Wellington Water

Absolutely Positively Wellington City Council
Me Heke Ki Pōneke

Moa Point Wastewater Treatment Plant

Annual Resource Consents Report 2019/2020

Your public water company

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Control Sheet

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Prepared by: Joemar Cacnio

Reviewed by: Anna Hector

Authorised by: Jeremy McKibbin

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Executive Summary

This report has been prepared on behalf of the Wellington City Council (WCC) for compliance with the following resource consents:

WGN080003 [31505]

This discharge permit allows WCC to continuously discharge up to 260,000 cubic meters per day of secondary treated and disinfected wastewater from the Moa Point Wastewater Treatment Plant into the coastal marine area via an existing submarine outfall. The coastal marine area is designated between map references NZMS 260: R27; 2660742.5982398 and NZMS 260: R27; 2660710.5982311.

WGN080003 [35047]

This coastal permit allows WCC to occasionally discharge up to 4500 litres per second of mixed disinfected secondary treated and milli-screened wastewater to the coastal marine area via an existing submarine outfall during and/or immediately after heavy rainfall, when the quantity of wastewater arriving at the Moa Point Wastewater Treatment Plant exceeds 3000 litres per second. The coastal marine area is designated between map references NZMS 260: R27; 2660742.5982398 and NZMS 260: R27; 2660710.5982311.

WGN080003 [26182]

This coastal permit allows WCC to occupy the foreshore and seabed of the coastal marine area with an existing submarine outfall pipeline. The coastal marine area is designated between map references NZMS 260: R27; 2660742.5982398 and NZMS 260: R27; 2660710.5982311.

WGN080003 [26183]

This discharge permit allows WCC to continuously discharge contaminants (including odour) to air from the Moa Point Wastewater Treatment Plan ventilation system. The Moa Point WWTP is located at map reference NZMS 260: R27; 2661614.5984078.

The report will cover the period from 1 July 2019 to 30 June 2020.

Table of Contents

Resource Consent

WGN080003 [31505]

Effluent discharge from the Moa Point WWTP is governed by the resource consent under the Greater Wellington Regional Council consent file number WGN8003 [31505]. In general, the consent allows the continuous discharge of up to 260,000 cubic metres per day of secondary treated and disinfected wastewater from Moa Point Wastewater Treatment Plant into coastal marine area via an existing submarine outfall.

The following outlines the conditions of this resource consent required for this report.

WGN980003 [35047]

In addition to the above resource consent, the discharge from the Moa Point WWTP is governed by another resource consent under the Greater Wellington Regional Council consent file number WGN8003 [35047]. In general, the consent allows the discharge up to 4500 litres per second of mixed disinfected secondary treated and milli-screened wastewater to the coastal marine area via an existing submarine outfall during and/or immediately after heavy rainfall, when the quantity of wastewater arriving at the Moa Point Wastewater Treatment Plant exceeds 3000 litres per second.

The following will also outline the conditions of this resource consent required for this report.

WGN980003 [26182]

The outfall pipeline from the Moa Point WWTP is governed by the resource consent under the Greater Wellington Regional Council consent file number WGN8003 [26182]. In general, the WCC is allowed to occupy the foreshore and seabed of the coastal marine area with an existing submarine outfall pipeline.

The following will also outline the conditions of this resource consent required for this report.

WGN980003 [26183]

Emissions from the Moa Point WWTP are governed by the resource consent under the Greater Wellington Regional Council consent file number WGN8003 [26183]. In general, the WCC is allowed to continuously discharge contaminants (including odour) to air from Moa Point Wastewater Treatment Plan ventilation system.

The following will also outline the conditions of this resource consent required for this report.

WGN080003 [31505]

Condition (5)

The permit holder shall continue to engage with the Moa Point Community Liaison Group (CLG) established and maintained under the Wellington City Council destination. A summary of each meeting that includes, but is not limited to, issues discussed, actions agreed upon and any follow-up on agreed actions from previous meetings shall be forwarded to the Manager, Environmental Regulation, Wellington Regional Council within 10 working days of each CLG meeting.

A CLG meeting was held on 24th September 2019. The minutes of the meeting was circulated to the group.

Condition (6)

The permit holder shall continuously monitor and record the flow rate and volume of treated wastewater entering the submarine outfall pipeline, to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council. A summary of the records listing the daily discharge volumes and average and maximum flow rates shall be forwarded to the Manager, Environmental Regulation, Wellington Regional Council at quarterly intervals, in accordance with condition 19 of this permit.

Although the data requested in Condition (6) is not a requirement for the annual report, please find below a summary of the monthly average daily discharge, monthly average flow rate, and monthly maximum flow rate.

Month	Average Daily Flow	Average Peak Daily Flow	Average Total Daily Flow
	L/s	L/s	m^3
July 2019	792	1705	68406
August 2019	689	1509	59512
September 2019	761	1494	64909
October 2019	761	1537	65732
November 2019	684	1439	59095
December 2019	634	1376	54789
January 2020	543	1217	46906
February 2020	580	1260	50117
March 2020	635	1286	54670
April 2020	560	1094	48349
May 2020	663	1440	56862
June 2020	876	1508	75100
Limit	**N/A**	**N/A**	**260,000**

Table 1: Monthly Effluent Average Daily Flow, Peak Daily Flow, and Total Daily Flow

For all average daily, peak hourly and total daily flow rates for the WWTP effluent see Appendix i: Effluent Flow Rate.

Condition (10)

The wastewater discharged from the Moa Point Wastewater Treatment Plant to the coastal waters shall comply with the following effluent quality criteria:

(a) $cBOD_5$

The geometric mean of 90 consecutive daily sampling results shall not exceed 20g/m^3 and no more than 10% of 90 consecutive sample results shall exceed 45g/m^3.

(b) Suspended solids

The geometric mean of 90 consecutive daily sampling results shall not exceed 30g/m^3 and no more than 10% of 90 consecutive sample results shall exceed 68g/m^3.

(c) Faecal Coliforms

The geometric mean of 90 consecutive daily sampling results shall not exceed 200 colony forming units per 100mL and no more than 10% of 90 consecutive sample results shall exceed 950 colony forming units per 100mL.

Compliance with the effluent quality criteria shall be determined from the results of wastewater monitoring undertaken in accordance with conditions (9)(a) and (9) (b) of this permit, with running geometric mean and ninetieth percentile calculated following each sampling event using the preceding 90 consecutive sample results.

Section (a)

Below is a summary of the geometric mean and ninetieth percentile for the Carbonaceous Biological Oxygen Demand.

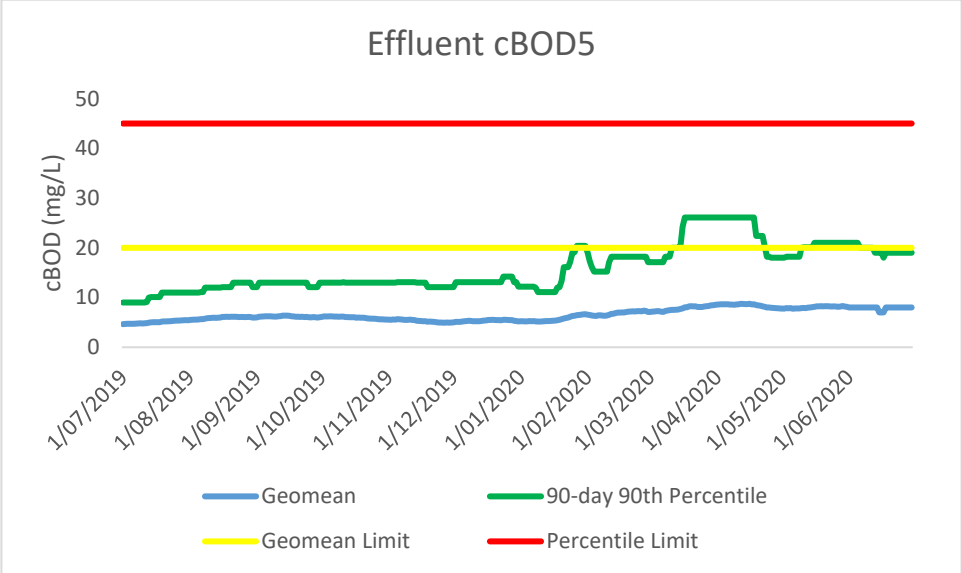


Chart 1: Carbonaceous Biological Oxygen Demand Results, Geometric Mean, and 90th Percentile

There is an upward trend in the effluent cBOD5 geometric and percentile results in the third quarter of FY2019/2020. This is due to the sludge pipeline failure which happened in January 2020. For all daily effluent geometric mean and ninetieth percentile of Biological Oxygen Demand results please see Appendix i: Daily Effluent Carbonaceous Biological Oxygen Demand Results.

Section (b)

Below is a summary of the geometric mean and ninetieth percentile for the Suspended Solids.

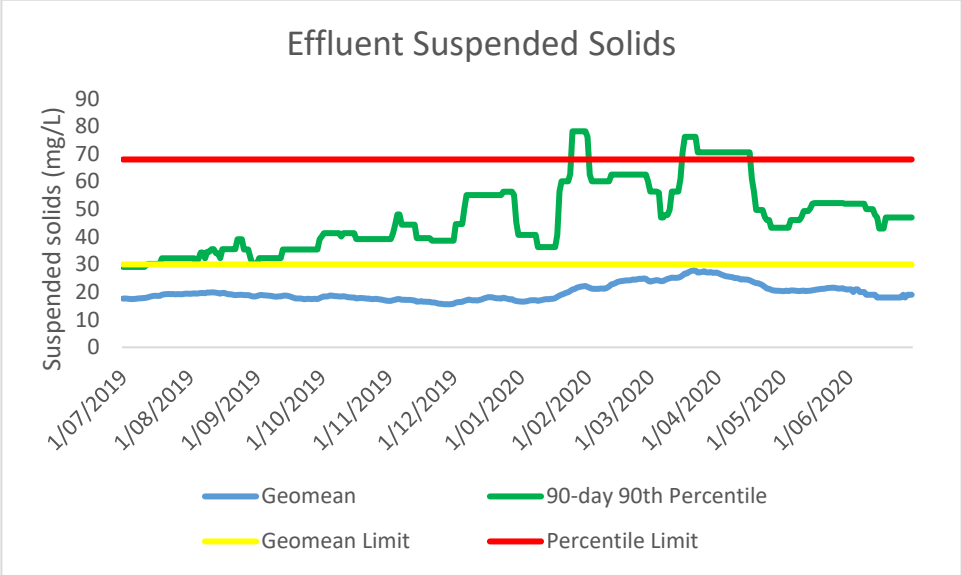


Chart 2: Suspended Solids Results, Geometric Mean, and 90th Percentile

The facility had non-compliances in the effluent suspended solids percentile limit on the second half of FY2019/2020. Also, there is an upward trend in the effluent suspended solids geometric and percentile results. These is due to the sludge pipeline failure which happened in January 2020. For all daily effluent geometric mean and ninetieth percentile of Suspended Solids results please see Appendix i: Daily Suspended Solids Results.

Section (c)

Below is a summary of the geometric mean and ninetieth percentile for the Faecal Coliforms.

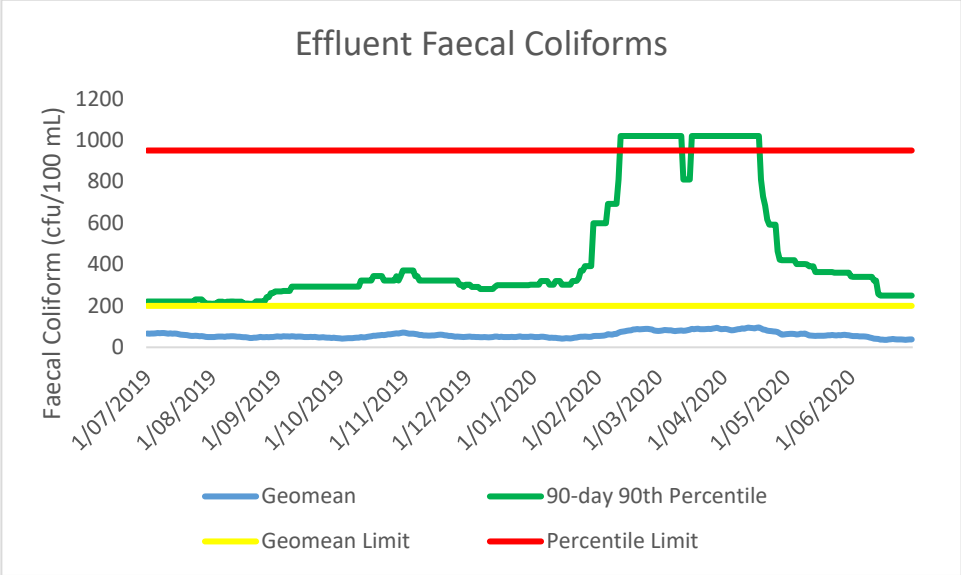


Table 2: Faecal Coliforms Results, Geometric Mean, and 90th Percentile

The facility had non-compliances in the effluent faecal coliforms percentile limit on the second half of FY2019/2020. This is due to the sludge pipeline failure which happened in January 2020. For all daily effluent geometric mean and ninetieth percentile of Faecal Coliform results please see Appendix i: Daily Effluent Faecal Coliform Results.

Condition (11)

The permit holder shall at least once every three months obtain a sample of the treated wastewater discharged from the treatment plant to the outfall. This sample shall be analyzed for and not exceed the following:

Total arsenic	0.26g/m^3
Total cadmium	0.08 g/m^3
Total chromium	0.48 g/m^3
Total copper	0.14 g/m^3
Total lead	0.48 g/m^3
Total mercury	0.01 g/m^3
Total nickel	0.77 g/m^3
Total zinc	1.65 g/m^3
Phenol	0.80 g/m^3
Cyanide as CN	0.10 g/m^3

The sample shall also be analysed for:
pH
Ammoniacal Nitrogen
Oil and Grease

Below is a summary of the analytical results for the quarterly effluent samples.

Compound	Units	Limit	16 August 2019	21 November 2019	20 February 2020	06 April 2020
Total arsenic	**g/m^3**	**0.26**	0.002	0.002	<0.002	0.00089
Total cadmium	**g/m^3**	**0.08**	0.001	0.001	<0.001	0.00005
Total chromium	**g/m^3**	**0.48**	0.001	0.001	0.001	0.00086
Total copper	**g/m^3**	**0.14**	0.004	0.004	0.015	0.0037
Total lead	**g/m^3**	**0.48**	0.001	0.001	0.001	0.00042
Total mercury	**g/m^3**	**0.01**	0.0005	0.0005	0.0005	0.00005
Total nickel	**g/m^3**	**0.77**	0.001	0.001	0.002	0.0011
Total zinc	**g/m^3**	**1.65**	0.017	0.017	0.044	0.039
Phenol	**g/m^3**	**0.80**	0.05	0.05	0.05	0.002
Cyanide as CN	**g/m^3**	**0.10**	0.010	0.010	0.063	0.005
pH	**N/A**	**N/A**	7.2	7.4	6.8	6.7
Ammoniacal Nitrogen	**g/m^3**	**N/A**	24.4	26.5	5.5	4.8
Oil and Grease	**g/m^3**	**N/A**	4	4	11	9.8

Table 2: Quarterly Effluent Sample Results

The analytical data sheet results can be viewed in the Moa Point WWTP quarterly reports. All analytical results for the quarterly effluent samples are well below the limits set in the resource consent. This is because of the lack of heavy industry in Wellington City.

All data for the 2019/2020 reporting year is compliant.

Condition (13)

The permit holder shall notify the Manager, Environmental Regulation, Wellington Regional Council immediately in the event that a running geometric mean and/or ninetieth percentile effluent quality value or other value calculated following each wastewater quality sampling event exceeds the criteria stipulated in conditions 10 and 11 of this permit for more than three consecutive sampling events. Such a notification shall include the likely reason for exceedance, and measures to be undertaken by the permit holder to remedy the situation. The permit holder shall also immediately notify the Medical Officer of Health of any such event.

The treatment plant had non-compliances in effluent suspended solids resource consent limits in January and March 2020. It also experienced non –compliances in effluent faecal coliform resource consent limits in February and March 2020. The non-compliances can be attributed to the sludge pipeline failure which happened in 16th January. The said failure made the plant unable to effectively manage its solids inventory in the system causing process issues. Wellington Water provided regular updates to GWRC and Regional public health regarding the issue in the plant until the sludge pipeline operation has been restored on the 23rd May 2020.

Condition (20)

The permit holder shall provide to the Manager, Environmental Regulation, Wellington Regional Council an Annual Assessment and Analysis Report for the period 1 July to 30 June by 31 July each year summarising compliance with the conditions of this permit. This report shall include, but not be limited to the following:

a) A summary of all monitoring undertaken in accordance with the conditions of this permit and a critical analysis of the information in terms of compliance and adverse environmental effects;
b) A comparison of data with previously collected data in order to identify any emerging trends;
c) Comments on compliance with the conditions of this permit;
d) Any reasons for non-compliance or difficulties in achieving compliance with the conditions of this permit;
e) Any measures that have been undertaken to improve the environmental performance of the wastewater treatment and disposal system;
f) A copy of any complaints recorded (in accordance with condition 18 of this permit) during the year;
g) Any other issues considered to be important;

A copy of the repot shall be provided to Community Liaison Group, Te Atiawa, Te Runanganui O Taranaki Whanui kit e Upoko o te Ika a Maui, Ngati Toa Rangatira and the Wellington Tenths Trust, if requested.

Section (a)

All monitoring performed at the Moa Point WWTP has been provided in the previous sections of this report under the designated resource consent conditions. The following is a summary of the monitoring parameters, the resource consent condition the data is listed under, the monitoring frequency, the limits for each parameter, and compliance with the resource consent:

Monitoring Parameter	WGN980003 [31505] Condition	Monitoring Frequency	Limits	Compliance
WWTP Effluent Flow Rate	(6)	Daily	260,000m^3/day	Compliant
Carbonaceous Biological Oxygen Demand	(10)(a)	Daily	Geometric Mean < 20g/m^3 90th Percentile < 45g/m^3	Compliant
Suspended Solids	(10)(b)	Daily	Geometric Mean < 30g/m^3 90th Percentile < 68g/m^3	10 out of 12 months Compliant
Faecal Coliforms	(10)(c)	Daily	Geometric Mean < 200cfu/100mL 90th Percentile < 950cfu/100mL	10 out of 12 months Compliant
Total arsenic	(11)	Quarterly	0.26g/m3	Compliant
Total cadmium		Quarterly	0.08 g/m3	Compliant
Total chromium		Quarterly	0.48 g/m3	Compliant
Total copper		Quarterly	0.14 g/m3	Compliant
Total lead		Quarterly	0.48 g/m3	Compliant
Total mercury		Quarterly	0.01 g/m3	Compliant
Total nickel		Quarterly	0.77 g/m3	Compliant
Total zinc		Quarterly	1.65 g/m3	Compliant
Phenol		Quarterly	0.80 g/m3	Compliant
Cyanide as CN		Quarterly	0.10 g/m3	Compliant
pH		Quarterly	N/A	N/A
Ammoniacal Nitrogen		Quarterly	N/A	N/A
Oil and Grease		Quarterly	N/A	N/A

Table 3: Summary of Continuous Discharge Monitoring Undertaken at Moa Point WWTP

Please see the listed sections for the summary. Note that the geometric mean and ninetieth percentile calculation are performed on ninety days of consecutive samples.

Note that the statistical analysis for the quarterly effluent samples has been included with the Condition (11).

Section (b)

A comparison of data from the 2019/2020 reporting period was made to the previous four (4) years. The following section summarises that comparison.

The following is a comparison of the total daily effluent flow rate:

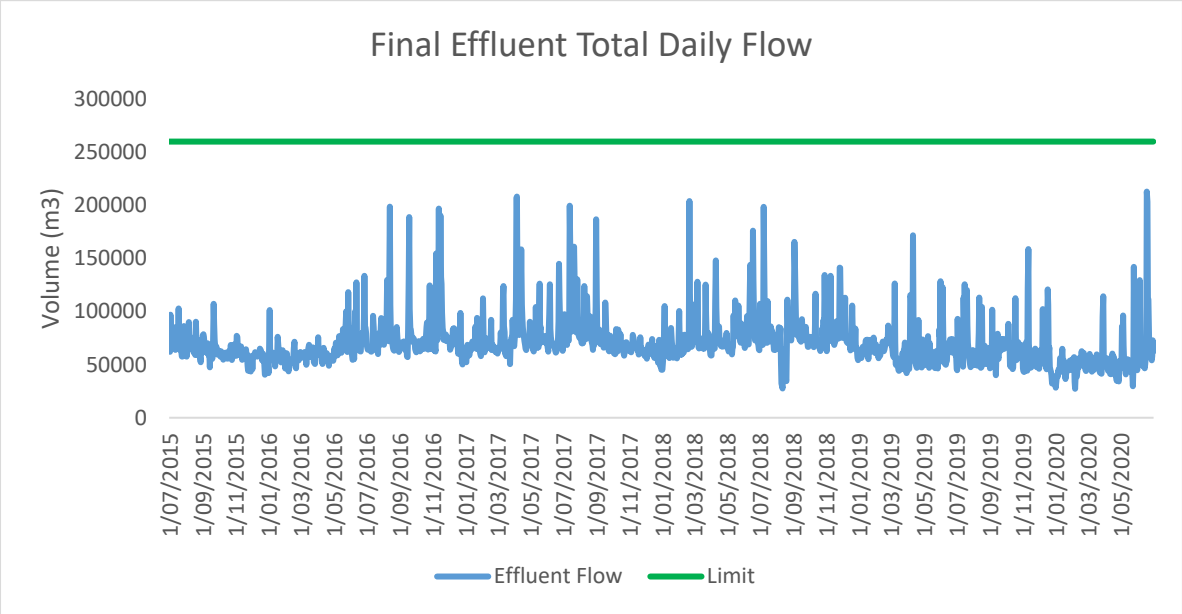


Chart 4: Final Effluent Total Daily Flow

There is a trend of the average daily effluent flow decreases between the months of December to February. This trend coincides with the summer months which have less rainfall than the winter months. The amount of effluent flow from the WWTP also seems to be increasing during the winter months. This could be a result of increased wet weather during the winter period.

The following is a comparison of the $cBOD_5$:

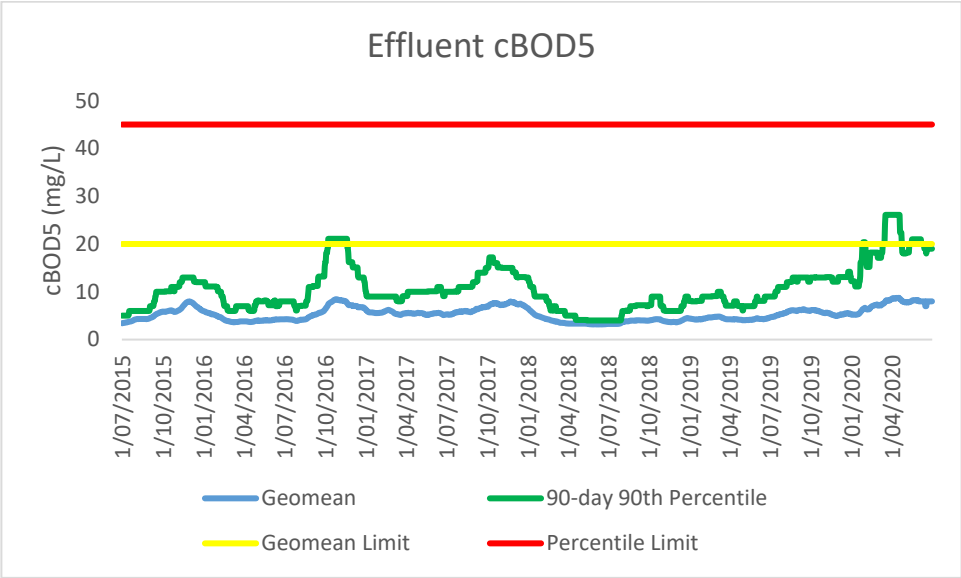


Chart 5: Final Effluent $cBOD_5$ Geometric Mean and Percentile Values

The effluent $cBOD_5$ has an upward trend in FY2019/2020 as compared to the previous 4 years. This was due to the sludge pipeline failure which happened this financial year.

The following is a comparison of the Suspended Solids:

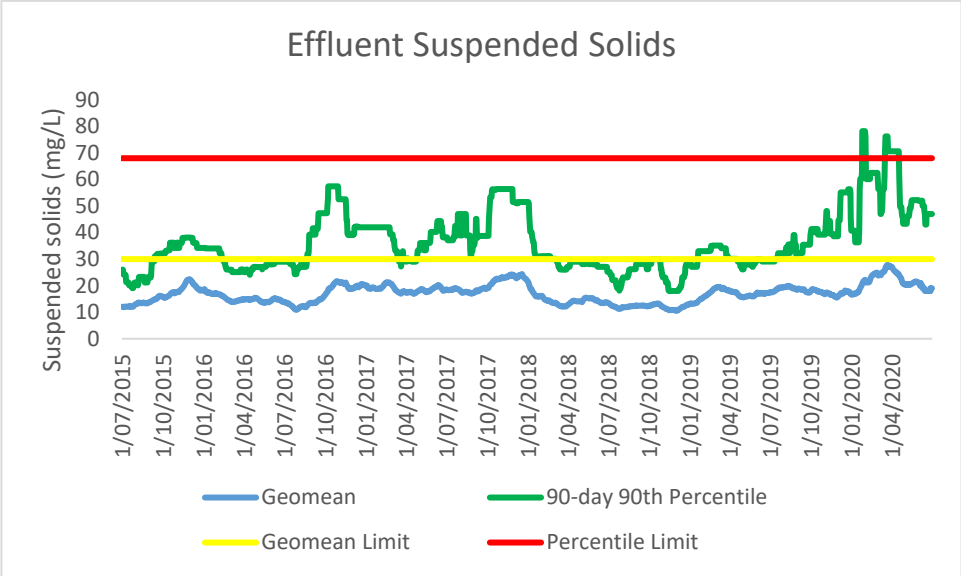
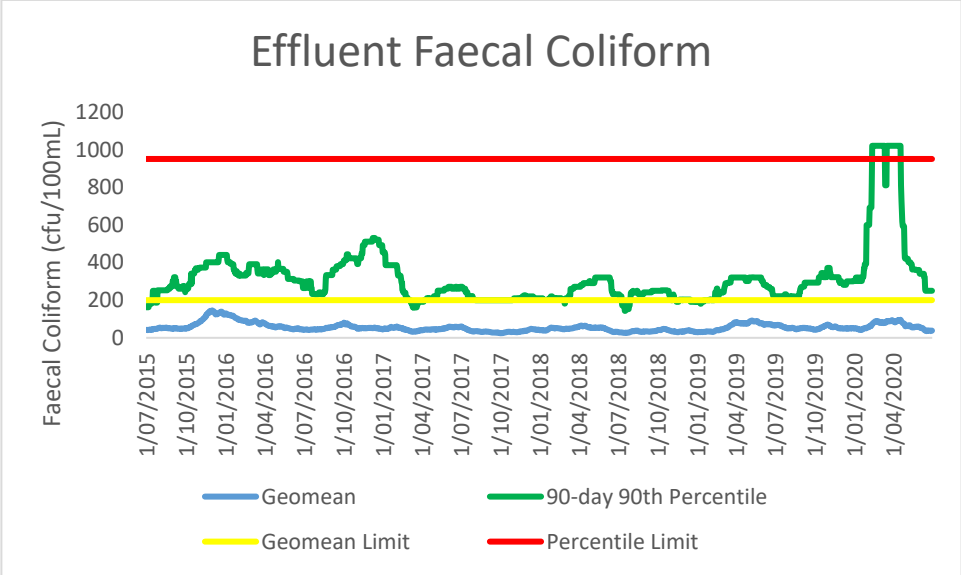


Chart 6: Final Effluent suspended solids Geometric Mean and Percentile Values

The effluent suspended solids has an upward trend in FY2019/2020 as compared to the previous 4 years. This was due to the sludge pipeline failure which happened this financial year.

The following is a comparison of the faecal coliforms:



The effluent faecal coliforms results were consistent over the 5 year period except during FY2019/2020 wherein the exceedances where majorly caused by sludge pipeline failure.

