



Veolia Water Services (ANZ) Pty Ltd

AMBIENT MICROBE MONITORING OF THE MOA POINT WASTEWATER
TREATMENT PLANT, AUGUST 2024

Issue

September 2024

Veolia Water Services (ANZ) Pty Ltd

AMBIENT MICROBE MONITORING OF THE MOA POINT WASTEWATER TREATMENT PLANT, AUGUST 2024

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Approved by

Name	Title	Signature
Matthew Newby, CAQP	Senior Air Quality Scientist	

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Executive Summary

Source Testing New Zealand Limited (STNZ) was commissioned by Veolia Water Services (ANZ) Pty Ltd (Veolia) to undertake ambient microbe monitoring in the vicinity of the Moa Point Wastewater Treatment Plant (WTP). The purpose of this monitoring was to confirm compliance with the Company’s Resource Consent (WGN080003[26183]). Condition 7 of the company’s resource consent stipulates the following:

“The permit holder shall monitor air quality in the vicinity of the plant to confirm the absence of faecal coliforms and salmonella originating from the plant. Sampling is to be carried out at least once every six months.

“The sampling method and locations are to be agreed with the Manager, Environmental Regulation, Wellington Regional Council within three months of the granting of this permit. Tests are to be carried out at a minimum of three sites down and three sites upwind of the plant, with at least one in the vicinity of the Air New Zealand kitchens and one at a level of Kekerenga Street. The other sites are to be located outside of/and within 100 meters of the site boundary.”

The results of the ambient microbe monitoring performed at the Moa Point WTP on 14 August 2024 confirmed the absence of Salmonella and Faecal Coliforms, nor was there any *Aspergillus Fumigatus*, Gram-negative, or Enterococci detected.

The microbiological counts at Sites 1, 2, 4, and 5 were consistent with general outdoor air while Sites 3 and 6 were within the range for ambient air in the vicinity of wastewater treatment plants (Biodet Data Base). The results are significantly lower than measured in April 2024 but were similar to September 2023 reflecting the different seasons.

■ **Table 1 Moa Point Wastewater Treatment Plant Ambient Microbe Monitoring, 14 August 2024**

Site	Total Count (CFU/m ³) ¹	Filter 1 Breakdown of Total Count					Filter 2		Filter 3		
		Total Bacteria (CFU/m ³) ^a	Total Actinomycetes (CFU /m ³) ^a	Total Fungi ^b (CFU /m ³) ^a	Total Yeasts (CFU/m ³) ^a	<i>Aspergillus Fumigatus</i> ^c (CFU /m ³) ^a	Gram Negative (CFU/m ³) ^a	Enterococci (CFU /m ³) ^a	Salmonella Present/Absent	Total Coliforms Present/Absent	Faecal Coliforms Present/Absent
Site 1	62	2	<2	60	<2	<2	<2	<2	Absent	Absent	Absent
Site 2	80	17	7	56	<2	<2	<2	<2	Absent	Absent	Absent
Site 3	153	3	<3	150	>3	>3	>3	<3	Absent	Absent	Absent
Site 4	72	3	<3	69	<3	<3	<3	<3	Absent	Absent	Absent
Site 5	29	6	<3	23	<3	<3	<3	<3	Absent	Absent	Absent
Site 6	223	8	62	153	<3	<3	<3	<3	Absent	Absent	Absent

- CFU/m³ = Colony forming units per cubic meter of air at actual temperature and pressure
- F/Fungi = Filamentous Fungi
- Aspergillus fumigatus* count is included in the Total Fungi count

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1. Introduction

Source Testing New Zealand Limited (STNZ) was commissioned by Veolia Water Services (ANZ) Pty Ltd (Veolia) to undertake ambient microbe monitoring in the vicinity of the Moa Point Wastewater Treatment Plant (WTP). The purpose of this monitoring was to confirm compliance with the Company's Resource Consent (WGN080003[26183]). Condition 7 of the company's resource consent stipulates the following:

