

26 February, 2024

Ingenia
Suite 1, 257 Gympie Road
Kedron, QLD - 4031.
Attention: Berny Connolly

Dear Berny,

RE: MERRY BEACH CARAVAN PARK, MONTHLY REVIEW OF LABORATORY RESULTS – SEWAGE TREATMENT AND REUSE SYSTEM – JANUARY 2024

Further to recommendations in Merry Beach Annual Monitoring Report find below the monthly review of monitoring data for January 1 to January 28, 2024.

1. Collection of water samples

Water samples for selected monitoring points were collected on the following dates:

- o January 17 – Eff1, Eff2, SW1, SW2, SW3, GW1, and Influent.
- o January 17 - Drinking water samples from Beach Front Tank, Creek Tanks, Main Tank, Top Toilet Tank and Pretty Beach Tank.
- o In accordance with revised license conditions, Eff2 residual free chlorine was tested onsite on January 6, 13 and 27.

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ABN 85 070 240 890 ACN 070 240 890

2. Review of monitoring results against POEO Act Environmental Protection License 5888 conditions

1. Effluent 1 (Eff1) (Monitoring Point 2)

Laboratory results were reviewed against License 5888 conditions for Eff1 (Monitoring Point 2), results are summarised in Table 1. Conclusions regarding Eff1 are:

- Laboratory results for Eff1 indicate license conditions were exceeded for faecal coliforms during January. Please ensure the UV unit tubes are cleaned monthly and UV lamps are checked and replaced in accordance with manufacturer's specifications. Alternatively, manual / automatic chlorination of effluent after decanting may also be trialled.
- Laboratory results for Eff1 indicate license conditions were exceeded for nitrogen (total) during January. This is historically 'typical' occurrence.
- All other laboratory results for Eff1 were within license conditions during January.

Table 1: Review of monitoring results for Eff1 against License 5888 conditions.

Chemical	Units	License 5888 Conditions – Eff1 (Point 2)			Sampling Date 2024	
		50 percentile concentration limit	90 percentile concentration limit	100 percentile concentration limit	January 17	Complies?
BOD	mg/L		20	30	>2	✓
Faecal coliforms (FC)	CFU/100 mL	25		150	~1,200	✗
Nitrogen (total)	mg/L		10	15	22.9	✗
Oil and grease	mg/L	1.5		5	< 1	✓
pH	pH units			6.5 – 8.5	7.83	✓
Phosphorous (total)	mg/L	5.5		10	4.39	✓
Total suspended solids (TSS)	mg/L		10	20	<5	✓

2. Reuse Effluent (Eff2) (Monitoring Point 6)

Laboratory results were reviewed against License 5888 conditions for Eff2 (Monitoring Point 6), results are summarised in Table 2. Conclusions regarding Eff2 are:

- Onsite testing results for free residual chlorine was tested on 6, 13 and 23 January 2023 with results shown in Table 2. Further comment is provided below.
- Laboratory results for Eff2 indicate license conditions were exceeded for E. coli during January. Please ensure onsite testing results of free residual chlorine is conducted weekly. Results should be >2 mg/L, this will assist in management of E.

coli observed in Eff2. Please ensure UV unit tubes are cleaned and UV lamps are checked and replaced in accordance with manufacture's specifications. Alternatively, manual / automatic chlorination of effluent after decanting may also be trailed.

- Laboratory results for Eff2 indicate TSS license conditions were exceeded during January 2024 and therefore MA recommends filters be removed, cleaned and inspected to ensure proper operation.
- All other laboratory results for Eff2 were within license conditions during January.

Table 2: Review of monitoring results for Eff2 against License 5888 conditions.

