



Akaroa

Wastewater Treatment Plant

Annual Monitoring Report

July 2017 – June 2018

Prepared by: Citycare Water
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On behalf of:

Christchurch City Council, City Water & Waste Unit

31 August 2018



Resource Consent Number: CRC133179 (replaces CRC071865.1)
File Number: CO6C/01282
Client Name: Christchurch City Council (City Solutions)
To: To discharge contaminants into the Coastal Waters.
Consent Location: Red House Bay, Beach Road, AKAROA HARBOUR
State: Current

Events:

8/09/2013 Commencement Date
8/09/2020 Consent Expires
8/09/2020 Lapse Date if not Given Effect To

1	The discharge shall be only treated wastewater from the Akaroa Wastewater Treatment Plant (WWTP), located at Redhouse Bay, Akaroa Harbour at or about map reference (NZMG) NZMS 260: N37: 0569-0984; (NZTM) Topo 50: BY25:9568-4825, as shown on Plan CRC133179A, which forms part of this consent.
	Compliance
2	Treated wastewater from the Akaroa Wastewater Treatment Plant shall be discharged into Akaroa Harbour via an existing 100 metre long submerged outfall at or about map reference (NZMG) NZMS 260: N37: 0558-0991; (NZTM) Topo 50: BY25:9558-4831, as shown on Plan CRC133179A.
	Compliance
3	Warning notices, which can be read from a distance of five metres, shall be erected and maintained at the following locations: On the shoreline 400 metres either side of the point on the shoreline nearest the outfall, and Beside Beach Road adjacent to the rocks that lead out to Green Point. The warning notices shall advise the public of the existence of a wastewater outfall and the dangers of swimming in the area or eating shellfish collected in that location.
	Compliance
4	a. The volume of wastewater discharged from the Akaroa Wastewater Treatment Plant shall be continuously recorded using a flow meter. b. The readings from the flow meter shall be recorded in litres per second and shall be used to calculate the daily volume of wastewater discharged from the treatment plant. These daily volumes shall be recorded and used to determine compliance with Condition (5).
	Compliance (Attachment 1)
5	The volume of treated wastewater discharged shall not exceed 750 cubic metres per day, except during rainfall events of a total of 50 millimetres or more over three consecutive days. Note: For the purposes of this condition, the rainfall shall be that measured at the Akaroa EWS weather station operated by NIWA (Agent number = 36593).
	Non Compliant (Attachments 1.1, 1.2 and 2.1); >750m³ recorded on 23 occasions, but 5 of these were when rainfall exceeded depth of 50mm.
6	Treated wastewater shall be sampled after treatment and prior to discharge into Akaroa Harbour via the outfall. The samples shall be grab samples collected at the frequencies specified, and analysed for the contaminants listed in Table 1: Treated wastewater quality monitoring – contaminants and sampling frequency Weekly (1 Dec-28 Feb) Faecal coliforms, enterococci, total suspended solids (TSS), total five day biochemical, oxygen demand (BOD5), dissolved reactive phosphorous (DRP), ammonia, Nitrogen oxides (NOx), total phosphorus (TP), Total nitrogen (TN), temperature Monthly (between 1 Mar and 30 Nov) Faecal coliforms, enterococci, total suspended solids (TSS), BOD5, DRP, ammonia, NOx, TP, TN, temperature Annually (during Jan) lead, copper, chromium, cadmium, zinc
	Compliance (Attachment 3.1)
7	Sampling shall be undertaken in accordance with the sampling schedule in Conditions (6), (12) and (16). The schedule shall seek to incorporate sampling during times with variable environmental parameters listed in Condition (20) (b) to (d) This schedule is to be agreed with the Canterbury Regional Council’s RMA Compliance and Enforcement Manager within one month of the commencement of this consent.
	Compliance
8	The median concentration of faecal coliforms in the treated wastewater shall not exceed 1,000 per 100 millilitres
	Non-compliant (Attachment 3.1); median was exceeded on 6 occasions.

