

07/03/2025

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Ingenia Holiday Parks

Julian Bacigalupo
Project Manager

by email

Reference: 24369L01_Merry Beach Monthly Results Jan 2025v1.0

Dear Julian,

Merry Beach Caravan Park, Monthly Review of Laboratory Results – Sewage Treatment and Reuse System – January 2025

EPL 5888 Monitoring Requirements

1 Introduction

Reditus Consulting Pty Ltd (Reditus) was commissioned by Ingenia Holiday Parks Pty Ltd (Ingenia) to complete to provide a factual report of the monthly sampling results collected in January 2025 as part of the Environmental Protection Licence (EPL 5888) monitoring requirements for the Merry Beach Caravan Park (the Site).

2 EPL5888 Requirements

Sampling frequency, as directed in EPL5888, is presented in **Table 1** below. Samples were collected on 28 January 2025, which include:

- Effluent sample (EFF1)
- Surface water samples (SW1, SW2, SW3)
- Groundwater samples (GW1, GW2, GW3, GW4, GW5, GW6)

Sample locations are presented in **Appendix A**. Analytical results against EPL5888 concentration limits are presented below, and analytical tables are presented in **Appendix B**.



Table 1 Sampling Frequency and Compliance

SAMPLING POINT	2	6	7, 8, 9	10, 11, 12, 13, 14, 15,	16
Type	Waste Treatment	Waste Treatment	Surface Water	Groundwater	Soil
January	X	X	X	X	
February	X	X	X		
March	X	X			
April	X	X	X	X	X
May	X	X			
June	X	X	X		
July	X	X			
August	X	X			
September	X	X			
October	X	X		X	
November	X	X			
December	X	X			



3 Results

3.1.1 POINT 2

Monitoring point 2 water sample (treated effluent discharge sample) was collected on 28 January 2025, with analytical results presented against EPL5888 concentration limits in **Table 2** below. All reported concentrations were below the concentration limits presented in the EPL.

Table 2 Analytical results from point 2 against EPL5888 concentration limits

		BOD	FAECAL COILFORMS	TOTAL NITROGEN	OIL AND GREASE	PH	TOTAL PHOSPHORUS	TOTAL SUSPENDED SOLIDS
Unit		mg/L	CFU/100ml	mg/L	mg/L	pH units	mg/L	mg/L
50%ile			25		1.5		5.5	
90%ile		20		10				10
100%ile		30	150	15	5	6.5-8.5	10	20
Sample ID	Date							
EFF1	28-Jan-25	<2	<1	7.4	<5	8.17	2.17	<5

3.1.2 SURFACE WATER

Surface water samples were collected on 28 January 2025 from three locations (SW1, SW2, SW3), and analytical results are presented in **Table B1** in **Appendix B**. A review of the monitored parameters found the following:

- SW2 and SW3 were generally consistent with the previous sampling round (November 2024), with the following exceptions:
 - Electrical conductivity was lower in January (1,840 $\mu\text{S}/\text{cm}$) than in November (4,690 $\mu\text{S}/\text{cm}$). This is possibly due to less rainfall in the days prior to the sampling event, causing reduced flow within the creek closer to the beach.



- Thermotolerant coliforms were higher in January (~12,000 CFU/100ml) than in November (3,200 CFU/100ml) in SW2. This is likely due to the pollution incident that was reported on 28 January 2025.
- Enterococci was higher in November (580 CFU/100ml) than in January (11 CFU/100ml). This is possibly due to the reduced rainfall prior to the sampling event causing less dilution of the bacteria.
- SW1 was not sampled in November, as the creek was dry and therefore there are no recent samples for comparison. Concentrations of contaminants reported at SW1 in January 2025 were generally within the range of the downstream sample points (SW2 and SW3), with the following exceptions:
 - Ammonia as N was significantly higher at SW1 compared to than SW2 and SW3, with a concentration of 5.31 mg/L. This is potentially due to the area of the creek being stagnant, leading to a concentration of Ammonia.
 - Total Kjeldahl Nitrogen (TKN) at SW1 was significantly higher than SW2 and SW3, with a concentration of 7.8 mg/L. This is consistent with the higher concentration as Ammonia as N forms a portion of TKN.