"The permit holder shall monitor air quality in the vicinity of the plant to confirm the absence of faecal coliforms and salmonella originating from the plant. Sampling is to be carried out at least once every six months"

"The sampling method and locations are to be agreed with the Manager, Environmental Regulation, Wellington Regional Council within three months of the granting of this permit. Tests are to be carried out at a minimum of three sites down and three sites upwind of the plant, with at least one in the vicinity of the Air New Zealand kitchens and one at a level of Kekerenga Street. The other sites are to be located outside of/and within 100 meters of the site boundary."

Matthew Newby, Senior Air Quality Scientist performed the monitoring on 14 August 2024. Matthew has 25 year's air quality monitoring and consulting experience and is designated as a Key Technical Person under STNZ's IANZ accreditation. Matthew is also a Certified Air Quality Professional (CAQP) under the Clean Air Society of Australia and New Zealand (CASANZ) certification programme. This report presents the sampling methodology, meteorological conditions on the day of sampling and the results of the ambient microbe monitoring.

2. Sampling Methodologies

Sampling for ambient microbes was performed at a total of six monitoring sites in the vicinity of the Moa Pt WTP. The sampling locations were approved by Greater Wellington Regional Council and are depicted in Figures 1 through 6 with Appendix A detailing their locations within the landfill. A series of three gelatine filters were collected from each site and analysed for the following microbes.

- Total Coliforms.
- Faecal Coliforms.
- Salmonella.
- Total Bacteria.
- Total Actinomycetes,
- Total Filamentous Fungi
- Total Yeasts,
- Aspergillus Fumigatus,
- Gram Negative,
- Total Yeasts, and
- Enterococci.

Samples were collected in accordance with NIOSH Method 0500 “Particulates Not Otherwise Regulated, Total” which determines the total aerosol mass. The samples were collected on a series of three specially prepared gelatine filters per site at a sampling rate of 1.5 to 2.5 L/min for a period of 6 to 7 hours. Due to the limited stability of salmonella and faecal coliforms on filter paper, the filter for these species was placed in a sterilised broth immediately following sampling. Samples were couriered on ice to the laboratory on the day of sample collection. Biodet Services Ltd, Auckland supplied the filters and performed the analysis.

Please note that for Site 6 the new neighbours have several chickens along the fence line where the original sample site was located (Figure 6).



■ **Figure 1: Site 1 Monitoring Equipment**



■ **Figure 2: Site 2 Monitoring Equipment**



■ **Figure 3: Site 3 Monitoring Equipment**



■ **Figure 4: Site 4 Monitoring Equipment**



■ **Figure 5: Site 5 Monitoring Equipment**



■ **Figure 6: Site 6 Monitoring Equipment**

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3. Meteorological Conditions

To aid in the determination of potential sources of the airborne microbes measured in the vicinity of the Moa Pt WTP, the wind speed and direction data was recorded at each of the monitoring sites for the duration of the monitoring using a handheld anemometer and compass. Tables 2 through 7 present the meteorological data recorded at each of the monitoring sites.

On 14 August 2024, light northerlies persisted throughout the day with mild temperature conditions with Sites 1 and 2 having the greatest potential to be impacted by emissions from the Moa Pt WTP.

Please note that the construction of the new sludge minimisation plant on site restricted access to Site 1 and Site 6 has been re-located to the western boundary of the Kekerenga St property as the current neighbour has several chickens which have the potential to artificially increase the microbe counts.