9	The consent holder shall use the best practicable option to ensure the median concentration of BOD5 and TSS does not exceed 30 grams per cubic metre
	Compliance for BOD₅ (Attachment 3.1); maximum medians were 15 mg/l BOD₅ Compliance for TSS (Attachment 3.1); max median of 29 mg/L
10	For the purposes of conditions (8) and (9) the median shall be calculated from the results of any five consecutive treated wastewater samples analysed
	Compliance (Attachment 3.1)
11	The receiving water shall be sampled and analysed for faecal coliforms and enterococci at the following locations, as shown on Plan CRC133179B, which forms part of this consent: a. At the shoreline nearest the outfall; b. 400 metres along the shoreline in a southerly direction from Site (a); and c. 400 metres along the shoreline in a northerly direction from Site (a).
	Compliance (Attachment 3.2)
12	Receiving water sampling and analysis for faecal coliforms and enterococci concentrations shall occur at least weekly between 1 December and 28 February each year and at least monthly for faecal coliforms between 1 March and 3 November each year. Receiving water sampling shall occur within six hours of treated wastewater sampling.
	Compliance (Attachment 3.2)
13	In the event that the analysis of receiving water samples collected at each site beyond the 250 metre mixing zone in accordance with Conditions (11) and (12) indicates: a. A concentration of faecal coliforms that exceeds a rolling median of 14 faecal coliforms per 100 millilitres from the previous five samples collected in the period 1 December to 28 February each year, the consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of detecting the exceedance; b. That the concentration of the faecal coliforms in more than ten percent of total samples collected between 1 December and 28 February each year exceeds 43 faecal coliforms per 100 millilitres, the consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of detecting the exceedance.
	Compliant: ECAN was notified.
14	The notification required under Condition (13) shall include the information required to be collected in Condition (20) and shall identify whether the exceedance is likely to have resulted from wastewater discharged from the Akaroa Wastewater Treatment Plant and if so, shall detail what measures the consent holder has implemented or will implement to mitigate any adverse environmental effects as a result of the exceedance, and to prevent a reoccurrence.
	CCC provided reports throughout the year
15	Grab samples of the receiving water shall be collected and analysed for temperature, Total Nitrogen (TN), Dissolved Inorganic Nitrogen (DIN, calculated as NO _x + ammonia), Total Phosphorus (TP), chlorophyll-a and Dissolved Reactive Phosphorus (DRP) at the following locations as shown on Plan Consent detail CRC133179C, which forms part of this consent: a. 250 metres due north of the outfall; b. 250 metres due west of the outfall; c. 250 metres due south of the outfall; d. A control site located at or about map reference (NZMG) NZMS 260: N36:0592-1117; (NZTM) Topo 50: BY25:959-4958, located in French Bay; and e. A control site located at or about map reference (NZMG) NZMS 260: N36:0472-1056; (NZTM) Topo 50: BY25:9471-4897, [potential site of long term outfall].
	Compliance (Attachment 3.3)
16	The receiving water sampling and analysis carried out in accordance with Condition (15) shall occur once every three weeks between 1 December and 28 February each year such that a total of four samples are taken over the summer period. Receiving water sampling shall occur within six hours of treated wastewater sampling.
	Compliance (Attachment 3.3)
17	For individual sampling events (as detailed in Condition (16)), if the analysis of receiving water samples collected in accordance with Conditions (15) (a) to (c) indicates trigger values of: a. Dissolved inorganic nitrogen (DIN) (combined total of NO _x and ammonia) that exceeds a median of 0.062 milligrams per litre (mg/L); b. Dissolved reactive phosphorus (DRP) that exceeds a median of 0.018 mg/L; and c. Ammonia that exceeds a maximum of 0.910 mg/L: the consent holder shall identify whether the Akaroa Wastewater Treatment Plant is operating abnormally and

