	lt Project - Monthly	WQ Sampling		La	boratory: Address:		RL									gn copy on receipt of samples an
a ll .		T			Lab	. Contact:		K	im	Roge	15					Project N	ned copy of CoC record to O2M Nanager.
Client:	Leichhardt	Job No.:	19WAU-0027			Cont	ainer			1		Anal	yses			Email lab	oratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	P-Plastic	3 / Other	146		otation							Project N	Aanager.
O2M Project Manager (Ph. Number):	477039996	Email Address: josh.abbott@o2m	narine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	rype Vial / G-Glass /	ervative / H₂SO⁴ / HNO	No. of Samples	Total Volume (mL)	test as per page 1 of quotation O2M170220Rev1'							Water	
O2M Sample ID	Laboratory Sample ID	Date	Time	S-Soil / SL-SI	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / $\rm HCL/\ H_2SO^4/HNO_3/Other$	No. o	Total V	©please test as pe O2M17								Comments
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					n.,												
	0.00	- 4		1/1	and a	10/0				-	0	7					110.0
Sampled By:	K-Steu		Date/Time:	Weg	THE	17/7	20		Relinquis		K	tevo	37	1	Date/Ti	me:	17/20
Received By Lab:	Maja 6	Solian	Date/Time:	17	7/10					Courier:							
Sample Cold (Yes/No):	Y	Sample Container	Sealed (Yes/No):		1		1										

Page 1 of 1

					La	boratory:				А	RL			Please Note:
Project:	Eramurra Sa	lt Project - Monthly	WQ Sampling			Address:			46-48 Ban	ksia Roa	d, Welshpo	ol, 6106		Please sign copy on receipt of samples ar email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027		Lab.	Contact:							•	Project Manager.
chent.	Leicillarut	305 No	19WAU-0027			Conta	ainer			11 (6)	Analys	es		Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	P-Plastic	3/Other			tation "					Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2ma	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Ype /ial / G-Glass /	ervative / H₂SO⁴ / HNC	No. of Samples	Total Volume (mL)	page 1 of quo					Water
O2M Sample ID	Laboratory Sample ID	Date	Time	Sai / SL-Sk	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative $Unpreserved / HCL / \ H_3SO^4 / HNO_3 / Other$	No. of	Total Vo	Please test as per page 1 of quotation O2M170220Rev1 "					Comments
OCP20	0-14963-1	23/08/2020		W					х					
NCP05	-2	23/08/2020		W			9		х	¥ .		8 9		
SIC02 - A	-3	23/08/2020		W					х					
SIC02 - B	-4	23/08/2020		W					х					
UNS05 - A	-5	23/08/2020		W					х	14				
UNS05 - B	-6	23/08/2020		W					х					
DUP	-7	23/08/2020		W					х					
Sampled By:	Matthe	w Porter	Date/Time:		23.08	.2020		Re	linquished By	:			Date/T	ime:
Received By Lab:	7		Date/Time:	3	1/08				Courie	:		***		
Sample Cold (Yes/No):	15.9	Sample Container	Sealed (Yes/No)		1/									

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Duningt	F				La	boratory	+					ARL		Please Note:
Project:	Eramurra Sai	lt Project - Monthly	WQ Sampling			Address			46	-48 B	anksia Ro	oad, Welshpool, 610	06	Please sign copy on receipt of samples an email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	1014/411 0027		Lab	. Contact:								Project Manager.
Chefft.	Leichhardt	JOD NO.:	19WAU-0027			Cont	ainer					Analyses		Email laboratory analysis results to O2M
Lab Quote No.:	02M170220Rev1	Turnaround Time:	,	r/A-Air	P-Plastic	/ Other			notation "	set in	notation "			Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2ma	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	'ype /ial / G-Glass /	ervative / H ₂ SO ⁴ / HNO	No. of Samples	Total Volume (mL)	RTERLY set in a	MICROPLASTICS 2M170220Rev1	NTHLY set in qu			Water
O2M Sample ID	Laboratory Sample ID	Date	Time	S-Soil/SL-Sk	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO ⁴ / HNO ₃ / Other	No. of	Total Vo	Please test as per QUARTERLY set in quotation O2M170220Rev1 "	Please test as per MICROPLASTICS set in quotation " O2M170220Rev1 "	Please test as per MO 02M170			Comments
OCP20	-)	28/9/20		W					х		x			
NCP05	- Z			W			Vi I		х		x			11 Citered
SIC02 - A	-3			W					x		x			Not filtered if no tick present.
SICO2 - B	-9			w			1				х			if no treat
UNS05 - A X1)	-5			W					х	х	x			cresent.
UNS05 - B 💉 📞	-6	1)/		W			2				х			A.
DUP X9	-7	V		W					х		х			
	test .													
Sampled By:	J. ASGA		Date/Time:	281	9/20	570		Re	inqui	shed	Ву:		Date/Time	e:
Received By Lab:	Migory	45	Date/Time:	30	101	200				Cour	rier:			
Sample Cold (Yes/No):		Sample Container	Sealed (Yes/No):		36	6.8,								

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			december 1		La	boratory:					ARL					Please Note:
Project:	Eramurra Sal	t Project - Monthly	WQ Sampling			Address:			46-48 Ba	anksia Ro	oad, We	elshpool, 6	106			Please sign copy on receipt of samples and email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027	-	Lab	. Contact:		15								Project Manager.
Client.	Leicillarut	300 140	13WAO-0027		Contain		Container					nalyses				Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		r / A-Air	P-Plastic	3 / Other			uotation "							Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	narine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass /	ervative / H ₂ SO ⁴ / HNO	No. of Samples	Total Volume (mL)	ONTHLY set in q 0220Rev1 "							Water
O2M Sample ID	Laboratory Sample ID	Date	Time	S-Soil / SL-Sl	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / $HCL/H_2SO^4/HNO_3/Other$	No. 0	Total V	Please test as per MONTHLY set in quotation O2M170220Rev1 "							Comments
OCP20	-1	8/11/20		W					х							
NCP05	-2	111		W					х							
SICO2 - A	-3			W			N		x							
SICO2 - B	-y ·			W					x							
UNS05 - A	-			W					х							
UNS05 - B	-6			W					х							
DUP BL	-)	0 V		W					x							
Sampled By:	Seb m	M	Date/Time	:	8/11/	20		Re	linquished	Ву:	1.4	both		Date	/Time:	10/11/20
Received By Lab:		over	Date/Time	: 16/1	to	CD: 1	0		Cou	rier:						/ /
Sample Cold (Yes/No):	Janos		er Sealed (Yes/No)		100		1									

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	_				La	boratory:				ARL		Please Note:
Project:	Eramurra Sal	t Project - Monthl	y WQ Sampling			Address:			46-48 Banks	sia Road, Welshpool, 610	6	Please sign copy on receipt of samples and email signed copy of CoC record to
Client:	Leichhardt	Job No.:	19WAU-0027		Lab	Contact:						O2M Project Manager.
						Conta	iner			Analyses		Email laboratory analysis results to O2N
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	P-Plastic	3 / Other			"notation "			Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2n	marine.com.au	Sample Matrix S-Soll / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass /	ervative / H ₂ SO ⁴ /HNO	No. of Samples	fotal Volume (mL)	OO220Rev1 "			Water
O2M Sample ID	Laboratory Sample ID 20-226	Date	Time	S-Soll / SL-S	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO ⁴ / HNO ₃ / Other	No. o	Total V	Please test as per MONTHLY set in quotation O2M170220Rev1 "			Comments
OCP20	-1	16/12/2020	9:00 am	w					х			NOT Pritered If no HCK
NCP05	-2	15/12/2020	10:000m	w			1		x			Present.
SICO2 - A	-3	16/12/2020	10:30 am	W					x			· · · · · · · · · · · · · · · · · · ·
SICO2 - B	-4	16/12/2020	10:30am	W					x			
UNS05 - A	-5	15/12/2020	11:58 am	W					x			
UNS05 - B	-4		11:58 cm	W					x			
DUP	-7		11:58 am	W					x			
			4									
			70.55	1-	, , h		}					
Sampled By:	MD & DH		Date/Time:	th	Ha	ec 202	0	Reli	nquished By:	mel Donda	Date/Time:	17/12/2020
Received By Lab:		and the second	Date/Time:					1	Courier:	Pentagon Fr		

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					La	boratory:				ARL			•	Please Note:
Project:	Eramurra Sal	lt Project - Monthly	WQ Sampling			Address:			46-48 Banksi	a Road, Welshpoo	ol, 6106			Please sign copy on receipt of samples an email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027		Lab	. Contact:								Project Manager.
. Client:	Leicinardi	JOB NO.:	19WAU-0027			Conta	ainer			Analyse	es			Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	P-Plastic)3 / Other			quotation "					Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass /	ervative / H ₂ SO ⁴ / HNC	No. of Samples	Total Volume (mL)	MONTHLY set in c					Water
O2M Sample ID	Laboratory Sample ID	Date	Bottles	Seil/SL-SI	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO ⁴ / HNO ₃ / Other	No. 0	Total V	Please test as per MONT 02M17022					Comments
OCP20	-)	15/01/2021	6	W					х					
NCP05	-1	15/01/2021	6	W					x					
SICO2 - A	-3	15/01/2021	6	W					x					
SICO2 - B	-4	15/01/2021	6	W					x					
UNS05 - A	- 2	15/01/2021	5	W					х					
UNS05 - B	-6	15/01/2021	5	W					x					
DUP	-7	15/01/2021	6	W					х					
Sampled By:	Ellie	Smith	Date/Time:		-	-Jan		Re	linquished By:	Emmy Rib	ooni	Dat	e/Time	:: 18-Ja
Received By Lab: Sample Cold (Yes/No):	A Bowe	Sample Container	Date/Time: r Sealed (Yes/No):	18	111	21			Courier:					

					Lal	oratory:						ARL		Please Note:
Project:	Eramurra Sal	t Project - Monthly	WQ Sampling			Address:			46-	48 B	anksia R	oad, Welshpool,	6106	Please sign copy on receipt of samples an email signed copy of CoC record to O2M
					Lab.	Contact:								Project Manager.
Client:	Leichhardt	Job No.:	19WAU-0027			Cont	ainer					Analyses		Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	/ P-Plastic	03 / Other			n quotation	CS set in v1 "	quotation "			Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass ,	servative / H ₂ SO⁴ / HNC	No. of Samples	Total Volume (mL)	JARTERLY set ii 70220Rev1 "	MICROPLASTI 02M170220Re	ONTHLY set in 70220Rev1 "			Water
O2M Sample ID	Laboratory Sample ID	Date	Time	S-Soil / SL-Sl	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / $\rm HCL\ /\ H_2SO^4\ /\ HNO_3\ /\ Other$	No. o	Total V	Please test as per QUARTERLY set in quotation " O2M170220Rev1 "	Please test as per MICROPLASTICS set in quotation " O2M170220Rev1 "	Please test as per MONTHLY set in quotatior O2M170220Rev1 "			Comments
OCP20 }	1-03681-	1 25/02/2021		W					х		х		16	
NCP05	-3			W					х		х			1
SIC02 - A	-7			W					х		x		9	
SICO2 - B	4	25/02/2021		W					х		х		L	0
UNS05 - A	-5			W					х	x	x		1	2
UNS05 - B	-6	25/02/2021		W					х	х	x			7
DUP	-7	25/02/2021		W					х		х		6	5
			,											
Sampled By:	J.Ak	obott	Date/Time:		25-	Feb		Re	linqui	shec	Ву:		Date/Tim	e:
Received By Lab:	170	M	Date/Time:		261	1021	21			Cou	rier:			
Sample Cold (Yes/No):		Sample Containe	r Sealed (Yes/No)				U							

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02 MARINE Chain of Custody (CoC) Record

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					La	boratory:				ARL						Please Note: Please sign copy on receipt of samples and			
Project:	Eramurra Sal	t Project - Monthly	WQ Sampling			Address:			46-48 Banksia	Road,	Welsh	ipool, 6	5106				Please sign copy on receipt of samples and email signed copy of CoC record to O2M		
Client	1 - 1 - 1 - 1 1 -	Lab Na	10)4/411 0027		Lab	. Contact:											Project Manager.		
Client:	Leichhardt	Job No.:	19WAU-0027			Conta	ainer				Ana	lyses					Email laboratory analysis results to O2M		
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	P-Plastic	3 / Other			quotation "		2						Project Manager.		
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Fype Vial / G-Glass /	ervative / H₂SO⁴ / HNO	No. of Samples	Total Volume (mL)	<u>.</u> ⊆		V						Water		
O2M Sample ID	Laboratory Sample ID	Date	Bottles	S-Soil / SL-SI	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / $\rm HCL\//\/\//\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/$	No. o	Total V	Please test as per MONTHLY set O2M170220Rev1 "								Comments		
OCP20	-1	24/03/2021	6	W					x										
NCP05	-2	24/03/2021	6	W					х										
SIC02 - A	-3	24/03/2021	6	W					х										
SIC02 - B	-4	24/03/2021	6	W					х										
UNS05 - A	-5	24/03/2021	5	W					х										
UNS05 - B	-6	24/03/2021	5	W					х						-				
DUP	-7	24/03/2021	5	W					x										
												0							
											1 4								
Sampled By:			Date/Time:					Re	elinquished By:		Emmy	Ribon	i	D	ate/Ti	ime:	18-Ja		
Received By Lab:	Ashler 1	Boures	Date/Time:	26	1.3/7	1			Courier:			MIDOII							
Sample Cold (Yes/No):		Sample Container			1010														

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						oratory:				ARL					Please Note:
Project:	Eramurra Sa	lt Project - Monthly	WQ Sampling		А	ddress:			46-48 Banksi	a Road, W	/elshpoc	l, 6106	•		Please sign copy on receipt of samples ar email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027		Lab. C	Contact:									Project Manager.
			+			Conta	iner				Analyse	s			Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		ır / A-Air	P-Plastic	3 / Other			notation "						Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	arine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	ype 'ial / G-Glass /	ervative H ₂ SO ⁴ / HNO	No. of Samples	Total Volume (mL)	NTHLY set in q						Water
O2M Sample ID	Laboratory Sample ID	Date	Bottles	Sai / SL-Slu	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO ⁴ / HNO ₃ / Other	No. of	Total Vo	Please test as per MONTHLY set in quotation O2M170220Rev1 "			3			Comments
OCP20	21-08915-	11.5.2021	6	W					X		_				
NCP05		11.5.2021	6	W					x						
SICO2 - A	-3	11.5.2021	6	W					x						
SICO2 - B	-4	11.5.2021	6	W					x				-		
UNS05 - A	-5	11.5.2021	5	W					x						
UNS05 - B	-6	11.5.2021	5	W					x						
DUP	7	11.5.2021	5	W					х						
					1900										
													•		
														* .	
Sampled By:	M	w	Date/Time:		11-Ma	ıv		Re	linquished By:				Date/T	ime:	
Received By Lab:	NA		Date/Time:	hil	1/21	,			Courier:						
Sample Cold (Yes/No):	7 6-8	Sample Container	Sealed (Yes/No):	141	(3) 2)		1								

Page_	1	of	1	
" upc_	_		_	-

Project:	Eramuera Ca	It Drainet Monthly	MO Como allino		Lá	aboratory:		******		************	ARL	***********************	***********	Please Note:
Project.	El dillulla 3d	It Project - Monthly \	wqsampiing			Address:			46	-48 Banksi	a Road, Welshpoo	ol, 6106		Please sign copy on receipt of samples and email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027		Lab	. Contact:		1	*********		****************	*********************		Project Manager.
****************************	~~~~~~		*************	~		Conta	iner	,	****		Analys	es		Email laboratory analysis results to O2M
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		er / A-Air	/ P-Plastic	0 ₃ / Other			set in					Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2ma	rine.com.au	mple Matrix	Fype /ial / G-Glass	Preservative HCL/H₂SO⁴/HNO₃/Oth	No. of Samples	otal Volume (mL)	per MONTHLY 02M170220Re					Water
O2M Sample ID	Laboratory Sample ID	Date	Bottles	S-Soil / SL-Sludge / V	Type B-Bottle / J-Jar / V-Vial / G-Glass /	Pres	No. 04	Total V	Please test as p quotation " O					Comments
OCP20	71-11035-1	11621	6	W			200		х					
NCP05	-2	1	6	W				********	х					
SIC02 - A	-3		6	W				**********	х					•
SIC02 - B	-9		6	W					Х					
UNS05 - A	5		5	W					х					***************************************
UNS05 - B	6	1	5	W					х					
DUP	-7	V	5	W					х					
			*********************	************					+					
			~~~~						1					
***************************************			*************************	*******										
Sampled By:	Lostl. A		Date/Time:	11	6/2	(		R	elinqui	shed By:	Emmy Rib	oni Dat	te/Time:	18-Ja
Received By Lab:	Maja (	2	Date/Time:	1	5/6/	21				Courier:	on a succession of the success	anna ann ann ann an deann ann ann ann ann ann ann ann ann ann		
ample Cold (Yes/No):	-4.3°C	Sample Container	Sealed (Yes/No):							construction				

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			The second secon	T	La	boratory:					ARL					Please Note:
Project:	Eramurra Salt	t Project - Quartler	y WQ Sampling			Address:			46-4	8 Banksia	Road, Wel	shpool, 61	06			Please sign copy on receipt of samples and email signed copy of CoC record to O2M
Client:	Leichhardt	Job No.:	19WAU-0027		Lab	. Contact:	:									Project Manager.
Chefft.	Leicillarut	305 110	15WA0-0027			Cont	ainer				Ar	nalyses				Email laboratory analysis results to O2M
Lab Quote No.:	02M170220Rev1	Turnaround Time:		er / A-Air	/ P-Plastic	03 / Other			n quotation	quotation "						Project Manager.
O2M Project Manager (Ph. Number):	Josh Abbott 0477039 996	Email Address: josh.abbott@o2m	narine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass ,	ervative / H ₂ SO ⁴ / HNC	No. of Samples	Total Volume (mL)	per QUARTERLY set in quotation O2M170220Rev1"	ONTHLY set in 0220Rev1 "						Water
O2M Sample ID	Laboratory Sample ID	Date	Time	Sail / SL-SI	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO* / HNO ₃ / Other	No. o	Total V	Please test as per QU " O2M1	Please test as per MONTHLY set in quotation O2M170220Rev1 "						Comments
OCP20	21-0362-1	2216		W					х	х						
NCP05	-1	1		W					x	х						
SICO2 - A	-3			W				5	х	x						· · · · · · · · · · · · · · · · · · ·
SICO2 - B	-4			W					х	х						
UNS05 - A	5			W					х	x						
UNS05 - B	-6	VI		W					х	х	7					
DUP	-7	7		W					х	x						
Wife.																
						(6)										
								U 10								
Sampled By:			Date/Time	:				Re	linquisl	ned By:				Date/	Time:	
Received By Lab:	wHanu	ah	Date/Time	15	6/2				(	Courier:						
Sample Cold (Yes/No):			r Sealed (Yes/No)	: 25	(P)C											

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					Capped Street, and Administrative Assessment	boratory:	*****************************					ARL			Please Note:
Project:	Eramurra Salt	t Project - Quartler	y WQ Sampling			Address:			46-	-48 B	anksia	Road, Welshp	ool, 6106		Please sign copy on receipt of samples and email signed copy of CoC record to
Client:	Leichhardt	Job No.:	10\\/\411.0027		Lab	Contact:				-			THE TAXABLE PARTY OF THE PARTY		O2M Project Manager.
Chefit.	Leichhardt	JOB NO.:	19WAU-0027	222		Conta	iner					Analys	es ·		Email laboratory analysis results to O2
Lab Quote No.:	O2M170220Rev1	Turnaround Time:		r / A-Air	2. Plastic	/ Other			notation "	set in	iotation "				Project Manager.
O2M Project Manager (Ph. Number):	ger 0477039 996 josh.abbott@o2marine		narine.com.au	Sample Matrix S-Soil / SL-Sludge / W-Water / A-Air	Type Vial / G-Glass / F	ervative / H ₂ SO ⁴ / HNO ₅	No. of Samples	Total Volume (mt)	NRTERLY set in q	MICROPLASTICS	NTHLY set in qu				Water
O2M Sample ID	Laboratory Sample ID	Date	Time	S-Soil / Is-18	Type B-Bottle / J-Jar / V-Vial / G-Glass / P-Plastic	Preservative Unpreserved / HCL / H ₂ SO ² / HNO ₃ / Other	No. o	Total W	lease test as per QUA	Please test as per quotation " O	Please test as per MONTHLY set in quotation " O2M170220Rev1 "				Comments
OCP20	1			w				7	X.		x		+++		
NCP05	2			W					×		x				
SICO2 - A	3			W					×		x				
SICO2 - B	4			W					x		x				
UNS05 - A	5			W					x	х	x				
UNS05 - B	6			W					x	х	х				
DUP				W					x		х				NOT RECEIVED
Sampled By:	J. Shakespeare	e / G. McCarthy	Date/Time:		30-/	Aug		Rel	inqui	shed	Ву:			Date/Tim	e:
Received By Lab:	J TUTL		Date/Time:	-	3/09	121				Cou	rier:				
Sample Cold (Yes/No):	ple Cold Sample Container Sealed (Yes/No):			1	•										









#### **LABORATORY REPORT**

**Job Number:** 20-12445 **Revision:** 00

Date: 4 August 2020

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 17/07/2020

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ Sampling

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager Ino

Sean Sangster Inorganics Supervisor

#### **REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 247393

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 029	Metals in Water by AAS
ARL No. 331	Persulfate Method Determination of Low Level Total Nitrogen
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



credited for compliance with ISO/IEC 17025 - Testing









02 Marine Job No: 20-12445

### **LABORATORY REPORT** Revision: 00

Date: 4/08/20

letals in Water		Sample No	20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:0
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.001	0.002	0.008	0.008	0.006
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	0.001	0.001	<0.001
Silver - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.1	5.8	6.4	5.6	5.4
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	0.02	0.02	<0.01
Lithium - Dissolved	0.01	mg/L	0.09	0.10	0.11	0.10	0.10
Strontium - Dissolved	0.01	mg/L	7.7	8.1	9.0	8.6	7.8
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.003	0.003	0.003	0.004
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.008	0.013	0.012	0.012
Selenium - Dissolved	0.001	mg/L	<0.001	0.003	0.004	0.008	0.011
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002
Sodium - Dissolved	0.1	mg/L	9,700	10,000	12,000	11,000	10,000
Potassium - Dissolved	0.1	mg/L	380	390	440	430	380
Calcium - Dissolved	0.1	mg/L	510	520	580	570	550
Magnesium - Dissolved	0.1	mg/L	1,500	1,500	1,700	1,700	1,600

Metals in Water		Sample No	20-12445-6	20-12445-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.002	0.003
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	0.001	<0.001
Silver - Dissolved	0.001	mg/L	<0.001	<0.001
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01









Date: 4/08/20

02 Marine Job No: 20-12445

### **LABORATORY REPORT** Revision: 00

Metals in Water		Sample No	20-12445-6	20-12445-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.4	5.2
Iron - Dissolved	0.01	mg/L	<0.01	0.01
Lithium - Dissolved	0.01	mg/L	0.10	0.09
Strontium - Dissolved	0.01	mg/L	7.6	7.4
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.009	0.012
Selenium - Dissolved	0.001	mg/L	0.009	0.007
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.002	0.003
Sodium - Dissolved	0.1	mg/L	10,000	10,000
Potassium - Dissolved	0.1	mg/L	390	390
Calcium - Dissolved	0.1	mg/L	530	540
Magnesium - Dissolved	0.1	mg/L	1,500	1,600

Total Nitrogen in Water		Sample No	20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.1	<0.1	0.2	0.2	0.3
Total Kjeldahl Nitrogen	0.1	mg/L	0.1	<0.1	0.2	0.2	0.3

Total Nitrogen in Water		Sample No	20-12445-6	20-12445-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.6	<0.1
Total Kjeldahl Nitrogen	0.1	mg/L	0.6	<0.1

Total Phosphorus in Water Sample No		20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00	
ANALYTE	TE LOR Units		Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	0.036	0.037	0.079	0.086	0.037

Total Phosphorus in Water		Sample No	20-12445-6	20-12445-7
Total Filospilorus III water		Sample NO	20-12445-0	20-12445-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.036	0.045









02 Marine Job No: 20-12445

### **LABORATORY REPORT**

Revision: 00 Date: 4/08/20

lons by Discrete Analyser		Sample No	20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5
	Samp	le Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Ammonia-N	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.005	<0.002	<0.002	<0.002	<0.002
NOx-N	0.002	mg/L	0.005	<0.002	<0.002	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Chloride	5	mg/L	21,000	21,000	24,000	22,000	21,000
Fluoride	0.4	mg/L	0.9	0.7	0.7	0.7	0.7
Sulfate	1	mg/L	2,800	2,900	3,200	3,200	2,900
Reactive Silica	0.1	mg/L	<0.1	<0.1	0.3	0.3	<0.1
Bromide	0.1	mg/L	79	81	89	91	82

Ions by Discrete Analyser		Sample No	20-12445-6	20-12445-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	Units	Result	Result
Ammonia-N	0.003	mg/L	<0.003	<0.003
Nitrate-N	0.002	mg/L	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002
Chloride	5	mg/L	22,000	23,000
Fluoride	0.4	mg/L	0.7	0.7
Sulfate	1	mg/L	2,900	3,000
Reactive Silica	0.1	mg/L	<0.1	<0.1
Bromide	0.1	mg/L	82	82

Physical Parameters	sical Parameters Sample No		20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
	Sample Date		15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	130	140	140	130
Bicarbonate	5	mg CaCO ₃ /L	120	130	140	140	130
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5

Physical Parameters		Sample No	20-12445-6	20-12445-7
	Sam	Sample Description		DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	130	120
Bicarbonate	5	mg CaCO ₃ /L	130	120
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5









02 Marine

### LABORATORY REPORT

Job No: 20-12445 Revision: 00 Date: 4/08/20

Misc. Inorganics in Water	later Sample No		20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	7,500	7,500	8,400	8,400	8,000
Density*	0.01	g/mL	1.03	1.03	1.03	1.03	1.03

Misc. Inorganics in Water		Sample No	20-12445-6	20-12445-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR	LOR Units		Result
Hardness	5	mg CaCO ₃ /L	7,500	7,900
Density*	0.01	g/mL	1.03	1.03

Subcontracting Sample No		20-12445-1	20-12445-2	20-12445-3	20-12445-4	20-12445-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		15/07/2020 11:00	15/07/2020 11:00	15/07/2020 12:00	15/07/2020 12:00	15/07/2020 08:00	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	2	3	3	2
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting		Sample No	20-12445-6	20-12445-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/07/2020 08:00	15/07/2020
ANALYTE	LOR Units		Result	Result
Total Organic Carbon	1	mg/L	2	2
lodide	0.01	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting

[NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations

^{*} Denotes test not covered by NATA Accreditation









#### **LABORATORY REPORT**

**Job Number:** 20-14963

Revision: 00

Date: 28 September 2020

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 31/08/2020

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager Sean Sangster Inorganics Supervisor

Sam Becker Inorganics Manager

#### **REPORT COMMENTS:**

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Sangster Huhr

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 249402

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.











