VISION ENVIRONMENT

A Trinity Consultants Company

JANUARY 2025

PORT OF ROCKHAMPTON WATER QUALITY MONITORING PROGRAM: 2024 ANNUAL REPORT

GLADSTONE PORTS CORPORATION (GPC)

GLADSTONE OFFICE
+61 7 4972 7530
Unit 3, 165 Auckland Street, Gladstone
PO BOX 1267, GLADSTONE QLD 4680

BRISBANE OFFICE
+61 7 4972 7530
Level 3, 43 Peel Street, South Brisbane
PO BOX 3901, SOUTH BRISBANE QLD 4101

NEW ZEALAND OFFICE
+64 273 053 353
35/115 Bamford Street, Woolston
CHRISTCHURCH, NEW ZEALAND, 8023

E office@visionenvironment.com.au | www.visionenvironment.com.au

REPORT CONTRIBUTORS

Role	Team member
Project Management	Felicity Melville
Fieldwork	Mark Jensen, James Hayman, Melanie Alpen, Carys Hanning, Grace Nord, Anna Skillington, Michael Baird
Reporting & Review	Felicity Melville, Anna Skillington

CITATION

This report should be cited as:

Vision Environment (2025). *Port of Rockhampton Water Quality Monitoring Program: 2024 Annual Report.* Vision Environment ANZ, A Trinity Consultants Australia Company, Gladstone, Australia.

DOCUMENT CONTROL

Document draft	***Originated by***	***Edit and review***	***Date***
Draft issued to Client	AS	FM	29/01/2025
Final issued to client	GPC	AS	31/01/2025

DISCLAIMER

FILE REFERENCE

31012025 FINAL GPC PoR Water Monitoring Annual Report 2024 _VE

EXECUTIVE SUMMARY

Vision Environment ANZ has undertaken ambient water quality monitoring at the Port of Rockhampton (PoR) since 2014, in order to establish a valid ambient dataset for comparison during future maintenance dredging campaigns at this port. Sampling is undertaken concurrently with the Port Curtis Integrated Monitoring Program (PCIMP) surveys in Gladstone harbour, in order to provide easy comparisons of data across the different monitoring programs.

During 2024, monitoring of water physicochemical parameters, nutrients, chlorophyll *a* and metal(loid) concentrations was undertaken in March, June, August and November at three sites. Water quality results were compared to Water Quality Objectives (WQO) for the Fitzroy and Curtis Island Basin, as well as results gained from adjacent and reference PCIMP zones.

Sub-surface physicochemical parameters were similar across the PoR sites within each survey but often varied across the surveys due to metocean influences such as ambient temperature and rainfall. Water pH remained within recommended WQO ranges throughout the year, while sub-surface turbidity and total suspended solid (TSS) concentrations often exceeded the 80th percentile WQO. Lowest turbidity and TSS were recorded during the June survey. Dissolved oxygen concentrations also exceeded the 80th WQO during most surveys, indicating well-oxygenated waters.

Total nutrients and metal(loid) concentrations somewhat paralleled turbidity and TSS results, with lowest concentrations evident during the June survey. Exceedances of recommended WQO for nutrient concentrations regularly occurred. However, no metal(loid) concentrations exceeded the 95% species protection AWQG.

In comparison with adjacent and reference PCIMP zones, the PoR exhibited significantly higher turbidity, TSS, total nutrients and metal(loid)s concentrations. Dissolved nutrient and metal(loid) forms were found to be reasonable similar across PoR and the PCIMP sites.

Higher total nutrients and metal(loid)s at PoR in comparison with Port Curtis has been recorded during multiple years of monitoring. It is likely that the higher concentration of suspended particles within the water at PoR in comparison with Port Curtis is resulting in the elevated total nutrients and metal(loid)s.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ALS	Australian Laboratory Services
ANOVA	Analysis of Variance
APHA	American Public Health Association
AWQG	Australian Water Quality Guidelines
BOM	Bureau of Meteorology
DEHP	Department of Environment and Heritage Protection (now DES)
DES	Department of Environment and Science
DOC	Dissolved Organic Carbon
DSITIA	Department of Science, Information Technology, Innovation and the Arts, Queensland
FB	Field Blank
FRP	Filterable Reactive Phosphorus
GPC	Gladstone Ports Corporation Ltd
LOR	Limit of Reporting
LSD	Least Significant Difference
LMDMP	Long-Term Maintenance Dredging Management Plan
NMI	National Measurement Institute
NW	Narrows
PCIMP	Port Curtis Integrated Monitoring Program
PoG	Port of Gladstone
PoR	Port of Rockhampton
RB	Rodds Bay
RCI	Reference Colosseum Inlet
QA/QC	Quality Assurance/Quality Control
QWQG	Queensland Water Quality Guidelines
SE	Standard error
TOC	Total Organic Carbon
TSS	Total Suspended Solids
VE	Vision Environment ANZ
WB	Western Basin
WQG	Water Quality Guidelines
WQO	Water Quality Objectives

1 INTRODUCTION

The Port of Rockhampton (PoR) is situated in the Fitzroy River delta area, and is managed by Gladstone Ports Corporation Ltd (GPC). Maintenance dredging at PoR is guided by the Long-Term Maintenance Dredging Management Plan (LMDMP) for the PoR (GPCL 2023), which has the objective to provide a long term sustainable approach to maintenance dredging. While dredging is predicted to occur every five years or longer, the most recent maintenance dredge program at this port occurred in 2011.

Ambient water quality monitoring at PoR sites (Figure 1) has been undertaken since 2014 (Vision Environment 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024), and is used to establish a valid ambient dataset for comparison during future dredging campaigns. Quarterly water quality monitoring at PoR coincides with the Port Curtis Integrated Monitoring Program (PCIMP) monitoring (Figure 2), with methodologies aligning to provide easy comparisons of both current and historical data.

This annual report provides an overview of the water quality data collected during 2024, in addition to a comparison of results collected from adjacent and reference PCIMP zones (Figure 3).

2 METHODOLOGY

2.1 Monitoring Sites

Monitoring was undertaken by VE personnel, who are qualified and experienced in water quality monitoring. Works were undertaken using sampling procedures which have been derived from standard protocols published by worldwide authorities, including:

- Australian and New Zealand Standards for water quality sampling (AS/NZS 1998a, b, c)
- The American Public Health Association Standard Methods for the Examination of Water and Wastewater (APHA 2017)
- Australian and New Zealand Water Quality Guidelines (AWQG) (ANZG 2018, 2021)
- Queensland Water Quality Guidelines (DERM 2009)
- Department of Environment and Science Monitoring and Sampling Manual (DES 2018).

The sampling methodology is summarised below:

Activity	Description
Monitoring Sites	Monitoring was undertaken at three sites (PoR1, PoR2 and PoR3), located in a shallow (~ 4 to 10 m depth) mangrove dominated estuary, which is highly influenced by large tidal flows (~ 0.4 m/s). PCIMP zones adjacent to and/or similar in ambient conditions to PoR (Figure 2 and 3) included: • Narrows (six sites: NW10 to NW60) • Western Basin (six sites: WB10 to WB60). PCIMP Reference zones for comparison included • Colosseum Inlet (four sites: RCI10 to RCI40) • Rodds Bay (three sites: RB10 to RB30).
Monitoring Frequency	REMP surveys were undertaken on four occasions aligning with PCIMP monitoring in March, June, August and November 2024.

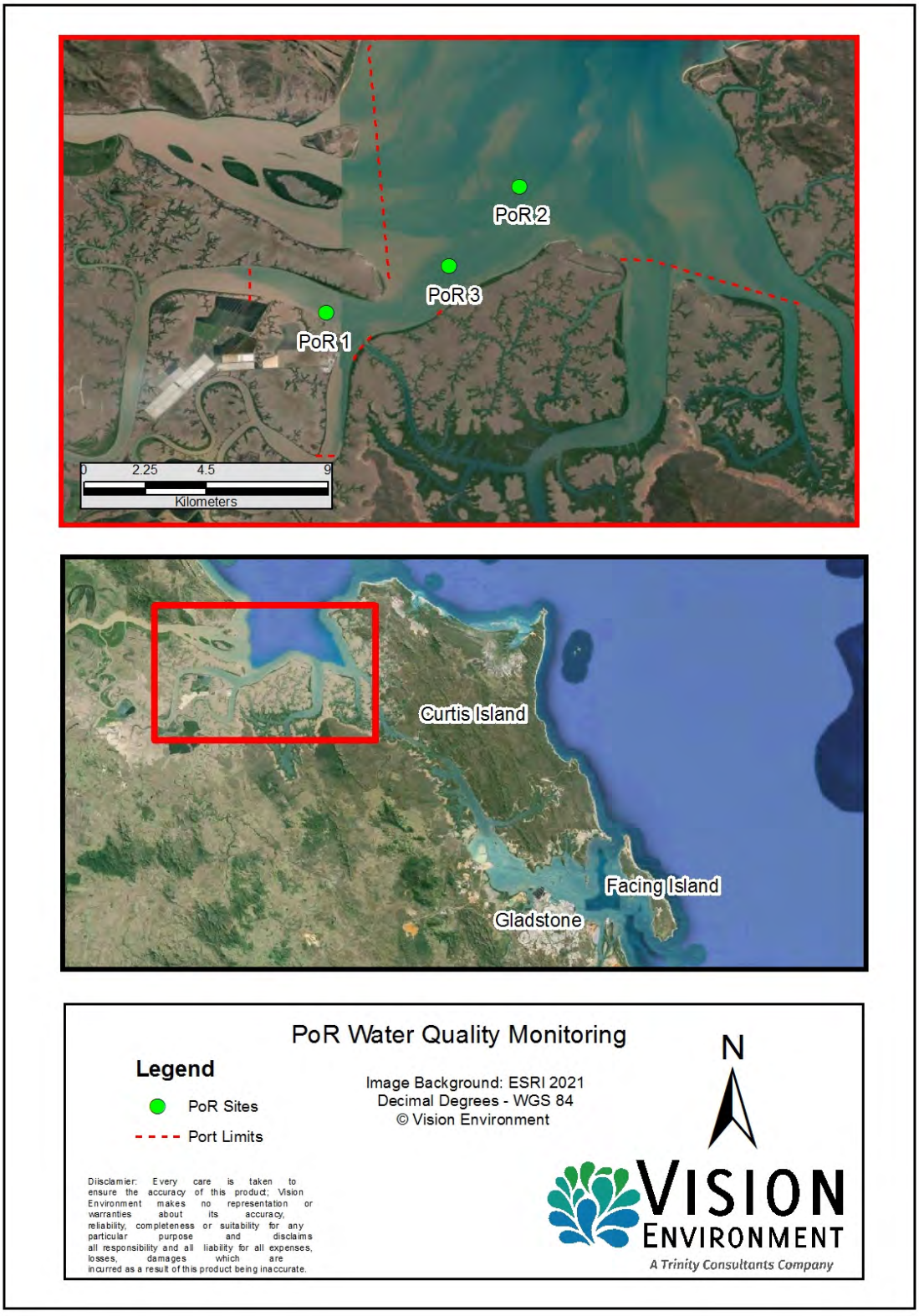


Figure 1 Location of the three monitoring sites for GPC PoR Water Quality monitoring.

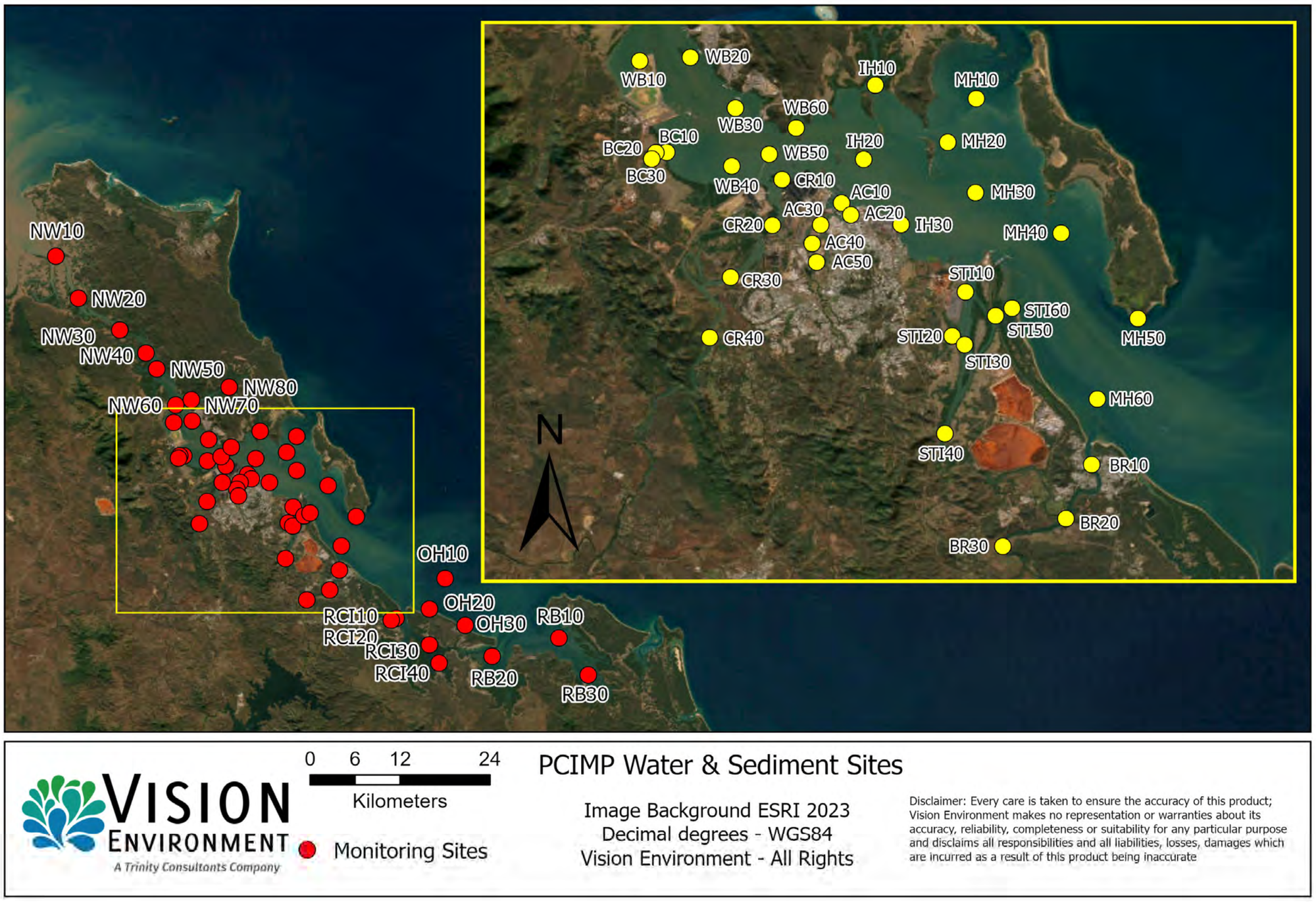


Figure 2 Location of PCIMP water quality monitoring sites in 2024.

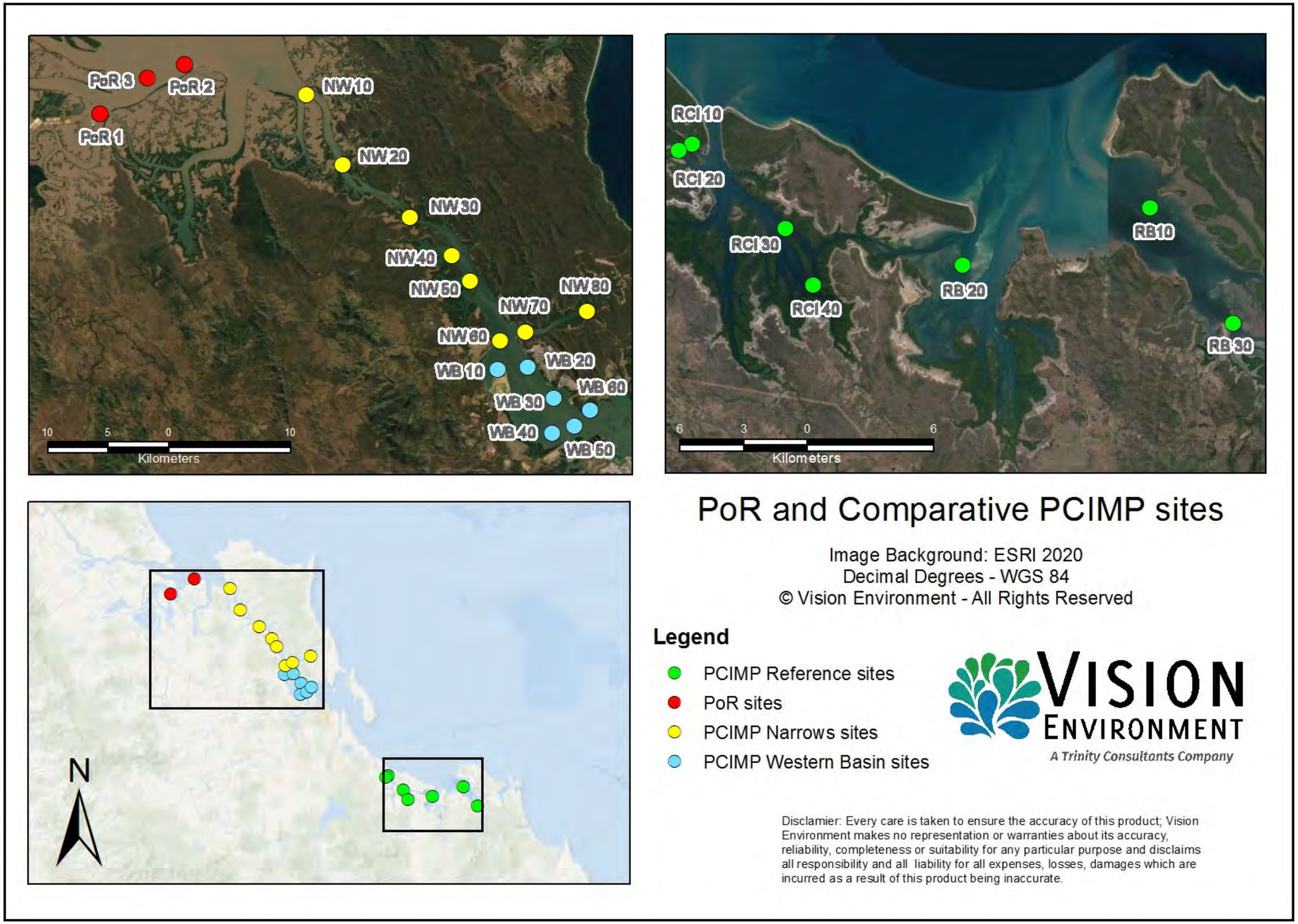


Figure 3 Location of PoR sites in comparison with sites in adjacent PCIMP zones (Narrows and Western Basin) and PCIMP reference sites (Colosseum Inlet and Rodds Bay).

Activity	Description
***In-situ* Measurements**	Measurements of physicochemical parameters (temperature, electrical conductivity, pH, turbidity and dissolved oxygen) were undertaken *in situ* using a calibrated YSI ProDSS multiparameter water quality meter. Measurements were undertaken at approximately 0.5 to 1.0 m depth intervals at each site. Concurrent light measurements using a LI-COR LI192 Underwater Quantum sensor to calculate the vertical light attenuation coefficient (Kd) were also undertaken.
Sample Collection	Water samples were collected at the sub-surface (0.5 m depth) using pre-acid washed Nalgene bottles (triple rinsed in Milli-Q and site water) in a Perspex pole sampler. Powder free gloves were worn to avoid contamination. Samples not requiring filtration were decanted directly into the laboratory provided sample bottles. Samples that required filtration were filtered *in situ* through a 0.45 µm sterile cellulose acetate membrane syringe filter into their respective laboratory provided sample bottles. Each syringe was pre-rinsed in site water and filters were pre-packaged from the supplier. To extend chlorophyll *a* holding time, samples were filtered within 24 h of collection and filters were stored frozen. Sample bottles were stored cool prior to being sent for analysis at the NATA accredited National Measurement Institute (NMI), Australian Laboratory Services (ALS) and Queensland Health (QH) within recommended holding periods and using appropriate Chain of Custody procedures.
Sample Analysis	The following analyses were undertaken during each survey: • Total Suspended Solids (TSS) • Total nutrients (nitrogen and phosphorus) • Dissolved nutrients (ammonia, nitrogen oxides [NOx], and filterable reactive phosphorus [FRP]) • Chlorophyll *a* • Dissolved and total metal(loid)s (aluminium, arsenic, cadmium, chromium, cobalt, copper, gallium, iron, lead, manganese, mercury, molybdenum, nickel, silver, tin, vanadium and zinc • Total organic carbon (TOC) and dissolved organic carbon (DOC) Laboratory reports are attached to the end of this report.
Quality Assurance (QA)	A field replicate was collected at one site during each survey, with a Field Blank (FB) for testing potential contamination from field procedures and/or sample bottles also collected. Laboratory QA measures include: • Laboratory duplicates • Method Blanks • Laboratory Control samples • Matrix Spike samples Results of the QA/QC program are presented in the Appendix.
Data Analysis	Site and survey means and standard errors were tabulated and plotted. Two-way analyses of variance (ANOVA) and post-hoc tests were undertaken to determine whether there were any significant statistical differences in parameters between zones (including PCIMP zones) or across the 2024 surveys.