Chemical	Units	License 5888 Conditions – Eff2 (Point 6)			Sampling Dates 2023	
		50 percentile concentration limit	90 percentile concentration limit	100 percentile concentration limit	January 17	Complies?
Chlorine (free residual) (onsite testing) ¹	mg/L			> 2	0.53	✘
E. coli	CFU/100 mL			2	10,000	✘
pH	pH units			6.5 – 8.5	7.69	✓
Total suspended solids (TSS)	mg/L			< 5	288	✘

Notes

1. Free residual chlorine was tested onsite on 6 (0.50 mg/L), 13 (0.44 mg/L) and 27 (0.66 mg/L) January 2024; Chlorine average shown above (Table 2).

Any results where faecal E. coli are identified in water accessible by patrons is significant. Due to E. coli detection in reuse effluent (Eff2) MA recommends to immediately discontinue reuse of effluent (Eff2) for amenities. **Supply from any tank with detected levels of E. coli must be sign posted as 'not fit for drinking immediately.** If MBCP is unsure what action is required then contact Marten's office urgently.

Onsite free residual chlorine sampling from January 2024 is non-compliant with license conditions. Site process is to ensure that whenever onsite chlorine results are <2.0 mg/L, chlorine is manually dosed and effluent is retested before transfer.

This in conjunction with E. coli exceedances observed in Eff2 MA recommend recommencement of onsite free residual chlorine testing and dosing to be undertaken immediately in accordance with license conditions.

As recommended previously, the pH in the effluent is above 7 which may impact on the disinfection effectiveness of chlorine as well as the effectiveness of alum dosing for

phosphorus removal. We recommend pH in the STP be manually adjusted daily to maintain pH between 6.5 and 7.0 using pool acid.

3. Drinking water supply tank testing

Laboratory results were reviewed against National Drinking Water Quality Standards for drinking water at multiple tested tanks:

- All sample locations were within the standards for *E. coli* with results (<CFU/100mL) for January 2024.
- All sample locations were within the standards for faecal coliforms with results (<1 CFU/100mL) for January 2024.

4. Review of Monitored Parameters

Surface water and groundwater results were reviewed for January 2024.

All surface water monitoring for January 2024 are generally consistent with previously reported periods and will continue to be monitored.

Only GW1 monitoring point was sampled for January 2024. This is considered non-compliant with License 5888. We recommend sampling of GW2, GW3, GW4, GW5 and GW6 immediately to compliant with License 5888.

GW1 monitoring point recorded its lowest EC (1,680 μ S/cm) and highest faecal coliform (10,000) recordings since the commencement of the study. All other GW1 results are generally consistent with previously reported periods and will continue to be monitored.

**For and on behalf of
MARTENS & ASSOCIATES PTY LTD**

TRYSTAN RICHARDS
Environmental Consultant

DAILY MONITORING RECORD – MERRY BEACH CARAVAN PARK SEWAGE TREATMENT AND RE-USE SCHEME

Start Date: 1/1/24.

Finish Date: 7-1-24

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Time of Readings	8am	6am	10.30	11.00	8.30	10.40	10.50
Meter 1 Reading MAGFLOW (L)	2881	2681	307693	97556	88246	111884	91413
Meter 2 Reading (KL) – Non-Potable RU	19210	19222	19235	19245	19253	19264	19272
Meter 3 Reading (KL) – Irrigation	101635	101735	101891	102008	102124	102295	102423
Meter 4 Reading (KL) – NPWS	037952	037952	37952	37952	37952	37952	37952
Meter 5 Reading (KL) - DLWC	027398	027398	27398	27398	27398	27398	27398
Pump Well Effluent Appearance	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY	<u>CLEAR</u> / CLOUDY / GREY
STP Status	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED	<u>OK</u> / ALARMED
UV Lamp Status	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>	OK / <u>ALARMED</u>
Chlorination System Status	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY	<u>OK</u> / FAULTY
Irrigation Field Status	<u>OK</u> / WET / PONDING	<u>OK</u> / WET / PONDING	<u>OK</u> / WET / PONDING	OK / <u>WET</u> / PONDING	OK / <u>WET</u> / PONDING	OK / <u>WET</u> / PONDING	<u>OK</u> / <u>WET</u> / PONDING
Weather Conditions	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN	<u>SUNNY</u> / <u>CLOUDY</u> / <u>RAIN</u>	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN	<u>SUNNY</u> / <u>CLOUDY</u> / RAIN
Dissolved Oxygen in IDEA reactor (mg/L)	6.36	6.40	6.6	6.1	6.0	5.9	6.1
pH in IDEA reactor / Effluent PW	7.70	7.77	7.4 7.6 7.9	7.8 7.8 7.7	7.7 7.8 7.9	7.7 7.7 7.7	7.7 7.7 7.7
Total Alkalinity in IDEA Reactor (mg/L)			190 mg/L		120 mg/L	Chlorine Free	
30 minute sludge volume (%)	Not pumping level is low	Reactor not pumping	78%		65%	0.37 / 0.50	
Initials	CFF	AO	CFF	CFF	CFF	CFF	CFF

