

Greater Wellington Regional Council
Wellington Office
100 Cuba Street
Te Aro, Wellington 6011
PO Box 11646
Manners Street, Wellington 6142

Attn: [REDACTED], Senior Resource Advisor, Greater Wellington Regional Council

10/05/2024

Dear [REDACTED]

Subject: Discolouration to the coastal marine area around Rukutane Point on 6th, 7th, and 12th of April 2024

Attached to this letter are the investigation reports that Veolia undertook for the discharge incidents which have caused the UVT values to drop below the consent threshold of 45% hourly average and have caused discoloration to the coastal marine area.

We would like to provide you a copy of the reports to ensure transparency regarding these incidents.

Please find Wellington Water's point of view regarding these incidents:

Cause of the incident:

Based on the outcome of the investigation reports and our own experience and knowledge, Wellington Water believes that:

- the discoloration to the coastal marine area around Rukutane Point on 6th April can be considered a sludge carryover incident as defined by the plant's consent and was supported by high TSS result on that day which is 69 g/m³.
- the discoloration to the coastal marine area around Rukutane Point on the 7th and 12th April are cases of high suspended solids content of the effluent discharge for a short period of time but has been mitigated before it could result in a sludge carry over. Furthermore, the daily effluent TSS results for 7th and 12th April were 6 and 7 g/m³ respectively and were compliant with the consent limits which was unlikely if a sludge carryover has occurred.
- There are other dates (1st, 3rd, 4th, 5th, 9th, 13th April 2024) recorded that the UVT dropped as mentioned in Veolia's report which have been caused by high suspended solids in the treated wastewater however discoloration in the coastal marine area cannot be confirmed.

These incidents caused the UVT hourly values to drop below the 45% hourly average threshold as required by the plant's consent.

The causes of these incidents are:

- high solids inventory (MLSS) in the system
- imbalance in flow distribution between the clarifiers as shown by difference in levels of the sludge blanket across the three clarifiers.

As mentioned in the March 2024 incident report, the plant was unable to maintain optimal MLSS level due to sludge dewatering system failures which have caused the solids to build up in the system over the last few months.

Balancing of flow distribution between the clarifiers are affected by the changes made by the operations team in the treatment plant.

Wellington Water would like to reiterate that the plant should be able to treat the maximum flow of up to 1,550 L/s provided that optimum MLSS levels (3,000 to 3,500 mg/L) are maintained and the sludge settling characteristics are within design parameters.

Effect to the receiving environment:

As noted earlier, there were discoloration observed on the coastal marine area on 6th, 7th, 12th April.

The discharges were not reported to emit any objectionable odour.

The shoreline results show that the effect to the receiving environment seems to be minor and the monitored parameters returned to normal levels after a few days that the discharge had ceased.

Update on the proposed Mitigating Measures:

As mentioned in the March 2024 report, we are still progressing with the short-term mitigating measures identified to mitigate the risk of sludge carry over. These mitigating measures involve maximising the dewatered sludge disposal of the treatment plant within the landfill's operating window, optimising the sludge handling operations, establishing a specialist maintenance service level agreement with a contractor, and assessing the critical spares availability of the sludge handling system. Medium term mitigating measures is also being investigated which may include an installation of an additional sludge dewatering system.

With the ongoing implementation of the identified mitigating measures, the MLSS levels in the treatment plant are steadily dropping and currently being actively monitored.

Yours sincerely,



Senior Asset and Operations Advisor, Wellington Water



Incident Investigation Report:
UV Transmissivity reduction below the compliance limit
45% (12/04/24 and 13/04/2024)

CONTROL SHEET

Document Title:	Investigation report - UV Transmissivity values reduction below the compliance limit 45% for 12/04/2024 and 13/04/2024
Prepared by:	██████████
Reviewed by:	██████████
Authorised by:	██████████

DOCUMENT CONTROL

Version	Status	Date	Details of Revision
0	Draft	26/04/2024	Draft for review.
1	Final	30/04/2024	Final version sent to WWL.

Internal Distribution	Company	Position	Email	Distribution
██████████	Veolia	Regional Manager (Wellington)	██████████	Internal
██████████	Veolia	Operations Manager (Wellington)	██████████	Internal
██████████	Veolia	Process Engineer	██████████	Internal
██████████	Veolia	Operations Coordinator (Northern)	██████████	Internal
██████████	Veolia	Northern Team Leader	██████████	Internal
██████████	WWL	Head of Wastewater Contracts	██████████	External
██████████	WWL	Senior Wastewater Operations and Assets Advisor	██████████	External

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INCIDENT DETAILS

Date	12/04/2024 and 13/04/2024
Location	Porirua WWTP
Description	On 12th and 13th April 2024, UV Transmissivity (UVT) values in the final effluent dropped below the limit of 45 % defined by condition 12D of Resource Consent WGN200229.
Cause	High Rainfall in the catchment area on the 12th and 13th April led to increased influent flows through the plant. Because of the reduced dewatering ability of the plant, higher than optimum levels of solids were accumulated in the treatment system. Combination of these two factors resulted in overloading of secondary clarifiers and poor effluent quality.
Actions	12th and 13th April Standard operating procedure was followed as a preparation for the increased inlet flows and during the period of high flows as well. This includes adjustments of the clarifiers inlet valves with an aim to balance the solids distribution between the clarifiers and to avoid their overloading.
Impacts	Reduction of the UVT values in the final effluent below the limit defined by the Resource consent (45%). Visible discolouration outside of the 200 metres radius from the outfall (12th April). No discolouration was observed on 13th April.

TIMELINE

The following is a list of events and when they occurred:

11/04/2024	
17:00	Heavy rain in the catchment area
12/04/2024	
Changes made throughout the day	Inlet penstocks for clarifiers 1 & 2 set to 45%
	Inlet penstocks for clarifiers 1 & 2 set to 35%
	Inlet penstocks for clarifiers 1 & 2s set to 30%
	Inlet penstocks for clarifiers 1 & 2 set to 25%
	4 out of 6 gates to clarifier 3 were closed
15:25	% UVT decreased to below 45%
13/04/2024	
00:50	%UVT increased above 45%
08:00	Shoreline Monitoring initiated
08:30	Inlet penstocks for clarifiers 1 & 2 set to 45%
13:40	Inlet penstocks for clarifiers 1 & 2 set to 35%
17:05	% UVT decreased to below 45%
17:15	Inlet penstocks for clarifiers 1 & 2 set to 30%
17:30	Inlet penstocks for clarifiers 1 & 2 set to 25%
	4 out of 6 gates to clarifier 3 were closed
23:20	%UVT increased above 45%
14/04/2024	
08:00	Shoreline monitoring initiated

PROCESS/QUALITY CONTROLS

Following parameters were analysed to investigate the root cause of the low UVT values.

UV transmissivity and Suspended Solids concentration

Figure 1 shows the period for %UVT decreases on the 12th and 13th of April. The %UVT values were reduced to below 45% on 12th of April between 15:25 and 00:50 am and on 13th April between 17:05 to 23:20 pm.

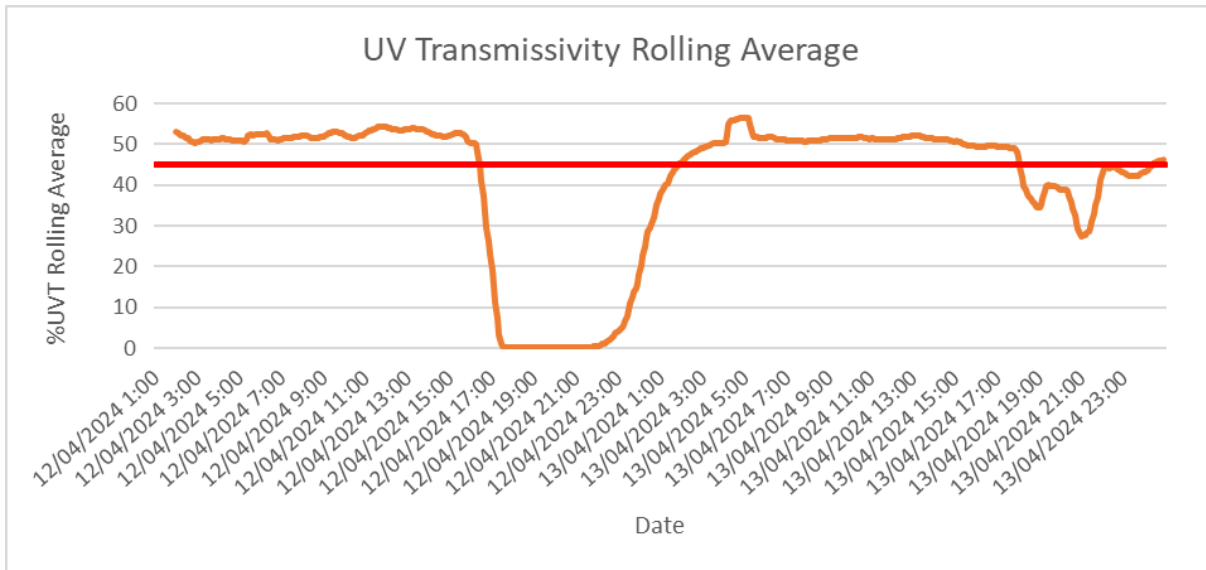


Figure 1: %UVT Rolling Average

% UV transmissivity is a real-time indicator of poor effluent quality due to the increased total suspended solids.

Even though the low UVT values indicate increased concentration of suspended solids in the effluent, the results for 12 and 13 April show values below the compliant limits. Table 1 shows daily values as well as calculated values for 90-day Geometric mean and 90-day 90th Percentile. Based on these numbers, the effluent remained compliant.

Date	TSS (g/m3) - final effluent*	90-day Geometric mean	90-day 90th Percentile
12/04/2024	6	9	96
13/04/2024	6	9	96
Limit	N/A	30	90

Table 1: Total Suspended Solids Results (flow-proportional 24hr composite- final effluent)

Inlet flows

Table 2 shows the average and peak flows during 12th and 14th April.

Date	Average Inflow (L/s)	Peak Flow (L/s)	Total Volume (m3)
11/04/2024	287	793	24822
12/04/2024	702	1179	60661
13/04/2024	489	1203	42275
14/04/2024	309	803	26735

Table 2: Daily Influent Flows

Peak flows from April 12th and 14th show values around the maximum hydraulic capacity of the plant indicating significant hydraulic loading.

Mixed Liquor Suspended Solids (MLSS)

To keep good effluent quality during high flows events, it is required to maintain MLSS concentration (biomass volume) in an optimum range to reduce the risk of sludge blanket increase with subsequent solids carry-over.

Due to a number of breakdowns of the dewatering system, the MLSS is higher than optimal value (3500 mg/L). See the MLSS values in Figure 2.