■ **Table 2: Moa Point WTP Site 1, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
7:51	0.4	N	6.9	102.96
11:20	0.8	N	14.0	
13:00	0.9	300	14.2	
16:45	0.6	N	13.7	

■ **Table 3: Moa Point WTP Site 2, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
8:21	0.5	340	7.6	102.55
10:03	0.9	N	11.8	
11:00	0.7	N	14.7	
12:03	1.2	N	14.1	
13:05	0.8	N	14.3	
13:40	0.9	N	14.3	
16:10	0.6	N	13.4	

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■ **Table 4: Moa Point WTP Site 3, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
9:33	4.2	20	10.5	102.60
11:10	1.8	30	12.7	
11:45	2.8	20	12.8	
12:47	2.2	N	13.6	
14:15	2.6	N	13.2	
15:30	2.4	N	13.0	

■ **Table 5: Moa Point WTP Site 4, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
9:42	3.1	10	10.3	102.59
11:12	1.8	30	12.7	
11:47	2.8	20	12.8	
12:50	2.2	N	13.6	
14:17	2.6	N	13.2	
15:35	2.4	N	12.9	

■ **Table 6: Moa Point WTP Site 5, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
8:45	1.1	N	8.9	102.89
10:20	1.0	N	11.8	
11:30	0.9	N	14.0	
13:15	0.7	N	14.2	
14:55	0.3	N	13.9	

■ **Table 7: Moa Point WTP Site 6, 14 August 2024**

Time	Wind Speed (m/s)	Wind Direction (from, degrees)	Temp. (°C)	Ambient Pressure (kPa)
9:02	0.8	10	9.1	101.97
10:36	0.9	N	11.0	
11:43	0.7	N	13.1	
13:55	1.2	N	13.3	
15:23	0.6	N	14.0	

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4. Ambient Microbe Monitoring Results

4.1 Ambient Microbe Monitoring Results

The results of the ambient microbe monitoring performed at the Moa Point WTP on 10 April 2024 are presented below. Table 8 presents the results of the ambient microbe monitoring with the raw sampling data presented in Appendix B and the Biodet analytical report presented in Appendix C.

■ **Table 8: Moa Point Wastewater Treatment Plant Ambient Microbe Monitoring Results, 14 August 2024**

Site	Total Count (CFU/m ³) ¹	Filter 1 Breakdown of Total Count					Filter 2		Filter 3		
		Total Bacteria (CFU/m ³) ¹	Total Actinomycettes (CFU /m ³) ¹	Total F/Fungi ² (CFU /m ³) ¹	Total Yeasts (CFU/m ³) ¹	<i>Aspergillus Fumigatus</i> ³ (CFU /m ³) ¹	Gram Negative (CFU/m ³) ¹	Enterococci (CFU /m ³) ¹	Salmonella Present/Absent	Total Coliforms Present/Absent	Faecal Coliforms Present/Absent
Site 1	62	2	<2	60	<2	<2	<2	<2	Absent	Absent	Absent
Site 2	80	17	7	56	<2	<2	<2	<2	Absent	Absent	Absent
Site 3	153	3	<3	150	<3	<3	<3	<3	Absent	Absent	Absent
Site 4	72	3	<3	69	<3	<3	<3	<3	Absent	Absent	Absent
Site 5	29	6	<3	23	<3	<3	<3	<3	Absent	Absent	Absent
Site 6	223	8	62	153	<3	<3	<3	<3	Absent	Absent	Absent

1. CFU/m³ = Colony forming units per cubic meter of air at actual temperature and pressure
2. F/Fungi = Filamentous Fungi
3. *Aspergillus fumigatus* count is included in the Total Fungi count