DAILY MONITORING RECORD – MERRY BEACH CARAVAN PARK SEWAGE TREATMENT AND RE-USE SCHEME

Start Date: 8-1-24

Finish Date: 14-1-24

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Time of Readings	9:40	7:48	11:15	10:35	11:10	12:55	12:50
Meter 1 Reading MAGFLOW (L)	2367	2435	2508	2592	2671	2748	2822
Meter 2 Reading (KL) – Non-Potable RU	19279	19287	19292	19299	19308	19314	19325
Meter 3 Reading (KL) – Irrigation	102477	102542	102699	102779	102890	102964	103079
Meter 4 Reading (KL) – NPWS	37952	37952	37952	37952	37952	37952	37952
Meter 5 Reading (KL) - DLWC	27398	27398	27398	27398	27398	27398	27398
Pump Well Effluent Appearance	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY
STP Status	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED
UV Lamp Status	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED
Chlorination System Status	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY
Irrigation Field Status	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING
Weather Conditions	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN
Dissolved Oxygen in IDEA reactor (mg/L)	6.7	9.63	9.5	9.7	8.6	9.1	9.1
pH in IDEA reactor / Effluent PW	7.54	7.52	7.4 7.5 7.5	7.4 7.4 7.3	7.4 7.5 7.2	7.4 7.4 7.3	7.5 7.4 7.2
Total Alkalinity in IDEA Reactor (mg/L)			180 mg/L		220 mg/L		
30 minute sludge volume (%)		68%			50%		
Chlorine (residual) onsite testing Eff2 (once per week)						0.17 / 0.44	
Initials		AL	CFE	CFE	CFE	CFE	CFE

DAILY MONITORING RECORD – MERRY BEACH CARAVAN PARK SEWAGE TREATMENT AND RE-USE SCHEME

Start Date: 22-1-24

Finish Date: 28-1-24

Day of Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Time of Readings	5:47am	7:30	9:15	10:50am	11-15am	11:00am	11:20am
Meter 1 Reading MAGFLOW (L)	3358	3422	3470	3541	3624	3301	3832
Meter 2 Reading (KL) – Non- Potable RU	19377	19377	19377	19378	19377	19377	19377
Meter 3 Reading (KL) – Irrigation	103727	103785	103848	103945	104022	104140	104288
Meter 4 Reading (KL) – NPWS	037952	037952	037952	037952	037952	037952	037952
Meter 5 Reading (KL) – DLWC	027398	027398	27398	27398	27398	27398	27398
Pump Well Effluent Appearance	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY	CLEAR / CLOUDY / GREY
STP Status	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED
UV Lamp Status	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED	OK / ALARMED
Chlorination System Status	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY	OK / FAULTY
Irrigation Field Status	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING	OK / WET / PONDING
Weather Conditions	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN	SUNNY / CLOUDY / RAIN
Dissolved Oxygen in IDEA reactor (mg/L)	10.47	10.46	9.9	10.4	10.3	10.28	10.55
pH in IDEA reactor / Effluent PW	7.60 /	7.66 /	7.6 / 7.4 / 7.4	7.5 / 7.4 / 7.5	7.5 / 7.5 / 7.4	7.4 / 7.6 / 7.4	7.4 / 7.2 / 7.4
Total Alkalinity in IDEA Reactor (mg/L)			390 mg/L		330 mg/L		
30 minute sludge volume (%)	60%	55%					
Chlorine (residual) onsite testing Eff2 (once per week)						0.66	
Initials	cm	AO	CFE	SC	SC	SC	SC