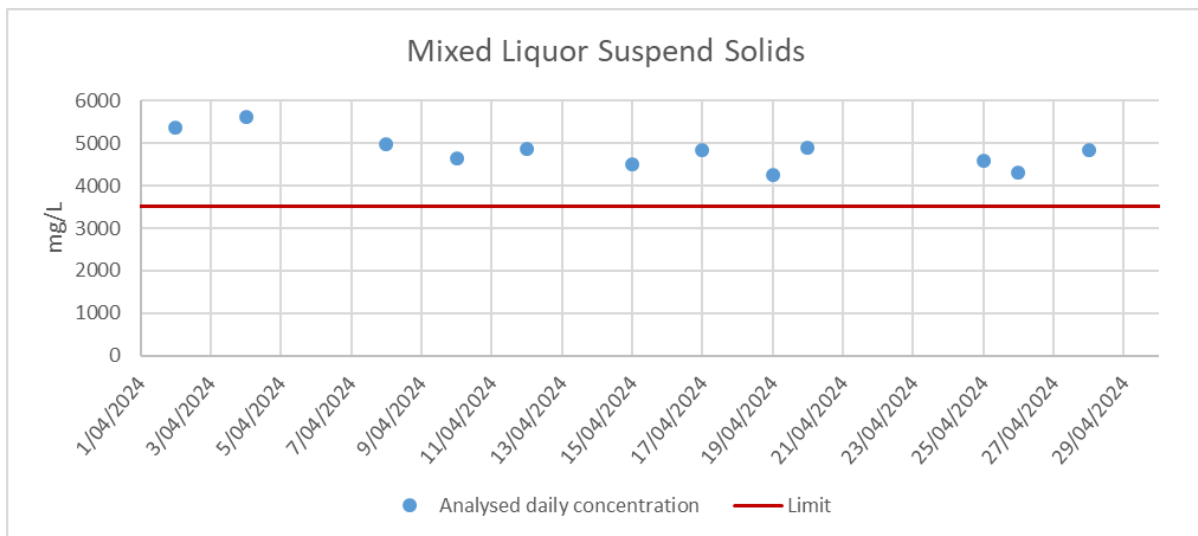


Figure 2

The increased flows coupled with a high Mixed Liquor Suspended Solids resulted in low UVT values in the final effluent.

ABSENT/FAILED DEFENCES

Increased Suspended Solids in the Aeration basin were a result of reduced dewatering capacity of the wastewater treatment plant. Reduced capacity occurred due to numerous mechanical issues with the centrifuges and dedicated polymer system.

INDIVIDUAL - HUMAN FACTORS/TEAM ACTIONS

To compensate for a negative effect of high flows and high biomass volumes in the system, a list of actions and adjustments has been identified.

Both team leader and the duty operator followed the instructions defined in the SOP and no omissions were identified.

ORGANISATIONAL FACTORS

The %UVT value decreased, and an alarm was triggered. Subsequently, inspection of the outfall was conducted, and photos were taken. The duty manager was notified about the non-compliance and the notifications were sent out as soon as possible.

TASK/ENVIRONMENTAL CONDITIONS

The following is a summary of the monthly shoreline monitoring performed as part of resource consent WGN200229 [36816]. Please note that the environmental results from 14th April are not yet processed by the contracted laboratory.

140m generally eastwards of the outfall

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
13/04/2024	09:31	500	8.26	37	10.21	16.4	N	Light	Mid	Flood
14/04/2024	09:21		8.23		10.37	16.1	S	Light	Mid	Flood
15/04/2024	10:05	10	8.21	39	10.35	16.7	N	Strong	Low	Flood
16/04/2024	9:48	120	8.17	38	10.35	16.7	N	Strong	Low	Flood

Table 4: Shoreline Monitoring 140m generally eastwards of the outfall

Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
13/04/2024	09:31	0.16	0.10	0.10	0.030	0.610	0.155
14/04/2024	09:21						
15/04/2024	10:05	0.02	0.1	0.1	0.007	0.272	0.005
16/04/2024	9:48	0.04	0.1	0.1	0.003	0.34	0.05

Table 5: Shoreline Monitoring 140m generally eastwards of the outfall

200m generally southwestwards of the outfall

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
13/04/2024	08:57	250	8.21	37	10.42	16.4	N	Light	Mid	Flood
14/04/2024	09:05		8.21		10.55	15.0	S	Light	Mid	Flood
15/04/2024	9:45	10	8.25	38	11.2	16.8	N	Strong	Low	Flood
16/04/2024	9:21	10	8.22	38	10.47	16.6	N	Strong	Low	Flood

Table 6: Shoreline Monitoring 200m generally southwestwards of the outfall

Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
13/04/2024	08:57	0.20	0.1	0.1	0.034	0.459	0.047
14/04/2024	09:05						
15/04/2024	9:45	0.1	0.1	0.1	0.028	0.183	0.1
16/04/2024	9:21	0.05	0.1	0.1	0.008	0.268	0.1

Table 7: Shoreline Monitoring 200m generally southwestwards of the outfall

Titahi Bay Beach At Toms Road - Surf Club

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
13/04/2024	09:16	210	8.27	38	9.97	16.6	N	Light	Mid	Flood
14/04/2024	09:32		8.16		10.54	15.6	S	Light	Mid	Flood
15/04/2024	10:11	10	8.17	39	10.73	16.7	N	Strong	Low	Flood
16/04/2024	9:54	50	8.16	38	11.22	16.4	N	Strong	Low	Flood

Table 8: Shoreline Monitoring

Control site

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
13/04/2024	09:43	260	8.32	36	10.72	16.7	N	Light	Mid	Flood
14/04/2024	09:50		8.22		10.87	15.6	S	Light	Mid	Flood
15/04/2024	10:42	10	8.17	37	10.73	16.7	N	Strong	Low	Flood
16/04/2024	10:18	280	8.16	38	11.22	16.4	N	Strong	Low	Flood

Table 6: Shoreline Monitoring 200m generally southwestwards of the outfall

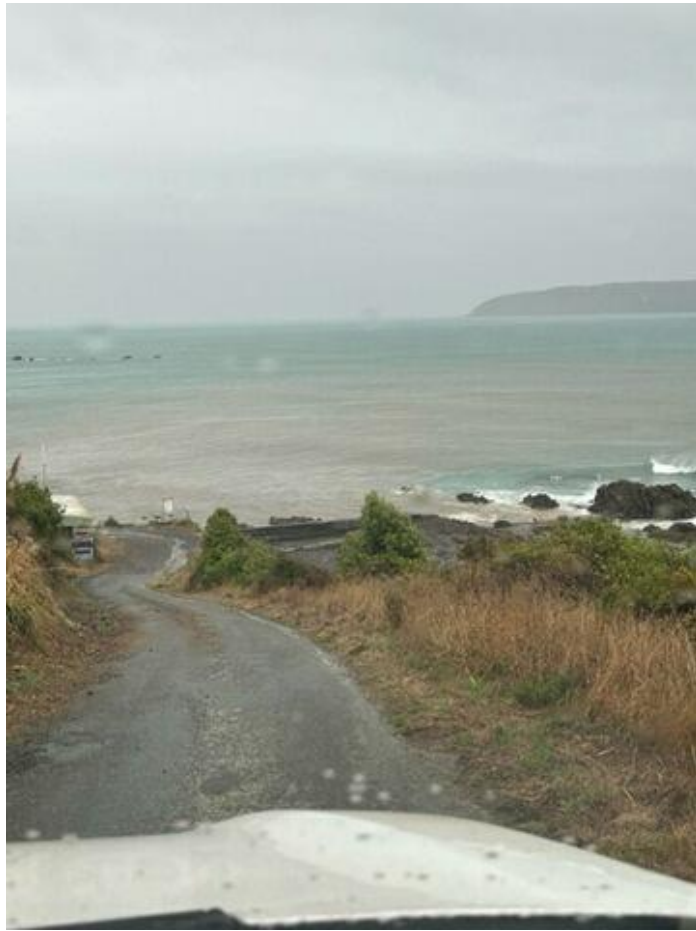
Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
13/04/2024	09:43	0.01	0.1	0.1	0.02	0.280	0.025
14/04/2024	09:50						
15/04/2024	10:42	0.02	0.1	0.1	0.006	0.185	0.1
16/04/2024	10:18	0.05	0.1	0.1	0.002	0.455	0.1

Table 7: Shoreline Monitoring 200m generally southwestwards of the outfall

PHOTOS

Date: 12/04/2024

Time: 15:00



Discoloration was observed outside of the 200-metre radius around the outfall.

Date: 13/04/2024

Time: 09:00



Discoloration was limited to the area immediately around the outfall.

Date: 14/04/2024

Time: 09:00



CORRECTIVE ACTIONS

Corrective Actions	Reference of issue on captured system or Defect raised	Responsibility	Measurement
Spares list for the centrifuges to be prepared	Mechanical breakdowns of the dewatering system contributed to the accumulation of biomass in the aeration basin and secondary clarifiers. To eliminate the down-down of the equipment, a list of spares will be created, and parts will be purchased accordingly.	Team Leader/ Coordinator	Document created and submitted to WWL for review/approval. Rivo action.
Installation of new polymer pumps equipped with the VSDs.	Improved control of the dewatering process.	Northern Operations Coordinator/Team Leader	Rivo action
Negotiations with the Spicer landfill to increase the volume of sludge accepted to the landfill.	Limited ability to remove the solids from the system resulting in sub-optimal accumulation in the process.	Operations manager	Rivo action
Solids Handling mitigating Measures were defined and timeline was agreed on between WWL and Veolia	Investigation report highlighted a number of actions which may reduce the risk of poor effluent during the high flows.	Operations manager/Process engineer	Regular meetings and meeting agreed targets

CONCLUSION

- According to the condition 12D of Resource consent WGN200229, the hourly average of UV transmissivity (UVT) values shall not reduce below 45%.
- Values of hourly average for UVT dropped below the limit on April 12th and 13th.
- Low values of the UVT parameter normally indicate poor water quality with increased suspended solids concentration.
- Daily results for the suspended solids in the effluent composite sample show average water quality suggesting that the temporary drop in the water quality (low UVT) had a minor effect on the final effluent quality during April 12th and 13th.
- The increased flows coupled with a high Mixed Liquor Suspended Solids resulted in low UVT values in the final effluent.
- Increased MLSS values are a result of mechanical breakdowns of the sludge dewatering equipment.
- Pictures taken of the outfall on April 12th show the discoloration outside of the 200-meters radius. Discoloration observed on April 13th was contained within the 200-meter radius.