4.2 Summary

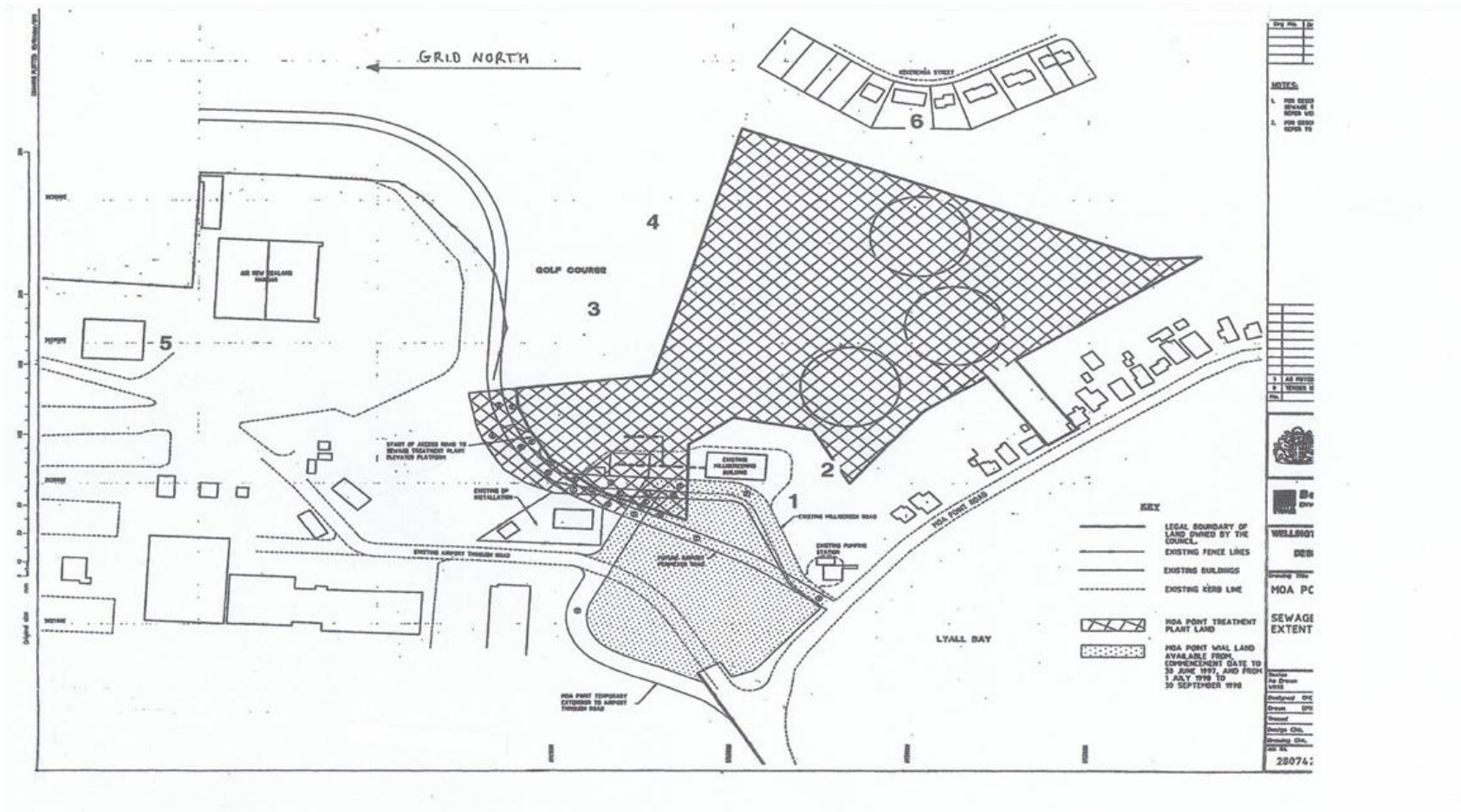
The results of the ambient microbe monitoring performed at the Moa Point WTP on 14 August 2024 confirmed the absence of Salmonella and Faecal Coliforms, nor was there any *Aspergillus Fumigatus*, Gram-negative, or Enterococci detected.

The microbiological counts at Sites 1, 2, 4, and 5 were consistent with general outdoor air while Sites 3 and 6 were within the range for ambient air in the vicinity of wastewater treatment plants (Biodet Data Base). The results are significantly lower than measured in April 2024 but were similar to September 2023 reflecting the different seasons.