CHAIN OF CUSTODY

ALS Laboratory, please tick →

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Ph: 08 8359 0800 E: andralid@alsglobal.com
D6801 SARIE 22 Sarna Street Sturtford QLD 4053
Ph: 07 52437222 E: samples.unsw@alsglobal.com
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Ph: 07 7471 5600 E: gladstone@alsglobal.com

D1MACKAY 787 Harbour Road Mackay QLD 4740
Ph: 07 4644 0177 E: mackay@alsglobal.com
D1MELBOURNE 2-4 Vespaal Road Springvale VIC 3171
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D1MUDGEE 27 Swiney Road Mudgee NSW 2560
Ph: 02 6372 6725 E: mudgee.mel@alsglobal.com

D1NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304
Ph: 02 4965 9433 E: samples.newcastle@alsglobal.com
D1NOWRA 4/13 Seary Place North Nowra NSW 2541
Ph: 02 4423 2068 E: nowra@alsglobal.com
D1PERTH 10 Hood Way Malaga WA 6060
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

D1SYDNEY 277-299 Woodpark Road Smithfield NSW 2164
Ph: 02 8794 8555 E: samples.sydney@alsglobal.com
D1TOWNSVILLE 14-15 Desma Court Balle QLD 4818
Ph: 07 4795 0600 E: townsville.environmental@alsglobal.com
D1WOLLONGONG 60 Kerry Street Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: **Ingénia Holidays Merry Beach**

OFFICE: **Merry Beach Rd, Kioloa NSW 2539**

PROJECT: **Merry Beach Fresh / Drinking Water - Monthly**

ORDER NUMBER: **PO 501061**

PROJECT MANAGER: **Gray Taylor**

SAMPLER: **Peter Young**

COC Emailed to ALS? (YES / NO)

Turnaround Requirements: Standard TAT (List due date): Non Standard or urgent TAT (List due date):

Country of Origin: **CONTACT PH: 0422 685 594**

Sampler Mobile: **0404 455 064**

EDD Format (or default):

Relinquished By: *Handwritten signature*

Received By: *Handwritten signature*

Relinquished Date/Time: *17/1/23 4:36*

Received Date/Time: *17/1/23 12:00*

Additional Information

Comments/Special Handling/Storage or Disposal:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <i>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).</i>	Additional Information
1	Beach Front Tank		W	STT	1	F.coli Total Coliforms	
2	Creek Tanks		W	STT	1	X	
3	Main Tank		W	STT	1	X	
4	Pool Showers Tanks		W	STT	1	X	
5	Peel Toilets Tank		W	STT	1	X	
6	Top Toilets Tank		W	STT	1	X	
7	Pretty Beach Tank		W	STT	1	X	
TOTAL					37		

Environmental Division
Wollongong
Work Order Reference
EW2400269



Telephone: 02 42253125



CERTIFICATE OF ANALYSIS

Work Order : **EW2400269**
Client : **Ingenia Holidays Merry Beach**
Contact : Gray Taylor
Address : Merry Beach Road,
Kioloa 2539
Telephone : 02 9476 9999
Project : Merry Beach Fresh /Drinking Water Monthly
Order number : P0501061
C-O-C number : ----
Sampler : Client - K Bourke
Site : Merry Beach
Quote number : EW23INGMER0002
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Glenn Davies
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jan-2024 17:00
Date Analysis Commenced : 18-Jan-2024
Issue Date : 06-Feb-2024 12:02



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Sarah Griffiths	Microbiologist	Sydney Microbiology, Smithfield, NSW



Page : 2 of 2
 Work Order : EW2400269
 Client : Ingenia Holidays Merry Beach
 Project : Merry Beach Fresh /Drinking Water Monthly

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 work for this work order will be conducted at ALS Sydney.
- MF = membrane filtration
- CFU = colony forming unit
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- 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.
- MW007 is ALS's internal code and is equivalent to AS4276.5.

Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

				Sample ID	Beach front tank	Creek Tanks	Main tank	Top toilets tank	Pretty beach tank
				Sampling date / time	17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00
Compound	CAS Number	LOR	Unit		EW2400269-001	EW2400269-002	EW2400269-003	EW2400269-004	EW2400269-005
					Result	Result	Result	Result	Result
MW006: Thermotolerant Coliforms & E.coli by MF									
<i>Escherichia coli</i>	----	1	CFU/100mL		<1	<1	<1	<1	<1
MW007: Coliforms by MF									
Coliforms	----	1	CFU/100mL		<1	<1	<1	<1	<1

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) MW007: Coliforms by MF

(WATER) MW006: Thermotolerant Coliforms & E.coli by MF



QUALITY CONTROL REPORT

Work Order	: EW2400269	Page	: 1 of 3
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division NSW South Coast
Contact	: Gray Taylor	Contact	: Glenn Davies
Address	: Merry Beach Road, Kioloa 2539	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone	: 02 9476 9999	Telephone	: +61 2 4225 3125
Project	: Merry Beach Fresh /Drinking Water Monthly	Date Samples Received	: 17-Jan-2024
Order number	: P0501061	Date Analysis Commenced	: 18-Jan-2024
C-O-C number	: ----	Issue Date	: 06-Feb-2024
Sampler	: Client - K Bourke		
Site	: Merry Beach		
Quote number	: EW23INGMER0002		
No. of samples received	: 5		
No. of samples analysed	: 5		



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
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.

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.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

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.**
-



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EW2400269	Page	: 1 of 4
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division NSW South Coast
Contact	: Gray Taylor	Telephone	: +61 2 4225 3125
Project	: Merry Beach Fresh /Drinking Water Monthly	Date Samples Received	: 17-Jan-2024
Site	: Merry Beach	Issue Date	: 06-Feb-2024
Sampler	: Client - K Bourke	No. of samples received	: 5
Order number	: P0501061	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
MW006: Thermotolerant Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006) Beach front tank, Main tank, Pretty beach tank	Creek Tanks, Top toilets tank,	17-Jan-2024	----	----	----	18-Jan-2024	18-Jan-2024	✓
MW007: Coliforms by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW007) Beach front tank, Main tank, Pretty beach tank	Creek Tanks, Top toilets tank,	17-Jan-2024	----	----	----	18-Jan-2024	18-Jan-2024	✓



Quality Control Parameter Frequency Compliance

- No Quality Control data available for this section.



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7
Coliforms by Membrane Filtration	MW007	WATER	AS 4276.5

WATER ANALYSIS CHAIN OF CUSTODY

Project: Merry Beach Monitoring - January 2024	Laboratory: ALS (Australian Laboratory Services)		Delivery Details	
Sampling Date: 11/1/23	Results Required by: 17/2/23	Address: 4/13 Geary Place, North Nowra, NSW 2541	Dispatch Date:	
Our reference: P2108127	Our Contact: Gray Taylor	Contact:	Shipment Method:	
		Phone: (02) 4423 2063	Facsimile: (02) 4423 2083	