3.1.3 GROUNDWATER

Groundwater samples were collected on 28 January 2025 from six locations (GW1, GW2, GW3, GW4, GW5, and GW6), and analytical results are presented in **Table B1** in **Appendix B**. A review of the monitored parameters found the following:

- pH results were generally circumneutral with a maximum pH of 7.65. GW1 reported a slightly acidic pH result of 5.08.
- Electrical conductivity results indicate generally fresh water with a minimum concentration of 332 µS/cm (GW04). GW3 results reported a maximum electrical conductivity of 3,430 µS/cm indicating brackish conditions.
- All other groundwater analytical concentrations were generally consistent with the exception of GW4 and GW5:
 - GW4 reported an increase in thermotolerant coliforms (16,000 CFU/100ml) and enterococci (1,000 CFU/100ml). This is likely a result of groundwater migration from GW5, as higher concentrations of thermotolerant coliforms and enterococci were reported during the September sampling round.
 - GW5 reported high concentrations of Ammonia as N (6.05 mg/L), TKN (9.4 mg/L) and Biochemical Oxygen Demand (BOD) (18 mg/L) and Enterococci (10,000 CFU/100ml). Ammonia as N, TKN and BOD concentrations in the previous round were significantly higher, which indicates a reducing trend. Additionally, as Enterococci is an indicator of waste, the increased concentrations are likely a result of the significant fauna population within the park, including duck, rabbit and kangaroo populations within the park.



4 Limitations

Reditus performed its services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties expressed or implied are made.

Subject to the scope of work, Reditus' assessment was limited strictly to reporting on the monthly sampling associated with the subject property and does not include evaluation of any other issues. The absence of any identified hazardous or toxic materials should not be interpreted as a guarantee that such materials do not exist on the subject property.

This report does not comment on any regulatory obligations based on the findings.

All conclusions and recommendations regarding the property are the professional opinions of Reditus personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements or sources outside of Reditus, or developments resulting from situations outside the scope of this project.

Reditus is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The client acknowledges that this report is for the exclusive use of the client.



5 Closure

We trust that this document meets your immediate requirements. Should you have any queries please feel free to contact the undersigned.

Sincerely,

Sebastien McCulloch

Senior Hydrogeologist

APPENDICES

Appendix A – Figures

Appendix B – Analytical Tables

Appendix B – Laboratory Reports

A

Figures





Map 24369_LTR01_f01_samplelocs_v01		Legend <div><div><div></div> Irrigation Fields</div><div><div></div> Creek</div></div> Sample Locations <div><div><div></div> Groundwater</div><div><div></div> Surface Water</div><div><div></div> Site Location</div></div> <td rowspan="5">Figure F1 - Sample Locations 46 Merry Beach Rd, Kioloa NSW 2539 24369 - Monthly Sampling Results Ina Operations Pty Ltd</td>	Figure F1 - Sample Locations 46 Merry Beach Rd, Kioloa NSW 2539 24369 - Monthly Sampling Results Ina Operations Pty Ltd
Date of Export 07/03/2025	Map Scale (approx. at A3) 1:2,500		
Author SM	Approver LD		
Data Source Metromap, Google Maps, Open Street Map, Geoscience Australia			

B

Analytical Tables



Table B1 - Surface Water Samples

Analyte			pH	Electrical Conductivity	Ammonia as N	Nitrate +Nitrite	Total Kjeldahl Nitrogen	Total Phosphorus	Biochemical Oxygen Demand	Thermotolerant Coliforms	Enterococci
Unit			pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100ml	CFU/100ml
LOR			0.01	1	0.01	0.01	0.1	0.01	2	1	1
Sample Location	EPL5888 Location	Date									
SW1	EPA10	14-Oct-24	6.8	1410	0.03	<0.01	2.9	0.13	6	250	65
SW1	EPA10	28-Jan-25	7.73	1770	5.31	0.01	7.9	0.76	4	5900	320
SW2	EPA11	14-Oct-24	6.9	3300	0.12	0.01	1.6	0.05	4	~1300	2200
SW2	EPA11	28-Nov-24	6.9	2140	0.18	<0.01	0.8	0.11	5	3200	910
SW2	EPA11	28-Jan-25	6.76	1900	0.2	<0.01	0.7	<0.01	<2	~12000	900
SW3	EPA12	14-Oct-24	7.1	5560	0.07	<0.01	1.2	0.18	4	1200	160
SW3	EPA12	28-Nov-24	7.5	4690	<0.01	<0.01	1.8	0.94	5	1400	580
SW3	EPA12	28-Jan-25	6.55	1840	0.02	<0.01	0.6	1.35	<2	480	11