	if so, shall record what measures the consent holder has implemented or will implement to return the Akaroa Wastewater Treatment Plant to normal operation, and to prevent a reoccurrence.
	Compliance (Attachment 3.3)
18	<p>Within one month of the end of the monitoring period required by Condition (16), the consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager if the trigger values specified in Condition (17) were exceeded.</p> <p>This notification shall include the information required to be collected in Condition (20) and shall identify whether the Consent detail exceedence is likely to have resulted from wastewater discharged from the Akaroa Wastewater Treatment Plant and if so, shall detail what measures the consent holder has implemented or will implement to mitigate any adverse environmental effects as a result of the exceedence, and to prevent a reoccurrence.</p>
	Compliance
19	<p>All wastewater and receiving environment samples shall:</p> <ol style="list-style-type: none"> be collected by a suitably qualified or experienced person; and be analysed at a laboratory accredited for the analyses to ISO guide 25, either by International Accreditation New Zealand (IANZ), or by an organisation with a mutual agreement with IANZ.
	Compliance
20	<p>At the time the wastewater and receiving environment samples are collected, the following parameters shall be recorded;</p> <ol style="list-style-type: none"> time and date of sampling and time delay between wastewater and receiving environment samples collection; the precipitation over the three consecutive days prior to sampling; the tidal state in the receiving environment at the time of sampling in the receiving environment; and wind direction and strength.
	Compliance (Attachment 3.3)
21	The consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, any sampling results required by this consent during each month by the 10th working day of the following month.
	Compliance via this report
22	<p>The consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an annual report prepared by a suitably qualified person by 31 August each year which includes, but is not limited to the following:</p> <ol style="list-style-type: none"> Results of the monitoring undertaken in the previous year from 1 July to 30 June; An analysis of monitoring results against limits and trigger values specified in Conditions (8), (9), (13) and (17) of this consent; A comparison of monitoring results for control sites and sites on the edge of the mixing zone for parameters as specified in Conditions (15) to (17). An analysis of the extent of correlation between the receiving water monitoring results and treated wastewater monitoring results, as required in Conditions (6), (11), (12), (15) and (16). This shall include an assessment of the information collected for Condition (20), its impact on the results and any changes to the sampling regime as a result of this analysis that have been agreed with Canterbury Regional Council; Comparison of monitoring results as required in Conditions (6), (11), (12), (15) and (16) with historical data; Comparison of the monitoring results required in Conditions (6), (11), (12), (15) and (16). with operation and performance issues from the WWTP; Consent detail An interpretation of the results in relation to the effects of the discharge on the environment; Identification of any measures taken to remedy any exceedences; Details of all changes or upgrades to the treatment plant that may affect the quality or volume of treated wastewater discharged; and Summary of any inflow and/or infiltration investigations or works undertaken in the reporting period.
	See below
23	Copies of all monitoring results and reports relating to the discharge from the Akaroa Wastewater Treatment Plant shall be made available to the community via the Akaroa Service Centre and the Christchurch City Council website.
	CCC to follow up
24	<p>The consent holder shall submit to the Canterbury Regional Council, within six months of the grant of this consent, a management plan that details;</p> <ol style="list-style-type: none"> measures that will be taken to ensure compliance with the consent limits specified in this consent relating to treated wastewater, as specified in Condition (8) and (9) and receiving environment microbiological parameters specified in Condition (13); and; Contingency measures in response to mechanical or electrical failures.

	Compliance
25	The consent shall be exercise in accordance with the management plan.
	Compliance
26	The consent holder shall achieve the following milestones within the term of this consent: <ul style="list-style-type: none"> a. Lodge all applications for the approvals under the Resource Management Act 1991 required to commission the new Akaroa Wastewater Treatment Plant no later than 30 June 2014; b. Award contracts for the construction of the new Wastewater Treatment Plant within eight calendar months of the commencement of the resource consents sought under clause (a) of this condition; c. Require contractors to commence construction on the site of the new Wastewater Treatment Plant within nine months of awarding the contracts under clause (b) of this condition; d. To have a fully operational new Wastewater Treatment Plant within 36 months of awarding the contracts under clause (b) of this condition.
	CCC to follow up
27	The discharge from Akaroa WWTP at or about map reference (NZMG) NZMS 260: N37: 0558-0991; (NZTM) Topo 50: BY25:9558-4831, shall cease no more than five years following the commencement of Coastal Permit CRC133179. The consent holder shall submit an annual progress report to the Canterbury Regional Council by the 31 August each year detailing progress made towards meeting the deadline for cessation of the discharge and the clauses of Condition (26).
	CCC to follow up
28	The Canterbury Regional Council may, on any of the last five working days of May or November each year, serve notice of its intention to review the conditions of this consent for the purposes of: <ul style="list-style-type: none"> a. dealing with any adverse effects on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; b. requiring the adoption of the best practicable option to remove or reduce any adverse effects on the environment; requiring the consent holder to conduct monitoring instead of, or in addition to, that required by the consent; and c. complying with the requirements of a relevant rule in an operative regional plan.
	ECAN to request