# **LABORATORY REPORT**

Revision: 00 Date: 28/09/20

Metals in Water		Sample No	20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	3.4	3.6	3.7	3.6	3.8
Iron - Dissolved	0.01	mg/L	0.04	0.02	0.01	0.01	0.05
Lithium - Dissolved	0.001	mg/L	0.19	0.20	0.20	0.20	0.21
Strontium - Dissolved	0.01	mg/L	7.2	7.8	8.1	8.0	8.0
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.011	0.012	0.012	0.011	0.012
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.003	0.003	0.003	0.003	0.003
Sodium - Dissolved	0.1	mg/L	11,000	11,000	12,000	12,000	12,000
Potassium - Dissolved	0.1	mg/L	540	550	580	560	530
Calcium - Dissolved	0.1	mg/L	540	560	570	540	550
Magnesium - Dissolved	0.1	mg/L	1,400	1,400	1,600	1,500	1,400

Metals in Water	etals in Water Sample No					
	Sample Description					
	Sample Date					
ANALYTE	LOR	Units	Result	Result		
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001		
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001		
Copper - Dissolved	0.001	mg/L	<0.001	<0.001		
Lead - Dissolved	0.001	mg/L	<0.001	<0.001		
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01		
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001		
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005		
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01		









## **LABORATORY REPORT**

Revision: 00 Date: 28/09/20

Metals in Water		Sample No	20-14963-6	20-14963-7
	Sample Description			
		23/08/2020	23/08/2020	
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	3.4	3.3
Iron - Dissolved	0.01	mg/L	0.02	0.01
Lithium - Dissolved	0.001	mg/L	0.19	0.19
Strontium - Dissolved	0.01	mg/L	7.3	7.2
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.011	0.012
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.003	0.003
Sodium - Dissolved	0.1	mg/L	12,000	12,000
Potassium - Dissolved	0.1	mg/L	590	670
Calcium - Dissolved	0.1	mg/L	500	460
Magnesium - Dissolved	0.1	mg/L	1,600	1,700

Total Nitrogen in Water Sample No		20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2

Total Nitrogen in Water		Sample No	20-14963-6	20-14963-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	23/08/2020	23/08/2020
ANALYTE	LOR	LOR Units		Result
Total Nitrogen	0.2	mg/L	<0.2	<0.2
Total Kjeldahl Nitrogen	0.2	mg/L	<0.2	<0.2

Total Phosphorus in Water		Sample No	20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01	0.01	0.01	0.01

Total Phosphorus in Water		Sample No	20-14963-6	20-14963-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.01	mg/L	0.01	0.01









### **LABORATORY REPORT**

Revision: 00 Date: 28/09/20

Ions by Discrete Analyser		Sample No	20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	19,000	21,000	23,000	23,000	23,000
Fluoride	0.4	mg/L	0.7	0.7	0.7	0.9	0.8
Sulfate	1	mg/L	3,300	3,300	3,600	3,400	3,400
Reactive Silica	0.1	mg/L	0.1	<0.1	0.2	0.2	<0.1
Ammonia-N	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrate-N	0.01	mg/L	0.06	<0.01	<0.01	<0.01	<0.01
NOx-N	0.01	mg/L	0.06	<0.01	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bromide	0.1	mg/L	63	71	74	72	70

lons by Discrete Analyser		Sample No	20-14963-6	20-14963-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	23,000	23,000
Fluoride	0.4	mg/L	0.9	0.8
Sulfate	1	mg/L	3,500	3,600
Reactive Silica	0.1	mg/L	<0.1	0.2
Ammonia-N	0.02	mg/L	<0.02	<0.02
Nitrate-N	0.01	mg/L	<0.01	<0.01
NOx-N	0.01	mg/L	<0.01	<0.01
Nitrite-N	0.01	mg/L	<0.01	<0.01
Bromide	0.1	mg/L	69	72

Physical Parameters	rsical Parameters Sample No		20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
	Sample Description			NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	120	120	120	110
Bicarbonate	5	mg CaCO ₃ /L	110	120	120	120	110
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	7	<5	<5

Physical Parameters		Sample No	20-14963-6	20-14963-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	120
Bicarbonate	5	mg CaCO ₃ /L	120	120
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	9









02 Marine

#### LABORATORY REPORT

Job No: 20-14963 Revision: 00 Date: 28/09/20

Misc. Inorganics in Water	Misc. Inorganics in Water Sample No		20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	7,100	7,200	8,000	7,500	7,100
Density*	0.01	g/mL	1.02	1.03	1.03	1.03	1.02

Misc. Inorganics in Water		Sample No	20-14963-6	20-14963-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	23/08/2020	23/08/2020
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	7,800	8,100
Density*	0.01	g/mL	1.02	1.03

Subcontracting Sample No			20-14963-1	20-14963-2	20-14963-3	20-14963-4	20-14963-5
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		23/08/2020	23/08/2020	23/08/2020	23/08/2020	23/08/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	2	<1
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting	20-14963-6	20-14963-7		
	UNS05-B	DUP		
		23/08/2020	23/08/2020	
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	1	1
lodide	0.01	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting * Denotes test not covered by NATA Accreditation

[NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.









#### **LABORATORY REPORT**

**Job Number:** 20-17032

Revision: 00 Date: 21 October 2020

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 30/09/2020

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

Paul Nottle Organics Manager Sean Sangster Inorganics Supervisor

a Dolla Ssangste

DouglasTodd Laboratory Manager

#### **REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 251096

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 190	Total Recoverable Hydrocarbons (C ₆ -C ₁₀ ) in Water
ARL No. 191	Total Recoverable Hydrocarbons (>C ₁₀ -C ₄₀ ) in Water
ARL No. 009	Total Petroleum Hydrocarbons (TPH) in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.











<u>LABURATURY REPURT</u>	
Revision: 00	Date: 21/10/20

TRH (C ₆ -C ₄₀ ) in Water		Sample No	20-17032-1	20-17032-2	20-17032-3	20-17032-5	20-17032-7
	Samı	ole Description	OCP20	NCP05	SIC02-A	UNS05-A	DUP
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C _{&gt;34-40}	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

TPH in Water		Sample No	20-17032-1	20-17032-2	20-17032-3	20-17032-5	20-17032-7
Sample Description			OCP20	NCP05	SIC02-A	UNS05-A	DUP
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
TPH C ₆₋₉	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TPH C ₁₀₋₁₄	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TPH C ₁₅₋₂₈	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04
TPH C ₂₉₋₃₆	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04
TPH C _{&gt;36}	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04

Metals in Water		Sample No	20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.4	5.5	5.8	5.8	5.5
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.38	0.37	0.40	0.39	0.38
Strontium - Dissolved	0.01	mg/L	9.1	9.6	10	10	9.8
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01









#### **LABORATORY REPORT**

Revision: 00 Date: 21/10/20

Metals in Water		Sample No	20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5
	Sam	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.021	0.022	0.024	0.025	0.023
Selenium - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.003
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.003	0.003	0.003	0.003	0.002
Sodium - Dissolved	0.1	mg/L	12,000	12,000	13,000	13,000	13,000
Potassium - Dissolved	0.1	mg/L	830	870	930	900	860
Calcium - Dissolved	0.1	mg/L	810	810	860	850	810
Magnesium - Dissolved	0.1	mg/L	2,000	2,200	2,300	2,200	2,200

etals in Water		Sample No	20-17032-6	20-17032-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.001	0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.5	5.5
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.38	0.37
Strontium - Dissolved	0.01	mg/L	9.7	9.7
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.025	0.026
Selenium - Dissolved	0.001	mg/L	0.004	0.005
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.002	0.002
Sodium - Dissolved	0.1	mg/L	12,000	12,000
Potassium - Dissolved	0.1	mg/L	850	840
Calcium - Dissolved	0.1	mg/L	810	800
Magnesium - Dissolved	0.1	mg/L	2,100	2,100









Date: 21/10/20

02 Marine Job No: 20-17032

#### LABORATORY REPORT Revision: 00

Total Nitrogen in Water Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.4	0.5	0.3	0.7	0.4
Total Kjeldahl Nitrogen	0.1	mg/L	0.4	0.5	0.3	0.7	0.4

Total Nitrogen in Water		Sample No	20-17032-6	20-17032-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.3	0.6
Total Kjeldahl Nitrogen	0.1	mg/L	0.3	0.6

Total Phosphorus in Water Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE LOR Units		Result	Result	Result	Result	Result	
Total Phosphorus	0.005	mg/L	0.019	0.016	0.017	0.015	0.018

Total Phosphorus in Water		Sample No	20-17032-6	20-17032-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.015	0.013

Ions by Discrete Analyser		Sample No	20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	24,000	24,000	24,000	24,000	24,000
Fluoride	0.4	mg/L	0.8	0.8	0.8	0.8	0.8
Sulfate	1	mg/L	3,200	3,300	3,200	3,200	3,100
Reactive Silica	0.1	mg/L	<0.1	<0.1	0.1	0.1	0.2
Ammonia-N	0.003	mg/L	<0.003	0.015	0.005	0.025	<0.003
Nitrate-N	0.002	mg/L	0.003	0.008	0.028	0.006	0.022
NOx-N	0.002	mg/L	0.005	0.010	0.030	0.009	0.025
Nitrite-N	0.002	mg/L	0.002	0.002	0.002	0.003	0.003
Bromide	0.1	mg/L	100	99	110	110	100

lons by Discrete Analyser		Sample No	20-17032-6	20-17032-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	24,000	24,000
Fluoride	0.4	mg/L	0.8	0.8
Sulfate	1	mg/L	3,100	3,000
Reactive Silica	0.1	mg/L	<0.1	<0.1
Ammonia-N	0.003	mg/L	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.006	0.002
NOx-N	0.002	mg/L	0.008	0.004
Nitrite-N	0.002	mg/L	0.002	0.002









Date: 21/10/20

02 Marine Job No: 20-17032

#### **LABORATORY REPORT** Revision: 00

Ions by Discrete Analyser		Sample No	20-17032-6	20-17032-7
	Sam	ole Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
Bromide	0.1	mg/L	95	99

Physical Parameters	Physical Parameters Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
	Sample Date		28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	170	120	120	130	120
Bicarbonate	5	mg CaCO ₃ /L	170	120	120	130	120
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	<5	6	<5

Physical Parameters		Sample No	20-17032-6	20-17032-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	110
Bicarbonate	5	mg CaCO ₃ /L	110	110
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5

Misc. Inorganics in Water Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	10,000	11,000	12,000	11,000	11,000
Density*	0.01	g/mL	1.03	1.03	1.03	1.03	1.03

Misc. Inorganics in Water		Sample No	20-17032-6	20-17032-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	11,000	11,000
Density*	0.01	g/mL	1.03	1.03

Ionic Balance (Calculated) Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Sum of Cations	0.01	meq/L	748	766	822	812	809
Sum of Anions	0.01	meq/L	746	748	746	746	744
Ionic Balance (Calculated)		%	0.1	1.2	4.9	4.3	4.2









### LABORATORY REPORT

Revision: 00 Date: 21/10/20

Ionic Balance (Calculated)		Sample No	20-17032-6	20-17032-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Sum of Cations	0.01	meq/L	757	756
Sum of Anions	0.01	meq/L	743	741
Ionic Balance (Calculated)		%	0.9	1.0

Subcontracting Sample No		20-17032-1	20-17032-2	20-17032-3	20-17032-4	20-17032-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		28/09/2020	28/09/2020	28/09/2020	28/09/2020	28/09/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	1	1	<1
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting		Sample No	20-17032-6	20-17032-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	28/09/2020	28/09/2020
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	<1	1
lodide	5	mg/L	<5	<5

Result Definitions

LOR Limit of Reporting [NT] Not Tested * Denotes test not covered by NATA Accreditation

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations









#### **LABORATORY REPORT**

**Job Number:** 20-19827

Revision: 00

Date: 23 December 2020

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 10/11/2020

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ Sampling

**PURCHASE ORDER:** 

**APPROVALS:** 

SSangster Kim
Inorganics Supervisor Gener

Kim Rodgers General Manager

#### **REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 253025

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 331	Persulfate Method Determination of Low Level Total Nitrogen
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



ccredited for compliance with ISO/IEC 17025 - Testing









Date: 23/12/20

02 Marine Job No: 20-19827

Thorium - Dissolved

Uranium - Dissolved

Sodium - Dissolved

Potassium - Dissolved

Calcium - Dissolved

Magnesium - Dissolved

#### LABORATORY REPORT Revision: 00

letals in Water		Sample No	20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5
	Sam	ple Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	4.5	5.0	5.2	5.1	5.1
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.01	mg/L	0.06	0.07	0.07	0.07	0.07
Strontium - Dissolved	0.01	mg/L	7.6	8.2	8.6	8.5	8.3
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.003	0.003	0.003	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.020	0.022	0.024	0.026	0.026
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
					+	_	+

Metals in Water	etals in Water Sample No					
	Sample Description					
	Sample Date					
ANALYTE	LOR	Units	Result	Result		
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001		
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001		
Copper - Dissolved	0.001	mg/L	<0.001	<0.001		
Lead - Dissolved	0.001	mg/L	<0.001	<0.001		
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01		
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001		
Silver - Dissolved	0.001	mg/L	<0.001	<0.001		
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01		

mg/L

mg/L

mg/L

mg/L

mg/L

mg/L

<0.001

0.002

11,000

360

460

1,100

<0.001

0.002

11,000

390

470

1,200

<0.001

0.002

12,000

410

470

1,200

<0.001

0.002

12,000

380

470

1,100

0.001

0.001

0.1

0.1

0.1

0.1

<0.001

0.002

11,000

350

430

1,100









Date: 23/12/20

02 Marine Job No: 20-19827

#### **LABORATORY REPORT** Revision: 00

Metals in Water		Sample No	20-19827-6	20-19827-7
	Sample Description			
		Sample Date	8/11/2020	8/11/2020
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.1	5.0
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.01	mg/L	0.07	0.06
Strontium - Dissolved	0.01	mg/L	8.4	8.2
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.004	0.004
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	0.002	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.027	0.026
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.002	0.002
Sodium - Dissolved	0.1	mg/L	11,000	11,000
Potassium - Dissolved	0.1	mg/L	380	350
Calcium - Dissolved	0.1	mg/L	450	420
Magnesium - Dissolved	0.1	mg/L	1,100	1,000

Total Nitrogen in Water Sample No		20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.7	0.6	0.6	0.6	0.6
Total Kjeldahl Nitrogen	0.1	mg/L	0.7	0.6	0.6	0.6	0.6

Total Nitrogen in Water	20-19827-6	20-19827-7		
	Sam	ple Description	UNS05-B	BL
	8/11/2020	8/11/2020		
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.8	0.7
Total Kjeldahl Nitrogen	0.1	mg/L	0.8	0.7

Total Phosphorus in Water		Sample No	20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	0.021	0.020	0.047	0.044	0.021

Total Phosphorus in Water		Sample No	20-19827-6	20-19827-7
	Sam	ple Description	UNS05-B	BL
		Sample Date	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.017	0.014









#### LABORATORY REPORT

Revision: 00 Date: 23/12/20

Ions by Discrete Analyser		Sample No	20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Ammonia-N	0.003	mg/L	<0.003	0.012	<0.003	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.005	0.014	0.014	0.034	0.039
NOx-N	0.002	mg/L	0.005	0.014	0.014	0.034	0.039
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Chloride	5	mg/L	21,000	21,000	23,000	23,000	21,000
Fluoride	0.4	mg/L	8.0	0.8	0.8	0.8	0.8
Sulfate	1	mg/L	2,800	2,900	3,000	3,000	2,800
Reactive Silica	0.1	mg/L	0.1	<0.1	0.2	0.2	<0.1
Bromide	0.1	mg/L	77	82	84	87	83

lons by Discrete Analyser		Sample No	20-19827-6	20-19827-7
	Samp	ole Description	UNS05-B	BL
		Sample Date	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result
Ammonia-N	0.003	mg/L	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.049	0.026
NOx-N	0.002	mg/L	0.049	0.026
Nitrite-N	0.002	mg/L	<0.002	<0.002
Chloride	5	mg/L	21,000	21,000
Fluoride	0.4	mg/L	0.8	1.0
Sulfate	1	mg/L	2,900	2,800
Reactive Silica	0.1	mg/L	<0.1	<0.1
Bromide	0.1	mg/L	81	82

Physical Parameters	Parameters Sample No		20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	120	130	130	120
Bicarbonate	5	mg CaCO ₃ /L	120	120	130	130	120
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	11	11	10	16	11

Physical Parameters		Sample No	20-19827-6	20-19827-7
	Sam	ple Description	UNS05-B	BL
		Sample Date	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	110
Bicarbonate	5	mg CaCO ₃ /L	120	110
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	9	11









#### LABORATORY REPORT

Revision: 00 Date: 23/12/20

Misc. Inorganics in Water		Sample No	20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	5,700	6,100	6,100	5,700	5,600
Density*	0.01	g/mL	1.02	1.03	1.02	1.02	1.02

Misc. Inorganics in Water		Sample No	20-19827-6	20-19827-7
wisc. morganics in water		Sample NO	20-13027-0	20-19021-1
	Sam	ple Description	UNS05-B	BL
		Sample Date	8/11/2020	8/11/2020
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	5,700	5,200
Density*	0.01	g/mL	1.02	1.02

Subcontracting Sample No		20-19827-1	20-19827-2	20-19827-3	20-19827-4	20-19827-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		8/11/2020	8/11/2020	8/11/2020	8/11/2020	8/11/2020	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	1	1	1	1
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting	20-19827-6	20-19827-7		
	Sam	ple Description	UNS05-B	BL
	8/11/2020	8/11/2020		
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	1	<1
lodide	0.01	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting * Denotes test not covered by NATA Accreditation

[NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.









#### LABORATORY REPORT

**Job Number:** 20-22615

Revision: 00

Date: 29 January 2021

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 17/12/2020

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager In

Sean Sangster Inorganics Supervisor

#### **REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 254951

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 331	Persulfate Method Determination of Low Level Total Nitrogen
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



Accredited for compliance with ISO/IEC 17025 - Testing









# LABORATORY REPORT

Revision: 00 Date: 29/01/21

Metals in Water		Sample No	20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.002
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	0.37	0.27	0.34	0.17	0.47
Boron - Dissolved	0.05	mg/L	5.4	5.2	5.5	5.6	5.5
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.060	0.060	0.060	0.070	0.060
Strontium - Dissolved	0.01	mg/L	8.8	8.3	9.1	9.5	8.8
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.003	0.003	0.003	0.004
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.023	0.021	0.026	0.024	0.028
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.004	0.003	0.003	0.004	0.003
Sodium - Dissolved	0.1	mg/L	12,000	11,000	12,000	12,000	12,000
Potassium - Dissolved	0.1	mg/L	570	540	590	600	590
Calcium - Dissolved	0.1	mg/L	720	680	670	720	650
Magnesium - Dissolved	0.1	mg/L	1,500	1,400	1,600	1,600	1,500

Metals in Water		Sample No	20-22615-6	20-22615-7
	Sample Description			
		Sample Date	15/12/2020 11:58	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01









Date: 29/01/21

02 Marine Job No: 20-22615

#### **LABORATORY REPORT** Revision: 00

Metals in Water		Sample No	20-22615-6	20-22615-7
	Samp	le Description	UNS05-B	DUP
		Sample Date	15/12/2020 11:58	15/12/2020 11:58
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	0.31	0.24
Boron - Dissolved	0.05	mg/L	5.4	5.5
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.060	0.060
Strontium - Dissolved	0.01	mg/L	8.8	9.0
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.004
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.024	0.024
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.003	0.003
Sodium - Dissolved	0.1	mg/L	12,000	11,000
Potassium - Dissolved	0.1	mg/L	580	580
Calcium - Dissolved	0.1	mg/L	690	700
Magnesium - Dissolved	0.1	mg/L	1,500	1,500

Total Nitrogen in Water	Total Nitrogen in Water Sample No		20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.5	0.6	0.8	0.6	0.5
Total Kjeldahl Nitrogen	0.1	mg/L	0.5	0.3	0.8	0.6	0.5

Total Nitrogen in Water	20-22615-6	20-22615-7		
	Samı	ple Description	UNS05-B	DUP
	15/12/2020 11:58	15/12/2020 11:58		
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.5	0.5
Total Kjeldahl Nitrogen	0.1	mg/L	0.5	0.5

Total Phosphorus in Water Sample No		20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE LOR Units		Result	Result	Result	Result	Result	
Total Phosphorus	Total Phosphorus 0.005 mg/L		0.035	0.089	0.084	0.084	0.016

Total Phosphorus in Water		Sample No	20-22615-6	20-22615-7
Total i nospilorus ili water		Cample 140	20-22010-0	20-22010-1
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/12/2020 11:58	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.021	0.020









#### **LABORATORY REPORT**

Revision: 00 Date: 29/01/21

Ions by Discrete Analyser		Sample No	20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5
	Samp	le Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	21,000	20,000	23,000	24,000	21,000
Fluoride	0.4	mg/L	0.9	0.9	1.0	1.0	1.0
Sulfate	1	mg/L	2,900	2,900	3,000	3,000	3,000
Reactive Silica	0.1	mg/L	0.1	2.2	0.2	0.2	<0.1
Ammonia-N	0.003	mg/L	<0.003	0.004	0.010	0.015	0.005
Nitrate-N	0.002	mg/L	0.039	0.27	0.021	0.012	0.015
NOx-N	0.002	mg/L	0.039	0.27	0.021	0.012	0.015
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	82	78	86	85	86

Ions by Discrete Analyser	Sample No		20-22615-6	20-22615-7
	Samp	Sample Description		DUP
		Sample Date	15/12/2020 11:58	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	22,000	21,000
Fluoride	0.4	mg/L	1.1	1.1
Sulfate	1	mg/L	3,000	2,900
Reactive Silica	0.1	mg/L	<0.1	<0.1
Ammonia-N	0.003	mg/L	0.010	0.004
Nitrate-N	0.002	mg/L	0.018	0.005
NOx-N	0.002	mg/L	0.018	0.005
Nitrite-N	0.002	mg/L	<0.002	<0.002
Bromide	0.1	mg/L	86	87

Physical Parameters	nysical Parameters Sample No			20-22615-2	20-22615-3	20-22615-4	20-22615-5
	Sample Description			NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	110	120	120	110
Bicarbonate	5	mg CaCO ₃ /L	110	110	120	120	110
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	5	20	18	<5

Physical Parameters		20-22615-6	20-22615-7	
	Samı	UNS05-B	DUP	
	15/12/2020 11:58	15/12/2020 11:58		
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	100
Bicarbonate	5	mg CaCO ₃ /L	110	100
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5









02 Marine

#### LABORATORY REPORT

Job No: 20-22615 Revision: 00 Date: 29/01/21

Misc. Inorganics in Water Sample No		20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
	Sample Date		16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	8,000	7,500	8,300	8,400	7,800
Density*	sity* 0.01 g/mL		1.01	1.02	1.02	1.01	1.02

Misc. Inorganics in Water		Sample No	20-22615-6	20-22615-7	
	Sam	ple Description	UNS05-B	DUP	
		Sample Date	15/12/2020 11:58	15/12/2020 11:58	
ANALYTE	LOR	Units	Result	Result	
Hardness	5	mg CaCO ₃ /L	7,900	7,900	
Density*	0.01	g/mL	1.01	1.01	

Subcontracting Sample No		20-22615-1	20-22615-2	20-22615-3	20-22615-4	20-22615-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
	Sample Date		16/12/2020 09:00	15/12/2020 10:00	16/12/2020 10:30	16/12/2020 10:30	15/12/2020 11:58
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	2	1	<1	<1
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting	20-22615-6	20-22615-7		
	UNS05-B	DUP		
	15/12/2020 11:58	15/12/2020 11:58		
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	1	<1
lodide	0.01	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting

[NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.