Activity	Description
Water Quality Objectives (WQO)	Results were compared to local WQO for the Fitzroy Basin (PoR1) and Curtis Island Basin coastal waters (PoR2 and PoR3), and the appropriate zones for the PCIMP sites (EHP 2013, 2014). Of note, PCIMP zones Narrows, Colosseum Inlet and Rodds Bay have been classified as slightly disturbed while PoR and Western Basin sites are located in areas considered moderately disturbed. As such, the 95% species protection Australian WQG trigger value was applicable to the PoR and Western Basin sites, while the 99% AWQG was applicable at the other sites (ANZG 2018, 2021)

3 RESULTS & DISCUSSION

3.1 Metocean Conditions

Table 1 outlines the climatic conditions experienced immediately prior to, and during, each water quality survey at the PoR sites, with 2024 rainfall, wind, Fitzroy and Calliope River flow and lunar phases patterns illustrated in Figure 4.

Table 1 Summary of ambient conditions during water sampling undertaken in 2024.
Rainfall includes amount recorded during the sampling day and one week prior at each site. Wind refers to the maximum wind gusts recorded during the sample day as recorded at the Rockhampton Aero Station 039083 (BOM 2025). Fitzroy (130005A) and Calliope flow (132001A) refers to the flow rate recorded on the day of PoR sampling (DNRM 2025a, b).

2024 Survey dates	Rainfall (mm)	Wind & direction (km/h)	Fitzroy flow (m^3/s)	Calliope flow (m^3/s)	Tides
25 Mar	6	30 ESE	19	<0.01	Spring tide, full moon on 25 March. Tidal range = 4.03 m
12 Jun	0	35 SW	0.5	<0.01	Neap tide, 2 days before first quarter moon on 14 June. Tidal range = 2.67 m
20 Aug	87	28 NE	69	1.4	Spring tide with full moon on 20 August. Tidal range = 5.22 m
1 Nov	1	35 NNE	<0.1	0.03	Spring tide, new moon on 1 November. Tidal range = 4.05 m

During 2024, approximately 740 mm of rainfall was recorded at Rockhampton Airport BOM station (039083), slightly lower than the average annual rainfall of 799 mm recorded from 1939 to 2024 (BOM 2025). Rainfall was lower during the Dry Season months (May to October: 284 mm) than during the Wet Season months (January to April, November to December: 456 mm). The highest monthly rainfall was recorded during August (166 mm) and April (158 mm), with lowest rainfall in September (5 mm) and July (8 mm).

High flows (> 75.9 m^3/s as per DSITI (2017)) from the Fitzroy River were recorded during January, February, March, April and August with maximum flow of 814 m^3/s recorded on 6 February (DNRM 2025b). Baseflow WQO were applicable to all PoR sampling surveys.

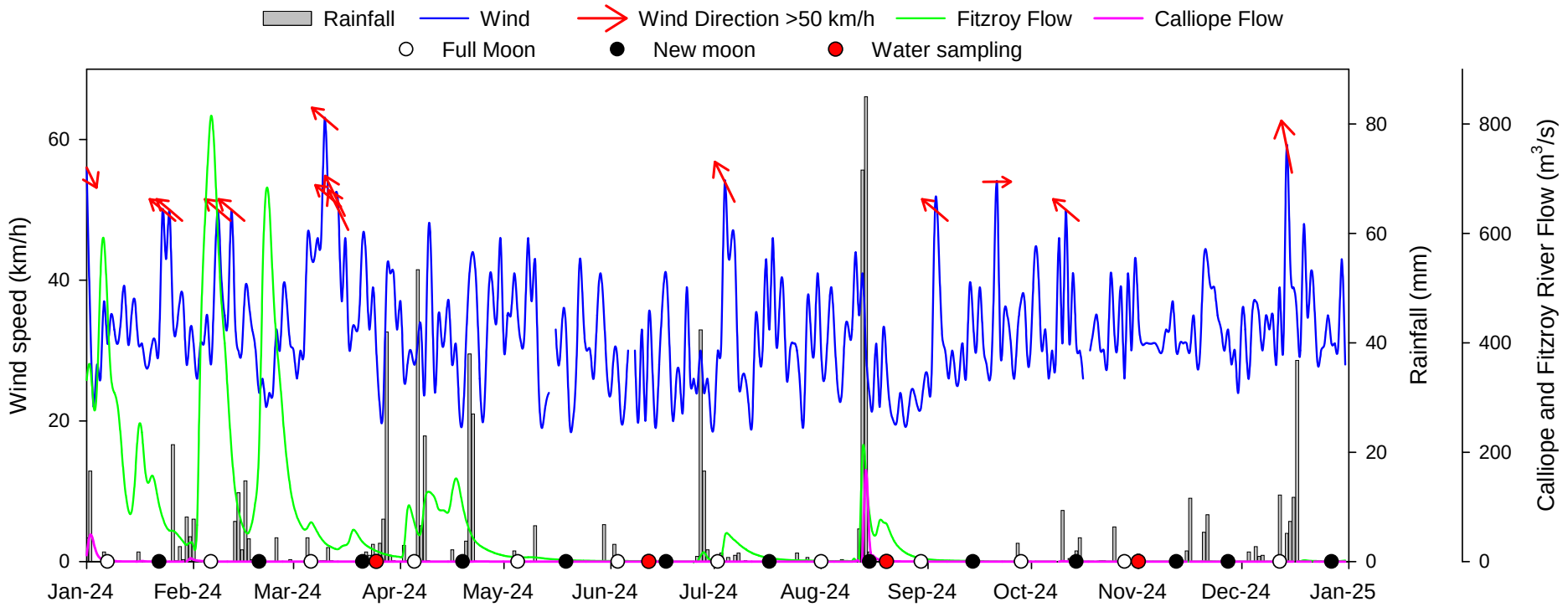


Figure 4 Rockhampton rainfall, wind, Fitzroy River flow (station 130005A), Calliope River flow (station132001A) and lunar phases during 2024 in relation to sampling events. *Note that the wind direction is pointing in the direction that the wind is blowing towards.*

Flows from the Calliope River increased after rainfall periods during 2024 (DNRM 2025a) but remained at Baseflow conditions (< 100 m^3/s) during the entirety of 2024, apart from 14 August (168 m^3/s) during the August rainfall event. As the flows were between 100 and 500 m^3/s on this date, event flow WQO were applicable for nutrients and chlorophyll *a* concentrations in the Narrows for a two week period (EHP 2014), which included the August water quality survey. However, EHP (2014) do not provide numeric values for event flow nutrient and chlorophyll a WQO.

As typically found, winds at Rockhampton during 2024 were primarily blowing from a south-easterly direction (Figure 5). Approximately 4% of maximum wind gusts were > 50 km/h (BOM 2025).

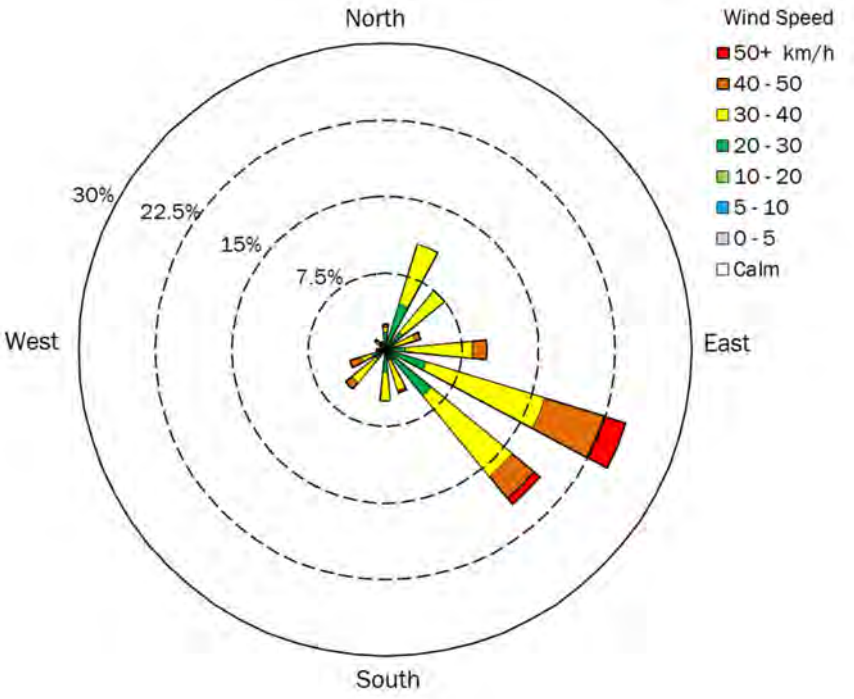


Figure 5 Windrose of daily maximum wind gusts at Rockhampton Airport Station during 2024.
Data sources from BOM. Note that the windrose displays the proportion of wind speeds (varying colours) blowing from various directions.

PoR water quality sampling surveys were generally undertaken during, or immediately post, spring tides, except for June which occurred during neap tides. Sampling was conducted at high tide during all surveys with highest tidal range during the surveys ranging from 2.67 m in June to 5.22 m in August (Table 1).

3.2 Physicochemical Parameters

3.2.1 PoR

Sub-surface (0.5 m depth) means for each physicochemical parameter at PoR sites across the four surveys are exhibited in Table 2, while physicochemical depth-profiles can be found in the Appendix (Figure A1). The results, in addition to concurrent PCIMP results at adjacent (Narrows and Western Basin) and Reference (Colosseum Inlet and Rodds Bay) zones, are presented in Figures 6 and 7, as well as Table A2 within the Appendix. Two-way ANOVA results can also be found in the Appendix (Table A5).

Table 2 Mean sub-surface physicochemical parameters at PoR sites during 2024 surveys.
*Values are means ± se (n = 3 - 6, TSS n = 1). 20th to 80th WQO percentile ranges listed for pH and DO, with two 80th percentile trigger value for turbidity listed: Wet Season (March and November) and Dry Season (June and August). Blue shading indicates values outside of the WQO recommended range (DSITI 2017). *QWQG value used for comparison for TSS (DERM 2009).*

Parameter	March 2024			June 2024			August 2024			November 2024			20th to 80th WQO
	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	
Temperature (°C)	26.2 ± 0.0	26.3 ± 0.0	26.2 ± 0.0	19.3 ± 0.0	19.5 ± 0.0	19.5 ± 0.0	20.9 ± 0.0	20.7 ± 0.0	20.8 ± 0.1	26.3 ± 0.0	26.3 ± 0.0	26.3 ± 0.0	-
Conductivity (mS/cm)	52.5 ± 0.0	53.9 ± 0.0	53.6 ± 0.0	52.1 ± 0.0	52.4 ± 0.0	52.1 ± 0.0	47.8 ± 0.0	50.5 ± 0.0	46.2 ± 0.5	53.8 ± 0.0	54.0 ± 0.0	54.1 ± 0.0	-
pH	8.0 ± 0.0	8.1 ± 0.0	8.1 ± 0.0	8.0 ± 0.0	8.0 ± 0.0	8.1 ± 0.0	8.0 ± 0.0	8.1 ± 0.0	8.1 ± 0.0	8.1 ± 0.0	8.1 ± 0.0	8.1 ± 0.0	7.2 - 8.3
Dissolved oxygen (% sat.)	94 ± 0	95 ± 0	96 ± 0	94 ± 0	96 ± 0	98 ± 0	95 ± 0	96 ± 0	96 ± 0	96 ± 0	96 ± 0	98 ± 0	87 - 95
Turbidity (NTU)	42 ± 1	41 ± 0	27 ± 1	18 ± 2	14 ± 0	30 ± 1	54 ± 5	67 ± 9	25 ± 3	55 ± 14	52 ± 1	19 ± 0	W = 30 D = 12
TSS (mg/L)	80	97	67	36	20	52	65	39	25	55	66	28	20*

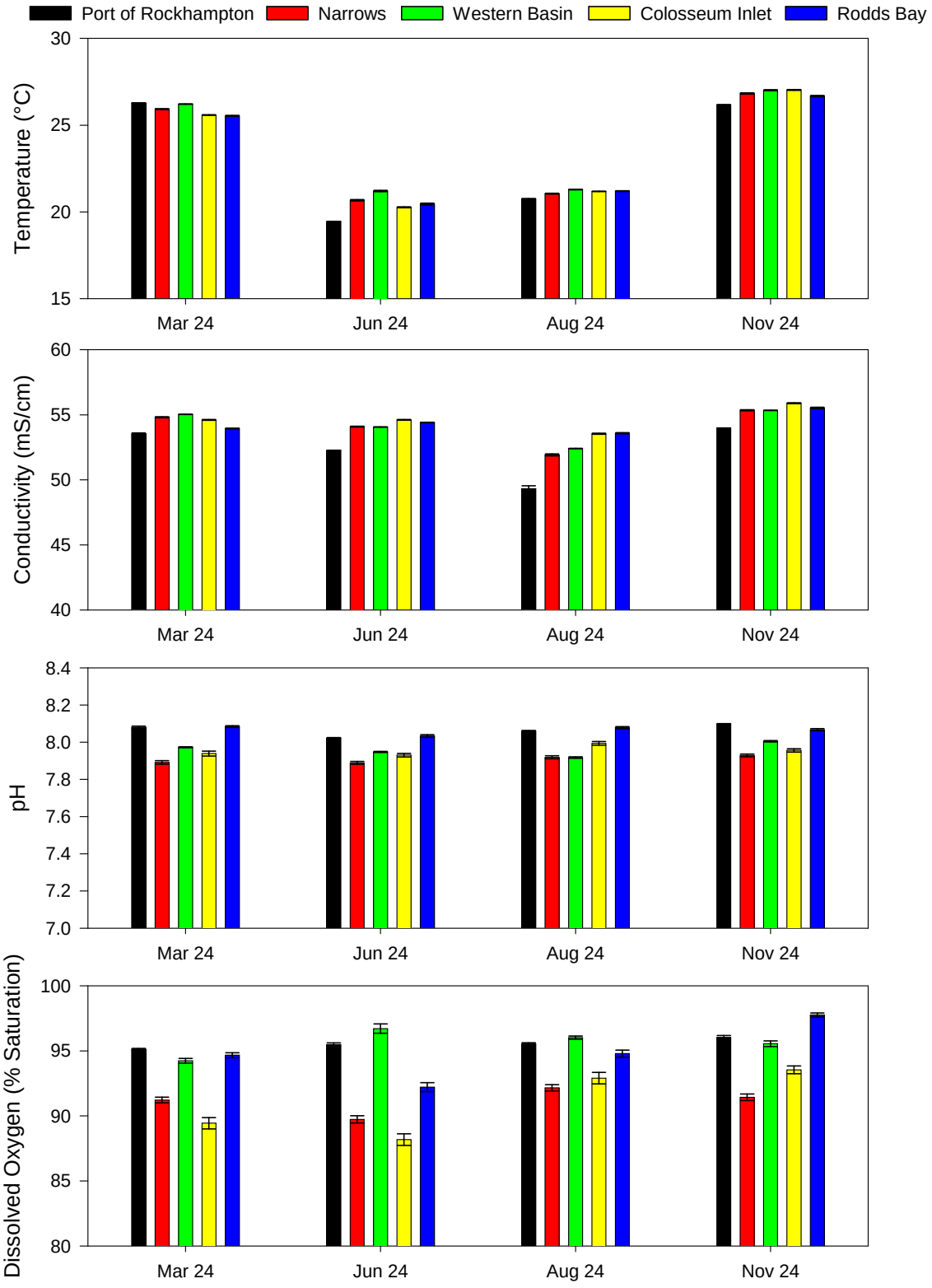


Figure 6 Temperature, conductivity, pH and dissolved oxygen at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 62 to 142).

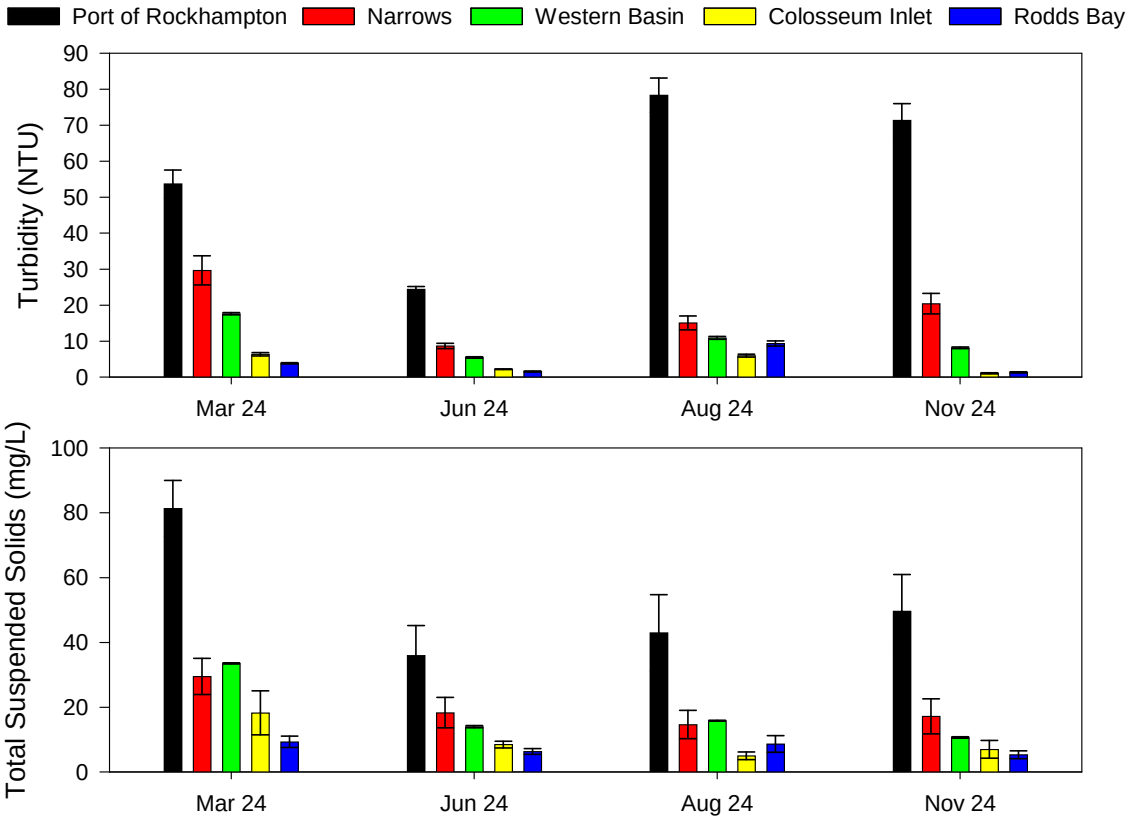


Figure 7 Turbidity and total suspended solids at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 142).

Sub-surface physicochemical parameters were similar across the PoR sites within each survey but often varied across the surveys. Typical seasonality was exhibited, with higher temperatures during the Wet Season surveys of March and November (26.3 and 26.2 °C, respectively) and lower temperatures (19.5 and 20.8 °C) during the Dry Season surveys of June and August (Table 2). Sub-surface pH remained consistent throughout the year ranging from 8.0 to 8.1 and within the recommended QWQG range of 7.2 to 8.3 (Table 2).

Conductivity was lower during August (~ 49 mS/cm) than during the other 2024 surveys (52 to 54 mS/cm), likely due to the higher rainfall recorded in the week prior to the August survey, which contributed freshwater to the water column. Dissolved oxygen ranged from ranged from 94 to 98% saturation across the surveys, with most values higher than the 80th percentile WQO of 95%, indicating well-oxygenated waters.

Sub-surface turbidity varied across the sites during each survey, with no consistent spatial pattern evident. Exceedances of the 80th percentile WQO were evident at each site during all surveys, except for PoR3 in March and November. TSS results paralleled turbidity results, ranging from 20 to 97 mg/L, with all concentrations equal to or exceeding the QWQG of 20 mg/L. Overall, turbidity and TSS were lowest during June survey, which was carried out during a neap tide period.

Within the water column, parameters generally remained consistent with depth (Figure A1 in Appendix). Dissolved oxygen occasionally decreased slightly with depth, due to reduced

photosynthetic activity in the reduced light environment of deeper waters, while turbidity often increased near the benthos due to sediment resuspension.

3.2.2 Comparison with PCIMP Results

PoR physicochemical parameters were compared to the adjacent PCIMP monitoring zones of the Narrows and Western Basin, as well as the PCIMP reference zones of Colosseum Inlet and Rodds Bay (Figures 6 and 7). Of note:

- Temperatures at PoR (annual mean of 23.1°C) was significantly ($P < 0.05$) lower than all other zones (23.4 to 24.3°C).
- Conductivity at PoR (52.4 mS/cm) was significantly ($P < 0.05$) lower than all other zones (54.1 to 54.7 mS/cm).
- The pH at PoR (8.1) was similar to Rodds Bay, both of which were significantly ($P < 0.05$) higher than the Narrows, Western Basin and Colosseum Inlet (8.0).
- Dissolved oxygen at PoR (96% saturation) was similar to Western Basin, both of which were significantly ($P < 0.05$) higher than Rodds Bay, Narrows and Colosseum Inlet (91 to 95% saturation).
- Turbidity and TSS at PoR (54 NTU and 53 mg/L) were significantly higher than all other zones (4 to 19 NTU, and 7 to 20 mg/L, respectively).

3.3 Chlorophyll *a* and Nutrients

3.3.1 PoR

Tabulated nutrient and chlorophyll *a* results for 2024 can be found in Table 3. The results, in addition to concurrent PCIMP sampling at adjacent and reference zones, are presented in Figures 8 and 9, and Table A3 within the Appendix. Two-way ANOVA results can also be found in the Appendix (Table A5).

Several nutrients (particularly total phosphorus and nitrogen) were lower during the June survey, corresponding to when turbidity and TSS were also at their lowest. This may indicate contribution of nutrients to the water column via nutrient fluxing from benthic sediment resuspension as found in other estuaries (Prastka et al. 1998, McKee et al. 2000). Exceedances of the WQO for total phosphorus and nitrogen occurred frequently.

Exceedances of WQO were also recorded for the readily bioavailable nutrient forms of FRP and NOx in each sample. In contrast, WQO exceedances for chlorophyll *a* and ammonia occurred infrequently, and only during Wet Seasons surveys. Highest concentrations of both TOC and DOC were recorded in August.