The following is a comparison of the analytical results for the quarterly effluent sample:

Parameters	Units	Limits	July - September					October - December					January - March					April - June				
			2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020
Total arsenic	g/m^3	0.26	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	<0.002	0.002	0.002	0.010	0.002	<0.001
Total cadmium	g/m^3	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	<0.001	0.001	0.001	0.001	0.001	<0.001
Total chromium	g/m^3	0.48	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	<0.001
Total copper	g/m^3	0.14	0.003	0.007	0.015	0.010	0.004	0.021	0.017	0.017	0.013	0.004	0.015	0.010	0.003	0.010	0.015	0.014	0.006	0.006	0.020	0.0037
Total lead	g/m^3	0.48	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	<0.001
Total mercury	g/m^3	0.01	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	<0.001
Total nickel	g/m^3	0.77	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.001	0.0011
Total zinc	g/m^3	1.65	0.020	0.005	0.045	0.025	0.017	0.037	0.027	0.041	0.032	0.017	0.052	0.049	0.029	0.032	0.044	0.047	0.035	0.046	0.038	0.039
Phenol	g/m^3	0.80	0.02	0.02	0.02	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.10	0.02	0.25	0.05	0.05	0.02	0.02	0.10	0.05	0.002
Cyanide as CN	g/m^3	0.10	0.010	0.010	0.010	0.010	0.010	0.0100	0.010	0.014	0.014	0.010	0.046	0.028	0.010	0.022	0.063	0.059	0.024	0.061	0.021	0.005
pH	N/A	N/A	6.9	7.1	6.8	6.9	7.2	7.5	7.4	6.9	6.9	7.4	6.6	7.4	6.9	6.7	6.8	6.4	6.6	6.8	7.0	6.7
Ammoniacal Nitrogen	g/m^3	N/A	18.3	22.8	14.2	7.7	24.4	28.2	21.4	9.1	13.9	26.5	1.5	8.5	N/A	5.2	5.5	4.3	4.9	5.0	7.3	4.8
Oil and Grease	g/m^3	N/A	4	4	5	5	4	8	4	5	5	4	5	4	11	4	11	4	4	4	19	9.8

Table 4: Analytical Results for Quarterly Effluent Sample

The results for the quarterly effluent samples were consistent over the 5 year period.

Section (c)

The plant has been compliant with all the requirements of this permit except for condition 10 (Effluent Quality) of this permit.

Section (d)

The non-compliance in condition 10 can be attributed to the sludge pipeline failure last January 2020 which caused the difficulty in managing the sludge inventory of the process during the early period of the incident.

Section (e)

Moa point WWTP has been a robust plant which can handle the variation of loading. The only issue that affected performance of the plant was the failure of the sludge pipeline from Moa Point to Carrey's Gully. In order to mitigate the impact of the sludge pipeline failure to the process, Wellington Water and Veolia removed sludge from the system via sludge trucking to Carey's Gully Sludge Dewatering facility. This 24/7 operation lasted until 23rd May 2020 and was able to prevent the discharge of untreated wastewater to the environment.

Section (f)

No complaints were recorded for the 2019/2020 reporting period.

Section (g)

There were no other issues that arose relating to the resource consent for the 2019/2020 reporting year.

WGN080003 [35047]

Condition (8)

The permit holder shall monitor and record the flow rate, total volume and duration of any bypass discharge from the Moa Point Wastewater Treatment Plant to the long outfall, and calculate and record a dilution ratio (secondary treated: screened effluent) for each bypass event based on average rates of flow during that event. The results of this monitoring shall be forwarded to the Manager, Environmental Regulation, Wellington Regional Council, within 10 working days of the bypass discharge occurring.

The following is a summary of the bypass events from the Moa Point WWTP for the 2019/2020 reporting period:

Date	Date of Notification	Duration	Average Flow Rate	Total Daily Influent Flow	Total Volume of Bypass	Total Volume Treated Effluent During Overflow	Dilution Ratio	Consented	Cause
dd/mm/yyyy	dd/mm/yyyy	hrs/mins	L/s	m^3	m^3	m^3	--	Y/N	--
14/07/2019	14/07/2019	01hr 10m	59	126,642	249	11,389	46:1	Y	Influent flows exceeded 3000 L/s.
11/11/2019	11/11/2019	09hr 34m	332	158,840	11,447	92,135	8:1	Y	
29/03/2020	29/03/2020	02hr 52m	294	127,083	3,033	28,408	9:1	Y	
3/05/2020	3/05/2020	00hr 44m	50	92,066	143	1,583	11:1	Y	
5/06/2020	5/06/2020	01hr 43m	2,937	109,440	368	10,681	29:1	Y	
19/06/2020	19/06/2020	27hr 50m	3,142	233,484	19,724	212,757	11:1	Y	

Table 5: Bypass Events from 2019/2020 Reporting Period

Condition (10)

During a bypass discharge (if during normal working hours) and on days one, two and three after the discharge, the permit holder shall take **a grab sample** of coastal water at each of the following locations, providing safe access is available:

- Dorrie Leslie Park at boat ramp
- Hue Te Taka Peninsula;
- Tarakena Bay Beach at boat ramp
- Tarakena Bay Beach, Western side
- Hue te Taka Peninsula, Western side;
- Moa Point Road, opposite number 49
- Lyall Bay Beach, Eastern side
- Dorrie Leslie Park, South side of boat ramp
- Dorrie Leslie Park, West of boat ramp
- Peninsula at Queens Drive and The Esplanade
- Houghton Bay, Western side
- Marine Centre, Island Bay, Eastern side
- Island Bay, Western side

Each sample shall be analysed for faecal coliforms and enterococci.
The permit holder shall identify and record the location of the sampling points (including map references) and supply this information to the Manager, Environmental Regulation, Wellington Regional Council, within three months of the commencement of this permit.

The details of the monitoring programme, as outlined in the Overflow Contingency Plan (required under condition 12 of this permit), shall be to the satisfaction of the Manager, Environmental Regulation, Wellington Regional Council.

Note: These sample locations have been selected to act as audit sites to determine if the results obtained from the modelling undertaken in regards to public health risks from bypass discharges are substantiated by sample results.

The resource consent WGN080003 [35047], Condition 10 was amended on 13 December 2017 to add another ten (10) shoreline monitoring sites. This additional shoreline monitoring sites are located near storm water discharges which may affect the monitoring results.

The following map displays the (13) sites for shoreline sampling:

Figure 1: Moa Point WWTP Shoreline Sampling Sites

The following is a summary of the shoreline samples taken for the bypass event(s) listed in Condition.

Date	49 Moa Point Road		Dorrie Leslie Park at Boat Ramp		Dorrie Leslie Park - South End		Dorrie Leslie Park - Western End		Houghton Bay - Western Side		Waitaha Cove (Peninsula at Queens Drive)		Hue te Taka Peninsula		Hue te Taka Peninsula - Western Side		Island Bay - Marine Centre		Island Bay - Western End		Eastern End of Lyall Bay		Tarakena Bay Beach at Boat Ramp		Tarakena Bay Western Side	
	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci	Faecal Coliform	Enterococci
	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL	cfu/ 100mL
15 Jul 2019	4	23	4	15	4	4	4	4	4	12	4	4	4	4	4	4	16	8	4	4	4	56	4	4	4	4
16 Jul 2019	4	12	580	3500	4	35	4500	920	33	4	4	32	4	4	8	84	12	32	400	1100	1330	450	440	790	1330	3900
17 Jul 2019	4	4	12	27	4	4	24	20	4	4	4	4	4	4	4	4	4	4	4	4	80	27	52	27	46	42
11 Nov 2019	4	16	33	23	31	8	4	12	48	46	80	42	58	12	4	12	480	460	170	160	88	36	38	24	370	240
12 Nov 2019	4	4	4	4	8	4	4	4	4	4	4	4	28	15	4	4	8	4	4	4	4	4	4	4	4	8
13 Nov 2019	4	4	8	4	4	8	4	4	8	8	4	4	12	4	4	4	8	4	4	12	12	8	12	4	48	4
30 Mar 2020	2	2	2	8	2	2	2	5	2	2	2	2	2	2	3	3	3	23	4600	280	8	21	6.6	4.9	6.6	4.9
31 Mar 2020	5	2	5	2	2	11	2	5	5	8	2	7	2	7	30	13	240	44	48	48	33	66	8	6.6	8.2	6.6
01 Apr 2020	2	2	2	12	21000	5400	1200	3600	2	2	2	3	2	3	5	2	70	35	94	70	12	84	8.2	6.6	3.3	1.7
04 May 2020	3	5	340	920	20	110	1400	130	7	21	5	50	5	50	5	40	1200	260	16	94	550	770	290	2700	490	5000
05 May 2020	50	500	50	320	23	510	310	38	82	84	38	1700	38	1700	390	480	290	230	58	220	46	180	64	290	120	390
06 May 2020	82	370	20	170	66	480	220	25	26	38	74	390	74	390	42	680	78	120	23	78	20	78	30	320	16	48
05 Jun 2020	1500	780	48	48000	40	13	1700	38	1100	480	72	4400	56	13	78	62	1700	740	56	160	78	48	68	3400	82	2600
06 Jun 2020	70	9	60	15	48	13	9	11	36	2	35	24	29	24	18	18	33	35	29	18	11	25	38	11	48	3.6
07 Jun 2020	92	140	40	6	33	40	6	6	13	21	260	38	2	20	1200	1100	2	8	210	20	36	6	58	8.2	66	24
19 Jun 2020	74	46	46	25	44	36	56	50	42	42	78	78	94	44	100	40	100	40	6300	1300	60	58	48	42	36	52
20 Jun 2020	7	38	18	440	7	15	40	36	20	520	64	52	84	74	130	31	320	380	25	800	15	13	24	20	16	15
21 Jun 2020	2	42	9	29	7	7	7	20	1600	140	18	9	18	6	9	7	16	7	6	9	1800	88	18	6	9	9

Table 6: Additional Moa Point Shoreline Sample Results

Condition (13)

The annual report required by condition 19 of this permit shall detail what steps have been taken in the reporting year and what steps are proposed to be undertaken in the future to reduce infiltration and stormwater ingress into the Wellington City sewerage network.

This information shall include, but not be limited to, the following information:

a) Details on the adoption of a policy to identify, and to repair or replace, defective private sewer drains in the Wellington City catchment. If such a policy is adopted, detail on its implementation made within the previous year
b) Details of additional works that have been undertaken and what these works are expected to achieve
c) An indication of when any on-going works will be completed
d) Details of any investigations undertaken with regard to inflow and infiltration in the Wellington City catchment
e) Details of any works or investigations planned for the next financial year

An inflow and infiltration report can be found in appendix vi.

Condition (16)

The permit holder shall provide suitable wastewater sample locations for monitoring the quality of:

a) The bypass flows; and
b) Secondary treated wastewater (i.e. both wastewater streams prior to mixing) during bypass discharges.

The permit holder shall obtain grab samples of both wastewater streams within the first two hours of a bypass discharge occurring during normal working hours or as soon as practicable for those events occurring outside normal working hours. These Samples shall be analysed for:

- cBOD5
- suspended solids
- faecal coliform
- pH
- ammoniacal nitrogen
- oil and grease

And on at least one bypass event each year these samples shall also be analysed for the following indicator contaminants:

- Total cadmium
- Total chromium
- Total copper
- Total lead
- Total nickel
- Total zinc

The wastewater quality results, together with the results of wastewater flow monitoring shall be used to calculate, by mass balance, the quality of the wastewater discharge after both wastewater streams have mixed. The mass balance calculation for a contaminant (a) is:

$C_{mixed}(a) - (C_{tr}(a)*Q_{tr} - C_{by}(a)*Q_{by})/Q_{mixed}$

Where: **C** is contaminant concentration
Q is the flow rate (litres/sec)
tr subscript relates to parameter of the secondary treated wastewater stream
by subscript relates to parameter of the bypassed wastewater stream
mixed subscript relates to the parameter of the mixed secondary treated and bypassed waste streams.

The calculated mixed wastewater discharge quality results shall be reported to the Manager, Environmental Regulation, Wellington Regional Council, within 10 working days of the overflow event occurring.

Six (6) consented bypass events occurred during this reporting period. The information was provided to GWRC within 10 days the discharge event occurring.

Condition (17)

The permit holder shall obtain grab samples of bypass flows and secondary treated wastewater during discharges (i.e. at the locations required by conditions 16) within the first two hours of a bypass discharge occurring during normal working hours until 7 bypass events have been sampled. The permit holder will use best endeavours to obtain these samples in the first 5 years of the permit. These samples shall be analysed for:

- Total cadmium
- Total chromium
- Total copper
- Total lead
- Total nickel
- Total zinc
- Total arsenic
- Total phenol
- Volatile organic compounds
- Semi-volatile organic compounds
- Organochlorine pesticides

The wastewater quality results, together with the results of wastewater flow monitoring shall be used to calculate, by mass balance, the quality of the wastewater discharge after both wastewater streams have mixed. The Calculated mixed wastewater monitoring results shall be forwarded to the Manager, Environmental Regulation, Wellington Regional Council, as soon as they are available.

Condition 17 is no longer enforced since seven (7) bypass events have been sampled and the five (5) year date has passed. Therefore, no reporting for this condition is required.

Condition (19)

The permit holder shall provide to the Manager, Environmental Regulation, Wellington Regional Council an Annual Assessment and Analysis Report for the period 1 July to 30 June by 31 July each year summarising compliance with the conditions of this permit. This report shall include, but not be limited to the following:

a) A summary of all monitoring undertaken in accordance with the conditions of this permit and a critical analysis of the information in terms of compliance and adverse environmental effects;
b) A comparison of data with previously collected data in order to identify any emerging trends;
c) Comments on compliance with the conditions of this permit;
d) Any reasons for non-compliance or difficulties in achieving compliance with the conditions of this permit;
e) Any measures that have been undertaken to improve the environmental performance of the wastewater treatment and disposal system;
f) A copy of any complaints recorded (in accordance with condition 18 of this permit) during the year;
g) Any other issues considered to be important;

Section (a)

Several parameters are used to monitor the Moa Point WWTP in the event that the influent flow rate exceeds 3000L/s and there is a bypass through the long outfall. The following table summarises the monitoring parameters, the resource consent condition the data would be listed under, the monitoring frequency, the limits for each parameter, and compliance with the resource consent:

Monitoring Parameter	WGN980003 [35047] Condition	Monitoring Frequency	Limits	Compliance
WWTP Bypass Flow Rate	(8)	Continuously during Bypass Event	4500L/s	Compliant
WWTP Bypass Total Volume		N/A	N/A	Compliant
WWTP Bypass Duration		N/A	N/A	Compliant
Dilution Ratio		N/A	N/A	Compliant
Faecal Coliforms	(10)	Grab Sample at 24hrs, 48hrs, and 72hrs	Amber - 260cfu/100mL Red - 550cfu/100mL	Compliant
Enterococci		Grab Sample at 24hrs, 48hrs, and 72hrs	Amber - 140cfu/100mL Red - 280cfu/100mL	Compliant
Carbonaceous Biological Oxygen Demand	(16)	Once during Bypass Event	Geometric Mean < 20g/m^3 90th Percentile < 45g/m^3	Compliant
Suspended Solids		Once during Bypass Event	Geometric Mean < 30g/m^3 90th Percentile < 68g/m^3	Compliant
Faecal Coliforms		Once during Bypass Event	Geometric Mean < 200cfu/100mL 90th Percentile < 950cfu/100mL	Compliant
pH		Once during Bypass Event	N/A	Compliant
Ammoniacal Nitrogen		Once during Bypass Event	N/A	Compliant
Oil and Grease		Once during Bypass Event	N/A	Compliant
Total cadmium	(16)	One Bypass Event a Year	0.08 g/m3	Compliant
Total chromium		One Bypass Event a Year	0.48 g/m3	Compliant
Total copper		One Bypass Event a Year	0.14 g/m3	Compliant
Total lead		One Bypass Event a Year	0.48 g/m3	Compliant
Total nickel		One Bypass Event a Year	0.77 g/m3	Compliant
Total zinc		One Bypass Event a Year	1.65 g/m3	Compliant

Table 7: Summary of Occasional Discharge Monitoring Undertaken at Moa Point WWTP

Throughout the 2019/2020 reporting period, there have been six (6) bypass events through the long outfall. Statistical analysis was performed on the consented bypass events through the long outfall. The following is a summary of the analysis performed on the monitoring parameters.

Parameter	Units	2019/2020 WWTP Bypass Discharges		
		Average	Minimum	Maximum
Average WWTP Bypass Flow Rate	L/s	1135.55	50.00	3142.00
WWTP Bypass Total Volume	m^3	5827.26	143.00	19724.00
Dilution Ratio	--	19:1	8:1	46:1
Ammoniacal Nitrogen	g/m^3	11.05	6.5	18
Carbonaceous Biological Oxygen Demand	g/m^3	98.83	60	163
Faecal Coliforms of Bypass	cfu/100mL	1,811,667	550,000	3,200,000
Oil and Grease	g/m^3	30.33	13	81
pH of Bypass	--	6.27	1.7	7.6
Suspended Solids	g/m^3	183.5	92	344
Total cadmium	g/m^3	0.00	0.00011	0.001
Total chromium	g/m^3	0.01	0.004	0.007
Total copper	g/m^3	0.04	0.019	0.062
Total lead	g/m^3	0.01	0.0057	0.023
Total nickel	g/m^3	0.01	0.001	0.015
Total zinc	g/m^3	1.22	0.09	6.5

Table 8: Bypass and Mixed Discharge Monitoring Parameters

Please note that the bypass wastewater stream are used to obtain the statistical data above.

Date	Faecal Coliforms - 49 Moa Point Road cfu/100mL	Enterococci - 49 Moa Point Road cfu/100mL	Faecal Coliforms - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Enteroccoci - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Faecal Coliforms - Dorrie Leslie Park -- South End cfu/100mL	Enterococci - Dorrie Leslie Park - South End cfu/100mL	Enterococci - Dorrie Leslie Park - Western End cfu/100mL	Faecal Coliforms - Dorrie Leslie Park -- Western End cfu/100mL	Faecal Coliforms - Houghton Bay - Western Side cfu/100mL	Enterococci - Houghton Bay - Western Side cfu/100mL	Faecal Coliforms - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Enterococci - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Faecal Coliforms - Hue Te Taka cfu/100mL	Enterococci - Hue te Taka cfu/100mL	Faecal Coliforms - Hue te Taka Peninsula - Western Side cfu/100mL	Enterococci - Hue te Taka Peninsula - Western Side cfu/100mL	Faecal Coliforms - Island Bay - Marine Centre cfu/100mL	Enterococci - Island Bay - Marine Centre cfu/100mL	Faecal Coliforms - Island Bay - Western End cfu/100mL	Enterococci - Island Bay - Western End cfu/100mL	Faecal Coliforms - Eastern End of Lyall Bay cfu/100mL	Enterococci - Eastern End of Lyall Bay cfu/100mL	Faecal Coliforms - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Enterococci - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Faecal Coliforms - Tarakena Bay - Western Side cfu/100mL2	Enterococci - Tarakena Bay - Western Side cfu/100mL2
15 Jul 2019	4	23	4	15	4	4	4	4	4	12	4	4	4	4	4	4	16	8	4	4	4	56	4	4	4	4
11 Nov 2019	4	16	33	23	31	8	4	12	48	46	80	42	58	12	4	12	480	460	170	160	88	36	38	24	370	240
30 Mar 2020	2	2	2	8	2	2	2	5	2	2	2	2	2	2	3	3	3	23	4600	280	8	21	6.6	4.9	6.6	4.9
04 May 2020	3	5	340	920	20	110	1400	130	7	21	5	50	5	50	5	40	1200	260	16	94	550	770	290	2700	490	5000
05 Jun 2020	1500	780	48	48000	40	13	1700	38	1100	480	72	4400	56	13	78	62	1700	740	56	160	78	48	68	3400	82	2600
19 Jun 2020	74	46	46	25	44	36	56	50	42	42	78	78	94	44	100	40	100	40	6300	1300	60	58	48	42	36	52
Average	264	145	79	8165	24	29	528	40	200	101	40	763	36	21	32	27	583	255	1858	333	131	165	76	1029	165	1317
Min	2	2	2	8	2	2	2	4	2	2	2	2	2	2	3	3	3	8	4	4	4	21	4	4	4	4
Max	1500	780	340	48000	44	110	1700	130	1100	480	80	4400	94	50	100	62	1700	740	6300	1300	550	770	290	3400	490	5000

Table 9: 24 hour samples Comparison

Date	Faecal Coliforms - 49 Moa Point Road cfu/100mL	Enterococci - 49 Moa Point Road cfu/100mL	Faecal Coliforms - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Enteroccoci - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Faecal Coliforms - Dorrie Leslie Park -- South End cfu/100mL	Enterococci - Dorrie Leslie Park - South End cfu/100mL	Enterococci - Dorrie Leslie Park - Western End cfu/100mL	Faecal Coliforms - Dorrie Leslie Park -- Western End cfu/100mL	Faecal Coliforms - Houghton Bay - Western Side cfu/100mL	Enterococci - Houghton Bay - Western Side cfu/100mL	Faecal Coliforms - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Enterococci - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Faecal Coliforms - Hue Te Taka cfu/100mL	Enterococci - Hue te Taka cfu/100mL	Faecal Coliforms - Hue te Taka Peninsula - Western Side cfu/100mL	Enterococci - Hue te Taka Peninsula - Western Side cfu/100mL	Faecal Coliforms - Island Bay - Marine Centre cfu/100mL	Enterococci - Island Bay - Marine Centre cfu/100mL	Faecal Coliforms - Island Bay - Western End cfu/100mL	Enterococci - Island Bay - Western End cfu/100mL	Faecal Coliforms - Eastern End of Lyall Bay cfu/100mL	Enterococci - Eastern End of Lyall Bay cfu/100mL	Faecal Coliforms - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Enterococci - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Faecal Coliforms - Tarakena Bay - Western Side cfu/100mL2	Enterococci - Tarakena Bay - Western Side cfu/100mL2
16 Jul 2019	4	12	580	3500	4	35	4500	920	33	4	4	32	4	4	8	84	12	32	400	1100	1330	450	440	790	1330	3900
12 Nov 2019	4	4	4	4	8	4	4	4	4	4	4	4	28	15	4	4	8	4	4	4	4	4	4	4	4	8
31 Mar 2020	5	2	5	2	2	11	2	5	5	8	2	7	2	7	30	13	240	44	48	48	33	66	8	7	8	7
05 May 2020	50	500	50	320	23	510	310	38	82	84	38	1700	38	1700	390	480	290	230	58	220	46	180	64	290	120	390
06 Jun 2020	70	9	60	15	48	13	9	11	36	2	35	24	29	24	18	18	33	35	29	18	11	25	38	11	48	4
20 Jun 2020	7	38	18	440	7	15	40	36	20	520	64	52	84	74	130	31	320	380	25	800	15	13	24	20	16	15
Average	23	94	119	713	15	98	811	169	30	104	24	303	31	304	97	105	151	121	94	365	240	123	96	187	254	721
Min	4	2	4	2	2	4	2	4	4	2	2	4	2	4	4	4	8	4	4	4	4	4	4	4	4	4
Max	70	500	580	3500	48	510	4500	920	82	520	64	1700	84	1700	390	480	320	380	400	1100	1330	450	440	790	1330	3900

Table 10: 48 hour samples Comparison

Date	Faecal Coliforms - 49 Moa Point Road cfu/100mL	Enterococci - 49 Moa Point Road cfu/100mL	Faecal Coliforms - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Enteroccoci - Dorrie Leslie Park at Boat ramp (cfu/100mL)	Faecal Coliforms - Dorrie Leslie Park -- South End cfu/100mL	Enterococci - Dorrie Leslie Park - South End cfu/100mL	Enterococci - Dorrie Leslie Park - Western End cfu/100mL	Faecal Coliforms - Dorrie Leslie Park -- Western End cfu/100mL	Faecal Coliforms - Houghton Bay - Western Side cfu/100mL	Enterococci - Houghton Bay - Western Side cfu/100mL	Faecal Coliforms - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Enterococci - Waitaha Cove (Peninsula at Queens Drive) - Southern End cfu/100mL	Faecal Coliforms - Hue Te Taka cfu/100mL	Enterococci - Hue te Taka cfu/100mL	Faecal Coliforms - Hue te Taka Peninsula - Western Side cfu/100mL	Enterococci - Hue te Taka Peninsula - Western Side cfu/100mL	Faecal Coliforms - Island Bay - Marine Centre cfu/100mL	Enterococci - Island Bay - Marine Centre cfu/100mL	Faecal Coliforms - Island Bay - Western End cfu/100mL	Enterococci - Island Bay - Western End cfu/100mL	Faecal Coliforms - Eastern End of Lyall Bay cfu/100mL	Enterococci - Eastern End of Lyall Bay cfu/100mL	Faecal Coliforms - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Enterococci - Tarakena Bay - North End (Boat Ramp) cfu/100mL	Faecal Coliforms - Tarakena Bay - Western Side cfu/100mL2	Enterococci - Tarakena Bay - Western Side cfu/100mL2
17 Jul 2019	4	4	12	27	4	4	24	20	4	4	4	4	4	4	4	4	4	4	4	4	80	27	52	27	46	42
13 Nov 2019	4	4	8	4	4	8	4	4	8	8	4	4	12	4	4	4	8	4	4	12	12	8	12	4	48	4
01 Apr 2020	2	2	2	12	21000	5400	1200	3600	2	2	2	3	2	3	5	2	70	35	94	70	12	84	8	7	3	2
06 May 2020	82	370	20	170	66	480	220	25	26	38	74	390	74	390	42	680	78	120	23	78	20	78	30	320	16	48
07 Jun 2020	92	140	40	6	33	40	6	6	13	21	260	38	2	20	1200	1100	2	8	210	20	36	6	58	8	66	24
21 Jun 2020	2	42	9	29	7	7	7	20	1600	140	18	9	18	6	9	7	16	7	6	9	1800	88	18	6	9	9
Average	31	94	15	41	3519	990	243	612	276	36	60	75	19	71	211	300	30	30	57	32	327	48	30	62	31	21
Min	2	2	2	4	4	4	4	4	2	2	2	3	2	3	4	2	2	4	4	4	12	6	8	4	3	2
Max	92	370	40	170	21000	5400	1200	3600	1600	140	260	390	74	390	1200	1100	78	120	210	78	1800	88	58	320	66	48

Table 11: 72 hour samples Comparison

Section (b)

Because the discharges from the WWTP are highly dependent on the wet weather event, it is difficult to compare the data from year to year. Instead of comparing the actual data, a comparison of the averages of the data from the 2019/2020 reporting period will be made to the previous three (3) years. The following section summarises that comparison.

Below is a comparison of the annual average of the monitoring parameters:

Parameter	Units	WWTP Bypass Discharges Annual Averages			
		2016/2017	2017/2018	2018/2019	2019/2020
Average WWTP Bypass Flow Rate	L/s	328	201.5	160.5	1135.55
WWTP Bypass Total Volume	m^3	13,476	8,310	3,522	5,827.26
Dilution Ratio	--	13:1	16:1	35:1	19:1
Ammoniacal Nitrogen	g/m^3	9	9.5	6.5	11.05
Carbonaceous Biological Oxygen Demand	g/m^3	25	21.5	28.25	98.83
Faecal Coliforms of Bypass	cfu/100mL	1,394,429	3,427,500	948,250	1,811,667
Oil and Grease	g/m^3	15	21	6.75	30.33
pH of Bypass	--	6.7	6.95	7.125	6.27
Suspended Solids	g/m^3	79	57.5	72.75	183.5
Total cadmium	g/m^3	0.001	0.001	0.001	0.00
Total chromium	g/m^3	0.005	0.0035	0.002	0.01
Total copper	g/m^3	0.021	0.026	0.027	0.04
Total lead	g/m^3	0.006	0.003	0.003	0.01
Total nickel	g/m^3	0.002	0.0015	0.0015	0.01
Total zinc	g/m^3	0.063	0.0725	0.145	1.22

Table 12: Discharge Parameters Comparison

The average bypass volume for FY2019/2020 has increased versus the previous financial year. The annual averages for the monitoring parameters are similar over the 4 year period.

The resource consent WGN080003 [35047], Condition 10 was amended on 13 December 2017 to add another ten (10) shoreline monitoring sites. Because of this recent amendment, a full comparison of the shoreline monitoring results cannot be performed because there is no data for the 10 new sites. The data could only be compared with the previous year.