Treatment Plant Effluent Monitoring

Flows into the Akaroa Wastewater Treatment Plant (WWTP) were under recording, with a new flowmeter being fitted in early July 2017. Flow recorder since then have resulted in exceedences 73 times for the Dry weather flows (750 m³/day) on 19 occasions there was sufficient rain to be compliant leaving 50 non-compliant days. Flows through the plant were up on previous years with 236,327m³, the previous reporting period (i.e., 86,127m³ in 2016-2017 albeit the meter was under recording) 95th percentile for flow recorded at 1,150 m³/d (Attachment 1.3).

Plant performance relating to organic parameters BOD₅ & TSS was good, with no exceedences above the 30-mg/L median limits for effluent quality, there was one TSS single sample which exceeded 30 on 1 occasion (max =33) (Table 1 & attachment 3.1).

Four faecal coliform (FC) exceedences were recorded over the summer period (1Dec17 – 28Feb18) with a further 2 occurring in early March 2018, when an increased loading was received at the plant considered to coincide with the high summer seasonal holiday population.

Receiving Environment Monitoring

Some trigger limits were exceeded for human-health related parameters (Attachment 3.2). 20.5% of samples of FC samples were >43 CFU/100mL. 3 of the 39 summer samples (5 sample median) exceeded 14 CFU/100mL FC.

Nutrient data gathered from the receiving environment did not exceed trigger values at any locations for DIN (Attachment 3.3).

Table 1. Summary of Monitoring Non-Compliances from July 2017-June 2018.