3.3.2 Comparison with PCIMP Results

Of note across the zones:

- Total phosphorus and FRP at PoR (annual means of 45 µg/L and 13 µg/L) were significantly ($P < 0.05$) higher than all other zones (8 to 18 µg/L, and <2 to 4 µg/L, respectively).
- Total nitrogen and NOx at PoR (233 µg/L and 32 µg/L) were significantly ($P < 0.05$) higher than all other zones (135 to 172 µg/L, and 2.4 to 10 µg/L, respectively).

Table 3 Chlorophyll *a* and nutrient concentrations at PoR during 2024 surveys.
N = 1. Highlighted values indicates exceedances of the 80th percentile WQO value (DSITI 2017). FRP = filterable reactive phosphorus, NOx = nitrogen oxides, TOC = total organic carbon and DOC = dissolved organic carbon.

Parameter (µg/L)	March 2024			June 2024			August 2024			November 2024			WQO
	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	
Total Phosphorus	55	44	40	36	28	42	66	64	46	44	50	30	**29**
FRP	16	8	10	14	11	11	18	11	20	12	10	9	**7**
Total Nitrogen	310	230	250	200	180	220	290	240	260	210	240	170	**220**
Ammonia	14	11	10	<2	<2	2	10	10	7	11	8	<2	**10**
NOx	44	24	45	30	22	23	48	32	59	18	20	20	**9**
Chlorophyll *a*	3.0	1.3	1	1.8	1.2	2.0	1.2	1.9	1.0	2.4	1.1	1.8	**2**
TOC (mg/L)	2.0	2.0	2.0	2.0	1.0	2.0	3.0	2.0	2.0	2.0	2.0	1.0	**-**
DOC (mg/L)	1.2	1.1	1.0	1.2	1.1	1.2	1.7	1.2	1.9	1.2	0.9	1.3	**-**

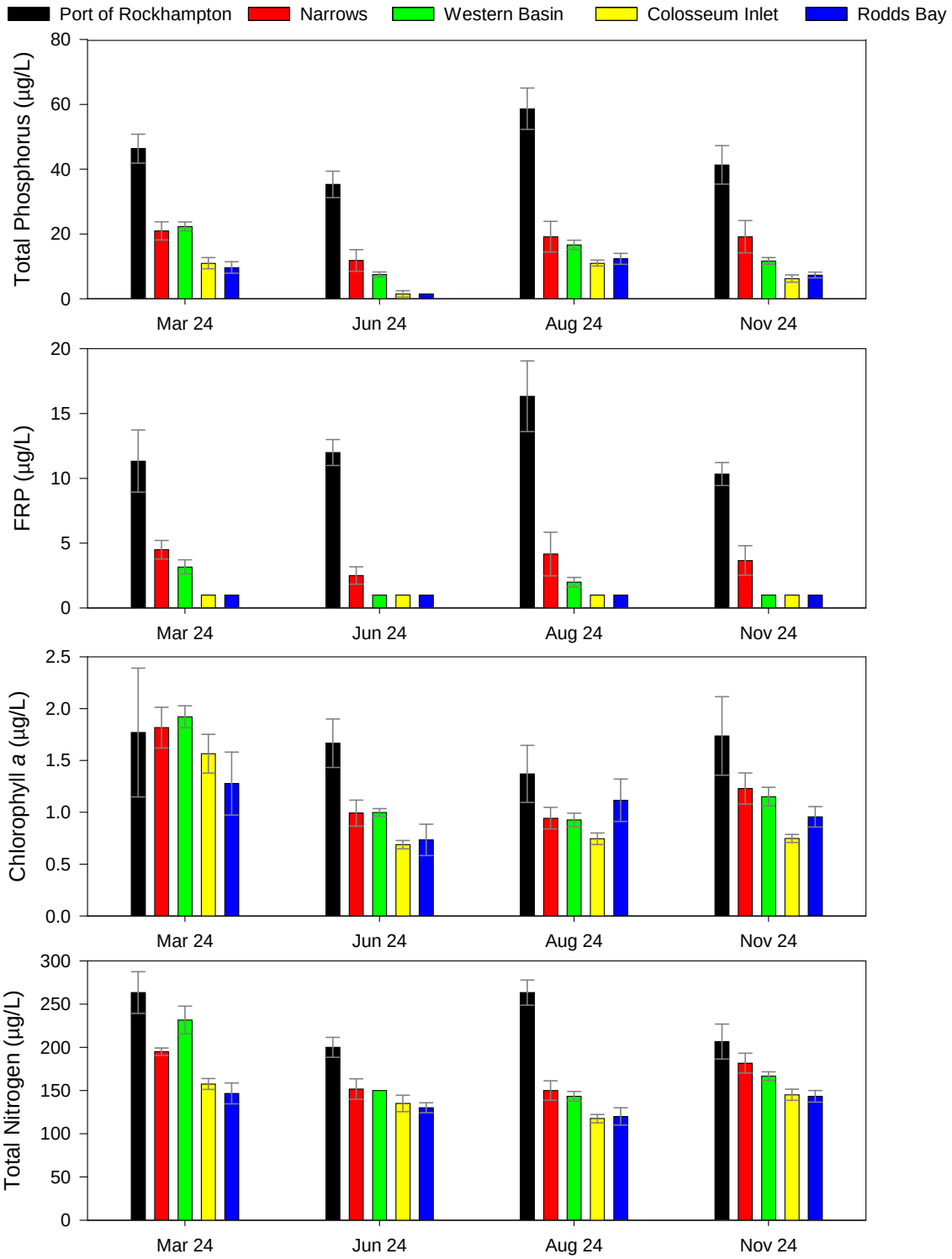


Figure 8 Total phosphorus, FRP, chlorophyll *a* and total nitrogen concentrations at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 6). For concentrations below Limit of Reporting (LOR), half the LOR was used in the plots.

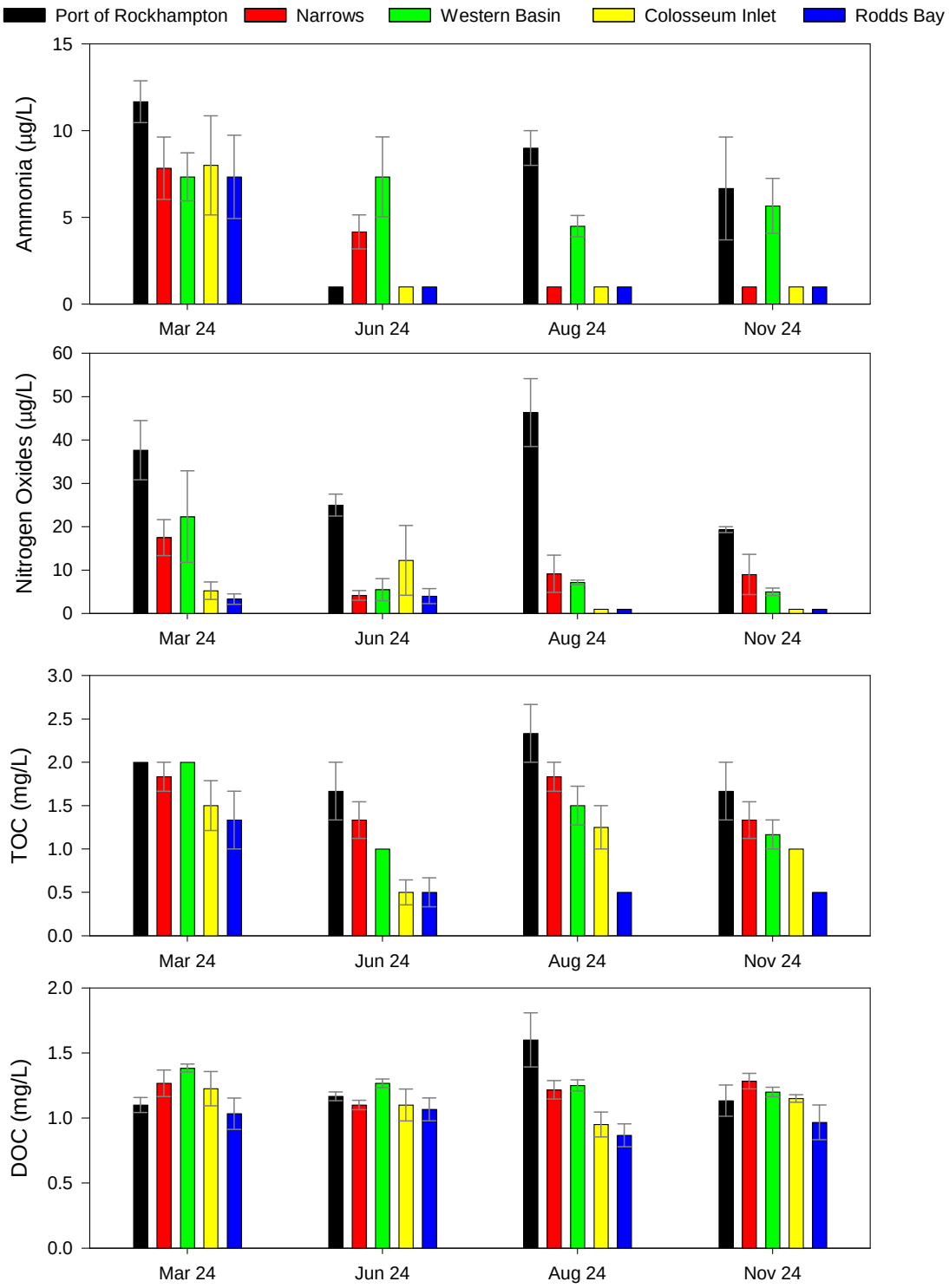


Figure 9 Mean ammonia, NOx, TOC and DOC concentrations at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.

- Ammonia concentrations at PoR (7 µg/L) were similar to Western Basin (6 µg/L), both of which were significantly ($P < 0.05$) higher than the Narrows, Colosseum Inlet and Rodds Bay (3 to 4 µg/L).
- PoR TOC concentrations (1.9 mg/L) were significantly ($P < 0.05$) higher than all other zones (1.0 to 1.6 mg/L).
- PoR DOC concentrations at PoR were similar to the Narrows and Western Basin (1.2 to 1.3 mg/L).
- PoR chlorophyll *a* concentrations (1.6 mg/L) were significantly ($P < 0.05$) higher than all other zones (0.9 to 1.2 mg/L).

Higher nutrients at PoR in comparison with Port Curtis have been recorded during multiple years of monitoring (Vision Environment 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024). It is likely that the elevated nutrients in PoR in comparison to Port of Gladstone (PoG) are a result of differing anthropogenic activities (farming in comparison to industrial) between the two areas, in addition to the high level of nutrient fluxing from the sediments to the water column.

3.4 Total and Dissolved Metal(loid)s

3.4.1 PoR

Total and dissolved metal(loid) concentrations recorded at PoR during 2024 are listed in Table 4. These results, in addition to concurrent PCIMP sampling results at adjacent and reference zones, are presented in Figures 10 to 14, and Table A4 within the Appendix. Two-way ANOVA results can be found in the Appendix (Table A5).

Many metal(loid)s were at or below laboratory limits of reporting (LOR), including total and dissolved cadmium, mercury, silver and tin. Dissolved chromium, cobalt, copper, gallium, lead, manganese and nickel were also below LOR, but total forms were detected.

Similar to several nutrients, concentrations of total aluminium, arsenic, chromium, iron, manganese, nickel and vanadium were lower during the June survey, corresponding with the lower turbidity and TSS concentrations. Metal(loid) ions will preferentially bind to suspended small particles and organic matter that contain a large surface charge and numerous binding sites (Simpson et al. 2005, Simpson et al. 2013).

No metal(loid)s exceeded their respective 95% AWQG at PoR during 2024.

3.4.2 Comparison with PCIMP Results

Of note across the zones

- Concentrations of total aluminium (annual mean of 3083 µg/L), arsenic (1.8 µg/L), chromium (12 µg/L), iron (2362 µg/L), manganese (35 µg/L), nickel (2.5 µg/L) and vanadium (5.7 µg/L) were significantly ($P < 0.05$) higher at PoR than at the other zones.
- Total molybdenum (10 µg/L) was significantly ($P < 0.05$) lower at PoR than at the PCIMP zones (11 to 12 µg/L)

Higher total metal(loid)s at PoR in comparison with Port Curtis has been recorded during multiple years of monitoring (Vision Environment 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024). It is likely that the higher concentration of suspended particles within the water at PoR results in the high level of total metal(loid)s. Dissolved metal(loid) forms were generally similar across PoR and Port Curtis.

Table 4 Total and dissolved metal concentrations at PoR during 2024 surveys.
N = 1. Blue shading indicates exceedances of the 95% species protection AWQG value which is applicable to PoR sites. Note that speciation measures have not been carried out on chromium, and thus these forms (Cr(III) and Cr(VI)) could potentially contribute to total concentrations.

Metal (µg/L)		March 2024			June 2024			August 2024			November 2024			95% AWQG
		PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	
Aluminium	Dissolved	7.5	8.5	8.1	<5	<5	<5	<5	<5	<5	10	14	8.3	24
	Total	2800	2200	2660	1840	950	1000	6300	6280	2130	3930	5000	1910	-
Arsenic	Dissolved	1.2	1.4	1.5	1.1	1.1	1.2	1	1.1	1.1	1.2	1.2	1.2	-
	Total	1.9	2	1.9	1.4	1.3	1.5	2.2	2.3	1.4	2	2.4	1.6	-
Cadmium	Dissolved	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.5
	Total	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Chromium	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	Cr (III) 27.4 Cr (VI) 4.4
	Total	2.5	1.7	1.8	1.1	<1	1	6.8	6.5	2.5	4.6	6.3	2.5	-
Cobalt	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
	Total	<1	<1	<1	<1	<1	<1	1.5	1.4	<1	<1	1.3	<1	-
Copper	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.3
	Total	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.4	2.8	1.7	-
Gallium	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Total	<1	<1	<1	<1	<1	<1	1.5	1.6	<1	<1	1	<1	-
Iron	Dissolved	6.9	<5	5.7	8.8	6.7	8.5	9.6	9	6.3	11	14	11	-
	Total	2300	2040	2190	1630	780	1440	4450	4380	1510	2650	3640	1340	-
Lead	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4.4
	Total	<1	<1	<1	<1	<1	<1	1.2	1.3	<1	<1	1.1	<1	-
Manganese	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Total	52	45	37	21	16	33	53	49	19	34	47	17	-

Metal (µg/L)		March 2024			June 2024			August 2024			November 2024			95% AWQG
		PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	PoR1	PoR2	PoR3	
Mercury	Dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.4**
	Total	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Molybdenum	Dissolved	10	10	10	10	11	11	9	9.7	8.4	12	12	12	-
	Total	9.3	9.6	11	10	10	12	9.6	10	8.9	11	11	11	-
Nickel	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**70**
	Total	1.8	1.2	2	1.5	<1	1	5.1	4.5	2.1	3.7	4.6	1.9	-
Silver	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**1.4**
	Total	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Tin	Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Total	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-
Vanadium	Dissolved	2.1	2.2	2.2	2	2.1	1.9	1.8	1.8	1.8	2.1	1.9	2.1	**100**
	Total	4.9	4	4.9	3.8	3.2	4.5	9.7	9.2	4.3	7.1	8.4	4.2	-
Zinc	Dissolved	<1	<1	<1	<1	<1	<1	1.4	1.6	3.1	2.8	2	7.6	**8**
	Total	<1	<1	<1	6.9	6.2	5.5	6.2	6.5	2.4	6.3	7.5	4.1	-

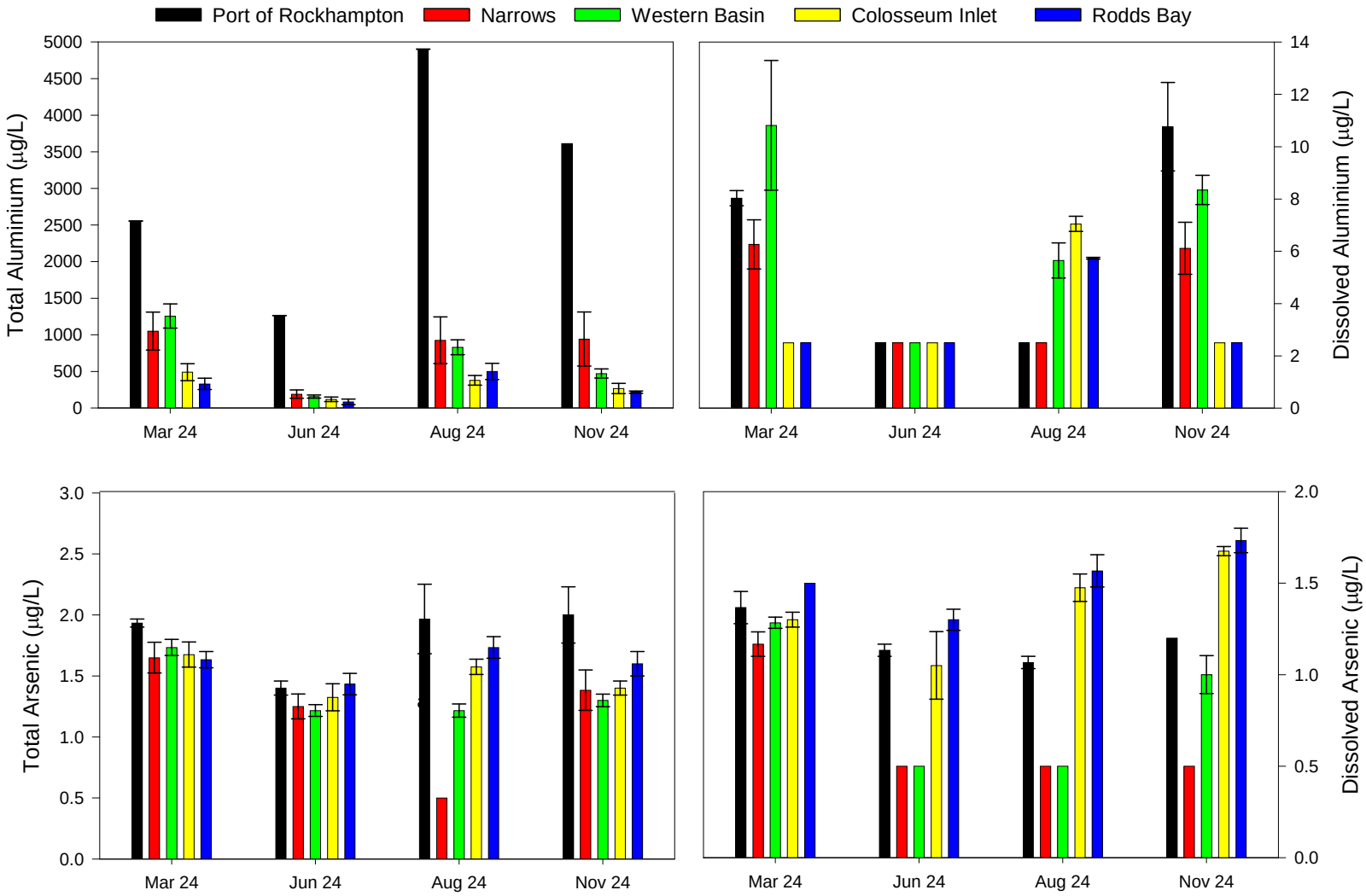


Figure 10 Total and dissolved aluminium and arsenic concentrations at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.