Section (c)
All monitoring parameters were compliant with the conditions of this permit.

Section (d)
The plant has been compliant with all conditions of this resource consent.

Section (e)
No measures have been undertaken to improve the environmental performance of the wastewater treatment and disposal system this quarter.

Section (f)
The have been no complaints recorded for the 2019/2020 reporting period.

Section (g)

There has been no issues regarding the consent for this financial year.

WGN 080003 [26812]

Condition (3)

The permit holder shall undertake an annual physical assessment of the condition of the outfall pipeline. This assessment shall include, but not be limited, the following:

a) An assessment of the structural condition of the pipeline

b) An inspection of the diffuser ports

c) An assessment of the erosion or scour around exposed sections of the pipeline and

d) Recommend any maintenance that is required

The results of the assessment shall be submitted to the manager, Environmental Regulation, Wellington Regional Council not later than three months after the assessment has been undertaken.

The assessment of the structural condition of the pipeline was conducted in June 2020. A report of the assessment can be found in Appendix ii: Outfall Pipeline Inspection Report.

WGN 080003 [26813]

Condition (7)

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 downwind and three sites upwind of the plant, with at least one in the vicinity of Air New Zealand kitchens and one at a level of Kekerenga Street. The other sites are to be located outside of/and within 100 metres of the site boundary.

The results shall be provided annually in the annual report required under condition 14 of this permit, or on request.

Ambient Microbe Monitoring was performed at the Moa Point WWTP. The following table is a summary of the air quality monitoring in the vicinity of the WWTP:

There was a presence of total coliform detected in ambient air quality monitoring in February. Although total coliform is not part of the monitoring requirement for the resource consent, GWRC has advised Veolia and Wellington Water to seek advice from Regional Public Health (RPH). The reports has been forwarded to RPH. Last July 2020, RPH upon examining the results suggested that the effects are likely to be minimal and GWRC had advised Veolia to resume with the normal monitoring frequency.

Full reports can be found in the Moa Point WWTP quarterly reports.

Date	10 September 2019	30 January 2020	11 February 2020	5 March 2020	14 May 2020
Site 1	Absent	Absent	Absent	Absent	Absent
Site 2	Absent	Absent	Absent	Absent	Absent
Site 3	Absent	Absent	Absent	Absent	Absent
Site 4	Absent	Absent	Absent	Absent	Absent
Site 5	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	Absent	Absent

Table 13:Semi-Annual Air Quality Monitoring – Faecal Coliforms

Date	10 September 2019	30 January 2020	11 February 2020	5 March 2020	14 May 2020
Site 1	Absent	Absent	Present	Absent	Absent
Site 2	Absent	Absent	Present	Absent	Absent
Site 3	Absent	Absent	Absent	No Result	Absent
Site 4	Absent	Absent	Absent	No Result	Absent
Site 5	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	No Result	Absent

Table 3:Semi-Annual Air Quality Monitoring – Total Coliforms

Date	10 September 2019	30 January 2020	11 February 2020	5 March 2020	14 May 2020
Site 1	Absent	Absent	Absent	Absent	Absent
Site 2	Absent	Absent	Absent	Absent	Absent
Site 3	Absent	Absent	Absent	Absent	Absent
Site 4	Absent	Absent	Absent	Absent	Absent
Site 5	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	Absent	Absent

Table 15:Semi-Annual Air Quality Monitoring – Salmonella

Condition (8)

Hydrogen Sulphide (H_2S) and other reduced Sulphur compounds shall be monitored in the deodorized gas discharge. Monitoring shall be undertaken in the stack leading from the chemical scrubber system on a monthly basis.

The results shall be provided annually in the annual report required under condition 14 of this permit, or on request.

The monthly results from the Hydrogen Sulphide (H_2S) and Total Reduced Sulphur (TRS) has been summarised in the in the following table:

Month	WWTP	
	H_2S	TRS
	ppm	ppm
July 2019	0.00013	0.002
August 2019	0.00013	0.002
September 2019	0.00013	0.002
October 2019	0.0001	0.009
November 2019	0.0057	0.002
December 2019	0.0015	0.002
January 2020	0.0001	0.002
February 2020	0.003	0.003
March 2020	0.002	0.002
April 2020	0.00011	0.002
May 2020	0.0001	0.002
June 2020	0.0001	0.002
Limits	**0.01**	**0.05**

Table 16: Monthly H_2S and TRS Concentrations

The full reports can be found in the quarterly reports for the 2019/2020 reporting period. All results were below the resource consent limits.

Condition (9)

The discharge to air from the chemical scrubber system shall contain no more than 0.01ppm hydrogen sulphide (H_2S) and no more than 0.05ppm total reduced Sulphur compounds (including H_2S).

These limits have been included in the summary under WGN080003[26813] Condition (8).

Condition (10)

The permit holder shall undertake smoke testing of the Moa Point wastewater treatment plant and ventilation system. The smoke tests are to be carried out on an annual basis between the months of August and November. The results of the smoke test shall be submitted to the Manager, Environmental Regulation, Wellington Regional Council within one month of the testing being carried out by the permit holder. A copy of the analysed results shall also be provided to Community Liaison Group, if requested.

A smoke test was performed on the WWTP on 26th November 2020. The smoke test report can be found in Appendix iii: Smoke Test Report.

Condition (14)

The permit holder shall provide to the Manager, Environmental Regulation, Wellington Regional Council an annual monitoring report for the period 1 July to 30 June, by 31 July each year summarising compliance with the conditions of this permit. A copy of the report shall be provided to Community Liaison Group, if requested.

This report shall include, but not be limited to the following:

a) A summary of all monitoring undertaken in accordance with the conditions of this permit and a critical analysis of the information in terms of compliance and adverse environmental effects
b) A comparison of data with previously collected data in order to identify any emerging trends
c) Comments on compliance with the conditions of this permit
d) Any reasons for non-compliance or difficulties in achieving compliance with the conditions of this permit
e) Any measures that have been undertaken, to improve the environmental performance of the wastewater treatment and disposal system
f) A copy of any complaints recorded (in accordance with condition 13 of this permit) during the year
g) Outcomes from the implementation of the Odour Management Plan
h) Any other issues considered important by the permit holder.

Section (a)

Several parameters are used to monitor the continuous discharge of contaminants to air from the Moa Point WWTP. The following table summarises the monitoring parameters, the resource consent condition where the data is reported, the limits for each parameter, and compliance with the resource consent:

Monitoring Parameter	WGN980003 [35047] Condition	Monitoring Frequency	Limits	Compliance
Faecal Coliforms	(7)	Semi-Annual	Absent	Compliant
Salmonella		Semi-Annual	Absent	Compliant
Total Coliforms		Semi-Annual	Absent	Compliant
Hydrogen Sulphide	(8) & (9)	Monthly	0.01ppm	Compliant
Total Reduced Sulphur		Monthly	0.05ppm	Compliant
Smoke Test	(10)	Annual	N/A	Compliant

Table 17: Summary of Continuous Discharge Contaminants to Air Monitoring Undertaken at Moa Point WWTP

Please see the listed sections for the summary.

Section (b)

A comparison of data from the 2019/2020 reporting period was made to the previous four (4) years. The following section summarises that comparison.

The following tables are a comparison of the results from the air quality monitoring:

Location	Faecal Coliforms									
	Q1 - 2015	Q1 - 2016	Q1 - 2017	Q1 - 2018	Q1 - 2019	Q3 – 2016	Q3 – 2017	Q3 – 2018	Q3 – 2019	Q3 – 2020
Site 1	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 2	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 3	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 4	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 5	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Table 18: Comparison of Faecal Coliforms in Air

Location	Total Coliforms									
	Q1 - 2015	Q1 - 2016	Q1 - 2017	Q1 - 2018	Q1 - 2019	Q3 – 2016	Q3 – 2017	Q3 – 2018	Q3 – 2019	Q3 – 2020
Site 1	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 2	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 3	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 4	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 5	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Table 4: Comparison of Total Coliforms in Air

Location	Salmonella									
	Q1 - 2015	Q1 - 2016	Q1 - 2017	Q1 - 2018	Q1 - 2019	Q3 – 2016	Q3 – 2017	Q3 – 2018	Q3 – 2019	Q3 – 2020
Site 1	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 2	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 3	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 4	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 5	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Site 6	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Table 20: Comparison of Salmonella in Air

The following is a comparison of the monthly Hydrogen Sulphide and total reduced Sulphur results:

Month	Moa Point WWTP									
	H_2S (ppm)					TRC (ppm)				
	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020
July	0.00015	0.00159	0.00602	0.00013	0.00013	0.017	0.002	0.006	0.011	0.002
August	0.00302	0.0015	0.0004	0.00915	0.00013	0.017	0.002	0.004	0.002	0.002
September	0.0031	0.00262	0.00091	0.0047	0.00013	0.017	0.002	0.022	0.004	0.002
October	0.00013	0.00045	0.00157	0.00422	0.0001	0.017	0.018	0.011	0.004	0.009
November	0.00353	0.00031	0.0033	0.00327	0.0057	0.004	0.002	0.035	0.007	0.002
December	0.00014	0.004	0.02333	0.00499	0.0015	0.002	0.00491	0.043	0.011	0.002
January	0.00013	0.00441	0.01005	0.00464	0.0001	0.002	0.002	0.045	0.007	0.002
February	0.00077	0.00064	0.01754	0.00453	0.003	0.002	0.012	0.017	0.013	0.003
March	0.003	0.0068	0.02367	0.00073	0.002	0.002	0.039	0.011	0.002	0.002
April	0.00329	0.00056	0.01374	0.00017	0.00011	0.002	0.003	0.019	0.002	0.002
May	0.00363	0.00054	0.00102	0.00219	0.0001	0.042	0.021	0.004	0.004	0.002
June	0.00627	0.00074	0.00028	0.00013	0.001	0.002	0.021	0.004	0.002	0.002
Limit	0.01					0.05				

Table 21: Monthly Moa Point WWTP H_2S and TRC Comparison

The H_2S and TRC results were comparable over the 5 year period.

Section (c)

As noted in WGN080003[26813] Condition (14) Section (a) all monitoring parameters are compliant to the resource consent.

Section (d)

As noted in WGN080003[26813] Condition (14) Section (a) all monitoring parameters are compliant to the resource consent. There were no difficulties in achieving compliance with the conditions of this permit.

Section (e)

The Moa Point WWTP has been performing well below the limits set in the resource consent. No significant measures have been undertaken to improve the environmental performance of the wastewater treatment and disposal system.

Section (f)

There have been five complaints recorded during the 2019/2020 reporting year. A list of these complaints can be found in the quarterly reports for the 2019/2020 reporting period. For simplicity the complaints can also be found in Appendix iv: Complaints. The following summarises the number of complaints that have been recorded in the past five (5) years:

Reporting Period	Number of Complaints
2015/2016	10
2016/2017	6
2017/2018	5
2018/2019	3
2019/2020	5

Table 22: Number of Complaints Recorded per Reporting Period

Section (g)

The outcomes for the implementation of the Odour Management Plan are good.

Section (h)

There were no other issues that arose relating to the resource consent for the 2019/2020 reporting year.

Appendix i:

Daily Effluent Carbonaceous Biological Oxygen Demand

Results

Day	BOD_{5T} Jul-19			BOD_{5T} Aug-19			BOD_{5T} Sep-19		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3
1	9.00	4.65	9.00	9.00	5.50	11.00	6.00	6.01	12.10
2	7.00	4.69	9.00	5.00	5.53	11.00	17.00	6.13	13.00
3	5.00	4.72	9.00	5.00	5.56	11.00	5.00	6.17	13.00
4	4.00	4.73	9.00	8.00	5.54	11.00	4.00	6.19	13.00
5	3.00	4.73	9.00	12.00	5.57	11.00	6.00	6.23	13.00
6	3.00	4.73	9.00	21.00	5.64	11.10	3.00	6.23	13.00
7	4.00	4.75	9.00	10.00	5.67	11.10	3.00	6.23	13.00
8	5.00	4.77	9.00	18.00	5.76	12.00	4.00	6.19	13.00
9	6.00	4.81	9.00	13.00	5.84	12.00	3.00	6.17	13.00
10	5.00	4.78	9.00	8.00	5.87	12.00	5.00	6.15	13.00
11	7.00	4.81	9.00	12.00	5.90	12.00	8.00	6.22	13.00
12	13.00	4.86	9.10	9.00	5.94	12.00	6.00	6.27	13.00
13	12.00	4.94	10.00	7.00	5.91	12.00	12.00	6.37	13.00
14	14.00	5.02	10.10	7.00	5.94	12.00	4.00	6.37	13.00
15	4.00	5.04	10.10	7.00	5.98	12.00	3.00	6.35	13.00
16	4.00	5.05	10.10	17.00	6.10	12.10	3.00	6.33	13.00
17	3.00	5.05	10.10	6.00	6.11	12.10	3.00	6.24	13.00
18	3.00	5.05	10.10	5.00	6.12	12.10	3.00	6.18	13.00
19	22.00	5.17	11.00	7.00	6.11	12.10	3.00	6.15	13.00
20	5.00	5.20	11.00	7.00	6.13	12.10	3.00	6.13	13.00
21	4.00	5.21	11.00	13.00	6.14	13.00	5.00	6.11	13.00
22	4.00	5.23	11.00	5.00	6.14	13.00	5.00	6.12	13.00
23	6.00	5.23	11.00	5.00	6.11	13.00	4.00	6.08	13.00
24	11.00	5.30	11.00	5.00	6.09	13.00	8.00	6.09	13.00
25	5.00	5.33	11.00	11.00	6.09	13.00	6.00	6.04	12.10
26	5.00	5.37	11.00	8.00	6.08	13.00	3.00	6.02	12.10
27	4.00	5.37	11.00	6.00	6.07	13.00	5.00	6.06	12.10
28	6.00	5.39	11.00	7.00	6.10	13.00	4.00	6.03	12.10
29	9.00	5.42	11.00	6.00	6.06	13.00	4.00	5.97	12.10
30	6.00	5.45	11.00	6.00	5.96	12.10	23.00	6.05	13.00
31	6.00	5.43	11.00	9.00	5.97	12.10			
Limits	**N/A**	**20**	**45**	**N/A**	**20**	**45**	**N/A**	**20**	**45**

Day	BOD_{5T}			BOD_{5T}			BOD_{5T}		
	Oct-19			Nov-19			Dec-19		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3
1	12.00	6.11	13.00	4.00	5.55	13.00	30.00	5.00	12.10
2	13.00	6.19	13.00	5.00	5.52	13.00	28.00	5.09	13.10
3	3.00	6.19	13.00	30.00	5.58	13.00	6.00	5.12	13.10
4	3.00	6.19	13.00	19.00	5.57	13.00	6.00	5.12	13.10
5	6.00	6.22	13.00	30.00	5.64	13.10	6.00	5.16	13.10
6	3.00	6.19	13.00	16.00	5.63	13.10	9.00	5.22	13.10
7	4.00	6.16	13.00	8.00	5.60	13.10	11.00	5.28	13.10
8	6.00	6.17	13.00	3.00	5.54	13.10	6.00	5.32	13.10
9	4.00	6.13	13.00	7.00	5.51	13.10	3.00	5.29	13.10
10	19.00	6.16	13.00	12.00	5.52	13.10	3.00	5.23	13.10
11	14.00	6.17	13.10	11.00	5.55	13.10	6.00	5.23	13.10
12	4.00	6.08	13.00	3.00	5.50	13.10	10.00	5.22	13.10
13	3.00	6.06	13.00	3.00	5.45	13.10	6.00	5.24	13.10
14	3.00	6.05	13.00	3.00	5.34	13.00	6.00	5.28	13.10
15	3.00	6.05	13.00	3.00	5.30	13.00	10.00	5.36	13.10
16	3.00	6.05	13.00	3.00	5.27	13.00	7.00	5.41	13.10
17	5.00	5.95	13.00	3.00	5.22	13.00	10.00	5.48	13.10
18	6.00	5.96	13.00	7.00	5.22	13.00	4.00	5.50	13.10
19	3.00	5.94	13.00	3.00	5.14	12.10	4.00	5.51	13.10
20	4.00	5.94	13.00	8.00	5.17	12.10	3.00	5.48	13.10
21	3.00	5.89	13.00	3.00	5.14	12.10	3.00	5.45	13.10
22	3.00	5.81	13.00	3.00	5.11	12.10	4.00	5.45	13.10
23	4.00	5.80	13.00	3.00	5.03	12.10	5.00	5.42	13.10
24	3.00	5.76	13.00	3.00	4.98	12.10	24.00	5.51	14.20
25	3.00	5.74	13.00	7.00	4.99	12.10	3.00	5.51	14.20
26	4.00	5.72	13.00	3.00	4.94	12.10	3.00	5.48	14.20
27	3.00	5.65	13.00	7.00	4.95	12.10	3.00	5.46	14.20
28	4.00	5.62	13.00	12.00	4.99	12.10	4.00	5.46	14.20
29	5.00	5.61	13.00	5.00	4.96	12.10	3.00	5.34	13.10
30	5.00	5.58	13.00	7.00	4.96	12.10	4.00	5.27	13.10
31	4.00	5.56	13.00				4.00	5.20	12.20
Limits	**N/A**	**20**	**45**	**N/A**	**20**	**45**	**N/A**	**20**	**45**

Day	BOD_{5T}			BOD_{5T}			BOD_{5T}		
	Jan-20			Feb-20			Mar-20		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3
1	4.00	5.22	12.20	9.00	6.57	19.10	20.00	7.09	17.10
2	3.00	5.22	12.20	7.00	6.50	17.30	13.00	7.15	17.10
3	4.00	5.20	12.20	6.00	6.38	16.10	10.00	7.19	17.10
4	4.00	5.21	12.20	8.00	6.33	15.20	16.00	7.27	17.10
5	8.00	5.25	12.20	5.00	6.30	15.20	9.00	7.27	17.10
6	5.00	5.24	12.20	15.00	6.41	15.20	3.00	7.16	17.10
7	5.00	5.26	12.20	7.00	6.41	15.20	3.00	7.11	17.10
8	9.00	5.21	12.00	6.00	6.36	15.20	28.00	7.29	18.20
9	7.00	5.17	11.10	6.00	6.32	15.20	9.00	7.38	18.20
10	4.00	5.17	11.10	9.00	6.40	15.20	13.00	7.44	18.20
11	4.00	5.19	11.10	18.00	6.53	17.10	27.00	7.52	20.00
12	6.00	5.23	11.10	36.00	6.71	18.20	6.00	7.52	20.00
13	5.00	5.26	11.10	6.00	6.76	18.20	7.00	7.54	20.00
14	3.00	5.26	11.10	12.00	6.87	18.20	17.00	7.58	20.00
15	10.00	5.30	11.10	10.00	6.96	18.20	30.00	7.70	20.40
16	9.00	5.32	11.10	10.00	6.99	18.20	39.00	7.82	24.20
17	5.00	5.35	11.10	4.00	7.01	18.20	38.00	8.02	26.10
18	17.00	5.44	12.00	9.00	7.02	18.20	5.00	8.04	26.10
19	13.00	5.53	12.10	7.00	7.09	18.20	22.00	8.22	26.10
20	27.00	5.67	13.30	7.00	7.15	18.20	4.00	8.25	26.10
21	20.00	5.77	16.10	5.00	7.19	18.20	3.00	8.22	26.10
22	15.00	5.87	16.10	5.00	7.23	18.20	5.20	8.22	26.10
23	15.00	5.98	16.10	4.00	7.19	18.20	6.40	8.10	26.10
24	35.00	6.12	17.20	7.00	7.26	18.20	2.90	8.10	26.10
25	33.00	6.29	19.10	8.00	7.27	18.20	3.40	8.11	26.10
26	7.00	6.33	19.10	9.00	7.24	18.20	7.80	8.20	26.10
27	26.00	6.45	20.40	17.00	7.34	18.20	6.80	8.25	26.10
28	10.00	6.50	20.40	4.00	7.30	18.20	4.10	8.28	26.10
29	9.00	6.56	20.40	3.00	7.11	17.10	18.00	8.42	26.10
30	9.00	6.61	20.40				7.00	8.47	26.10
31	9.00	6.66	20.40				6.40	8.51	26.10
Limits	**N/A**	**20**	**45**	**N/A**	**20**	**45**	**N/A**	**20**	**45**

Day	BOD_{5T}			BOD_{5T}			BOD_{5T}		
	Apr-20			May-20			June-20		
	Results	90 Day Geometric Mean	90 Day 90^{th} Percentile	Results	90 Day Geometric Mean	90 Day 90^{th} Percentile	Results	90 Day Geometric Mean	90 Day 90^{th} Percentile
	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3	g/m^3
1	6.30	8.58	26.10	6.20	7.78	18.00	8	8	21
2	6.10	8.62	26.10	6.30	7.77	18.00	8	8	21
3	5.40	8.65	26.10	20.00	7.88	18.20	8	8	21
4	6.70	8.63	26.10	6.20	7.85	18.20	20	8	21
5	6.30	8.66	26.10	5.70	7.86	18.20	15	8	21
6	4.40	8.64	26.10	4.40	7.76	18.20	6	8	20
7	4.30	8.57	26.10	12.00	7.80	18.20	6	8	20
8	6.90	8.57	26.10	7.20	7.82	18.20	15	8	20
9	3.00	8.55	26.10	4.70	7.80	18.20	7	8	20
10	8.80	8.62	26.10	25.00	7.89	20.00	7	8	20
11	8.80	8.66	26.10	21.00	7.90	20.10	3	8	20
12	11.00	8.73	26.10	22.00	7.86	20.10	6	8	20
13	2.20	8.70	26.10	19.00	7.96	20.10	5	8	19
14	8.20	8.68	26.10	19.00	8.00	20.10	6	8	19
15	7.20	8.66	26.10	19.00	8.06	20.10	7	7	19
16	12.00	8.75	26.10	21.00	8.12	21.00	7	7	19
17	4.70	8.62	26.10	11.00	8.22	21.00	5	7	18
18	14.00	8.63	26.10	9.70	8.22	21.00	38	8	19
19	5.80	8.48	22.40	12.00	8.27	21.00	11	8	19
20	8.80	8.41	22.40	4.00	8.22	21.00	5	8	19
21	7.90	8.35	22.40	7.60	8.26	21.00	8	8	19
22	4.40	8.23	22.40	4.20	8.24	21.00	3	8	19
23	10.00	8.12	20.20	3.90	8.24	21.00	4	8	19
24	9.10	8.01	18.20	3.70	8.18	21.00	9	8	19
25	8.00	8.02	18.20	11.00	8.21	21.00	3	8	19
26	9.80	7.93	18.00	6.60	8.18	21.00	4	8	19
27	7.30	7.90	18.00	8.50	8.12	21.00	9	8	19
28	6.30	7.87	18.00	9.00	8.19	21.00	12	8	19
29	6.50	7.84	18.00	8.70	8.29	21.00	14	8	19
30	6.30	7.81	18.00	7.20	8.20	21.00	16	8	19
31				6.30	8.13	21.00	8	8	21
Limits	**N/A**	**20**	**45**	**N/A**	**20**	**45**	**N/A**	**20**	**45**

Daily Effluent Suspended Solids Results

Day	Suspended Solids			Suspended Solids			Suspended Solids		
	Jul-19			Aug-19			Sep-19		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³
1	25.00	17.62	29.10	25.00	19.38	32.20	20.00	18.54	30.20
2	13.00	17.67	29.10	30.00	19.40	32.20	49.00	18.85	32.30
3	10.00	17.64	29.10	23.00	19.51	32.20	22.00	18.97	32.30
4	11.00	17.49	29.10	22.00	19.42	30.40	6.00	18.85	32.30
5	16.00	17.43	29.10	32.00	19.51	32.20	11.00	18.76	32.30
6	9.00	17.51	29.10	41.00	19.66	34.30	14.00	18.74	32.30
7	7.00	17.54	29.10	23.00	19.66	34.30	9.00	18.66	32.30
8	20.00	17.66	29.10	28.00	19.60	32.20	18.00	18.57	32.30
9	17.00	17.76	29.10	62.00	19.80	34.60	6.00	18.38	32.30
10	20.00	17.80	29.10	28.00	19.81	34.60	20.00	18.34	32.30
11	24.00	17.85	29.10	35.00	19.87	35.50	19.00	18.42	32.30
12	48.00	17.98	30.00	23.00	19.90	35.50	17.00	18.43	32.30
13	40.00	18.21	30.20	23.00	19.77	34.10	50.00	18.66	35.40
14	24.00	18.43	30.20	13.00	19.65	34.10	15.00	18.71	35.40
15	20.00	18.59	30.20	13.00	19.44	32.30	9.00	18.65	35.40
16	11.00	18.66	30.20	48.00	19.68	35.50	6.00	18.51	35.40
17	11.00	18.63	30.20	14.00	19.64	35.50	6.00	18.19	35.40
18	11.00	18.59	30.20	6.00	19.36	35.50	6.00	17.93	35.40
19	67.00	18.99	32.20	13.00	19.20	35.50	8.00	17.71	35.40
20	16.00	19.20	32.20	15.00	19.17	35.50	18.00	17.69	35.40
21	9.00	19.22	32.20	15.00	19.03	35.50	18.00	17.66	35.40
22	12.00	19.28	32.20	15.00	18.88	35.50	9.00	17.59	35.40
23	10.00	19.26	32.20	39.00	18.94	39.10	6.00	17.39	35.40
24	21.00	19.32	32.20	23.00	19.01	39.10	33.00	17.52	35.40
25	11.00	19.18	32.20	29.00	19.01	39.10	22.00	17.54	35.40
26	23.00	19.26	32.20	24.00	18.91	35.40	16.00	17.46	35.40
27	17.00	19.23	32.20	22.00	18.90	35.40	18.00	17.49	35.40
28	12.00	19.19	32.20	18.00	18.88	35.40	18.00	17.55	35.40
29	27.00	19.29	32.20	18.00	18.66	32.30	14.00	17.44	35.40
30	18.00	19.40	32.20	30.00	18.41	30.20	79.00	17.79	39.10
31	21.00	19.41	32.20	27.00	18.39	30.20			
Limits	**N/A**	**30**	**68**	**N/A**	**30**	**68**	**N/A**	**30**	**68**

Day	Suspended Solids			Suspended Solids			Suspended Solids		
	Oct -19			Nov-19			Dec-19		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³
1	55.00	18.13	40.10	17.00	16.78	39.20	96.00	15.76	38.60
2	44.00	18.42	41.30	23.00	16.79	39.20	212.00	16.16	44.60
3	12.00	18.36	41.30	123.00	17.05	41.30	16.00	16.34	44.60
4	19.00	18.51	41.30	90.00	17.19	44.40	14.00	16.38	44.60
5	25.00	18.77	41.30	80.00	17.43	48.10	23.00	16.47	44.60
6	11.00	18.65	41.30	34.00	17.47	48.10	61.00	16.83	50.50
7	10.00	18.54	41.30	19.00	17.24	44.40	56.00	17.04	55.10
8	16.00	18.49	41.30	23.00	17.21	44.40	18.00	17.25	55.10
9	18.00	18.44	41.30	24.00	17.13	44.40	10.00	17.12	55.10
10	38.00	18.39	40.10	27.00	17.16	44.40	11.00	17.01	55.10
11	59.00	18.47	41.30	20.00	17.14	44.40	19.00	17.03	55.10
12	16.00	18.38	41.30	8.00	17.05	44.40	32.00	16.95	55.10
13	7.00	18.17	41.30	7.00	16.93	44.40	39.00	17.13	55.10
14	7.00	18.08	41.30	6.00	16.54	39.50	27.00	17.34	55.10
15	9.00	18.04	41.30	15.00	16.56	39.50	30.00	17.65	55.10
16	11.00	18.04	41.30	11.00	16.67	39.50	25.00	17.94	55.10
17	12.00	17.70	39.20	6.00	16.52	39.50	18.00	18.16	55.10
18	29.00	17.82	39.20	16.00	16.54	39.50	8.00	18.16	55.10
19	12.00	17.87	39.20	10.00	16.46	39.50	11.00	18.06	55.10
20	8.00	17.79	39.20	17.00	16.49	39.50	6.00	17.84	55.10
21	8.00	17.75	39.20	9.00	16.22	38.60	6.00	17.76	55.10
22	10.00	17.60	39.20	22.00	16.21	38.60	6.00	17.76	55.10
23	13.00	17.64	39.20	12.00	16.05	38.60	18.00	17.64	55.10
24	8.00	17.43	39.20	6.00	15.81	38.60	107.00	17.95	56.30
25	17.00	17.43	39.20	18.00	15.77	38.60	6.00	17.76	56.30
26	21.00	17.54	39.20	10.00	15.67	38.60	6.00	17.54	56.30
27	18.00	17.46	39.20	11.00	15.58	38.60	6.00	17.33	56.30
28	10.00	17.35	39.20	34.00	15.61	38.60	30.00	17.48	56.30
29	10.00	17.20	39.20	23.00	15.58	38.60	6.00	16.98	55.10
30	10.00	17.03	39.20	29.00	15.64	38.60	17.00	16.76	45.20
31	11.00	16.84	39.20				22.00	16.63	40.70
Limits	**N/A**	**30**	**68**	**N/A**	**30**	**68**	**N/A**	**30**	**68**