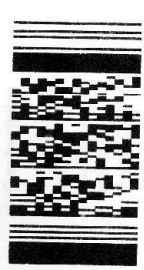
Sample ID	Number of Containers	Analysis Required (X)												
		pH	Conductivity	Suspended Solids	BOD ₅	Phosphorous (total)	Nitrogen (total)	TKN	Ammonia	NOx	Faecal Col.	Enterococci	Oil and Grease	E. Coli
1 884/Eff1		X		X	X	X	X	X	X	X	X	X		
2 884/Eff2		X	X	X										X
3 884/SW1		X	X	X	X	X	X	X	X	X	X	X	X	
4 884/SW2		X	X	X	X	X	X	X	X	X	X	X	X	
5 884/SW3		X	X	X	X	X	X	X	X	X	X	X	X	
6 884/GW1		X	X	X	X	X	X	X	X	X	X	X	X	
884/GW2		X	X	X	X	X	X	X	X	X	X	X	X	
884/GW3		X	X	X	X	X	X	X	X	X	X	X	X	
884/GW4		X	X	X	X	X	X	X	X	X	X	X	X	
884/GW5		X	X	X	X	X	X	X	X	X	X	X	X	
884/GW6		X	X	X	X	X	X	X	X	X	X	X	X	
7 Influent		X		X	X	X	X	X	X	X	X	X	X	

Notes: Fax (02 9476 8767) and email (gtaylor@martens.com.au; trichards@martens.com.au; mail@martens.com.au; [redacted] and merrybeachmgr@ingeniaholidays.com.au) results as soon as available, originals of laboratory reports to be posted to Merry Beach Caravan Park, KIOLOA, NSW, 2539.

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Asmid 1811 0900

Environmental Division
Sydney
Work Order Reference
ES2401700



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CERTIFICATE OF ANALYSIS

Work Order	: ES2401700	Page	: 1 of 4
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division Sydney
Contact	: Gray Taylor	Contact	: Glenn Davies
Address	: Merry Beach Road, Kioloa 2539	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9476 9999	Telephone	: +61 2 4225 3125
Project	: Merry Beach Monitoring - January 2024	Date Samples Received	: 18-Jan-2024 09:00
Order number	: P2108127	Date Analysis Commenced	: 18-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Feb-2024 09:43
Sampler	: ----		
Site	: Merry Beach		
Quote number	: EW23INGMER0002		
No. of samples received	: 7		
No. of samples analysed	: 7		



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
Geetha Ramasundara	Chemistry Teamleader	Inorganics, Hume, ACT
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	884/Eff1	884/Eff2	884/SW1	884/SW2	884/SW3
Sampling date / time				17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00	17-Jan-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2401700-001	ES2401700-002	ES2401700-003	ES2401700-004	ES2401700-005	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.83	7.69	6.38	6.97	7.81	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	1100	1190	1640	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	288	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.35	----	<0.01	0.14	0.04	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	18.4	----	<0.01	0.12	0.48	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.5	----	0.5	0.6	1.5	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
[^] Total Nitrogen as N	----	0.1	mg/L	22.9	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	4.39	----	<0.01	0.04	0.52	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	<2	----	<2	<2	<2	
MW006: Thermotolerant Coliforms & E.coli by MF									
<i>Escherichia coli</i>	----	1	CFU/100mL	----	10000	----	----	----	
Faecal Coliforms	----	1	CFU/100mL	~1200	----	250	1000	890	
MW023: Enterococci by Membrane Filtration									
<i>Enterococci</i>	----	1	CFU/100mL	----	----	50	~1200	98	
EP020CA: Oil and Grease									
Oil and Grease	----	1	mg/L	<1	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		884/GW1	Influent	----	----	----
		Sampling date / time		17-Jan-2024 00:00	17-Jan-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2401700-006	ES2401700-007	-----	-----	-----
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.03	8.18	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1680	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	218	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.05	96.8	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.20	0.03	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	118	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
[^] Total Nitrogen as N	----	0.1	mg/L	----	118	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.08	14.6	----	----	----
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	<2	86	----	----	----
MW006: Thermotolerant Coliforms & E.coli by MF								
<i>Escherichia coli</i>	----	1	CFU/100mL	----	53000000	----	----	----
Faecal Coliforms	----	1	CFU/100mL	~10000	65000000	----	----	----
MW023: Enterococci by Membrane Filtration								
<i>Enterococci</i>	----	1	CFU/100mL	~6	----	----	----	----
EP020CA: Oil and Grease								
Oil and Grease	----	1	mg/L	----	8	----	----	----