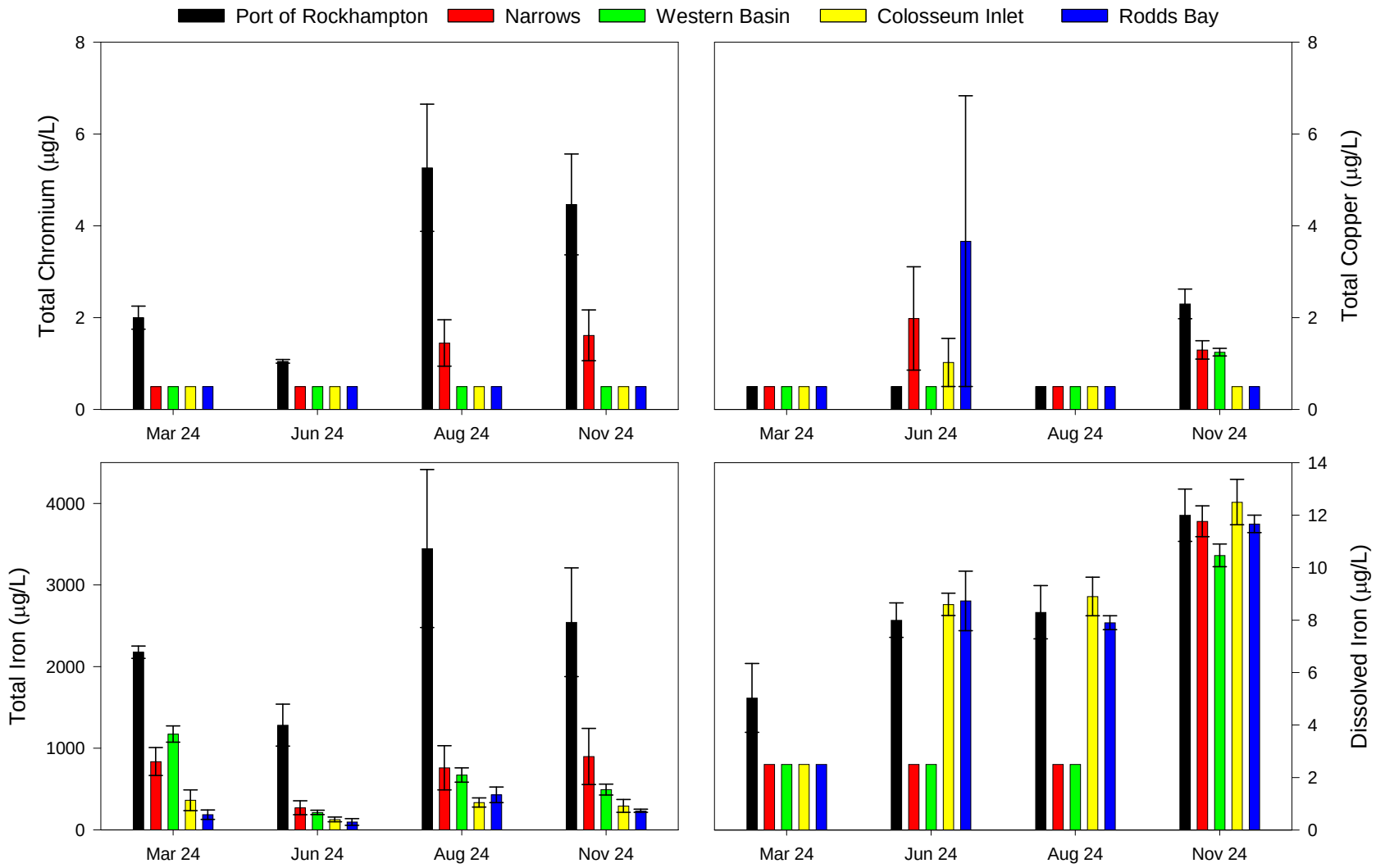


Figure 11 Total chromium and copper and total and dissolved iron concentrations at PoR, and adjacent and reference PCIMP zones during each survey. *Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.*

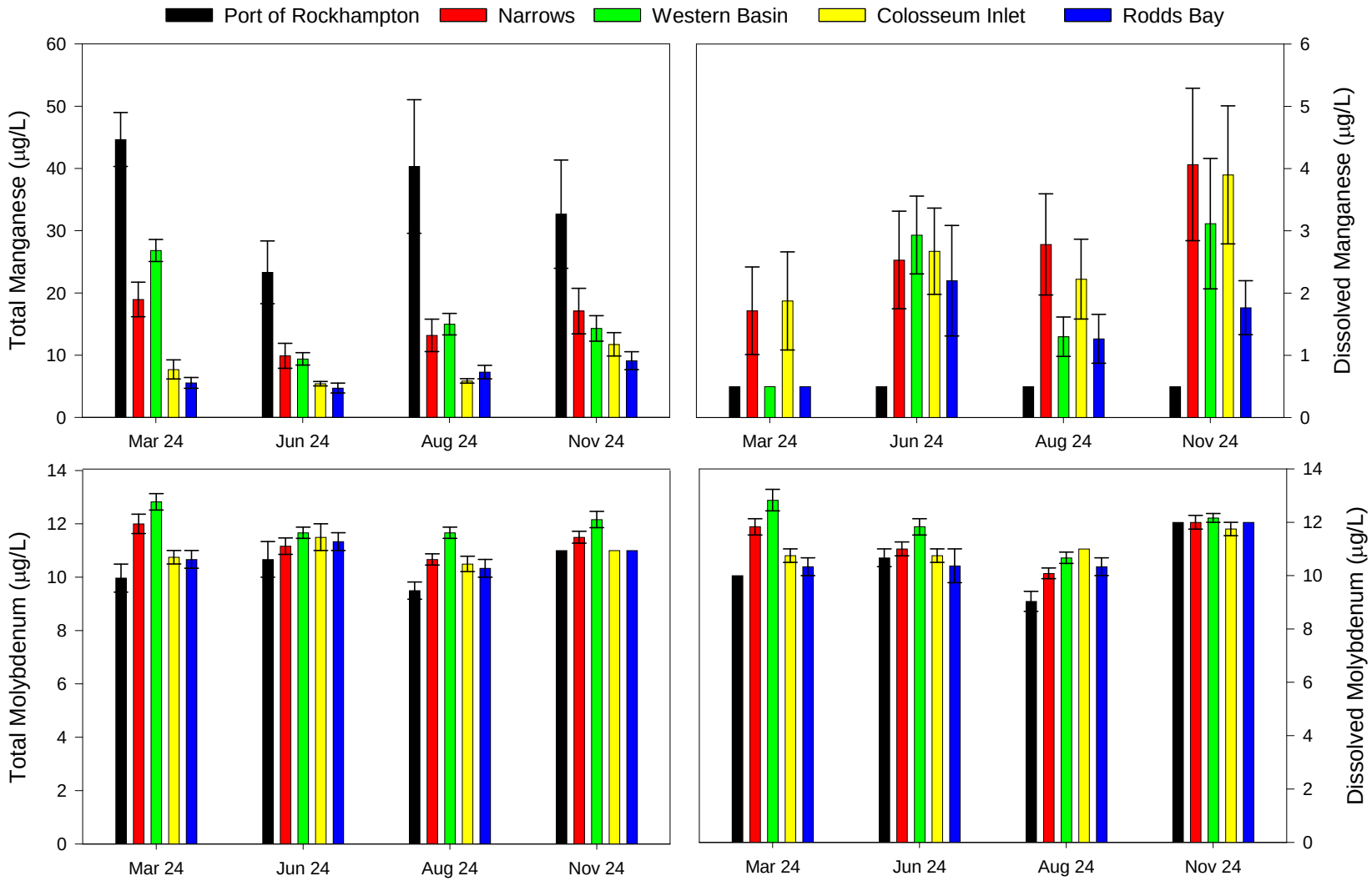


Figure 12 Total and dissolved manganese and molybdenum concentrations at PoR, and adjacent and reference PCIMP zones during each survey. *Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.*

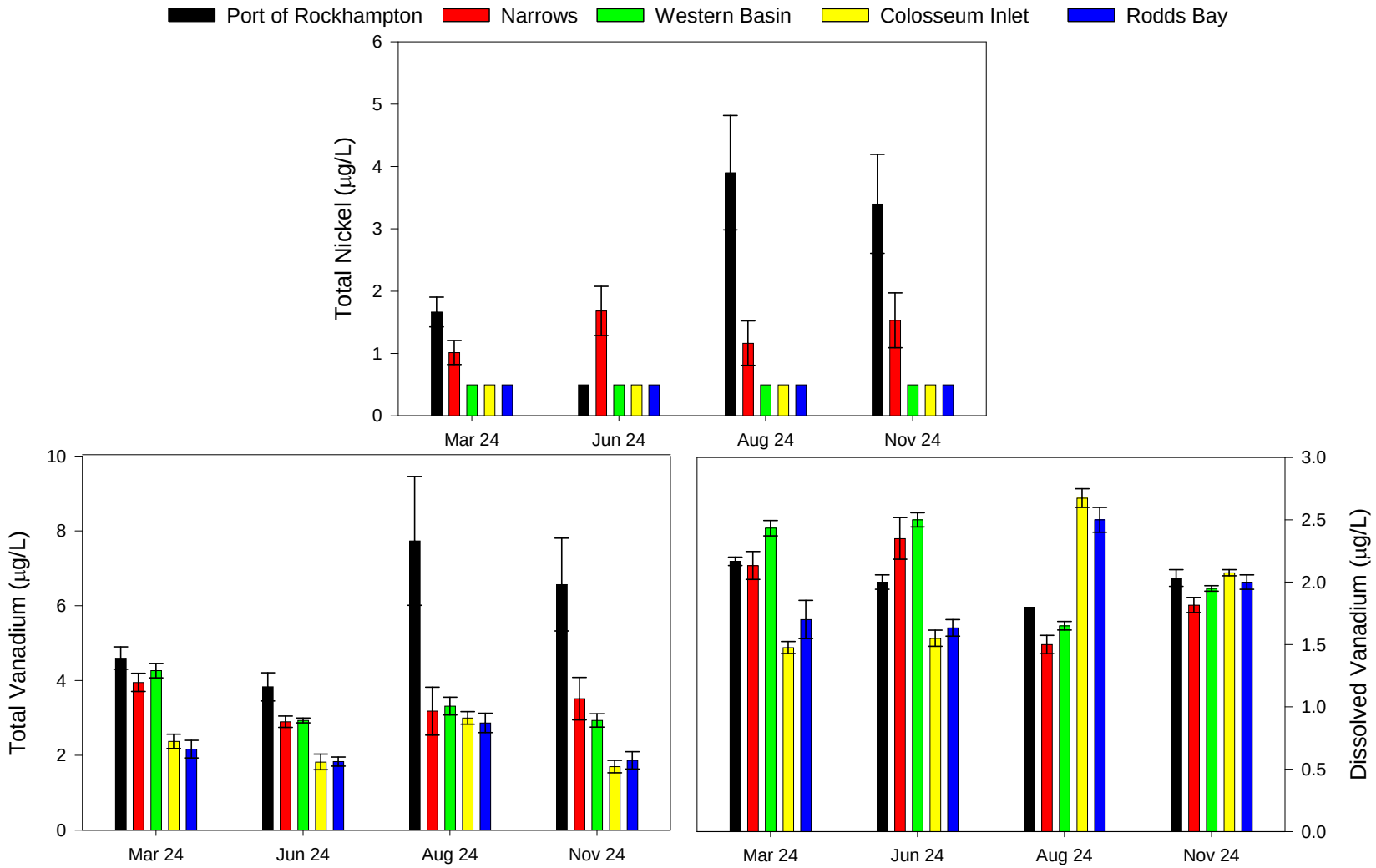


Figure 13 Total and dissolved molybdenum and nickel concentrations at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.

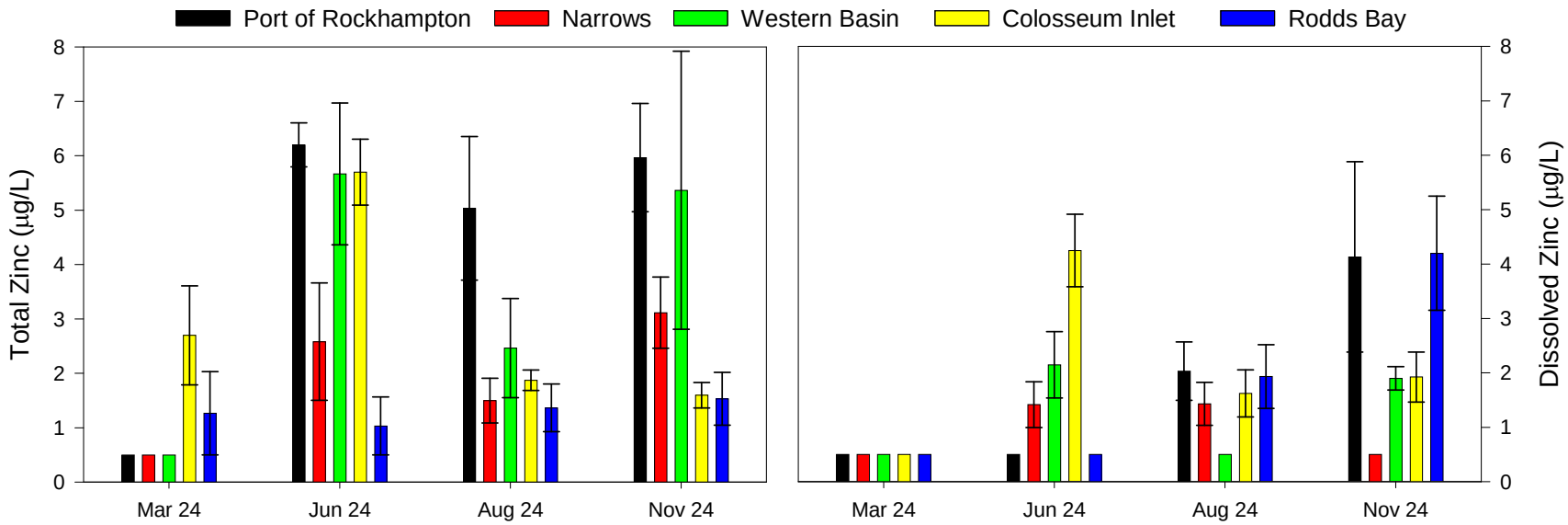


Figure 14 Total and dissolved zinc at PoR, and adjacent and reference PCIMP zones during each survey.
Values are means ± se (n = 3 to 6). For concentrations below LOR, half the LOR is displayed in the plots.

4 REFERENCES

ANZG. 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, Australia.

ANZG. 2021. Toxicant default guideline values for aquatic ecosystem protection: Zinc in marine water. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, Australia.

APHA. 2017. Standard Methods for the Examination of Water and Wastewater. 21st edition. American Public Health Association, Washington, USA.

AS/NZS. 1998a. 5667.1:1998 Water Quality - Sampling. Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples. Joint Standards Australia/Standards New Zealand, Canberra, Australia.

AS/NZS. 1998b. 5667.4:1998 Water Quality - Sampling. Part 4: Guidance on sampling from lakes, natural and man-made. Joint Standards Australia/Standards New Zealand, Canberra, Australia.

AS/NZS. 1998c. 5667.6:1998 Water Quality - Sampling. Part 6: Guidance on sampling of rivers and streams. Joint Standards Australia/Standards New Zealand, Canberra, Australia.

BOM. 2025. Climate statistics for Australian locations. Bureau of Meterology, Commonwealth of Australia, Canberra, Australia.

DEHP. 2014. Curtis Island, Calliope River and Boyne River Basins Environmental Values and Water Quality Objectives. Department of Environment and Heritage Protection, Brisbane, Australia.

DERM. 2009. Queensland Water Quality Guidelines, Version 3. ISBN 978-0-9806986-0-2, Department of Environment and Resource Management, Brisbane, Australia.

DES. 2018. Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009. Department of Environment and Science, Brisbane, Australia.

DNRM. 2025a. Calliope Basin Streamflow Data. Department of Natural Resources and Mines, Brisbane, Australia.

DNRM. 2025b. Fitzroy Basin Streamflow Data. Department of Natural Resources and Mines.

DSITI. 2017. Draft environmental values and water quality guidelines: Fitzroy Basin fresh, estuarine and marine waters, including Keppel Bay. Department of Science, Information Technology and Innovation, Brisbane, Australia.

EHP. 2013. Fitzroy River Sub-basin Environmental Values and Water Quality Objectives. Department of Environment and Heritage Protection, Brisbane, Australia.

EHP. 2014. Curtis Island, Calliope River and Boyne River Basins Environmental Values and Water Quality Objectives. Department of Environment and Heritage Protection, Brisbane, Australia.

Golding, L. A., B. M. Angel, G. E. Batley, S. C. Apte, R. Krassoi, and C. J. Doyle. 2015. Derivation of a water quality guideline for aluminium in marine waters. Environmental Toxicology and Chemistry **34**:141-151.

GPCL. 2023. Long-term Maintenance Dredging Management Plan for the Port of Rockhampton v5. Gladstone Ports Corporation Limited, Gladstone, Australia.

McKee, L. J., B. D. Eyre, and S. Hossain. 2000. Transport and Retention of Nitrogen and Phosphorus in the Sub-Tropical Richmond River Estuary, Australia: A Budget Approach. Biogeochemistry **50**:241-278.

O'Neill, M. E. 2000. Theory & Methods A Weighted Least Squares Approach to Levene's Test of Homogeneity of Variance. Australian & New Zealand Journal of Statistics **42**:81-100.

Prastka, K., R. Sanders, and T. Jickells. 1998. Has the role of estuaries as sources or sinks of dissolved inorganic phosphorus changed over time? Results of a Kd study. Marine Pollution Bulletin **36**:718-728.

Rajesh, M., and S. Rehana. 2022. Impact of climate change on river water temperature and dissolved oxygen: Indian riverine thermal regimes. Scientific Reports **12**:9222.

Simpson, S. L., G. E. Batley, and A. A. Chariton. 2013. Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines. CSIRO Land and Water, Sydney, Australia.

Simpson, S. L., G. E. Batley, A. A. Chariton, J. L. Stauber, C. K. King, J. C. Chapman, R. V. Hyne, S. A. Glaes, A. C. Roach, and W. A. Maher. 2005. Handbook for Sediment Quality Assessment. CSIRO, Sydney, Australia.

Underwood, A. J. 1997. Experiments in ecology: their logical design and interpretation using analysis of variance. Cambridge University Press, Cambridge, U.K.

Vision Environment. 2016. Port of Rockhampton and East Banks Disposal Site Water Quality Monitoring - 2015 Annual Report. Gladstone, Australia.

Vision Environment. 2017. Port of Rockhampton and East Banks Disposal Site Water Quality Monitoring - 2016 Annual Report. Gladstone, Australia.

Vision Environment. 2018. Port of Rockhampton and East Banks Disposal Site Water Quality Monitoring - 2017 Annual Report. Gladstone, Australia.

Vision Environment. 2019. Port of Rockhampton and East Banks Disposal Site Water Quality Monitoring - 2018 Annual Report. Gladstone, Australia.

Vision Environment. 2020. Port of Rockhampton Water Quality Monitoring Program - 2019 Annual Report. Gladstone, Australia.

Vision Environment. 2021. Port of Rockhampton Water Quality Monitoring Program - 2020 Annual Report. Gladstone, Australia.

Vision Environment. 2022. Port of Rockhampton Water Quality Monitoring Program - 2021 Annual Report. Gladstone, Australia.

Vision Environment. 2023. Port of Rockhampton Water Quality Monitoring Program - 2022 Annual Report. Gladstone, Australia.

Vision Environment. 2024. Port of Rockhampton Water Quality Monitoring Program - 2023 Annual Report. Gladstone, Australia.

5 APPENDIX

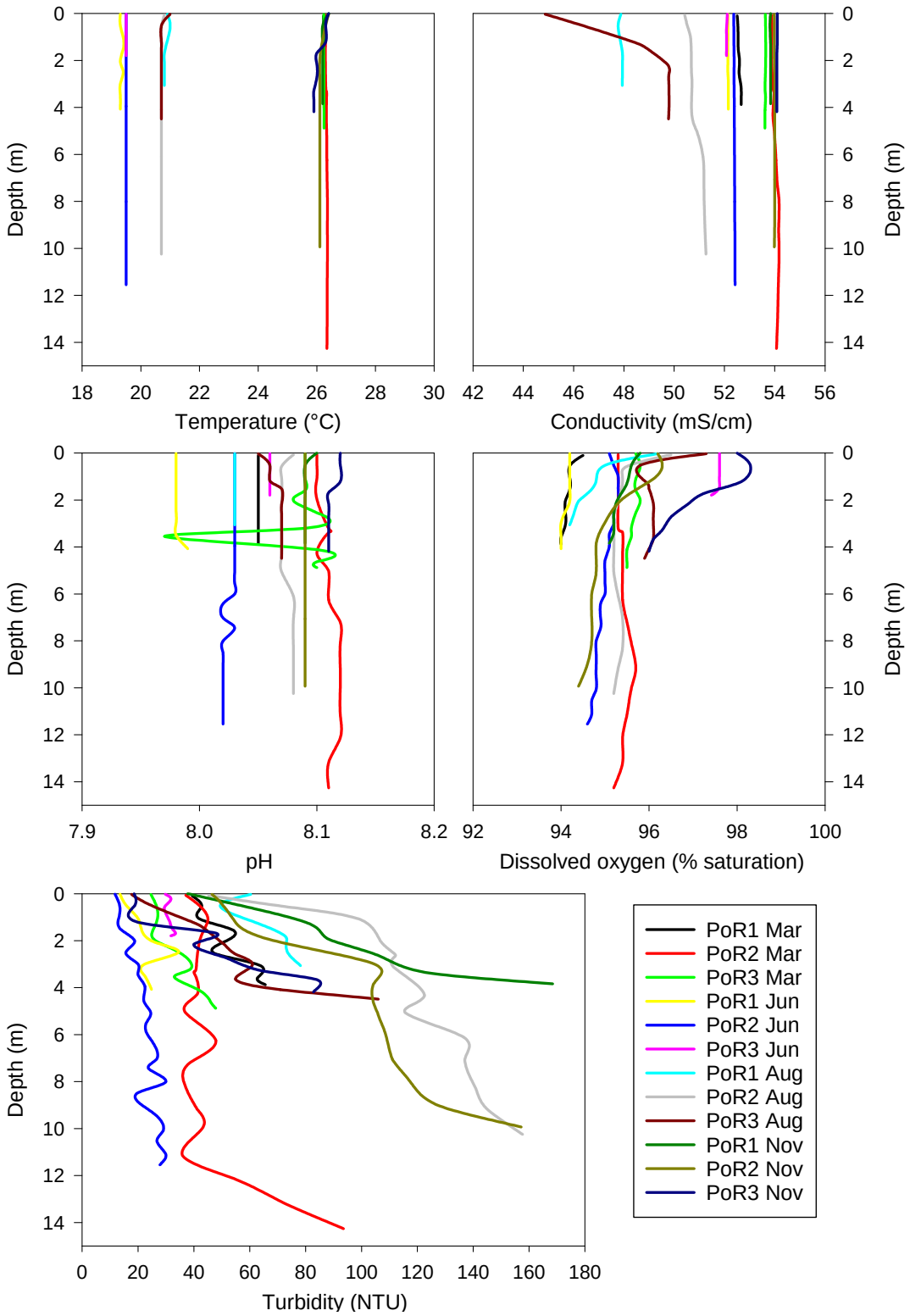


Figure A1 Depth-profiled physicochemical parameters at all Port of Rockhampton sites during 2024.

5.1 QA/QC Summary

Table A1 summarises the quality objectives and their achievement. Definitions and acceptance targets for the laboratory QA measures are detailed in the laboratory reports.