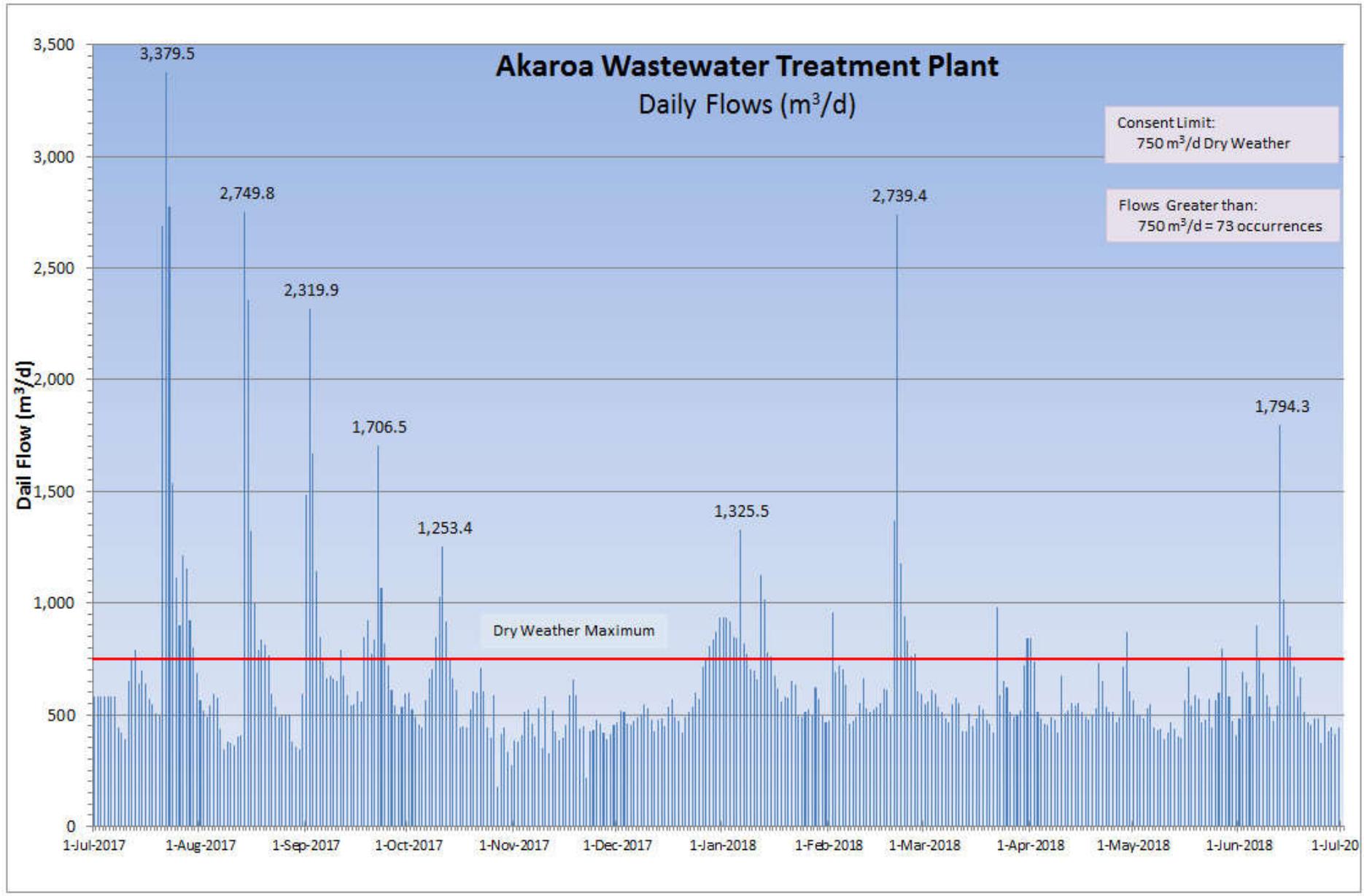
Treatment Plant Effluent			
Parameter	Single Samples Exceeding Limit	Median Limit Exceedances	Condition Non-Compliances
Dry Weather Flow > 750 m ³ /d	73	-	54
		-	
BOD ₅ > 30 mg/L	0	0	0
TSS > 30 mg/L	1	0	
FC > 1,000 CFU/100 mL	7	6	6
Receiving Environment			
Parameter	Single Samples Exceeding Limit	Median Limit or % Exceedances	Condition Non-Compliances
Summer FC > 14 CFU/100 mL	11	3	NA
<10% Summer FC > 43 CFU/100 mL	8	20.5	
DIN > 0.062 mg/L (cond 17a) 250m	0		0
250 m North		0.015	
250m West		0.015	
250m South		0.031	
DRP median > 0.018 mg/L (cond 17b)	0		
250 m North		0.009	
250m West		0.009	
250m South		0.012	
NH3 median > 0.910 mg/L (cond 17c)	0		
250 m North		0.015	
250m West		0.005	
250m South		0.013	