Appendix A Site Plan

This Appendix contains 2 pages including cover

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 Ambient Microbe Monitoring of the Moa Point WTP
 August 2024



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Appendix B Raw Sampling Data

This Appendix contains 2 pages including cover.

Ambient Microbe Monitoring Data, Moa Point WTP, 14 August 2024

Sample Description	Sample ID	Sampling Date	Sampling Period	Sample Duration (min)	Initial Flow (L/min)	Final Flow (L/min)	Ave Flow (L/min)	Sample Vol (m ³)
Moa Pt Site 1 Filter 1	ST1216/01	14/08/2024	8:19 - 16:08	469	2.10	2.05	2.08	0.973
Moa Pt Site 1 Filter 2	ST1216/02	14/08/2024	8:19 - 16:08	469	2.25	2.25	2.25	1.055
Moa Pt Site 1 Filter 3	ST1216/03	14/08/2024	8:19 - 16:08	469	2.05	2.10	2.08	0.973
Moa Pt Site 2 Filter 1	ST1216/04	14/08/2024	7:50 - 16:36	526	1.55	1.60	1.58	0.828
Moa Pt Site 2 Filter 2	ST1216/05	14/08/2024	7:50 - 16:36	526	1.45	1.50	1.48	0.776
Moa Pt Site 2 Filter 3	ST1216/06	14/08/2024	7:50 - 16:36	526	2.00	2.00	2.00	1.052
Moa Pt Site 3 Filter 1	ST1216/07	14/08/2024	9:37 - 15:40	363	2.15	2.10	2.13	0.771
Moa Pt Site 3 Filter 2	ST1216/08	14/08/2024	9:37 - 15:40	363	1.75	1.70	1.73	0.626
Moa Pt Site 3 Filter 3	ST1216/09	14/08/2024	9:37 - 15:40	363	2.20	2.20	2.20	0.799
Moa Pt Site 4 Filter 1	ST1216/10	14/08/2024	9:45 - 15:35	350	2.00	2.00	2.00	0.700
Moa Pt Site 4 Filter 2	ST1216/11	14/08/2024	9:45 - 15:35	350	2.00	2.00	2.00	0.700
Moa Pt Site 4 Filter 3	ST1216/12	14/08/2024	9:45 - 15:35	350	1.90	1.90	1.90	0.665
Moa Pt Site 5 Filter 1	ST1216/13	14/08/2024	8:42 - 14:51	369	1.95	1.85	1.90	0.701
Moa Pt Site 5 Filter 2	ST1216/14	14/08/2024	8:42 - 14:51	369	1.90	1.85	1.88	0.692
Moa Pt Site 5 Filter 3	ST1216/15	14/08/2024	8:42 - 14:51	369	1.95	1.85	1.90	0.701
Moa Pt Site 6 Filter 1	ST1216/16	14/08/2024	9:00 - 15:06	366	2.10	2.10	2.10	0.769
Moa Pt Site 6 Filter 2	ST1216/17	14/08/2024	9:00 - 15:06	366	2.10	2.10	2.10	0.769
Moa Pt Site 6 Filter 3	ST1216/18	14/08/2024	9:00 - 15:06	366	2.05	2.10	2.08	0.759

Appendix C Laboratory Reports

This Appendix contains 3 pages including cover.

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Ambient Microbe Monitoring of the Moa Point WTP
August 2024

Biodet Services Ltd
 Consulting Industrial Microbiologists

Unit K, 383 Khyber Pass Road, PO Box 99010, Newmarket, Auckland 1149. Phone: 09-529-1563. E-mail: office@biodet.co.nz, www.biodet.co.nz

CULTURABLE AIRBORNE MICROBIAL REPORT

DATE OF REPORT: 21 August 2024
 SITE: Veolia Moa Pt
 DATE OF SAMPLING: 14 August 2024
 DATE SAMPLES RECEIVED: 15 August 2024
 CLIENT REF NO: ST1216
 BIODET REF NO: 24/52844

CLIENT: Source Testing New Zealand
 PO Box 32-017
 Maungaraki
 LOWER HUTT 5010

ATTN: Matthew Newby

METHOD: In-house gelatin filter method (available on request.)