Day	Suspended Solids			Suspended Solids			Suspended Solids		
	Jan-20			Feb-20			Mar-20		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³
1	10.00	16.60	40.70	30.00	21.85	76.20	56.00	23.78	56.40
2	13.00	16.53	40.70	20.00	21.49	62.50	38.00	24.01	56.40
3	31.00	16.57	40.70	23.00	21.19	60.10	28.00	24.20	56.40
4	23.00	16.71	40.70	26.00	21.13	60.10	41.00	24.35	56.40
5	36.00	16.95	40.70	21.00	21.15	60.10	29.00	24.15	56.00
6	27.00	17.05	40.70	25.00	21.17	60.10	24.00	23.93	47.00
7	20.00	17.07	40.70	35.00	21.26	60.10	22.00	23.98	47.00
8	30.00	17.02	40.70	27.00	21.26	60.10	47.00	24.40	47.90
9	20.00	16.82	36.30	18.00	21.24	60.10	37.00	24.73	47.90
10	34.00	16.96	36.30	29.00	21.54	60.10	49.00	24.99	49.70
11	18.00	17.14	36.30	46.00	22.00	60.10	78.00	25.24	56.40
12	20.00	17.34	36.30	128.00	22.76	62.50	27.00	25.13	56.40
13	16.00	17.45	36.30	29.00	22.93	62.50	27.00	25.13	56.40
14	9.00	17.41	36.30	43.00	23.28	62.50	38.00	25.20	56.40
15	30.00	17.59	36.30	30.00	23.70	62.50	70.00	25.49	61.00
16	26.00	17.57	36.30	30.00	23.86	62.50	115.00	26.02	70.60
17	36.00	17.78	36.30	18.00	24.02	62.50	83.00	26.71	76.20
18	78.00	18.24	40.70	24.00	24.11	62.50	11.00	26.71	76.20
19	83.00	18.72	56.50	15.00	24.25	62.50	41.00	27.28	76.20
20	60.00	19.10	60.10	20.00	24.22	62.50	19.00	27.63	76.20
21	40.00	19.34	60.10	16.00	24.30	62.50	11.00	27.82	76.20
22	44.00	19.71	60.10	16.00	24.57	62.50	14.00	27.74	76.20
23	44.00	19.91	60.10	12.00	24.46	62.50	11.00	27.05	70.60
24	188.00	20.41	62.70	20.00	24.65	62.50	7.00	27.10	70.60
25	153.00	20.90	78.20	21.00	24.82	62.50	12.00	27.31	70.60
26	22.00	21.08	78.20	25.00	24.74	62.50	13.00	27.54	70.60
27	76.00	21.56	78.20	43.00	24.91	62.50	8.30	27.15	70.60
28	25.00	21.78	78.20	18.00	24.78	62.50	4.40	27.06	70.60
29	26.00	21.99	78.20	9.00	24.14	60.10	30.00	27.23	70.60
30	25.00	22.09	78.20				9.20	26.97	70.60
31	36.00	22.20	78.20				11.00	27.00	70.60
Limits	**N/A**	**30**	**68**	**N/A**	**30**	**68**	**N/A**	**30**	**68**

Day	Suspended Solids			Suspended Solids			Suspended Solids		
	Apr-20			May-20					
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³	g/m³
1	14.00	27.02	70.60	21.00	20.36	43.30	16	21	52
2	8.80	26.64	70.60	20.00	20.36	43.30	16	21	52
3	8.00	26.33	70.60	43.00	20.50	43.30	13	20	52
4	13.00	26.04	70.60	12.00	20.32	43.30	48	21	52
5	9.70	25.74	70.60	58.00	20.55	46.10	26	21	52
6	14.00	25.64	70.60	26.00	20.56	46.10	16	20	52
7	19.00	25.51	70.60	31.00	20.53	46.10	13	20	52
8	14.00	25.41	70.60	17.00	20.43	46.10	14	20	52
9	11.00	25.09	70.60	11.00	20.32	46.10	19	19	50
10	14.00	25.02	70.60	52.00	20.45	47.20	14	19	50
11	13.00	24.90	70.60	59.00	20.51	49.30	12	19	50
12	4.00	24.52	70.60	63.00	20.35	49.30	12	19	50
13	14.00	24.64	70.60	47.00	20.45	49.30	11	19	48
14	21.00	24.54	70.60	50.00	20.49	50.20	9	18	47
15	22.00	24.50	70.60	52.00	20.61	52.00	15	18	43
16	18.00	24.31	70.60	54.00	20.75	52.20	13	18	43
17	16.00	23.89	61.00	37.00	20.92	52.20	19	18	43
18	20.00	23.51	56.40	34.00	21.00	52.20	71	18	47
19	21.00	23.24	49.70	29.00	21.15	52.20	36	18	47
20	29.00	23.16	49.70	23.00	21.18	52.20	14	18	47
21	14.00	22.86	49.70	25.00	21.29	52.20	13	18	47
22	9.50	22.48	49.70	29.00	21.43	52.20	12	18	47
23	14.00	21.84	47.20	18.00	21.53	52.20	14	18	47
24	14.00	21.27	46.10	26.00	21.59	52.20	12	18	47
25	15.00	21.18	46.10	21.00	21.59	52.20	13	18	47
26	16.00	20.81	43.30	15.00	21.47	52.20	11	19	47
27	10.00	20.60	43.30	21.00	21.30	52.20	21	18	47
28	18.00	20.52	43.30	18.00	21.30	52.20	20	19	47
29	21.00	20.48	43.30	12.00	21.37	52.20	29	19	47
30	30.00	20.44	43.30	16.00	21.07	52.00	34	19	47
31				18.00	20.90	52.00	16	21	52
Limits	**N/A**	**30**	**68**	**N/A**	**30**	**68**	**N/A**	**30**	**68**

Daily Effluent Faecal Coliforms Results

Day	Faecal Coliforms July 2019			Faecal Coliforms Aug 2019			Faecal Coliforms Sep 2019		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL
1	190	67	221	190	49	210	88	53	270
2	20	66	221	220	50	211	12	52	270
3	44	66	221	200	51	211	44	51	270
4	180	66	221	240	52	220	340	53	272
5	48	68	221	150	52	220	76	53	272
6	28	69	221	76	52	220	230	53	272
7	20	68	221	16	50	211	30	52	272
8	64	69	221	420	53	220	570	53	293
9	32	69	221	56	52	220	20	52	293
10	4	67	221	520	53	221	16	51	293
11	44	66	221	260	53	221	270	52	293
12	88	67	221	170	53	220	72	52	293
13	4	66	221	8	51	220	64	51	293
14	100	66	221	36	51	220	24	50	293
15	36	66	221	28	50	220	52	49	293
16	4	63	221	52	49	211	290	50	293
17	4	61	221	44	49	211	210	50	293
18	4	60	221	4	47	211	4	50	293
19	12	59	221	8	45	210	180	50	293
20	64	59	221	8	45	210	40	49	293
21	4	57	221	270	46	211	4	47	293
22	4	55	221	290	47	222	24	48	293
23	8	55	221	190	48	222	36	48	293
24	380	56	231	140	50	222	16	47	293
25	8	55	231	12	49	222	28	46	293
26	4	54	231	140	49	222	4	46	293
27	120	54	231	320	49	242	4	45	293
28	12	52	221	60	49	242	280	46	293
29	8	50	211	380	50	261	12	45	293
30	56	50	211	200	50	261	4	44	293
31	520	50	211	480	51	270			
Limits	**N/A**	**200**	**950**	**N/A**	**200**	**950**	**N/A**	**200**	**950**

Day	Faecal Coliforms			Faecal Coliforms			Faecal Coliforms		
	Oct 2019			Nov 2019			Dec 2019		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL
1	8	43	293	120	70	371	80	51	302
2	20	42	293	16	68	371	72	52	302
3	62	42	293	8	66	371	69	51	291
4	140	43	293	35	66	371	36	50	291
5	130	44	293	24	66	371	44	49	291
6	62	44	293	32	64	343	68	50	291
7	32	44	293	12	63	343	96	49	281
8	150	46	293	4	60	322	32	49	281
9	180	46	293	140	59	322	40	50	281
10	92	46	293	12	57	322	80	49	281
11	990	49	322	4	57	322	24	48	281
12	8	48	322	19	57	322	210	49	281
13	44	48	322	12	56	322	88	50	281
14	170	50	322	320	57	322	2300	52	291
15	100	52	322	44	57	322	300	52	300
16	69	54	322	44	59	322	4	50	300
17	510	56	344	48	60	322	32	51	300
18	80	56	344	56	61	322	40	50	300
19	16	57	344	52	60	322	12	49	300
20	16	58	344	8	58	322	4	49	300
21	160	60	344	52	57	322	36	49	300
22	60	59	322	4	55	322	84	50	300
23	100	60	322	20	55	322	12	50	300
24	210	63	322	12	54	322	16	49	300
25	88	63	322	4	51	322	110	51	300
26	60	64	322	300	52	322	48	53	300
27	150	66	322	72	51	302	4	50	300
28	370	67	343	36	50	302	16	50	300
29	240	67	322	170	50	291	4	50	300
30	3000	69	343	320	50	302	4	50	300
31	2700	71	371				330	52	302
Limits	**N/A**	**200**	**950**	**N/A**	**200**	**950**	**N/A**	**200**	**950**

Day	Faecal Coliforms			Faecal Coliforms			Faecal Coliforms		
	Jan 2020			Feb 2020			Mar 2020		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL
1	28	51	302	8	55	599	23	79	1020
2	4	49	302	84	55	599	110	79	1020
3	210	50	302	73	56	599	390	81	1020
4	120	50	302	80	57	599	400	83	1020
5	370	51	320	240	58	599	40	83	1020
6	160	51	320	3900	63	692	24	82	1020
7	16	50	320	35	62	692	42	82	1020
8	4	48	320	4	61	692	4	80	1020
9	8	46	302	300	64	692	16	78	1020
10	40	47	302	32	65	692	110	80	1020
11	4	45	302	32000	71	810	420	80	1020
12	320	46	320	28000	74	1020	310	82	1020
13	4	44	320	280	76	1020	180	79	810
14	20	43	320	230	77	1020	720	80	810
15	24	42	302	610	79	1020	60	83	810
16	300	43	302	400	81	1020	420	85	810
17	190	44	302	160	82	1020	2200	89	1020
18	4	43	302	340	86	1020	4	88	1020
19	44	42	302	110	86	1020	12	89	1020
20	2100	44	320	24	88	1020	130	90	1020
21	18300	47	320	4	87	1020	4	87	1020
22	900	48	321	32	88	1020	23	88	1020
23	3900	50	334	8	88	1020	13	87	1020
24	800	51	370	450	89	1020	210	88	1020
25	200	51	370	130	89	1020	110	89	1020
26	590	52	392	4	87	1020	2	88	1020
27	120	51	392	32	85	1020	140	90	1020
28	680	50	392	4	81	1020	23	92	1020
29	7360	51	392	15	80	1020	36	94	1020
30	24000	54	599				7	90	1020
31	60	55	599				2	87	1020
Limits	**N/A**	**200**	**950**	**N/A**	**200**	**950**	**N/A**	**200**	**950**

Day	Faecal Coliforms			Faecal Coliforms			Faecal Coliforms		
	Apr 2020			May 2020			June 2020		
	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile	Results	90 Day Geometric Mean	90 Day 90th Percentile
	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL	cfu/100mL
1	7	88	1020	78	63	420	13	56	342
2	590	89	1020	340	64	420	25	54	340
3	30	88	1020	340	65	420	33	54	340
4	10	84	1020	88	65	420	13	54	340
5	21	82	1020	64	64	420	10	53	340
6	20	82	1020	82	62	402	3	53	340
7	78	85	1020	94	62	402	50	53	340
8	120	88	1020	320	65	402	5	52	340
9	48	88	1020	98	65	402	11	50	340
10	88	91	1020	340	66	402	2	47	340
11	62	89	1020	62	62	400	3	45	340
12	120	93	1020	38	58	391	7	42	322
13	210	95	1020	70	57	391	8	41	322
14	3	93	1020	42	56	391	7	40	257
15	230	93	1020	360	55	363	7	37	250
16	54	92	1020	470	55	363	2	37	250
17	44	94	1020	360	56	363	5	36	250
18	250	96	1020	250	56	363	92	36	250
19	28	91	810	72	55	363	240	38	250
20	78	86	728	74	56	363	200	39	250
21	100	84	684	74	58	363	66	40	250
22	88	81	617	44	58	363	56	39	250
23	140	79	592	68	60	363	31	38	250
24	56	78	592	52	58	360	2	38	250
25	120	77	592	50	58	360	42	38	250
26	46	76	592	25	59	360	2	37	250
27	56	74	464	13	58	360	8	36	250
28	2	67	423	54	60	360	28	37	250
29	10	61	420	23	60	360	11	38	250
30	70	62	420	5	59	360	44	38	250
31				21	58	360			
Limits	**N/A**	**200**	**950**	**N/A**	**200**	**950**	**N/A**	**200**	**950**

Effluent Flow Rate

Day	Effluent Flow July 2019			Effluent Flow Aug 2019			Effluent Flow Sep 2019		
	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow
	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3
1	1914	1502	45945	2277	1408	54656	1937	1142	46490
2	1863	1048	44719	2180	1207	52314	2018	1104	48420
3	3879	2373	93105	2071	1307	49714	2009	1303	48214
4	2604	1298	62488	2142	1168	51418	2223	1139	53348
5	3117	1881	74800	2062	1185	49483	4240	2000	101759
6	2875	1581	69003	2068	1449	49632	3398	1711	61542
7	2853	1618	68473	2073	1209	49740	2927	1510	70254
8	2886	1702	69253	2056	1360	49343	2999	1555	71969
9	2366	1517	56781	2040	1206	48969	2922	1461	70129
10	2239	1100	53738	2546	1508	61096	2497	1461	59927
11	2107	1254	50570	3320	2018	79677	2085	1154	50047
12	2198	1450	52762	4714	2857	113129	2044	1268	40044
13	2000	1164	47998	3190	1906	76569	2713	1854	65105
14	4710	3141	113027	3024	1679	72570	3269	2050	76444
15	3442	2437	82612	1959	1403	47005	3295	2097	79081
16	5233	3018	125602	1983	2030	47583	2366	1410	56786
17	3560	1881	85436	4341	2911	104184	2307	1152	55375
18	3116	1903	74782	2434	1176	58408	2960	1547	71044
19	3333	1998	79984	2170	1182	52074	2946	1546	70749
20	5008	2382	120202	2284	1417	54806	2753	1528	66075
21	3627	1897	87056	2629	1680	63100	2629	1609	63100
22	2929	1740	70305	2824	1815	67768	2721	1458	65300
23	2639	1305	63346	2322	1572	55730	3077	1662	73859
24	2392	1382	57395	2107	1431	50570	2827	1747	67846
25	2231	1733	53542	2116	1384	50773	3088	1564	74100
26	2073	1918	49755	2222	1124	53329	3034	1476	72821
27	1980	1639	47521	2127	1084	51057	2697	1290	64722
28	2020	1124	48480	2101	1187	50415	2772	1509	66530
29	2082	1083	49956	2105	1109	50521	2609	1037	67412
30	2428	1232	58270	2642	1341	63416	2866	1475	68780
31	2654	1551	63686	2743	1475	65820			

Day	Effluent Flow			Effluent Flow			Effluent Flow		
	Oct 2019			Nov 2019			Dec 2019		
	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow
	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3
1	2970	1519	71271	1935	1451	46430	1921	1270	46113
2	3115	1695	74748	1825	1171	43802	2122	1276	50916
3	2935	1527	70430	1795	1111	43087	2647	1419	63519
4	2754	1527	66091	1957	1076	46973	2544	1358	61045
5	3683	2836	88388	1940	1014	46567	2486	1328	59670
6	2923	1539	70156	2576	1252	61829	2431	1404	58337
7	2940	1523	70563	2961	1372	71063	2645	1620	63488
8	2100	1432	50396	2023	1306	48550	4261	2969	102259
9	2005	962	48131	1848	1200	44344	2172	1118	52118
10	2855	1354	68517	5073	4000	121740	2148	1297	51549
11	2301	1504	55235	6617	3469	158804	2163	1689	51910
12	1993	1212	47826	2908	1475	69801	2074	1405	49777
13	1907	1073	45763	2555	1597	61320	2052	1461	49251
14	1965	1220	47163	2676	1643	64233	1986	1351	47661
15	2861	1434	68671	2157	1312	51768	1903	1381	45661
16	2860	1623	68638	1966	1123	47178	2886	1672	69263
17	2772	1782	66530	2019	1062	48452	5037	2896	120876
18	4688	2584	112508	2293	1334	55030	4429	2837	106293
19	3153	1989	75677	2329	1097	55886	2487	1266	59687
20	2257	1166	54173	2254	1132	54096	2763	1422	66316
21	2299	1191	55181	2098	1154	50355	1996	1275	47900
22	2628	1515	63080	2625	1420	62997	1871	1110	44901
23	2966	1962	71189	2640	1429	63357	1810	995	43428
24	2367	1163	56814	2709	1539	65020	1678	885	40268
25	2897	1541	69535	2067	1341	49610	1345	753	32273
26	2761	1431	66271	1993	1094	47842	1451	832	34813
27	2654	1306	63700	2030	1118	48725	1543	970	37036
28	2803	1400	67278	2060	1160	49448	1544	836	37053
29	2804	1528	67292	1970	1413	47281	1411	828	33852
30	2845	1607	68273	1970	1305	47269	1472	840	35326
31	2841	1507	68194				1496	905	35903

Day	Effluent Flow			Effluent Flow			Effluent Flow		
	Jan 2020			Feb 2020			Mar 2020		
	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow
	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3
1	1183	621	28379	2278	1257	54664	2159	1092	51820
2	1433	788	34393	2276	1176	54615	2244	1145	53848
3	1673	882	40161	2341	1254	56190	2331	1185	55945
4	1609	919	38603	2376	1272	57020	2505	1157	60119
5	1634	766	39216	1412	1239	33893	2113	991	50714
6	1892	901	45405	1135	920	27247	1909	1040	45827
7	1770	840	42482	1774	1227	42577	1882	1158	45016
8	1793	836	43034	1684	1246	40405	1804	1018	43306
9	2338	1271	56099	1613	1054	38702	2028	1134	48679
10	2317	1302	55596	1815	1186	43557	2217	1145	53219
11	2138	1245	51306	1993	1262	47834	2144	1313	51465
12	2294	2054	55051	1969	1340	47261	2070	1104	45025
13	2702	1969	64847	2333	1383	55990	2363	1288	56326
14	2288	1253	54912	2329	1239	55889	2320	1229	55687
15	2261	1180	54253	2277	1277	54640	2180	1144	52146
16	2240	1208	53753	2241	1355	53776	2343	1207	56241
17	1752	1241	42043	2371	1398	56905	2488	1361	59706
18	1715	1191	41154	2614	1223	62726	2375	1303	56989
19	1517	937	36401	2437	1265	58492	2253	1082	54071
20	1673	919	40156	2038	1162	48901	1926	1215	46221
21	1854	906	44491	2024	1300	48580	1939	1126	46377
22	1829	935	43899	2543	1312	61039	1946	1138	46543
23	1926	1238	46233	2183	1348	52390	1773	1140	42416
24	2083	1251	49990	2041	1369	48977	2159	1144	51827
25	1972	1282	47328	1888	1329	45310	1755	1108	42124
26	1989	1366	47724	1835	1347	44039	1726	1030	41422
27	2242	1281	53809	2222	1280	53322	2405	1940	57715
28	2162	3328	51876	2266	1226	54393	3975	1941	95070
29	1868	1122	44838	2253	1303	54061	4765	3483	114354
30	2169	1239	52057				2418	1447	58042
31	2275	1457	54605				2354	1072	56505

Day	Effluent Flow			Effluent Flow			Effluent Flow		
	Apr 2020			May 2020			June 2020		
	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow	Average Daily Flow	Peak Hourly Flow	Total Daily Flow
	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3	m^3/hour	L/s	m^3
1	2273	1136	53989	2044	1129	49059	2036	1103	48690
2	2325	1016	55617	2176	1436	52224	2186	986	52454
3	2294	1144	55052	3583	3208	85998	2107	943	50577
4	2311	1158	55468	2818	1224	67621	3984	3286	95294
5	2244	1210	56097	4013	2592	96321	5402	2982	129637
6	2040	969	46929	2839	1279	68148	2823	1484	67750
7	1840	1042	44149	2074	1140	49788	2609	1232	62407
8	1999	1097	47986	1915	1053	45951	2355	1221	56531
9	1827	1028	43851	1873	1257	44951	2255	1088	53746
10	1979	1423	47487	1700	1065	40790	2069	1111	48976
11	1719	1072	41252	2012	1431	48277	2095	1095	50103
12	1710	1079	41035	2280	1131	54727	2097	1027	50318
13	2278	1128	54679	2254	1153	54103	2008	999	48180
14	2354	1274	56504	2299	2016	54975	1939	977	46530
15	2520	1449	60475	2265	1218	54179	2103	1056	50300
16	2359	1212	56626	2208	1183	52998	2439	1304	58325
17	2296	1240	55106	2157	1292	51588	3118	1473	74840
18	2372	1118	56917	2051	1455	49226	8872	3289	212919
19	2207	1274	52959	1820	1119	43533	8528	3292	203244
20	1838	1071	44116	1869	1387	44860	4727	1747	113061
21	1638	1148	39318	1786	1464	42865	4648	1764	111166
22	1680	826	40318	1799	1120	43184	3192	1433	76601
23	1450	639	34792	1701	1537	29627	2692	1196	64596
24	1657	1034	39777	1935	1484	44837	2651	1299	63636
25	1712	942	41099	5917	2709	142002	2468	1254	58815
26	1503	861	36065	2781	1435	66732	2367	1109	56802
27	1421	1033	34109	2589	1348	61915	2256	1300	54136
28	2228	1067	53471	2922	1517	70123	2432	1344	58164
29	2181	996	52346	2425	1045	58194	3046	1504	72848
30	2204	1136	52897	2048	1053	49162	3067	1341	62362
31				1866	1151	44781			

Appendix ii: Outfall Pipeline Inspection Report

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VEOLIA WATER SERVICES NZ LIMITED – MOA POINT WASTEWATER OCEAN OUTFALL PIPELINE & SEABED ANNUAL INSPECTION

June 2020

Document Title:	**Moa Point Wastewater Ocean Outfall Pipeline & Seabed Annual Inspection**
Document No.:	**UCL – 2020.06 – WWTP Outfall Pipeline – IR001**
	Prepared for: **Veolia Water Services NZ Ltd.,** **Moa Point WWTP,** **Wellington.**

UNDERSEA CONSTRUCTION LTD.

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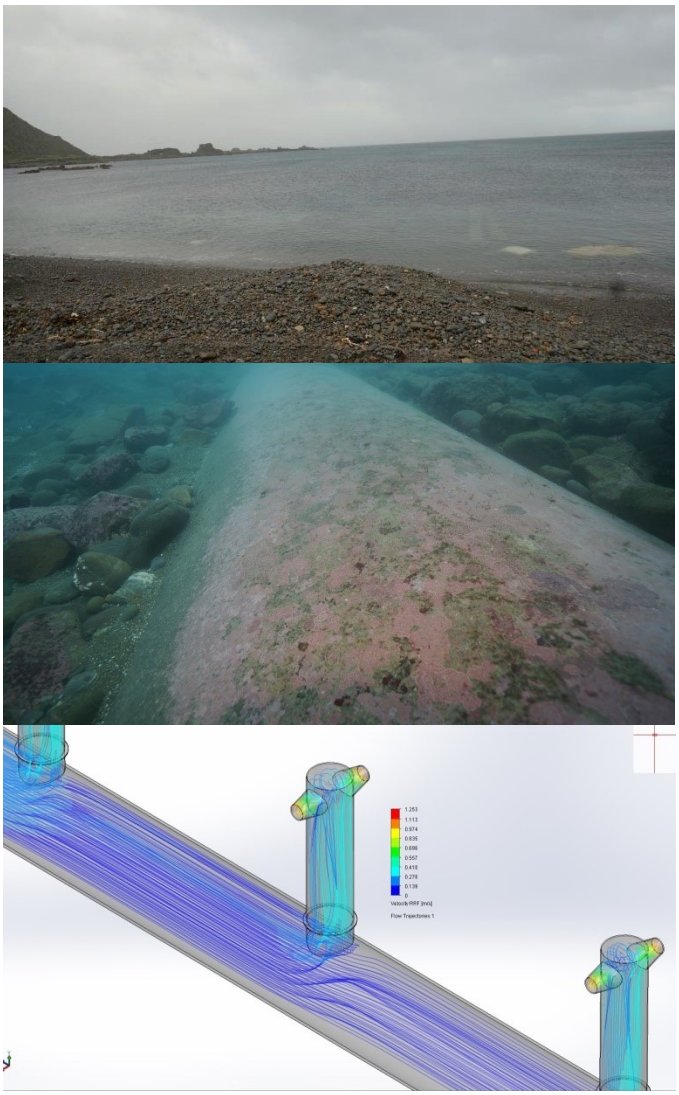

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Document circulation			
Name	**Circulation**	**Phone**	**Email**
Stuart Pearce	Contract Manager Moa Point WWTP Veolia Water Services NZ	027 4660563	stuart.pearce2@veolia.com
Edward Yong	Safety, Risk, and Compliance Officer Moa Point WWTP Veolia Water Services NZ	027 2735226	edward.yong@veolia.com
Wayne Angus	Civil Engineer / Construction Diver Undersea Construction Ltd.	027 4438621	undersea.construction@xtra.co.nz

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- If you have any questions regarding the content of this Document, please direct them to the Engineer; Wayne Angus at Undersea Construction Ltd.

M: +64 274 438621
P: +64 4 565 3866
E: undersea.construction@xtra.co.nz

TABLE OF CONTENTS

Preface

Pipeline installations and their life cycle management represent major planning and engineering efforts; especially those subjected to harsh environmental conditions such as Wellington south coasts Moa Point Wastewater Ocean Pipeline Outfall. For Companies and or Government Authorities to obtain the maximum working life and return on their initial investment from assets in a marine environment it is important that they be maintained to an acceptable and safe working standard. To ensure the quality assurance of their asset it is necessary to complete infrastructure surveys, programmed maintenance, and subsequent to inspection findings; remedial works.

When pipeline installations and their ancillary components come into service, it is hoped that they're free of all significant faults. This of course depends on the professional standards of the quality assurance of the numerous involved Parties in design, fabrication, construction, and installation.
To ensure a continuous working life for any marine asset, it is necessary to maintain an adequate inspection programme. Such a programme must be capable of detecting potential problems at an early stage. This allows the designers and engineers time to analyse the inspection information and suggest remedial action if required.

Experience has shown that the vast majority of all faults; damage / defects / deterioration found in marine structures have been done so visually. Visual information is of utmost importance both in programmed visual survey inspection, condition assessment, and general diver observation.
Throughout the progression of these survey inspections personnel observe and record data on numerous components in varying condition states.
The consequences of failure of what initially may only be a single component, especially sudden failure, can be catastrophic and very expensive, both in terms of repairs, lost business, and risks to health, safety and the environment.
Programmed survey inspections / condition assessment / asset audits are completed to ensure the continuing operational function and safe condition of the structure is maintained. Providing the Asset Owner, its operators, and subsequently the users with an assurance of reliability and ensuring the integrity of the structure.