#### **LABORATORY REPORT**

**Job Number:** 21-00964

Revision: 00

Date: 15 February 2021

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 18/01/2021

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager I

Sean Sangster Inorganics Supervisor

#### **REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 255924 and 256867

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 331	Persulfate Method Determination of Low Level Total Nitrogen
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



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# LABORATORY REPORT

Revision: 00 Date: 15/02/21

Metals in Water		Sample No	21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	0.006	0.006	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	0.01	0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.0	6.3	6.7	6.2	5.9
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	0.02	0.02	<0.01
Lithium - Dissolved	0.001	mg/L	0.050	0.060	0.060	0.050	0.050
Strontium - Dissolved	0.01	mg/L	6.0	7.4	7.9	7.4	7.0
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.003	0.002	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.021	0.012	0.017	0.020	0.014
Selenium - Dissolved	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	0.003	0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	10,000	11,000	12,000	11,000	11,000
Potassium - Dissolved	0.1	mg/L	590	480	490	490	620
Calcium - Dissolved	0.1	mg/L	570	720	770	730	690
Magnesium - Dissolved	0.1	mg/L	2,100	1,500	1,600	1,500	2,000

Metals in Water	letals in Water Sample No					
	Sample Description					
		Sample Date	15/01/2021	15/01/2021		
ANALYTE	LOR	Units	Result	Result		
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001		
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001		
Copper - Dissolved	0.001	mg/L	<0.001	<0.001		
Lead - Dissolved	0.001	mg/L	<0.001	<0.001		
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01		
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001		
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005		
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01		









Date: 15/02/21

02 Marine Job No: 21-00964

#### **LABORATORY REPORT** Revision: 00

Metals in Water	21-00964-6	21-00964-7		
	Samp	UNS05-B	DUP	
		Sample Date	15/01/2021	15/01/2021
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	6.0	5.9
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.050	0.050
Strontium - Dissolved	0.01	mg/L	7.0	7.0
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.021	0.016
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	10,000	10,000
Potassium - Dissolved	0.1	mg/L	450	490
Calcium - Dissolved	0.1	mg/L	710	680
Magnesium - Dissolved	0.1	mg/L	1,400	1,600

Total Nitrogen in Water Sample No		21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.2	0.2	0.2	0.2	0.2
Total Kjeldahl Nitrogen	0.1	mg/L	0.2	0.2	0.2	0.2	0.2

Total Nitrogen in Water		21-00964-6	21-00964-7	
	Samı	ple Description	UNS05-B	DUP
		Sample Date	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.2	0.2
Total Kjeldahl Nitrogen	0.1	mg/L	0.2	0.2

Total Phosphorus in Water		Sample No	21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021
ANALYTE LOR Units		Result	Result	Result	Result	Result	
Total Phosphorus	0.005	mg/L	0.022	0.019	0.018	0.020	0.013

Total Phosphorus in Water		Sample No	21-00964-6	21-00964-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.008	0.016









#### LABORATORY REPORT

Revision: 00 Date: 15/02/21

Ions by Discrete Analyser		Sample No	21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5
	Samp	le Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	19,000	19,000	21,000	22,000	21,000
Fluoride	0.4	mg/L	8.0	0.9	0.9	0.9	0.8
Sulfate	1	mg/L	3,100	3,000	3,200	3,200	2,300
Reactive Silica	0.1	mg/L	0.1	0.9	0.2	0.4	<0.1
Ammonia-N	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.003	0.002	0.002	0.002	0.002
NOx-N	0.002	mg/L	0.003	0.002	0.002	0.002	0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	91	97	100	100	53

lons by Discrete Analyser		Sample No	21-00964-6	21-00964-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	21,000	19,000
Fluoride	0.4	mg/L	0.9	0.8
Sulfate	1	mg/L	3,000	2,400
Reactive Silica	0.1	mg/L	<0.1	0.1
Ammonia-N	0.003	mg/L	<0.003	<0.003
Nitrate-N	0.002	mg/L	0.002	0.003
NOx-N	0.002	mg/L	0.002	0.003
Nitrite-N	0.002	mg/L	<0.002	<0.002
Bromide	0.1	mg/L	69	100

Physical Parameters Sample No			21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5
	Sample Description			NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	120	120	120	100
Bicarbonate	5	mg CaCO ₃ /L	110	120	120	120	53
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	48
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	44	18	54	44	<5

Physical Parameters		Sample No	21-00964-6	21-00964-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	140	120
Bicarbonate	5	mg CaCO ₃ /L	45	120
Carbonate	5	mg CaCO ₃ /L	95	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	10	8









02 Marine

#### LABORATORY REPORT

Job No: 21-00964 Revision: 00 Date: 15/02/21

Misc. Inorganics in Water Sample No		21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	10,000	8,000	8,500	8,000	10,000
Density*	0.01	g/mL	1.01	1.01	1.01	1.01	1.01

Misc. Inorganics in Water		Sample No	21-00964-6	21-00964-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	15/01/2021	15/01/2021
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	7,500	8,300
Density*	0.01	g/mL	1.01	1.01

Subcontracting Sample No			21-00964-1	21-00964-2	21-00964-3	21-00964-4	21-00964-5
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		15/01/2021	15/01/2021	15/01/2021	15/01/2021	15/01/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	2	2	2	2
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting	21-00964-6	21-00964-7			
	UNS05-B	DUP			
	Sample Date				
ANALYTE	LOR	Units	Result	Result	
Total Organic Carbon	1	mg/L	2	2	
lodide	5	mg/L	<5	<5	

#### **Result Definitions**

LOR Limit of Reporting * Denotes test not covered by NATA Accreditation

[NT] Not Tested [ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.









#### **LABORATORY REPORT**

**Job Number:** 21-03681

Revision: 00 Date: 13 April 2021

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 26/02/2021

YOUR REFERENCE: 19WAU-0027 Eramurra Salt Project - Monthly WQ Sampling

**PURCHASE ORDER:** 

**APPROVALS:** 

Paul Nottle Organics Manager Kim Rodgers General Manager Sean Sangster Inorganics Supervisor

#### **REPORT COMMENTS:**

This report is issued by Eurofins ARL Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 258014

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" and "EDP" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 190	Total Recoverable Hydrocarbons (C ₆ -C ₁₀ ) in Water
ARL No. 191	Total Recoverable Hydrocarbons (>C ₁₀ -C ₄₀ ) in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 331	Persulfate Method Determination of Low Level Total Nitrogen
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 035	Ammonia in Water
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 033	NOx in Water
ARL No. 032	Nitrite in Water
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



credited for compliance with ISO/IEC 17025 - Testing



0.05

0.1

0.1



<0.05

<0.1

<0.1

<0.05

<0.1

<0.1

<0.05

<0.1

<0.1





Date: 13/04/21

<0.05

<0.1

<0.1

02 Marine Job No: 21-03681

TRH C_{>10-16} minus Naphthalene (F2)

TRH C_{>16-34}

TRH C_{>34-40}

#### LABORATORY REPORT Revision: 00

TRH (C ₆ -C ₄₀ ) in Water		Sample No	21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
	Samı	ole Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

<0.05

<0.1

<0.1

TRH (C ₆ -C ₄₀ ) in Water		Sample No	21-03681-6	21-03681-7
	Samp	ole Description	UNS05 - B	DUP
	Sample Date			
ANALYTE	LOR	Units	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1	<0.1
TRH C _{&gt;34-40}	0.1	mg/L	<0.1	<0.1

mg/L

mg/L

mg/L

Metals in Water		Sample No	21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
	Sam	ple Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	0.01	0.01	<0.01









#### LABORATORY REPORT

Revision: 00 Date: 13/04/21

Metals in Water		Sample No	21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
	Sam	ple Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	4.6	4.8	5.2	5.2	4.8
Iron - Dissolved	0.01	mg/L	<0.01	0.01	0.02	0.02	0.02
Lithium - Dissolved	0.01	mg/L	0.05	0.05	0.06	0.05	0.05
Strontium - Dissolved	0.01	mg/L	7.0	7.2	8.0	7.9	7.2
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	<0.001	<0.001	<0.001	<0.001
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	0.002	0.002	0.003	0.002	0.002
Molybdenum - Dissolved	0.001	mg/L	0.006	0.007	0.006	0.006	0.006
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	10,000	11,000	13,000	14,000	13,000
Potassium - Dissolved	0.1	mg/L	480	510	550	570	560
Calcium - Dissolved	0.1	mg/L	620	630	710	650	620
Magnesium - Dissolved	0.1	mg/L	1,300	1,300	1,500	1,600	1,600

Metals in Water		Sample No	21-03681-6	21-03681-7
	Samp	ole Description	UNS05 - B	DUP
		Sample Date	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	4.3	4.6
Iron - Dissolved	0.01	mg/L	0.01	0.01
Lithium - Dissolved	0.01	mg/L	0.05	0.05
Strontium - Dissolved	0.01	mg/L	6.7	7.1
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	<0.001	<0.001
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	0.003	0.001
Molybdenum - Dissolved	0.001	mg/L	0.005	0.006









Date: 13/04/21

02 Marine Job No: 21-03681

#### LABORATORY REPORT Revision: 00

Metals in Water Sample No 21-03681-6 21-03681-7

	Sample Description			DUP
		Sample Date	25/02/2021	25/02/2021
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	<0.001	<0.001
Sodium - Dissolved	0.1	mg/L	12,000	14,000
Potassium - Dissolved	0.1	mg/L	490	560
Calcium - Dissolved	0.1	mg/L	550	600
Magnesium - Dissolved	0.1	mg/L	1,400	1,600

Total Nitrogen in Water	otal Nitrogen in Water Sample No		21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
Sample Description			OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	<0.1	1.1	0.2	<0.1	<0.1
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	1.1	0.2	<0.1	<0.1

Total Nitrogen in Water	21-03681-6	21-03681-7			
	Samı	UNS05 - B	DUP		
	Sample Date				
ANALYTE	LOR	Units	Result	Result	
Total Nitrogen	0.1	mg/L	<0.1	<0.1	
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	<0.1	

Total Phosphorus in Water		Sample No	21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
Sample Description			OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	0.024	0.013	0.018	0.021	0.013

Total Phosphorus in Water Sample No		21-03681-6	21-03681-7	
	Samp	ole Description	UNS05 - B	DUP
		Sample Date	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.013	0.018

lons by Discrete Analyser		Sample No	21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
	Samp	le Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	20,000	21,000	24,000	25,000	22,000
Fluoride	0.4	mg/L	1.0	0.9	0.9	0.9	0.9
Sulfate	1	mg/L	2,900	3,000	3,200	3,300	3,000
Reactive Silica	0.1	mg/L	0.2	0.2	0.4	0.4	0.2
Ammonia-N	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Nitrate-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	50	47	95	92	87









Date: 13/04/21

02 Marine Job No: 21-03681

#### **LABORATORY REPORT** Revision: 00

lons by Discrete Analyser		Sample No	21-03681-6	21-03681-7
	Samp	ole Description	UNS05 - B	DUP
		Sample Date	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	20,000	23,000
Fluoride	0.4	mg/L	0.9	0.9
Sulfate	1	mg/L	3,100	3,200
Reactive Silica	0.1	mg/L	0.2	0.4
Ammonia-N	0.003	mg/L	<0.003	<0.003
Nitrate-N	0.002	mg/L	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002
Bromide	0.1	mg/L	86	93

Physical Parameters	sical Parameters Sample No		21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5
	Sample Description			NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	110	120	130	120	120
Bicarbonate	5	mg CaCO ₃ /L	110	120	130	120	120
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	11	13	19	7

Physical Parameters		Sample No	21-03681-6	21-03681-7
	Sam	ple Description	UNS05 - B	DUP
	25/02/2021	25/02/2021		
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	130
Bicarbonate	5	mg CaCO ₃ /L	120	130
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	0.002 mg/L		<0.002
Total Suspended Solids	5	mg/L	13	8

Misc. Inorganics in Water Sample No		21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5	
Sample Description		OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A	
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	6,900	6,900	8,000	8,200	8,100
Density*	0.01	g/mL	1.02	1.02	1.02	1.02	1.02

Misc. Inorganics in Water	in Water Sample No			21-03681-7
	Samı	ole Description	UNS05 - B	DUP
		Sample Date	25/02/2021	25/02/2021
ANALYTE	LOR	LOR Units		Result
Hardness	5	mg CaCO ₃ /L	7,100	8,100
Density*	0.01	g/mL	1.02	1.02









02 Marine LABORATORY REPORT Job No: 21-03681

Revision: 00 Date: 13/04/21

Subcontracting Sample No		21-03681-1	21-03681-2	21-03681-3	21-03681-4	21-03681-5	
Sample Description		OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A	
		Sample Date	25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	1	1	<1
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting	Sample No			21-03681-7
	Samı	ole Description	UNS05 - B	DUP
	Sample Date			
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	<1	<1
lodide	0.01	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

^{*} Denotes test not covered by NATA Accreditation



**Job Number:** 21-05697 **Revision:** 00

**Date:** 17 May 2021

#### LABORATORY REPORT

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 26/03/2021

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ Sampling

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager Sean Sangster Inorganics Supervisor Leigh Bermingham Applications Chemist

#### **REPORT COMMENTS:**

This report is issued by Eurofins ARL Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 259526.

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" and "EDP" are covered under NATA Accreditation Number: 2561

Method ID	Method Description					
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS					
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry					
ARL No. 029	Metals in Water by AAS					
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP					
ARL No. 049	Low Level Total and Filtered Reactive Phosphorus In Water					
ARL No. 305	Chloride in Water by Discrete Analyser					
ARL No. 321	Fluoride in Water by Discrete Analyser					
ARL No. 301	Sulfate in Water by Discrete Analyser					
ARL No. 315	Reactive Silica in Water by Discrete Analyser					
ARL No. 303	Ammonia in Water by Discrete Analyser					
ARL No. 035	Ammonia in Water					
ARL No. 313/319	NOx in Water by Discrete Analyser					
ARL No. 033	NOx in Water					
ARL No. 311	Nitrite in Water by Discrete Analyser					
ARL No. 323	Bromide in Water by Discrete Analyser					
ARL No. 037	Alkalinity in Water					
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser					
ARL No. 016	Total Suspended Solids					
Inhouse	Inhouse Method					
Subcontracting	See Report Comments section for more information.					



Accredited for compliance with ISO/IEC 17025 - Testing



Job Number: 21-05697 Revision: 00

Date: 17 May 2021

### **LABORATORY REPORT**

Metals in Water		Sample No	21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5
	Sam	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	0.001	0.002	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	3.0	3.8	3.9	3.4	3.6
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.040	0.050	0.050	0.050	0.050
Strontium - Dissolved	0.01	mg/L	4.2	5.6	5.8	4.9	5.4
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.001	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.007	0.009	0.009	0.007	0.008
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.001	0.002	0.003	0.002	0.002
Sodium - Dissolved	0.1	mg/L	10,000	12,000	12,000	12,000	11,000
Potassium - Dissolved	0.1	mg/L	570	640	710	680	600
Calcium - Dissolved	0.1	mg/L	350	460	490	420	440
Magnesium - Dissolved	0.1	mg/L	1,200	1,500	1,500	1,400	1,400

Metals in Water	etals in Water Sample No					
	Sample Description					
	Sample Date	24/03/2021	24/03/2021			
ANALYTE	LOR	Units	Result	Result		
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001		
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001		
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001		
Copper - Dissolved	0.001	mg/L	<0.001	<0.001		
Lead - Dissolved	0.001	mg/L	<0.001	<0.001		
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01		
Mercury - Dissolved	0.0001	mg/L	<0.0001	0.0002		
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001		
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005		
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01		



**Job Number:** 21-05697 **Revision:** 00

**Date:** 17 May 2021

## LABORATORY REPORT

Metals in Water		Sample No	21-05697-6	21-05697-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	4.7	3.7
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.060	0.050
Strontium - Dissolved	0.01	mg/L	7.1	5.5
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.009
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.002	0.002
Sodium - Dissolved	0.1	mg/L	14,000	11,000
Potassium - Dissolved	0.1	mg/L	760	610
Calcium - Dissolved	0.1	mg/L	600	440
Magnesium - Dissolved	0.1	mg/L	1,900	1,400

otal Nitrogen in Water Sample No		21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.5	0.6	0.6	0.5	0.5
Total Kjeldahl Nitrogen	0.1	mg/L	0.5	0.6	0.6	0.5	0.5

Total Nitrogen in Water		Sample No	21-05697-6	21-05697-7
	Sam	ole Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
ANALYTE	LOR Units		Result	Result
Total Nitrogen	0.1	mg/L	0.5	0.6
Total Kjeldahl Nitrogen	0.1	mg/L	0.5	0.6

Total Phosphorus in Water		Sample No	21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021
ANALYTE LOR Units		Result	Result	Result	Result	Result	
Total Phosphorus	0.005	mg/L	0.012	0.010	0.013	0.009	0.011

Total Phosphorus in Water		Sample No	21-05697-6	21-05697-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.011	0.013



**Job Number:** 21-05697 **Revision:** 00

**Date:** 17 May 2021

#### LABORATORY REPORT

lons by Discrete Analyser Sample No		21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5	
	Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	22,000	23,000	25,000	24,000	24,000
Fluoride	0.4	mg/L	0.8	0.7	0.7	0.7	0.6
Sulfate	1	mg/L	3,000	2,900	2,900	2,900	2,500
Reactive Silica	0.1	mg/L	0.2	0.2	0.4	0.4	<0.1
Ammonia-N	0.003	mg/L			0.035		
Ammonia-N	0.003	mg/L	0.003	0.017		0.017	<0.003
Nitrate-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	68	78	91	81	80

lons by Discrete Analyser		Sample No	21-05697-6	21-05697-7
	Samp	ole Description	UNS05-B	DUP
	Sample Date		24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	22,000	24,000
Fluoride	0.4	mg/L	0.7	0.6
Sulfate	1	mg/L	2,500	2,700
Reactive Silica	0.1	mg/L	<0.1	<0.1
Ammonia-N	0.003	mg/L	<0.003	0.019
Nitrate-N	0.002	mg/L	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002
Bromide	0.1	mg/L	100	80

Physical Parameters Sample No		21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	120	120	130	120
Bicarbonate	5	mg CaCO ₃ /L	120	120	120	130	120
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	10	5	15	9	11

Physical Parameters		Sample No	21-05697-6	21-05697-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	120	120
Bicarbonate	5	mg CaCO ₃ /L	120	120
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	15	14



**Job Number:** 21-05697 **Revision:** 00

**Date:** 17 May 2021

### **LABORATORY REPORT**

Misc. Inorganics in Water		Sample No	21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	5,800	7,300	7,400	6,800	6,900
Density*	0.01	g/mL	1.03	1.03	1.03	1.03	1.03

Misc. Inorganics in Water		Sample No	21-05697-6	21-05697-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	9,300	6,900
Density*	0.01	g/mL	1.03	1.03

Subcontracting Sample No		21-05697-1	21-05697-2	21-05697-3	21-05697-4	21-05697-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	1	2	2	1
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting	21-05697-6	21-05697-7		
	Sam	ple Description	UNS05-B	DUP
		Sample Date	24/03/2021	24/03/2021
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	<1	1
lodide	5	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting [NT] Not Tested
* Denotes test not covered by NATA Accreditation

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.



**Job Number:** 21-08915 **Revision:** 00

**Date:** 24 June 2021

#### LABORATORY REPORT

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 14/05/2021

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

Leigh Bermingham Applications Chemist Sean Sangster Inorganics Supervisor

Andrew Harvey Resources Manager



Accredited for compliance with ISO/IEC 17025 - Testing

#### **REPORT COMMENTS:**

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Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 261972

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM" and "EDP" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



Job Number: 21-08915 Revision: 00

Date: 24 June 2021

Metals in Water		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.002	<0.001	0.002	0.002	0.002
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.001	<0.001	<0.001	<0.001	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.0	5.1	5.0	5.1	5.5
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.24	0.23	0.26	0.24	0.22
Strontium - Dissolved	0.01	mg/L	7.7	7.8	7.8	7.9	8.3
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.013	0.026	0.015	0.013
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.008
Sodium - Dissolved	0.1	mg/L	11,000	12,000	11,000	11,000	11,000
Potassium - Dissolved	0.1	mg/L	590	570	570	570	600
Calcium - Dissolved	0.1	mg/L	450	460	420	410	640
Magnesium - Dissolved	0.1	mg/L	1,200	1,300	1,200	1,200	1,400

Metals in Water		Sample No	21-08915-6	21-08915-7
	Sample Description			
		Sample Date	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	0.002	0.002
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01



**Job Number:** 21-08915 **Revision:** 00

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Metals in Water		Sample No	21-08915-6	21-08915-7
	UNS05-B	DUP		
		Sample Date	11/05/2021	11/05/2021
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.7	5.6
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.21	0.22
Strontium - Dissolved	0.01	mg/L	8.6	8.5
Tin - Dissolved	0.01	mg/L	0.01	0.02
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.004	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.013
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.008	0.008
Sodium - Dissolved	0.1	mg/L	11,000	11,000
Potassium - Dissolved	0.1	mg/L	600	600
Calcium - Dissolved	0.1	mg/L	650	600
Magnesium - Dissolved	0.1	mg/L	1,400	1,400

Total Nitrogen in Water		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	<0.1	0.2	0.7	<0.1	<0.1
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	0.2	0.7	<0.1	<0.1

Total Nitrogen in Water		Sample No	21-08915-6	21-08915-7
	Samı	ple Description	UNS05-B	DUP
		Sample Date	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	0.5	<0.1
Total Kjeldahl Nitrogen	0.1	mg/L	0.5	<0.1

Total Phosphorus in Water		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
	Sample Date		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	0.010	<0.005	0.020	0.020	0.010

Total Phosphorus in Water		Sample No	21-08915-6	21-08915-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	0.010	0.010



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**Date:** 24 June 2021

lons by Discrete Analyser		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	23,000	20,000	23,000	22,000	23,000
Fluoride	0.4	mg/L	2.0	1.5	0.7	0.7	0.7
Sulfate	1	mg/L	3,000	3,100	3,000	3,000	3,000
Reactive Silica	0.1	mg/L	<0.1	<0.1	0.3	0.3	<0.1
Ammonia-N	0.003	mg/L	<0.003	<0.003	0.006	0.010	<0.003
Nitrate-N	0.002	mg/L	0.011	<0.002	<0.002	<0.002	<0.002
NOx-N	0.002	mg/L	0.015	0.005	0.004	0.005	0.005
Nitrite-N	0.002	mg/L	0.004	0.005	0.004	0.005	0.005
Bromide	0.1	mg/L	70	100	90	110	110

Ions by Discrete Analyser		Sample No	21-08915-6	21-08915-7
	Sample Description		UNS05-B	DUP
		Sample Date	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	21,000	23,000
Fluoride	0.4	mg/L	0.9	0.7
Sulfate	1	mg/L	3,200	3,000
Reactive Silica	0.1	mg/L	<0.1	<0.1
Ammonia-N	0.003	mg/L	0.014	0.020
Nitrate-N	0.002	mg/L	<0.002	<0.002
NOx-N	0.002	mg/L	<0.002	0.002
Nitrite-N	0.002	mg/L	<0.002	0.002
Bromide	0.1	mg/L	110	110

Physical Parameters		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	150	140	150	150	140
Bicarbonate	5	mg CaCO ₃ /L	150	140	150	150	140
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5

Physical Parameters		Sample No	21-08915-6	21-08915-7
	Sam	ple Description	UNS05-B	DUP
		Sample Date	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	140	140
Bicarbonate	5	mg CaCO ₃ /L	140	140
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5



Job Number: 21-08915 Revision: 00

Date: 24 June 2021

#### LABORATORY REPORT

Misc. Inorganics in Water		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
	Sam	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	6,100	6,500	6,000	6,000	7,400
Density*	0.01	g/mL	1.00	1.00	1.00	1.00	1.00

Misc. Inorganics in Water		Sample No	21-08915-6	21-08915-7
	Sam	ple Description	UNS05-B	DUP
		11/05/2021	11/05/2021	
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	7,400	7,300
Density*	0.01	g/mL	1.00	1.00

Subcontracting		Sample No	21-08915-1	21-08915-2	21-08915-3	21-08915-4	21-08915-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	1	1	2	2	1
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting	21-08915-6	21-08915-7		
	Sam	ple Description	UNS05-B	DUP
		11/05/2021	11/05/2021	
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	1	1
lodide	5	mg/L	<5	<5

Result Definitions
LOR Limit of Reporting [NT] Not Tested * Denotes test not covered by NATA Accreditation

[ND] Not Detected at indicated Limit of Reporting

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.