Table A1. Summary of project quality objectives

Quality Indicators	Task	Acceptability
Field	Appropriate sampling methods undertaken	Yes
	Experienced sampling personnel	Yes
	Equipment calibrated	Yes
	Required sites sampled	Yes
	Appropriate decontamination procedures	Yes
	Collection of field replicate (1 in 10 samples)	Yes
	Collection of Field Blank (FB)	Yes
	Appropriate Documentation	Yes
	FB results < LOR	Ammonia, NOx and dissolved and total zinc were detected in one or more surveys
Laboratory	Samples analysed at NATA accredited laboratory	Yes
	Samples analysed within holding periods	Yes
	Method Blanks < LOR	Yes
	Laboratory duplicate samples within recommended RPD%	Yes
	Laboratory control samples within recommended recovery rates	Yes

Table A2 Whole water column physicochemical parameters and TSS at PoR, and adjacent and reference PCIMP zones during 2024 surveys.
Values are means ± se (n = 3 to 160). 20th to 80th WQO ranges for pH and DO, Wet and Dry Season 80th percentile trigger value for turbidity. No WQO are available for TSS, so QWQG used (DERM 2009). Values exceeding WQO or QWQG are highlighted.

Site	Survey	Temperature (°C)	Conductivity (mS/cm)	pH	Turbidity (NTU)	Dissolved oxygen (% sat.)	TSS (mg/L)
PoR	Mar-24	26.3 ± 0.0	53.5 ± 0.1	8.1 ± 0.0	54 ± 4	95 ± 0	81 ± 9
	Jun-24	19.5 ± 0.0	52.3 ± 0.0	8.0 ± 0.0	24 ± 1	96 ± 0	36 ± 9
	Aug-24	20.8 ± 0.0	49.3 ± 0.2	8.1 ± 0.0	78 ± 5	96 ± 0	43 ± 12
	Nov-24	26.2 ± 0.0	54.0 ± 0.0	8.1 ± 0.0	71 ± 5	96 ± 0	50 ± 11
WQO		-	-	**7.2 – 8.3**	**W = 30, D = 12**	**87 - 95**	**20**
NW	Mar-24	25.9 ± 0.0	54.8 ± 0.0	7.9 ± 0.0	30 ± 4	91 ± 0	30 ± 6
	Jun-24	20.7 ± 0.0	54.1 ± 0.0	7.9 ± 0.0	9 ± 1	90 ± 0	18 ± 5
	Aug-24	21.1 ± 0.0	51.9 ± 0.1	7.9 ± 0.0	15 ± 2	92 ± 0	15 ± 4
	Nov-24	26.8 ± 0.0	55.4 ± 0.0	7.9 ± 0.0	20 ± 3	91 ± 0	17 ± 5
WQO		-	-	**7.4 – 8.3**	**W = 30, D = 12**	**87 - 95**	**20**
WB	Mar-24	26.2 ± 0.0	55.0 ± 0.0	8.0 ± 0.0	18 ± 0	94 ± 0	34 ± 3
	Jun-24	21.2 ± 0.0	54.1 ± 0.0	7.9 ± 0.0	6 ± 0	97 ± 0	14 ± 2
	Aug-24	21.3 ± 0.0	52.4 ± 0.0	7.9 ± 0.0	11 ± 0	96 ± 0	16 ± 2
	Nov-24	27.0 ± 0.0	55.3 ± 0.0	8.0 ± 0.0	8 ± 0	96 ± 0	11 ± 2
WQO		-	-	**7.4 – 8.3**	**W = 29, D = 17**	**91 - 100**	**20**
RCI	Mar-24	25.6 ± 0.0	54.6 ± 0.0	7.9 ± 0.0	6 ± 1	89 ± 0	18 ± 7
	Jun-24	20.3 ± 0.0	54.6 ± 0.0	7.9 ± 0.0	2 ± 0	88 ± 0	9 ± 1
	Aug-24	21.2 ± 0.0	53.5 ± 0.0	8.0 ± 0.0	6 ± 0	93 ± 0	5 ± 1
	Nov-24	27.0 ± 0.0	55.9 ± 0.0	8.0 ± 0.0	1 ± 0	94 ± 0	7 ± 3
WQO		-	-	**7.4 – 8.3**	**W = 14, D = 4**	**86 - 97**	**20**
RB	Mar-24	25.5 ± 0.0	53.9 ± 0.0	8.1 ± 0.0	4 ± 0	95 ± 0	9 ± 2
	Jun-24	20.5 ± 0.1	54.4 ± 0.0	8.0 ± 0.0	2 ± 0	92 ± 0	6 ± 1
	Aug-24	21.2 ± 0.0	53.6 ± 0.0	8.1 ± 0.0	9 ± 1	95 ± 0	9 ± 3
	Nov-24	26.7 ± 0.0	55.5 ± 0.1	8.1 ± 0.0	1 ± 0	98 ± 0	5 ± 1
WQO		-	-	**7.4 – 8.3**	**W = 12, D = 7**	**93 - 98**	**20**

Table A3 Chlorophyll *a* and nutrient concentrations at PoR, and adjacent and reference PCIMP zones during 2024 surveys.
Values are means ± se (n = 3 to 6). Highlight values indicates exceedances of the 80th percentile WQO value (DEHP 2014, DSITI 2017).

Site	Survey	Chlorophyll *a* (µg/L)	Phosphorous (µg/L)	FRP (µg/L)	Nitrogen (µg/L)	Ammonia (µg/L)	NOx (µg/L)	TOC (mg/L)	DOC (mg/L)
PoR	Mar-24	1.8 ± 0.6	46 ± 4	11 ± 2	263 ± 24	12 ± 1	38 ± 7	2.0 ± 0.0	1.1 ± 0.1
	Jun-24	1.7 ± 0.2	35 ± 4	12 ± 1	200 ± 12	<2	25 ± 3	1.7 ± 0.3	1.2 ± 0.0
	Aug-24	1.4 ± 0.3	59 ± 6	16 ± 3	263 ± 15	9 ± 1	46 ± 8	2.3 ± 0.3	1.6 ± 0.2
	Nov-24	1.7 ± 0.4	41 ± 6	10 ± 1	207 ± 20	7 ± 3	19 ± 1	1.7 ± 0.3	1.1 ± 0.1
WQG		2.0	29	7	220	10	9	-	-
NW	Mar-24	1.8 ± 0.2	21 ± 3	5 ± 1	195 ± 4	8 ± 2	18 ± 4	1.8 ± 0.2	1.3 ± 0.1
	Jun-24	1.0 ± 0.1	12 ± 3	3 ± 1	152 ± 12	4 ± 1	4 ± 1	1.3 ± 0.2	1.1 ± 0.0
	Aug-24	0.9 ± 0.1	19 ± 5	4 ± 2	150 ± 11	<2	9 ± 4	1.8 ± 0.2	1.2 ± 0.1
	Nov-24	1.2 ± 0.1	19 ± 5	4 ± 1	182 ± 11	<2	9 ± 5	1.3 ± 0.2	1.3 ± 0.1
WQG		2.0	29	7	220	10	9	-	-
WB	Mar-24	1.9 ± 0.1	22 ± 1	3 ± 1	232 ± 16	7 ± 1	22 ± 11	2.0 ± 0.0	1.4 ± 0.0
	Jun-24	1.0 ± 0.0	8 ± 1	<2	150 ± 0	7 ± 2	6 ± 3	1.0 ± 0.0	1.3 ± 0.0
	Aug-24	0.9 ± 0.1	17 ± 2	2 ± 0	143 ± 6	5 ± 1	7 ± 1	1.5 ± 0.2	1.3 ± 0.0
	Nov-24	1.2 ± 0.1	12 ± 1	<2	167 ± 5	6 ± 2	5 ± 1	1.2 ± 0.2	1.2 ± 0.0
WQG		2.0	29	7	210	8	16	-	-
RCI	Mar-24	1.6 ± 0.2	11 ± 2	<2	158 ± 6	8 ± 3	5 ± 2	1.5 ± 0.3	1.2 ± 0.1
	Jun-24	0.7 ± 0.0	<3	<2	135 ± 10	<2	12 ± 8	0.8 ± 0.1	1.1 ± 0.1
	Aug-24	0.7 ± 0.1	11 ± 1	<2	118 ± 5	<2	<2	1.3 ± 0.3	1.0 ± 0.1
	Nov-24	0.7 ± 0.0	6 ± 1	<2	145 ± 6	<2	<2	1.0 ± 0.0	1.2 ± 0.0
WQG		1.4	15	3	180	15	5	-	-
RB	Mar-24	1.3 ± 0.3	10 ± 2	<2	147 ± 12	7 ± 2	3 ± 1	1.3 ± 0.3	1.0 ± 0.1
	Jun-24	0.7 ± 0.2	<3	<2	130 ± 6	<2	4 ± 2	0.8 ± 0.2	1.1 ± 0.1
	Aug-24	1.1 ± 0.2	12 ± 2	<2	120 ± 10	<2	<2	0.5 ± 0.0	0.9 ± 0.1
	Nov-24	1.0 ± 0.1	7 ± 1	<2	143 ± 7	<2	<2	0.5 ± 0.0	1.0 ± 0.1
WQG		2.2	21	3	200	4	3	-	-

Table A4 Total and dissolved metal concentrations at PoR, and adjacent and reference PCIMP zones during 2024 surveys.
Values are means ± se (n = 3 to 6). Note the 99% AWQG applicable to Narrows, Colosseum Inlet and Rodds Bay (DEHP 2014). AWQG applicable to dissolved metal concentrations only. Values exceeding AWQG are highlighted.

Site	Survey	Aluminium (µg/L)		Arsenic (µg/L)		Cadmium (µg/L)		Chromium (µg/L)		Cobalt (µg/L)		Copper (µg/L)	
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
PoR	Mar-24	8 ± 0	2553 ± 181	1.4 ± 0.1	1.9 ± 0.0	<0.1	<0.1	<1	2.0 ± 0.3	<1	<1	<1	<1
	Jun-24	<5	1263 ± 289	1.1 ± 0.0	1.4 ± 0.1	<0.1	<0.1	<1	1.1 ± 0.0	<1	<1	<1	<1
	Aug-24	<5	4903 ± 1387	1.1 ± 0.0	2.0 ± 0.3	<0.1	<0.1	<1	5.3 ± 1.4	<1	1.1 ± 0.3	<1	<1
	Nov-24	11 ± 2	3613 ± 906	1.2 ± 0.0	2.0 ± 0.2	<0.1	<0.1	<1	4.5 ± 1.1	<1	<1	<1	2.3 ± 0.3
NW	Mar-24	6 ± 1	1052 ± 260	1.2 ± 0.1	1.7 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Jun-24	<5	190 ± 58	<1	1.3 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	2.0 ± 1.1
	Aug-24	<5	927 ± 319	<1	<1	<0.1	<0.1	<1	1.5 ± 0.5	<1	<1	<1	<1
	Nov-24	6 ± 1	943 ± 369	<1	1.4 ± 0.2	<0.1	<0.1	<1	1.6 ± 0.6	<1	<1	<1	1.3 ± 0.2
WB	Mar-24	11 ± 2	1257 ± 165	1.3 ± 0.0	1.7 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Jun-24	<5	157 ± 22	<1	1.2 ± 0.0	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Aug-24	6 ± 1	830 ± 102	<1	1.2 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Nov-24	8 ± 1	472 ± 62	1.0 ± 0.1	1.3 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	1.3 ± 0.1
RCI	Mar-24	<5	490 ± 115	1.3 ± 0.0	1.7 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Jun-24	<5	119 ± 31	1.1 ± 0.2	1.3 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	1.0 ± 0.5
	Aug-24	7 ± 0	380 ± 66	1.5 ± 0.1	1.6 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Nov-24	<5	268 ± 70	1.7 ± 0.0	1.4 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
RB	Mar-24	<5	330 ± 78	1.5 ± 0.0	1.6 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Jun-24	<5	84 ± 38	1.3 ± 0.1	1.4 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	3.7 ± 3.2
	Aug-24	6 ± 0	500 ± 111	1.6 ± 0.1	1.7 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
	Nov-24	<5	217 ± 17	1.7 ± 0.1	1.6 ± 0.1	<0.1	<0.1	<1	<1	<1	<1	<1	<1
95% AWQG		**24**		**-**		**5.5**		**Cr(III) 27.4, Cr(VI) 4.4**		**1**		**1.3**	
99% AWQG		**2.1**		**-**		**0.7**		**Cr(III) 7.7, Cr(VI) 0.14**		**0.005**		**0.3**	

Site	Survey	Gallium (µg/L)		Iron (µg/L)		Lead (µg/L)		Manganese (µg/L)		Mercury (µg/L)	
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
PoR	Mar-24	<1	<1	5 ± 1	2177 ± 75	<1	<1	<1	45 ± 4	<0.05	<0.05
	Jun-24	<1	<1	8 ± 1	1283 ± 258	<1	<1	<1	23 ± 5	<0.05	<0.05
	Aug-24	<1	1.2 ± 0.4	8 ± 1	3447 ± 969	<1	<1	<1	40 ± 11	<0.05	<0.05
	Nov-24	<1	<1	12 ± 1	2543 ± 666	<1	<1	<1	33 ± 9	<0.05	<0.05
NW	Mar-24	<1	<1	<5	837 ± 172	<1	<1	2 ± 1	19 ± 3	<0.05	<0.05
	Jun-24	<1	<1	<5	270 ± 85	<1	<1	3 ± 1	10 ± 2	<0.05	<0.05
	Aug-24	<1	<1	<5	760 ± 271	<1	<1	3 ± 1	13 ± 3	<0.05	<0.05
	Nov-24	<1	<1	12 ± 1	898 ± 345	<1	<1	4 ± 1	17 ± 4	<0.05	<0.05
WB	Mar-24	<1	<1	<5	1173 ± 100	<1	<1	<1	27 ± 2	<0.05	<0.05
	Jun-24	<1	<1	<5	213 ± 27	<1	<1	3 ± 1	9 ± 1	<0.05	<0.05
	Aug-24	<1	<1	<5	672 ± 87	<1	<1	1 ± 0	15 ± 2	<0.05	<0.05
	Nov-24	<1	<1	10 ± 0	493 ± 66	<1	<1	3 ± 1	14 ± 2	<0.05	<0.05
RCI	Mar-24	<1	<1	<5	363 ± 127	<1	<1	2 ± 1	8 ± 2	<0.05	<0.05
	Jun-24	<1	<1	9 ± 0	127 ± 28	<1	<1	3 ± 1	5 ± 0	<0.05	<0.05
	Aug-24	<1	<1	9 ± 1	335 ± 57	<1	<1	2 ± 1	6 ± 0	<0.05	<0.05
	Nov-24	<1	<1	13 ± 1	293 ± 78	<1	<1	4 ± 1	12 ± 2	<0.05	<0.05
RB	Mar-24	<1	<1	<5	187 ± 58	<1	<1	<1	6 ± 1	<0.05	<0.05
	Jun-24	<1	<1	9 ± 1	97 ± 42	<1	<1	2 ± 1	5 ± 1	<0.05	<0.05
	Aug-24	<1	<1	8 ± 0	430 ± 95	<1	<1	1 ± 0	7 ± 1	<0.05	<0.05
	Nov-24	<1	<1	12 ± 0	233 ± 19	<1	<1	2 ± 0	9 ± 1	<0.05	<0.05
95% AWQG		-		-		**4.4**		-		**0.4**	
99% AWQG		-		-		**2.2**		-		**0.1**	

Site	Survey	Molybdenum (µg/L)		Nickel (µg/L)		Silver (µg/L)		Tin (µg/L)		Vanadium (µg/L)		Zinc (µg/L)	
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
PoR	Mar-24	10 ± 0	10 ± 1	<1	1.7 ± 0.2	<1	<1	<1	<1	2.2 ± 0.0	4.6 ± 0.3	<1	<1
	Jun-24	11 ± 0	11 ± 1	<1	<1	<1	<1	<1	<1	2.0 ± 0.1	3.8 ± 0.4	<1	6.2 ± 0.4
	Aug-24	9 ± 0	10 ± 0	<1	3.9 ± 0.9	<1	<1	<1	<1	1.8 ± 0.0	7.7 ± 1.7	2.0 ± 0.5	5.0 ± 1.3
	Nov-24	12 ± 0	11 ± 0	<1	3.4 ± 0.8	<1	<1	<1	<1	2.0 ± 0.1	6.6 ± 1.2	4.1 ± 1.7	6.0 ± 1.0
NW	Mar-24	12 ± 0	12 ± 0	<1	1.0 ± 0.2	<1	<1	<1	<1	2.1 ± 0.1	4.0 ± 0.2	<1	<1
	Jun-24	11 ± 0	11 ± 0	<1	1.7 ± 0.4	<1	<1	<1	<1	2.4 ± 0.2	2.9 ± 0.2	1.4 ± 0.4	2.6 ± 1.1
	Aug-24	10 ± 0	11 ± 0	<1	1.2 ± 0.4	<1	<1	<1	<1	1.5 ± 0.1	3.2 ± 0.6	1.4 ± 0.4	1.5 ± 0.4
	Nov-24	12 ± 0	12 ± 0	<1	1.5 ± 0.4	<1	<1	<1	<1	1.8 ± 0.1	3.5 ± 0.6	<1	3.1 ± 0.7
WB	Mar-24	13 ± 0	13 ± 0	<1	<1	<1	<1	<1	<1	2.4 ± 0.1	4.3 ± 0.2	<1	<1
	Jun-24	12 ± 0	12 ± 0	<1	<1	<1	<1	<1	<1	2.5 ± 0.1	2.9 ± 0.1	2.2 ± 0.6	5.7 ± 1.3
	Aug-24	11 ± 0	12 ± 0	<1	<1	<1	<1	<1	<1	1.7 ± 0.0	3.3 ± 0.2	<1	2.5 ± 0.9
	Nov-24	12 ± 0	12 ± 0	<1	<1	<1	<1	<1	<1	2.0 ± 0.0	2.9 ± 0.2	1.9 ± 0.2	5.4 ± 2.6
RCI	Mar-24	11 ± 0	11 ± 0	<1	<1	<1	<1	<1	<1	1.5 ± 0.0	2.4 ± 0.2	<1	2.7 ± 0.9
	Jun-24	11 ± 0	12 ± 1	<1	<1	<1	<1	<1	<1	1.6 ± 0.1	1.8 ± 0.2	4.3 ± 0.7	5.7 ± 0.6
	Aug-24	11 ± 0	11 ± 0	<1	<1	<1	<1	<1	<1	2.7 ± 0.1	3.0 ± 0.2	1.6 ± 0.4	1.9 ± 0.2
	Nov-24	12 ± 0	11 ± 0	<1	<1	<1	<1	<1	<1	2.1 ± 0.0	1.7 ± 0.2	1.9 ± 0.5	1.6 ± 0.2
RB	Mar-24	10 ± 0	11 ± 0	<1	<1	<1	<1	<1	<1	1.7 ± 0.2	2.2 ± 0.2	<1	1.3 ± 0.8
	Jun-24	10 ± 1	11 ± 0	<1	<1	<1	<1	<1	<1	1.6 ± 0.1	1.8 ± 0.1	<1	1.0 ± 0.5
	Aug-24	10 ± 0	10 ± 0	<1	<1	<1	<1	<1	<1	2.5 ± 0.1	2.9 ± 0.3	1.9 ± 0.6	1.4 ± 0.4
	Nov-24	12 ± 0	11 ± 0	<1	<1	<1	<1	<1	<1	2.0 ± 0.1	1.9 ± 0.2	4.2 ± 1.1	1.5 ± 0.5
95% AWQG		-		70		1.4		-		100		8	
99% AWQG		-		7		0.8		-		50		3.3	

Table A5 Results of two-way ANOVAs for PoR statistical comparison with PCIMP zones.
Note no analyses able to be performed for, total and dissolved cadmium, mercury, silver and tin, and dissolved chromium, cobalt, copper, gallium, lead and nickel as site concentrations generally < LOR.

Parameter	Zone		Survey		Interaction		Comment
	P-value	F statistic	P-value	F statistic	P-value	F statistic	
Temperature	<0.05	401	<0.05	69428	<0.05	166	Temperatures were significantly different for each survey, increasing in temperature from June < August < March < November. Temperatures were significantly different for each zone, increasing in temperature from PoR < RCI < RB < NW < WB.
Conductivity	<0.05	1332	<0.05	3533	<0.05	165	Conductivity was significantly different for each survey, increasing in conductivity from August < June < March < November. Conductivity was significantly lowest in PoR, followed by NW. WB and RB were significantly the same and RCI was significantly higher.
pH	<0.05	408	<0.05	39	<0.05	12	pH was significantly lower in June than March and November and significantly higher in November. pH in PoR and RB were significantly higher than other zones.
Turbidity	<0.05	415	<0.05	64	<0.05	26	Turbidity was significantly different for each survey, increasing in turbidity from June < November < August < March. Turbidity was significantly highest in PoR than other zones.
Dissolved Oxygen	<0.05	302	<0.05	83	<0.05	27	DO was significantly different for each survey, increasing in oxygenation from June < March < August < November. DO was significantly higher in PoR and WB and significantly lower in NW and RCI.
TSS	<0.05	40	<0.05	14	0.07	2	TSS was significantly higher in March than all other surveys. TSS was significantly highest in PoR than other zones.
Chlorophyll *a*	7.5	<1	<0.05	15	0.4	1	Chlorophyll *a* was significantly higher in March than all other surveys. Chlorophyll *a* was significantly highest in PoR than other zones.
Phosphorus	<0.05	70	<0.05	13	0.34	1.1	Phosphorus was significantly higher in March and August and significantly lower in June. Phosphorus was significantly highest in PoR than other zones.
FRP	<0.05	78	0.09	2	0.18	1.4	FRP was significantly higher in PoR than all other zones.
Nitrogen	<0.05	39	<0.05	16	<0.05	3	Nitrogen was significantly higher in March and were significantly lower in June and August. Nitrogen was significantly higher in PoR than all other zones.
Ammonia	<0.05	6	<0.05	14	0.07	2	Ammonia was significantly higher in March than all other surveys. Ammonia was significantly higher in POR and WB than all other zones.
Nitrogen oxides	<0.05	17	<0.05	3.7	0.08	2	NOx was significantly higher in March than all other surveys. NOx was significantly highest in PoR than other zones.
TOC	<0.05	11	<0.05	10	0.76	<1	TOC was significantly higher in March and August than all other surveys.