Condition assessment is an important step in the life cycle management process of Marine Structure Assets and their ancillary components.
One of UCL's major facets of work and experience is in the inspections, condition assessment and reporting on numerous 'in-water' structures throughout New Zealand and Offshore. It is a facet of our work that we can derive immense satisfaction from; when being able to detect potential problems at an early stage, then work in partnership with Clients towards achieving common goals and economic solutions. Thus minimising risk and therefore maintaining the Clients valuable asset in safe and efficient working condition – "fit for purpose".

Asset Management

Asset management is a strategic, long-term approach which provides a foundation for improved operational performance and a sustainable business model.
The key benefits of Asset Management Planning are:

- Manage an asset throughout its lifetime and improve performance.
- Consider risks associated with costs and performance in all decisions.
- Help to improve organisational performance and achieve sustainable business objectives.
- Achieve tangible profits over time with optimised return on investment and / or growth.
- Be able to demonstrate to stakeholders, sensible utilisation of assets and associated risks and costs.
- Improve corporate reputation and credibility.

Asset Maintenance

“It needs to be recognised; to have an effective Asset Management Plan; you’re required to have an effective Asset Maintenance Programme”.

Over the past few decades, the desire of extending the useful service life of infrastructures has become of paramount significance. Where the ageing infrastructure is a serious problem faced by countries across the world, the premature deterioration has also emerged as the major problem that result in reduced service life of structures.
Structural elements are constantly subjected to multiple risk factors that result in deterioration over the course of their service lives.
Structural failure may be defined as the inability of a structure to serve its intended function with the desired levels of safety and serviceability.
Failure of a structure may be attributed to a number of independent and interrelated factors.

Asset condition assessments combine the processes of periodic inspection and testing and the assessment and interpretation of the resultant data to provide an indication of the current condition of a specific asset as to the determination of the requirement for remedial action.
Asset condition assessments determine the physical state of an asset that may affect the performance of the asset and the ability of the asset to provide the required level of service.

The benefits of knowing the current condition of an asset are:

- The ability to plan and manage the delivery of the required level of service of the asset.
- Avoiding premature asset failure by providing the option of cost effective remediation.
- Providing an accurate estimate of future expenditure that is required.
- Determination and refinement of maintenance and rehabilitation strategies.

Asset maintenance to be undertaken over the balance of structure service life is a major challenge to provide reliable and sustainable facility operation. Operating ageing facilities efficiently and safely requires an asset maintenance cycle to include inspection diagnosis, evaluation and implementation of remediation processes.
It is a critical part of asset management to determine the remaining lifecycle of an asset and the capability of the asset to meet the designed performance and level of service requirements.
In today’s environment, the preventative maintenance of ageing structures is much better than the cost of construction of new structures once original design lives have been exceeded. Asset Condition Assessment gathered information assists the determination of the remaining service life of an asset, the scheduling of remediation requirements that are required to reinstate the level of service that is provided by the asset to the desired standard.

Being unaware of the current condition of an asset may lead to the premature failure of the asset leaving limited options to the facility owner with replacement being the most expensive option. Unforeseen failure of an asset provides major consequences that constitute a risk to business operations or potential loss to the organisation. The benefits of knowing the current condition of an asset are the ability to plan and manage the delivery of the required level of service of the asset, avoiding premature asset failure providing the option of cost effective remediation, providing an accurate estimate of future expenditure that is required and the determination and refinement of maintenance and rehabilitation strategies.

Assessment of damaged or deteriorated structures should only be made by qualified and experienced people and the process of should always include the aspects of the condition of the structure including all visible, non-visible and potential damage and defects, a review of the past, current and future service functions / requirements.

With most damaged or deteriorated structures, the facility owner has a number of options which will effectively decide the appropriate remediation strategy that will meet the future service requirements of the structure. These options will include doing nothing, downgrading the capacity or functioning of the structure, preventing or reducing further damage without repair, improving, strengthening or refurbishing the structure, reconstructing all or part of the structure or demolishing the structure.

Proper remediation methodology begins with inspection and testing to identify the type and extent of defects and degradation mechanisms and the overall condition and quality of the structure. Remediation projects are prone to increasing in volume and costs once work has commenced – investing in comprehensive and accurate Asset Condition Assessments before remediation begins has proven cost effective in the long term.

Often there is limited information on “as built” with drawings and construction records being partial at best and more than often incorrect.
An understanding of structures is critical in being able to provide comprehensive reporting on all aspects of the construction envelope. Prior to diagnosing the causes of defects or failure within a structure it is important to understand that defects result from several factors: design, construction practices, materials, the environment, and loading applied to the structure.

The Asset Condition Assessment is intended to form the foundation for short-term maintenance strategies in which structural elements of the facility are prioritised aligned with the degree of deterioration and loss of function.

General

All structural assets exposed to the marine environment are subjected to considerable deteriorating forces. Of course, the designers take this into account when designing the various components that are constructed to form marine structures; however local anomalies do occur and some detailed aspects of the problem are imperfectly understood. Another point to note is that any marine structure warrants careful monitoring on engineering grounds.
This indicates a need for documentation for marine structures and the importance of these records should not be underestimated. The average working life of structures designed for marine environments is predicted to be between 35 – 50 years. During that life cycle, it would be reasonable to assume that defects of one type or another will occur. It makes good sense for both engineering and economic reasons for any such damage to be dealt with on a planned basis.

Veolia Water Services NZ Ltd. – Moa Point Wastewater Ocean Outfall Pipeline and Seabed

Annual Underwater Condition Survey Inspection

Overview

Report prepared for:
Stuart Pearce, Contract Manager /
& Edward Yong, Safety, Risk, & Compliance Officer
Moa Point WWTP
Veolia Water Services NZ Ltd. (Client)

Survey Inspection Investigations and Report completed by:
Wayne Angus, Civil Engineer / Construction Diver
Undersea Construction Ltd. (UCL) (Diving Contractor / Consultant)

The Moa Point Ocean Outfall Pipeline is approximately 1858m in length, from position 'A' at the roadside southern embankment inspection chamber, then traversing in a southerly direction through Lyall Bay to the pipelines southernmost diffuser (position 'F') at a water depth of 23 metres and a GPS position of 41° 21.119' S 174° 48.080' E.

Wellington City Council holds Resource Consent WGN080003 (26180) to discharge treated wastewater from the Moa Point Wastewater Treatment Plant into Lyall Bay via a 1.8km offshore outfall pipeline.

Following a brief discussion on the survey scope and objectives, staff from UCL completed underwater survey inspections of the Moa Point Wastewater Ocean Outfall Pipeline and seabed.

The emphasis of the survey investigations is to both monitor as per set 'Scope' criteria, observe and report on any defect / damage / deterioration that could affect the current operational working and future service life of the inspection components, the pipeline system as a whole, and to establish documented data that not only provides the Client with reporting on current condition status, but also comparisons with historic values.

It's noted that Covid – 19, followed by a period of adverse sea conditions delayed the 2020 Annual Inspection work from being carried out until June 2020.

UNDERSEA CONSTRUCTION LTD.

SUBSEA ENGINEERING, MARINE CIVIL, OFFSHORE MOORINGS, & COMMERCIAL DIVING SPECIALISTS.

PHONE: +64 4 565 3866
MOBILE: +64 274 438621
EMAIL: undersea.construction@xtra.co.nz

P. O. BOX 31081,
LOWER HUTT 5040
NEW ZEALAND.

DAILY RECORD OF INSPECTION OR NDT

DATES OF DIVES: 13th & 16th June 2020
INSPECTION PERSONNEL: Dave Angus, Kieran Nelson, Rian Kriel, Wayne Angus
CLIENT: Veolia Water Services NZ Ltd.
LOCATION: Moa Point WWTP, Lyall Bay, Wellington
INSPECTION COMPONENT: Wastewater Ocean Outfall Pipeline and Seabed – Annual Survey

TYPE OF DIVE:

SCUBA	SURFACE SUPPLY	MIXED GAS	OTHER
X			

DIVE DETAILS:

	DIVE 1	DIVE 2	DIVE 3	DIVE 4
MAXIMUM DEPTH OF DIVE	24.0 metres	24.0 metres	23.0 metres	8.0 metres
BOTTOM TIME (minutes)	40	25	20	52

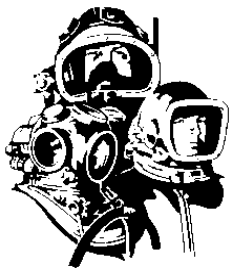
METHOD	CHECK	PARTICULARS / EQUIPMENT
CLEANING		
TECHNIQUES:		
SAMPLING		
TYPE:		
VISUAL INSPECTION		
GENERAL SURVEY:	X	Visual condition assessment of inspection components
STILL PHOTOGRAPHY:	X	Photograph items of interest
VIDEO SURVEY:	X	Take video footage of diffusers in operation & exposed inshore pipeline section
NDT		
POTENTIAL MEASUREMENT:	X	Cathodic Potential readings
DIMENSIONAL SURVEY:	X	Obtain seabed scour measurements at set positions from adjacent exposed inshore pipeline section, & offshore diffusers
REMEDIAL GRINDING:		
M.P.I.:		
ULTRASONIC:		
OTHER:		

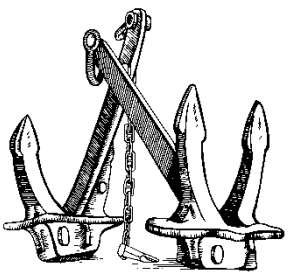
ANY OTHER REMARKS: Refer to this Report for result detail.

APPROVED

NAME OF SUPERVISOR: Wayne Angus
SIGNATURE: *W. T. Angus*
DATE: 16th June 2020

NAME OF CLIENT'S REP: Stuart Pearce
SIGNATURE:
DATE:





"To solve it easily, detect it early"

Positional Data

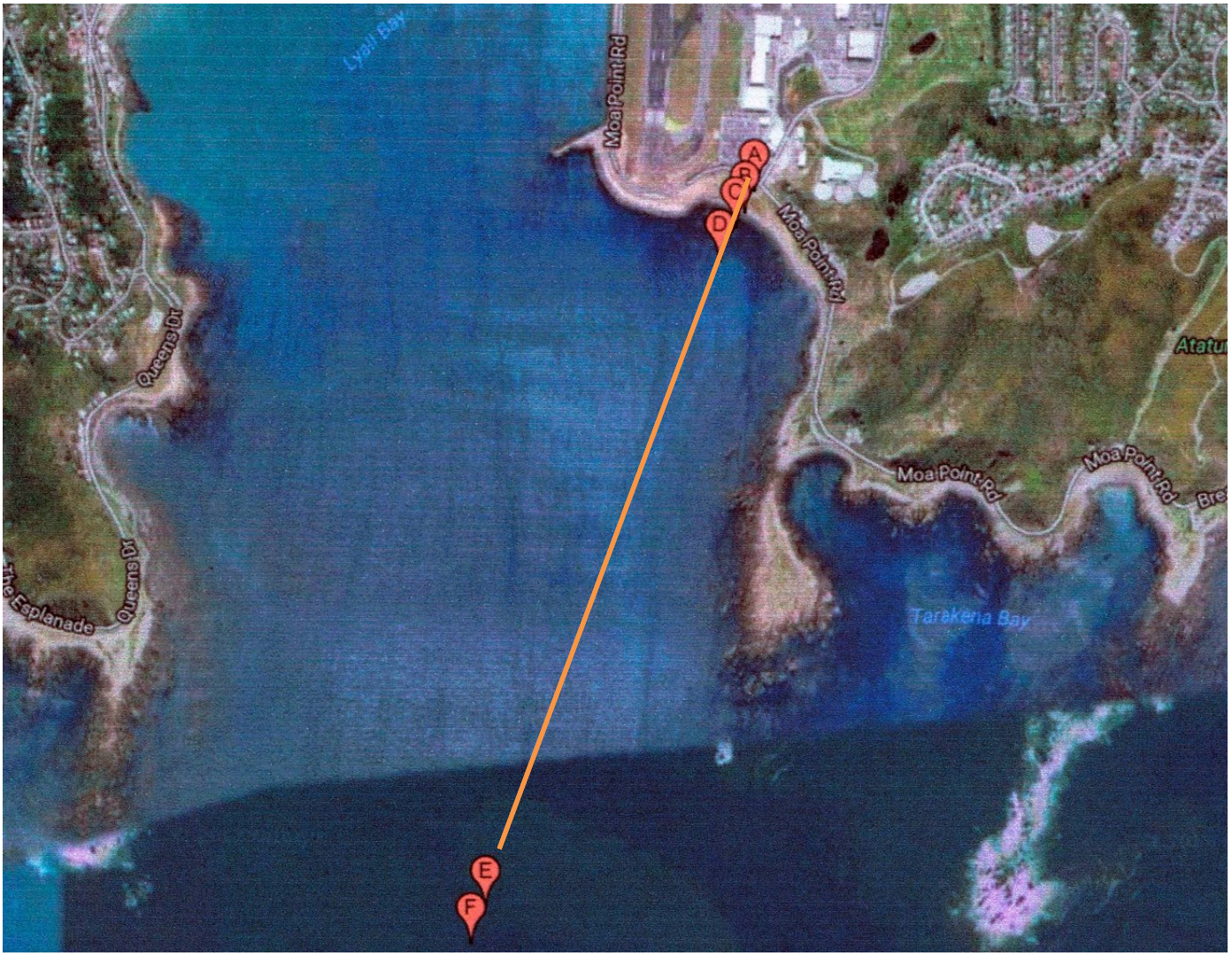


Figure 1: Pipeline route and key reference positions

Position 'A' - Onshore manhole access to buried pipeline

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316670 x – ea.	Lat: -41.33630°N	41° 20.178'S	41° 20' 10.7"S
	5421594 y – no.	Long: 174.80903°E	174° 48.542'E	174° 48' 32.5"E

Position 'B' - Mean High Water (MHW)

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316652 x – ea.	Lat: -41.33673°N	41° 20.204'S	41° 20' 12.2"S
	5421545 y – no.	Long: 174.80880°E	174° 48.528'E	174° 48' 31.7"E

Position 'C' - Exposed inshore pipeline section shoreward end

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316630 x – ea.	Lat: -41.33707°N	41° 20.224'S	41° 20' 13.5"S
	5421507 y – no.	Long: 174.80853°E	174° 48.512'E	174° 48' 30.7"E

Position 'D' - Exposed inshore pipeline section seaward end

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316598 x – ea.	Lat: -41.33772°N	41° 20.263'S	41° 20' 15.8"S
	5421434 y – no.	Long: 174.80812°E	174° 48.487'E	174° 48' 29.2"E

Position 'E' - Shoreward end of pipeline diffuser section

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316100 x – ea.	Lat: -41.35121°N	41° 21.073'S	41° 21' 44.0"S
	5419923 y – no.	Long: 174.80172°E	174° 48.103'E	174° 48' 06.2"E

Position 'F' - Seaward end (southernmost) of pipeline diffuser section

UTM		dd.ddddd°	dd° mm.mmm'	dd° mm' ss.s"
60G	316070 x – ea.	Lat: -41.35198°N	41° 21.119'S	41° 21' 07.1"S
	5419836 y – no.	Long: 174.80133°E	174° 48.080'E	174° 48' 04.8"E

Distance between points – (in metres)

Reference	A	B	C	D	E	F
A	00.0	52.0	96.0	175.0	1765.0	1858.0
B	52.0	00.0	44.0	123.0	1713.0	1805.0
C	96.0	44.0	00.0	79.7	1670.0	1762.0
D	175.0	123.0	79.7	00.0	1591.0	1683.0
E	1765.0	1713.0	1670.0	1591.0	00.0	92.1
F	1858.0	1805.0	1762.0	1683.0	92.1	00.0

Table 1: Distances between key positions

Scope of Work

- Formulate a survey plan.
- Submit Worksafe NZ Notification of Work (Diving – Notifiable work).
- Task assessments, hazard analysis, and equipment preparation.
- Visual survey inspection of pipeline components:
  a) inshore exposed pipeline section; 3.0 – 8.0 metre water depth (positions 'C – D'),
  b) buried pipeline route from diffuser # 18 (position 'E') on a heading back to position 'D',
  c) outfall diffuser section from southernmost diffuser # 1 (position 'F') to diffuser # 18 (position 'E').
- Dimensional measure of scour:
  a) at inshore exposed pipeline section (positions 'C – D'). With reference to existing markers, set at 10 metre increments along the length of exposed pipe to establish repetitive monitoring at fixed positions. Update CAD drawing for 2020 reference and reporting purposes.
  b) at diffuser section.
- Cathodic Potential testing at diffuser test point and outlet nozzles.
- Photograph items of interest.
- Video diffusers in operation.
- Log all observations; defect / damage / deterioration etc., and general condition.
- Compile and submit a report of all inspection findings.

Methodology / Procedure

Using both standard SCUBA and light-weight contaminated water equipment, divers inspected pipeline components as per the programmed Scope of Work: firstly the outfall diffuser section from southernmost diffuser # 1 (position 'F') to diffuser # 18 (position 'E'), followed by the buried pipeline route from diffuser # 18 (position 'E') on a heading of 18° East of True North back to position 'D', then finally the inshore exposed pipeline section 3.0 – 8.0 metre water depth (positions 'C – D').
Divers completed the tasks as detailed within the scope of work: carrying out specific investigations, while also observing for any evidence of abnormal or aggressive wear, defect, damage, or deterioration, then logging all details accordingly.
Refer to relevant section of Report for further detail.

Specialised Non Destructive Testing (NDT) equipment was used in the Cathodic Potential testing of the diffuser section of the pipeline.

The specialised CP equipment used to extrapolate data was:

BUCKLEYS Bathycorrometer, Serial No. BUC587.
Certificate of Calibration: S.41610, Det Norske Veritas (D.N.V.)

Figure 2: Bathycorrometer (Cathodic Potential Meter) in operation

As standard with the use of this type of equipment; prior to taking Cathodic Potential readings a calibration check is carried-out using a Zinc (Zn) test block; against the CP meters Silver / Silver Chloride (Ag/AgCl) electrode; the returned reading of 1.05V is considered very good.

Notes:

For ease of interpretation this Report addresses and documents the pipeline inspection components in individual sections as follows:

- Inshore Exposed Pipeline Section and Seabed.
- Buried Pipeline Outfall Route and Seabed.
- Offshore Diffuser Section – General Survey.
- Diffuser section Cathodic Potential Survey.

Inshore Exposed Pipeline Section and Seabed

The inshore exposed pipeline section (position 'C') commences 44.0 metres below the MHWL at a depth of 3.0M, and extends approximately 80.0 metres to a depth of 7.0M.

Over the past year (between 2019 to 2020 Inspections) there's tendered to be a greater frequency of Southerly wind conditions and moderate swells experienced. During these types of conditions, an increased volume of sand and fine gravel gets deposited in the shallows; while at the same time, moderate swells erode the shoreline.
Visual observations indicate an increase in bed (sand and fine gravel) deposit levels occurring around the exposed pipeline between the inspections period May 2019 to June 2020.
Also due to coastal shoreline swell, a lot more demolition material has become exposed in the shallows.

Due to the nature of this coastline; its exposure to severe southerly storms, its wave action and strong currents causing continual aggregate migration, and the shallow depth of burial of the inshore pipeline section; scour adjacent to the pipe will always remain a factor requiring monitoring.

Although the exposed length of pipeline has increased slightly since commissioning; exposure progression has remained relatively slow; with exposure length remaining the same over the 2019 to 2020 inspection period. Over this same period scour adjacent the pipeline has reduced at several designated monitoring positions, largely due to an increase in sand deposits within the shallows.

In 2017 with the intention of gaining greater accuracy in the collection and reporting of scour data; UCL drove reference markers into the seabed at 10 metre intervals adjacent the 80 metre length of exposed pipeline section. These markers serve as fixed reference positions for the repetitive logging and comparison of annual data.

Exposed Pipeline Section
Scour Depth Data

Test point meterage	Year								Comments
	2017		2018		2019		2020		
	West (mm)	East (mm)	West (mm)	East (mm)	West (mm)	East (mm)	West (mm)	East (mm)	Seafloor composition
Position 'C' 00.0 metres	200	100	200	120	200	150	100	100	Formed rock reef with loose packed rock and gravels – in close proximity with pipeline
10.0 metres	100	200	100	200	200	200	150	200	As above
20.0 metres	300	300	320	350	350	400	250	300	As above
30.0 metres	600	400	600	400	500	500	350	400	As above
40.0 metres	400	600	430	580	700	650	600	650	As above
50.0 metres	900	900	870	900	1000	1000	700	750	As above
60.0 metres	800	1100	840	1150	760	1100	600	600	Formed rock reef with gravel and sand deposits – rock reef structuring standing off 1 – 2 metres from pipeline
70.0 metres	500	700	520	730	500	750	400	450	As above
Position 'D' 80.0 metres	000	200	000	160	200	430	150	150	Sand and cobbles

Table 2: Scour measure record

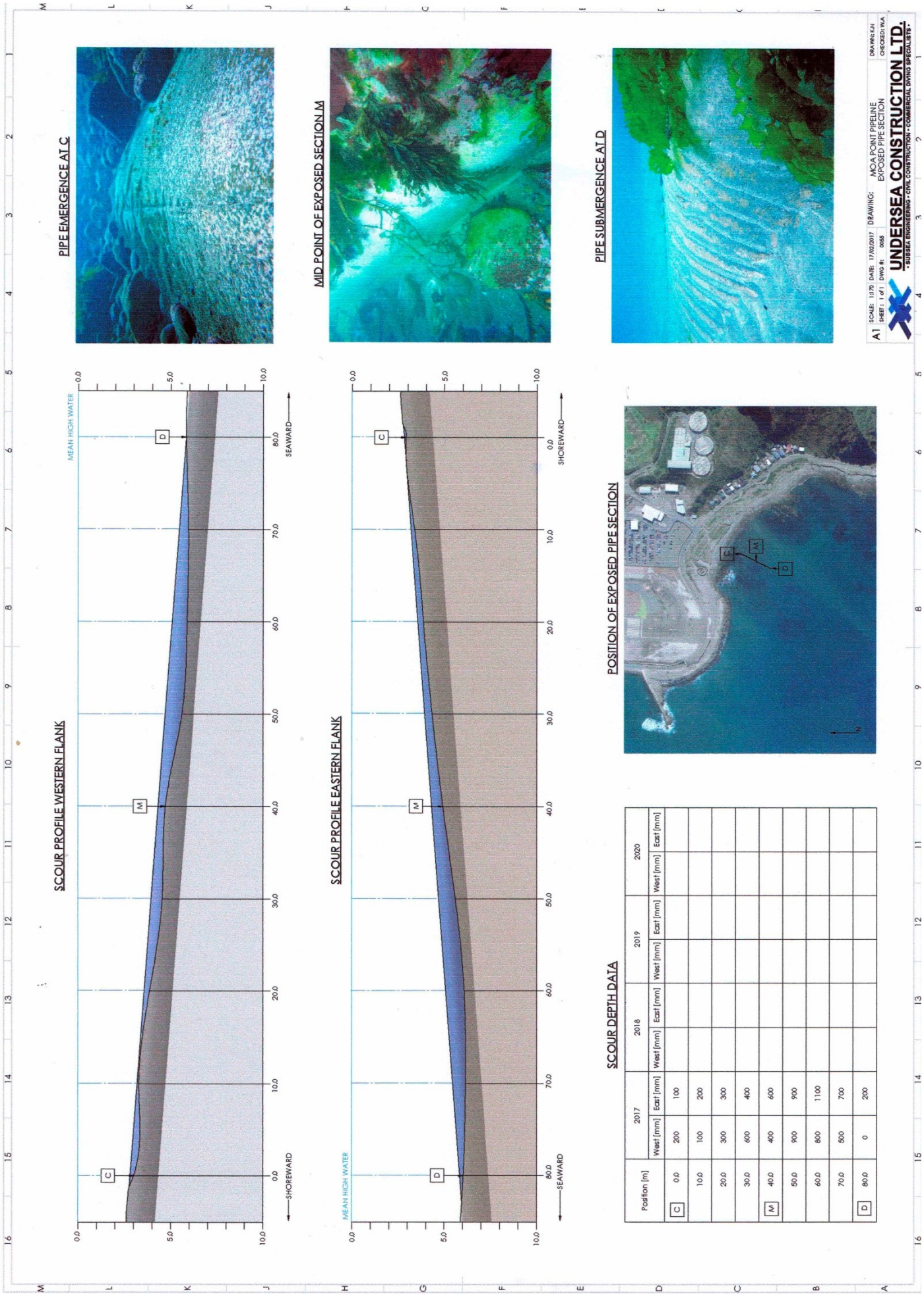


Figure 3: Inshore profile

Notes:
The updated detail for the drawing on Page 16 (Figure 3) can be viewed in A1 size CAD format, as provided on attached drawing.

Video footage of Inshore Exposed Pipeline Section can be viewed in file: Inshore – exposed pipeline section 2020.
Due to inshore swell conditions on the day; suspended particle in the water resulted in poor visibility conditions during the recording of this footage.