Job Number: 21-11085 Revision: 00

**Date:** 26 July 2021

WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

#### LABORATORY REPORT

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 15/06/2021

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Monthly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

DouglasTodd Laboratory Manager Sam Becker Inorganics Manager Sean Sangster Inorganics Supervisor



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Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 263857

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM", "EDP" and "MM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



Job Number: 21-11085 Revision: 00

Date: 26 July 2021

Metals in Water		Sample No	21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	0.001	0.001	0.001	0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.4	5.6	5.5	5.7	5.6
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.32	0.31	0.35	0.36	0.38
Strontium - Dissolved	0.01	mg/L	8.8	9.1	9.1	9.5	9.3
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.002	0.002	0.002	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.033	0.034	0.036	0.037	0.038
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.009	0.009	0.009	0.010	0.009
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000
Potassium - Dissolved	0.1	mg/L	640	670	660	670	670
Calcium - Dissolved	0.1	mg/L	480	470	470	490	460
Magnesium - Dissolved	0.1	mg/L	1,100	1,100	1,100	1,200	1,100

Metals in Water		Sample No	21-11085-6	21-11085-7	
	Sample Description				
	11/06/2021	11/06/2021			
ANALYTE	LOR	Units	Result	Result	
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	
Copper - Dissolved	0.001	mg/L	0.002	<0.001	
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	
Silver - Dissolved	0.0005	mg/L	<0.001	<0.001	
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	



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26 July 2021 Date:

Metals in Water		Sample No	21-11085-6	21-11085-7
	Sample Description			
		Sample Date	11/06/2021	11/06/2021
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.006	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.5	3.1
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.001	mg/L	0.35	0.17
Strontium - Dissolved	0.01	mg/L	9.2	5.2
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.001
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.038	0.021
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.009	0.005
Sodium - Dissolved	0.1	mg/L	11,000	11,000
Potassium - Dissolved	0.1	mg/L	670	400
Calcium - Dissolved	0.1	mg/L	450	250
Magnesium - Dissolved	0.1	mg/L	1,100	740

Total Nitrogen in Water Sample No		21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5	
Sample Description			OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	<0.1	0.2	<0.1	<0.1	0.9
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	0.2	<0.1	<0.1	0.9

Total Nitrogen in Water		Sample No	21-11085-6	21-11085-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Total Nitrogen	0.1	mg/L	<0.1	<0.1
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	<0.1

Total Phosphorus in Water		Sample No	21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE LOR Units		Result	Result	Result	Result	Result	
Total Phosphorus	0.005	mg/L	0.010	<0.005	<0.005	<0.005	<0.005

Total Phosphorus in Water		Sample No	21-11085-6	21-11085-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	<0.005	<0.005



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Ions by Discrete Analyser		Sample No	21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	23,000	24,000	25,000	25,000	24,000
Fluoride	0.4	mg/L	<0.4	<0.4	<0.4	0.4	0.8
Sulfate	1	mg/L	2,600	3,200	2,800	2,800	2,800
Reactive Silica	0.1	mg/L	<0.1	<0.1	0.2	0.2	0.2
Ammonia-N	0.003	mg/L	<0.003	0.009	0.024	0.032	0.010
Nitrate-N	0.002	mg/L	<0.002	<0.002	<0.002	0.006	<0.002
NOx-N	0.002	mg/L	<0.002	<0.002	<0.002	0.006	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	97	95	96	99	97

lons by Discrete Analyser		Sample No	21-11085-6	21-11085-7
	Samp	ole Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	25,000	25,000
Fluoride	0.4	mg/L	0.7	0.7
Sulfate	1	mg/L	2,700	2,900
Reactive Silica	0.1	mg/L	0.2	0.2
Ammonia-N	0.003	mg/L	0.011	<0.003
Nitrate-N	0.002	mg/L	0.003	<0.002
NOx-N	0.002	mg/L	0.003	<0.002
Nitrite-N	0.002	mg/L	<0.002	<0.002
Bromide	0.1	mg/L	91	64

Physical Parameters Sample No			21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5
	Sam	ple Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	130	130	140	140	130
Bicarbonate	5	mg CaCO ₃ /L	130	130	140	140	130
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	7	<5	<5

Physical Parameters		21-11085-6	21-11085-7	
	Sam	ple Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	130	130
Bicarbonate	5	mg CaCO ₃ /L	130	130
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	6	5



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#### LABORATORY REPORT

Misc. Inorganics in Water Sample No		21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	5,700	5,700	5,700	6,200	5,700
Density*	0.01	g/mL	1.03	1.03	1.03	1.03	1.03

Misc. Inorganics in Water		Sample No	21-11085-6	21-11085-7
	Samı	ole Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO₃/L	5,700	3,700
Density*	0.01	g/mL	1.03	1.03

Subcontracting Sample No		21-11085-1	21-11085-2	21-11085-3	21-11085-4	21-11085-5	
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
Sample Date		11/06/2021	11/06/2021	11/06/2021	11/06/2021	11/06/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting	21-11085-6	21-11085-7		
	Sam	ple Description	UNS05-B	DUP
		Sample Date	11/06/2021	11/06/2021
ANALYTE	LOR	Units	Result	Result
Total Organic Carbon	1	mg/L	<1	<1
lodide	5	mg/L	<5	<5

#### **Result Definitions**

LOR Limit of Reporting * Denotes test not covered by NATA Accreditation

[NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

¹pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.

FOR MICROBIOLOGICAL TESTING - The results relate only to the sample tested and may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.



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WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

#### LABORATORY REPORT

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 25/06/2021

YOUR REFERENCE: 19WAU-0027 Eramurra Salt Project - Quarterly WQ Sampling

**PURCHASE ORDER:** 

**APPROVALS:** 

Min How Organics Supervisor Sean Sangster Inorganics Supervisor

DouglasTodd Laboratory Manager



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Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 264414

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM", "EDP" and "MM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 190	Total Recoverable Hydrocarbons (C ₆ -C ₁₀ ) in Water
ARL No. 191	Total Recoverable Hydrocarbons (>C ₁₀ -C ₄₀ ) in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



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TRH (C ₆ -C ₄₀ ) in Water		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
	Sam	ole Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C _{&gt;34-40}	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

TRH (C ₆ -C ₄₀ ) in Water		Sample No	21-11862-6	21-11862-7
	Samp	ole Description	UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1	<0.1
TRH C _{&gt;34-40}	0.1	mg/L	<0.1	<0.1

Metals in Water		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
	Sam	ple Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	0.001	0.001	<0.001	<0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.009	<0.005	<0.005	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01



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Metals in Water		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
	Sam	ple Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.1	5.2	5.3	5.3	5.1
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.01	mg/L	0.12	0.12	0.12	0.12	0.12
Strontium - Dissolved	0.01	mg/L	8.1	8.3	8.5	8.5	7.7
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.003	0.002	0.002	0.003
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.013	0.013	0.013	0.016
Selenium - Dissolved	0.001	mg/L	0.001	0.002	<0.001	<0.001	0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.008	0.008	0.008	0.008	0.008
Sodium - Dissolved	0.1	mg/L	11,000	12,000	11,000	11,000	12,000
Potassium - Dissolved	0.1	mg/L	670	710	700	710	740
Calcium - Dissolved	0.1	mg/L	500	480	490	480	530
Magnesium - Dissolved	0.1	mg/L	1,400	1,600	1,500	1,400	1,600

Metals in Water		Sample No	21-11862-6	21-11862-7
	Sam	ole Description	UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	<0.005	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.1	5.2
Iron - Dissolved	0.01	mg/L	<0.01	<0.01
Lithium - Dissolved	0.01	mg/L	0.12	0.12
Strontium - Dissolved	0.01	mg/L	7.9	8.1
Tin - Dissolved	0.01	mg/L	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.003	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.013	0.012
Selenium - Dissolved	0.001	mg/L	<0.001	0.001



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Metals in Water		Sample No	21-11862-6	21-11862-7
	Sam	ple Description	UNS05 - B	DUP
	22/06/2021	22/06/2021		
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.008	0.008
Sodium - Dissolved	0.1	mg/L	11,000	12,000
Potassium - Dissolved	0.1	mg/L	720	770
Calcium - Dissolved	0.1	mg/L	510	510
Magnesium - Dissolved	0.1	mg/L	1,500	1,700

Total Nitrogen in Water		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
Sample Description		OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A	
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.2	<0.1	<0.1	<0.1	0.1
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Total Nitrogen in Water		Sample No	21-11862-6	21-11862-7	
	Samı	ole Description	UNS05 - B	DUP	
	Sample Date				
ANALYTE	LOR	Units	Result	Result	
Total Nitrogen	0.1	mg/L	<0.1	<0.1	
Total Kjeldahl Nitrogen	0.1	mg/L	<0.1	<0.1	

Total Phosphorus in Water		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
Sample Description			OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01

Total Phosphorus in Water		Sample No	21-11862-6	21-11862-7
	Samp	ole Description	UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Total Phosphorus	0.005	mg/L	<0.01	<0.01

lons by Discrete Analyser		Sample No	21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
	Samp	ole Description	OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	24,000	24,000	25,000	26,000	26,000
Fluoride	0.4	mg/L	0.9	0.9	0.9	1.0	1.0
Sulfate	1	mg/L	2,700	2,800	2,800	2,800	2,800
Reactive Silica	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia-N	0.003	mg/L	0.15	0.081	0.020	0.041	0.10
Nitrate-N	0.002	mg/L	<0.002	<0.002	0.009	0.006	<0.002
NOx-N	0.002	mg/L	0.006	0.006	0.014	0.012	0.006
Nitrite-N	0.002	mg/L	0.006	0.006	0.005	0.006	0.006
Bromide	0.1	mg/L	96	93	100	97	97



Job Number: 21-11862 Revision: 01

Date: 3 August 2021

lons by Discrete Analyser		Sample No	21-11862-6	21-11862-7
	Sample Description		UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Chloride	5	mg/L	23,000	24,000
Fluoride	0.4	mg/L	0.9	0.9
Sulfate	1	mg/L	2,700	2,800
Reactive Silica	0.1	mg/L	<0.1	<0.1
Ammonia-N	0.003	mg/L	0.048	0.014
Nitrate-N	0.002	mg/L	<0.002	0.002
NOx-N	0.002	mg/L	0.006	0.008
Nitrite-N	0.002	mg/L	0.006	0.006
Bromide	0.1	mg/L	97	98

Physical Parameters	hysical Parameters Sample No		21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
	Sample Description			NCP05	SIC02 - A	SIC02 - B	UNS05 - A
Sample Date		22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	130	130	140	130	130
Bicarbonate	5	mg CaCO ₃ /L	130	130	140	130	130
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5

Physical Parameters		Sample No	21-11862-6	21-11862-7
	Sam	ple Description	UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Alkalinity	5	mg CaCO ₃ /L	130	130
Bicarbonate	5	mg CaCO ₃ /L	130	130
Carbonate	5	mg CaCO ₃ /L	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002
Total Suspended Solids	5	mg/L	9	<5

Misc. Inorganics in Water	norganics in Water Sample No		21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5
Sample Description		OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A	
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	7,000	7,800	7,400	7,000	7,900
Density*	0.01	g/mL	1.02	1.02	1.02	1.02	1.02

Misc. Inorganics in Water		Sample No	21-11862-6	21-11862-7
	Sam	ple Description	UNS05 - B	DUP
		Sample Date	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result
Hardness	5	mg CaCO ₃ /L	7,500	8,300
Density*	0.01	g/mL	1.02	1.02



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Revision: 01

Date: 3 August 2021

#### LABORATORY REPORT

Subcontracting Sample No		21-11862-1	21-11862-2	21-11862-3	21-11862-4	21-11862-5	
Sample Description			OCP20	NCP05	SIC02 - A	SIC02 - B	UNS05 - A
		Sample Date	22/06/2021	22/06/2021	22/06/2021	22/06/2021	22/06/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	<1	<1	<1	<1	<1
lodide	0.01	mg/L	<5	<5	<5	<5	<5

Subcontracting	ubcontracting Sample No				
	Sam	ple Description	UNS05 - B	DUP	
	22/06/2021	22/06/2021			
ANALYTE	LOR	Units	Result	Result	
Total Organic Carbon	1	mg/L	<1	<1	
lodide	0.01	mg/L	<5	<5	

Result Definitions

LOR Limit of Reporting [NT] Not Tested

[ND] Not Detected at indicated Limit of Reporting

¹pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.

FOR MICROBIOLOGICAL TESTING - The results relate only to the sample tested and may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

^{*} Denotes test not covered by NATA Accreditation



**Job Number:** 21-16305

Revision: 00

Date: 24 September 2021

WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

#### LABORATORY REPORT

ADDRESS: O2 Marine

Suite 2, 4B Mews Rd Fremantle WA 6160

ATTENTION: Josh Abbott

**DATE RECEIVED:** 3/09/2021

YOUR REFERENCE: 19WAU-0027 - Eramurra Salt Project - Quarterly WQ

**PURCHASE ORDER:** 

**APPROVALS:** 

Min How Organics Supervisor Sean Sangster Inorganics Supervisor

DouglasTodd Laboratory Manager

#### REPORT COMMENTS:

This report is issued by Eurofins ARL Pty Ltd. The report shall not be reproduced except in full without written approval from the laboratory.

Samples are analysed on an as received basis unless otherwise noted.

Total Organic Carbon and Iodide in Water analysis subcontracted to MPL, NATA Accred No. 2901, Report Number 268341

#### **METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377 Methods prefixed with "PM", "EDP" and "MM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 190	Total Recoverable Hydrocarbons (C ₆ -C ₁₀ ) in Water
ARL No. 191	Total Recoverable Hydrocarbons (>C ₁₀ -C ₄₀ ) in Water
ARL No. 009	Total Petroleum Hydrocarbons (TPH) in Water
ARL No. 402/403	Metals in Water by ICPOES/ICPMS
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 029	Metals in Water by AAS
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 305	Chloride in Water by Discrete Analyser
ARL No. 321	Fluoride in Water by Discrete Analyser
ARL No. 301	Sulfate in Water by Discrete Analyser
ARL No. 315	Reactive Silica in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 323	Bromide in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 316	Hexavalent Chromium in Water by Discrete Analyser
ARL No. 016	Total Suspended Solids
Inhouse	Inhouse Method
Subcontracting	See Report Comments section for more information.



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TRH (C ₆ -C ₄₀ ) in Water		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Sam	ple Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
m/p-Xylenes	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
o-Xylenes	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C>34-40	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1

TRH (C ₆ -C ₄₀ ) in Water	21-16305-6		
	Samp	ole Description	UNS05-B
		Sample Date	3/09/2021
ANALYTE	LOR	Units	Result
Benzene	0.001	mg/L	<0.001
Toluene	0.001	mg/L	<0.001
Ethylbenzene	0.001	mg/L	<0.001
m/p-Xylenes	0.002	mg/L	<0.002
o-Xylenes	0.001	mg/L	<0.001
Xylenes (Total)	0.003	mg/L	<0.003
Naphthalene	0.005	mg/L	<0.005
TRH C ₆₋₁₀	0.02	mg/L	<0.02
TRH C ₆₋₁₀ minus BTEX (F1)	0.02	mg/L	<0.02
TRH C _{&gt;10-16}	0.05	mg/L	<0.05
TRH C _{&gt;10-16} minus Naphthalene (F2)	0.05	mg/L	<0.05
TRH C _{&gt;16-34}	0.1	mg/L	<0.1
TRH C _{&gt;34-40}	0.1	mg/L	<0.1

TRH in Water	RH in Water Sample No		21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Sample Description			NCP05	SIC02-A	SIC02-B	UNS05-A
Sample Date		3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021	
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
TRH C ₆₋₉	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₁₀₋₁₄	0.02	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02
TRH C ₁₅₋₂₈	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04
TRH C ₂₉₋₃₆	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04
TRH C _{&gt;36}	0.04	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04



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TRH in Water	TRH in Water Sample No						
	UNS05-B						
	Sample Date						
ANALYTE	LOR	Units	Result				
TRH C ₆₋₉	0.02	mg/L	<0.02				
TRH C ₁₀₋₁₄	0.02	mg/L	<0.02				
TRH C ₁₅₋₂₈	0.04	mg/L	<0.04				
TRH C ₂₉₋₃₆	0.04	mg/L	<0.04				
TRH C _{&gt;36}	0.04	mg/L	<0.04				

letals in Water		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Sam	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Antimony - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Cobalt - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper - Dissolved	0.001	mg/L	<0.001	<0.001	0.002	0.002	<0.001
Lead - Dissolved	0.001	mg/L	<0.001	<0.001	0.007	0.007	<0.001
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001
Silver - Dissolved	0.0005	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc - Dissolved	0.005	mg/L	0.006	<0.005	0.019	0.021	<0.005
Aluminium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Boron - Dissolved	0.05	mg/L	5.4	5.7	5.8	5.8	5.7
Iron - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lithium - Dissolved	0.01	mg/L	0.14	0.16	0.02	0.17	0.19
Strontium - Dissolved	0.01	mg/L	8.5	9.1	9.4	9.5	9.3
Tin - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Titanium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic - Dissolved	0.001	mg/L	0.002	0.002	0.002	0.001	0.002
Beryllium - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum - Dissolved	0.001	mg/L	0.014	0.014	0.014	0.014	0.014
Selenium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium - Dissolved	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium - Dissolved	0.001	mg/L	0.005	0.005	0.006	0.006	0.005
Sodium - Dissolved	0.1	mg/L	11,000	11,000	11,000	11,000	11,000
Potassium - Dissolved	0.1	mg/L	650	650	670	680	660
Calcium - Dissolved	0.1	mg/L	460	450	450	450	420
Magnesium - Dissolved	0.1	mg/L	920	920	960	960	930



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Metals in Water		Sample No	21-16305-6		
	Sample Description				
		Sample Date	3/09/2021		
ANALYTE	LOR	Units	Result		
Antimony - Dissolved	0.001	mg/L	<0.001		
Cadmium - Dissolved	0.0001	mg/L	<0.0001		
Cobalt - Dissolved	0.001	mg/L	<0.001		
Copper - Dissolved	0.001	mg/L	<0.001		
Lead - Dissolved	0.001	mg/L	<0.001		
Manganese - Dissolved	0.01	mg/L	<0.01		
Mercury - Dissolved	0.0001	mg/L	<0.0001		
Nickel - Dissolved	0.001	mg/L	<0.001		
Silver - Dissolved	0.0005	mg/L	<0.0005		
Thallium - Dissolved	0.01	mg/L	<0.01		
Vanadium - Dissolved	0.01	mg/L	<0.01		
Zinc - Dissolved	0.005	mg/L	0.006		
Aluminium - Dissolved	0.01	mg/L	<0.01		
Barium - Dissolved	0.01	mg/L	<0.01		
Bismuth - Dissolved	0.01	mg/L	<0.01		
Boron - Dissolved	0.05	mg/L	5.7		
Iron - Dissolved	0.01	mg/L	<0.01		
Lithium - Dissolved	0.01	mg/L	0.17		
Strontium - Dissolved	0.01	mg/L	9.3		
Tin - Dissolved	0.01	mg/L	<0.01		
Titanium - Dissolved	0.01	mg/L	<0.01		
Arsenic - Dissolved	0.001	mg/L	0.002		
Beryllium - Dissolved	0.01	mg/L	<0.01		
Chromium - Dissolved	0.001	mg/L	<0.001		
Molybdenum - Dissolved	0.001	mg/L	0.014		
Selenium - Dissolved	0.001	mg/L	<0.001		
Thorium - Dissolved	0.001	mg/L	<0.001		
Uranium - Dissolved	0.001	mg/L	0.004		
Sodium - Dissolved	0.1	mg/L	11,000		
Potassium - Dissolved	0.1	mg/L	660		
Calcium - Dissolved	0.1	mg/L	410		
Magnesium - Dissolved	0.1	mg/L	940		

Total Nitrogen in Water		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
Sample Description		OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A	
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Nitrogen	0.1	mg/L	0.2	0.1	0.5	0.2	1.8
Total Kjeldahl Nitrogen	0.1	mg/L	0.2	0.1	0.5	0.2	1.8

Total Nitrogen in Water		Sample No	21-16305-6
	Samı	UNS05-B	
		Sample Date	3/09/2021
ANALYTE	LOR	Units	Result
Total Nitrogen	0.1	mg/L	0.2
Total Kjeldahl Nitrogen	0.1	mg/L	0.2



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Total Phosphorus in Water		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Phosphorus	0.005	mg/L	0.021	<0.005	0.014	<0.005	<0.005

Total Phosphorus in Water	I Phosphorus in Water Sample No			
	Samp	UNS05-B		
		Sample Date	3/09/2021	
ANALYTE	LOR	Units	Result	
Total Phosphorus	0.005	mg/L	<0.005	

Ions by Discrete Analyser		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Samp	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Chloride	5	mg/L	22,000	21,000	22,000	22,000	23,000
Fluoride	0.4	mg/L	<0.4	<0.4	<0.4	<0.4	<0.4
Sulfate	1	mg/L	2,500	2,900	3,000	3,000	2,800
Reactive Silica	0.1	mg/L	0.2	<0.1	0.2	<0.1	<0.1
Ammonia-N	0.003	mg/L	0.010	0.004	0.10	0.028	0.004
Nitrate-N	0.002	mg/L	0.041	<0.002	<0.002	<0.002	<0.002
NOx-N	0.002	mg/L	0.049	<0.002	<0.002	<0.002	<0.002
Nitrite-N	0.002	mg/L	0.008	<0.002	<0.002	<0.002	<0.002
Bromide	0.1	mg/L	98	98	99	98	96

Ions by Discrete Analyser		21-16305-6	
	Samı	ole Description	UNS05-B
		Sample Date	3/09/2021
ANALYTE	LOR	Units	Result
Chloride	5	mg/L	22,000
Fluoride	0.4	mg/L	<0.4
Sulfate	1	mg/L	2,800
Reactive Silica	0.1	mg/L	<0.1
Ammonia-N	0.003	mg/L	0.007
Nitrate-N	0.002	mg/L	<0.002
NOx-N	0.002	mg/L	<0.002
Nitrite-N	0.002	mg/L	<0.002
Bromide	0.1	mg/L	92

Physical Parameters		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Sam	ple Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO ₃ /L	74	120	110	120	110
Bicarbonate	5	mg CaCO ₃ /L	74	120	110	120	110
Carbonate	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Hydroxide	5	mg CaCO ₃ /L	<5	<5	<5	<5	<5
Chromium (VI)	0.002	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Total Suspended Solids	5	mg/L	<5	<5	<5	<5	<5



**Job Number:** 21-16305

**Revision:** 00

Date: 24 September 2021

#### LABORATORY REPORT

Physical Parameters		21-16305-6	
	Samı	UNS05-B	
		Sample Date	3/09/2021
ANALYTE	LOR	Units	Result
Alkalinity	5	mg CaCO ₃ /L	110
Bicarbonate	5	mg CaCO ₃ /L	110
Carbonate	5	mg CaCO ₃ /L	<5
Hydroxide	5	mg CaCO ₃ /L	<5
Chromium (VI)	0.002	mg/L	<0.002
Total Suspended Solids	5	mg/L	<5

Misc. Inorganics in Water		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Samı	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Hardness	5	mg CaCO ₃ /L	4,900	4,900	5,100	5,100	4,900
Density*	0.01	g/mL	1.01	1.02	1.02	1.02	1.02

Misc. Inorganics in Water		21-16305-6	
	Sam	UNS05-B	
		3/09/2021	
ANALYTE	LOR	Units	Result
Hardness	5	mg CaCO ₃ /L	4,900
Density*	0.01	g/mL	1.02

Subcontracting		Sample No	21-16305-1	21-16305-2	21-16305-3	21-16305-4	21-16305-5
	Sam	ole Description	OCP20	NCP05	SIC02-A	SIC02-B	UNS05-A
		Sample Date	3/09/2021	3/09/2021	3/09/2021	3/09/2021	3/09/2021
ANALYTE	LOR	Units	Result	Result	Result	Result	Result
Total Organic Carbon	1	mg/L	2	<1	1	<1	<1
lodide	5	mg/L	<5	<5	<5	<5	<5

Subcontracting Sample No			21-16305-6
	UNS05-B		
		Sample Date	3/09/2021
ANALYTE	LOR	Units	Result
Total Organic Carbon	1	mg/L	<1
lodide	5	mg/L	<5

#### **Result Definitions**

LOR Limit of Reporting [NT] Not Tested
* Denotes test not covered by NATA Accreditation

[ND] Not Detected at indicated Limit of Reporting

¹pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.

FOR MICROBIOLOGICAL TESTING - The results relate only to the sample tested and may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

## Appendix B. Laboratory Quality Control Reports

Job Number: 20-12445 Date: 4/08/2020



This report must not be reproduced except in full without prior written consent.