Parameter	Zone		Survey		Interaction		Comment
	P-value	F statistic	P-value	F statistic	P-value	F statistic	
							TOC was significantly higher in PoR than other zones.
DOC	<0.05	8	0.64	<1	<0.05	3	No significant difference between surveys. DOC was significantly higher in NW, WB and PoR.
Dissolved Al	<0.05	7	<0.05	11	<0.05	4	Dissolved Al was significantly higher in March and November than the other surveys. Dissolved Al was significantly higher in WB except PoR.
Total Al	<0.05	42	<0.05	11	<0.05	3	Total Al was significantly lower in June than all other surveys. Total Al was significantly highest in PoR than other zones.
Dissolved As	<0.05	28	<0.05	9	<0.05	4	Dissolved As was significantly higher in March and November. Dissolved As was significantly highest in RCI and RB than other zones.
Total As	<0.05	9	<0.05	7	0.05	2	Total As was significantly higher in March. Total As was significantly highest in PoR than all other zones.
Total Cr	<0.05	3	0.16	2	0.12	2	Total Cr was significantly higher in PoR than other zones.
Total Co	<0.05	9	<0.05	5	<0.05	4	Total Co was significantly higher in August except November. Total Co was significantly higher in PoR than all other zones.
Total Cu	0.59	<1	<0.05	4	0.23	1	Total Cu was significantly higher in June except November.
Total Gallium	<0.05	7	<0.05	7	<0.05	4	Total Ga was significantly higher in August. Total Ga was significantly higher in PoR than all other zones.
Dissolved Fe	<0.05	17	<0.05	96	<0.05	5	Dissolved Fe was significantly higher in November and March was significantly lower than the other surveys. Dissolved Fe in PoR, RCI and RB were significantly higher than all other zones.
Total Fe	<0.05	39	<0.05	8	<0.05	2	Total Fe was significantly lower in June than all other surveys. Total Fe in PoR was significantly higher than all other zones.
Dissolved Mn	<0.05	5	<0.05	4	0.89	<1	Dissolved Mn was significantly higher in November except for June. Dissolved Mn in PoR was significantly lower than all other sites except RB
Total Mn	<0.05	40	<0.05	9	0.05	2	Total Mn was significantly lower in June and significantly higher in March. Total Mn in PoR was significantly higher than all other zones
Dissolved Mo	<0.05	14	<0.05	28	<0.05	4	Dissolved Mo was significantly lower in August < June < March < November. Dissolved Mo was significantly higher in WB than all other zones.
Total Mo	<0.05	18	<0.05	7	0.06	2	Total Mo was significantly lower in August than all other surveys. Total Mo was significantly higher in WB than all other zones.
Total Ni	<0.05	24	<0.05	3	<0.05	4	Total Ni resulted in no differences between surveys. Total Ni significantly highest in PoR followed by NW than other zones.
Total Pb	<0.05	4	<0.05	4	<0.05	2	Total Pb was significantly higher in August, except November. Total Pb was significantly higher in PoR than all other zones.
Dissolved V	<0.05	4	0.8	<1	<0.05	27	Dissolved V significantly highest in WB than all other zones.
Total V	<0.05	29	<0.05	7	<0.05	3	Total V significantly lowest in June, except November. Total V significantly highest in PoR than all other zones.

Parameter	Zone		Survey		Interaction		Comment
	P-value	F statistic	P-value	F statistic	P-value	F statistic	
Dissolved Zn	<0.05	4	<0.05	14	<0.05	5	Dissolved Zn significantly lower in March. Dissolved Zn significantly highest in RCI, except for PoR and RB.
Total Zn	<0.05	4	<0.05	7	0.12	2	Total Zn significantly higher in June, except November. Total Zn significantly highest in PoR, except for WB and RCI.

REPORT OF ANALYSIS

Report No. RN1424928

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/240328
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 28-MAR-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	:

Lab Reg No.	Sample Ref	Sample Description
N24/006770	POR1	SEAWATER 25/03/2024 09:37
N24/006771	POR2A	SEAWATER 25/03/2024 10:08
N24/006772	POR2B	SEAWATER 25/03/2024 10:08
N24/006773	POR3	SEAWATER 25/03/2024 09:54

Lab Reg No.		N24/006770	N24/006771	N24/006772	N24/006773	
Date Sampled		25-MAR-2024	25-MAR-2024	25-MAR-2024	25-MAR-2024	
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	7.5	8.5	8.1	8.1	NT2_47
Arsenic Filtered	ug/L	1.2	1.4	1.3	1.5	NT2_47
Cadmium Filtered	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Cobalt Filtered	ug/L	<1	<1	<1	<1	NT2_47
Copper Filtered	ug/L	<1	<1	<1	<1	NT2_47
Gallium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Iron Filtered	ug/L	6.9	<5	<5	5.7	NT2_47
Lead Filtered	ug/L	<1	<1	<1	<1	NT2_47
Manganese Filtered	ug/L	<1	<1	<1	<1	NT2_47
Molybdenum Filtered	ug/L	10	10	9	10	NT2_47
Nickel Filtered	ug/L	<1	<1	<1	<1	NT2_47
Silver Filtered	ug/L	<1	<1	<1	<1	NT2_47
Tin Filtered	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Filtered	ug/L	2.1	2.2	2	2.2	NT2_47
Zinc Filtered	ug/L	<1	<1	<1	<1	NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	2800	2200	690	2660	NT2_47
Arsenic Total	ug/L	1.9	2	1.9	1.9	NT2_47
Cadmium Total	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Total	ug/L	2.5	1.7	<1	1.8	NT2_47
Cobalt Total	ug/L	<1	<1	<1	<1	NT2_47
Copper Total	ug/L	<1	<1	<1	<1	NT2_47
Gallium Total	ug/L	<1	<1	<1	<1	NT2_47
Iron Total	ug/L	2300	2040	940	2190	NT2_47

REPORT OF ANALYSIS

Report No. RN1424928

Lab Reg No.		N24/006770	N24/006771	N24/006772	N24/006773	
Date Sampled		25-MAR-2024	25-MAR-2024	25-MAR-2024	25-MAR-2024	
	Units					Method
Total Recoverable Trace Elements by ICP						
Lead Total	ug/L	<1	<1	<1	<1	NT2_47
Manganese Total	ug/L	52	45	41	37	NT2_47
Molybdenum Total	ug/L	9.3	9.6	8.9	11	NT2_47
Nickel Total	ug/L	1.8	1.2	1	2	NT2_47
Silver Total	ug/L	<1	<1	<1	<1	NT2_47
Tin Total	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Total	ug/L	4.9	4	3.5	4.9	NT2_47
Zinc Total	ug/L	<1	<1	<1	<1	NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_44
Dates						
Date extracted		5-APR-2024	5-APR-2024	5-APR-2024	5-APR-2024	
Date analysed		9-APR-2024	9-APR-2024	9-APR-2024	9-APR-2024	

Pankaj Barai, Analyst
Inorganics - NSW
Accreditation No. 198

15-APR-2024

Lab Reg No.		N24/006770	N24/006771	N24/006772	N24/006773	
Date Sampled		25-MAR-2024	25-MAR-2024	25-MAR-2024	25-MAR-2024	
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	80	97	87	67	NW_S13
Dates						
Date extracted		11-APR-2024	11-APR-2024	11-APR-2024	11-APR-2024	
Date analysed		12-APR-2024	12-APR-2024	12-APR-2024	12-APR-2024	

Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

15-APR-2024

REPORT OF ANALYSIS

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/240328
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 28-MAR-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	:

Lab Reg No.	Sample Ref	Sample Description
N24/006774	FB5	FRESHWATER 25/03/2024 12:00

Lab Reg No.		**N24/006774**				
Date Sampled		**25-MAR-2024**				
	Units					**Method**
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	<5				NT2_47
Arsenic Filtered	ug/L	<1				NT2_47
Cadmium Filtered	ug/L	<0.1				NT2_47
Chromium Filtered	ug/L	<1				NT2_47
Cobalt Filtered	ug/L	<1				NT2_47
Copper Filtered	ug/L	<1				NT2_47
Gallium Filtered	ug/L	<1				NT2_47
Iron Filtered	ug/L	<5				NT2_47
Lead Filtered	ug/L	<1				NT2_47
Manganese Filtered	ug/L	<1				NT2_47
Molybdenum Filtered	ug/L	<1				NT2_47
Nickel Filtered	ug/L	<1				NT2_47
Silver Filtered	ug/L	<1				NT2_47
Tin Filtered	ug/L	<1				NT2_47
Vanadium Filtered	ug/L	<1				NT2_47
Zinc Filtered	ug/L	<1				NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05				NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	<5				NT2_47
Arsenic Total	ug/L	<1				NT2_47
Cadmium Total	ug/L	<0.1				NT2_47
Chromium Total	ug/L	<1				NT2_47
Cobalt Total	ug/L	<1				NT2_47
Copper Total	ug/L	<1				NT2_47
Gallium Total	ug/L	<1				NT2_47
Iron Total	ug/L	<5				NT2_47
Lead Total	ug/L	<1				NT2_47
Manganese Total	ug/L	<1				NT2_47
Molybdenum Total	ug/L	<1				NT2_47

REPORT OF ANALYSIS

Lab Reg No.		N24/006774				
Date Sampled		25-MAR-2024				
	Units					Method
Total Recoverable Trace Elements by ICP						
Nickel Total	ug/L	<1				NT2_47
Silver Total	ug/L	<1				NT2_47
Tin Total	ug/L	<1				NT2_47
Vanadium Total	ug/L	<1				NT2_47
Zinc Total	ug/L	<1				NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.1				NT2_44
Dates						
Date extracted		5-APR-2024				
Date analysed		9-APR-2024				

Pankaj Barai, Analyst
Inorganics - NSW
Accreditation No. 198

15-APR-2024

Lab Reg No.		N24/006774				
Date Sampled		25-MAR-2024				
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	<2				NW_S13
Dates						
Date extracted		11-APR-2024				
Date analysed		12-APR-2024				

Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

15-APR-2024

REPORT OF ANALYSIS

Total = acid extractable elements

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

* Denotes the analyte or test method is not within our ISO/IEC 17025 scope of accreditation.

Measurement Uncertainty is available upon request.

Note: Sampling date(s) have been provided by the client.
The testing was undertaken at: 105 Delhi Road, North Ryde, NSW, 2113

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240327**
VISI05/240328
VISI05/240328/2
Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/006795**				**N24/006795**
Aluminium Filtered	NT2_47	ug/L	5	<5	8.4	8.3	1	104	98
Arsenic Filtered	NT2_47	ug/L	1	<1	1.4	1.3	7	113	108
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	104	101
Chromium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	96
Cobalt Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	111	100
Copper Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	98
Gallium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	95	104
Iron Filtered	NT2_47	ug/L	5	<5	<5	5.2	NA	102	96
Lead Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	96
Manganese Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	97
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	<0.05	<0.05	NA	102	110
Molybdenum Filtered	NT2_47	ug/L	1	<1	13	13	0	106	106
Nickel Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	110	98
Silver Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	93	95
Tin Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	103
Vanadium Filtered	NT2_47	ug/L	1	<1	2.3	2.4	4	93	109
Zinc Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	96	101
Aluminium Total	NT2_47	ug/L	5	<5	NA	NA	NA	104	98
Arsenic Total	NT2_47	ug/L	1	<1	1.8	1.8	0	113	105
Cadmium Total	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	104	104
Chromium Total	NT2_47	ug/L	1	<1	<1	<1	NA	102	101
Cobalt Total	NT2_47	ug/L	1	<1	<1	<1	NA	111	102
Copper Total	NT2_47	ug/L	1	<1	<1	<1	NA	102	97
Gallium Total	NT2_47	ug/L	1	<1	<1	<1	NA	95	96
Iron Total	NT2_47	ug/L	5	<5	1240	1380	11	102	99
Lead Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	104
Manganese Total	NT2_47	ug/L	1	<1	26	28	7	102	97
Mercury - Total	NT2_44	ug/L	0.05	0.05	<0.05	<0.05	NA	102	98
Molybdenum Total	NT2_47	ug/L	1	<1	13	13	0	106	118
Nickel Total	NT2_47	ug/L	1	<1	<1	1.1	NA	110	97
Silver Total	NT2_47	ug/L	1	<1	<1	<1	NA	93	104
Tin Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	95

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Vanadium Total	NT2_47	ug/L	1	<1	4.5	4.5	0	93	97
Zinc Total	NT2_47	ug/L	1	<1	<1	<1	NA	96	108

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable

Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.

Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.

#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.

**: reference value not available

Signed: 

Dr Andrew Evans
Inorganics, NMI (North Ryde)

Date: 12/04/2024

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240328** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/006770**				**N24/006770**
Suspended Solids - Total	NW_S13	mg/L	2	<2	82	78	5	1120	NA

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable
Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.
Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.
#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.
**: reference value not available

Signed: 
Dr Andrew Evans
Inorganics, NMI (North Ryde)
Date: 15/04/2024

CERTIFICATE OF ANALYSIS

Work Order	: **EB2410747**	Page	: 1 of 2
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Customer Services EB
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: PCIMP POR MARCH 2024	Date Samples Received	: 02-Apr-2024 15:00
Order number	: ----	Date Analysis Commenced	: 04-Apr-2024
C-O-C number	: ----	Issue Date	: 05-Apr-2024 12:19
Sampler	: ----		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Sample ID*	**POR1**	**POR2A**	**POR2B**	**POR3**	**FB5**
			Sampling date / time	25-Mar-2024 11:23	25-Mar-2024 11:02	25-Mar-2024 11:02	25-Mar-2024 10:35	25-Mar-2024 10:22
Compound	*CAS Number*	*LOR*	*Unit*	**EB2410747-001**	**EB2410747-002**	**EB2410747-003**	**EB2410747-004**	**EB2410747-005**
				Result	Result	Result	Result	Result
EP008CA: Chlorophyll a								
Chlorophyll a	----	0.02	µg/L	**3.00**	**1.31**	**1.15**	**1.00**	<0.02

Inter-Laboratory Testing

Analysis conducted by ALS Canberra, NATA accreditation no. 992.

(WATER) EP008CA: Chlorophyll a

QUALITY CONTROL REPORT

Work Order	: **EB2410747**	Page	: 1 of 3
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Customer Services EB
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3243 7222
Project	: PCIMP POR MARCH 2024	Date Samples Received	: 02-Apr-2024
Order number	: ----	Date Analysis Commenced	: 04-Apr-2024
C-O-C number	: ----	Issue Date	: 05-Apr-2024
Sampler	: ----		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP008CA: Chlorophyll a (QC Lot: 5703487)									
CA2402151-001	Anonymous	EP008: Chlorophyll a	----	0.02	µg/L	4.49	4.42	1.7	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP008CA: Chlorophyll a (QCLot: 5703487)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	102	85.0	113

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Queensland Government

Forensic and Scientific Services

CERTIFICATE OF ANALYSIS

CLIENT : (HVEC)

Vision Environment ANZ
3/165 Auckland St
GLADSTONE QLD 4680
felicity@visionenvironment.com.au

ATTN: Felicity Melville

Laboratory Reference	: SSP0088097
Client Order No.	: MELVILLE_F
Quote Number	: 23IN1102_F Melville
Date Received	: 03-Apr-2024
Date Commenced	: 04-Apr-2024
Laboratory Number/s	: SS24KN1264-SS24KN1268

Number of Samples : 5

Reason for Analysis : Environmental research

Method/s of Analysis :
13796 - Nitrogen (Ammonia) by Flow Injection Analysis
13798 - Nitrogen (Oxides) by Flow Injection Analysis
13799 - Phosphorus (Filterable Reactive) by Flow Injection Analysis
13800 - Phosphorus (Total) by Simultaneous Persulfate or Kjeldahl Digestion
13802 - Nitrogen (Total) by Simultaneous Persulfate Digestion
16628 - Total Organic Carbon by High Temperature Oxidation

NATA Accredited Laboratory 41 Accredited for compliance with ISO/IEC 17025 - Testing.

Matthew Cross
Laboratory Technician, Inorganic Chemistry
15-Apr-2024

SS24KN1264-SS24KN1268

Enquiries **Matthew Cross**
Phone **(+61 7) 3096 2805**
Email **matthew.cross@health.qld.gov.au**

39 Kessels Road
Coopers Plains QLD 4108
AUSTRALIA

PO Box 594
Archerfield QLD 4108
AUSTRALIA

Phone (+61) 1800 000 FSS (377)
Fax (+61 7) 3096 2977
Email FSS@health.qld.gov.au

Client Reference				POR1	POR2A	POR2B	POR3
Sample Type				Water Sea	Water Sea	Water Sea	Water Sea
Sampling Time/Date				09:37 25-Mar-2024	10:08 25-Mar-2024	10:08 25-Mar-2024	09:54 25-Mar-2024
Sample Description				Filtered and Frozen	Filtered and Frozen	Filtered and Frozen	Filtered and Frozen
Method	Nutrients	Units	Reporting Limit	SS24KN1264	SS24KN1265	SS24KN1266	SS24KN1267
13796	Ammonia	mg/L as N	0.002	0.014	0.011	0.016	0.010
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	0.016	0.008	0.008	0.010
13798	Nitrogen Oxides	mg/L as N	0.002	0.044	0.024	0.030	0.045
13800	Total Phosphorus	mg/L as P	0.003	0.055	0.044	0.045	0.040
13802	Total Nitrogen	mg/L as N	0.02	0.31	0.23	0.24	0.25
16628	Total Organic Carbon as NPOC	mg/L as C	1	2	2	2	2
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	1.2	1.1	1.1	1.0

Client Reference				FB5
Sample Type				Water Sea
Sampling Time/Date				12:00 25-Mar-2024
Sample Description				Filtered and Frozen
Method	Nutrients	Units	Reporting Limit	SS24KN1268
13796	Ammonia	mg/L as N	0.002	0.005
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	< 0.002
13798	Nitrogen Oxides	mg/L as N	0.002	< 0.002
13800	Total Phosphorus	mg/L as P	0.003	< 0.003
13802	Total Nitrogen	mg/L as N	0.02	< 0.02
16628	Total Organic Carbon as NPOC	mg/L as C	1	< 1
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	< 0.5

REPORT OF ANALYSIS

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/240619/1
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 19-JUN-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N24/013715	POR1	SEAWATER 12/06/2024 7:29
N24/013716	POR2	SEAWATER 13/06/2024 8:10
N24/013717	POR3A	SEAWATER 13/06/2024 7:48
N24/013718	POR3B	SEAWATER 13/06/2024 7:48

Lab Reg No.		N24/013715	N24/013716	N24/013717	N24/013718	
Date Sampled		12-JUN-2024	13-JUN-2024	13-JUN-2024	13-JUN-2024	
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	<5	<5	<5	<5	NT2_47
Arsenic Filtered	ug/L	1.1	1.1	1.2	1.2	NT2_47
Cadmium Filtered	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Cobalt Filtered	ug/L	<1	<1	<1	<1	NT2_47
Copper Filtered	ug/L	<1	<1	<1	<1	NT2_47
Gallium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Iron Filtered	ug/L	8.8	6.7	8.5	8.1	NT2_47
Lead Filtered	ug/L	<1	<1	<1	<1	NT2_47
Manganese Filtered	ug/L	<1	<1	<1	<1	NT2_47
Molybdenum Filtered	ug/L	10	11	11	10	NT2_47
Nickel Filtered	ug/L	<1	<1	<1	<1	NT2_47
Silver Filtered	ug/L	<1	<1	<1	<1	NT2_47
Tin Filtered	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Filtered	ug/L	2	2.1	1.9	2	NT2_47
Zinc Filtered	ug/L	<1	<1	<1	<1	NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	1840	950	1000	960	NT2_47
Arsenic Total	ug/L	1.4	1.3	1.5	1.6	NT2_47
Cadmium Total	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Total	ug/L	1.1	<1	1	<1	NT2_47
Cobalt Total	ug/L	<1	<1	<1	<1	NT2_47
Copper Total	ug/L	<1	<1	<1	<1	NT2_47
Gallium Total	ug/L	<1	<1	<1	<1	NT2_47
Iron Total	ug/L	1630	780	1440	1040	NT2_47

REPORT OF ANALYSIS

Lab Reg No.		N24/013715	N24/013716	N24/013717	N24/013718	
Date Sampled		12-JUN-2024	13-JUN-2024	13-JUN-2024	13-JUN-2024	
	Units					Method
Total Recoverable Trace Elements by ICP						
Lead Total	ug/L	<1	<1	<1	<1	NT2_47
Manganese Total	ug/L	21	16	33	30	NT2_47
Molybdenum Total	ug/L	10	10	12	12	NT2_47
Nickel Total	ug/L	1.5	<1	1.0	<1	NT2_47
Silver Total	ug/L	<1	<1	<1	<1	NT2_47
Tin Total	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Total	ug/L	3.8	3.2	4.5	4.1	NT2_47
Zinc Total	ug/L	6.9	6.2	5.5	3.4	NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Dates						
Date extracted		21-JUN-2024	21-JUN-2024	21-JUN-2024	21-JUN-2024	
Date analysed		25-JUN-2024	25-JUN-2024	25-JUN-2024	25-JUN-2024	

N24/013715
- N24/013719
Total and filtered zinc results have been amended to report ICP-MS not ICP-OES results.