Figure 4: 00.0 metres

Figure 5: 10.0 metres

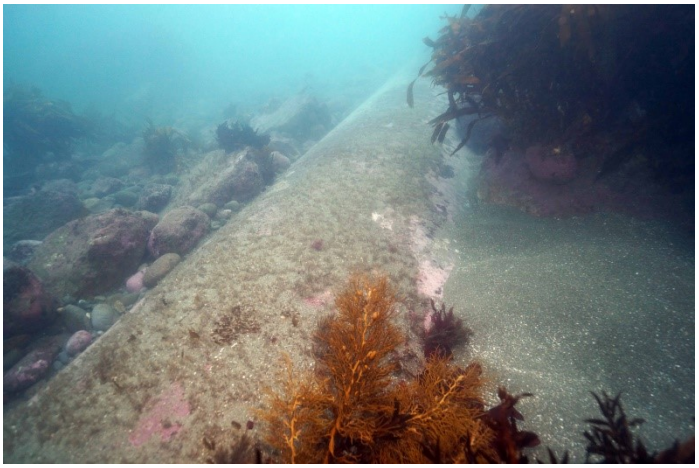


Figure 6: 20.0 metres

Figure 7: 30.0 metres

Figure 8: 40.0 metres

Figure 9: 50.0 metres

Figure 10: 60.0 metres

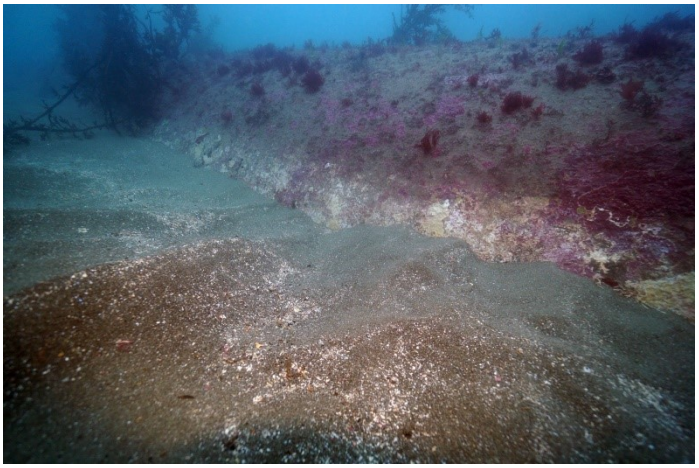
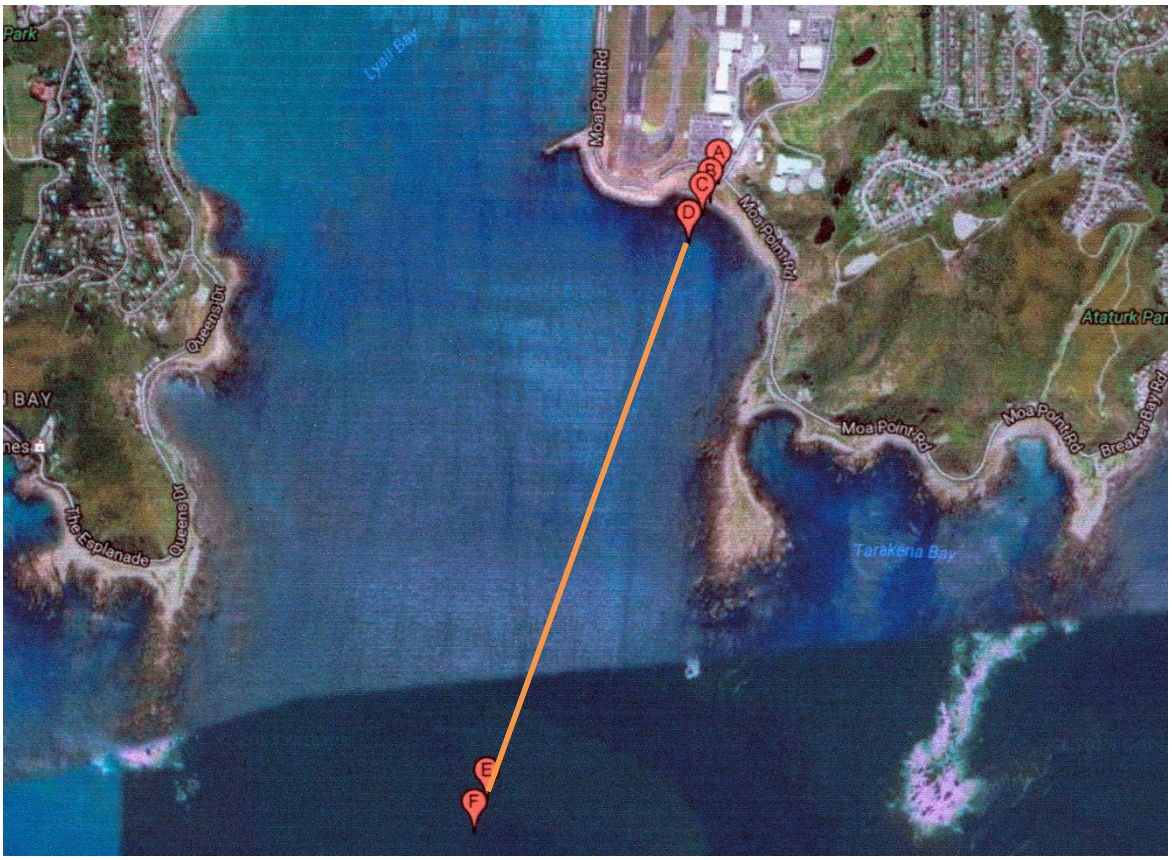


Figure 11: 70.0 metres

Figure 12: 80.0 metres

Figures 13, 14, 15, 16: Pipeline route through intertidal zone – seabed & exposed demolition material

Buried Pipeline Outfall Route and Seabed



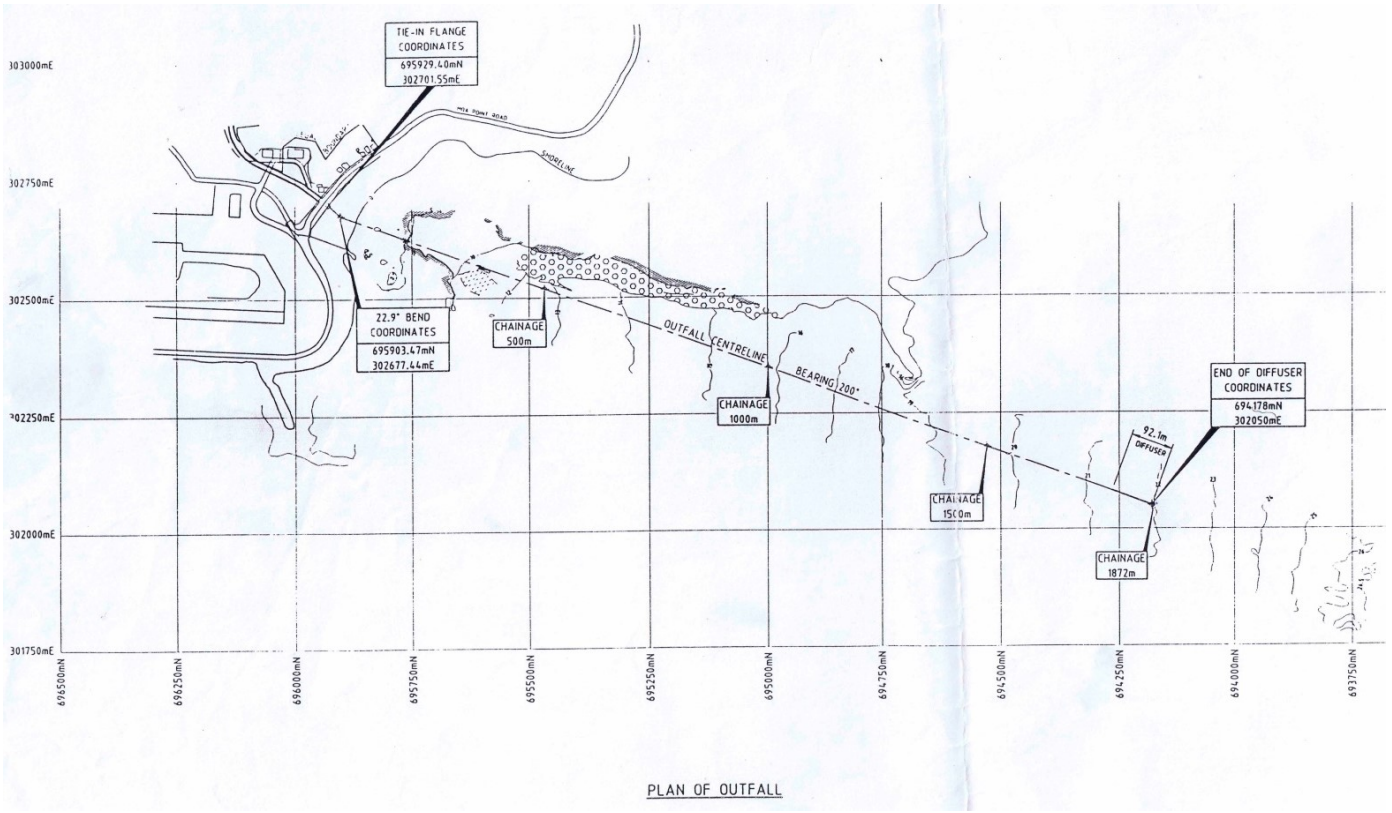


Figure 17: Pipeline route

Prior to underwater inspection of the buried pipeline outfall route and seabed UCL personnel dropped anchored marker buoys at positions ‘D & E’, and placed a survey tripod with prism set at position ‘B’ as a backsight alignment. From the vessel used for the pipeline inspection, a diver with manta-board tethered to the vessel was dropped in the water at position ‘E’ where he descended to the seabed and readied for the tow along the pipeline route. The vessel proceeded slowly on a heading of 18° East of True North towing the diver who also had his underwater computer compass aligned on the same heading.

Travelling just above the seabed along the pipeline route, the diver kept observation for any exposed pipeline sections, or evidence of fouling. The tow commencing at position ‘E’ (Diffuser # 18) and ceased approximately 50 metres from the shoreline at position ‘D’.

Visibility was fair; ranging from 1.0 to 2.5 metres.

The diver experienced no observations of exposed pipe, nor any evidence of fouling by foreign objects.

The offshore seabed, consisting of rocks, and coarse gravels and sand forms a profile of undulating peaks and depressions of +/- 400mm.

The inner route seabed, consisting of coarse sand and gravels forms a profile of undulating peaks and depressions of +/- 300mm.

Seafloor deposits of gravel and sand in the form of undulating, peaks and depressions are typical and commonplace in this type of coastal environment.

The result of the underwater tow inspection being; no areas for concern observed.

Figure 18: Typical seabed composition – offshore route – Position E

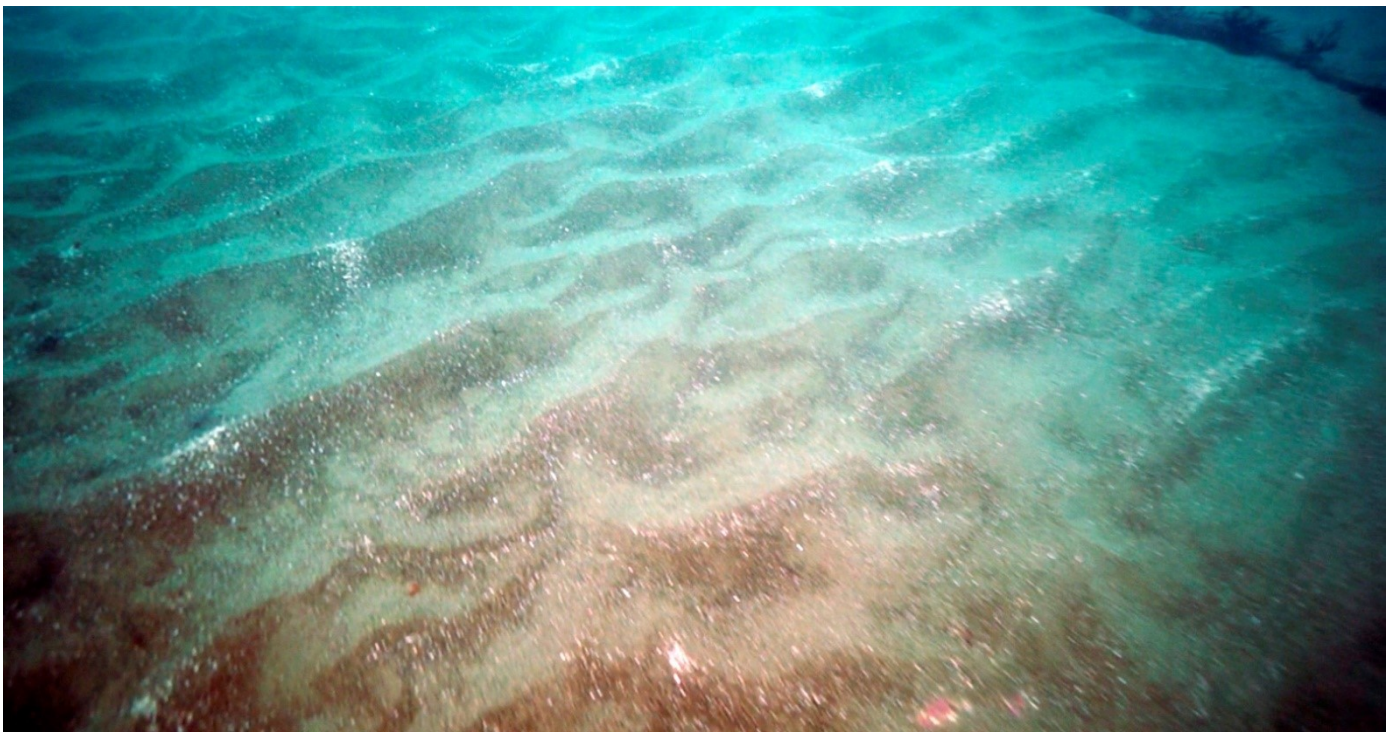
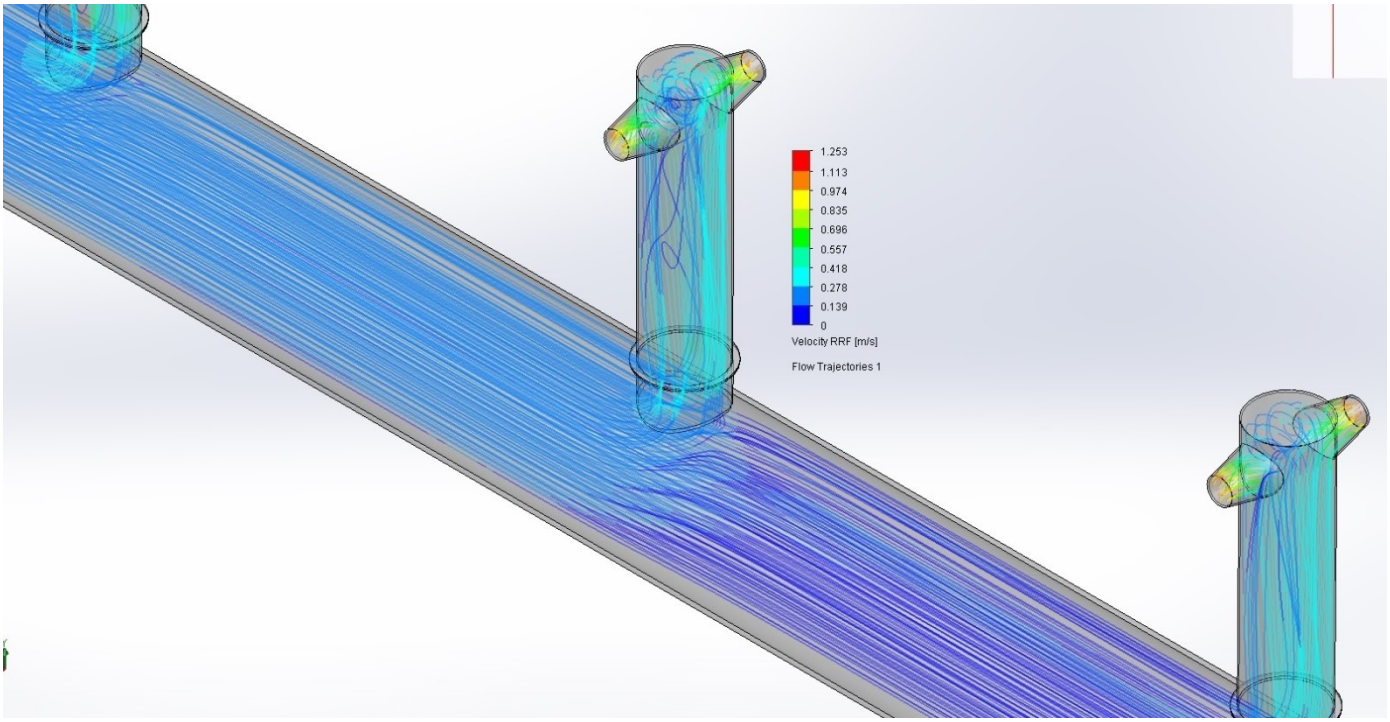


Figure 19: Typical seabed composition – offshore route – Position D

Offshore Diffuser Section – General Survey



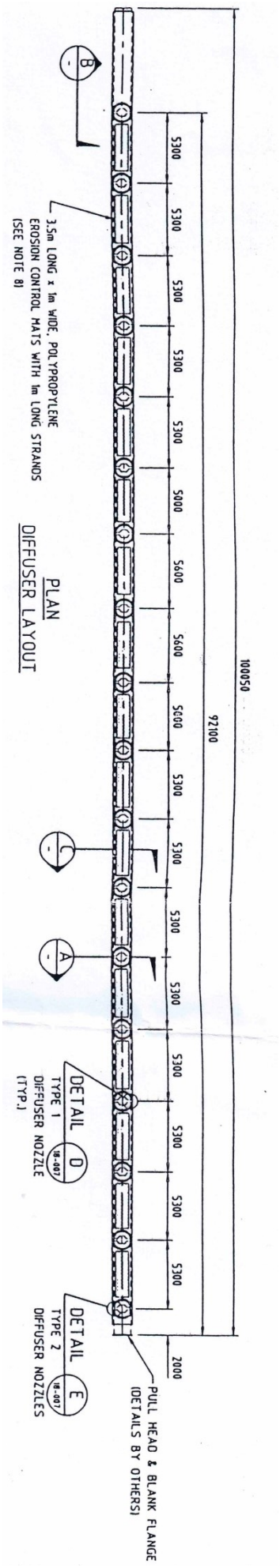


Figure 20: Diffuser layout

Divers inspected the general condition of diffusers, measuring scour depths around riser pipes, and checking for any evidence of fouling, damage, defect, or deterioration.

The inspection commenced at the seaward most diffuser, this being diffuser # 1 (position 'F'), and finished at the shoreward diffuser, this being diffuser # 18 (position 'E').

Visual observations were completed around the diffusers that exhibited the greatest scour depths to ensure that none of the bed stabilisation mats were exposed. There were no sightings made, nor any exposed material observed from the erosion control mats.
With reference to the construction drawings it should be noted that at the current recorded scour depths some of the bed erosion stabilisation matting should be exposed; however none was observed.

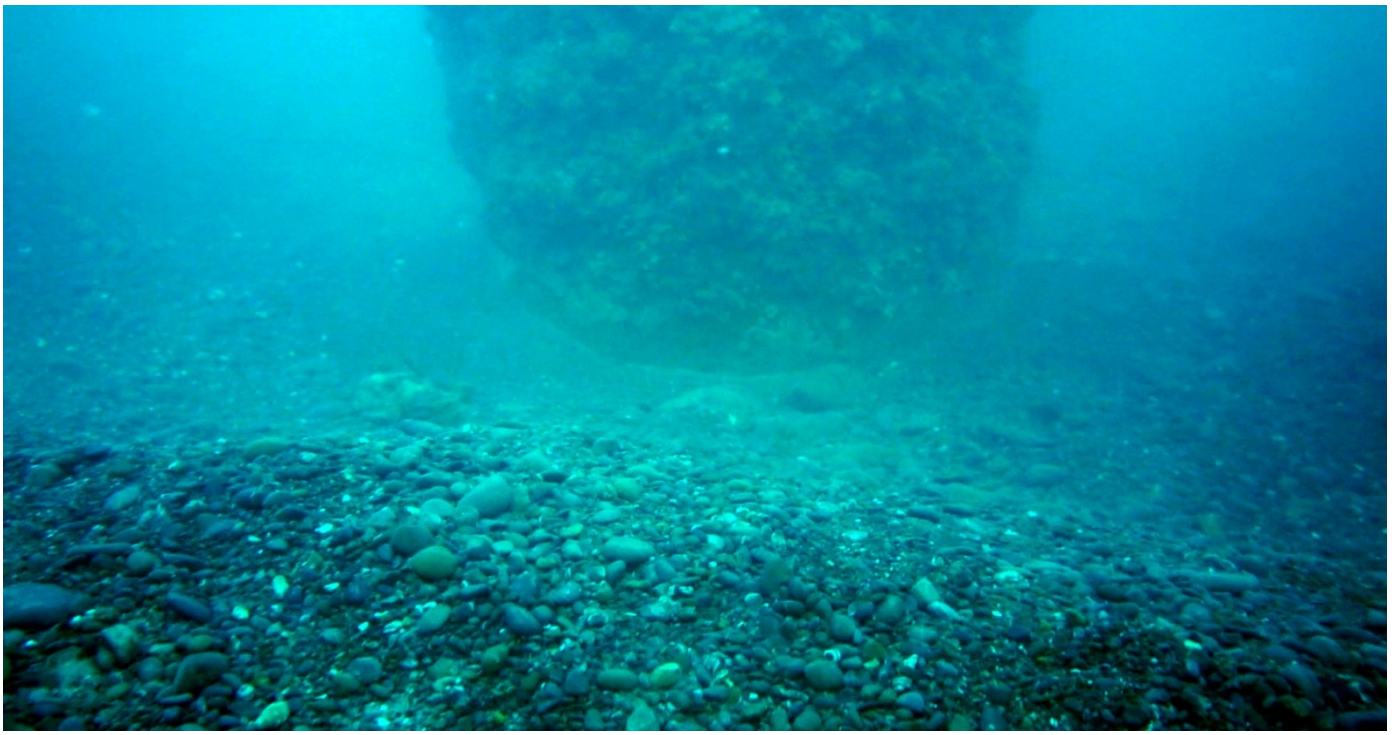
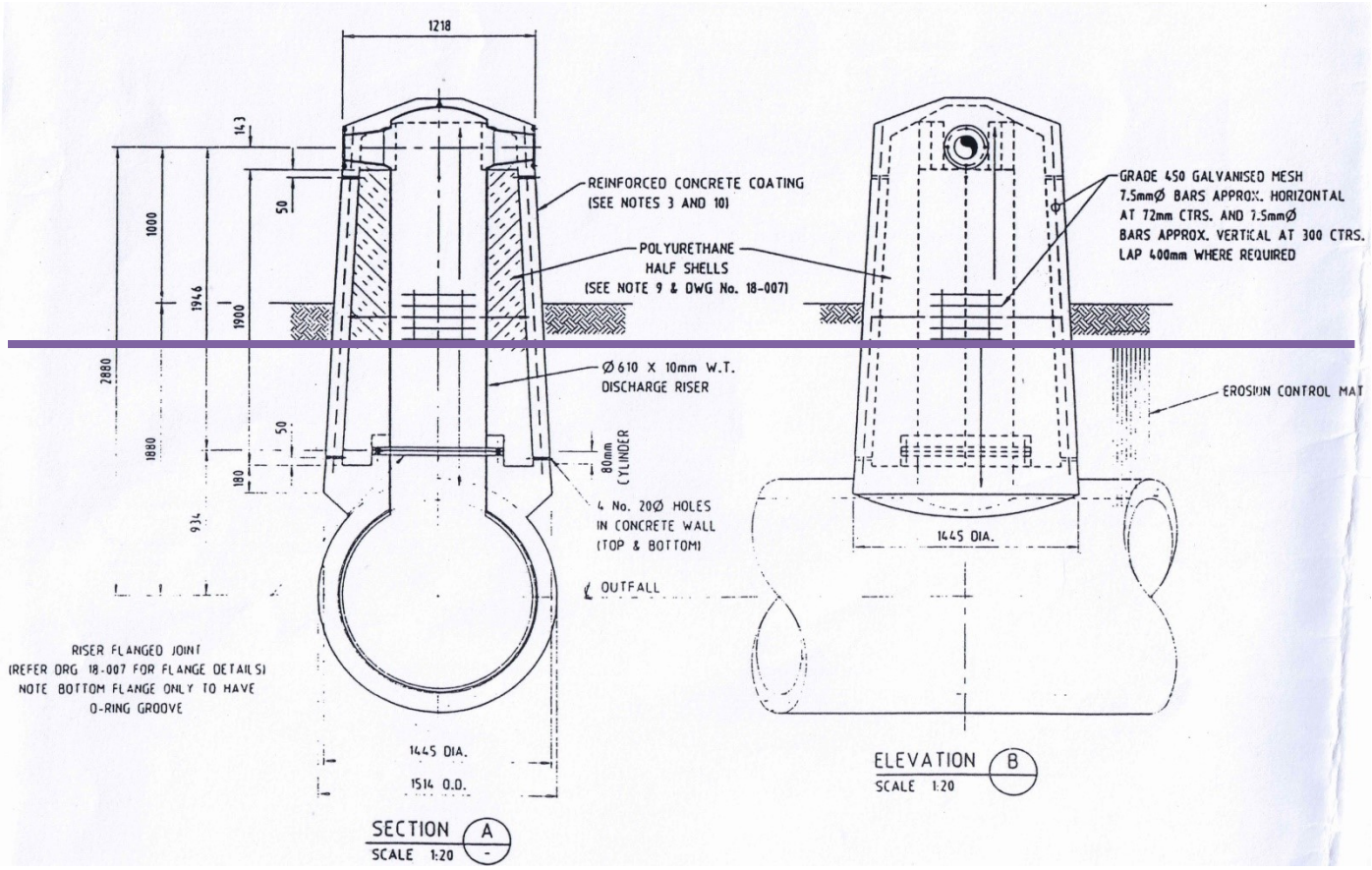


Figure 21: At diffusers where greatest scour depths were measured, examination was completed for any evidence of exposed erosion control mats; however no sighting of any such material was made

All 18 diffusers had their exposed heights measured from seabed. All heights ranged between 1.300 to 1.600 metres.



Maximum current scour depth / seafloor level

Figure 22: Diffuser detail

No evidence was observed of any damage or deterioration to any of the 18 diffuser assemblies. Seafloor deposits of rocks, course gravels and sand form undulating, peaks and depressions typically of +/- 400mm in west – east (shoreline) orientation around the diffuser positions.
During the 2018 inspection it was recognised that there was a lot larger sized rock exposed and less fine aggregates deposited around the vicinity of the diffusers than observed during previous inspections. However during the 2019 inspection much of the smaller stone and fine aggregate had returned. The 2020 observations remain very similar to that of the 2019 findings.

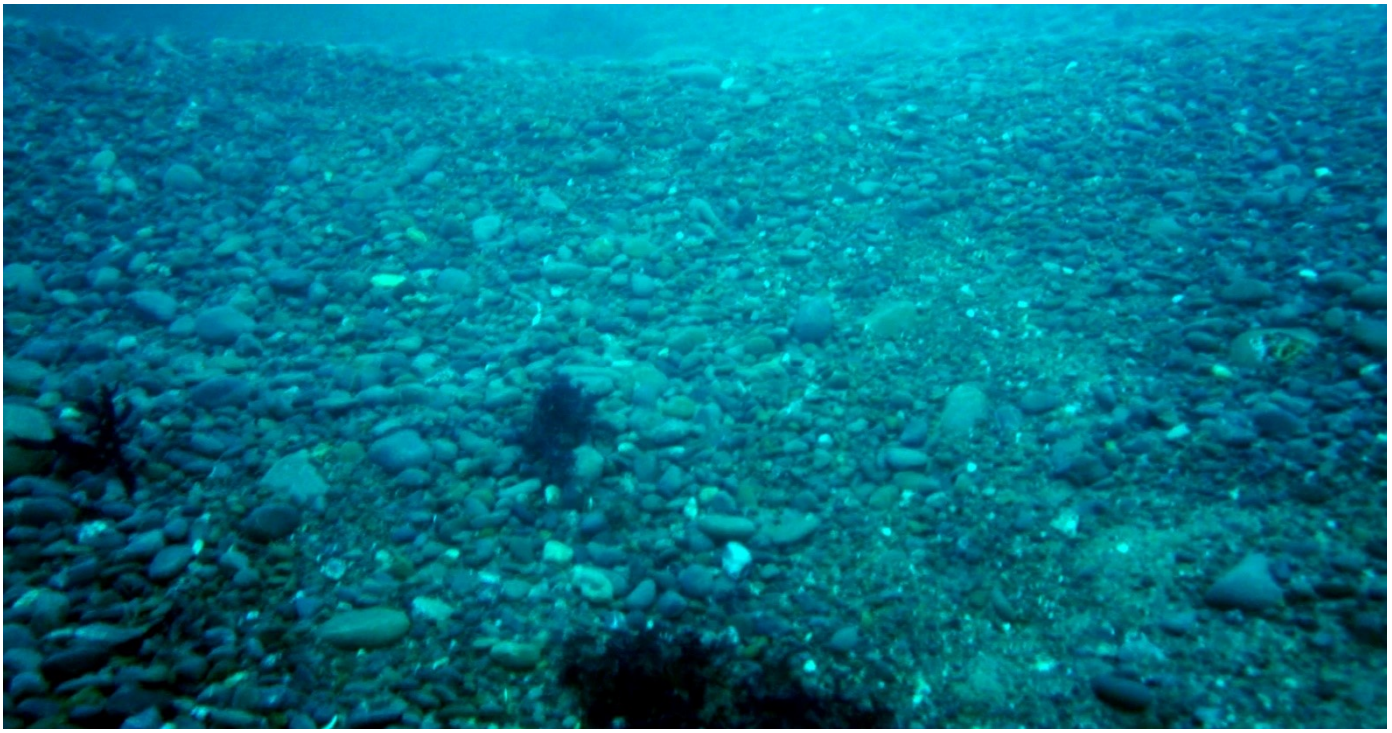


Figure 23: Typical scale of aggregate sizing observed around the Diffuser positions

Diffuser from seaward to shoreward	Diffuser Exposed Height out of Seabed		Open Ports	
	North face	South face	West	East
1	1.400 metre	1.500 metre	X	X
2	1.400 metre	1.500 metre	X	X
3	1.400 metre	1.400 metre	X	X
4	1.400 metre	1.450 metre	X	X
5	1.500 metre	1.500 metre	X	X
6	1.600 metre	1.600 metre	X	X
7	1.600 metre	1.600 metre	X	X
8	1.500 metre	1.550 metre	X	X
9	1.500 metre	1.550 metre		X
10	1.500 metre	1.550 metre	X	
11	1.500 metre	1.500 metre		X
12	1.500 metre	1.500 metre	X	
13	1.400 metre	1.400 metre		X
14	1.400 metre	1.400 metre	X	
15	1.400 metre	1.400 metre		X
16	1.300 metre	1.400 metre	X	
17	1.400 metre	1.400 metre		X
18	1.300 metre	1.350 metre	X	

Table 3: Exposed heights of diffusers (seabed scour around diffuser positions)
X Open diffuser ports

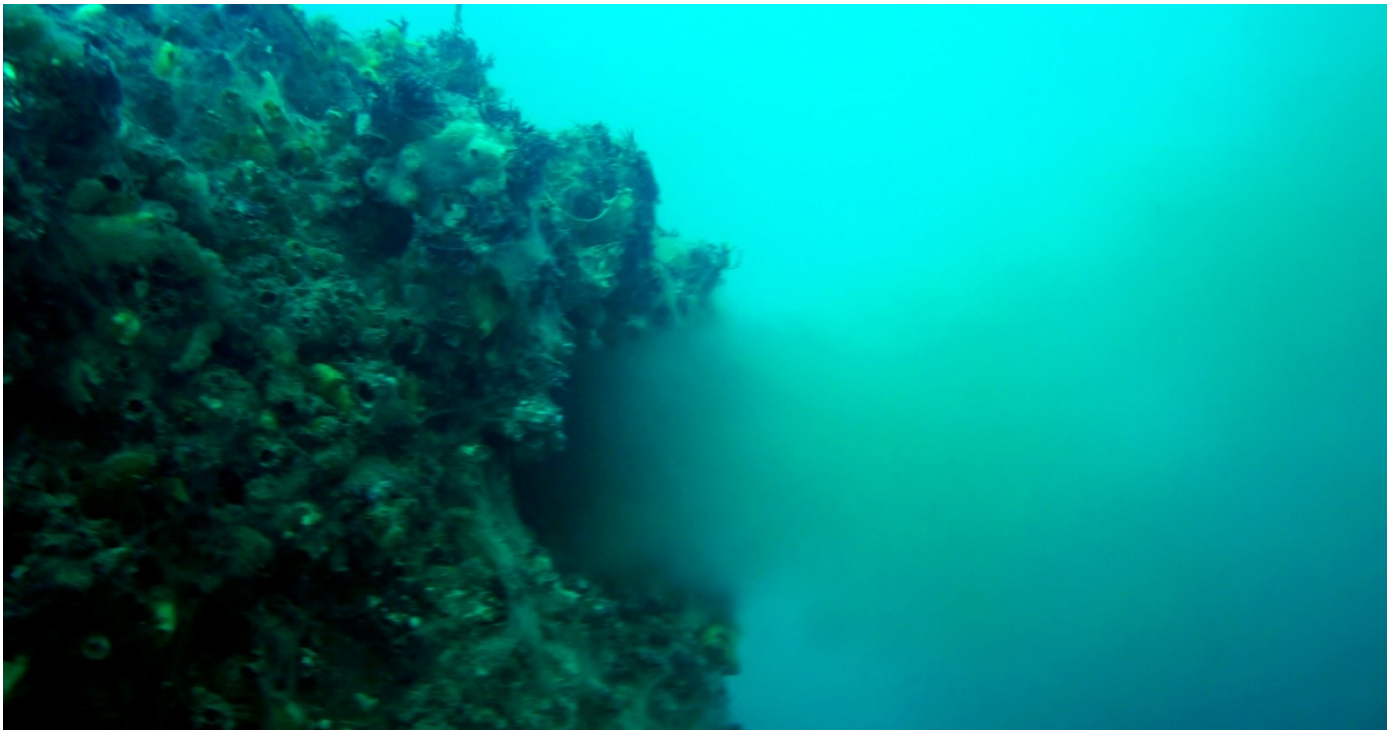


Figure 24: Typical flow discharge flume from a diffuser nozzle

Note: Video footage of Diffusers in Operation can be viewed in file: Diffuser Section 2020.
Due to swell and current conditions on the day; suspended particle in the water resulted in poor visibility conditions during the recording of this footage.