This Quality Control Report is issued in accordance with Section 18 of the ARL Quality Management Manual. All QC parameters are contained within the relevant ARL Method as indicated by the method reference, either on this report or the Laboratory Report.

Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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46-48 Banksia Road, Welshpool, Western Australia 6106

Job Number: 20-12445 Date: 4/08/2020

#### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	28/07/2020	
Analysed	28/07/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	107	80 - 120

#### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	23/07/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	103	80 - 120
Cobalt - Dissolved	105	80 - 120
Copper - Dissolved	95	80 - 120
Lead - Dissolved	118	80 - 120
Nickel - Dissolved	113	80 - 120
Silver - Dissolved	113	80 - 120
Zinc - Dissolved	90	80 - 120
Aluminium - Dissolved	110	80 - 120
Chromium - Dissolved	118	80 - 120
Molybdenum - Dissolved	107	80 - 120

Job Number: 20-12445 Date: 4/08/2020

#### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	23/07/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Tin - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	106	80 - 120
Manganese - Dissolved	103	80 - 120
Thallium - Dissolved	116	80 - 120
Vanadium - Dissolved	98	80 - 120
Barium - Dissolved	109	80 - 120
Boron - Dissolved	96	80 - 120
Iron - Dissolved	98	80 - 120
Strontium - Dissolved	118	80 - 120
Arsenic - Dissolved	105	80 - 120
Beryllium - Dissolved	106	80 - 120
Selenium - Dissolved	89	80 - 120
Sodium - Dissolved	102	90 - 110
Potassium - Dissolved	94	90 - 110
Calcium - Dissolved	97	90 - 110
Magnesium - Dissolved	98	90 - 110

Job Number: 20-12445 Date: 4/08/2020

Certified Reference Material	Recovery (%)	Limits (%)
Titanium - Dissolved	95	80 - 120
Lithium - Dissolved	120	80 - 120

#### Low Level TN/TKN in Water

Holding Time Criteria	Date	
Extracted	21/07/2020	
Analysed	24/07/2020	
Duplicate Analysis (20-12445-1)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Total Kjeldahl Nitrogen	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.1	0.1
Total Kjeldahl Nitrogen	<0.1	0.1
Matrix Spike (20-12445-1)	Recovery (%)	Limits (%)
Total Nitrogen	91	80 - 120
Total Kjeldahl Nitrogen	91	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	89	80 - 120
Total Kjeldahl Nitrogen	89	80 - 120

### Low Level TP in water

Holding Time Criteria	Date	
Extracted	21/07/2020	
Analysed	24/07/2020	
Duplicate Analysis (20-12445-1)	RPD (%)	Limits (%)
Total Phosphorus	22	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	118	80 - 120

#### Fluoride by ISE

Holding Time Criteria	Date	
Analysed	30/07/2020	
Duplicate Analysis (20-12518-1)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	81	0 - 0

Job Number: 20-12445 Date: 4/08/2020

#### Ions in Water

Holding Time Criteria	Date	
Analysed	27/07/2020	
Duplicate Analysis (20-12872-1)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	0	25
Reactive Silica	0	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Matrix Spike (20-12872-1)	Recovery (%)	Limits (%)
Chloride	117	80 - 120
Sulfate	103	80 - 120
Reactive Silica	83	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	106	80 - 120
Sulfate	101	80 - 120
Reactive Silica	80	80 - 120
Duplicate Analysis (20-12872-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (20-12872-1)	Recovery (%)	Limits (%)
Chromium (VI)	98	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	107	80 - 120

#### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	24/07/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	106	80 - 120

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Job Number: 20-12445 Date: 4/08/2020

#### **Low Nitrite in Water**

Holding Time Criteria	Date	
Analysed	27/07/2020	
Duplicate Analysis (20-12445-7)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Matrix Spike (20-12445-7)	Recovery (%)	Limits (%)
Nitrite-N	85	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	105	80 - 120

#### **Low Level NOx**

Holding Time Criteria	Date	
Analysed	29/07/2020	
Duplicate Analysis (20-12445-7)	RPD (%)	Limits (%)
NOx-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Matrix Spike (20-12445-7)	Recovery (%)	Limits (%)
NOx-N	103	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	112	80 - 120

#### Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	28/07/2020	
Analysed	29/07/2020	
Duplicate Analysis (20-12445-7)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	109	80 - 120

Job Number: 20-12445 Date: 4/08/2020

#### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	20/07/2020	
Duplicate Analysis (20-12391-6)	RPD (%)	Limits (%)
Total Suspended Solids	8	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	100	80 - 120

#### **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	7
Analysed	20/07/2020	
Duplicate Analysis (20-12445-5)	RPD (%)	Limits (%)
Alkalinity	0	25
Bicarbonate	0	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	108	80 - 120
Bicarbonate	108	80 - 120
Carbonate	108	80 - 120
Hydroxide	108	80 - 120

#### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	23/07/2020	
Analysed	23/07/2020	
Duplicate Analysis (20-12445-1)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1	0.01

Job Number: 20-14963 Date: 28/09/2020



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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

Job Number: 20-14963 Date: 28/09/2020

#### Low Level Dissolved Metals in Water

Holding Time Criteria	Date	
Analysed	2/09/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	91	80 - 120
Cobalt - Dissolved	110	80 - 120
Copper - Dissolved	104	80 - 120
Lead - Dissolved	104	80 - 120
Nickel - Dissolved	101	80 - 120
Silver - Dissolved	107	80 - 120
Zinc - Dissolved	98	80 - 120
Aluminium - Dissolved	89	80 - 120
Chromium - Dissolved	104	80 - 120
Molybdenum - Dissolved	110	80 - 120
Lithium - Dissolved	97	80 - 120

# Quality Control Report Job Number: 20-14963

Date: 28/09/2020

#### Dissolved Metals in Water

Holding Time Criteria	Date	
Analysed	2/09/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	94	80 - 120
Manganese - Dissolved	101	80 - 120
Thallium - Dissolved	109	80 - 120
Vanadium - Dissolved	106	80 - 120
Barium - Dissolved	104	80 - 120
Boron - Dissolved	98	80 - 120
Iron - Dissolved	100	80 - 120
Strontium - Dissolved	101	80 - 120
Arsenic - Dissolved	94	80 - 120
Beryllium - Dissolved	101	80 - 120
Selenium - Dissolved	95	80 - 120
Sodium - Dissolved	99	90 - 110
Potassium - Dissolved	101	90 - 110
Calcium - Dissolved	106	90 - 110
Magnesium - Dissolved	98	90 - 110

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Job Number: 20-14963 Date: 28/09/2020

#### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	1/09/2020	
Analysed	1/09/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	89	80 - 120

#### **Total Nitrogen in Water**

Holding Time Criteria	Date	
Extracted	1/09/2020	
Analysed	2/09/2020	
Duplicate Analysis (20-14929-4)	RPD (%)	Limits (%)
Total Nitrogen	40	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (20-14929-4)	Recovery (%)	Limits (%)
Total Nitrogen	98	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	95	80 - 120

#### **Total Phosphorus in Water**

Holding Time Criteria	Date	
Extracted	1/09/2020	
Analysed	2/09/2020	
Duplicate Analysis (20-14929-4)	RPD (%)	Limits (%)
Total Phosphorus	29	200
Duplicate Analysis (20-14963-7)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Matrix Spike (20-14929-4)	Recovery (%)	Limits (%)
Total Phosphorus	95	80 - 120
Matrix Spike (20-14963-7)	Recovery (%)	Limits (%)
Total Phosphorus	94	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	90	80 - 120

Job Number: 20-14963 Date: 28/09/2020

#### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	9/09/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	95	80 - 120

#### Fluoride by ISE

Holding Time Criteria	Date	
Analysed	3/09/2020	
Duplicate Analysis (20-14995-3)	RPD (%)	Limits (%)
Fluoride	18	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Matrix Spike (20-14995-3)	Recovery (%)	Limits (%)
Fluoride	109	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	84	0 - 0

#### **Ammonia in Water**

Holding Time Criteria	Date	
Analysed	1/09/2020	
Duplicate Analysis (20-14929-1)	RPD (%)	Limits (%)
Ammonia-N	0	200
Duplicate Analysis (20-14939-1)	RPD (%)	Limits (%)
Ammonia-N	0	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (20-14929-1)	Recovery (%)	Limits (%)
Ammonia-N	113	80 - 120
Matrix Spike (20-14939-1)	Recovery (%)	Limits (%)
Ammonia-N	117	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	106	80 - 120

Job Number: 20-14963 Date: 28/09/2020

### lone in Water

s in Water		7
Holding Time Criteria	Date	
Analysed	1/09/2020	
Duplicate Analysis (20-14929-1)	RPD (%)	Limits (%)
Chloride	2	25
Sulfate	0	25
NOx-N	0	200
Duplicate Analysis (20-14939-1)	RPD (%)	Limits (%)
NOx-N	3	25
Nitrite-N	6	50
Duplicate Analysis (20-15003-1)	RPD (%)	Limits (%)
Chloride	0	200
Reactive Silica	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Matrix Spike (20-14929-1)	Recovery (%)	Limits (%)
Chloride	111	80 - 120
Sulfate	110	80 - 120
NOx-N	111	80 - 120
Matrix Spike (20-14939-1)	Recovery (%)	Limits (%)
NOx-N	115	80 - 120
Nitrite-N	100	80 - 120
Matrix Spike (20-15003-1)	Recovery (%)	Limits (%)
Chloride	107	80 - 120
Reactive Silica	114	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	111	80 - 120
Sulfate	109	80 - 120
NOx-N	114	80 - 120
Reactive Silica	84	80 - 120
Nitrite-N	105	80 - 120
Duplicate Analysis (20-14939-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (20-14939-1)	Recovery (%)	Limits (%)
Chromium (VI)	99	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	101	80 - 120

Job Number: 20-14963 Date: 28/09/2020

## TDS and TSS in water

Holding Time Criteria	Date	
Analysed	1/09/2020	
Duplicate Analysis (20-14963-1)	RPD (%)	Limits (%)
Total Suspended Solids	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	100	80 - 120

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	1/09/2020	
Duplicate Analysis (20-14963-3)	RPD (%)	Limits (%)
Alkalinity	0	25
Bicarbonate	0	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	98	80 - 120
Bicarbonate	98	80 - 120
Carbonate	98	80 - 120
Hydroxide	98	80 - 120

## **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	1/09/2020	
Analysed	1/09/2020	
Duplicate Analysis (20-14963-7)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	0.99	0.01

Job Number: 20-17032 Date: 21/10/2020



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#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

Job Number: 20-17032 Date: 21/10/2020

## TRH (NEPM 2013) in Water

Holding Time Criteria	Date	]
Extracted	1/10/2020	
Analysed	7/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Xylenes (Total)	<0.003	0.003
Naphthalene	<0.005	0.005
TRHC ₆₋₁₀	<0.02	0.02
TRHC ₆₋₁₀ minus BTEX (F1)	<0.02	0.02
TRHC>10-16	<0.05	0.05
TRHC>10-16 minus Naphthalene (F2)	<0.05	0.05
TRH C>16-34	<0.1	0.1
TRHC>34-40	<0.1	0.1
Laboratory Control Sample	Recovery (%)	Limits (%)
Benzene	111	70 - 140
Toluene	106	70 - 140
Ethylbenzene	112	70 - 140
Xylenes (Total)	106	70 - 140
Naphthalene	105	70 - 140
TRHC ₆₋₁₀	105	70 - 140
TRHC>10-16	110	70 - 140
TRHC>16-34	113	70 - 140

## **TPH** in Water

Holding Time Criteria	Date	
Extracted	6/10/2020	
Analysed	7/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
TPH C ₆₋₉	<0.02	0.02
TPH C ₁₀₋₁₄	<0.02	0.02
TPH C ₁₅₋₂₈	<0.04	0.04
TPH C ₂₉₋₃₆	<0.04	0.04
TPH C>36	<0.04	0.04
Matrix Spike (20-17032-7)	Recovery (%)	Limits (%)
TPH C ₁₅₋₂₈	103	60 - 120

# Quality Control Report Job Number: 20-17032

Date: 21/10/2020

## Low Level Dissolved Metals in Water

Holding Time Criteria	Date	
Analysed	8/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	117	80 - 120
Cobalt - Dissolved	118	80 - 120
Copper - Dissolved	98	80 - 120
Lead - Dissolved	120	80 - 120
Nickel - Dissolved	101	80 - 120
Silver - Dissolved	119	80 - 120
Zinc - Dissolved	93	80 - 120
Aluminium - Dissolved	113	80 - 120
Chromium - Dissolved	118	80 - 120
Molybdenum - Dissolved	104	80 - 120
Lithium - Dissolved	101	80 - 120

Job Number: 20-17032 Date: 21/10/2020

## **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	8/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	120	80 - 120
Manganese - Dissolved	115	80 - 120
Thallium - Dissolved	116	80 - 120
Vanadium - Dissolved	120	80 - 120
Barium - Dissolved	99	80 - 120
Boron - Dissolved	97	80 - 120
Iron - Dissolved	93	80 - 120
Strontium - Dissolved	95	80 - 120
Arsenic - Dissolved	107	80 - 120
Beryllium - Dissolved	120	80 - 120
Selenium - Dissolved	105	80 - 120
Sodium - Dissolved	103	90 - 110
Potassium - Dissolved	96	90 - 110
Calcium - Dissolved	96	90 - 110
	105	90 - 110
Magnesium - Dissolved	105	90 - 110

Job Number: 20-17032 Date: 21/10/2020

## **Mercury in Water**

Holding Time Criteria	Date	
Extracted	7/10/2020	
Analysed	7/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	80	80 - 120

## **Total Nitrogen in Water**

Total Miliogon III Water		¬
Holding Time Criteria	Date	
Extracted	2/10/2020	
Analysed	6/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (20-16995-3)	Recovery (%)	Limits (%)
Total Nitrogen	97	80 - 120
Matrix Spike (20-17036-25)	Recovery (%)	Limits (%)
Total Nitrogen	90	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	96	80 - 120
Total Nitrogen	90	80 - 120

## Low Level TP in water

Holding Time Criteria	Date	
Extracted	15/10/2020	
Analysed	15/10/2020	
Duplicate Analysis (20-17032-5)	RPD (%)	Limits (%)
Total Phosphorus	40	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Matrix Spike (20-17032-5)	Recovery (%)	Limits (%)
Total Phosphorus	99	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	104	80 - 120

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Job Number: 20-17032 Date: 21/10/2020

## **Total Phosphorus in Water**

Holding Time Criteria	Date	
Extracted	5/10/2020	
Analysed	6/10/2020	
Duplicate Analysis (20-16995-3)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Duplicate Analysis (20-17036-25)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Duplicate Analysis (20-17083-2)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Matrix Spike (20-16995-3)	Recovery (%)	Limits (%)
Total Phosphorus	97	80 - 120
Matrix Spike (20-17036-25)	Recovery (%)	Limits (%)
Total Phosphorus	90	80 - 120
Matrix Spike (20-17083-2)	Recovery (%)	Limits (%)
Total Phosphorus	96	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	98	80 - 120
Total Phosphorus	96	80 - 120

### Low Nitrite in Water

Holding Time Criteria	Date	
Analysed	15/10/2020	
Duplicate Analysis (20-17032-3)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Matrix Spike (20-17032-3)	Recovery (%)	Limits (%)
Nitrite-N	80	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	95	80 - 120

Job Number: 20-17032 Date: 21/10/2020

## **Low Level NOx**

Holding Time Criteria	Date	
Analysed	15/10/2020	
Duplicate Analysis (20-17032-4)	RPD (%)	Limits (%)
NOx-N	25	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Matrix Spike (20-17032-4)	Recovery (%)	Limits (%)
NOx-N	110	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	91	80 - 120

## Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	15/10/2020	
Analysed	15/10/2020	
Duplicate Analysis (20-17032-1)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Matrix Spike (20-17032-1)	Recovery (%)	Limits (%)
Ammonia-N	103	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	107	80 - 120

## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	6/10/2020	
Duplicate Analysis (20-16300-4)	RPD (%)	Limits (%)
Fluoride	0	200
Duplicate Analysis (20-17161-1)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	85	0 - 0
Fluoride	97	0 - 0

Job Number: 20-17032 Date: 21/10/2020

## **Bromide in Water**

Holding Time Criteria	Date	
Analysed	2/10/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	83	80 - 120

## **Ammonia in Water**

		_
Holding Time Criteria	Date	
Analysed	2/10/2020	
Duplicate Analysis (20-17032-7)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (20-17032-7)	Recovery (%)	Limits (%)
Ammonia-N	112	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	99	80 - 120

Job Number: 20-17032 Date: 21/10/2020

## Ions in Water

Holding Time Criteria	Date	
Analysed	2/10/2020	
Duplicate Analysis (20-17032-7)	RPD (%)	Limits (%)
Sulfate	3	25
Reactive Silica	0	200
NOx-N	0	200
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Matrix Spike (20-17032-7)	Recovery (%)	Limits (%)
Chloride	97	80 - 120
Sulfate	114	80 - 120
Reactive Silica	107	80 - 120
NOx-N	90	80 - 120
Nitrite-N	114	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	110	80 - 120
Sulfate	100	80 - 120
NOx-N	103	80 - 120
Reactive Silica	84	80 - 120
Nitrite-N	105	80 - 120
Duplicate Analysis (20-17032-7)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (20-17032-7)	Recovery (%)	Limits (%)
Chromium (VI)	98	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	105	80 - 120

## TDS and TSS in water

120 and 100 m water		
Holding Time Criteria	Date	
Analysed	1/09/2020	
Duplicate Analysis (20-17032-2)	RPD (%)	Limits (%)
Total Suspended Solids	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	104	80 - 120

Job Number: 20-17032 Date: 21/10/2020

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	1/10/2020	
Duplicate Analysis (20-17032-3)	RPD (%)	Limits (%)
Alkalinity	0	25
Bicarbonate	0	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	105	80 - 120
Bicarbonate	105	80 - 120
Carbonate	105	80 - 120
Hydroxide	105	80 - 120

## **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	6/10/2020	
Analysed	6/10/2020	
Duplicate Analysis (20-17032-7)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.06	0.01

Job Number: 20-19827 Date: 23/12/2020



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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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Job Number: 20-19827 Date: 23/12/2020

## **Low Level Dissolved Metals in Water**