Table B2 - Groundwater Analytical Results

Analyte			pH	Electrical Conductivity	Ammonia as N	Nitrate +Nitrite	Total Kjeldahl Nitrogen	Total Phosphorus	Biochemical Oxygen Demand	Thermotolerant Coliforms	Enterococci
Unit			pH Unit	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100ml	CFU/100ml
LOR			0.01	1	0.01	0.01	0.1	0.01	2	1	1
Sample Location	EPL5888 Location	Date									
GW01	EPA10	28-Jan-25	5.08	2000	0.18	0.06	0.7	0.03	<2	500	21
GW02	EPA11	28-Jan-25	6.58	809	0.23	0.02	1.5	<0.01	<2	~1	<1
GW03	EPA12	28-Jan-25	6.44	3430	0.84	0.03	2.1	0.27	8	<1	<1
GW04	EPA13	26-Sep-25	7.09	848	0.53	0.31	3.1	0.88	7	98	180
GW04	EPA13	28-Jan-25	7.15	332	0.31	0.25	0.9	1.14	2	16000	1000
GW05	EPA14	26-Sep-25	7.45	1110	13.2	<0.01	23.6	2.31	62	~22000	9000
GW05	EPA14	28-Jan-25	7.65	1170	6.05	0.04	9.4	1.19	18	580	10000
GW06	EPA15	26-Sep-25	7.03	954	0.45	0.09	45.7	4.55	3	130	670
GW06	EPA15	28-Jan-25	6.92	998	0.56	0.57	1.8	0.03	<2	44	36

C

Analytical Results





CERTIFICATE OF ANALYSIS

Work Order	: ES2502284	Page	: 1 of 5
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division Sydney
Contact	: Harry Brazil	Contact	: Customer Services ES
Address	: Merry Beach Road, Kioloa 2539	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Merry Beach	Date Samples Received	: 29-Jan-2025 08:00
Order number	: ----	Date Analysis Commenced	: 29-Jan-2025
C-O-C number	: ----	Issue Date	: 03-Feb-2025 10:57
Sampler	: JOSH		
Site	: ----		
Quote number	: EW24INGMER0001		
No. of samples received	: 11		
No. of samples analysed	: 11		



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
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Prasanna Ganta	Team Leader - Microbiology/Phycology	Sydney Microbiology, Smithfield, NSW
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



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.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- MW023 is ALS's internal code and is equivalent to AS4276.9.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Eff1	Influent	SW1	SW2	SW3
Sampling date / time					28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00
Compound	CAS Number	LOR	Unit		ES2502284-001	ES2502284-002	ES2502284-003	ES2502284-004	ES2502284-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		8.17	8.33	7.73	6.76	6.55
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	2590	1770	1900	1840
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	537	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.24	54.8	5.31	0.20	0.02
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.03	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		5.57	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		5.60	<0.01	0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		1.8	74.1	7.9	0.7	0.6
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		7.4	74.1	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		2.17	11.5	0.76	<0.01	1.35
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	42	----	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	297	4	<2	<2
MW006: Thermotolerant Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		<1	37000000	5900	~12000	480
Escherichia coli	----	1	CFU/100mL		<1	27000000	----	----	----
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		----	----	320	900	110



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GW1	GW2	GW3	GW4	GW5
Sampling date / time					28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00	28-Jan-2025 00:00
Compound	CAS Number	LOR	Unit		ES2502284-006	ES2502284-007	ES2502284-008	ES2502284-009	ES2502284-010
				Result	Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		5.08	6.58	6.44	7.15	7.65
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		2000	809	3430	332	1170
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.18	0.23	0.84	0.31	6.05
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.06	0.02	0.03	0.25	0.04
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		0.7	1.5	2.1	0.9	9.4
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.03	<0.01	0.27	1.14	1.19
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	8	2	18
MW006: Thermotolerant Coliforms & E.coli by MF									
Thermotolerant Coliforms	----	1	CFU/100mL		500	~1	<1	16000	580
MW023: Enterococci by Membrane Filtration									
Enterococci	----	1	CFU/100mL		21	<1	<1	1000	10000



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	GW6	----	----	----	----
Sampling date / time				28-Jan-2025 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2502284-011	-----	-----	-----	-----
Result					----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.92	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	998	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.56	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.57	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	----	----	----	----
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	<2	----	----	----	----
MW006: Thermotolerant Coliforms & E.coli by MF								
Thermotolerant Coliforms	----	1	CFU/100mL	44	----	----	----	----
MW023: Enterococci by Membrane Filtration								
Enterococci	----	1	CFU/100mL	36	----	----	----	----



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