APPENDIX I: Laboratory Certificate of Analysis

Food & Water Testing ANALYTICAL REPORT

REPORT CODE	AR-24-NW-024784-01	REPORT DATE	24/04/2024
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Attention Veolia Water - Wellington

Wastewater Treatment Plant
P.O. Box 14744
WELLINGTON 6041
Wellington
NEW ZEALAND

Phone (04) 388 0067

Email ann.shibu@veolia.com

Contact for your orders: Deb Bottrill	Order code: EUNZWE-00178464
Contract: Porirua Discharge Testing	
Submission Reference: Porirua Discharge	Purchase Order Number: 7300350261

SAMPLE CODE 812-2024-00054545

Sample Reference: 140	Sampling Point name: Porirua 1: 140m E of Outfall
Sampling Point code: POR_L1_G_1M	
Reception Date & Time: 13/04/2024 11:00	Analysis Ending Date: 23/04/2024
Analysis Started on: 13/04/2024	Sampler(s): customer
Sampled Date & Time: 13/04/2024 09:31	

	RESULTS		LOQ
NW676 Ammonia Nitrogen	Ammonia nitrogen 0.16 mg/l		0.01
NW673 Dissolved Reactive Phosphorus	Phosphorus 0.030 mg/l		0.002
ZMOU1 Enumeration of Enterococci By Membrane Filtration	Enterococcus Species 500 cfu/100 ml		10
NW010 Nitrate-N	Nitrate-N <0.1 mg/l		0.01
NW008 Nitrite-N	Nitrite Nitrogen as N <0.1 mg/l		0.01
④NW388 Salinity	Salinity 37 ppt		2
NW189 Total Nitrogen	Total Nitrogen (N) 0.610 mg/l		0.002
NW194 Total Phosphorus	Total phosphorus 0.155 mg/l		0.005

SAMPLE CODE 812-2024-00054546

Sample Reference: 200 SE	Sampling Point name: Porirua 2: 200m SW of Outfall
Sampling Point code: POR_L2_G_1M	
Reception Date & Time: 13/04/2024 11:00	Analysis Ending Date: 24/04/2024
Analysis Started on: 13/04/2024	Sampler(s): customer
Sampled Date & Time: 13/04/2024 08:57	

	RESULTS		LOQ
NW676 Ammonia Nitrogen	Ammonia nitrogen 0.20 mg/l		0.01
NW673 Dissolved Reactive Phosphorus			

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Lower Hutt
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NEW ZEALAND

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Food & Water Testing

		RESULTS		LOQ
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	0.034	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	250	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
① NW388	Salinity			
	Salinity	37	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.459	mg/l	0.002
NW194	Total Phosphorus			
	Total phosphorus	0.047	mg/l	0.005

SAMPLE CODE	812-2024-00054547		
Sample Reference	Surf		
Sampling Point code:	POR_L3_G_1M	Sampling Point name:	Porirua 3: Titahi Bay Surf Club
Reception Date & Time:	13/04/2024 11:00	Analysis Ending Date:	16/04/2024
Analysis Started on:	13/04/2024	Sampler(s)	customer
Sampled Date & Time	13/04/2024 09:18		

		RESULTS		LOQ
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	210	cfu/100 ml	10
① NW388	Salinity			
	Salinity	38	ppt	2

SAMPLE CODE	812-2024-00054548		
Sample Reference	Control		
Sampling Point code:	POR_SCS_G_1M	Sampling Point name:	Porirua 7: Sample Control Site
Reception Date & Time:	13/04/2024 11:00	Analysis Ending Date:	24/04/2024
Analysis Started on:	13/04/2024	Sampler(s)	customer
Sampled Date & Time	13/04/2024 09:43		

		RESULTS		LOQ
NW676	Ammonia Nitrogen			
	Ammonia nitrogen	<0.01	mg/l	0.01
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	<0.002	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	260	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
① NW388	Salinity			
	Salinity	38	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.280	mg/l	0.002

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Food & Water Testing

	RESULTS	LOQ
NW194 Total Phosphorus		
Total phosphorus	<0.025 mg/l	0.005

LIST OF METHODS			
NW008	Nitrite-N: APHA Online Edition 4110 B	NW010	Nitrate-N: APHA Online Edition 4110 B
NW189	Total Nitrogen: APHA Online Edition 4500-NO3- I	NW194	Total Phosphorus: APHA Online Edition 4500-P G / 4500-P B
NW388	Salinity: APHA Online Edition 2510 Conductivity meter calibrated to synthetic seawater samples	NW673	Dissolved Reactive Phosphorus: Internal Method based on APHA 4500-P F, Spectrophotometry (DA)
NW676	Ammonia Nitrogen: Internal Method, Spectrophotometry (DA)	ZMDU1	Enterococcus Species E (Water) [NZ] <10 >6 000 /100 ml (0) mEI Agar-F: US-EPA 1600:2009

Signature

<div style="background-color: black; width: 100%; height: 15px; margin-bottom: 5px;"></div> Laboratory Manager Eurofins ELS Limited	<div style="background-color: black; width: 100%; height: 15px; margin-bottom: 5px;"></div> Supervisor Eurofins ELS Limited	<div style="background-color: black; width: 100%; height: 15px; margin-bottom: 5px;"></div> Senior Analyst Microbiology
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EXPLANATORY NOTE	
<ul style="list-style-type: none"> ④ Test is not accredited ② Test is subcontracted within Eurofins group and is accredited ③ Test is subcontracted within Eurofins group and is not accredited ④ Test is subcontracted outside Eurofins group and is accredited ④ Test is subcontracted outside Eurofins group and is not accredited ⑥ Test result is provided by the customer and is not accredited ⑦ Tested at the sampling point by Eurofins and is not accredited ⑥ Tested at the sampling point by Eurofins and is accredited ⑥ Test is RLP accredited ⑥ Test is subcontracted within Eurofins group and is RLP accredited 	<p>N/A means Not Applicable</p> <p>Not Detected means not detected at or above the Limit of Quantification (LOQ)</p> <p>LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit</p> <p>X (Unsatisfactory) means does not meet the specification</p> <p>✓ (Satisfactory) means meets the specification</p>

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Food & Water Testing ANALYTICAL REPORT

REPORT CODE: **AR-24-NW-025409-01** REPORT DATE: **26/04/2024**

Attention Veolia Water - Wellington
 [REDACTED]
 Wastewater Treatment Plant
 P.O. Box 14744
 WELLINGTON 6041
 Wellington
 NEW ZEALAND
 Phone (04) 388 0067
 Email [REDACTED]

Contact for your orders: [REDACTED] Order code: EUNZWE-00178612
 Contract: Porirua Discharge Testing
 Submission Reference: Day 3 Purchase Order Number: 7300350261

SAMPLE CODE	812-2024-00055096		
Sampling Point code:	POR_L1_G_1M	Sampling Point name:	Porirua 1: 140m E of Outfall
Reception Date & Time:	15/04/2024 12:00	Analysis Ending Date:	24/04/2024
Analysis Started on:	15/04/2024	Sampler(s)	[REDACTED]
Sampled Date & Time	15/04/2024 10:05		

	RESULTS		LOQ
NW676 Ammonia Nitrogen			
Ammonia nitrogen	0.02	mg/l	0.01
NW673 Dissolved Reactive Phosphorus			
Phosphorus	0.007	mg/l	0.002
ZM0U1 Enumeration of Enterococci By Membrane Filtration			
Enterococcus Species	<10	cfu/100 ml	10
NW010 Nitrate-N			
Nitrate-N	<0.1	mg/l	0.01
NW008 Nitrite-N			
Nitrite Nitrogen as N	<0.1	mg/l	0.01
©NW388 Salinity			
Salinity	39	ppt	2
NW189 Total Nitrogen			
Total Nitrogen (N)	0.272	mg/l	0.002
NW194 Total Phosphorus			
Total phosphorus	<0.005	mg/l	0.005

SAMPLE CODE	812-2024-00055097		
Sampling Point code:	POR_L2_G_1M	Sampling Point name:	Porirua 2: 200m SW of Outfall
Reception Date & Time:	15/04/2024 12:00	Analysis Ending Date:	26/04/2024
Analysis Started on:	15/04/2024	Sampler(s)	[REDACTED]
Sampled Date & Time	15/04/2024 09:45		

	RESULTS		LOQ
NW676 Ammonia Nitrogen			
Ammonia nitrogen	0.10	mg/l	0.01
NW673 Dissolved Reactive Phosphorus			
Phosphorus	0.028	mg/l	0.002

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		RESULTS	LOQ	
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	<10	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
④NW388	Salinity			
	Salinity	38	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.183	mg/l	0.002
NW194	Total Phosphorus			
	Total phosphorus	<0.1	mg/l	0.005

SAMPLE CODE	812-2024-00055098		
Sampling Point code:	POR_L3_G_1M	Sampling Point name:	Porirua 3: Titahi Bay Surf Club
Reception Date & Time:	15/04/2024 12:00	Analysis Ending Date:	17/04/2024
Analysis Started on:	15/04/2024	Sampler(s)	[REDACTED]
Sampled Date & Time	15/04/2024 10:11		

		RESULTS	LOQ	
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	<10	cfu/100 ml	10
④NW388	Salinity			
	Salinity	39	ppt	2

SAMPLE CODE	812-2024-00055099		
Sampling Point code:	POR_SCS_G_1M	Sampling Point name:	Porirua 7: Sample Control Site
Reception Date & Time:	15/04/2024 12:00	Analysis Ending Date:	26/04/2024
Analysis Started on:	15/04/2024	Sampler(s)	[REDACTED]
Sampled Date & Time	15/04/2024 10:42		

		RESULTS	LOQ	
NW676	Ammonia Nitrogen			
	Ammonia nitrogen	0.02	mg/l	0.01
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	0.006	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	<10	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
④NW388	Salinity			
	Salinity	37	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.185	mg/l	0.002
NW194	Total Phosphorus			
	Total phosphorus	<0.1	mg/l	0.005

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LIST OF METHODS			
NW008	Nitrite-N: APHA Online Edition 4110 B	NWD10	Nitrate-N: APHA Online Edition 4110 B
NW189	Total Nitrogen: APHA Online Edition 4500-NO3- I	NW194	Total Phosphorus: APHA Online Edition 4500-P G / 4500-P B
NW388	Salinity: APHA Online Edition 2510 Conductivity meter calibrated to synthetic seawater samples	NW673	Dissolved Reactive Phosphorus: Internal Method based on APHA 4500-P F, Spectrophotometry (DA)
NW676	Ammonia Nitrogen: Internal Method, Spectrophotometry (DA)	ZM0U1	Enterococcus Species E (Water) [NZ] <10 >6 000 /100 ml (0) mEI Agar-F: US-EPA 1600:2009

Signature

 Supervisor Eurofins ELS Limited

 Supervisor Eurofins ELS Limited

 Laboratory Supervisor Microbiology

EXPLANATORY NOTE

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 Not Detected means not detected at or above the Limit of Quantification (LOQ)
 LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
 ✗ (Unsatisfactory) means does not meet the specification
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ANALYTICAL REPORT

REPORT CODE: **AR-24-NW-025410-01** REPORT DATE: **26/04/2024**

Attention: Veolia Water - Wellington
 [REDACTED]
 Wastewater Treatment Plant
 P.O. Box 14744
 WELLINGTON 6041
 Wellington
 NEW ZEALAND
 Phone: (04) 388 0067
 Email: ann.shibu@veolia.com

Order code: EUNZWE-00178847
 Purchase Order Number: 7300350261

Contact for your orders: [REDACTED]
 Contract: Porirua Discharge Testing
 Submission Reference: Porirua Discharge

SAMPLE CODE		812-2024-00055886	
Sample Reference	140m 16/04	Sampling Point name:	Porirua 1: 140m E of Outfall
Sampling Point code:	POR_L1_G_1M	Reception Date & Time:	16/04/2024 12:05
Analysis Started on:	16/04/2024	Analysis Ending Date:	24/04/2024
Sampled Date & Time	16/04/2024 09:48	Sampler(s)	customer

		RESULTS	LOQ	
NW676	Ammonia Nitrogen			
	Ammonia nitrogen	0.04	mg/l	0.01
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	0.003	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	120	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
NW388	Salinity			
	Salinity	38	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.340	mg/l	0.002
NW194	Total Phosphorus			
	Total phosphorus	<0.05	mg/l	0.005

SAMPLE CODE		812-2024-00055887	
Sample Reference	200m 16/04	Sampling Point name:	Porirua 2: 200m SW of Outfall
Sampling Point code:	POR_L2_G_1M	Reception Date & Time:	16/04/2024 12:05
Analysis Started on:	16/04/2024	Analysis Ending Date:	26/04/2024
Sampled Date & Time	16/04/2024 09:21	Sampler(s)	customer

		RESULTS	LOQ	
NW676	Ammonia Nitrogen			
	Ammonia nitrogen	0.05	mg/l	0.01
NW673	Dissolved Reactive Phosphorus			