Diffuser Section Cathodic Potential Survey

To protect a steel structure or installation in seawater, a more active metal than the steel is selected from the galvanic series and placed in contact with the steel below water level.
Current flows as a result of the electrochemical difference, from the active metal, through the seawater, to the steel. Thus the active metal becomes anodic and corrodes, whilst the steel becomes cathodic and is protected; so that in fact the active metal corrodes in order to protect the steel.

The Cathodic Protection System on the Moa Point Wastewater Ocean Outfall Pipeline consists of 26 Zinc Alloy Sacrificial Anodes on the outfall pipeline, and 18 Zinc Alloy Sacrificial Anodes installed on the diffuser risers. The system has a minimum design life of 30 years.

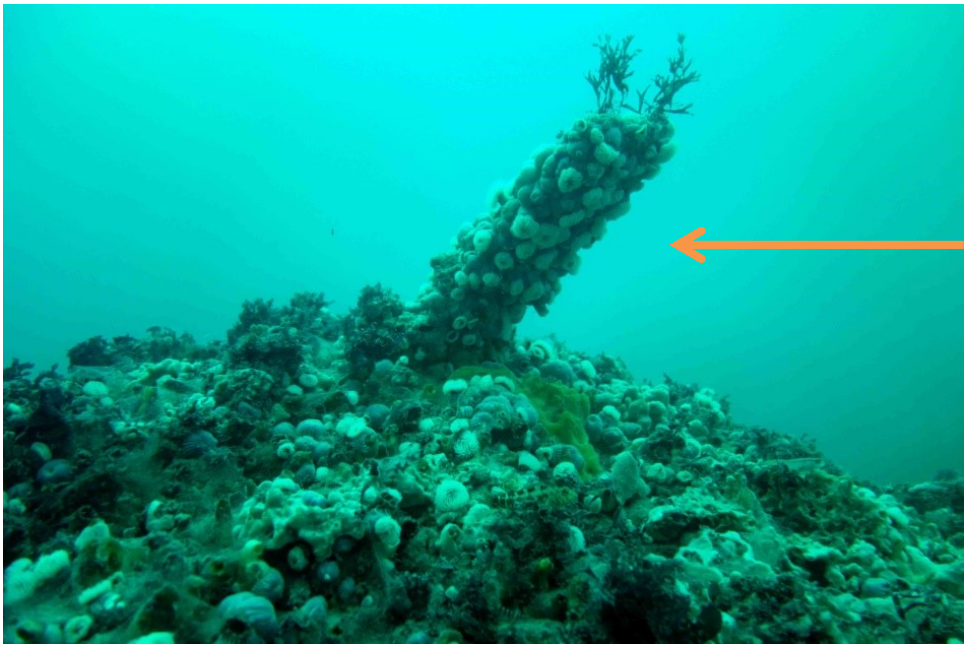


Figure 25:
Diffuser # 1 (seaward southern-most diffuser) – CP test point. Readings at this position provide evidence of electrical continuity through the diffuser section

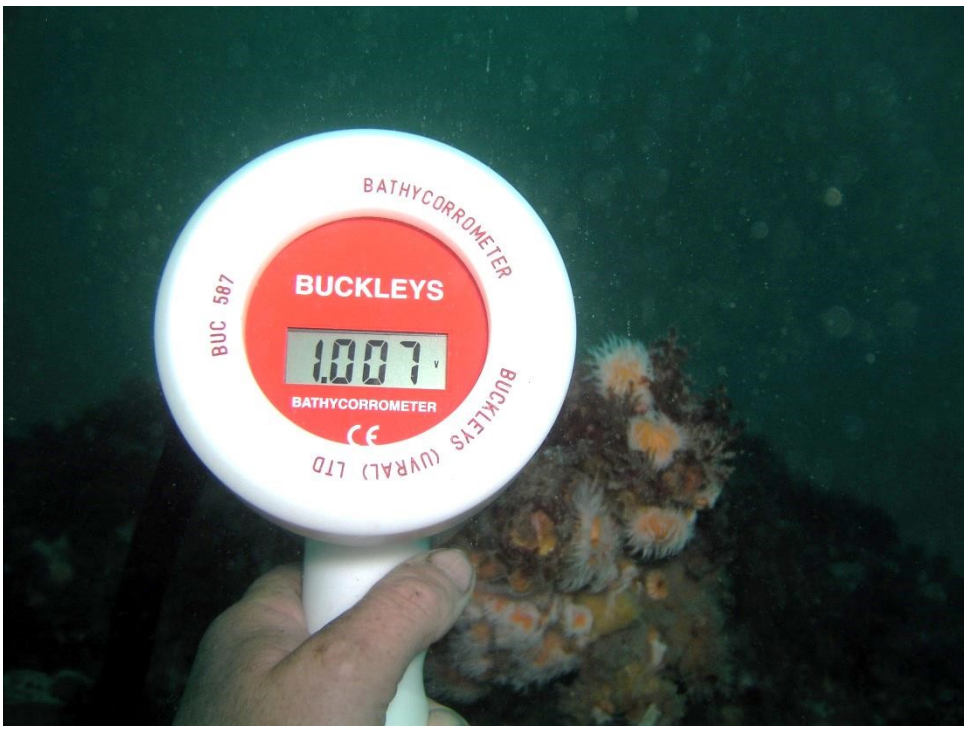


Figure 26: Cathodic Potential reading being recorded at Diffuser # 1 test position

Figure 27:
The steel diffuser nozzle outer flange is where the diver makes contact with the Bathycorrometer to obtain the Cathodic Potential values

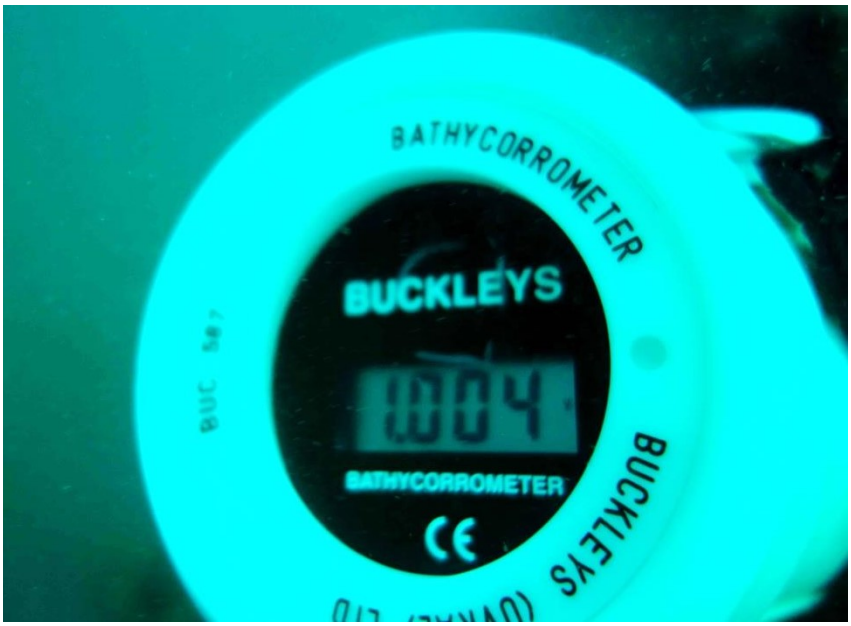


Figure 28: Taking CP reading at Diffuser # 3

Cathodic potential (CP) measurements are taken to monitor the effectiveness (need for anode replacement) of the cathodic protection system.
The main objective of corrosion prevention in structures is to provide enough anodes to keep the potential, or voltage, levels to less than – 800mV.
The function of a cathodic protection system is to provide enough potential to maintain an optimum level of protection through the entire structure.
It is emphasised that this level must be maintained at between –800mV to 1.050V.

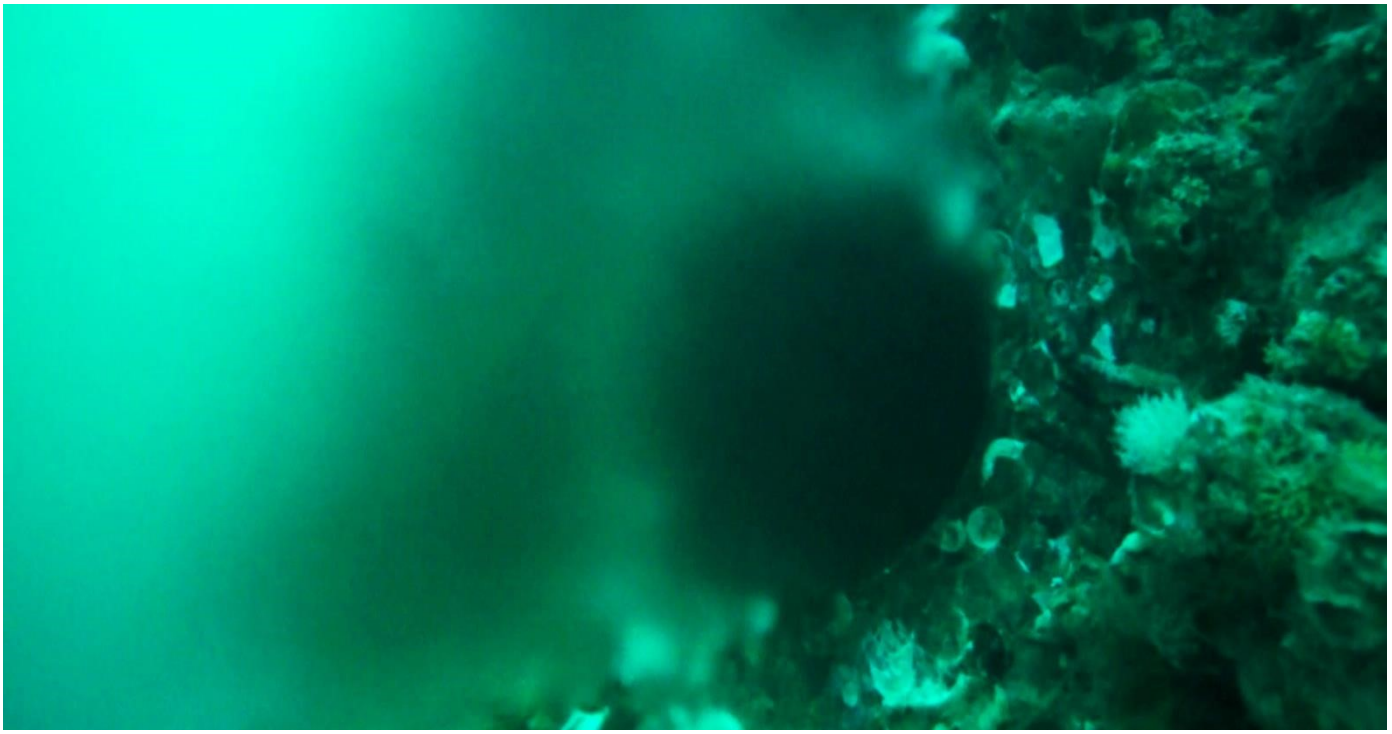
It's the Test Point at the top of Diffuser # 1 (position 'F') that provides the most accurate Cathodic Potential readings. Although representative readings are obtained at several diffuser outlet nozzles across the diffuser section; variations in water salinity at nozzle flange locations, and / or significant changes in water temperature can subsequently cause Potential differences.

Cathodic Potential (CP) Readings		
Zinc Calibration Test Block Reading		1.050V
C.P. test point	Diffuser # 1	1.007V
Discharge flange	Diffuser # 3 (east)	1.004V
Discharge flange	Diffuser # 5 (west)	1.002V
Discharge flange	Diffuser # 8 (east)	1.007V
Discharge flange	Diffuser # 10 (west)	1.013V
Discharge flange	Diffuser # 12 (west)	1.009V
Discharge flange	Diffuser # 14 (west)	1.011V
Discharge flange	Diffuser # 16 (west)	1.005V

Table 4: Cathodic Potential readings

All logged cathodic potential readings confirm that the sacrificial anode system in place is providing effective corrosion protection throughout the diffuser section of the pipeline structure.

Summary



In completing the tasks as detailed within the scope of work UCL personnel didn't observe any evidence of abnormal or aggressive wear, defect, damage, deterioration, or loss of function.

Appendix iii: Smoke Test Report

Veolia Water Australia
and New Zealand

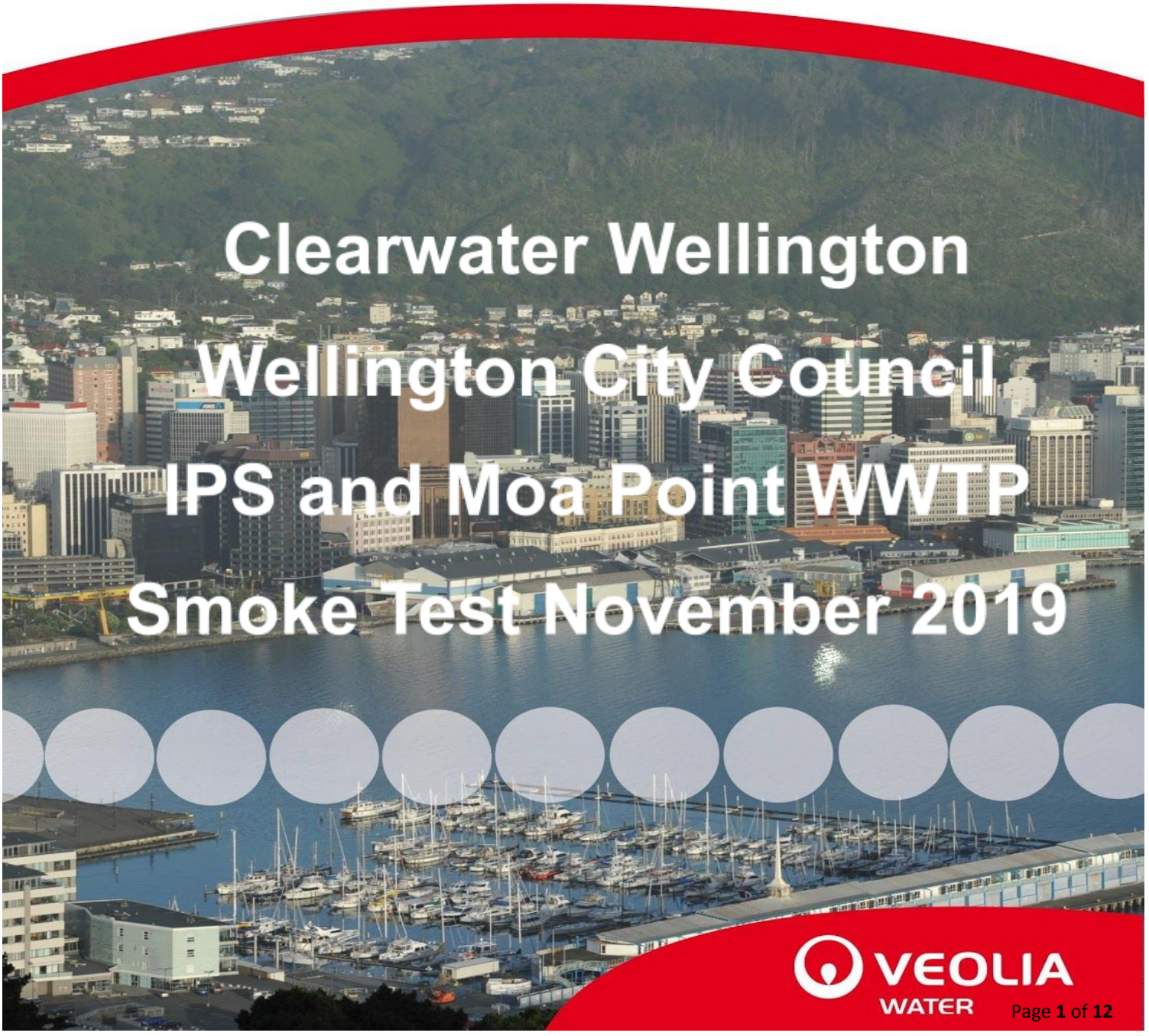
United Water International (Wellington) Ltd – T/A Veolia Water

Moa Point

PO Box 3253

Wellington

NEW ZEALAND



Clearwater Wellington

Wellington City Council

IPS and Moa Point WWTP

Smoke Test November 2019

Control Sheet

DOCUMENT TITLE: IPS and Moa Point Wastewater Plant Annual Smoke Test – November 2019

PREPARED BY Phil Love

REVIEWED BY: Rik Lawlor

AUTHORISED BY: Stuart Pearce

DOCUMENT CONTROL REGISTER

Version	Status	Date	Details of Revision
V1	Draft	November 2019	Draft
V2	Final	December 2019	Final report

Purpose

The purpose of this report is to comply with resource consent WGN080003 [26183] condition 10 (Monitoring).

The permit holder shall undertake smoke testing of the Moa Point wastewater treatment plant and ventilation system. The smoke tests are to be carried out on an annual basis between the months of August and November.

The results of the smoke test shall be submitted to the manager, environmental regulation, Wellington Regional Council within one month of the testing being carried out by the permit holder. A copy of the analysed results shall be provided to Community Liaison Group, if requested.

Summary

On 26 November 2019 the Inlet Pump Station (IPS) and Moa Point Wastewater Treatment Plant (Moa Point WwTP) smoke tests were performed by Phil Love (Team Leader) and Tich Mundra (Trade staff).

Smoke was generated and discharged into the IPS inlet sampler chamber, the Primary Tank area and Moving Bed Bio Reactors. The hatches and seals were visually checked and photographs were taken. There were no issues with the process or results.

Smoke Generator

Inlet pump station (IPS)

Scope

Establishing that odour causing compounds liberated from the inlet sewer to the pump station wet wells, are contained within the ventilation system and are not escaping directly into the atmosphere.

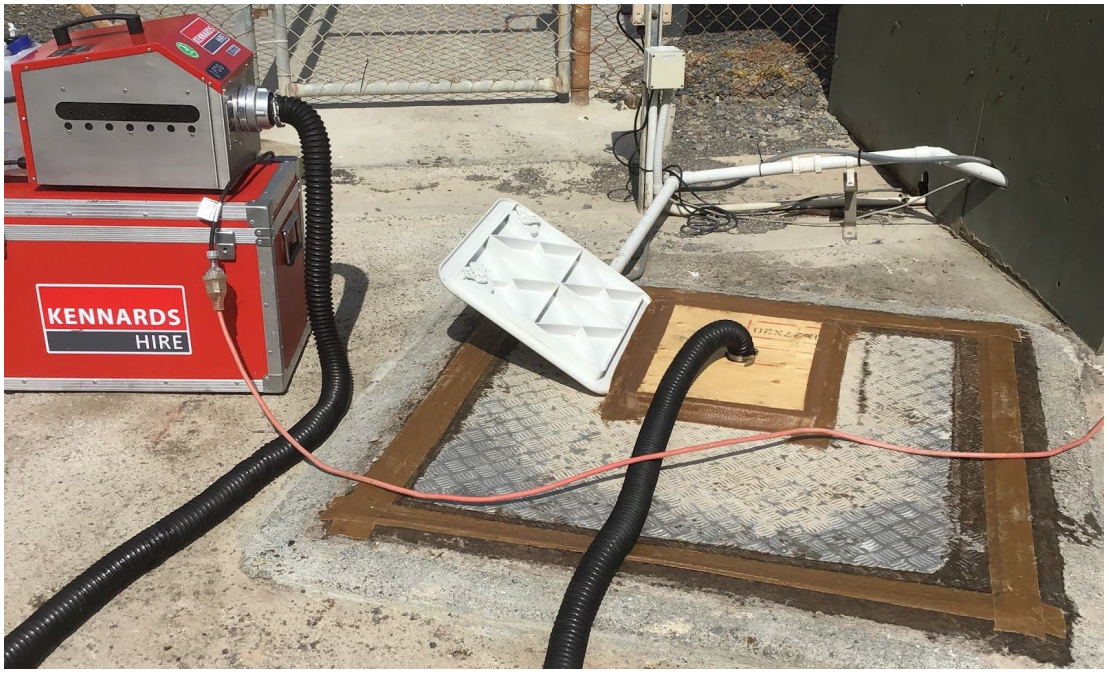
Background information

The inlet pump station processes odorous air through a three stage wet chemical scrubber before discharging to atmosphere.

In 2003 it was suggested that any possible source of odours emanating from the inlet sewer and the wet well of the pumping station could not be positively identified, and that a process to determine performance and eliminate leakage be carried out. Smoke testing was introduced to verify that negative pressure is maintained, throughout the IPS odour control system.

Smoke test setup

Location - Inlet Pumps Station (IPS).
Weather conditions – Dry with a variable Northerly wind averaging 4 Knots
Date of test – 26 November 2019
Plant operation – Pump #8 is out of service for maintenance, all other IPS pumps in normal operational condition. The odour ventilation system is operating in normal mode.



Smoke generator discharging into the inlet sampling chamber

Smoke inside sample hatch

Performance

The airtight cover over the main inlet channel into the IPS has an opening hatch to allow ready access for the plant operators, to the sample pickup tubes.

This hatch was fully opened and a temporary timber cover was sealed into place to allow for the smoke generator to inject smoke into the inlet system.

Smoke was discharged into the IPS inlet chamber, and after approximately 20 minutes visible smoke was noted coming out of the IPS stack and being carried south by the Northerly wind. The smoke machine was left operating for another 30 minutes after this to ensure complete saturation of the wet well chamber and ventilation system. During this time constant monitoring took place, and no smoke was seen to be escaping from any hatches.

Smoke discharging from the IPS stack

Once smoke saturation was confirmed by checking in the wet wells through the hatches, a visual inspection of all the various sealing faces took place, and any weathered sealing tape was replaced.

Sealing tape around hatches

IPS Pump Hatches

Seal around IPS Dry Well

IPS Dry Well

No indication of smoke could be detected escaping from around the hatch covers, hinged hatches and the wet and dry wells coverings. With no indication of smoke escaping, the smoke testing of the IPS site was brought to a close.

Smoke being drawn in by the vacuum inside the well once the temporary cover was removed.

Moa Point Primary tanks

Smoke testing of the primary tank roof integrity and the ventilation system was conducted on 26 November 2019 by Phil Love and Tich Mundra.

Smoke machine starting to saturate the Primary Tank area

Smoke starting to build up under Primary Tank Roof

The smoke generator was set up inside the Primary tank room, and as in previous years, relocated from time to time to ensure an even distribution of smoke throughout the room.

The actions of the foul air extraction system meant that the generator was mainly located towards the western end of the room, as the drift of the smoke towards the extract grills at the eastern wall evened out density of the cloud.

The smoke generator was run until sufficient smoke had accumulated to form a smoke cloud on the underside of the roof rafters. Then an inspection of the inlet works room and an external inspection of the roof was carried out and with no smoke leakage observed, no further action was taken.

Inlet Works

Smoke being drawn into the extract grills

Smoke discharging from Moa Point stack

Primary Tank Roof looking West

Moving Bed Bio Reactors (MBBR's) Tanks

Following the primary tank smoke test, the smoke generator was piped into the primary tank effluent sample point flooding the common feed channel and the downstream MBBR tanks with smoke.

Full smoke saturation was achieved with evidence noted through examination of the access hatch. Following full smoke saturation of the tank system an inspection of all sealing joints on the MBBR covers was conducted with no indication of smoke escaping, no remedial action was necessary, therefore the smoke test was brought to a finish.

During the testing of the Primary tanks and the MBBR tanks smoke was observed exiting from the Moa scrubber stack.

Smoke directed flooding channel to MBBR

Smoke saturation in MBBR Tank

MBBR covers

Appendix iv: Moa Point WWTP Complaints

Date	Investigation
23/01/2020	Duty Manager received an Odour complaint received at 13:40, strong smell of raw sewage in her garden and bedroom. Caller made it quite clear that she does not want anyone calling her, she did add that it should be better communicated the issue at the plant.
27/01/2020	Duty Manager received an Odour complaint received from at 11:23am, strong smell of raw sewage in her garden and bedroom. She requested that the complaint be recorded and be followed up on.
28/01/2020	Duty Manager received an Odour complaint via the 0800 Clearwater phone at 10:58am on 28/01/2020. Caller complained of sewage smell coming from the Moa Point Wastewater Treatment Plant, caller did not give a name or address.
23/02/2020	Duty Manager received a text alert from the call centre as follows; 2885296 Moa Point/Western Treatment Pl, Miramar Golf Club, South end of course. Strong smell of sewage coming from Moa Point Sewage plant at 4:18pm. SCADA systems checked and the plant was operating normally. Trucks were transporting sludge as per the procedure. Wellington Water informed.

25/02/2020	Comment from caller as follows: Hello and welcome to 2020. Another beautiful still summer night in Island Bay, windows open and would be enjoying the summer night air except for the sewerage smell that pervades the air. See previous email exchange below. The last email from which I've received no response to the solution ideas I suggested. Disappointed. Actions Taken: Have spoken to the Environmental Officer at GWRC who will follow up further with the resident. Came through via EMQ. Veolia comment: the notifiers location is approximately 300m North of the Sludge Transport route. Recorded for information purpose. Environmental Officer at GWRC who will follow up further with residents.