Volumes Sampled:	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Filter 1	973L	828L	771L	700L	701L	769L
Filter 2	1055L	776L	626L	700L	692L	769L
Filter 3	973L	1052L	799L	665L	701L	759L

LABORATORY NUMBER	TOTAL COUNT CFU/M ³	FILTER 1 - BREAKDOWN OF TOTAL COUNT					FILTER 2		FILTER 3		
		TOTAL BACTERIA CFU/M ³	TOTAL ACTINOMYCETES CFU/M ³	TOTAL F/FUNGI CFU/M ³	TOTAL YEASTS CFU/M ³	<i>Aspergillus fumigatus</i> CFU/M ³	GRAM NEGATIVE CFU/M ³	ENTEROCOCCI CFU/M ³	<i>SALMONELLA</i> Present/Absent	TOTAL COLIFORMS Present/Absent	FAECAL COLIFORMS Present/Absent
52844/1 - Site 1	62	2	<2	60	<2	<2	<2	<2	Absent	Absent	Absent
52844/2 - Site 2	80	17	7	56	<2	<2	<3	<3	Absent	Absent	Absent
52844/3 - Site 3	153	3	<3	150	<3	<3	<3	<3	Absent	Absent	Absent
52844/4 - Site 4	72	3	<3	69	<3	<3	<3	<3	Absent	Absent	Absent
52844/5 - Site 5	29	6	<3	23	<3	<3	<3	<3	Absent	Absent	Absent
52844-6 - Site 6	223	8	62	153	<3	<3	<3	<3	Absent	Absent	Absent

Limit of detection for quantitative analyses is 2-3 cfu per m³
 F/FUNGI = FILAMENTOUS FUNGI

< = less than
 The *Aspergillus fumigatus* count is included in the TOTAL FUNGI count.

INTERPRETATION:

Total coliforms are generally found associated with decaying organic material, so are commonly found in soil and wet environments.
 Faecal coliforms and *Salmonella* have a relatively short survival time in aerosols.
 Faecal Streptococci, Actinomycetes and *Candida* yeast species have good survival in aerosols and are useful indicators of wastewater aerosol pollution.
 Total counts of bacteria and fungi give an indication of air quality.
 Actinomycetes are soil microorganisms and may indicate disturbance to the soil
Aspergillus fumigatus is indicative of decomposing plant material and has the potential to cause infection in immunocompromised people.
 Actinomycete bacteria are becoming recognised as a significant microorganism in indoor air quality, with some species implicated in hypersensitivity pneumonitis.

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Ambient Microbe Monitoring of the Moa Point WTP
August 2024

Biodet Services Ltd
Consulting Industrial Microbiologists

GUIDELINES: (based on Biodet database)

Colony-forming units (cfu) per cubic meter (m³) of air

	Bacteria	Fungi
Outdoor air	50-100	50-350
Vicinity of waste-water treatment plant	50-500	500-5000

Note: These counts may increase significantly with soil disturbance in the vicinity

CONCLUSIONS:

The microbial counts for all sites sampled were well within the guidelines for a waste water treatment plant.

Aspergillus fumigatus, Gram-negative bacteria, Enterococci, *Escherichia coli* and *Salmonella* were not isolated from any of the sites.

Yours faithfully



Elaine Khor

M.Sc.

The samples were tested as received.

This report must not be reproduced except in full.

Unless otherwise indicated, sample analysis was performed at Biodet Services, 383 Khyber Pass Road, Newmarket, Auckland.

MEMBER OF NEW ZEALAND ASSOCIATION OF CONSULTING LABORATORIES

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