11.1.1.1	D. C.	
Holding Time Criteria	Date	
Analysed	17/11/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	105	80 - 120
Cobalt - Dissolved	97	80 - 120
Copper - Dissolved	100	80 - 120
Lead - Dissolved	108	80 - 120
Nickel - Dissolved	97	80 - 120
Silver - Dissolved	108	80 - 120
Zinc - Dissolved	97	80 - 120
Aluminium - Dissolved	109	80 - 120
Chromium - Dissolved	86	80 - 120
Molybdenum - Dissolved	81	80 - 120

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### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	17/11/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Tin - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	109	80 - 120
Manganese - Dissolved	106	80 - 120
Thallium - Dissolved	109	80 - 120
Vanadium - Dissolved	111	80 - 120
Barium - Dissolved	108	80 - 120
Boron - Dissolved	89	80 - 120
Iron - Dissolved	100	80 - 120
Strontium - Dissolved	99	80 - 120
Arsenic - Dissolved	104	80 - 120
Beryllium - Dissolved	103	80 - 120
Selenium - Dissolved	104	80 - 120
Sodium - Dissolved	90	90 - 110
Potassium - Dissolved	96	90 - 110
Calcium - Dissolved	104	90 - 110
Calcium - Dissolved		
Magnesium - Dissolved	98	90 - 110

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Certified Reference Material	Recovery (%)	Limits (%)
Titanium - Dissolved	100	80 - 120
Lithium - Dissolved	119	80 - 120

### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	16/11/2020	
Analysed	16/11/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	80	80 - 120

## Low Level TN/TKN in Water

Holding Time Criteria	Date	
Extracted	22/12/2020	
Analysed	20/12/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.1	0.1
Total Kjeldahl Nitrogen	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	88	80 - 120
Total Kjeldahl Nitrogen	88	80 - 120

## Low Level TP in water

Holding Time Criteria	Date	
Extracted	22/12/2020	
Analysed	20/12/2020	
Duplicate Analysis (20-19827-7)	RPD (%)	Limits (%)
Total Phosphorus	19	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	81	80 - 120

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Job Number: 20-19827 Date: 23/12/2020

### Low Nitrite in Water

Holding Time Criteria	Date	
Analysed	22/12/2020	
Duplicate Analysis (20-19827-5)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Matrix Spike (20-19827-5)	Recovery (%)	Limits (%)
Nitrite-N	97	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	106	80 - 120

### Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	19/12/2020	
Analysed	19/12/2020	
Duplicate Analysis (20-19827-6)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	98	80 - 120

## **Low Level NOx**

Holding Time Criteria	Date	
Analysed	19/12/2020	
Duplicate Analysis (20-19827-7)	RPD (%)	Limits (%)
NOx-N	26	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	120	80 - 120

## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	20/11/2020	
Duplicate Analysis (20-19853-1)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	97	0 - 0

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Job Number: 20-19827 Date: 23/12/2020

#### Ions in Water

ns in Water  Holding Time Criteria	Date	
Analysed	17/11/2020	
Duplicate Analysis (20-19777-1)	RPD (%)	Limits (%)
Chloride	10	200
Sulfate	40	200
Duplicate Analysis (20-19827-7)  Reactive Silica	RPD (%)	Limits (%)
	0	200
Duplicate Analysis (20-20190-1)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	0	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Matrix Spike (20-19777-1)	Recovery (%)	Limits (%)
Chloride	111	80 - 120
Sulfate	114	80 - 120
Matrix Spike (20-19827-7)	Recovery (%)	Limits (%)
Reactive Silica	101	80 - 120
Matrix Spike (20-20190-1)	Recovery (%)	Limits (%)
Chloride	109	80 - 120
Sulfate	116	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	93	80 - 120
Sulfate	102	80 - 120
Reactive Silica	85	80 - 120
Chloride	93	80 - 120
Sulfate	102	80 - 120
Duplicate Analysis (20-19827-7)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (20-19827-7)	Recovery (%)	Limits (%)
Chromium (VI)	104	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	90	80 - 120
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Job Number: 20-19827 Date: 23/12/2020

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	13/11/2020	
Duplicate Analysis (20-19827-7)	RPD (%)	Limits (%)
Bromide	0	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	104	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	11/11/2020	
Duplicate Analysis (20-19839-5)	RPD (%)	Limits (%)
Total Suspended Solids	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	104	80 - 120

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	11/11/2020	
Duplicate Analysis (20-19827-1)	RPD (%)	Limits (%)
Alkalinity	9	25
Bicarbonate	9	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	102	80 - 120
Bicarbonate	102	80 - 120
Carbonate	102	80 - 120
Hydroxide	102	80 - 120

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Job Number: 20-19827 Date: 23/12/2020

## **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	12/11/2020	
Analysed	12/11/2020	
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.00	0.01

Job Number: 20-22615 Date: 29/01/2021



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#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

Job Number: 20-22615 Date: 29/01/2021

## **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	24/12/2020	
Duplicate Analysis (20-22780-1)	RPD (%)	Limits (%)
Cadmium - Dissolved	0	200
Cobalt - Dissolved	0	200
Copper - Dissolved	18	25
Lead - Dissolved	67	200
Nickel - Dissolved	11	50
Zinc - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Matrix Spike (20-22780-1)	Recovery (%)	Limits (%)
Cadmium - Dissolved	108	80 - 120
Cobalt - Dissolved	96	80 - 120
Nickel - Dissolved	83	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	119	80 - 120
Cobalt - Dissolved	115	80 - 120
Copper - Dissolved	116	80 - 120
Lead - Dissolved	119	80 - 120
Nickel - Dissolved	113	80 - 120
Silver - Dissolved	115	80 - 120
Zinc - Dissolved	100	80 - 120
Aluminium - Dissolved	91	80 - 120
Chromium - Dissolved	109	80 - 120
Molybdenum - Dissolved	106	80 - 120
Lithium - Dissolved	90	80 - 120

ARL Group
Proudly Western Australian

Job Number: 20-22615 Date: 29/01/2021

## **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	24/12/2020	
Duplicate Analysis (20-22780-1)	RPD (%)	Limits (%)
Manganese - Dissolved	0	200
Boron - Dissolved	8	50
Arsenic - Dissolved	0	200
Beryllium - Dissolved	0	200
Selenium - Dissolved	0	200
Potassium - Dissolved	3	25
Calcium - Dissolved	0	25
Magnesium - Dissolved	1	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Matrix Spike (20-22780-1)	Recovery (%)	Limits (%)
Manganese - Dissolved	110	80 - 120
Boron - Dissolved	115	80 - 120
Beryllium - Dissolved	112	80 - 120
Selenium - Dissolved	94	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	118	80 - 120
Manganese - Dissolved	95	80 - 120
Thallium - Dissolved	117	80 - 120
Vanadium - Dissolved	109	80 - 120



Job Number: 20-22615 Date: 29/01/2021

Certified Reference Material	Recovery (%)	Limits (%)
Barium - Dissolved	89	80 - 120
Boron - Dissolved	98	80 - 120
Iron - Dissolved	89	80 - 120
Strontium - Dissolved	99	80 - 120
Arsenic - Dissolved	109	80 - 120
Beryllium - Dissolved	112	80 - 120
Selenium - Dissolved	113	80 - 120
Sodium - Dissolved	99	90 - 110
Potassium - Dissolved	103	90 - 110
Calcium - Dissolved	92	90 - 110
Magnesium - Dissolved	92	90 - 110
Titanium - Dissolved	118	80 - 120

### **Mercury in Water**

Halifa Time Office	D. C.	٦
Holding Time Criteria	Date	
Extracted	21/12/2020	
Analysed	22/12/2020	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	89	80 - 120

## Low Level TN/TKN in Water

Holding Time Criteria	Date	
Extracted	12/01/2021	
Analysed	13/01/2021	
Duplicate Analysis (20-22615-2)	RPD (%)	Limits (%)
Total Nitrogen	0	50
Total Kjeldahl Nitrogen	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.1	0.1
Total Kjeldahl Nitrogen	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	94	80 - 120
Total Kjeldahl Nitrogen	94	80 - 120

Job Number: 20-22615 Date: 29/01/2021

## Low Level TP in water

Holding Time Criteria	Date	
Extracted	12/01/2021	
Analysed	13/01/2021	
Duplicate Analysis (20-22615-2)	RPD (%)	Limits (%)
Total Phosphorus	4	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Matrix Spike (20-22615-2)	Recovery (%)	Limits (%)
Total Phosphorus	117	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	106	80 - 120

### Low Nitrite in Water

Holding Time Criteria	Date	
Analysed	22/12/2020	
Duplicate Analysis (20-22615-3)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Matrix Spike (20-22615-3)	Recovery (%)	Limits (%)
Nitrite-N	80	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	94	80 - 120

## **Low Level NOx**

Holding Time Criteria	Date	
Analysed	12/01/2021	
Duplicate Analysis (20-22615-2)	RPD (%)	Limits (%)
NOx-N	0	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	114	80 - 120

ARL Group
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Job Number: 20-22615 Date: 29/01/2021

## Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	11/01/2021	
Analysed	12/01/2021	
Duplicate Analysis (20-22615-1)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Matrix Spike (20-22615-1)	Recovery (%)	Limits (%)
Ammonia-N	118	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	103	80 - 120

Job Number: 20-22615 Date: 29/01/2021

## Ions in Water

ns in Water  Holding Time Criteria	Date	
Analysed	8/01/2021	
Duplicate Analysis (20-22513-1)	RPD (%)	Limits (%)
Chloride	12	200
Reactive Silica	0	200
Duplicate Analysis (20-22568-1)	RPD (%)	Limits (%)
Chloride	0	50
Sulfate	3	25
Duplicate Analysis (20-22599-1)	RPD (%)	Limits (%)
Reactive Silica	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Reactive Silica	<0.1	0.1
Matrix Spike (20-22513-1)	Recovery (%)	Limits (%)
Chloride	84	80 - 120
Reactive Silica	105	80 - 120
Matrix Spike (20-22568-1)	Recovery (%)	Limits (%)
Chloride	99	80 - 120
Sulfate	107	80 - 120
Matrix Spike (20-22599-1)	Recovery (%)	Limits (%)
Reactive Silica	108	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	107	80 - 120
Sulfate	101	80 - 120
Reactive Silica	80	80 - 120
Chloride	103	80 - 120
Reactive Silica	80	80 - 120
Duplicate Analysis (20-22598-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (20-22598-1)	Recovery (%)	Limits (%)
Chromium (VI)	106	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	111	80 - 120

Job Number: 20-22615 Date: 29/01/2021

## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	4/01/2021	
Duplicate Analysis (20-21956-6)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	95	80 - 120

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	23/12/2020	
Duplicate Analysis (20-22615-7)	RPD (%)	Limits (%)
Bromide	2	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Matrix Spike (20-22615-7)	Recovery (%)	Limits (%)
Bromide	93	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	89	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	18/12/2020	
Duplicate Analysis (20-22593-1)	RPD (%)	Limits (%)
Total Suspended Solids	200	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	104	80 - 120

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Job Number: 20-22615 Date: 29/01/2021

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	18/12/2020	
Duplicate Analysis (20-22593-1)	RPD (%)	Limits (%)
Alkalinity	9	25
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	95	80 - 120
Bicarbonate	95	80 - 120
Carbonate	95	80 - 120
Hydroxide	95	80 - 120

## **Density/Specific Gravity**

		<b>-</b>
Holding Time Criteria	Date	
Extracted	23/12/2020	
Analysed	23/12/2020	
Duplicate Analysis (20-22615-7)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	0.99	0.01

Job Number: 21-00964 Date: 15/02/2021



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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

Job Number: 21-00964 Date: 15/02/2021

## **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	21/01/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Chromium - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	105	80 - 120
Cobalt - Dissolved	108	80 - 120
Copper - Dissolved	103	80 - 120
Lead - Dissolved	105	80 - 120
Nickel - Dissolved	109	80 - 120
Silver - Dissolved	102	80 - 120
Zinc - Dissolved	91	80 - 120
Aluminium - Dissolved	90	80 - 120
Chromium - Dissolved	111	80 - 120
Molybdenum - Dissolved	106	80 - 120
Cadmium - Dissolved	105	80 - 120
Copper - Dissolved	103	80 - 120
Lead - Dissolved	105	80 - 120
Nickel - Dissolved	109	80 - 120
Zinc - Dissolved	91	80 - 120
Chromium - Dissolved	111	80 - 120

ARL Group
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Job Number: 21-00964 Date: 15/02/2021

## **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	21/01/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Sodium - Dissolved	106	90 - 110
Potassium - Dissolved	100	90 - 110
Calcium - Dissolved	97	90 - 110
Magnesium - Dissolved	98	90 - 110
Antimony - Dissolved	109	80 - 120
Manganese - Dissolved	87	80 - 120
Thallium - Dissolved	102	80 - 120
Vanadium - Dissolved	113	80 - 120
Barium - Dissolved	97	80 - 120
Boron - Dissolved	91	80 - 120
Iron - Dissolved	113	80 - 120
Strontium - Dissolved	95	80 - 120
Arsenic - Dissolved	107	80 - 120
Beryllium - Dissolved	89	80 - 120
Selenium - Dissolved	120	80 - 120
Titanium - Dissolved	90	80 - 120

Job Number: 21-00964 Date: 15/02/2021



## **Mercury in Water**

Holding Time Criteria	Date	
Extracted	19/01/2021	
Analysed	20/01/2021	
Duplicate Analysis (21-00955-8)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Duplicate Analysis (21-00963-12)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Matrix Spike (21-00955-8)	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120
Matrix Spike (21-00963-12)	Recovery (%)	Limits (%)
Mercury - Dissolved	99	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	80	80 - 120

## Low Level TN/TKN in Water

		_
Holding Time Criteria	Date	
Extracted	9/02/2021	
Analysed	9/02/2021	
Duplicate Analysis (21-00964-1)	RPD (%)	Limits (%)
Total Nitrogen	13	200
Total Kjeldahl Nitrogen	13	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.1	0.1
Total Kjeldahl Nitrogen	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	89	80 - 120
Total Kjeldahl Nitrogen	89	80 - 120

### Low Level TP in water

		_
Holding Time Criteria	Date	
Extracted	29/01/2021	
Analysed	29/01/2021	
Duplicate Analysis (21-00964-6)	RPD (%)	Limits (%)
Total Phosphorus	12	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Matrix Spike (21-00964-6)	Recovery (%)	Limits (%)
Total Phosphorus	99	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	92	80 - 120

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Job Number: 21-00964 Date: 15/02/2021

## Ions in Water

Holding Time Criteria	Date	
Analysed	22/01/2021	
Duplicate Analysis (20-23081-3)	RPD (%)	Limits (%)
Chloride	9	25
Sulfate	2	25
Reactive Silica	3	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Matrix Spike (20-23081-3)	Recovery (%)	Limits (%)
Chloride	81	80 - 120
Sulfate	107	80 - 120
Reactive Silica	106	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	103	80 - 120
Sulfate	102	80 - 120
Reactive Silica	85	80 - 120
Duplicate Analysis (21-00964-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (21-00964-1)	Recovery (%)	Limits (%)
Chromium (VI)	81	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	98	80 - 120

## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	22/01/2021	
Duplicate Analysis (21-00964-6)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	87	80 - 120

Job Number: 21-00964 Date: 15/02/2021

## **Low Nitrite in Water**

Holding Time Criteria	Date	
Analysed	13/01/2021	
Duplicate Analysis (21-00471-1)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Matrix Spike (21-00471-1)	Recovery (%)	Limits (%)
Nitrite-N	84	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	116	80 - 120

## **Low Level NOx**

Holding Time Criteria	Date	
Analysed	13/01/2021	
Duplicate Analysis (21-00964-6)	RPD (%)	Limits (%)
NOx-N	40	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Matrix Spike (21-00964-6)	Recovery (%)	Limits (%)
NOx-N	104	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	110	80 - 120

## Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	13/01/2021	
Analysed	13/01/2021	
Duplicate Analysis (21-00471-1)	RPD (%)	Limits (%)
Ammonia-N	7	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Matrix Spike (21-00471-1)	Recovery (%)	Limits (%)
Ammonia-N	89	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	114	80 - 120

Job Number: 21-00964 Date: 15/02/2021

## **Bromide in Water**

Holding Time Criteria	Date	
Analysed	20/01/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	104	80 - 120

## TDS and TSS in water

Holding Time Criteria	Date	
Analysed	19/01/2021	
Duplicate Analysis (21-00963-1)	RPD (%)	Limits (%)
Total Suspended Solids	13	25
Duplicate Analysis (21-00963-10)	RPD (%)	Limits (%)
Total Suspended Solids	7	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	104	80 - 120
Total Suspended Solids	92	80 - 120

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	19/01/2021	
Duplicate Analysis (21-00964-7)	RPD (%)	Limits (%)
Alkalinity	0	25
Bicarbonate	0	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	95	80 - 120
Bicarbonate	95	80 - 120
Carbonate	95	80 - 120
Hydroxide	95	80 - 120

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Job Number: 21-00964 Date: 15/02/2021

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	20/01/2020	
Analysed	20/01/2020	
Dunlicate Analysis (24 00064 1)	DDD (0/)	Limita (0/)
Duplicate Analysis (21-00964-1)	RPD (%)	Limits (%)
Blank Analysis	RPD (%) Result (g/mL)	Limits (%) Limit (g/mL)

Job Number: 21-03681 Date: 13/04/2021



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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

Job Number: 21-03681 Date: 13/04/2021

## TPH (NEDM 2013) in Water

Holding Time Criteria	Date	
Extracted	2/03/2021	
Analysed	8/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Xylenes (Total)	<0.003	0.003
Naphthalene	<0.005	0.005
TRHC ₆₋₁₀	<0.02	0.02
TRHC ₆₋₁₀ minus BTEX (F1)	<0.02	0.02
TRHC>10-16	<0.05	0.05
TRHC>10-16 minus Naphthalene (F2)	<0.05	0.05
TRHC>16-34	<0.1	0.1
TRHC>34-40	<0.1	0.1
Laboratory Control Sample	Recovery (%)	Limits (%)
Benzene	97	70 - 140
Toluene	96	70 - 140
Ethylbenzene	94	70 - 140
Xylenes (Total)	95	70 - 140
Naphthalene	81	70 - 140
TRHC ₆₋₁₀	94	70 - 140
TRHC>10-16	89	70 - 140
TRHC>16-34	94	70 - 140

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Job Number: 21-03681 Date: 13/04/2021

### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	5/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	97	80 - 120
Cobalt - Dissolved	96	80 - 120
Copper - Dissolved	100	80 - 120
Lead - Dissolved	98	80 - 120
Nickel - Dissolved	115	80 - 120
Silver - Dissolved	113	80 - 120
Zinc - Dissolved	95	80 - 120
Aluminium - Dissolved	106	80 - 120
Chromium - Dissolved	115	80 - 120
Molybdenum - Dissolved	115	80 - 120

ARL Group
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Job Number: 21-03681 Date: 13/04/2021

### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	5/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Tin - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	116	80 - 120
Manganese - Dissolved	96	80 - 120
Thallium - Dissolved	115	80 - 120
Vanadium - Dissolved	111	80 - 120
Barium - Dissolved	96	80 - 120
Boron - Dissolved	99	80 - 120
Iron - Dissolved	107	80 - 120
Strontium - Dissolved	102	80 - 120
Arsenic - Dissolved	91	80 - 120
Beryllium - Dissolved	117	80 - 120
Selenium - Dissolved	108	80 - 120
Sodium - Dissolved	98	90 - 110
Potassium - Dissolved	103	90 - 110
Calcium - Dissolved	102	90 - 110
Calcium - Dissolved		
Magnesium - Dissolved	98	90 - 110

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Job Number: 21-03681 Date: 13/04/2021

Certified Reference Material	Recovery (%)	Limits (%)
Titanium - Dissolved	96	80 - 120
Lithium - Dissolved	102	80 - 120

### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	3/03/2021	
Analysed	4/02/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120

### Low Level TN/TKN in Water

		_
Holding Time Criteria	Date	
Extracted	16/03/2021	
Analysed	17/03/2021	
Duplicate Analysis (21-03681-5)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Total Kjeldahl Nitrogen	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.1	0.1
Total Kjeldahl Nitrogen	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	86	80 - 120
Total Kjeldahl Nitrogen	86	80 - 120

### Low Level TP in water

Holding Time Criteria	Date	
Extracted	10/03/2021	
Analysed	16/03/2021	
Duplicate Analysis (21-03681-5)	RPD (%)	Limits (%)
Total Phosphorus	14	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	118	80 - 120

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Job Number: 21-03681 Date: 13/04/2021

### **Ions in Water**

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Holding Time Criteria	Date	
Analysed	12/03/2021	
Duplicate Analysis (21-03681-7)	RPD (%)	Limits (%)
Reactive Silica	29	200
Duplicate Analysis (21-03852-2)	RPD (%)	Limits (%)
Chloride	12	200
Sulfate	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Matrix Spike (21-03681-7)	Recovery (%)	Limits (%)
Reactive Silica	102	80 - 120
Matrix Spike (21-03852-2)	Recovery (%)	Limits (%)
Chloride	111	80 - 120
Sulfate	119	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	99	80 - 120
Sulfate	106	80 - 120
Reactive Silica	80	80 - 120
Duplicate Analysis (21-03683-A-6)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	106	80 - 120

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	11/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	103	80 - 120

Job Number: 21-03681 Date: 13/04/2021



## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	8/03/2021	
Duplicate Analysis (21-03689-4)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	99	80 - 120

### **Low Nitrite in Water**

Holding Time Criteria	Date	
Analysed	17/03/2021	
Duplicate Analysis (21-03681-2)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	101	80 - 120

### **Low Level NOx**

Holding Time Criteria	Date	
Analysed	17/03/2021	
Duplicate Analysis (21-03681-3)	RPD (%)	Limits (%)
NOx-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	83	80 - 120

### Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	16/03/2021	
Analysed	16/03/2021	
Duplicate Analysis (21-03681-1)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	80	80 - 120

Job Number: 21-03681 Date: 13/04/2021



### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	2/03/2021	
Duplicate Analysis (21-03681-6)	RPD (%)	Limits (%)
Total Suspended Solids	17	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	120	80 - 120
Total Suspended Solids	112	80 - 120

### **Alkalinity and Acidity in Water**

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Holding Time Criteria	Date	
Analysed	2/03/2021	
Duplicate Analysis (21-03656-5)	RPD (%)	Limits (%)
Alkalinity	0	25
Duplicate Analysis (21-03669-1)	RPD (%)	Limits (%)
Alkalinity	3	25
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	102	80 - 120
Bicarbonate	102	80 - 120
Carbonate	102	80 - 120
Hydroxide	102	80 - 120
Alkalinity	102	80 - 120
-		

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	3/03/2021	
Analysed	3/03/2021	
Duplicate Analysis (21-03689-4)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.00	0.01

Job Number: 21-03689 Date: 13/04/2021



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This Quality Control Report is issued in accordance with Section 18 of the ARL Quality Management Manual. All QC parameters are contained within the relevant ARL Method as indicated by the method reference, either on this report or the Laboratory Report.

Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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Job Number: 21-03689 Date: 13/04/2021

### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	9/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Silver - Dissolved	<0.001	0.001
Aluminium - Dissolved	<0.01	0.01
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Chromium - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Blank Analysis	Result (mg/L)	Limit (mg/L)
Aluminium - Dissolved	<0.01	0.01
Cadmium - Dissolved	<0.0001	0.0001
Copper - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Certified Reference Material	Recovery (%)	Limits (%)
Silver - Dissolved	101	80 - 120
Aluminium - Dissolved	102	80 - 120
Cadmium - Dissolved	104	80 - 120
Cobalt - Dissolved	108	80 - 120
Chromium - Dissolved	112	80 - 120
Copper - Dissolved	100	80 - 120
Molybdenum - Dissolved	102	80 - 120
Nickel - Dissolved	98	80 - 120
Lead - Dissolved	108	80 - 120
Zinc - Dissolved	101	80 - 120

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Job Number: 21-03689 Date: 13/04/2021

#### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	9/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Silicon - Dissolved	<0.1	0.1
Arsenic - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Barium - Dissolved	<0.01	0.01
Beryllium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Manganese - Dissolved	<0.01	0.01
Antimony - Dissolved	<0.001	0.001
Selenium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Thorium - Dissolved	<0.001	0.001
Titanium - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Uranium - Dissolved	<0.001	0.001
Vanadium - Dissolved	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Arsenic - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Arsenic - Dissolved	104	80 - 120
Boron - Dissolved	103	80 - 120
Barium - Dissolved	108	80 - 120
Beryllium - Dissolved	94	80 - 120
Iron - Dissolved	107	80 - 120
Manganese - Dissolved	108	80 - 120
Antimony - Dissolved	115	80 - 120
Selenium - Dissolved	97	80 - 120
Strontium - Dissolved	102	80 - 120
Thallium - Dissolved	110	80 - 120
Vanadium - Dissolved	103	80 - 120
Calcium - Dissolved	101	90 - 110
Magnesium - Dissolved	99	90 - 110

Job Number: 21-03689 Date: 13/04/2021



Certified Reference Material	Recovery (%)	Limits (%)
Sodium - Dissolved	102	90 - 110
Potassium - Dissolved	104	90 - 110
Tin - Dissolved	84	80 - 120
Titanium - Dissolved	101	80 - 120
Lithium - Dissolved	112	80 - 120
Silicon - Dissolved	111	80 - 120
Arsenic - Dissolved	104	80 - 120

### **Mercury in Water**

		<b>-</b>
Holding Time Criteria	Date	
Extracted	3/03/2021	
Analysed	4/02/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
<b>Certified Reference Material</b>	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120

### Low Level TN/TKN in Water

Holding Time Criteria	Date	
Extracted	16/03/2021	
Analysed	17/03/2021	
Duplicate Analysis (21-03681-5)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Total Kjeldahl Nitrogen	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Blank Analysis Total Nitrogen	Result (mg/L) <0.1	<b>Limit (mg/L)</b> 0.1
	` ` ` `	· - ·
Total Nitrogen	<0.1	0.1
Total Nitrogen Total Kjeldahl Nitrogen	<0.1 <0.1	0.1 0.1

## Low Level TP in water

Holding Time Criteria	Date	
Extracted	23/02/2021	
Analysed	23/02/2021	
Duplicate Analysis (21-03163-3)	RPD (%)	Limits (%)
Total Phosphorus	4	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Matrix Spike (21-03163-3)	Recovery (%)	Limits (%)
Total Phosphorus	102	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	109	80 - 120

Job Number: 21-03689 Date: 13/04/2021



### lons in Water

Holding Time Criteria	Date	
Analysed	11/03/2021	
Duplicate Analysis (21-03728-1)	RPD (%)	Limits (%)
Chloride	15	25
Sulfate	3	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Matrix Spike (21-03728-1)	Recovery (%)	Limits (%)
Chloride	107	80 - 120
Sulfate	120	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chloride	114	80 - 120
Sulfate	106	80 - 120

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	11/03/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	103	80 - 120

## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	8/03/2021	
Duplicate Analysis (21-03689-4)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	99	80 - 120

### Low Nitrite in Water

Holding Time Criteria	Date	
Analysed	22/02/2021	
Duplicate Analysis (21-03163-11)	RPD (%)	Limits (%)
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Nitrite-N	<0.002	0.002
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	102	80 - 120

Job Number: 21-03689 Date: 13/04/2021

### **Low Level NOx**

Holding Time Criteria	Date	
Analysed	22/02/2021	
Duplicate Analysis (21-03163-11)	RPD (%)	Limits (%)
NOx-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Matrix Spike (21-03163-11)	Recovery (%)	Limits (%)
NOx-N	85	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	112	80 - 120

### Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	22/02/2021	
Analysed	22/02/2021	
Duplicate Analysis (21-03163-1)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	100	80 - 120

### Low Level FRP in Water

Holding Time Criteria	Date	
Analysed	22/02/2021	
Duplicate Analysis (21-03163-3)	RPD (%)	Limits (%)
Filterable Reactive Phosphorus	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Filterable Reactive Phosphorus	<0.002	0.002
Matrix Spike (21-03163-3)	Recovery (%)	Limits (%)
Filterable Reactive Phosphorus	102	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Filterable Reactive Phosphorus	99	80 - 120

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Job Number: 21-03689 Date: 13/04/2021

### **Alkalinity and Acidity in Water**

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<b>Holding Time Criteria</b>	Date	
Analysed	2/03/2021	