Inter-Laboratory Testing

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

(WATER) EP020CA: Oil and Grease



QUALITY CONTROL REPORT

Work Order	: ES2401700	Page	: 1 of 5
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division Sydney
Contact	: Gray Taylor	Contact	: Glenn Davies
Address	: Merry Beach Road, Kioloa 2539	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9476 9999	Telephone	: +61 2 4225 3125
Project	: Merry Beach Monitoring - January 2024	Date Samples Received	: 18-Jan-2024
Order number	: P2108127	Date Analysis Commenced	: 18-Jan-2024
C-O-C number	: ----	Issue Date	: 09-Feb-2024
Sampler	: ----		
Site	: Merry Beach		
Quote number	: EW23INGMER0002		
No. of samples received	: 7		
No. of samples analysed	: 7		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Geetha Ramasundara	Chemistry Teamleader	Inorganics, Hume, ACT
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.

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 (%)
EA005P: pH by PC Titrator (QC Lot: 5551260)									
ES2401677-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.68	7.71	0.4	0% - 20%
ES2401479-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.07	7.20	1.8	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 5551261)									
ES2401481-007	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3880	3900	0.4	0% - 20%
ES2401704-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	775	784	1.1	0% - 20%
ES2401479-003	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	83	83	0.0	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 5556820)									
ES2401509-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	262	233	11.5	0% - 20%
ES2401633-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	44	48	9.8	No Limit
ES2401677-005	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	8	7	12.9	No Limit
ES2401748-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	8	40.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5555781)									
ES2401677-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.0	No Limit
ES2401765-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.05	50.7	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5555780)									
ES2401478-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.0	No Limit
ES2401677-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.43	0.43	0.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5555776)									
ES2401478-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	16.5	16.9	2.4	0% - 20%
ES2401677-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	6.9	6.0	14.1	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5555777)									
ES2401478-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.56	1.54	1.0	0% - 20%

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 Work Order : ES2401700
 Client : Ingenia Holidays Merry Beach
 Project : Merry Beach Monitoring - January 2024



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 (%)
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5555777) - continued									
ES2401677-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.64	0.62	3.0	0% - 20%
EP030: Biochemical Oxygen Demand (BOD) (QC Lot: 5548956)									
ES2401611-003	Anonymous	EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	<2	0.0	No Limit
ES2401715-001	Anonymous	EP030: Biochemical Oxygen Demand	----	2	mg/L	2	<2	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: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 5551260)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.5	98.8	101
				----	7 pH Unit	99.7	99.2	101
EA010P: Conductivity by PC Titrator (QCLot: 5551261)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	99.3	89.9	110
				<1	2100 µS/cm	111	90.2	111
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 5556820)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	97.0	83.0	129
				<5	1000 mg/L	95.1	82.0	110
				<5	841 mg/L	108	83.0	118
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5555781)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	98.5	90.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5555780)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5555776)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	88.2	69.0	101
				<0.1	1 mg/L	98.8	70.0	118
				<0.1	5 mg/L	93.6	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5555777)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	95.3	71.3	126
				<0.01	0.442 mg/L	102	71.3	126
				<0.01	1 mg/L	99.4	70.0	130
EP030: Biochemical Oxygen Demand (BOD) (QCLot: 5548956)								
EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	200 mg/L	93.0	74.0	112

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.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
					MS	Low	High

Page : 5 of 5
 Work Order : ES2401700
 Client : Ingenia Holidays Merry Beach
 Project : Merry Beach Monitoring - January 2024