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		RESULTS		LOQ
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	0.008	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	<10	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
ⓐ NW388	Salinity			
	Salinity	38	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.268	mg/l	0.002
NW194	Total Phosphorus			
	Total phosphorus	<0.1	mg/l	0.005

SAMPLE CODE	812-2024-00055888		
Sample Reference	surf 16/04		
Sampling Point code:	POR_L3_G_1M	Sampling Point name:	Porirua 3: Titahi Bay Surf Club
Reception Date & Time:	16/04/2024 12:05	Analysis Ending Date:	19/04/2024
Analysis Started on:	16/04/2024	Sampler(s)	customer
Sampled Date & Time	16/04/2024 09:54		

		RESULTS		LOQ
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	50	cfu/100 ml	10
ⓐ NW388	Salinity			
	Salinity	38	ppt	2

SAMPLE CODE	812-2024-00055889		
Sample Reference	control 16/04		
Sampling Point code:	POR_SCS_G_1M	Sampling Point name:	Porirua 7: Sample Control Site
Reception Date & Time:	16/04/2024 12:05	Analysis Ending Date:	26/04/2024
Analysis Started on:	16/04/2024	Sampler(s)	customer
Sampled Date & Time	16/04/2024 10:18		

		RESULTS		LOQ
NW676	Ammonia Nitrogen			
	Ammonia nitrogen	0.05	mg/l	0.01
NW673	Dissolved Reactive Phosphorus			
	Phosphorus	<0.002	mg/l	0.002
ZM0U1	Enumeration of Enterococci By Membrane Filtration			
	Enterococcus Species	280	cfu/100 ml	10
NW010	Nitrate-N			
	Nitrate-N	<0.1	mg/l	0.01
NW008	Nitrite-N			
	Nitrite Nitrogen as N	<0.1	mg/l	0.01
ⓐ NW388	Salinity			
	Salinity	38	ppt	2
NW189	Total Nitrogen			
	Total Nitrogen (N)	0.455	mg/l	0.002

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	RESULTS	LOQ
NW194 Total Phosphorus		
Total phosphorus	<0.1 mg/l	0.005

LIST OF METHODS			
NW008	Nitrite-N: APHA Online Edition 4110 B	NW010	Nitrate-N: APHA Online Edition 4110 B
NW189	Total Nitrogen: APHA Online Edition 4500-NO3- I	NW194	Total Phosphorus: APHA Online Edition 4500-P G / 4500-P B
NW388	Salinity: APHA Online Edition 2510 Conductivity meter calibrated to synthetic seawater samples	NW673	Dissolved Reactive Phosphorus: Internal Method based on APHA 4500-P F, Spectrophotometry (DA)
NW676	Ammonia Nitrogen: Internal Method, Spectrophotometry (DA)	ZM0U1	Enterococcus Species E (Water) [NZ] <10 >6 000 /100 ml (0) mEI Agar-F: US-EPA 1600:2009

Signature



Supervisor Eurofins ELS Limited

Supervisor Eurofins ELS Limited

Laboratory Manager, Microbiology

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Incident Investigation Report:
UV Transmissivity reduction below 45% (April 2024)

CONTROL SHEET

Document Title:	Investigation report - UV Transmissivity values reduction below the compliance limit 45% for April 2024
Prepared by:	██████████
Reviewed by:	██████████
Authorised by:	██████████

DOCUMENT CONTROL

Version	Status	Date	Details of Revision
0	Draft	07/05/2024	Draft for review.
1	Final	09/05/2024	Final version sent to WWL.
2	Rev1	10/05/2024	WWL's comments incorporated

Internal Distribution	Company	Position	Email	Distribution
██████████	Veolia	Regional Manager (Wellington)	██████████	Internal
██████████	Veolia	Operations Manager (Wellington)	██████████	Internal
██████████	Veolia	Process Engineer	██████████	Internal
██████████	Veolia	Operations Coordinator (Northern)	██████████	Internal
██████████	Veolia	Northern Team Leader	██████████	Internal
██████████	WWL	Head of Wastewater Contracts	██████████	External
██████████	WWL	Senior Wastewater Operations and Assets Advisor	██████████	External

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INCIDENT DETAILS

Date	April 2024
Location	Porirua WWTP
Description	The UV Transmissivity (UVT) values in the final effluent decreased below the limit of 45 % defined by condition 12D of Resource Consent WGN200229.
Cause	Because of the reduced solids removal capacity of the plant, higher than optimum levels of solids (MLSS) were accumulated in the treatment system. As a consequence, the secondary clarifiers were prone to become overloaded during sustained higher than normal inlet flows (>400 L/s). Combination of increased flows and high MLSS in the system resulted in decrease of the UVT values on a number of occasions throughout April 2024. On 28-29 April, the decrease of the UVT value was caused by the TAK UV system being used instead of the Duron UV system during night hours. Because the UVT probe located in the Duron system records the reading while there is no flow through the channel, the readings are not representative.
Actions	Standard Operation Procedure for the high inlet flow events was followed. Additionally, a number of projects which will allow for increased solids removal are ongoing.
Impacts	Reduction of the UVT values in the final effluent below the limit defined by the Resource consent (45%).
	Visible discolouration outside of the 200 metres radius from the outfall was observed during the event on 12 April.

EVENTS TIMELINE

In April 2024 the UVT hourly rolling average value decreased below 45% on the following days and times:

Date	Time of the start	Duration	Average	Minimum
1/04/2024	13:10	1:50	22	2
	16:15	0:55	42	41
	23:40	0:45	42	39
3/04/2024	0:10	5:50	13	0
	7:55	1:40	41	39
	10:30	0:05	44	44
4/04/2024	20:45	10:30	17	0
5/04/2024	10:40	2:15	40	33
	23:10	3:45	15	1
6/04/2024	11:20	1:20	31	22
	14:10	3:20	28	1
	21:55	4:05	19	4
7/04/2024	11:35	0:55	37	35
	14:05	1:20	28	18
	16:05	0:55	43	43
	22:25	2:25	32	22
9/04/2024	12:20	0:40	45	44
12/04/2024	15:30	7:20	10	0
13/04/2024	17:10	6:10	39	26
28/04/2024	5:30	26:55:00	41	39

Table 1 April 2024- UVT decreases events timeline.

PROCESS/QUALITY CONTROLS

Following plant performance parameters were analysed to investigate the root cause of the low UVT values.

Final effluent quality- Total Suspended Solids and UVT

Total suspended solids (TSS) and the UVT values are the indicators of final effluent quality. TSS are analysed in the 24-hour flow-proportional sample. UVT is analysed in the grab sample.

Date	Total Suspended Solids			UVT
	Daily Results	90 Day Geometric Mean	90 Day % compliance	daily lab results (grab sample)
	g/m ³	g/m ³	g/m ³	%
1/04/2024	6	7.7	12.0	61
2/04/2024	137	8.0	13.0	61
3/04/2024	73	8.2	22.3	57
4/04/2024	74	8.5	25.2	63
5/04/2024	27	8.6	27.0	67
6/04/2024	69	8.8	30.5	67
7/04/2024	7	8.9	30.5	65
8/04/2024	6	8.9	30.5	66
9/04/2024	6	8.9	30.5	66
10/04/2024	6	8.9	30.5	65
11/04/2024	71	9.1	62.0	68
12/04/2024	6	9.1	62.0	69
13/04/2024	6	9.1	62.0	66
14/04/2024	38	9.3	62.0	55
15/04/2024	60	9.5	62.0	67
16/04/2024	29	9.7	62.0	67
17/04/2024	6	9.7	62.0	66
18/04/2024	6	9.7	62.0	65
19/04/2024	6	9.7	62.0	67
20/04/2024	6	9.5	62.0	66
21/04/2024	6	9.5	62.0	65
22/04/2024	5	9.5	62.0	65
23/04/2024	6	9.5	62.0	63
24/04/2024	6	9.5	62.0	66
25/04/2024	6	9.5	62.0	65
26/04/2024	6	9.5	62.0	68
27/04/2024	6	9.5	62.0	67
28/04/2024	6	9.5	62.0	65
29/04/2024	6	9.5	62.0	64
30/04/2024	6	9.5	62.0	
Limits	-	30	75	-

Table 2 Final effluent-Total Suspended Solids (April 2024)

Mixed Liquor Suspended Solids (MLSS)

MLSS is a parameter expressing concentration of biomass in the biological treatments step. To achieve a good treatment performance, optimum range of the MLSS needs to be maintained.

Date	MLSS g/m3
1/04/2024	
2/04/2024	5370
3/04/2024	
4/04/2024	5620
5/04/2024	
6/04/2024	
7/04/2024	
8/04/2024	4980
9/04/2024	
10/04/2024	4650
11/04/2024	
12/04/2024	4850
13/04/2024	
14/04/2024	
15/04/2024	4500
16/04/2024	
17/04/2024	4830
18/04/2024	
19/04/2024	4240
20/04/2024	4900
21/04/2024	
22/04/2024	
23/04/2024	
24/04/2024	
25/04/2024	4590
26/04/2024	4310
27/04/2024	
28/04/2024	4840
29/04/2024	4840
30/04/2024	
Optimum range	3500-4000

Table 3 MLSS in April 2024

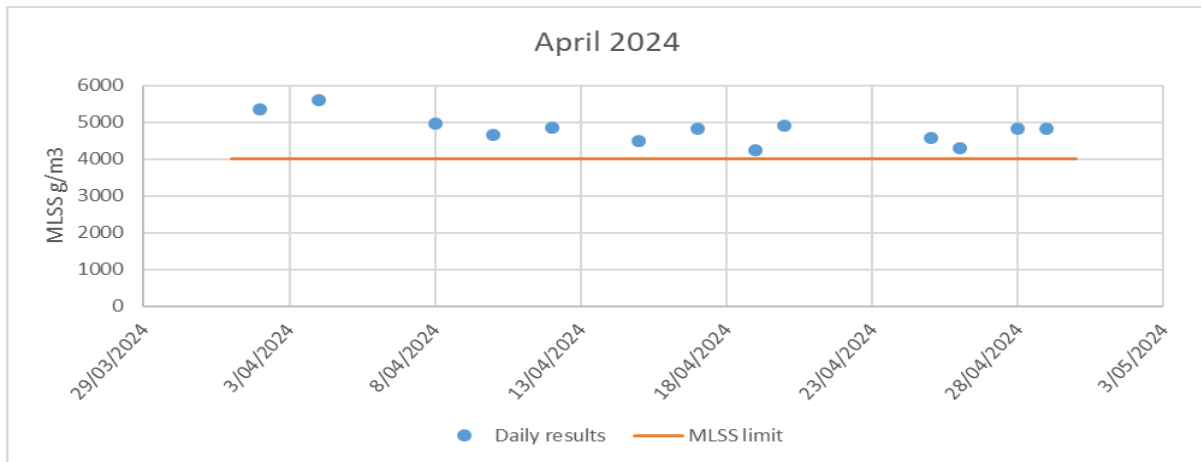


Figure 1 MLSS in April 2024

Events details

1 April

UVT values

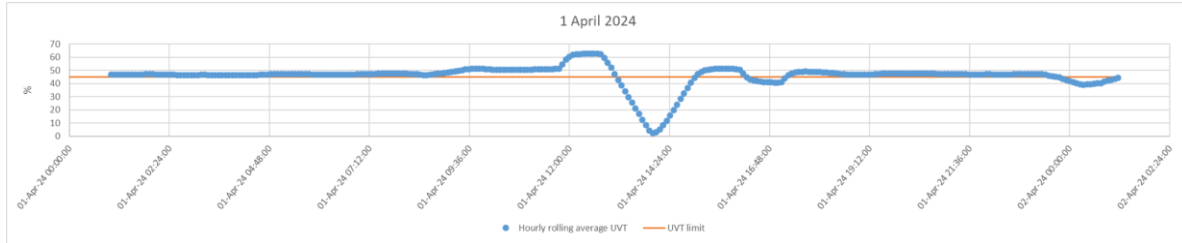


Figure 2 UVT Values on 1 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show good effluent quality. TSS (24-hour flow-proportional sample) were in a normal range (6 g/m³) and UVT value was of 61% (morning grab sample).