Duplicate Analysis (21-03728-3)	RPD (%)	Limits (%)
Alkalinity	0	25
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	102	80 - 120

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	3/03/2021	
Analysed	3/03/2021	
Duplicate Analysis (21-03689-4)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.00	0.01

Job Number: 21-05697 Date: 17/05/2021



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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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Job Number: 21-05697 Date: 17/05/2021

## **Mercury in Water**

Holding Time Criteria	Date	
Extracted	9/04/2021	
Analysed	13/04/2021	
Duplicate Analysis (21-06065-1)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	104	80 - 120

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Job Number: 21-05697 Date: 17/05/2021

### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	7/04/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Blank Analysis	Result (mg/L)	Limit (mg/L)
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	99	80 - 120
Cobalt - Dissolved	102	80 - 120
Copper - Dissolved	103	80 - 120
Lead - Dissolved	103	80 - 120
Nickel - Dissolved	99	80 - 120
Silver - Dissolved	110	80 - 120
Zinc - Dissolved	102	80 - 120
Aluminium - Dissolved	98	80 - 120
Chromium - Dissolved	98	80 - 120
Molybdenum - Dissolved	104	80 - 120
Lithium - Dissolved	107	80 - 120
Copper - Dissolved	111	80 - 120
Lead - Dissolved	107	80 - 120
Nickel - Dissolved	103	80 - 120
Zinc - Dissolved	107	80 - 120
A1 ' ' D' 1 1	91	80 - 120
Aluminium - Dissolved	91	00 - 120

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Job Number: 21-05697 Date: 17/05/2021

### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	7/04/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Blank Analysis	Result (mg/L)	Limit (mg/L)
Manganese - Dissolved	<0.01	0.01
Iron - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	103	80 - 120
Manganese - Dissolved	103	80 - 120
Thallium - Dissolved	111	80 - 120
Vanadium - Dissolved	102	80 - 120
Barium - Dissolved	101	80 - 120
Boron - Dissolved	102	80 - 120
Iron - Dissolved	107	80 - 120
Strontium - Dissolved	102	80 - 120
Arsenic - Dissolved	94	80 - 120
Beryllium - Dissolved	104	80 - 120



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Certified Reference Material	Recovery (%)	Limits (%)
Selenium - Dissolved	86	80 - 120
Sodium - Dissolved	103	90 - 110
Potassium - Dissolved	106	90 - 110
Calcium - Dissolved	106	90 - 110
Magnesium - Dissolved	110	90 - 110
Manganese - Dissolved	106	80 - 120
Iron - Dissolved	114	80 - 120
Arsenic - Dissolved	94	80 - 120
Sodium - Dissolved	103	90 - 110
Potassium - Dissolved	106	90 - 110
Magnesium - Dissolved	106	90 - 110

### **Total Nitrogen in Water**

Holding Time Criteria	Date	]
Extracted	23/04/2021	
Analysed	24/04/2021	
Duplicate Analysis (21-05707-1)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Duplicate Analysis (21-05863-5)	RPD (%)	Limits (%)
Total Nitrogen	2	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (21-05707-1)	Recovery (%)	Limits (%)
Total Nitrogen	94	80 - 120
Matrix Spike (21-05863-5)	Recovery (%)	Limits (%)
Total Nitrogen	101	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	85	80 - 120
Total Nitrogen	84	80 - 120

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### Low Level TP in water

Holding Time Criteria	Date	
Extracted	11/05/2021	
Analysed	11/05/2021	
Duplicate Analysis (21-05697-7)	RPD (%)	Limits (%)
Total Phosphorus	7	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.005	0.005
Matrix Spike (21-05697-7)	Recovery (%)	Limits (%)
Total Phosphorus	109	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	100	80 - 120

### Low Level Ammonia in Water

Holding Time Criteria	Date	
Extracted	10/05/2021	
Analysed	10/05/2021	
Duplicate Analysis (21-05697-6)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.003	0.003
Matrix Spike (21-05697-6)	Recovery (%)	Limits (%)
Ammonia-N	115	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	90	80 - 120

### **Low Level NOx**

Holding Time Criteria	Date	
Analysed	8/05/2021	
Duplicate Analysis (21-06578-28)	RPD (%)	Limits (%)
NOx-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.002	0.002
Matrix Spike (21-06578-28)	Recovery (%)	Limits (%)
NOx-N	80	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	120	80 - 120

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## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	20/04/2021	
Duplicate Analysis (21-06085-4)	RPD (%)	Limits (%)
Fluoride	6	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	92	80 - 120

### Ammonia in Water

Holding Time Criteria	Date	
Analysed	19/04/2021	
Duplicate Analysis (21-05510-2)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (21-05510-2)	Recovery (%)	Limits (%)
Ammonia-N	111	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	103	80 - 120

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### **Ions in Water**

Holding Time Criteria	Date	
Analysed	19/04/2021	
Duplicate Analysis (21-05510-2)	RPD (%)	Limits (%)
Chloride	5	200
Sulfate	0	50
Reactive Silica	1	25
Nitrite-N	0	200
Duplicate Analysis (21-05697-1)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	3	25
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
Nitrite-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Nitrite-N	<0.01	0.01
Matrix Spike (21-05510-2)	Recovery (%)	Limits (%)
Chloride	110	80 - 120
Sulfate	119	80 - 120
Reactive Silica	117	80 - 120
Nitrite-N	104	80 - 120
Matrix Spike (21-05697-1)	Recovery (%)	Limits (%)
Chloride	109	80 - 120
Sulfate	103	80 - 120
Nitrite-N	97	80 - 120
	Recovery (%)	
Certified Reference Material	114	Limits (%)
Nitrite-N	113	80 - 120 80 - 120
Chloride		
Sulfate	105	80 - 120
Reactive Silica	83	80 - 120
Nitrite-N	113	80 - 120
Chloride	111	80 - 120
Sulfate	104	80 - 120
Duplicate Analysis (21-05697-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (21-05697-1)	Recovery (%)	Limits (%)
Chromium (VI)	97	80 - 120
Certified Reference Material	Recovery (%)	Limits (%) 80 - 120

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### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	8/04/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	103	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	29/03/2021	
Duplicate Analysis (21-05670-16)	RPD (%)	Limits (%)
Total Suspended Solids	6	25
Duplicate Analysis (21-05672-1)	RPD (%)	Limits (%)
Total Suspended Solids	9	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	102	80 - 120
Total Suspended Solids	102	80 - 120

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## **Alkalinity and Acidity in Water**

indinity and Acidity in Water		_
Holding Time Criteria	Date	
Analysed	29/03/2021	
Duplicate Analysis (21-05649-3)	RPD (%)	Limits (%)
Alkalinity	2	50
Duplicate Analysis (21-05675-14)	RPD (%)	Limits (%)
Alkalinity	5	25
Bicarbonate	5	25
Carbonate	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	105	80 - 120
Bicarbonate	105	80 - 120
Carbonate	105	80 - 120
Hydroxide	105	80 - 120
Alkalinity	101	80 - 120
Bicarbonate	101	80 - 120
Carbonate	101	80 - 120

## **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	7/04/2021	
Analysed	7/04/2021	
Duplicate Analysis (21-05697-1)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.00	0.01

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Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	27/05/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	112	80 - 120
Cobalt - Dissolved	110	80 - 120
Copper - Dissolved	106	80 - 120
Lead - Dissolved	106	80 - 120
Nickel - Dissolved	109	80 - 120
Silver - Dissolved	107	80 - 120
Zinc - Dissolved	100	80 - 120
Aluminium - Dissolved	104	80 - 120
Chromium - Dissolved	108	80 - 120
Molybdenum - Dissolved	100	80 - 120
Lithium - Dissolved	101	80 - 120
Lithium - Dissolved	101	80 - 120

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### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	27/05/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	112	80 - 120
Manganese - Dissolved	101	80 - 120
Thallium - Dissolved	110	80 - 120
Vanadium - Dissolved	106	80 - 120
Barium - Dissolved	109	80 - 120
Boron - Dissolved		
	104	80 - 120
Iron - Dissolved		80 - 120 80 - 120
Iron - Dissolved Strontium - Dissolved	104	
	104 83	80 - 120
Strontium - Dissolved	104 83 102	80 - 120 80 - 120
Strontium - Dissolved Arsenic - Dissolved	104 83 102 93	80 - 120 80 - 120 80 - 120
Strontium - Dissolved Arsenic - Dissolved Beryllium - Dissolved	104 83 102 93 105	80 - 120 80 - 120 80 - 120 80 - 120
Strontium - Dissolved Arsenic - Dissolved Beryllium - Dissolved Selenium - Dissolved	104 83 102 93 105 86	80 - 120 80 - 120 80 - 120 80 - 120 80 - 120
Strontium - Dissolved Arsenic - Dissolved Beryllium - Dissolved Selenium - Dissolved Sodium - Dissolved	104 83 102 93 105 86 103	80 - 120 80 - 120 80 - 120 80 - 120 80 - 120 90 - 110
Strontium - Dissolved Arsenic - Dissolved Beryllium - Dissolved Selenium - Dissolved Sodium - Dissolved Potassium - Dissolved	104 83 102 93 105 86 103 104	80 - 120 80 - 120 80 - 120 80 - 120 80 - 120 90 - 110

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## **Mercury in Water**

Holding Time Criteria	Date	
Extracted	28/05/2021	
Analysed	27/05/2021	
Duplicate Analysis (21-08907-4)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Duplicate Analysis (21-09240-4)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	96	80 - 120

### **Total Nitrogen in Water**

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Holding Time Criteria	Date	
Extracted	27/05/2021	
Analysed	28/05/2021	
Duplicate Analysis (21-08964-1)	RPD (%)	Limits (%)
Total Nitrogen	33	200
Duplicate Analysis (21-09240-4)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (21-08964-1)	Recovery (%)	Limits (%)
Total Nitrogen	99	80 - 120
Matrix Spike (21-09240-4)	Recovery (%)	Limits (%)
Total Nitrogen	98	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	95	80 - 120
Total Nitrogen	88	80 - 120
Total Nitrogen	94	80 - 120
Total Nitrogen	93	80 - 120

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### **Total Phosphorus in Water**

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Holding Time Criteria	Date	
Extracted	27/05/2021	
Analysed	31/05/2021	
Duplicate Analysis (21-08662-1)	RPD (%)	Limits (%)
Total Phosphorus	0	25
Duplicate Analysis (21-08857-2)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Duplicate Analysis (21-08930-1)	RPD (%)	Limits (%)
Total Phosphorus	0	25
Duplicate Analysis (21-09240-4)	RPD (%)	Limits (%)
Total Phosphorus	24	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Matrix Spike (21-08662-1)	Recovery (%)	Limits (%)
Total Phosphorus	103	80 - 120
Matrix Spike (21-09240-4)	Recovery (%)	Limits (%)
Total Phosphorus	98	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	99	80 - 120
Total Phosphorus	97	80 - 120
Total Phosphorus	97	80 - 120
Total Phosphorus	96	80 - 120
	•	<u> </u>

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	15/06/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	92	80 - 120

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### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	9/06/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	97	80 - 120

### **Ammonia in Water**

Holding Time Criteria	Date	
Analysed	26/05/2021	
Duplicate Analysis (21-09022-9)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (21-09022-9)	Recovery (%)	Limits (%)
Ammonia-N	111	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	101	80 - 120
Ammonia-N	106	80 - 120

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#### Ions in Water

Holding Time Criteria	Date	
Analysed	26/05/2021	
Duplicate Analysis (21-08915-6)	RPD (%)	Limits (%)
Chloride	5	25
Sulfate	3	25
Reactive Silica	0	200
NOx-N	0	200
Nitrite-N	0	200
Duplicate Analysis (21-09022-9)	RPD (%)	Limits (%)
NOx-N	0	200
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Matrix Spike (21-08915-6)	Recovery (%)	Limits (%)
Chloride	106	80 - 120
Sulfate	85	80 - 120
Reactive Silica	100	80 - 120
NOx-N	90	80 - 120
Nitrite-N	87	80 - 120
Matrix Spike (21-09022-9)	Recovery (%)	Limits (%)
NOx-N	110	80 - 120
Nitrite-N	89	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Nitrite-N	102	80 - 120
NOx-N	113	80 - 120
Chloride	94	80 - 120
Sulfate	108	80 - 120
Reactive Silica	83	80 - 120
Nitrite-N	115	80 - 120
NOx-N	108	80 - 120
Duplicate Analysis (21-08915-6)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (21-08915-6)	Recovery (%)	Limits (%)
Chromium (VI)	85	80 - 120

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## Fluoride by ISE

Holding Time Criteria	Date	
Analysed	26/05/2021	
Duplicate Analysis (21-08188-1)	RPD (%)	Limits (%)
Fluoride	5	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Matrix Spike (21-08188-1)	Recovery (%)	Limits (%)
Fluoride	107	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	105	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	17/05/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	92	80 - 120

## **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	]
Analysed	25/05/2021	
Duplicate Analysis (21-08880-1)	RPD (%)	Limits (%)
Alkalinity	12	25
Duplicate Analysis (21-08956-2)	RPD (%)	Limits (%)
Alkalinity	5	25
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	111	80 - 120
Bicarbonate	111	80 - 120
Carbonate	111	80 - 120
Hydroxide	111	80 - 120

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## **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	11/06/2021	
Analysed	11/06/2021	
Duplicate Analysis (21-08915-7)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	0.99	0.01

Job Number: 21-11085 Date: 26/07/2021



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### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### RPD

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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Job Number: 21-11085 Date: 26/07/2021

### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	8/07/2021	
Analysed	8/07/2021	
Duplicate Analysis (21-11085-7)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Duplicate Analysis (21-11675-8)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Matrix Spike (21-11085-7)	Recovery (%)	Limits (%)
Mercury - Dissolved	110	80 - 120
Matrix Spike (21-11675-8)	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120

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Job Number: 21-11085 Date: 26/07/2021

### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	2/06/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.001	0.001
Tin - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	90	80 - 120
Cobalt - Dissolved	103	80 - 120
Copper - Dissolved	98	80 - 120
Lead - Dissolved	96	80 - 120
Nickel - Dissolved	117	80 - 120
Silver - Dissolved	96	80 - 120
Zinc - Dissolved	102	80 - 120
Aluminium - Dissolved	112	80 - 120
Chromium - Dissolved	96	80 - 120
Molybdenum - Dissolved	97	80 - 120
Cadmium - Dissolved	103	80 - 120
Copper - Dissolved	103	80 - 120
Lead - Dissolved	103	80 - 120
Nickel - Dissolved	103	80 - 120
Zinc - Dissolved	103	80 - 120
Lithium - Dissolved	100	80 - 120

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#### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	29/06/2021	
Duplicate Analysis (21-10745-12)	RPD (%)	Limits (%)
Boron - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Blank Analysis	Result (mg/L)	Limit (mg/L)
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	96	80 - 120
Manganese - Dissolved	96	80 - 120
Thallium - Dissolved	102	80 - 120
Vanadium - Dissolved	104	80 - 120
Barium - Dissolved	97	80 - 120
Boron - Dissolved	100	80 - 120
Iron - Dissolved	97	80 - 120
Strontium - Dissolved	102	80 - 120



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Certified Reference Material	Recovery (%)	Limits (%)
Arsenic - Dissolved	87	80 - 120
Beryllium - Dissolved	97	80 - 120
Selenium - Dissolved	90	80 - 120
Sodium - Dissolved	100	90 - 110
Potassium - Dissolved	94	90 - 110
Calcium - Dissolved	96	90 - 110
Magnesium - Dissolved	110	90 - 110
Titanium - Dissolved	103	80 - 120
Sodium - Dissolved	102	90 - 110
Potassium - Dissolved	94	90 - 110
Calcium - Dissolved	110	90 - 110
Magnesium - Dissolved	110	90 - 110

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### **Total Nitrogen in Water**

Total Millogen III Water	T-	1
Holding Time Criteria	Date	
Extracted	1/07/2021	
Analysed	2/07/2021	
Duplicate Analysis (21-10983-6)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Duplicate Analysis (21-11085-1)	RPD (%)	Limits (%)
Total Nitrogen	0	200
Duplicate Analysis (21-11288-1)	RPD (%)	Limits (%)
Total Nitrogen	0	50
Duplicate Analysis (21-11452-1)	RPD (%)	Limits (%)
Total Nitrogen	8	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (21-10983-6)	Recovery (%)	Limits (%)
Total Nitrogen	103	80 - 120
Matrix Spike (21-11085-1)	Recovery (%)	Limits (%)
Total Nitrogen	95	80 - 120
Matrix Spike (21-11288-1)	Recovery (%)	Limits (%)
Total Nitrogen	105	80 - 120
Matrix Spike (21-11452-1)	Recovery (%)	Limits (%)
Total Nitrogen	104	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	87	80 - 120
Total Nitrogen	88	80 - 120
Total Nitrogen	91	80 - 120
Total Nitrogen	90	80 - 120

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### **Total Phosphorus in Water**

air nosphoras in water		
Holding Time Criteria	Date	
Extracted	1/07/2021	
Analysed	2/07/2021	
Duplicate Analysis (21-11063-1)	RPD (%)	Limits (%)
Total Phosphorus	0	25
Duplicate Analysis (21-11076-1)	RPD (%)	Limits (%)
Total Phosphorus	18	50
Duplicate Analysis (21-11611-24)	RPD (%)	Limits (%)
Total Phosphorus	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Matrix Spike (21-11063-1)	Recovery (%)	Limits (%)
Total Phosphorus	107	80 - 120
Matrix Spike (21-11076-1)	Recovery (%)	Limits (%)
Total Phosphorus	103	80 - 120
Matrix Spike (21-11611-24)	Recovery (%)	Limits (%)
Total Phosphorus	101	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	83	80 - 120
Total Phosphorus	86	80 - 120
Total Phosphorus	82	80 - 120
*		

### **Ammonia in Water**

Holding Time Criteria	Date	
Analysed	11/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	99	80 - 120

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#### **Ions in Water**

ons in water	1	7
Holding Time Criteria	Date	_
Analysed	11/07/2021	
Duplicate Analysis (21-10991-2)	RPD (%)	Limits (%)
Sulfate	0	200
Duplicate Analysis (21-11085-2)	RPD (%)	Limits (%)
Sulfate	3	25
Duplicate Analysis (21-11085-7)	RPD (%)	Limits (%)
Sulfate	0	25
Reactive Silica	0	200
NOx-N	0	200
Nitrite-N	0	200
Duplicate Analysis (21-11454-1)	RPD (%)	Limits (%)
NOx-N	0	25
Nitrite-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.01	0.01
Matrix Spike (21-10991-2)	Recovery (%)	Limits (%)
Chloride	117	80 - 120
Sulfate	103	80 - 120
Matrix Spike (21-11085-2)	Recovery (%)	Limits (%)
Chloride	95	80 - 120
Sulfate	104	80 - 120
Matrix Spike (21-11085-7)	Recovery (%)	Limits (%)
Reactive Silica	103	80 - 120
NOx-N	85	80 - 120
Matrix Spike (21-11454-1)	Recovery (%)	Limits (%)
Nitrite-N	110	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	117	80 - 120
Chloride	107	80 - 120
Sulfate	94	80 - 120
Nitrite-N	101	80 - 120
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Certified Reference Material	Recovery (%)	Limits (%)
Reactive Silica	89	80 - 120
NOx-N	111	80 - 120
Duplicate Analysis (21-11085-7)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (21-11085-7)	Recovery (%)	Limits (%)
Chromium (VI)	92	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	98	80 - 120

#### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	29/06/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	103	80 - 120

### Fluoride by ISE

Holding Time Criteria	Date	
Analysed	22/06/2021	
Duplicate Analysis (21-11085-5)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	89	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	16/06/2021	
Duplicate Analysis (21-11085-1)	RPD (%)	Limits (%)
Total Suspended Solids	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	90	80 - 120

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### **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	16/06/2021	
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	104	80 - 120
Bicarbonate	104	80 - 120
Carbonate	104	80 - 120
Hydroxide	104	80 - 120

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	25/06/2021	
Analysed	25/06/2021	
Duplicate Analysis (21-11085-7)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	0.99	0.01

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This Quality Control Report is issued in accordance with Section 18 of the ARL Quality Management Manual. All QC parameters are contained within the relevant ARL Method as indicated by the method reference, either on this report or the Laboratory Report.

Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### RPD

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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### TRH (NEPM 2013) in Water

Holding Time Criteria	Date	
Extracted	5/07/2021	
Analysed	7/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Xylenes (Total)	<0.003	0.003
Naphthalene	<0.005	0.005
TRHC ₆₋₁₀	<0.02	0.02
TRHC ₆₋₁₀ minus BTEX (F1)	<0.02	0.02
TRHC>10-16	<0.05	0.05
TRHC>10-16 minus Naphthalene (F2)	<0.05	0.05
TRHC>16-34	<0.1	0.1
TRHC>34-40	<0.1	0.1
Laboratory Control Sample	Recovery (%)	Limits (%)
Benzene	107	70 - 140
Toluene	106	70 - 140
Ethylbenzene	106	70 - 140
Xylenes (Total)	106	70 - 140
Naphthalene	94	70 - 140
TRHC ₆₋₁₀	112	70 - 140
	72	70 - 140
TRHC>10-16	12	
TRHC>10-16 TRHC>16-34	80	70 - 140

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### **Low Level Dissolved Metals in Water**

<b>Holding Time Criteria</b>	Date	
Analysed	13/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Blank Analysis	Result (mg/L)	Limit (mg/L)
Aluminium - Dissolved	<0.01	0.01
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	116	80 - 120
Copper - Dissolved	112	80 - 120
Lead - Dissolved	115	80 - 120
Nickel - Dissolved	107	80 - 120
Zinc - Dissolved	94	80 - 120
Aluminium - Dissolved	98	80 - 120
Chromium - Dissolved	110	80 - 120
Aluminium - Dissolved	98	80 - 120

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#### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	13/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Tin - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	114	80 - 120
Manganese - Dissolved	92	80 - 120
Thallium - Dissolved	108	80 - 120
Vanadium - Dissolved	111	80 - 120
Barium - Dissolved	92	80 - 120
Boron - Dissolved	91	80 - 120
Iron - Dissolved	106	80 - 120
Strontium - Dissolved	84	80 - 120
Arsenic - Dissolved	115	80 - 120
Beryllium - Dissolved	117	80 - 120
Selenium - Dissolved	106	80 - 120
Sodium - Dissolved	99	90 - 110
Potassium - Dissolved	106	90 - 110



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Certified Reference Material	Recovery (%)	Limits (%)
Calcium - Dissolved	94	90 - 110
Magnesium - Dissolved	92	90 - 110

### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	12/07/2021	
Analysed	12/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	100	80 - 120

### **Total Nitrogen in Water**

Holding Time Criteria	Date	
Extracted	12/07/2021	
Analysed	12/07/2021	
Duplicate Analysis (21-11862-1)	RPD (%)	Limits (%)
Total Nitrogen	200	200
Duplicate Analysis (21-12103-1)	RPD (%)	Limits (%)
Total Nitrogen	0	25
Duplicate Analysis (21-12121-1)	RPD (%)	Limits (%)
Total Nitrogen	6	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (21-11862-1)	Recovery (%)	Limits (%)
Total Nitrogen	102	80 - 120
Matrix Spike (21-12103-1)	Recovery (%)	Limits (%)
Total Nitrogen	112	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	89	80 - 120
Total Nitrogen	103	80 - 120

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### **Total Phosphorus in Water**

	1
Date	
12/07/2021	
12/07/2021	
RPD (%)	Limits (%)
0	200
RPD (%)	Limits (%)
0	25
RPD (%)	Limits (%)
12	25
Result (mg/L)	Limit (mg/L)
<0.01	0.01
Result (mg/L)	Limit (mg/L)
<0.01	0.01
Result (mg/L)	Limit (mg/L)
<0.01	0.01
Recovery (%)	Limits (%)
92	80 - 120
Recovery (%)	Limits (%)
90	80 - 120
Recovery (%)	Limits (%)
80	80 - 120
82	80 - 120
82	80 - 120
	12/07/2021 12/07/2021 RPD (%) 0 RPD (%) 0 RPD (%) 12 Result (mg/L) <0.01 Result (mg/L) <0.01 Result (mg/L) <0.01 Recovery (%) 92 Recovery (%) 90 Recovery (%) 80 82

### Fluoride by ISE

Holding Time Criteria	Date	
Analysed	20/07/2021	
Duplicate Analysis (21-11862-1)	RPD (%)	Limits (%)
Fluoride	12	200
Duplicate Analysis (21-12596-1)	RPD (%)	Limits (%)
Fluoride	0	50
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	81	80 - 120
Fluoride	81	80 - 120

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### **Ammonia in Water**

Holding Time Criteria	Date	
Analysed	19/07/2021	
Duplicate Analysis (21-11898-12)	RPD (%)	Limits (%)
Ammonia-N	0	200
Duplicate Analysis (21-12044-5)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (21-11898-12)	Recovery (%)	Limits (%)
Ammonia-N	109	80 - 120
Matrix Spike (21-12044-5)	Recovery (%)	Limits (%)
Ammonia-N	101	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	98	80 - 120
Ammonia-N	101	80 - 120
Ammonia-N	109	80 - 120

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#### Ions in Water

Holding Time Criteria	Date	
Analysed	19/07/2021	
Duplicate Analysis (21-11585-1)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	3	25
Reactive Silica	0	25
NOx-N	0	200
Nitrite-N	0	200
Duplicate Analysis (21-11702-4)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	0	25
Duplicate Analysis (21-11740-2)	RPD (%)	Limits (%)
Chloride	2	25
Sulfate	0	25
Duplicate Analysis (21-12044-5)	RPD (%)	Limits (%)
Chloride	0	25
Sulfate	0	200
Duplicate Analysis (21-12121-2)	RPD (%)	Limits (%)
NOx-N	1	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
Reactive Silica	<0.1	0.1
NOx-N	<0.01	0.01
Nitrite-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chloride	<5	5
Sulfate	<1	1
NOx-N	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
NOx-N	<0.01	0.01
Matrix Spike (21-11585-1)	Recovery (%)	Limits (%)
Chloride	103	80 - 120



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Matrix Spike (21-11585-1)	Recovery (%)	Limits (%)
Sulfate	104	80 - 120
Reactive Silica	99	80 - 120
NOx-N	120	80 - 120
Nitrite-N	109	80 - 120
Matrix Spike (21-11702-4)	Recovery (%)	Limits (%)
Chloride	99	80 - 120
Matrix Spike (21-11740-2)	Recovery (%)	Limits (%)
Chloride	103	80 - 120
Sulfate	107	80 - 120
Matrix Spike (21-12044-5)	Recovery (%)	Limits (%)
Chloride	105	80 - 120
Sulfate	102	80 - 120
Matrix Spike (21-12121-2)	Recovery (%)	Limits (%)
NOx-N	114	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
NOx-N	93	80 - 120
Chloride	96	80 - 120
Sulfate	97	80 - 120
Nitrite-N	103	80 - 120
Reactive Silica	87	80 - 120
NOx-N	106	80 - 120
Chloride	103	80 - 120
Sulfate	103	80 - 120
Nitrite-N	114	80 - 120
Chloride	96	80 - 120
Sulfate	97	80 - 120
Reactive Silica	81	80 - 120
NOx-N	106	80 - 120
NOx-N	107	80 - 120
Duplicate Analysis (21-11585-1)	RPD (%)	Limits (%)
Chromium (VI)	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Chromium (VI)	<0.002	0.002
Matrix Spike (21-11585-1)	Recovery (%)	Limits (%)
Chromium (VI)	97	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Chromium (VI)	108	80 - 120

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### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	7/07/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	103	80 - 120

### TDS and TSS in water

Holding Time Criteria	Date	
Analysed	28/06/2021	
Duplicate Analysis (21-11862-1)	RPD (%)	Limits (%)
Total Suspended Solids	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Suspended Solids	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Total Suspended Solids	88	80 - 120

### **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	
Analysed	28/06/2021	
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	98	80 - 120
Bicarbonate	98	80 - 120
Carbonate	98	80 - 120
Hydroxide	98	80 - 120

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	13/07/2021	
Analysed	13/07/2021	
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	1.0	0.01

Job Number: 21-16305 Date: 24/09/2021



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This Quality Control Report is issued in accordance with Section 18 of the ARL Quality Management Manual. All QC parameters are contained within the relevant ARL Method as indicated by the method reference, either on this report or the Laboratory Report.

Acceptance of Holding Times, Duplicate RPD, Spike, LCS and CRM Recoveries are determined at the time of analysis by the Signatory indicated on the Laboratory Report.

#### **DEFINITIONS**

#### **Duplicate Analysis**

A sample, chosen randomly by the analyst at the time of sample preparation, analysed in duplicate.

#### **RPD**

Relative Percent Difference is the absolute difference between the sample and a duplicate analysis compared to the average of the two analytical results. Acceptance Limits can be exceeded by matrix interference or when the result is less than 5 times the LOR.

#### Matrix Spike

An additional portion of sample to which known amounts of the target analytes are added before sample preparation. Acceptance Limits can be exceeded by matrix interference or when the target analytes are present in the sample.

#### Certified Reference Material (CRM)

A commercially available certified solution/mixture of the target analyte of known concentration.

#### Laboratory Control Sample (LCS)

An in-house certified solution/mixture of the target analyte of known concentration.