Pankaj Barai, Analyst
Inorganics - NSW
Accreditation No. 198

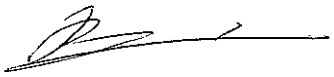
Andrew Evans, Analyst
Inorganics - NSW
Accreditation No. 198

12-JUL-2024

Lab Reg No.		N24/013715	N24/013716	N24/013717	N24/013718	
Date Sampled		12-JUN-2024	13-JUN-2024	13-JUN-2024	13-JUN-2024	
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	36	20	52	40	NW_S13
Dates						
Date extracted		1-JUL-2024	1-JUL-2024	1-JUL-2024	1-JUL-2024	
Date analysed		1-JUL-2024	1-JUL-2024	1-JUL-2024	1-JUL-2024	

REPORT OF ANALYSIS

Lab Reg No.		N24/013715	N24/013716	N24/013717	N24/013718	
Date Sampled		12-JUN-2024	13-JUN-2024	13-JUN-2024	13-JUN-2024	
	Units					Method



Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

12-JUL-2024

REPORT OF ANALYSIS

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/240619/1
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 19-JUN-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N24/013719	FB5	FRESHWATER 12/06/2024 12:00

Lab Reg No.		N24/013719				
Date Sampled		12-JUN-2024				
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	<5				NT2_47
Arsenic Filtered	ug/L	<1				NT2_47
Cadmium Filtered	ug/L	<0.1				NT2_47
Chromium Filtered	ug/L	<1				NT2_47
Cobalt Filtered	ug/L	<1				NT2_47
Copper Filtered	ug/L	<1				NT2_47
Gallium Filtered	ug/L	<1				NT2_47
Iron Filtered	ug/L	<5				NT2_47
Lead Filtered	ug/L	<1				NT2_47
Manganese Filtered	ug/L	<1				NT2_47
Molybdenum Filtered	ug/L	<1				NT2_47
Nickel Filtered	ug/L	<1				NT2_47
Silver Filtered	ug/L	<1				NT2_47
Tin Filtered	ug/L	<1				NT2_47
Vanadium Filtered	ug/L	<1				NT2_47
Zinc Filtered	ug/L	1.4				NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05				NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	<5				NT2_47
Arsenic Total	ug/L	<1				NT2_47
Cadmium Total	ug/L	<0.1				NT2_47
Chromium Total	ug/L	<1				NT2_47
Cobalt Total	ug/L	<1				NT2_47
Copper Total	ug/L	<1				NT2_47
Gallium Total	ug/L	<1				NT2_47
Iron Total	ug/L	<5				NT2_47
Lead Total	ug/L	<1				NT2_47
Manganese Total	ug/L	<1				NT2_47
Molybdenum Total	ug/L	<1				NT2_47

REPORT OF ANALYSIS

Lab Reg No.		N24/013719				
Date Sampled		12-JUN-2024				
	Units					Method
Total Recoverable Trace Elements by ICP						
Nickel Total	ug/L	<1				NT2_47
Silver Total	ug/L	<1				NT2_47
Tin Total	ug/L	<1				NT2_47
Vanadium Total	ug/L	<1				NT2_47
Zinc Total	ug/L	<1				NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.05				NT2_44
Dates						
Date extracted		21-JUN-2024				
Date analysed		25-JUN-2024				

Pankaj Barai, Analyst
Inorganics - NSW
Accreditation No. 198

Andrew Evans, Analyst
Inorganics - NSW
Accreditation No. 198

12-JUL-2024

Lab Reg No.		N24/013719				
Date Sampled		12-JUN-2024				
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	<2				NW_S13
Dates						
Date extracted		1-JUL-2024				
Date analysed		1-JUL-2024				

Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

12-JUL-2024

REPORT OF ANALYSIS

Total = acid extractable elements

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

This Report supersedes reports: *RN1433421*

Measurement Uncertainty is available upon request.

Note: Sampling date(s) have been provided by the client.
The testing was undertaken at: 105 Delhi Road, North Ryde, NSW, 2113

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240619/1** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/013715**				**N24/013715**
Suspended Solids - Total	NW_S13	mg/L	2	<2	34	38	11	96	NA

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable
Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.
Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.
#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.
**: reference value not available

Signed: 
Dr Andrew Evans
Inorganics, NMI (North Ryde)
Date: 02/07/2024

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240619/1** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/013715**				**N24/013715**
Aluminium Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	104	NA
Arsenic Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	92	NA
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	106	NA
Chromium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	99	NA
Cobalt Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	97	NA
Copper Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	96	NA
Gallium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	95	NA
Iron Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	102	NA
Lead Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	98	NA
Manganese Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	109	NA
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	103	NA
Molybdenum Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	NA
Nickel Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	95	NA
Silver Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	113	NA
Tin Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	104	NA
Vanadium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	NA
Zinc Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	103	NA
Aluminium Total	NT2_47	ug/L	5	<5	NA	NA	NA	104	NA
Arsenic Total	NT2_47	ug/L	1	<1	NA	NA	NA	92	NA
Cadmium Total	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	106	NA
Chromium Total	NT2_47	ug/L	1	<1	NA	NA	NA	99	NA
Cobalt Total	NT2_47	ug/L	1	<1	NA	NA	NA	97	NA
Copper Total	NT2_47	ug/L	1	<1	NA	NA	NA	96	NA
Gallium Total	NT2_47	ug/L	1	<1	NA	NA	NA	95	NA
Iron Total	NT2_47	ug/L	5	<5	NA	NA	NA	102	NA
Lead Total	NT2_47	ug/L	1	<1	NA	NA	NA	98	NA
Manganese Total	NT2_47	ug/L	1	<1	NA	NA	NA	109	NA
Mercury - Total	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	103	NA
Molybdenum Total	NT2_47	ug/L	1	<1	NA	NA	NA	100	NA
Nickel Total	NT2_47	ug/L	1	<1	NA	NA	NA	95	NA
Silver Total	NT2_47	ug/L	1	<1	NA	NA	NA	113	NA
Tin Total	NT2_47	ug/L	1	<1	NA	NA	NA	104	NA

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Vanadium Total	NT2_47	ug/L	1	<1	NA	NA	NA	100	NA
Zinc Total	NT2_47	ug/L	1	<1	NA	NA	NA	103	NA

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable

Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.

Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.

#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.

**: reference value not available

Signed: 

Dr Andrew Evans
Inorganics, NMI (North Ryde)

Date: 03/07/2024

CERTIFICATE OF ANALYSIS

Work Order	: **EB2420602**	Page	: 1 of 2
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: POR June 2024	Date Samples Received	: 18-Jun-2024 10:00
Order number	: ----	Date Analysis Commenced	: 24-Jun-2024
C-O-C number	: ----	Issue Date	: 26-Jun-2024 11:34
Sampler	: Anna Skillington		
Site	: ----		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	**POR 1**	**POR 2**	**POR 3A**	**POR 3B**	**FB5**
			Sampling date / time	12-Jun-2024 07:29	12-Jun-2024 08:10	12-Jun-2024 07:48	12-Jun-2024 07:48	12-Jun-2024 12:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2420602-001**	**EB2420602-002**	**EB2420602-003**	**EB2420602-004**	**EB2420602-005**
				Result	Result	Result	Result	Result
EP008CA: Chlorophyll a								
Chlorophyll a	----	0.02	µg/L	**1.77**	**1.22**	**2.01**	**1.27**	<0.02

Inter-Laboratory Testing

Analysis conducted by ALS Canberra, NATA accreditation no. 992.

(WATER) EP008CA: Chlorophyll a

QUALITY CONTROL REPORT

Work Order	: **EB2420602**	Page	: 1 of 3
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: POR June 2024	Date Samples Received	: 18-Jun-2024
Order number	: ----	Date Analysis Commenced	: 24-Jun-2024
C-O-C number	: ----	Issue Date	: 26-Jun-2024
Sampler	: Anna Skillington		
Site	: ----		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP008CA: Chlorophyll a (QCLot: 5878089)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	98.3	85.0	113
EP008CA: Chlorophyll a (QCLot: 5878090)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	97.6	85.0	113

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Queensland Government

Forensic and Scientific Services

CERTIFICATE OF ANALYSIS

CLIENT :
(HVEC)

Vision Environment ANZ
3/165 Auckland St
GLADSTONE QLD 4680
felicity@visionenvironment.com.au

ATTN: Felicity Melville

Laboratory Reference : SSP0089173
Client Order No. : MELVILLE_F
Client Batch Reference : POR JUNE 2024
Date Received : 18-Jun-2024
Date Commenced : 19-Jun-2024
Laboratory Number/s : SS24KN2355-SS24KN2359

Number of Samples : 5

Reason for Analysis : Environmental Research

Method/s of Analysis : 13796 - Nitrogen (Ammonia) by Flow Injection Analysis
13798 - Nitrogen (Oxides) by Flow Injection Analysis
13799 - Phosphorus (Filterable Reactive) by Flow Injection Analysis
13800 - Phosphorus (Total) by Simultaneous Persulfate or Kjeldahl Digestion
13802 - Nitrogen (Total) by Simultaneous Persulfate Digestion

NATA Accredited
Laboratory 41
Accredited for compliance with ISO/IEC 17025 - Testing.
WORLD RECOGNISED ACCREDITATION

Matthew Cross
Laboratory Technician, Inorganic Chemistry
25-Jun-2024

SS24KN2355-SS24KN2359

Enquiries **Matthew Cross**
Phone **(+61 7) 3096 2805**
Email **matthew.cross@health.qld.gov.au**

39 Kessels Road
Coopers Plains QLD 4108
AUSTRALIA

PO Box 594
Archerfield QLD 4108
AUSTRALIA

Phone (+61) 1800 000 FSS (377)
Fax (+61 7) 3096 2977
Email FSS@health.qld.gov.au

Client Reference				POR1	POR2	POR3A	POR3B
Sample Type				Water	Water	Water	Water
Sampling Time/Date				07:29 12-Jun-2024	08:10 12-Jun-2024	07:48 12-Jun-2024	07:48 12-Jun-2024
Sample Description							
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN2355**	**SS24KN2356**	**SS24KN2357**	**SS24KN2358**
13796	Ammonia	mg/L as N	0.002	< 0.002	< 0.002	0.002	0.007
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	0.014	0.011	0.011	0.010
13798	Nitrogen Oxides	mg/L as N	0.002	0.030	0.022	0.023	0.022
13800	Total Phosphorus	mg/L as P	0.003	0.036	0.028	0.042	0.041
13802	Total Nitrogen	mg/L as N	0.02	0.20	0.18	0.22	0.21
16628	Total Organic Carbon as NPOC	mg/L as C	1	2	1	2	2
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	1.2	1.1	1.2	1.1

Client Reference				FB5
Sample Type				Water
Sampling Time/Date				12:00 12-Jun-2024
Sample Description				
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN2359**
13796	Ammonia	mg/L as N	0.002	0.002
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	< 0.002
13798	Nitrogen Oxides	mg/L as N	0.002	< 0.002
13800	Total Phosphorus	mg/L as P	0.003	< 0.003
13802	Total Nitrogen	mg/L as N	0.02	< 0.02
16628	Total Organic Carbon as NPOC	mg/L as C	1	< 1
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	< 0.5

REPORT OF ANALYSIS

Report No. RN1440360

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/240823
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 23-AUG-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

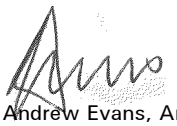
Lab Reg No.	Sample Ref	Sample Description
N24/017996	POR1A	SEAWATER 20/08/2024 9:40
N24/017998	POR2	SEAWATER 20/08/2024 9:15
N24/017999	POR3	SEAWATER 20/08/2024 9:26
N24/018000	FB5	SEAWATER 20/08/2024 12:00

Lab Reg No.		N24/017996	N24/017998	N24/017999	N24/018000	
Date Sampled		20-AUG-2024	20-AUG-2024	20-AUG-2024	20-AUG-2024	
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	<5	<5	<5	<5	NT2_47
Arsenic Filtered	ug/L	1	1.1	1.1	<1	NT2_47
Cadmium Filtered	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Cobalt Filtered	ug/L	<1	<1	<1	<1	NT2_47
Copper Filtered	ug/L	<1	<1	<1	<1	NT2_47
Gallium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Iron Filtered	ug/L	9.6	9	6.3	<5	NT2_47
Lead Filtered	ug/L	<1	<1	<1	<1	NT2_47
Manganese Filtered	ug/L	<1	<1	<1	<1	NT2_47
Molybdenum Filtered	ug/L	9	9.7	8.4	<1	NT2_47
Nickel Filtered	ug/L	<1	<1	<1	<1	NT2_47
Silver Filtered	ug/L	<1	<1	<1	<1	NT2_47
Tin Filtered	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Filtered	ug/L	1.8	1.8	1.8	<1	NT2_47
Zinc Filtered	ug/L	1.4	1.6	3.1	<1	NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	6300	6280	2130	<5	NT2_47
Arsenic Total	ug/L	2.2	2.3	1.4	<1	NT2_47
Cadmium Total	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Total	ug/L	6.8	6.5	2.5	<1	NT2_47
Cobalt Total	ug/L	1.5	1.4	<1	<1	NT2_47
Copper Total	ug/L	<1	<1	<1	<1	NT2_47
Gallium Total	ug/L	1.5	1.6	<1	<1	NT2_47
Iron Total	ug/L	4450	4380	1510	<5	NT2_47

REPORT OF ANALYSIS

Report No. RN1440360

Lab Reg No.		N24/017996	N24/017998	N24/017999	N24/018000	
Date Sampled		20-AUG-2024	20-AUG-2024	20-AUG-2024	20-AUG-2024	
	Units					Method
Total Recoverable Trace Elements by ICP						
Lead Total	ug/L	1.2	1.3	<1	<1	NT2_47
Manganese Total	ug/L	53	49	19	<1	NT2_47
Molybdenum Total	ug/L	9.6	10	8.9	<1	NT2_47
Nickel Total	ug/L	5.1	4.5	2.1	<1	NT2_47
Silver Total	ug/L	<1	<1	<1	<1	NT2_47
Tin Total	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Total	ug/L	9.7	9.2	4.3	<1	NT2_47
Zinc Total	ug/L	6.2	6.5	2.4	<1	NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Dates						
Date extracted		9-SEP-2024	9-SEP-2024	9-SEP-2024	9-SEP-2024	
Date analysed		10-SEP-2024	10-SEP-2024	10-SEP-2024	10-SEP-2024	



Andrew Evans, Analyst
Inorganics - NSW
Accreditation No. 198

10-SEP-2024

Lab Reg No.		N24/017996	N24/017998	N24/017999	N24/018000	
Date Sampled		20-AUG-2024	20-AUG-2024	20-AUG-2024	20-AUG-2024	
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	65	39	25	<2	NW_S13
Dates						
Date extracted		28-AUG-2024	28-AUG-2024	28-AUG-2024	28-AUG-2024	
Date analysed		29-AUG-2024	29-AUG-2024	29-AUG-2024	29-AUG-2024	

Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

10-SEP-2024

REPORT OF ANALYSIS

Total = acid extractable elements

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

Measurement Uncertainty is available upon request.

Note: Sampling date(s) have been provided by the client.
The testing was undertaken at: 105 Delhi Road, North Ryde, NSW, 2113

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240823** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/017996**				**N24/017996**
Suspended Solids - Total	NW_S13	mg/L	2	<2	61	69	12	100	NA

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable
Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.
Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.
#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.
**: reference value not available

Signed: 
Dr Andrew Evans
Inorganics, NMI (North Ryde)
Date: 06/09/2024

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/240823** Matrix: Saline Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/017999**				**N24/017999**
Aluminium Filtered	NT2_47	ug/L	5	<5	<5	<5	NA	108	97
Arsenic Filtered	NT2_47	ug/L	1	<1	1.1	1	10	99	100
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	101	100
Chromium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	99
Cobalt Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	100	99
Copper Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	99	100
Gallium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	97
Iron Filtered	NT2_47	ug/L	5	<5	6.3	6.4	2	110	100
Lead Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	101	99
Manganese Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	107	97
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	<0.05	<0.05	NA	104	103
Molybdenum Filtered	NT2_47	ug/L	1	<1	8.6	8.3	4	100	99
Nickel Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	100	99
Silver Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	98	101
Tin Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	98
Vanadium Filtered	NT2_47	ug/L	1	<1	1.8	1.8	0	102	99
Zinc Filtered	NT2_47	ug/L	1	<1	2.5	3.7	39	100	98
Aluminium Total	NT2_47	ug/L	5	<5	2100	2150	2	94	106
Arsenic Total	NT2_47	ug/L	1	<1	1.3	1.4	7	101	97
Cadmium Total	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	99	101
Chromium Total	NT2_47	ug/L	1	<1	2.5	2.5	0	105	97
Cobalt Total	NT2_47	ug/L	1	<1	<1	<1	NA	103	98
Copper Total	NT2_47	ug/L	1	<1	<1	<1	NA	103	98
Gallium Total	NT2_47	ug/L	1	<1	<1	<1	NA	101	99
Iron Total	NT2_47	ug/L	5	<5	1500	1520	1	91	110
Lead Total	NT2_47	ug/L	1	<1	<1	<1	NA	93	104
Manganese Total	NT2_47	ug/L	1	<1	18	19	5	104	99
Mercury - Total	NT2_44	ug/L	0.05	<0.05	<0.05	<0.05	NA	88	117
Molybdenum Total	NT2_47	ug/L	1	<1	8.6	9.1	6	101	99
Nickel Total	NT2_47	ug/L	1	<1	2.1	2.2	5	104	98
Silver Total	NT2_47	ug/L	1	<1	<1	<1	NA	98	102
Tin Total	NT2_47	ug/L	1	<1	<1	<1	NA	99	100
Vanadium Total	NT2_47	ug/L	1	<1	4.3	4.4	2	104	98
Zinc Total	NT2_47	ug/L	1	<1	2.3	2.5	8	104	99

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/018000**				**N24/018000**
Aluminium Filtered	NT2_47	ug/L	5	<5	<5	<5	NA	108	98
Arsenic Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	99	101
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	101	101
Chromium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	101
Cobalt Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	100	100
Copper Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	99	101
Gallium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	102
Iron Filtered	NT2_47	ug/L	5	<5	<5	<5	NA	110	98
Lead Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	101	100
Manganese Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	107	101
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	<0.05	<0.05	NA	104	105
Molybdenum Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	100	102
Nickel Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	100	101
Silver Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	98	101
Tin Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	104	102
Vanadium Filtered	NT2_47	ug/L	1	<1	<1	<1	NA	102	101
Zinc Filtered	NT2_47	ug/L	1	<1	1.3	1	26	100	100
Aluminium Total	NT2_47	ug/L	5	<5	<5	<5	NA	94	104
Arsenic Total	NT2_47	ug/L	1	<1	<1	<1	NA	101	99
Cadmium Total	NT2_47	ug/L	0.1	<0.1	<0.1	<0.1	NA	99	101
Chromium Total	NT2_47	ug/L	1	<1	<1	<1	NA	105	98
Cobalt Total	NT2_47	ug/L	1	<1	<1	<1	NA	103	98
Copper Total	NT2_47	ug/L	1	<1	<1	<1	NA	103	99
Gallium Total	NT2_47	ug/L	1	<1	<1	<1	NA	101	99
Iron Total	NT2_47	ug/L	5	<5	<5	<5	NA	91	104
Lead Total	NT2_47	ug/L	1	<1	<1	<1	NA	93	99
Manganese Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	99
Mercury - Total	NT2_44	ug/L	0.05	<0.05	<0.05	<0.05	NA	88	93
Molybdenum Total	NT2_47	ug/L	1	<1	<1	<1	NA	101	101
Nickel Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	99
Silver Total	NT2_47	ug/L	1	<1	<1	<1	NA	98	100
Tin Total	NT2_47	ug/L	1	<1	<1	<1	NA	99	99
Vanadium Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	99
Zinc Total	NT2_47	ug/L	1	<1	<1	<1	NA	104	99

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable

Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.

Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.

#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.

**: reference value not available

Signed: 

Dr Andrew Evans
Inorganics, NMI (North Ryde)

Date: 10/09/2024

CERTIFICATE OF ANALYSIS

Work Order	: **EB2429131**	Page	: 1 of 2
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: PoR August 2024	Date Samples Received	: 27-Aug-2024 10:45
Order number	: ----	Date Analysis Commenced	: 28-Aug-2024
C-O-C number	: ----	Issue Date	: 28-Aug-2024 15:45
Sampler	: ----		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	POR1A	POR1B	POR2	POR3	FB5
			Sampling date / time	20-Aug-2024 09:40	20-Aug-2024 09:40	20-Aug-2024 09:15	20-Aug-2024 09:26	20-Aug-2024 12:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2429131-001**	**EB2429131-002**	**EB2429131-003**	**EB2429131-004**	**EB2429131-005**
				Result	Result	Result	Result	Result
EP008CA: Chlorophyll a								
Chlorophyll a	----	0.02	µg/L	**1.19**	**1.77**	**1.91**	**1.01**	<0.02

Inter-Laboratory Testing

Analysis conducted by ALS Canberra, NATA accreditation no. 992.