Influent flows

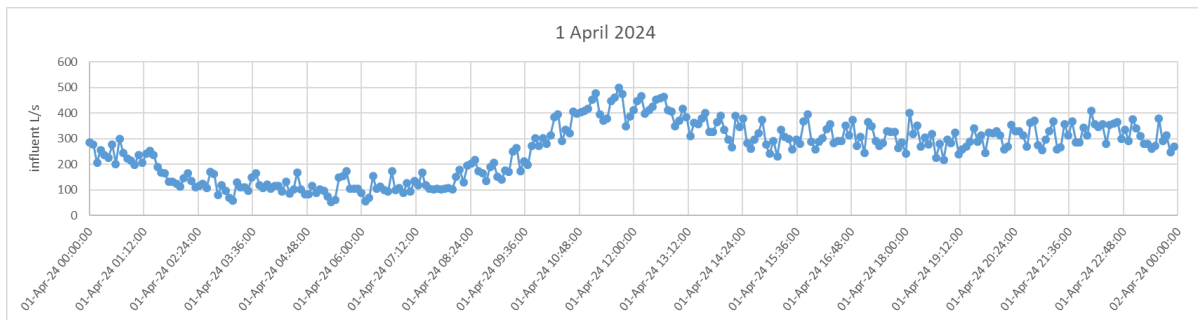


Figure 3 Influent flows on 1 April

Sludge blanket levels

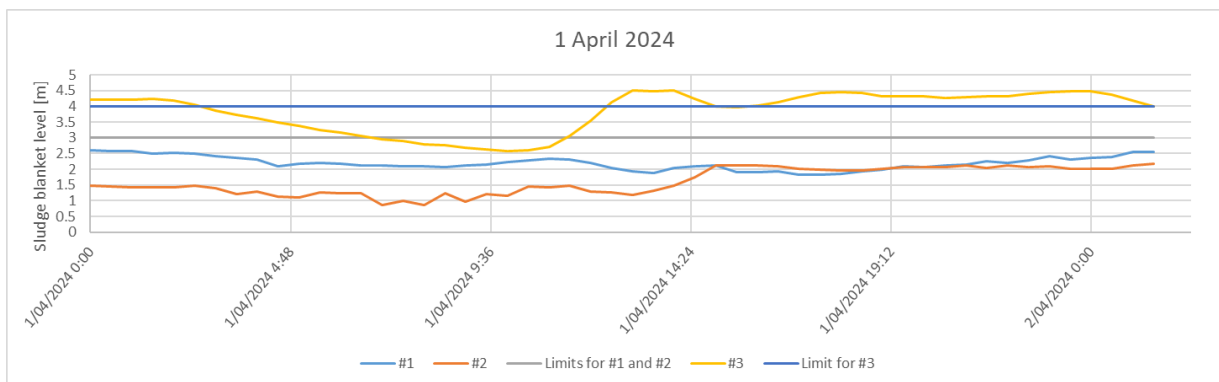


Figure 4 Sludge blanket levels on 1 April

Summary

UVT values decreases that occurred during 1 April correspond to the increased inlet flows and subsequent increase of the sludge blanket levels in clarifier #3. The blankets exceeded the maximum level of the optimum range (4 m) indicating solids carry-over from the clarifier negatively affecting the effluent quality and therefore causing low UVT values. Analytical results for the 1 April composite

sample show average values indicating that the negative effect of these events on the daily effluent quality was minor. It is important to note that MLSS concentration exceeded the optimum range, and the secondary clarifiers are prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s).

3 April

UVT values

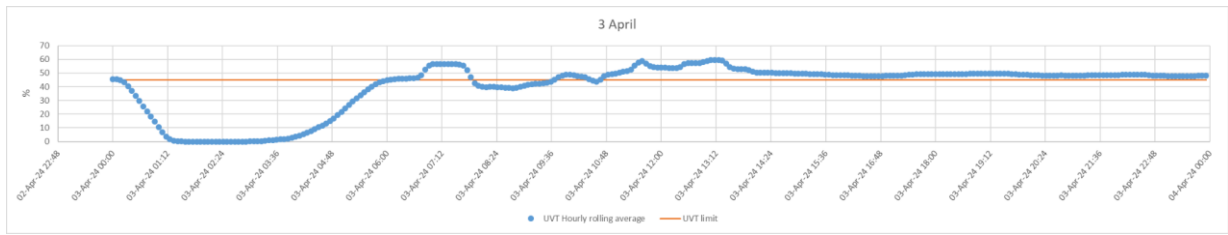


Figure 5 UVT Values on 3 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show increased concentration of TSS (73 g/m³) in the final effluent (24 hour flow-proportional sample) and UVT value was 57% (morning grab sample).

Influent flows

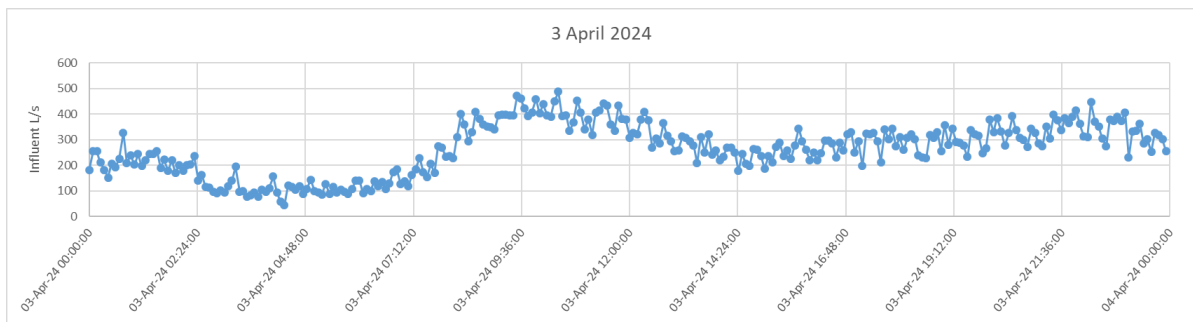


Figure 6 Influent flows on 3 April

Sludge blanket levels

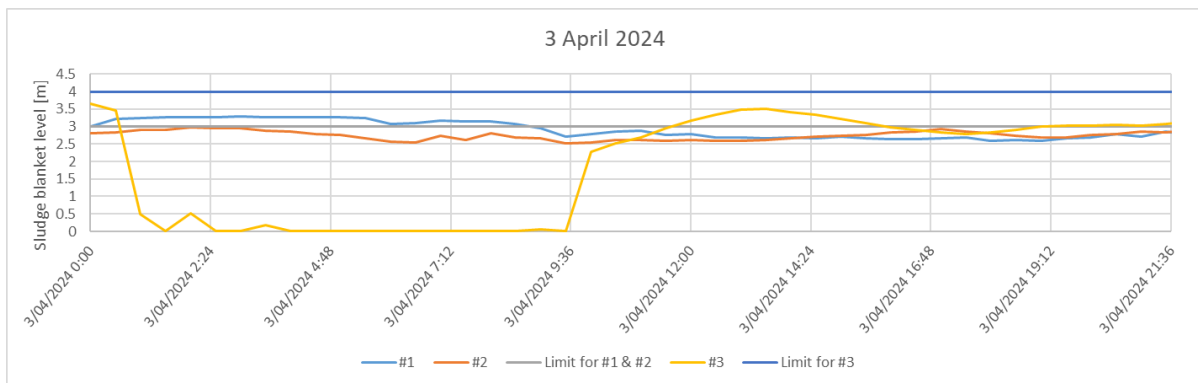


Figure 7 Sludge blanket levels on 3 April

Summary

During the period of low UVT values, the sludge blanket levels in clarifiers #1 and #2 exceeded the maximum limits indicating solids carry-over into the final effluent. This aligns with the TSS analytical results from 3 April. Pictures of the outfall vicinity were taken and are attached in [Appendix I-Photos](#). No discoloration exceeding 200-metre radius of the outfall was observed. It is important to note that

MLSS concentration exceeded the optimum range, and the secondary clarifiers are prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s).

4 April

UVT values

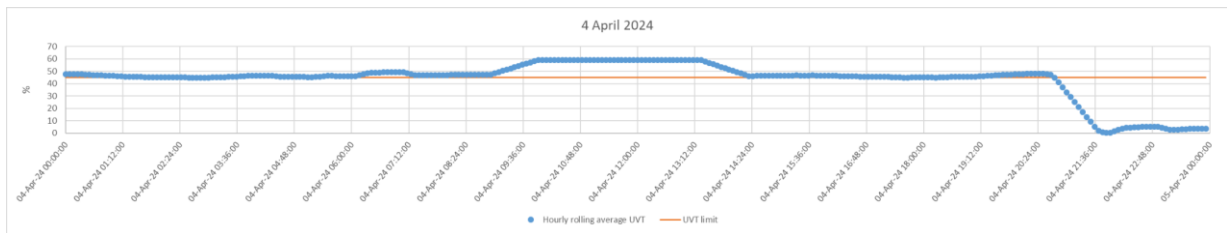


Figure 8 UVT Values on 4 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show increased concentration of TSS (74 g/m³) in the final effluent (24-hour flow-proportional sample) and UVT value was 63% (morning grab sample).