Appendix v: Discharge Event Letters

Wellington Water

31 July 2019

Manager, Consents Management
c/o Clare Baldwin
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Hugh,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	14/07/2019 11:35
End	-	14/07/2019 12:45
Duration	-	1 hour 10 minutes
Mean Bypass Flow	litres per second	59
Maximum Bypass Flow	litres per second	531
Treated Volume	cubic metres	126,642
Partially Treated Volume	cubic metres	249
Dilution Ratio	-	46:1

Table 1: Discharge Monitoring Parameters

Private Bag 39804, Wellington Mail Centre 5045
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt
+64 4 910 3800 www.wellingtonwater.co.nz

Our water, our future.

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Site	Enterococci	Faecal Coliforms
Day 1 – 15/07/2019	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	4	15
Dorrie Leslie Park – West End	4	4
Dorrie Leslie Park – South End	4	4
Hue te Taka	4	4
Hue te Taka Peninsula – Western Side	4	4
Tarakena Bay	4	4
Tarakena Bay – North End	4	4
49 Moa Road	23	4
Eastern End of Lyall Bay	56	4
Waitaha Cove – Southern End	4	4
Houghton Bay – Western Side	12	4
Island Bay – Marine Centre	8	16
Island Bay – Western End	4	4

Table 2: Coastal Samples (Day 1)

Site	Enterococci	Faecal Coliforms
Day 2 – 16/07/2019	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	3500	580
Dorrie Leslie Park – West End	4500	920
Dorrie Leslie Park – South End	35	4
Hue te Taka	4	4
Hue te Taka Peninsula – Western Side	84	8
Tarakena Bay	3900	1330
Tarakena Bay – North End	790	440
49 Moa Road	12	4
Eastern End of Lyall Bay	450	1330
Waitaha Cove – Southern End	32	4
Houghton Bay – Western Side	4	33
Island Bay – Marine Centre	32	12
Island Bay – Western End	1100	400

Table 3: Coastal Samples (Day 2)

Site	Enterococci	Faecal Coliforms
Day 3 – 17/07/2019	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	27	12
Dorrie Leslie Park – West End	24	20
Dorrie Leslie Park – South End	4	4
Hue te Taka	4	4
Hue te Taka Peninsula – Western Side	4	4
Tarakena Bay	42	46
Tarakena Bay – North End	27	52
49 Moa Road	4	4
Eastern End of Lyall Bay	27	80
Waitaha Cove – Southern End	4	4
Houghton Bay – Western Side	4	4
Island Bay – Marine Centre	4	4
Island Bay – Western End	4	4

Table 4: Coastal Samples (Day 3)

Condition 15 of Resource Consent WGN080003 [26181] requires samples of paua and/or kina at Hue Te Take Peninsula during and or immediately after the bypass discharge, these samples were not taken due to health and safety concerns.

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	10.1	10.6	11
$CBOD_5$	g/m^3	163	486	485
Faecal Coliforms	cfu/100mL	3,200,000	161,000	--
Oil and Grease	g/m^3	81	119	119
pH	--	7.1	6.7	--
Suspended Solids	g/m^3	344	1130	1128
Cadmium*	g/m^3	0.001	0.001	0.001
Chromium*	g/m^3	0.007	0.008	0.008
Copper*	g/m^3	0.062	0.304	0.304
Lead*	g/m^3	0.023	0.022	0.022
Nickel*	g/m^3	0.004	0.007	0.007
Zinc*	g/m^3	0.188	0.375	0.375

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Please note that some of the analytical values from the effluent discharge are higher than the bypass values. From an initial investigation it appears the effluent discharge sample may have been contaminated.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Wastewater Compliance Analyst

Wellington Water

22 November 2019

Manager, Consents Management
c/o Claire Baldwin
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Claire,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	11 November 2019
End	-	11 November 2019
Duration	-	9 hours 34 minutes
Mean Bypass Flow	litres per second	332
Maximum Bypass Flow	litres per second	1125
Treated Volume	cubic metres	92,134
Partially Treated Volume	cubic metres	11,440
Dilution Ratio	-	8:1

Table 1: Discharge Monitoring Parameters

Private Bag 39804, Wellington Mail Centre 5045
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt
+64 4 910 3800 www.wellingtonwater.co.nz

Our water, our future.

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Site	Faecal Coliforms	Enterococci
Day 1 – 11/11/2019	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	33	23
Dorrie Leslie Park – West End	12	4
Dorrie Leslie Park – South End	31	8
Hue te Taka	58	12
Hue te Taka Peninsula – Western Side	4	12
Tarakena Bay	370	240
Tarakena Bay – North End	38	24
49 Moa Road	4	16
Eastern End of Lyall Bay	88	36
Waitaha Cove – Southern End	80	42
Houghton Bay – Western Side	48	46
Island Bay – Marine Centre	480	460
Island Bay – Western End	170	160

Table 2: Coastal Samples (Day 1)

Site	Faecal Coliforms	Enterococci
Day 2 – 12/11/2019	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	4	4
Dorrie Leslie Park – West End	4	4
Dorrie Leslie Park – South End	8	4
Hue te Taka	28	15
Hue te Taka Peninsula – Western Side	4	4
Tarakena Bay	4	8
Tarakena Bay – North End	4	4
49 Moa Road	4	4
Eastern End of Lyall Bay	4	4
Waitaha Cove – Southern End	4	4
Houghton Bay – Western Side	4	4
Island Bay – Marine Centre	8	4
Island Bay – Western End	4	4

Table 3: Coastal Samples (Day 2)

Site	Faecal Coliforms	Enterococci
Day 3 -	**cfu/100mL**	**cfu/100mL**
Dorrie Leslie Park	8	4
Dorrie Leslie Park – West End	4	4
Dorrie Leslie Park – South End	4	8
Hue te Taka	12	4
Hue te Taka Peninsula – Western Side	4	4
Tarakena Bay	48	4
Tarakena Bay – North End	12	4
49 Moa Road	4	4
Eastern End of Lyall Bay	12	8
Waitaha Cove – Southern End	4	4
Houghton Bay – Western Side	8	8
Island Bay – Marine Centre	8	4
Island Bay – Western End	4	12

Table 4: Coastal Samples (Day 3)

Condition 15 of Resource Consent WGN080003 [26181] requires samples of paua and/or kina at Hue Te Take Peninsula during and or immediately after the bypass discharge, these samples were not taken due to health and safety concerns.

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	10.7	6.54	7
$CBOD_5$	g/m^3	73	11	18
Faecal Coliforms	cfu/100mL	1,020,000	90,900	193,521
Oil and Grease	g/m^3	21	4	6
pH	--	7.4	7.0	7.0
Suspended Solids	g/m^3	135	30	42
Cadmium*	g/m^3	0.001	0.001	0.001
Chromium*	g/m^3	0.004	0.003	0.003
Copper*	g/m^3	0.037	0.012	0.015
Lead*	g/m^3	0.012	0.005	0.006
Nickel*	g/m^3	0.003	0.002	0.002
Zinc*	g/m^3	0.129	0.054	0.062

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Wastewater Compliance Analyst

Wellington Water

15 April 2020

Manager, Consents Management
c/o Claire McKevitt
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Claire,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	29 March 2020
End	-	29 March 2020
Duration	-	2 hours 52 minutes
Mean Bypass Flow	litres per second	294
Maximum Bypass Flow	litres per second	834
Treated Volume	cubic metres	28,408
Partially Treated Volume	cubic metres	3,033
Dilution Ratio	-	9:1

Table 1: Discharge Monitoring Parameters

Private Bag 39804, Wellington Mail Centre 5045
Level 4, IBM House, 25 Victoria Street, Petone, Lower Hutt
+64 4 910 3800 www.wellingtonwater.co.nz

Our water, our future.

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Site	Faecal Coliforms	Enterococci
Day 1 – 30/03/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	1.6	1.6
Dorrie Leslie Park at Boat Ramp	1.6	8.2
Dorrie Leslie Park South Side	1.6	1.6
Dorrie Leslie Park West Side	4.9	1.6
Hougton Bay Westside	1.6	1.6
Hue te Taka Peninsula	1.6	1.6
Hue te Taka Peninsula West	3.3	3.3
Island Bay Marine Centre Eastside	3.3	23
Island Bay Westside	4600	280
Lyall Bay Beach Eastern Side	8.2	21
Peninsula at Queens Drive	6.6	18
Tarakena Bay Beach at Boat Ramp	6.6	4.9
Tarakena Bay Western Side	1200	680

Table 2: Coastal Samples (Day 1)

Site	Faecal Coliforms	Enterococci
Day 2 – 31/03/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	4.9	1.6
Dorrie Leslie Park at Boat Ramp	1.6	4.9
Dorrie Leslie Park South Side	1.6	11
Dorrie Leslie Park West Side	4.9	3.3
Hougton Bay Westside	4.9	8.2
Hue te Taka Peninsula	1.6	6.6
Hue te Taka Peninsula West	13	30
Island Bay Marine Centre Eastside	240	44
Island Bay Westside	48	48
Lyall Bay Beach Eastern Side	33	66
Peninsula at Queens Drive	11	60
Tarakena Bay Beach at Boat Ramp	8.2	6.6
Tarakena Bay Western Side	48	1.6

Table 3: Coastal Samples (Day 2)

Site	Faecal Coliforms	Enterococci
Day 3 – 01/04/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	1.7	1.7
Dorrie Leslie Park at Boat Ramp	1.7	12
Dorrie Leslie Park South Side	21000	5400
Dorrie Leslie Park West Side	3600	1200
Hougton Bay Westside	1.7	1.7
Hue te Taka Peninsula	1.7	3.3
Hue te Taka Peninsula West	5	1.7
Island Bay Marine Centre Eastside	70	35
Island Bay Westside	94	70
Lyall Bay Beach Eastern Side	12	84
Peninsula at Queens Drive	18	1.7
Tarakena Bay Beach at Boat Ramp	3.3	1.7
Tarakena Bay Western Side	1.7	1.7

Table 4: Coastal Samples (Day 3)

Condition 15 of Resource Consent WGN080003 [26181] requires samples of paua and/or kina at Hue Te Take Peninsula during and or immediately after the bypass discharge, these samples were not taken due to health and safety concerns.

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	11	9.3	9
$CBOD_5$	g/m^3	97	4.2	13
Faecal Coliforms	cfu/100mL	2,500,000	460	241,582
Oil and Grease	g/m^3	26	26	26
pH	--	1.7	1.6	1.6
Suspended Solids	g/m^3	210	20	38
Cadmium*	g/m^3	0.00093	0.005	0.005
Chromium*	g/m^3	0.0069	0.005	0.005
Copper*	g/m^3	0.051	0.0096	0.014
Lead*	g/m^3	0.023	0.001	0.003
Nickel*	g/m^3	0.005	0.0015	0.002
Zinc*	g/m^3	0.19	0.043	0.057

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Safety, Risk, and Compliance Officer

20 May 2020

Manager, Consents Management
c/o Claire McKevitt
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Claire,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	03/05/2020 18:34
End	-	03/05/2020 19:18
Duration	-	44min
Mean Bypass Flow	litres per second	50
Maximum Bypass Flow	litres per second	421
Treated Volume	cubic metres	1583
Partially Treated Volume	cubic metres	143
Dilution Ratio	-	11:1

Table 1: Discharge Monitoring Parameters

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Veolia Water Ltd.
A: 127 Stewart Duff Drive, Rongotai, Wellington, New Zealand, 6003
T: 0800-928-371 W: **www.veolia.com.au**

Site	Faecal Coliforms	Enterococci
Day 1 – 4/5/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	3.3	4.9
Dorrie Leslie Park at Boat Ramp	340	920
Dorrie Leslie Park South Side	20	110
Dorrie Leslie Park West Side	130	1400
Hougton Bay Westside	6.6	21
Hue te Taka Peninsula	4.9	50
Hue te Taka Peninsula West	4.9	40
Island Bay Marine Centre Eastside	1200	260
Island Bay Westside	16	94
Lyall Bay Beach Eastern Side	550	770
Peninsula at Queens Drive	630	2400
Tarakena Bay Beach at Boat Ramp	290	2700
Tarakena Bay Western Side	490	5000

Table 2: Coastal Samples (Day 1)

Site	Faecal Coliforms	Enterococci
Day 2 – 5/5/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	50	500
Dorrie Leslie Park at Boat Ramp	50	320
Dorrie Leslie Park South Side	23	510
Dorrie Leslie Park West Side	38	310
Hougton Bay Westside	82	84
Hue te Taka Peninsula	38	1700
Hue te Taka Peninsula West	390	480
Island Bay Marine Centre Eastside	290	230
Island Bay Westside	58	220
Lyall Bay Beach Eastern Side	46	180
Peninsula at Queens Drive	78	280
Tarakena Bay Beach at Boat Ramp	64	290
Tarakena Bay Western Side	120	390

Table 3: Coastal Samples (Day 2)

Site	Faecal Coliforms	Enterococci
Day 3 – 6/5/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	82	370
Dorrie Leslie Park at Boat Ramp	20	170
Dorrie Leslie Park South Side	66	480
Dorrie Leslie Park West Side	25	220
Hougton Bay Westside	26	38
Hue te Taka Peninsula	74	390
Hue te Taka Peninsula West	42	680
Island Bay Marine Centre Eastside	120	78
Island Bay Westside	23	78
Lyall Bay Beach Eastern Side	20	78
Peninsula at Queens Drive	18	82
Tarakena Bay Beach at Boat Ramp	30	320
Tarakena Bay Western Side	16	48

Table 4: Coastal Samples (Day 3)

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	18	6.7	8
$CBOD_5$	g/m^3	140	4.5	16
Faecal Coliforms	cfu/100mL	550000	180	45,733
Oil and Grease	g/m^3	21	5	6
pH	--	7.6	6.7	6.8
Suspended Solids	g/m^3	170	12	25
Cadmium*	g/m^3	0.0005	0.0005	0.001
Chromium*	g/m^3	0.005	0.005	0.005
Copper*	g/m^3	0.047	0.0036	0.007
Lead*	g/m^3	0.0079	0.001	0.002
Nickel*	g/m^3	0.001	0.001	0.001
Zinc*	g/m^3	0.09	0.023	0.029

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Safety, Risk, and Compliance Officer

29 June 2020

Manager, Consents Management
c/o Claire McKevitt
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Claire,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	04/06/2020 22:50
End	-	05/06/2020 00:33
Duration	-	1hr 43min
Mean Bypass Flow	litres per second	2937
Maximum Bypass Flow	litres per second	3535
Treated Volume	cubic metres	10681
Partially Treated Volume	cubic metres	368
Dilution Ratio	-	29:1

Table 1: Discharge Monitoring Parameters

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Veolia Water Ltd.
A: 127 Stewart Duff Drive, Rongotai, Wellington, New Zealand, 6003
T: 0800-928-371 W: **www.veolia.com.au**

Site	Faecal Coliforms	Enterococci
Day 1 – 5/6/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	1500	780
Dorrie Leslie Park at Boat Ramp	48	48000
Dorrie Leslie Park South Side	40	13
Dorrie Leslie Park West Side	38	1700
Hougton Bay Westside	1100	480
Hue te Taka Peninsula	56	13
Hue te Taka Peninsula West	78	62
Island Bay Marine Centre Eastside	1700	740
Island Bay Westside	56	160
Lyall Bay Beach Eastern Side	78	48
Peninsula at Queens Drive	72	4400
Tarakena Bay Beach at Boat Ramp	68	3400
Tarakena Bay Western Side	82	2600

Table 2: Coastal Samples (Day 1)

Site	Faecal Coliforms	Enterococci
Day 2 – 6/6/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	70	9.1
Dorrie Leslie Park at Boat Ramp	60	15
Dorrie Leslie Park South Side	48	13
Dorrie Leslie Park West Side	9.1	11
Hougton Bay Westside	36	1.8
Hue te Taka Peninsula	29	24
Hue te Taka Peninsula West	18	18
Island Bay Marine Centre Eastside	33	35
Island Bay Westside	29	18
Lyall Bay Beach Eastern Side	11	25
Peninsula at Queens Drive	35	24
Tarakena Bay Beach at Boat Ramp	38	11
Tarakena Bay Western Side	48	3.6

Table 3: Coastal Samples (Day 2)

Site	Faecal Coliforms	Enterococci
Day 3 – 7/6/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	92	140
Dorrie Leslie Park at Boat Ramp	40	5.5
Dorrie Leslie Park South Side	33	40
Dorrie Leslie Park West Side	5.5	5.5
Hougton Bay Westside	13	21
Hue te Taka Peninsula	1.8	20
Hue te Taka Peninsula West	1200	1100
Island Bay Marine Centre Eastside	1.6	8.2
Island Bay Westside	210	20
Lyall Bay Beach Eastern Side	36	5.5
Peninsula at Queens Drive	260	38
Tarakena Bay Beach at Boat Ramp	58	8.2
Tarakena Bay Western Side	66	24

Table 4: Coastal Samples (Day 3)

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	10	2.2	2
$CBOD_5$	g/m^3	60	2.7	5
Faecal Coliforms	cfu/100mL	1600000	20	53,309
Oil and Grease	g/m^3	13	9.6	10
pH	--	7.3	6.7	6.7
Suspended Solids	g/m^3	92	8	11
Cadmium*	g/m^3	0.0005	0.005	0.005
Chromium*	g/m^3	0.005	0.005	0.005
Copper*	g/m^3	0.019	0.0032	0.004
Lead*	g/m^3	0.0057	0.001	0.001
Nickel*	g/m^3	0.015	0.001	0.001
Zinc*	g/m^3	0.25	0.025	0.032

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Safety, Risk, and Compliance Officer

8 July 2020

Manager, Consents Management
c/o Claire McKevitt
Greater Wellington Regional Council
PO Box 11646
WELLINGTON

Dear Claire,

Overflow Discharge from the Moa Point Treatment Plant

Condition 8 of Resource Consent WGN080003 [35407] states that notification is required to update Manger, Environmental Regulation, Wellington Regional Council about any overflow discharges. This letter serves as notification of the recent consented overflow discharge from the Moa Point Treatment Plant. The discharge was due to the heavy rainfall.

The following is a summary of the parameters monitored during the overflow discharge:

Parameter	Units	Result
Start	-	18/6/2020 08:57
End	-	19/6/2020 12:47
Duration	-	27:50
Mean Bypass Flow	litres per second	197
Maximum Bypass Flow	litres per second	928
Treated Volume	cubic metres	213,757
Partially Treated Volume	cubic metres	19,724
Dilution Ratio	-	11:1

Table 1: Discharge Monitoring Parameters

Condition 10 of Resource Consent WGN080003 [35674] requires grabs samples one, two, and three days after the discharge from three (3) coastal water locations and analysed for faecal coliforms and enterococci.

The following are the analytical results from the sample:

Veolia Water Ltd.
A: 127 Stewart Duff Drive, Rongotai, Wellington, New Zealand, 6003
T: 0800-928-371 W: **www.veolia.com.au**

Site	Enterococci	Faecal Coliforms
Day 1 – 19/06/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	46	74
Dorrie Leslie Park at Boat Ramp	25	46
Dorrie Leslie Park South Side	36	44
Dorrie Leslie Park West Side	50	56
Hougton Bay Westside	42	42
Hue te Taka Peninsula	44	94
Hue te Taka Peninsula West	40	100
Island Bay Marine Centre Eastside	1000	5500
Island Bay Westside	1300	6300
Lyall Bay Beach Eastern Side	58	60
Peninsula at Queens Drive	78	78
Tarakena Bay Beach at Boat Ramp	42	48
Tarakena Bay Western Side	52	36

Table 2: Coastal Samples (Day 1)

Site	Enterococci	Faecal Coliforms
Day 2 – 20/06/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	38	7.3
Dorrie Leslie Park at Boat Ramp	440	18
Dorrie Leslie Park South Side	15	7.3
Dorrie Leslie Park West Side	36	40
Hougton Bay Westside	520	20
Hue te Taka Peninsula	74	84
Hue te Taka Peninsula West	31	130
Island Bay Marine Centre Eastside	380	320
Island Bay Westside	800	25
Lyall Bay Beach Eastern Side	13	15
Peninsula at Queens Drive	52	64
Tarakena Bay Beach at Boat Ramp	20	24
Tarakena Bay Western Side	15	16

Table 3: Coastal Samples (Day 2)

Site	Enterococci	Faecal Coliforms
Day 3 – 21/6/2020	**cfu/100mL**	**cfu/100mL**
49 Moa Point Rd	42	1.8
Dorrie Leslie Park at Boat Ramp	29	9.1
Dorrie Leslie Park South Side	7.3	7.3
Dorrie Leslie Park West Side	20	7.3
Hougton Bay Westside	140	1600
Hue te Taka Peninsula	5.5	18
Hue te Taka Peninsula West	7.3	9.1
Island Bay Marine Centre Eastside	7.3	16
Island Bay Westside	9.1	5.5
Lyall Bay Beach Eastern Side	88	1800
Peninsula at Queens Drive	9.1	18
Tarakena Bay Beach at Boat Ramp	5.5	18
Tarakena Bay Western Side	9.1	9.1

Table 4: Coastal Samples (Day 3)

Condition 16 requires extra samples be taken from the bypass discharge and the secondary treated wastewater during the first two (2) hours of a bypass event occurring during normal working hours or as soon as practicable.

The following table outlines the results:

Analytical Parameter	Units	Bypass Discharge	Effluent Discharge	Cmixed
Ammonia Nitrogen	g/m^3	6.5	7.9	8
$CBOD_5$	g/m^3	60	17	21
Faecal Coliforms	cfu/100mL	2000000	8200	176,463
Oil and Grease	g/m^3	20	17	17
pH	--	6.5	6.6	6.6
Suspended Solids	g/m^3	150	54	62
Cadmium*	g/m^3	0.00011	0.000061	0.000
Chromium*	g/m^3	0.0047	0.0035	0.004
Copper*	g/m^3	0.037	0.024	0.025
Lead*	g/m^3	0.0089	0.0059	0.006
Nickel*	g/m^3	0.0025	0.0021	0.002
Zinc*	g/m^3	6.5	0.089	0.631

Table 5: Bypass and Effluent Discharge Samples

*Note: These indicator contaminants are only analysed for at least one (1) bypass event each year.

Condition 17 of Resource Consent WGN080003 [35674] has been satisfied and is no longer exercised.

If there are any questions please feel free to contact me.

Regards,

Edward Yong
Safety, Risk, and Compliance Officer

Appendix vi: Inflow and Infiltration Report

Condition (13)

The annual report required by condition 19 of this permit shall detail what steps have been taken in the reporting year and what steps are proposed to be undertaken in the future to reduce infiltration and stormwater ingress into the Wellington City sewerage network.

This information shall include, but not be limited to, the following information:

a) Details on the adoption of a policy to identify, and to repair or replace, defective private sewer drains in the Wellington City catchment. If such a policy is adopted, detail on its implementation made within the previous year
b) Details of additional works that have been undertaken and what these works are expected to achieve
c) An indication of when any on-going works will be completed
d) Details of any investigations undertaken with regard to inflow and infiltration in the Wellington City catchment
e) Details of any works or investigations planned for the next financial year

Inflow and Infiltration Report

A variety of mitigation measures have been undertaken to reduce inflow and infiltration (I/I) and to contain wastewater within the reticulated wastewater network. This work aims to reduce the demand on the Moa Point WWTP to also improve waterway health. Sections a,b,c,d and e of Condition 13 are addressed below for the various activities or work programs relating to inflow and infiltration.

Section (a)

There have been no changes to the Wellington City Council Policy on Lateral Repairs in 2019-2020. Detection of faulty laterals are identified through ongoing operations and maintenance work and are then repaired or replaced as required.

Section (b), (c), (d) and (e)

The following work programs and activities are described below and provide information relating to Section (b) to (e).

Inflow Surveys

Inflow Surveys have been undertaken in 2019-2020 in the Moa Point Catchment and are due for completion in 2020-2021. The catchments where inflow survey work is in progress and planned to be completed this coming financial year include;

- Karori North/Northland
- Kingsbridge/Newlands

For both the Kingsbridge and Karori North Catchments, the initial fault inspection has been completed and private faults will be followed up through engaging with the property owners and subsequent inspections to confirm repairs are undertaken. The public faults identified from the inflow surveys are also being addressed. These faults included manhole repairs and suspected public faults requiring further investigation to determine if maintenance or repairs are required. A consultant specialising in Inflow and Infiltration Management was also engaged to support regional strategic work in 2019-2020 and is continuing some work in 2020-2021.

Flow Monitoring and Rain Gauge Monitoring

There are currently 18 wastewater flow and 34 overflow monitoring sites within the Moa Point WWTP Catchment. These overflow monitoring sites are part of the long term monitoring contract which will end in June 2021 and therefore reassessment of priority monitoring sites will be carried out to determine whether monitoring these sites will continue or change after June 2021.

In addition to the above flow meters, there are 11 magnetic flow meters at wastewater pumps stations (PS23, PS24, PS10, PS14, PS15, PS17, PS18, PS22, PS39, PS45, and PS46).

There are currently six rain gauges monitoring stations in the Moa Point catchment. Wellington Water utilises this data to assist in a variety of ways such as aligning with flow monitoring data to understand impact of inflow and infiltration for various rain events. The rain gauges sites are listed below;

- Miramar at Miramar Bowling Club
- Berhampore at Nusery
- Newtown at Mansfield Street
- Hataitai at Old Post Office
- Wellington at Te Papa
- Khandallah at Library

Wastewater Modelling

The Moa Point WWTP Catchment has four wastewater network models including; Evans Bay, Island Bay, CBD Model and Western hills model. Recently work has been carried out to integrate all models into the one model to reflect the entire Moa Point WWTP Catchment.

CCTV Inspections

There has been no planned CCTV works undertaken in the Wellington City Council area in 2019-2020. In 2020-2021 there are plans to reorganise the contract and to proceed with some planned CCTV work. At this stage it has not yet been determined which areas of WCC will be have CCTV completed in 2020-2021.

Stormwater and Wastewater Capital Projects

Table 1 below provides a summary of capital projects for wastewater (reticulation and trunk network) and stormwater assets that were undertaken in 2019-2020 or scheduled for 2020-2021. Ongoing operational work such as investigations and reactive maintenance and renewals are also carried out in addition to the planned work listed below. Some projects in the table below are noted in both columns as the project is delivered over multiple years.

Table 1 - Capital Planned Works for Stormwater and Wastewater in the Moa Point WWTP Catchment

Activity	2019/2020	2020/2021
Stormwater	• Lifting Stormwater Manholes • Tukanae Reserve SW & Slip Rehab • Plymouth Rd (8) – SW Renewals • Manholes Cover Improvements • Kent Tce (54 – Buckle St) SW Culvert Renewal and Strengthening (with WW) • Shirley St(37-39) - Hurman St • Stirling St (10-14) to Adelaide • Wallace Street Corridor Stormwater Network Renewal (6 Rolleston St - 36 Wallace St)	• 9 Queen St Mt Vic SW Renewal • Woodman Drive (55-59) Flood Mitigation • Agra Crescent (5-10A) SW Renewal • Kent Tce (54 – Buckle St) SW Culvert Renewal and Strengthening (with WW) • Shirley St(37-39) - Hurman St • Stirling St (10-14) to Adelaide • Wallace Street Corridor Stormwater Network Renewal (6 Rolleston St - 36 Wallace St)
Wastewater	• Interceptor Rehabilitation upstream of Moa Point WWTP • Buller Street (27) - Vivian Sreet (175) Wastewater Renewal • Crawford Thames and Mortimer Roads Wastewater Renewal • Kent Tce (69-83) Sewer Renewal and Associated Works (with SW) • Melbourne Road (127) • Severn St (61–83) Wastewater Renewal - Portion 1 (Conventional) • Severn Street Wastewater Renewal - Portion 2 (CIPP) • Wallace Street Corridor Wastewater Renewals (from Carrington St - Finlay Tce)	• Broadway and Cavendish Square Wastewater Renewals - Stage 2 • (PCR) Mortimer Terrace Stage 3 (Relining) • (PCR) Queen Street (9) Wastewater Renewal (with SW) • Elphinstone Ave (5-22) - Tannadyce St (5) Wastewater Renewal • McColl Street (22) - Mills Road (18-42) with Whaui Street (to 19), Mana Street (to 28) and Fortunatus Street Wastewater Renewal • Whitmore Street (17) - Bowen Street (38) Rising Main Renewal