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5555781)							
ES2401677-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	97.9	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5555780)							
ES2401478-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	104	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5555776)							
ES2401478-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	93.0	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5555777)							
ES2401478-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.1	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2401700	Page	: 1 of 6
Client	: Ingenia Holidays Merry Beach	Laboratory	: Environmental Division Sydney
Contact	: Gray Taylor	Telephone	: +61 2 4225 3125
Project	: Merry Beach Monitoring - January 2024	Date Samples Received	: 18-Jan-2024
Site	: Merry Beach	Issue Date	: 09-Feb-2024
Sampler	: ----	No. of samples received	: 7
Order number	: P2108127	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
884/Eff1, 884/SW1, 884/SW3, Influent	884/Eff2, 884/SW2, 884/GW1,	----	----	----	19-Jan-2024	17-Jan-2024	2

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results. This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein. Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters. Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
		Container / Client Sample ID(s)	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
884/Eff1, 884/SW1, 884/SW3, Influent	884/Eff2, 884/SW2, 884/GW1,	17-Jan-2024	----	----	----	19-Jan-2024	17-Jan-2024	*
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P)								
884/SW1, 884/SW3,	884/SW2, 884/GW1	17-Jan-2024	----	----	----	19-Jan-2024	14-Feb-2024	✓
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025H)								
884/Eff1, Influent	884/Eff2,	17-Jan-2024	----	----	----	23-Jan-2024	24-Jan-2024	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
884/Eff1, 884/SW2, 884/GW1,	884/SW1, 884/SW3, Influent	17-Jan-2024	----	----	----	23-Jan-2024	14-Feb-2024	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) 884/Eff1, 884/SW2, 884/GW1, 884/SW1, 884/SW3, Influent	17-Jan-2024	----	----	----	23-Jan-2024	14-Feb-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) 884/Eff1, 884/SW2, 884/GW1, 884/SW1, 884/SW3, Influent	17-Jan-2024	23-Jan-2024	14-Feb-2024	✓	23-Jan-2024	14-Feb-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) 884/Eff1, 884/SW2, 884/GW1, 884/SW1, 884/SW3, Influent	17-Jan-2024	23-Jan-2024	14-Feb-2024	✓	23-Jan-2024	14-Feb-2024	✓
EP020CA: Oil and Grease							
Glass Jar (EP020) 884/Eff1, Influent	17-Jan-2024	----	----	----	30-Jan-2024	14-Feb-2024	✓
EP030: Biochemical Oxygen Demand (BOD)							
Clear Plastic Bottle - Natural (EP030) 884/Eff1, 884/SW2, 884/GW1, 884/SW1, 884/SW3, Influent	17-Jan-2024	----	----	----	18-Jan-2024	19-Jan-2024	✓
MW006: Thermotolerant Coliforms & E.coli by MF							
Sterile Plastic Bottle - Sodium Thiosulfate (MW006) 884/Eff1, 884/SW1, 884/SW3, Influent, 884/Eff2, 884/SW2, 884/GW1,	17-Jan-2024	----	----	----	18-Jan-2024	18-Jan-2024	✓
MW023: Enterococci by Membrane Filtration							
Sterile Plastic Bottle - Sodium Thiosulfate (MW023) 884/SW1, 884/SW3, 884/SW2, 884/GW1	17-Jan-2024	----	----	----	18-Jan-2024	18-Jan-2024	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	25	12.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	3	25	12.00	8.33	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	5	39	12.82	12.50	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	25	8.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G. Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Oil and Grease	EP020	WATER	APHA, 5520 C. Oil & greases contained in an aqueous sample are quantitatively extracted with S-316 a solvent which has no C-H bonds, S-316 is a chlorofluorocarbon. Measurement of the amount of I.R. light absorbed by the extract is performed on the Horiba Ocms 350 Oil Content Analyser.
Biochemical Oxygen Demand (BOD)	EP030	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM Schedule B(3).
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7
Enumeration of Enterococci by Membrane Filtration	MW023	WATER	AS4276.9

Preparation Methods	Method	Matrix	Method Descriptions
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Work Order : ES2401700
Client : Ingenia Holidays Merry Beach
Project : Merry Beach Monitoring - January 2024



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)