Influent flows

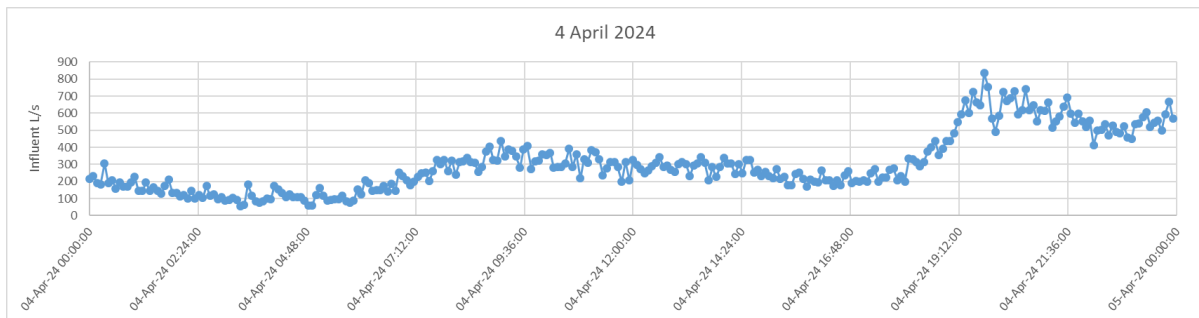


Figure 9 Influent flows on 4 April

Sludge blanket levels

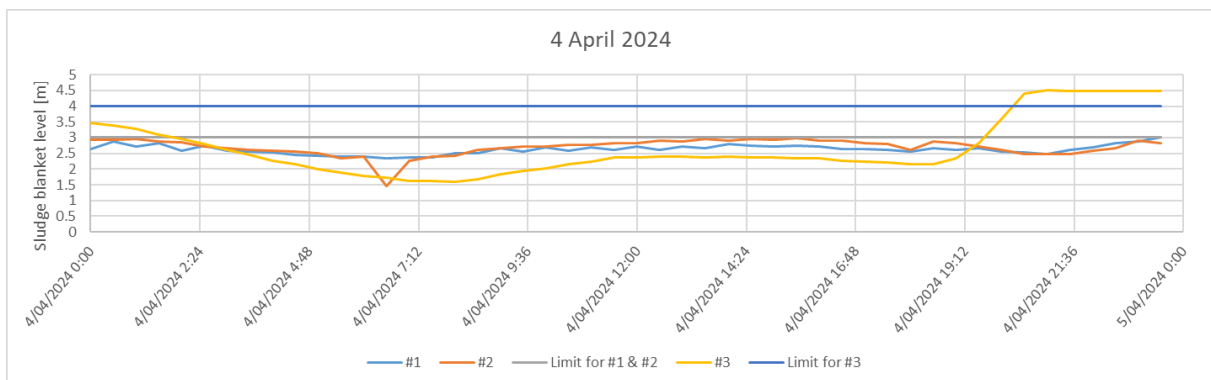


Figure 10 Sludge blanket levels on 4 April

Summary

Sludge blanket level in clarifier #3 exceeded the maximum limit indicating solids carry-over from the secondary clarifiers into the final effluent. This aligns with the UVT decrease.

Poor effluent quality is confirmed by the TSS analytical results from 4 April. The increased sludge levels align with the inlet flows increase. Increase in the sludge blanket level correlates with the increased influent flows. It is important to note that MLSS concentration exceeded the optimum range

and the secondary clarifiers are prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s).

5 April

UVT values

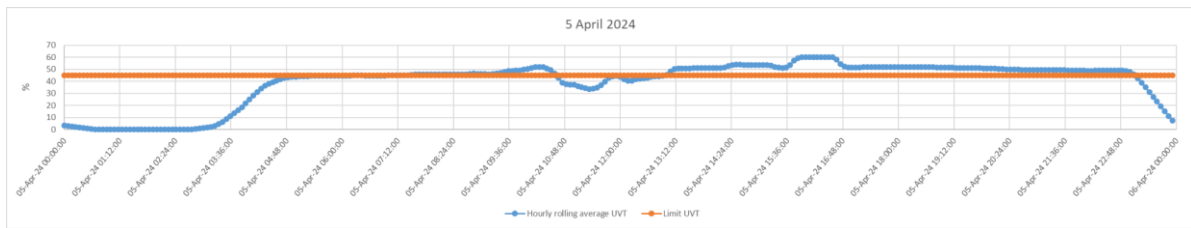


Figure 11 UVT Values on 5 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show good effluent quality. TSS (24-hour flow-proportional sample) were on a high end of a normal range (27 g/m³) and UVT value was 67% (morning grab sample).

Influent flows

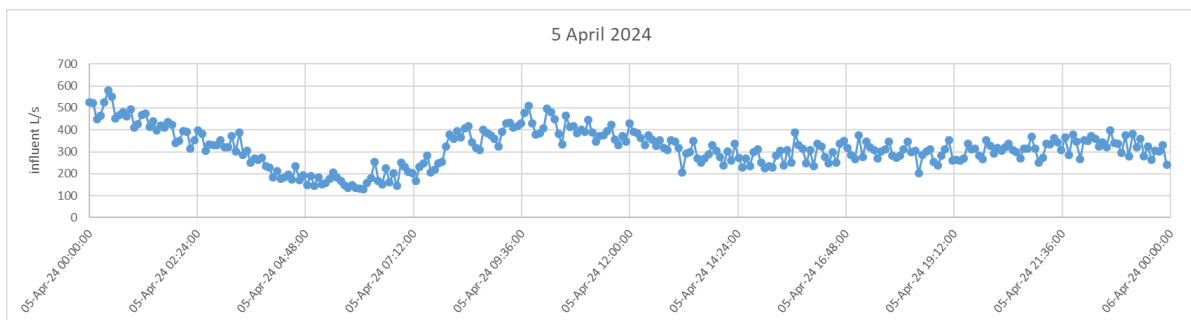


Figure 12 Inlet flows on 5 April

Sludge blanket levels

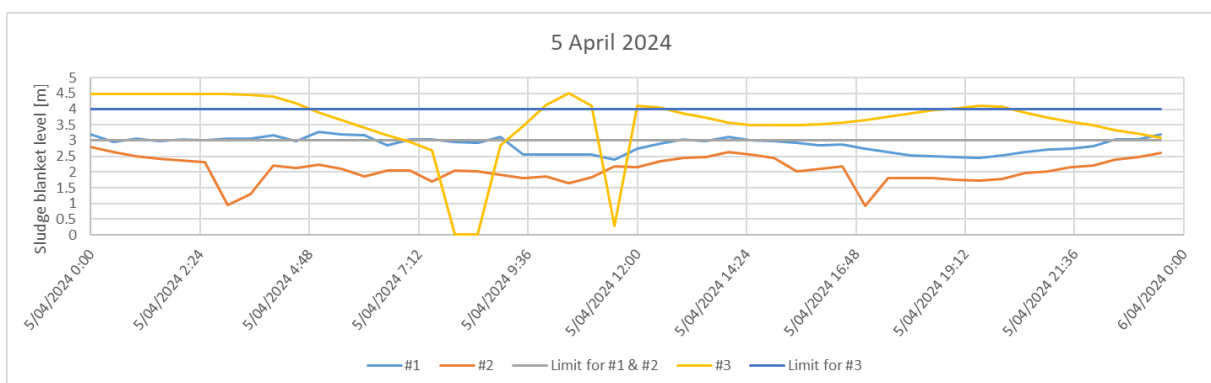


Figure 13 Sludge blanket levels on 5 April

Summary

Sludge blanket level in clarifier #3 exceeded the maximum limit indicating solids carry-over from the secondary clarifiers into the final effluent. This aligns with the UVT decrease.

Effluent quality on the high end of the optimum range is confirmed by the TSS analytical results from 5 April. It is important to note that MLSS concentration exceeded the optimum range and the secondary

clarifiers are prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s). Photos of the outfall during the UVT decrease which occurred during the day hours (10:40 am-12:55pm) were taken - see [Appendix I-Photos](#).

6 April

UVT values

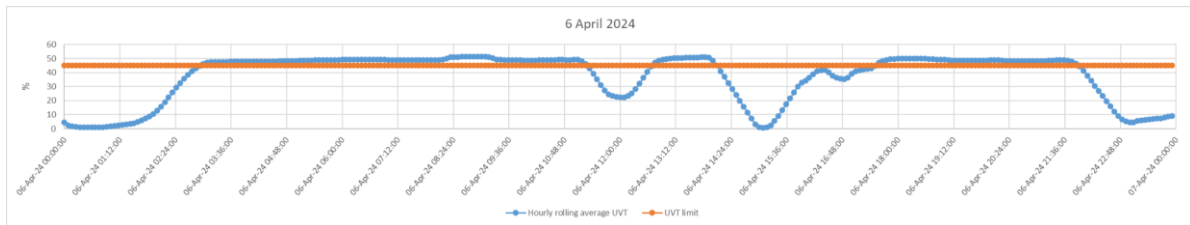


Figure 14 UVT Values on 6 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show increased concentration of TSS (69 g/m³) in the final effluent (24-hour flow-proportional sample) and UVT value was 67% (morning grab sample).

Influent flows

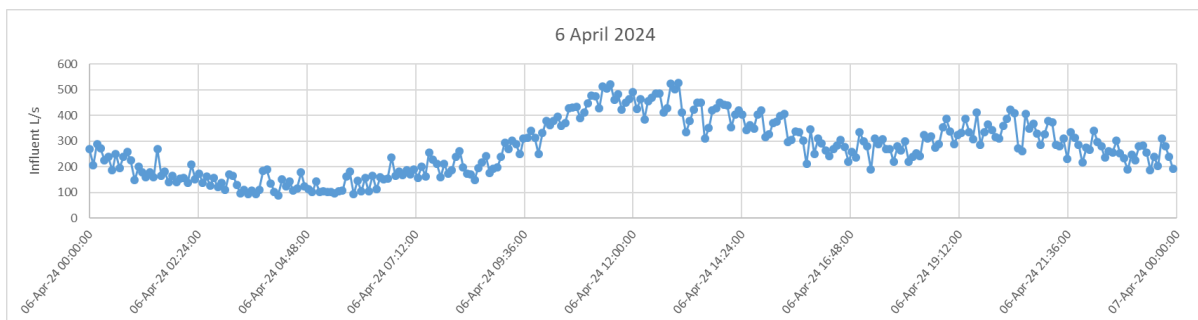


Figure 15 Inlet flows on 6 April

Sludge blanket levels

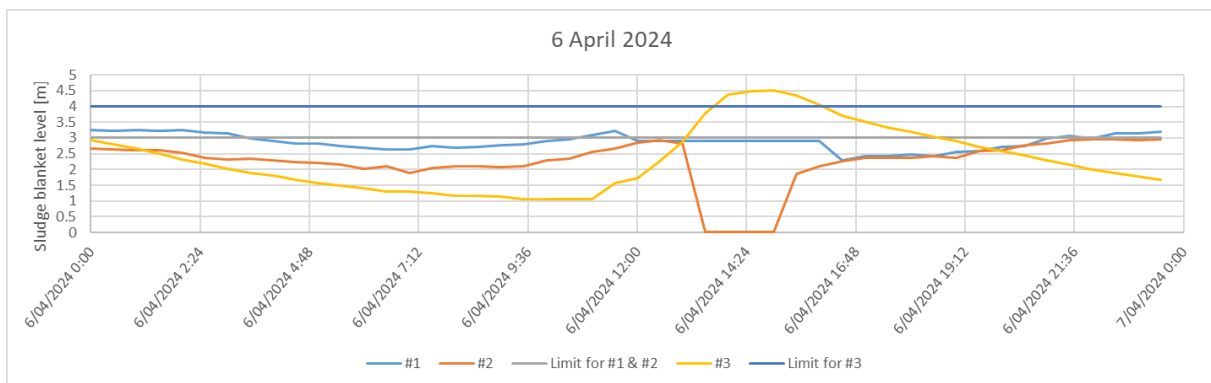


Figure 16 Sludge blanket levels on 6 April

Summary

Sludge blanket level in all clarifiers exceeded the maximum limit throughout the day indicating solids carry-over from the secondary clarifiers into the final effluent. This aligns with the TSS analytical

results from 6 April which indicate poor effluent quality. It is important to note that MLSS concentration exceeded the optimum range, and the secondary clarifiers are prone to become overloaded during higher than normal inlet flows (approx. 400 L/s).