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### TRH (NEPM 2013) in Water

Holding Time Criteria	Date	
Extracted	8/09/2021	
Analysed	8/09/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Xylenes (Total)	<0.003	0.003
Naphthalene	<0.005	0.005
TRHC ₆₋₁₀	<0.02	0.02
TRHC ₆₋₁₀ minus BTEX (F1)	<0.02	0.02
TRHC>10-16	<0.05	0.05
TRHC>10-16	<0.05	0.05
minus Naphthalene (F2)		
TRHC>16-34	<0.1	0.1
TRHC>34-40	<0.1	0.1
Blank Analysis	Result (mg/L)	Limit (mg/L)
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Xylenes (Total)	<0.003	0.003
Naphthalene	<0.005	0.005
TRHC ₆₋₁₀	<0.02	0.02
TRHC ₆₋₁₀ minus BTEX (F1)	<0.02	0.02
TRHC>10-16	<0.05	0.05
TRH C>10-16 minus Naphthalene (F2)	<0.05	0.05
TRHC>16-34	<0.1	0.1
TRHC>34-40	<0.1	0.1
Laboratory Control Sample	Recovery (%)	Limits (%)
Benzene	77	70 - 140
Toluene	92	70 - 140
Ethylbenzene	82	70 - 140
Xylenes (Total)	92	70 - 140
Naphthalene	91	70 - 140
TRHC ₆₋₁₀	90	70 - 140
TRHC>10-16	118	70 - 140
TRHC>16-34	139	70 - 140
TRHC>34-40	130	70 - 140
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### **TPH in Water**

Holding Time Criteria	Date	
Extracted	8/09/2021	
Analysed	9/09/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
TRHC ₆₋₉	<0.02	0.02
TRHC ₁₀₋₁₄	<0.02	0.02
TRHC ₁₅₋₂₈	<0.04	0.04
TRH C ₂₉₋₃₆	<0.04	0.04
TRHC>36	<0.04	0.04
Matrix Spike (21-16305-6)	Recovery (%)	Limits (%)
TRHC ₁₅₋₂₈	100	60 - 120

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### **Low Level Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	13/09/2021	
Duplicate Analysis (21-16360-10)	RPD (%)	Limits (%)
Cadmium - Dissolved	0	200
Cobalt - Dissolved	0	200
Copper - Dissolved	0	200
Lead - Dissolved	0	200
Nickel - Dissolved	0	200
Zinc - Dissolved	15	200
Chromium - Dissolved	0	200
Molybdenum - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Cadmium - Dissolved	<0.0001	0.0001
Cobalt - Dissolved	<0.001	0.001
Copper - Dissolved	<0.001	0.001
Lead - Dissolved	<0.001	0.001
Nickel - Dissolved	<0.001	0.001
Silver - Dissolved	<0.001	0.001
Zinc - Dissolved	<0.005	0.005
Aluminium - Dissolved	<0.01	0.01
Chromium - Dissolved	<0.001	0.001
Molybdenum - Dissolved	<0.001	0.001
Matrix Spike (21-16360-10)	Recovery (%)	Limits (%)
Cadmium - Dissolved	95	80 - 120
Zinc - Dissolved	100	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Cadmium - Dissolved	104	80 - 120
Cobalt - Dissolved	103	80 - 120
Copper - Dissolved	107	80 - 120
Lead - Dissolved	107	80 - 120
Nickel - Dissolved	101	80 - 120
Silver - Dissolved	106	80 - 120
Zinc - Dissolved	98	80 - 120
Aluminium - Dissolved	101	80 - 120
Chromium - Dissolved	101	80 - 120
Molybdenum - Dissolved	102	80 - 120

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#### **Dissolved Metals in Water**

Holding Time Criteria	Date	
Analysed	13/09/2021	
Duplicate Analysis (21-16360-10)	RPD (%)	Limits (%)
Antimony - Dissolved	0	200
Manganese - Dissolved	0	200
Barium - Dissolved	0	200
Boron - Dissolved	0	50
Tin - Dissolved	0	200
Arsenic - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Antimony - Dissolved	<0.001	0.001
Manganese - Dissolved	<0.01	0.01
Thallium - Dissolved	<0.01	0.01
Vanadium - Dissolved	<0.01	0.01
Barium - Dissolved	<0.01	0.01
Bismuth - Dissolved	<0.001	0.001
Boron - Dissolved	<0.05	0.05
Iron - Dissolved	<0.01	0.01
Lithium - Dissolved	<0.01	0.01
Strontium - Dissolved	<0.01	0.01
Tin - Dissolved	<0.01	0.01
Titanium - Dissolved	<0.01	0.01
Arsenic - Dissolved	<0.001	0.001
Beryllium - Dissolved	<0.01	0.01
Selenium - Dissolved	<0.001	0.001
Thorium - Dissolved	<0.001	0.001
Uranium - Dissolved	<0.001	0.001
Sodium - Dissolved	<0.1	0.1
Potassium - Dissolved	<0.1	0.1
Calcium - Dissolved	<0.1	0.1
Magnesium - Dissolved	<0.1	0.1
Matrix Spike (21-16360-10)	Recovery (%)	Limits (%)
Manganese - Dissolved	100	80 - 120
Boron - Dissolved	102	80 - 120
Tin - Dissolved	117	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Antimony - Dissolved	108	80 - 120
Manganese - Dissolved	102	80 - 120
Thallium - Dissolved	106	80 - 120
Vanadium - Dissolved	104	80 - 120
Barium - Dissolved	105	80 - 120



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Certified Reference Material	Recovery (%)	Limits (%)
Boron - Dissolved	107	80 - 120
Iron - Dissolved	96	80 - 120
Strontium - Dissolved	101	80 - 120
Arsenic - Dissolved	99	80 - 120
Beryllium - Dissolved	101	80 - 120
Selenium - Dissolved	98	80 - 120
Sodium - Dissolved	97	90 - 110
Potassium - Dissolved	90	90 - 110
Calcium - Dissolved	102	90 - 110
Magnesium - Dissolved	107	90 - 110
Tin - Dissolved	105	80 - 120
Titanium - Dissolved	107	80 - 120

### **Mercury in Water**

Holding Time Criteria	Date	
Extracted	10/09/2021	
Analysed	10/09/2021	
Duplicate Analysis (21-16305-1)	RPD (%)	Limits (%)
Mercury - Dissolved	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Mercury - Dissolved	<0.0001	0.0001
Matrix Spike (21-16305-1)	Recovery (%)	Limits (%)
Mercury - Dissolved	97	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Mercury - Dissolved	96	80 - 120

### **Total Nitrogen in Water**

Holding Time Criteria	Date	
Extracted	8/09/2021	
Analysed	9/09/2021	
Duplicate Analysis (21-16360-3)	RPD (%)	Limits (%)
Total Nitrogen	13	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Nitrogen	<0.2	0.2
Matrix Spike (21-16360-3)	Recovery (%)	Limits (%)
Total Nitrogen	97	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Total Nitrogen	93	80 - 120
Total Nitrogen	95	80 - 120

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### **Total Phosphorus in Water**

Holding Time Criteria	Date	
Extracted	8/09/2021	
Analysed	9/09/2021	
Duplicate Analysis (21-16319-3)	RPD (%)	Limits (%)
Total Phosphorus	0	25
Duplicate Analysis (21-16360-6)	RPD (%)	Limits (%)
Total Phosphorus	2	25
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Blank Analysis	Result (mg/L)	Limit (mg/L)
Total Phosphorus	<0.01	0.01
Certified Reference Material	Recovery (%)	Limits (%)
Total Phosphorus	83	80 - 120
Total Phosphorus	105	80 - 120

### Fluoride by ISE

Holding Time Criteria	Date	
Analysed	14/09/2021	
Duplicate Analysis (21-16305-6)	RPD (%)	Limits (%)
Fluoride	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Fluoride	<0.4	0.4
Certified Reference Material	Recovery (%)	Limits (%)
Fluoride	81	80 - 120

### **Bromide in Water**

Holding Time Criteria	Date	
Analysed	9/09/2021	
Blank Analysis	Result (mg/L)	Limit (mg/L)
Bromide	<0.1	0.1
Certified Reference Material	Recovery (%)	Limits (%)
Bromide	95	80 - 120

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#### **Ions in Water**

Holding Time Criteria	Date			
Analysed	7/09/2021			
Duplicate Analysis (21-16305-6)	RPD (%)	Limits (%)		
Chloride	0	25		
Sulfate	0	25		
Reactive Silica	0	200		
NOx-N	0	200		
Duplicate Analysis (21-16318-1)	RPD (%)	Limits (%)		
Chloride	3	50		
Sulfate	0	50		
Nitrite-N	0	200		
Blank Analysis	Result (mg/L)	Limit (mg/L)		
Chloride	<5	5		
Sulfate	<1	1		
Reactive Silica	<0.1	0.1		
NOx-N	<0.01	0.01		
Nitrite-N	<0.01	0.01		
Matrix Spike (21-16305-6)	Recovery (%)	Limits (%)		
Chloride	113	80 - 120		
Sulfate	107	80 - 120		
Reactive Silica	101	80 - 120 80 - 120		
NOx-N	86			
Matrix Spike (21-16318-1)	Recovery (%)	Limits (%)		
Chloride	120	80 - 120		
Sulfate	104	80 - 120		
Nitrite-N	111	80 - 120		
Certified Reference Material	Recovery (%)	Limits (%)		
NOx-N	95	80 - 120		
Chloride	109	80 - 120		
Sulfate	107	80 - 120		
Sulfate	106	80 - 120		
Reactive Silica	88	80 - 120		
Nitrite-N	107	80 - 120		
Duplicate Analysis (21-16305-6)	RPD (%)	Limits (%)		
Chromium (VI)	0	200		
Blank Analysis	Result (mg/L)	Limit (mg/L)		
Chromium (VI)	<0.002	0.002		
Matrix Spike (21-16305-6)	Recovery (%)	Limits (%)		
Chromium (VI)	89	80 - 120		
Certified Reference Material	Recovery (%)	Limits (%)		
Chromium (VI)	105	80 - 120		

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### Ammonia in Water

Holding Time Criteria	Date	
Analysed	6/09/2021	
Duplicate Analysis (21-16180-1)	RPD (%)	Limits (%)
Ammonia-N	40	200
Duplicate Analysis (21-16191-14)	RPD (%)	Limits (%)
Ammonia-N	0	200
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Blank Analysis	Result (mg/L)	Limit (mg/L)
Ammonia-N	<0.02	0.02
Matrix Spike (21-16180-1)	Recovery (%)	Limits (%)
Ammonia-N	117	80 - 120
Matrix Spike (21-16191-14)	Recovery (%)	Limits (%)
Ammonia-N	111	80 - 120
Certified Reference Material	Recovery (%)	Limits (%)
Ammonia-N	99	80 - 120
Ammonia-N	99	80 - 120

#### TDS and TSS in water

Date	
6/09/2021	
RPD (%)	Limits (%)
0	200
Result (mg/L)	Limit (mg/L)
<5	5
Recovery (%)	Limits (%)
90	80 - 120
	6/09/2021  RPD (%)  0  Result (mg/L)  <5  Recovery (%)

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### **Alkalinity and Acidity in Water**

Holding Time Criteria	Date	]
Analysed	6/09/2021	
Duplicate Analysis (21-16305-5)	RPD (%)	Limits (%)
Alkalinity	9	25
Bicarbonate	9	25
Carbonate	0	200
Hydroxide	0	200
Blank Analysis	Result (mg	Limit (mg
	CaCO ₃ /L)	CaCO ₃ /L)
Alkalinity	<5	5
Bicarbonate	<5	5
Carbonate	<5	5
Hydroxide	<5	5
Certified Reference Material	Recovery (%)	Limits (%)
Alkalinity	102	80 - 120
Bicarbonate	102	80 - 120
Carbonate	102	80 - 120
Hydroxide	102	80 - 120

### **Density/Specific Gravity**

Holding Time Criteria	Date	
Extracted	7/09/2021	
Analysed	7/09/2021	
Duplicate Analysis (21-16305-1)	RPD (%)	Limits (%)
Blank Analysis	Result (g/mL)	Limit (g/mL)
Density*	<0.01	0.01



# Appendix C. Field QA/QC Results



Table 15 Relative Percentage Difference (RPD) for Metals in duplicate water samples

	Units	Copper - Dissolved	Nickel - Dissolved	Zinc - Dissolved	Bismuth - Dissolved	Boron - Dissolved	Iron - Dissolved	Lithium - Dissolved	Strontium - Dissolved	Tin - Dissolved
						mg/L				
	LoR	0.001	0.001	0.005	0.01	0.05	0.01	0.01	0.01	0.01
15/07/2020	UNSO5-B	0.002	0.001	0.0025	0.005	5.4	0.005	0.1	7.6	0.005
	DUP	0.003	0.0005	0.0025	0.005	5.2	0.01	0.09	7.4	0.005
	RPD (%)	40%	67%	0%	0%	4%	67%	11%	3%	0%
23/08/2020	UNSO5-B	0.0005	0.0005	0.0025	0.005	3.4	0.02	0.19	7.3	0.005
	DUP	0.00	0.00	0.0025	0.005	3.3	0.01	0.19	7.2	0.005
	RPD (%)	0%	0%	0%	0%	3%	67%	0%	1%	0%
28/09/2020	UNSO5-B	0.001	0.0005	0.0025	0.005	5.5	0.005	0.38	9.7	0.005
	DUP	0.001	0.0005	0.0025	0.005	5.5	0.005	0.37	9.7	0.005
	RPD (%)	0%	0%	0%	0%	0%	0%	3%	0%	0%
8/11/2020	UNSO5-B	0.0005	0.0005	0.0025	0.005	5.1	0.005	0.07	8.3	0.005
	DUP	0.0005	0.0005	0.0025	0.005	5	0.005	0.06	8.2	0.005
	RPD (%)	0%	0%	0%	0%	2%	0%	15%	1%	0%
15/12/2020	UNS05-A	0.001	0.002	0.0025	0.47	5.5	0.005	0.06	8.8	0.005
	DUP	0.0005	0.0005	0.0025	0.24	5.5	0.005	0.06	9	0.005
	RPD (%)	67%	120%	0%	65%	0%	0%	0%	2%	0%
15/01/2021	UNS05-A	0.0005	0.0005	0.0025	0.005	5.9	0.005	0.05	7	0.005
	DUP	0.0005	0.0005	0.0025	0.005	5.9	0.005	0.05	7	0.005
	RPD (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%

	RPD (%)	0%	0%	82%	0%	0%	0%	11%	0%	0%
	UNSO5-B	0.0005	0.0005	0.006	0.005	5.7	0.005	0.17	9.3	0.005
3/09/2021	UNSO5-A	0.0005	0.0005	0.0025	0.005	5.7	0.005	0.19	9.3	0.005
	RPD (%)	0%	67%	0%	0%	2%	0%	0%	2%	0%
	DUP	0.0005	0.0005	0.0025	0.005	5.2	0.005	0.12	8.1	0.005
22/06/2021	UNSO5-B	0.0005	0.001	0.0025	0.005	5.1	0.005	0.12	7.9	0.005
	RPD (%)	120%	0%	82%	0%	56%	0%	69%	56%	0%
	DUP	0.0005	0.0005	0.0025	0.005	3.1	0.005	0.17	5.2	0.005
11/06/2021	UNSO5-B	0.002	0.0005	0.006	0.005	5.5	0.005	0.35	9.2	0.005
	RPD (%)	0%	0%	0%	0%	2%	0%	5%	1%	67%
	DUP	0.002	0.0005	0.0025	0.005	5.6	0.005	0.22	8.5	0.02
11/05/2021	UNSO5-B	0.002	0.0005	0.0025	0.005	5.7	0.005	0.21	8.6	0.01
	RPD (%)	0%	0%	0%	0%	3%	0%	0%	2%	0%
	DUP	0.0005	0.0005	0.0025	0.005	3.7	0.005	0.05	5.5	0.005
24/03/2021	UNSO5-A	0.0005	0.0005	0.0025	0.005	3.6	0.005	0.05	5.4	0.005
	RPD (%)	0%	0%	0%	0%	4%	67%	0%	1%	0%
	DUP	0.0005	0.0005	0.0025	0.005	4.6	0.01	0.05	7.1	0.005
25/02/2021	UNSO5-A	0.0005	0.0005	0.0025	0.005	4.8	0.02	0.05	7.2	0.005

Dates	Units	Arsenic - Dissolved	Chromium - Dissolved	Molybdenu m - Dissolved	Selenium - Dissolved	Thorium - Dissolved	Uranium - Dissolved	Sodium - Dissolved	Potassium - Dissolved	Calcium - Dissolved	Magnesium - Dissolved
						ı	mg/L				
	LoR	0.001	0.001	0.001	0.001	0.001	0.001	0.1	0.1	0.1	0.1
15/07/2020	UNSO5-B	0.003	0.0005	0.009	0.009	0.0005	0.002	10,000	390	530	1,500
	DUP	0.003	0.0005	0.012	0.007	0.0005	0.003	10,000	390	540	1,600
	RPD (%)	0%	0%	29%	25%	0%	40%	0%	0%	2%	6%
23/08/2020	UNSO5-B	0.002	0.0005	0.011	0.0005	0.0005	0.003	12,000	590	500	1,600
	DUP	0.002	0.0005	0.012	0.0005	0.0005	0.003	12000	670	460	1700
	RPD (%)	0%	0%	9%	0%	0%	0%	0%	13%	8%	6%
28/09/2020	UNSO5-B	0.003	0.0005	0.025	0.004	0.0005	0.002	12,000	850	810	2,100
	DUP	0.003	0.0005	0.026	0.005	0.0005	0.002	12,000	840	800	2,100
	RPD (%)	0%	0%	4%	22%	0%	0%	0%	1%	1%	0%
8/11/2020	UNSO5-B	0.003	0.0005	0.026	0.0005	0.0005	0.002	11,000	350	430	1,100
	DUP	0.004	0.0005	0.026	0.0005	0.0005	0.002	11000	350	420	1000
	RPD (%)	29%	0%	0%	0%	0%	0%	0%	0%	2%	10%
15/12/2020	UNS05-A	0.004	0.0005	0.028	0.0005	0.0005	0.003	12,000	590	650	1,500
	DUP	0.004	0.0005	0.024	0.0005	0.0005	0.003	11,000	580	700	1,500
	RPD (%)	0%	0%	15%	0%	0%	0%	9%	2%	7%	0%
15/01/2021	UNS05-A	0.002	0.0005	0.014	0.0005	0.0005	0.0005	11,000	620	690	2,000
	DUP	0.002	0.0005	0.016	0.0005	0.0005	0.0005	10,000	490	680	1,600
	RPD (%)	0%	0%	13%	0%	0%	0%	10%	23%	1%	22%

	RPD (%)	0%	0%	0%	0%	0%	22%	0%	0%	2%	1%
	UNSO5-B	0.002	0.0005	0.014	0.0005	0.0005	0.004	11,000	660	410	940
3/09/2021	UNSO5-A	0.002	0.0005	0.014	0.0005	0.0005	0.005	11,000	660	420	930
	RPD (%)	40%	0%	8%	67%	0%	0%	9%	7%	0%	13%
	DUP	0.002	0.0005	0.012	0.001	0.0005	0.008	12,000	770	510	1,700
22/06/2021	UNSO5-B	0.003	0.0005	0.013	0.0005	0.0005	0.008	11,000	720	510	1,500
	RPD (%)	100%	0%	58%	0%	0%	57%	0%	50%	57%	39%
	DUP	0.001	0.0005	0.021	0.0005	0.0005	0.005	11,000	400	250	740
11/06/2021	UNSO5-B	0.003	0.0005	0.038	0.0005	0.0005	0.009	11,000	670	450	1,100
	RPD (%)	29%	0%	0%	0%	0%	0%	0%	0%	8%	0%
	DUP	0.003	0.0005	0.013	0.0005	0.0005	0.008	11,000	600	600	1,400
11/05/2021	UNSO5-B	0.004	0.0005	0.013	0.0005	0.0005	0.008	11,000	600	650	1,400
	RPD (%)	40%	0%	12%	0%	0%	0%	0%	2%	0%	0%
	DUP	0.002	0.0005	0.009	0.0005	0.0005	0.002	11,000	610	440	1,400
24/03/2021	UNSO5-A	0.003	0.0005	0.008	0.0005	0.0005	0.002	11,000	600	440	1,400
	RPD (%)	0%	67%	0%	0%	0%	0%	7%	0%	3%	0%
	DUP	0.0005	0.001	0.006	0.0005	0.0005	0.0005	14,000	560	600	1,600
25/02/2021	UNSO5-A	0.0005	0.002	0.006	0.0005	0.0005	0.0005	13,000	560	620	1,600



Table 16 Relative Percentage Difference (RPD) for Nutrients in duplicate water samples

Dates	Units	Total Kjeldahl Nitrogen	Total Phosphorus	Ammonia-N	Nitrate-N	NOx-N	Nitrite-N
		mg/L					
	LoR	0.1	0.005	0.003	0.002	0.002	0.002
15/07/2020	UNSO5-B	0.6	0.036	0.0015	0.001	0.001	0.001
	DUP	0.05	0.045	0.0015	0.001	0.001	0.001
	RPD (%)	169%	22%	0%	0%	0%	0%
23/08/2020	UNSO5-B	0.1	0.01	23,000	0.9	3,500	0.05
	DUP	0.1	0.01	23000	0.8	3600	0.2
	RPD (%)	0%	0%	0%	12%	3%	120%
28/09/2020	UNSO5-B	0.3	0.015	0.0015	0.006	0.008	0.002
•	DUP	0.6	0.013	0.0015	0.002	0.004	0.002
	RPD (%)	67%	14%	0%	100%	67%	0%
8/11/2020	UNSO5-B	0.6	0.021	0.0015	0.039	0.039	0.001
	DUP	0.7	0.014	0.0015	0.026	0.026	0.001
	RPD (%)	15%	40%	0%	40%	40%	0%
15/12/2020	UNS05-A	0.5	0.016	0.005	0.015	0.015	0.001
•	DUP	0.5	0.02	0.004	0.005	0.005	0.05
	RPD (%)	0%	22%	22%	100%	100%	192%
15/01/2021	UNS05-A	0.2	0.013	0.0015	0.002	0.002	0.001
-	DUP	0.2	0.016	0.0015	0.003	0.003	0.001
	RPD (%)	0%	21%	0%	40%	40%	0%
25/02/2021	UNSO5-A	0.05	0.013	0.0015	0.001	0.001	0.001
	DUP	0.05	0.018	0.0015	0.001	0.001	0.001
	RPD (%)	0%	32%	0%	0%	0%	0%
24/03/2021	UNSO5-A	0.5	0.011	0.0015	0.001	0.001	0.001
	DUP	0.6	0.013	0.019	0.001	0.001	0.001
	RPD (%)	18%	17%	171%	0%	0%	0%
11/05/2021	UNSO5-B	0.5	0.01	0.014	0.001	0.001	0.001
	DUP	0.05	0.01	0.02	0.001	0.002	0.002
	RPD (%)	164%	0%	35%	0%	67%	67%
11/06/2021	UNSO5-B	0.05	0.0025	0.011	0.003	0.003	0.001
	DUP	0.05	0.0025	0.0015	0.001	0.001	0.001

	RPD (%)	0%	0%	152%	100%	100%	0%
22/06/2021	UNSO5-B	0.05	0.005	0.048	0.001	0.006	0.006
	DUP	0.05	0.005	0.014	0.002	0.008	0.006
	RPD (%)	0%	0%	110%	67%	29%	0%
3/09/2021	UNSO5-A	1.8	0.0025	0.004	0.001	0.001	0.001
	UNSO5-B	0.2	0.0025	0.007	0.001	0.001	0.001
	RPD (%)	160%	0%	55%	0%	0%	0%

Table 17 Relative Percentage Difference (RPD) for Alkalinity and Hardness in duplicate water samples

Dates	Units	Alkalinity	Bicarbonate	Hardness
	LoR	5	5	5
15/07/2020	UNSO5-B	130	130	7,500
	DUP	120	120	7,900
	RPD (%)	8%	8%	5%
23/08/2020	UNSO5-B	120	120	7,800
	DUP	120	120	8,100
	RPD (%)	0%	0%	4%
28/09/2020	UNSO5-B	110	110	11,000
	DUP	110	110	11,000
	RPD (%)	0%	0%	0%
8/11/2020	UNSO5-B	120	120	5,600
	DUP	110	110	5,200
	RPD (%)	9%	9%	7%
15/12/2020	UNS05-A	110	110	7,800
	DUP	100	100	7,900
	RPD (%)	10%	10%	1%
15/01/2021	UNS05-A	100	53	10,000
	DUP	120	120	8,300
	RPD (%)	18%	77%	19%
25/02/2021	UNSO5-A	120	120	8,100
	DUP	130	130	8,100
	RPD (%)	8%	8%	0%
24/03/2021	UNSO5-A	120	120	6,900
	DUP	120	120	6,900

	RPD (%)	0%	0%	0%
11/05/2021	UNSO5-B	140	140	7,400
	DUP	140	140	7,300
	RPD (%)	0%	0%	1%
11/06/2021	UNSO5-B	130	130	5,700
	DUP	130	130	3,700
	RPD (%)	0%	0%	43%
22/06/2021	UNSO5-B	130	130	7,500
	DUP	130	130	8,300
	RPD (%)	0%	0%	10%
3/09/2021	UNSO5-A	110	110	4,900
	UNSO5-B	110	110	4,900
	RPD (%)	0%	0%	0%