(WATER) EP008CA: Chlorophyll a

QUALITY CONTROL REPORT

Work Order	: **EB2429131**	Page	: 1 of 3
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: PoR August 2024	Date Samples Received	: 27-Aug-2024
Order number	: ----	Date Analysis Commenced	: 28-Aug-2024
C-O-C number	: ----	Issue Date	: 28-Aug-2024
Sampler	: ----		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP008CA: Chlorophyll a (QC Lot: 6017615)									
CA2405248-005	Anonymous	EP008: Chlorophyll a	----	0.02	µg/L	3.78	3.80	0.6	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP008CA: Chlorophyll a (QCLot: 6017615)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	90.6	85.0	113
EP008CA: Chlorophyll a (QCLot: 6017616)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	90.1	85.0	113

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Queensland Government

Forensic and Scientific Services

CERTIFICATE OF ANALYSIS

CLIENT : (HVEC)

Vision Environment ANZ
3/165 Auckland St
GLADSTONE QLD 4680
felicity@visionenvironment.com.au

ATTN: F Melville

Laboratory Reference	:	SSP0090106
Client Order No.	:	MELVILLE_F
Quote Number	:	23IN1102_F Melville
Client Batch Reference	:	POR August 2024
Date Received	:	27-Aug-2024
Date Commenced	:	29-Aug-2024
Laboratory Number/s	:	SS24KN3351-SS24KN3355

Number of Samples : 5

Reason for Analysis : Environmental Research

Method/s of Analysis :
13796 - Nitrogen (Ammonia) by Flow Injection Analysis
13798 - Nitrogen (Oxides) by Flow Injection Analysis
13799 - Phosphorus (Filterable Reactive) by Flow Injection Analysis
13800 - Phosphorus (Total) by Simultaneous Persulfate or Kjeldahl Digestion
13802 - Nitrogen (Total) by Simultaneous Persulfate Digestion
16628 - Total Organic Carbon by High Temperature Oxidation

NATA Accredited Laboratory 41
Accredited for compliance with ISO/IEC 17025 - Testing.

.....
Jane Pullar
Laboratory Technician, Inorganic Chemistry
09-Sep-2024

SS24KN3351-SS24KN3355

Enquiries **Jane Pullar**
Phone **(+61 7) 30962807**
Email **jane.pullar@health.qld.gov.au**

39 Kessels Road
Coopers Plains QLD 4108
AUSTRALIA

PO Box 594
Archerfield QLD 4108
AUSTRALIA

Phone (+61) 1800 000 FSS (377)
Fax (+61 7) 3096 2977
Email FSS@health.qld.gov.au

Client Reference				POR1A	POR1B	POR2	POR3
Sample Type				Water	Water	Water	Water
Sampling Time/Date				09:40 20-Aug-2024	09:40 20-Aug-2024	09:15 20-Aug-2024	09:26 20-Aug-2024
Sample Description							
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN3351**	**SS24KN3352**	**SS24KN3353**	**SS24KN3354**
13796	Ammonia	mg/L as N	0.002	0.010	0.009	0.010	0.007
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	0.018	0.012	0.011	0.020
13798	Nitrogen Oxides	mg/L as N	0.002	0.048	0.034	0.032	0.059
13800	Total Phosphorus	mg/L as P	0.003	0.066	0.064	0.064	0.046
13802	Total Nitrogen	mg/L as N	0.02	0.29	0.29	0.24	0.26
16628	Total Organic Carbon as NPOC	mg/L as C	1	3	3	2	2
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	1.7	1.7	1.2	1.9

Client Reference				FB5
Sample Type				Water
Sampling Time/Date				12:00 20-Aug-2024
Sample Description				
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN3355**
13796	Ammonia	mg/L as N	0.002	0.002
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	< 0.002
13798	Nitrogen Oxides	mg/L as N	0.002	0.018
13800	Total Phosphorus	mg/L as P	0.003	< 0.003
13802	Total Nitrogen	mg/L as N	0.02	< 0.02
16628	Total Organic Carbon as NPOC	mg/L as C	1	< 1
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	< 0.5

REPORT OF ANALYSIS

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/241106
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 06-NOV-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N24/022612	POR1	SEAWATER 1/11/2024 9:34
N24/022613	POR2A	SEAWATER 1/11/2024 9:06
N24/022614	POR2B	SEAWATER 1/11/2024 9:06
N24/022615	POR3	SEAWATER 1/11/2024 9:48

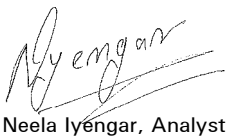
Lab Reg No.		N24/022612	N24/022613	N24/022614	N24/022615	
Date Sampled		01-NOV-2024	01-NOV-2024	01-NOV-2024	01-NOV-2024	
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	10	14	6.9	8.3	NT2_47
Arsenic Filtered	ug/L	1.2	1.2	1.1	1.2	NT2_47
Cadmium Filtered	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Filtered	ug/L	<1	<1	1.1	<1	NT2_47
Cobalt Filtered	ug/L	<1	<1	<1	<1	NT2_47
Copper Filtered	ug/L	<1	<1	<1	<1	NT2_47
Gallium Filtered	ug/L	<1	<1	<1	<1	NT2_47
Iron Filtered	ug/L	11	14	10	11	NT2_47
Lead Filtered	ug/L	<1	<1	<1	<1	NT2_47
Manganese Filtered	ug/L	<1	<1	<1	<1	NT2_47
Molybdenum Filtered	ug/L	12	12	11	12	NT2_47
Nickel Filtered	ug/L	<1	<1	<1	<1	NT2_47
Silver Filtered	ug/L	<1	<1	<1	<1	NT2_47
Tin Filtered	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Filtered	ug/L	2.1	1.9	2.1	2.1	NT2_47
Zinc Filtered	ug/L	2.8	2	14	7.6	NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	3930	5000	4400	1910	NT2_47
Arsenic Total	ug/L	2	2.4	2.2	1.6	NT2_47
Cadmium Total	ug/L	<0.1	<0.1	<0.1	<0.1	NT2_47
Chromium Total	ug/L	4.6	6.3	5.8	2.5	NT2_47
Cobalt Total	ug/L	<1	1.3	1.2	<1	NT2_47
Copper Total	ug/L	2.4	2.8	2.4	1.7	NT2_47
Gallium Total	ug/L	<1	1	1	<1	NT2_47
Iron Total	ug/L	2650	3640	3160	1340	NT2_47

REPORT OF ANALYSIS

Lab Reg No.		N24/022612	N24/022613	N24/022614	N24/022615	
Date Sampled		01-NOV-2024	01-NOV-2024	01-NOV-2024	01-NOV-2024	
	Units					Method
Total Recoverable Trace Elements by ICP						
Lead Total	ug/L	<1	1.1	<1	<1	NT2_47
Manganese Total	ug/L	34	47	40	17	NT2_47
Molybdenum Total	ug/L	11	11	11	11	NT2_47
Nickel Total	ug/L	3.7	4.6	4	1.9	NT2_47
Silver Total	ug/L	<1	<1	<1	<1	NT2_47
Tin Total	ug/L	<1	<1	<1	<1	NT2_47
Vanadium Total	ug/L	7.1	8.4	7.8	4.2	NT2_47
Zinc Total	ug/L	6.3	7.5	6.6	4.1	NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.05	<0.05	<0.05	<0.05	NT2_44
Dates						
Date extracted		19-NOV-2024	19-NOV-2024	19-NOV-2024	19-NOV-2024	
Date analysed		20-NOV-2024	20-NOV-2024	20-NOV-2024	20-NOV-2024	

N24/022612

- N24/022616
The Zinc results for F>T have been confirmed by repeat analysis.



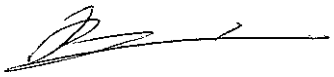
Neela Iyengar, Analyst
Inorganics - NSW
Accreditation No. 198

20-NOV-2024

Lab Reg No.		N24/022612	N24/022613	N24/022614	N24/022615	
Date Sampled		01-NOV-2024	01-NOV-2024	01-NOV-2024	01-NOV-2024	
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	55	66	53	28	NW_S13
Dates						
Date extracted		12-NOV-2024	12-NOV-2024	12-NOV-2024	12-NOV-2024	
Date analysed		13-NOV-2024	13-NOV-2024	13-NOV-2024	13-NOV-2024	

REPORT OF ANALYSIS

Lab Reg No.		N24/022612	N24/022613	N24/022614	N24/022615	
Date Sampled		01-NOV-2024	01-NOV-2024	01-NOV-2024	01-NOV-2024	
	Units					Method



Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

20-NOV-2024

REPORT OF ANALYSIS

Client	: VISION ENVIRONMENT PTY LTD (QLD)	**Job No.**	: VISI05/241106
	U3 / 165 AUCKLAND STREET	**Quote No.**	: QT-02093
	GLADSTONE CENTRAL QLD 4680	**Order No.**	:
		Date Received	: 06-NOV-2024
Attention	: FELICITY MELVILLE	**Sampled By**	: CLIENT
Project Name	:		
Your Client Services Manager	: Danny Slee	**Phone**	: 02 9449 0169

Lab Reg No.	Sample Ref	Sample Description
N24/022616	FB5	SEAWATER 1/11/2024 12:00

Lab Reg No.		N24/022616				
Date Sampled		01-NOV-2024				
	Units					Method
Filtered Trace Elements by ICP						
Aluminium Filtered	ug/L	<5				NT2_47
Arsenic Filtered	ug/L	<1				NT2_47
Cadmium Filtered	ug/L	<0.1				NT2_47
Chromium Filtered	ug/L	<1				NT2_47
Cobalt Filtered	ug/L	<1				NT2_47
Copper Filtered	ug/L	<1				NT2_47
Gallium Filtered	ug/L	<1				NT2_47
Iron Filtered	ug/L	<5				NT2_47
Lead Filtered	ug/L	<1				NT2_47
Manganese Filtered	ug/L	<1				NT2_47
Molybdenum Filtered	ug/L	<1				NT2_47
Nickel Filtered	ug/L	<1				NT2_47
Silver Filtered	ug/L	<1				NT2_47
Tin Filtered	ug/L	<1				NT2_47
Vanadium Filtered	ug/L	<1				NT2_47
Zinc Filtered	ug/L	1.9				NT2_47
Filtered Mercury by CV-AAS						
Mercury - Filtered	ug/L	<0.05				NT2_44
Total Recoverable Trace Elements by ICP						
Aluminium Total	ug/L	<5				NT2_47
Arsenic Total	ug/L	<1				NT2_47
Cadmium Total	ug/L	<0.1				NT2_47
Chromium Total	ug/L	<1				NT2_47
Cobalt Total	ug/L	<1				NT2_47
Copper Total	ug/L	<1				NT2_47
Gallium Total	ug/L	<1				NT2_47
Iron Total	ug/L	<5				NT2_47
Lead Total	ug/L	<1				NT2_47
Manganese Total	ug/L	<1				NT2_47
Molybdenum Total	ug/L	<1				NT2_47

REPORT OF ANALYSIS

Lab Reg No.		N24/022616				
Date Sampled		01-NOV-2024				
	Units					Method
Total Recoverable Trace Elements by ICP						
Nickel Total	ug/L	<1				NT2_47
Silver Total	ug/L	<1				NT2_47
Tin Total	ug/L	<1				NT2_47
Vanadium Total	ug/L	<1				NT2_47
Zinc Total	ug/L	2.2				NT2_47
Total Recoverable Mercury by CV-AAS						
Mercury - Total	ug/L	<0.05				NT2_44
Dates						
Date extracted		19-NOV-2024				
Date analysed		20-NOV-2024				

Neela Iyengar, Analyst
Inorganics - NSW
Accreditation No. 198

20-NOV-2024

Lab Reg No.		N24/022616				
Date Sampled		01-NOV-2024				
	Units					Method
Miscellaneous						
Suspended Solids - Total	mg/L	<2				NW_S13
Dates						
Date extracted		12-NOV-2024				
Date analysed		13-NOV-2024				

Wei Huang, Analyst
Inorganics - NSW
Accreditation No. 198

20-NOV-2024

REPORT OF ANALYSIS

Total = acid extractable elements

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

Measurement Uncertainty is available upon request.

Note: Sampling date(s) have been provided by the client.
The testing was undertaken at: 105 Delhi Road, North Ryde, NSW, 2113

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/241106** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/022615**				**N24/022615**
Aluminium Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	100	98
Arsenic Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	99	106
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	100	96
Chromium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	105
Cobalt Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	104
Copper Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	104
Gallium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	101
Iron Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	100	98
Lead Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	97
Manganese Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	98
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	105	96
Molybdenum Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	99	102
Nickel Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	101	104
Silver Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	95	100
Tin Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	97	96
Vanadium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	107
Zinc Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	103
Aluminium Total	NT2_47	ug/L	5	<5	NA	NA	NA	117	NA
Arsenic Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	103
Cadmium Total	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	103	98
Chromium Total	NT2_47	ug/L	1	<1	NA	NA	NA	111	102
Cobalt Total	NT2_47	ug/L	1	<1	NA	NA	NA	107	102
Copper Total	NT2_47	ug/L	1	<1	NA	NA	NA	107	101
Gallium Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	101
Iron Total	NT2_47	ug/L	5	<5	NA	NA	NA	104	NA
Lead Total	NT2_47	ug/L	1	<1	NA	NA	NA	103	98
Manganese Total	NT2_47	ug/L	1	<1	NA	NA	NA	100	NA
Mercury - Total	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	103	98
Molybdenum Total	NT2_47	ug/L	1	<1	NA	NA	NA	105	103
Nickel Total	NT2_47	ug/L	1	<1	NA	NA	NA	108	100
Silver Total	NT2_47	ug/L	1	<1	NA	NA	NA	104	101
Tin Total	NT2_47	ug/L	1	<1	NA	NA	NA	105	99
Vanadium Total	NT2_47	ug/L	1	<1	NA	NA	NA	110	103
Zinc Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	101

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/022616**				**N24/022616**
Aluminium Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	100	99
Arsenic Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	99	99
Cadmium Filtered	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	100	100
Chromium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	99
Cobalt Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	100
Copper Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	100
Gallium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	100
Iron Filtered	NT2_47	ug/L	5	<5	NA	NA	NA	100	98
Lead Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	100
Manganese Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	98
Mercury - Filtered	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	105	102
Molybdenum Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	99	100
Nickel Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	101	99
Silver Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	95	103
Tin Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	97	100
Vanadium Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	99
Zinc Filtered	NT2_47	ug/L	1	<1	NA	NA	NA	100	99
Aluminium Total	NT2_47	ug/L	5	<5	NA	NA	NA	117	98
Arsenic Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	98
Cadmium Total	NT2_47	ug/L	0.1	<0.1	NA	NA	NA	103	99
Chromium Total	NT2_47	ug/L	1	<1	NA	NA	NA	111	99
Cobalt Total	NT2_47	ug/L	1	<1	NA	NA	NA	107	98
Copper Total	NT2_47	ug/L	1	<1	NA	NA	NA	107	98
Gallium Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	98
Iron Total	NT2_47	ug/L	5	<5	NA	NA	NA	104	98
Lead Total	NT2_47	ug/L	1	<1	NA	NA	NA	103	101
Manganese Total	NT2_47	ug/L	1	<1	NA	NA	NA	100	99
Mercury - Total	NT2_44	ug/L	0.05	<0.05	NA	NA	NA	103	108
Molybdenum Total	NT2_47	ug/L	1	<1	NA	NA	NA	105	99
Nickel Total	NT2_47	ug/L	1	<1	NA	NA	NA	108	98
Silver Total	NT2_47	ug/L	1	<1	NA	NA	NA	104	96
Tin Total	NT2_47	ug/L	1	<1	NA	NA	NA	105	101
Vanadium Total	NT2_47	ug/L	1	<1	NA	NA	NA	110	96
Zinc Total	NT2_47	ug/L	1	<1	NA	NA	NA	106	96

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable

Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.

Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.

#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.

**: reference value not available

Signed: 

Dr Andrew Evans
Inorganics, NMI (North Ryde)

Date: 20/11/2024

QUALITY ASSURANCE REPORT

Client: **VISION ENVIRONMENT PTY LTD (QLD)**
QA Report No: **VISI05/241106** Matrix: Water

Analyte	Method	Units	LOR	Blank	Duplicates			Recoveries	
					Sample	Duplicate	RPD	LCS	Matrix Spike
							%	%	%
Inorganics Section					**N24/022612**				**N24/022612**
Suspended Solids - Total	NW_S13	mg/L	2	<2	54	55	2	86	NA

LOR = Limit Of Reporting RPD = Relative Percent Difference LCS = Laboratory Control Sample NA = Not Applicable
Acceptable recoveries for the LCS and Matrix Spike are 80 - 120%.
Acceptable RPDs on duplicates is 30 % at concentrations more than 5 times LOR. Greater RPD may be expected at less than 5 times LOR.
#: Spike level is less than 50% of the sample's concentration, hence the recovery data is not reliable.
**: reference value not available

Signed: 
Dr Andrew Evans
Inorganics, NMI (North Ryde)
Date: 20/11/2024

CERTIFICATE OF ANALYSIS

Work Order	: **EB2438903**	Page	: 1 of 2
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: POR November 2024	Date Samples Received	: 12-Nov-2024 12:00
Order number	: ----	Date Analysis Commenced	: 14-Nov-2024
C-O-C number	: ----	Issue Date	: 15-Nov-2024 09:01
Sampler	: Anna Skillington		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	POR1	POR2 A	POR2 B	POR3	FB
			Sampling date / time	01-Nov-2024 09:34	01-Nov-2024 09:06	01-Nov-2024 09:06	01-Nov-2024 09:48	01-Nov-2024 12:00
Compound	*CAS Number*	*LOR*	*Unit*	**EB2438903-001**	**EB2438903-002**	**EB2438903-003**	**EB2438903-004**	**EB2438903-005**
				Result	Result	Result	Result	Result
EP008CA: Chlorophyll a								
Chlorophyll a	----	0.02	µg/L	**2.36**	**1.05**	**1.68**	**1.80**	<0.02

Inter-Laboratory Testing

Analysis conducted by ALS Canberra, NATA accreditation no. 992.

(WATER) EP008CA: Chlorophyll a

QUALITY CONTROL REPORT

Work Order	: **EB2438903**	Page	: 1 of 3
Client	: **VISION ENVIRONMENT ANZ**	Laboratory	: Environmental Division Brisbane
Contact	: FELICITY MELVILLE	Contact	: Kelly Schafer
Address	: OFFICE 3 165 AUCKLAND STREET GLADSTONE 4680	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61 7 4978 7944
Project	: POR November 2024	Date Samples Received	: 12-Nov-2024
Order number	: ----	Date Analysis Commenced	: 14-Nov-2024
C-O-C number	: ----	Issue Date	: 15-Nov-2024
Sampler	: Anna Skillington		
Site	:		
Quote number	: BN/133/19 V4 PCIMP		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Don Sirimanne	Senior Biologist - Water	Microbiology / Biology, Hume, ACT

General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP008CA: Chlorophyll a (QC Lot: 6187403)									
EB2438890-062	Anonymous	EP008: Chlorophyll a	----	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP008CA: Chlorophyll a (QCLot: 6187403)								
EP008: Chlorophyll a	----	0.02	µg/L	<0.02	200 µg/L	95.2	85.0	113

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Queensland Government

Forensic and Scientific Services

CERTIFICATE OF ANALYSIS

CLIENT : (HVEC)

Vision Environment ANZ
3/165 Auckland St
GLADSTONE QLD 4680
felicity@visionenvironment.com.au

ATTN: Felicity Melville

Laboratory Reference	: SSP0091261
Client Order No.	: MELVILLE_F
Quote Number	: 23IN1102_F Melville
Client Batch Reference	: POR November 2024
Date Received	: 12-Nov-2024
Date Commenced	: 18-Nov-2024
Laboratory Number/s	: SS24KN5138-SS24KN5142

Number of Samples : 5

Reason for Analysis : Environmental research

Method/s of Analysis :
13796 - Nitrogen (Ammonia) by Flow Injection Analysis
13798 - Nitrogen (Oxides) by Flow Injection Analysis
13799 - Phosphorus (Filterable Reactive) by Flow Injection Analysis
13800 - Phosphorus (Total) by Simultaneous Persulfate or Kjeldahl Digestion
13802 - Nitrogen (Total) by Simultaneous Persulfate Digestion
16628 - Total Organic Carbon by High Temperature Oxidation

NATA Accredited Laboratory 41 Accredited for compliance with ISO/IEC 17025 - Testing.
WORLD RECOGNISED ACCREDITATION

Matthew Cross
Laboratory Technician, Inorganic Chemistry
22-Nov-2024

SS24KN5138-SS24KN5142

Enquiries **Matthew Cross**
Phone **(+61 7) 3096 2805**
Email **matthew.cross@health.qld.gov.au**

39 Kessels Road
Coopers Plains QLD 4108
AUSTRALIA

PO Box 594
Archerfield QLD 4108
AUSTRALIA

Phone (+61) 1800 000 FSS (377)
Fax (+61 7) 3096 2977
Email FSS@health.qld.gov.au

Client Reference				POR1	POR2A	POR2B	POR3
Sample Type				Seawater	Seawater	Seawater	Seawater
Sampling Time/Date				09:34 01-Nov-2024	09:06 01-Nov-2024	09:06 01-Nov-2024	09:48 01-Nov-2024
Sample Description							
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN5138**	**SS24KN5139**	**SS24KN5140**	**SS24KN5141**
13796	Ammonia	mg/L as N	0.002	0.011	0.008	0.007	< 0.002
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	0.012	0.010	0.011	0.009
13798	Nitrogen Oxides	mg/L as N	0.002	0.018	0.020	0.024	0.020
13800	Total Phosphorus	mg/L as P	0.003	0.044	0.050	0.048	0.030
13802	Total Nitrogen	mg/L as N	0.02	0.21	0.24	0.23	0.17
16628	Total Organic Carbon as NPOC	mg/L as C	1	2	2	2	1
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	1.2	0.9	1.1	1.3

Client Reference				FB5
Sample Type				Seawater
Sampling Time/Date				12:00 01-Nov-2024
Sample Description				
Method	**Nutrients**	**Units**	**Reporting Limit**	**SS24KN5142**
13796	Ammonia	mg/L as N	0.002	< 0.002
13799	Filterable Reactive Phosphorus	mg/L as P	0.002	< 0.002
13798	Nitrogen Oxides	mg/L as N	0.002	< 0.002
13800	Total Phosphorus	mg/L as P	0.003	< 0.003
13802	Total Nitrogen	mg/L as N	0.02	< 0.02
16628	Total Organic Carbon as NPOC	mg/L as C	1	< 1.0
16628	Dissolved Organic Carbon as NPOC	mg/L as C	0.5	< 0.5