7 April

UVT values

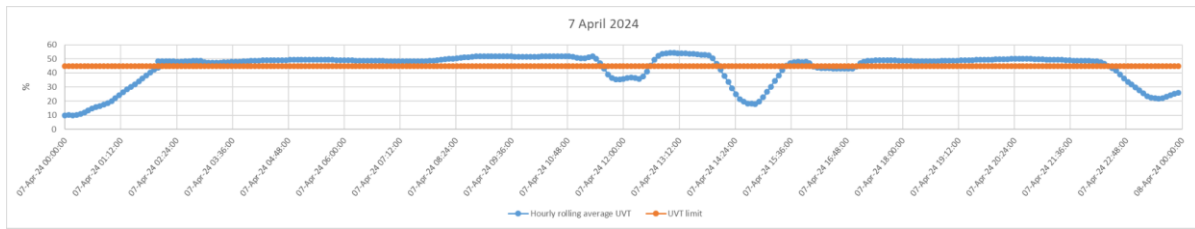


Figure 17 UVT Values on 7 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show good effluent quality. TSS (24-hour flow-proportional sample) were in a normal range (7 g/m³) and UVT value was 65% (morning grab sample).

Influent flows

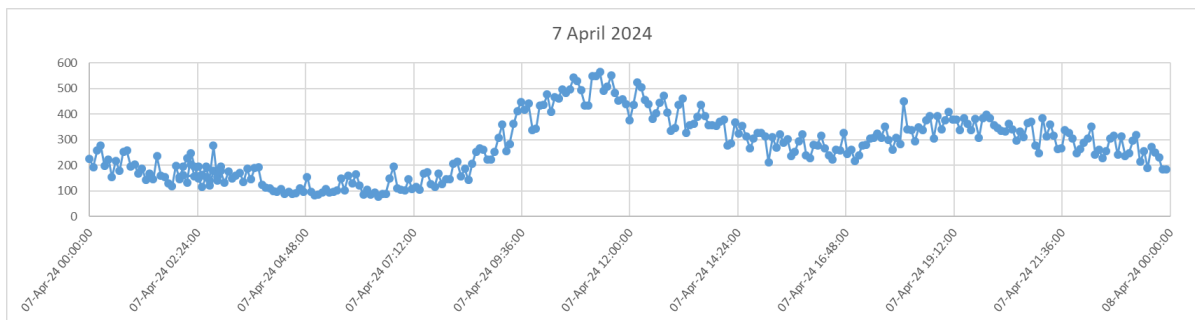


Figure 18 Inlet flows on 7 April.

Sludge blanket levels

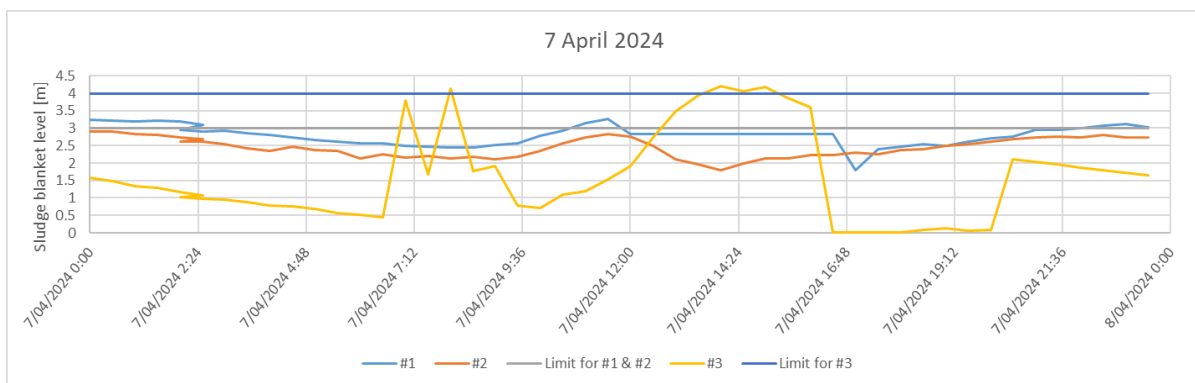


Figure 19 Sludge blanket levels on 7 April

Summary

Sludge blanket level in all clarifiers exceeded the maximum limit throughout the day indicating solids carry-over from the secondary clarifiers into the final effluent. Based on the TSS results this had a short-term effect on the effluent quality. It is important to note that MLSS concentration exceeded the optimum range, and the secondary clarifiers are prone to become overloaded during higher than normal inlet flows (approx. 400 L/s). Shoreline sampling was conducted from 7-9 April 2024 and results are given in [Appendix II- Shoreline monitoring](#).

9 April

UVT values

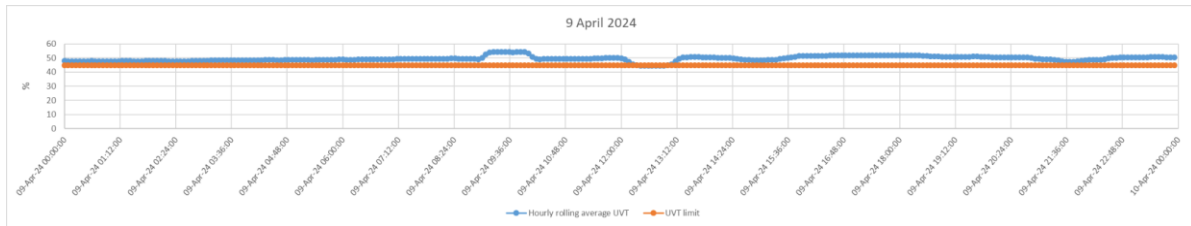


Figure 20 UVT Values on 9 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show good effluent quality. TSS (24-hour flow-proportional sample) were in a normal range (6 g/m³) and UVT value was 66% (morning grab sample).

Influent flows

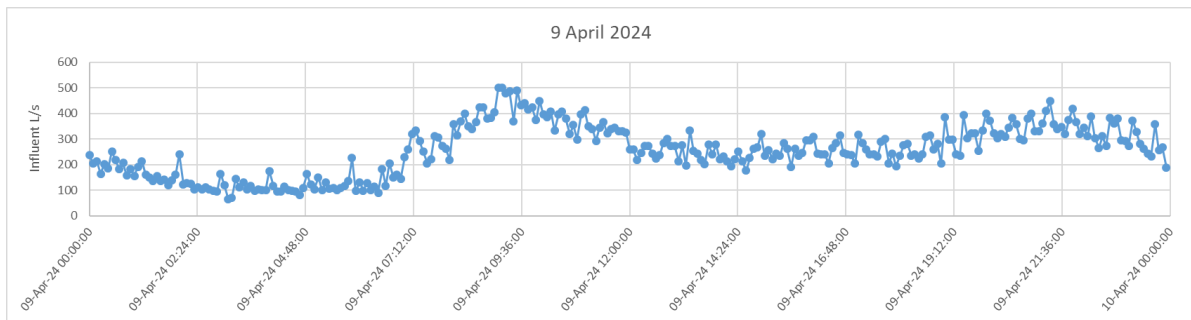


Figure 21 Inlet flows 9 April.

Sludge blanket levels

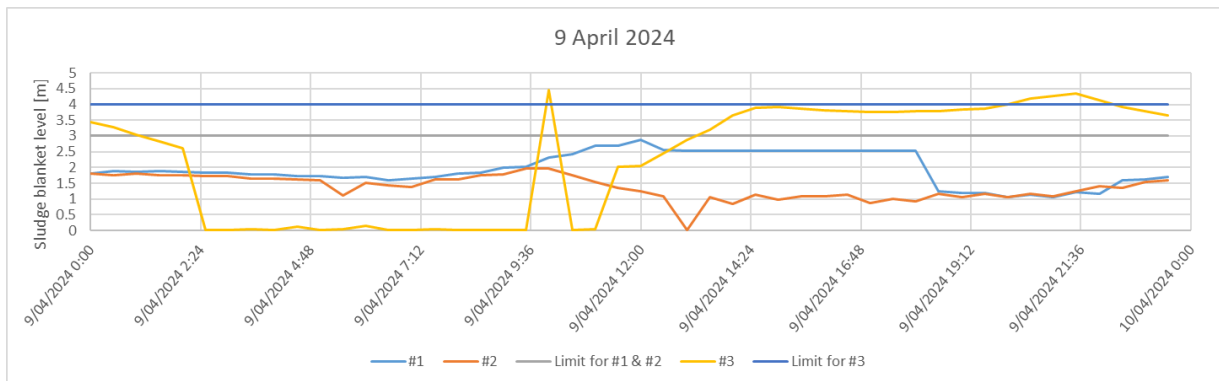


Figure 22 Sludge blanket levels on 9 April

Summary

Sludge blanket level in clarifier #3 exceeded the maximum limit indicating solids carry-over from the secondary clarifiers into the final effluent. Based on the TSS results and minimum UVT value of 44%, the exceedance was minor, having a short-term effect on the effluent quality. It is important to note that MLSS concentration exceeded the optimum range, and the secondary clarifiers are prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s). Shoreline sampling was conducted from 7-9 April 2024 and results are given in [Appendix II- Shoreline monitoring](#).

12 & 13 April

Separate Investigation report for the events on 12 & 13 April was prepared and submitted to WWL on 29 April 2024.

28 & 29 April

UVT values

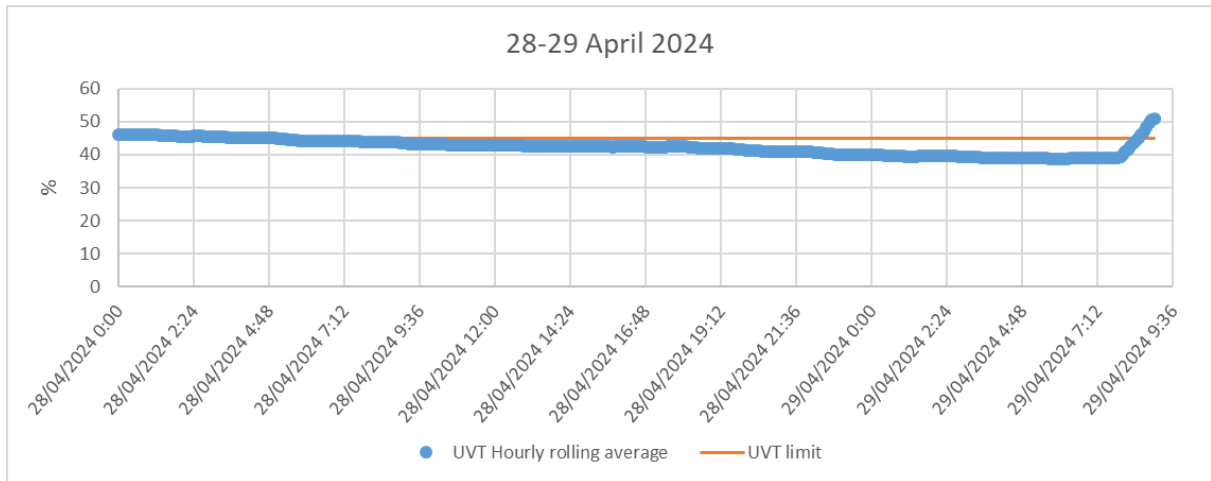


Figure 23 UVT Values on 1 April

Suspended solids (TSS) & UVT lab results

Results for daily effluent analysis show good effluent quality. TSS (24-hour flow-proportional sample) were in a normal range (6 g/m³).

Influent flows

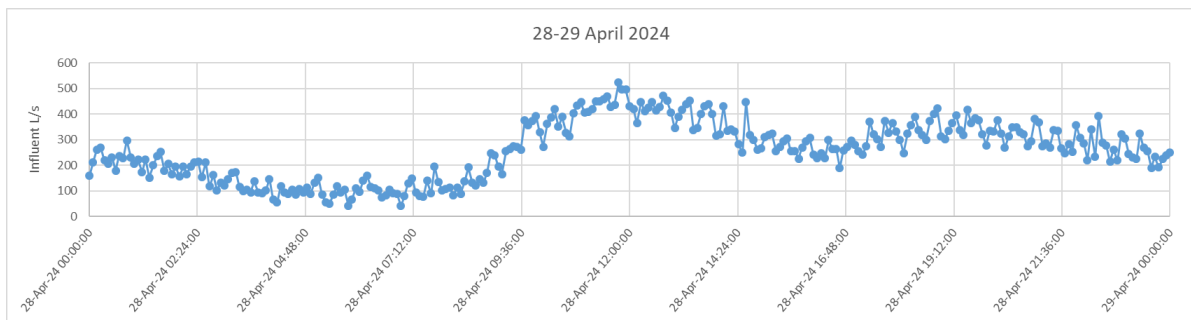


Figure 24 Inlet flows on 28- 29 April.

Sludge blanket levels

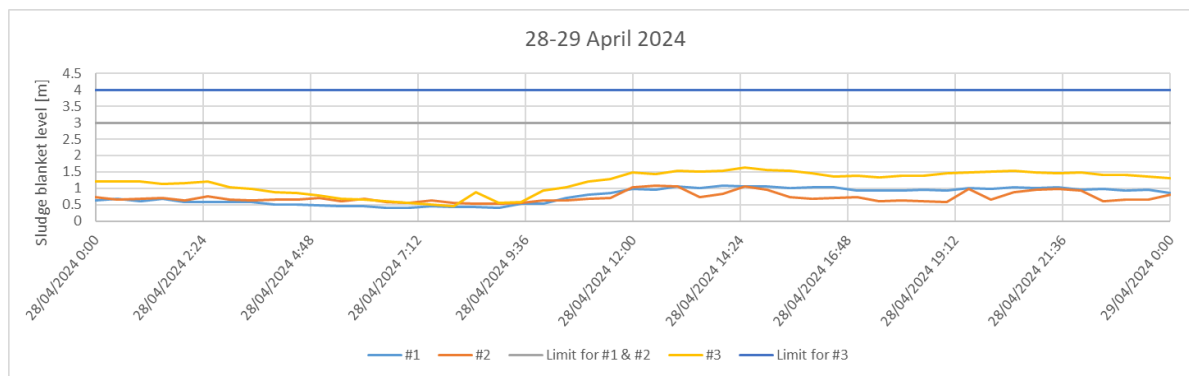


Figure 25 Sludge blanket levels on 28- 29 April

Summary

The UVT hourly rolling average decreased to 39% however there is no indication of poor final effluent quality. Sludge blanket levels are below the maximum limits.

Because of mechanical issues with the Duron UV channel penstock, the TAK unit is used to achieve reliable UV disinfection during the night-hours when the plant is not manned. The UVT readings are however received from the Duron channel. Because there is no flow through the Duron channel during night hours, the UVT readings are not reliable/representative.

CONCLUSION

- According to the condition 12D of Resource consent WGN200229, the hourly average of UV transmissivity (UVT) values shall not reduce below 45%.
- Values of hourly average for UVT dropped below the limit on the following days:
 - 1 April 2024
 - 3 April 2024
 - 4 April 2024
 - 5 April 2024
 - 6 April 2024
 - 7 April 2024
 - 9 April 2024
 - 12 April 2024
 - 13 April 2024
 - 28 & 29 April 2024
- Low values of the UVT parameter normally indicate poor water quality with increased suspended solids concentration.
- During the month of April, the Mixed Liquor Suspended Solids (MLSS) concentration exceeded the optimum range, and the secondary clarifiers were prone to become overloaded during higher-than-normal inlet flows (approx. 400 L/s). Increased MLSS accumulation in the system was a result of limited sludge removal capacity.
- To compensate for the solids accumulation in the system, Standard Operational Procedure is followed to balance the flows and solids distribution between the secondary clarifiers to avert the solids carry-over. However, during the increased flows of longer duration the solids carry-overs are unavoidable.
- The increased flows coupled with a high Mixed Liquor Suspended Solids resulted in low UVT values in the final effluent during 1- 13 April events.
- Low UVT values during 28 & 29 April were a result of the Duron channel being operational during daytime only.
- The planned sludge handling project is essential to reduce the risk of excessive accumulation of solids in the system. Until the full solids removal capacity is achieved, the plant will be prone to solids carry-overs during the increased inlet flows.
- It is important to note that some of the notifications during the April period were not submitted due to insufficient initial training introducing the conditions of the new Resource consent.

CORRECTIVE ACTIONS

Corrective Actions		Reference of issue on captured system or Defect raised	Responsibility	Measurement
Sludge removal	Spares list for the centrifuges to be prepared	Mechanical breakdowns of the dewatering system contributed to the accumulation of biomass in the aeration basin and secondary clarifiers. To eliminate the down-down of the equipment, a list of spares will be created and parts will be purchased accordingly.	Northern Team Leader/ Coordinator	Document created and submitted to WWL for review/approval Rivo action.
	Installation of new polymer pumps equipped with the VSDs.	Improved control of the dewatering process.	Northern Operations Coordinator/Team Leader	Rivo action
	Negotiations with the Spicer landfill to increase the volume of sludge accepted to the landfill.	Limited ability to remove the solids from the system resulting in sub-optimal accumulation in the process.	Wellington Water	Request sent for actioning - Email. Rivo action
	Solids Handling mitigating Measures were defined and timeline was agreed on between WWL and Veolia	Investigation report highlighted a number of actions which may reduce the risk of poor effluent during the high flows.	Northern Operations Team/Process engineer	Regular meetings and meeting agreed targets
UVT probe operation	Installation of additional UVT probe in the TAK channel	If the TAK UV channel is used because of the Duron UV system malfunction, the online UVT readings are not representative. Project for the UVT probe installation in the TAK channel is ongoing.	Process Engineer	Rivo action
	Repositioning of the UVT probe in the Duron channel to improve its functionality	Overall, the readings from the UVT probe are significantly lower than the analytical results received from the third-party laboratory. Expert technician suggested a number of improvements to be conducted to improve the measurement.	Process Engineer / Northern Team Leader	Rivo action

Appendix I- Photos

3 April

Date: 03/04/2024
Time: 08:00 am



5 April

Date: 05/04/2024

Time: approx 11:00am



Appendix II- Shoreline monitoring

200m South West of Outfall

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
07/04/2024	9:28	40	8.07	38	10.27	15.8	S	Light	High	Ebb
08/04/2024	9:28	100	8.09	38	10.7	16.6	NW	Moderate	High	Flood
09/04/2024	9:08	70	8.03	38	10.27	17.1	NW	Strong	High	Flood
13/04/2024	08:57	250	8.21	37	10.42	16.4	N	Light	Mid	Flood
14/04/2024	09:05	20	8.21	38	10.55	15.0	S	Light	Mid	Flood
15/04/2024	9:45	10	8.25	38	11.2	16.8	N	Strong	Low	Flood
16/04/2024	9:21	10	8.22	38	10.47	16.6	N	Strong	Low	Flood

Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
07/04/2024	9:28	0.1	0.1	0.1	0.075	0.708	0.054
08/04/2024	9:28	0.1	0.1	0.1	0.077	0.771	0.081
09/04/2024	9:08	0.04	0.1	0.1	0.071	0.296	0.14
13/04/2024	08:57	0.20	0.1	0.1	0.034	0.459	0.047
14/04/2024	09:05	0.01	0.1	0.1	0.047	0.72	0.054
15/04/2024	9:45	0.1	0.1	0.1	0.028	0.183	0.1
16/04/2024	9:21	0.05	0.1	0.1	0.008	0.268	0.1

140m East of Outfall

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
07/04/2024	9:18	30	8.1	38	10.15	14.9	S	Light	High	Ebb
08/04/2024	9:51	30	8.07	39	10.96	15.7	NW	Moderate	High	Flood
09/04/2024	9:28	60	8.09	38	10.43	16.5	NW	Strong	High	Flood
13/04/2024	09:31	500	8.26	37	10.21	16.4	N	Light	Mid	Flood
14/04/2024	09:21	40	8.23	38	10.37	16.1	S	Light	Mid	Flood
15/04/2024	10:05	10	8.21	39	10.35	16.7	N	Strong	Low	Flood
16/04/2024	9:48	120	8.17	38	10.35	16.7	N	Strong	Low	Flood

Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
07/04/2024	9:18	0.11	0.1	0.1	0.063	0.78	0.07
08/04/2024	9:51	0.02	0.1	0.1	0.012	0.587	0.05
09/04/2024	9:28	0.06	0.1	0.1	0.046	0.328	0.052
13/04/2024	09:31	0.16	0.10	0.10	0.030	0.610	0.155

14/04/2024	09:21	0.11	0.1	0.10	0.024	0.762	0.057
15/04/2024	10:05	0.02	0.1	0.1	0.007	0.272	0.005
16/04/2024	9:48	0.04	0.1	0.1	0.003	0.34	0.05

Titahi Bay (Surf Club) at Toms Road

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
07/04/2024	9:00	460	8.21	38	10.43	16.5	S	Light	High	Ebb
08/04/2024	9:58	10	8.07	38	10.96	15.7	NW	Moderate	High	Flood
09/04/2024	9:37	40	8.1	38	10.47	16.9	NW	Strong	High	Flood
13/04/2024	09:16	210	8.27	38	9.97	16.6	N	Light	Mid	Flood
14/04/2024	09:32	80	8.16	38	10.54	15.6	S	Light	Mid	Flood
15/04/2024	10:11	10	8.17	39	10.73	16.7	N	Strong	Low	Flood
16/04/2024	9:54	50	8.16	38	11.22	16.4	N	Strong	Low	Flood

Control Site

Date	Time	Enterococci	pH	Salinity	Dissolved Oxygen	Temp.	Wind Direction	Wind Strength	Tide	Sea Conditions
dd/mm/yyyy	hh:mm	cfu/100mL	-	g/m3	g/m3	C	--	--	--	--
07/04/2024	-	-	-	-	-	-	S	Light	High	Ebb
08/04/2024	10:22	10	8.14	38	10.46	16.4	NW	Moderate	High	Flood
09/04/2024	9:58	30	8.05	38	10.35	17	NW	Strong	High	Flood
13/04/2024	09:43	260	8.32	36	10.72	16.7	N	Light	Mid	Flood
14/04/2024	09:50	100	8.22	38	10.87	15.6	S	Light	Mid	Flood
15/04/2024	10:42	10	8.17	37	10.73	16.7	N	Strong	Low	Flood
16/04/2024	10:18	280	8.16	38	11.22	16.4	N	Strong	Low	Flood

Date	Time	Total Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Dissolved Reactive Phosphorus	Total Nitrogen	Total Phosphorus
dd/mm/yyyy	hh:mm	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
07/04/2024	-	-	-	-	-	-	-
08/04/2024	10:22	0.01	0.1	0.1	0.04	0.269	0.05
09/04/2024	9:58	0.01	0.1	0.1	0.09	0.143	0.025
13/04/2024	09:43	0.01	0.1	0.1	0.02	0.280	0.025
14/04/2024	09:50	0.01	0.1	0.1	0.005	0.18	0.022
15/04/2024	10:42	0.02	0.1	0.1	0.006	0.185	0.1
16/04/2024	10:18	0.05	0.1	0.1	0.002	0.455	0.1