Attachment 1.1: Flows, Akaroa, Data

Akaroa Wastewater Treatment, Banks Peninsula: Daily Flows for July 2017 - June 2018							
Plant							
Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
1-Jul-2017	580.2	1-Oct-2017	597.3	1-Jan-2018	932.4	1-Apr-2018	843.5
2-Jul-2017	580.2	2-Oct-2017	524.4	2-Jan-2018	935.8	2-Apr-2018	735.6
3-Jul-2017	580.2	3-Oct-2017	491.3	3-Jan-2018	915.7	3-Apr-2018	510.8
4-Jul-2017	580.2	4-Oct-2017	455.1	4-Jan-2018	849.8	4-Apr-2018	485.3
5-Jul-2017	580.2	5-Oct-2017	445.0	5-Jan-2018	840.3	5-Apr-2018	459.1
6-Jul-2017	580.2	6-Oct-2017	565.3	6-Jan-2018	1,325.5	6-Apr-2018	456.1
7-Jul-2017	580.2	7-Oct-2017	665.3	7-Jan-2018	818.1	7-Apr-2018	490.9
8-Jul-2017	442.3	8-Oct-2017	704.4	8-Jan-2018	771.6	8-Apr-2018	476.2
9-Jul-2017	421.6	9-Oct-2017	845.0	9-Jan-2018	703.0	9-Apr-2018	420.0
10-Jul-2017	390.0	10-Oct-2017	1,029.7	10-Jan-2018	699.5	10-Apr-2018	674.6
11-Jul-2017	651.5	11-Oct-2017	1,253.4	11-Jan-2018	658.5	11-Apr-2018	504.5
12-Jul-2017	752.5	12-Oct-2017	917.3	12-Jan-2018	1,124.5	12-Apr-2018	514.9
13-Jul-2017	792.1	13-Oct-2017	743.4	13-Jan-2018	1,017.5	13-Apr-2018	552.0
14-Jul-2017	639.8	14-Oct-2017	662.3	14-Jan-2018	775.4	14-Apr-2018	538.4
15-Jul-2017	695.6	15-Oct-2017	607.8	15-Jan-2018	758.3	15-Apr-2018	551.7
16-Jul-2017	640.1	16-Oct-2017	441.7	16-Jan-2018	671.2	16-Apr-2018	509.5
17-Jul-2017	567.4	17-Oct-2017	448.2	17-Jan-2018	617.3	17-Apr-2018	489.1
18-Jul-2017	548.9	18-Oct-2017	440.3	18-Jan-2018	558.2	18-Apr-2018	474.8
19-Jul-2017	507.9	19-Oct-2017	522.2	19-Jan-2018	582.6	19-Apr-2018	501.2
20-Jul-2017	492.9	20-Oct-2017	604.2	20-Jan-2018	573.0	20-Apr-2018	527.6
21-Jul-2017	2,686.2	21-Oct-2017	596.5	21-Jan-2018	653.7	21-Apr-2018	729.6
22-Jul-2017	3,379.5	22-Oct-2017	710.8	22-Jan-2018	633.2	22-Apr-2018	653.1
23-Jul-2017	2,774.1	23-Oct-2017	605.6	23-Jan-2018	497.4	23-Apr-2018	535.7
24-Jul-2017	1,536.7	24-Oct-2017	443.8	24-Jan-2018	488.8	24-Apr-2018	510.3
25-Jul-2017	1,114.7	25-Oct-2017	397.5	25-Jan-2018	513.4	25-Apr-2018	511.9
26-Jul-2017	901.3	26-Oct-2017	585.8	26-Jan-2018	524.1	26-Apr-2018	467.4
27-Jul-2017	1,212.5	27-Oct-2017	174.2	27-Jan-2018	502.5	27-Apr-2018	490.5
28-Jul-2017	1,152.9	28-Oct-2017	411.0	28-Jan-2018	620.8	28-Apr-2018	712.0
29-Jul-2017	921.6	29-Oct-2017	444.0	29-Jan-2018	569.0	29-Apr-2018	869.5
30-Jul-2017	801.7	30-Oct-2017	333.1	30-Jan-2018	492.4	30-Apr-2018	605.4
31-Jul-2017	686.1	31-Oct-2017	271.8	31-Jan-2018	468.3	1-May-2018	563.3
1-Aug-2017	566.6	1-Nov-2017	384.2	1-Feb-2018	472.9	2-May-2018	501.2
2-Aug-2017	518.6	2-Nov-2017	378.8	2-Feb-2018	955.4	3-May-2018	502.2
3-Aug-2017	490.4	3-Nov-2017	405.7	3-Feb-2018	689.6	4-May-2018	480.4
4-Aug-2017	543.3	4-Nov-2017	512.6	4-Feb-2018	720.7	5-May-2018	529.8
5-Aug-2017	592.5	5-Nov-2017	525.5	5-Feb-2018	700.9	6-May-2018	546.1
6-Aug-2017	576.4	6-Nov-2017	460.1	6-Feb-2018	632.6	7-May-2018	442.5
7-Aug-2017	434.7	7-Nov-2017	400.1	7-Feb-2018	462.4	8-May-2018	431.7
8-Aug-2017	344.1	8-Nov-2017	528.6	8-Feb-2018	474.3	9-May-2018	438.4
9-Aug-2017	377.7	9-Nov-2017	348.4	9-Feb-2018	490.1	10-May-2018	388.9
10-Aug-2017	374.1	10-Nov-2017	580.6	10-Feb-2018	555.2	11-May-2018	421.7
11-Aug-2017	361.5	11-Nov-2017	328.4	11-Feb-2018	663.9	12-May-2018	464.0
12-Aug-2017	403.6	12-Nov-2017	515.9	12-Feb-2018	528.3	13-May-2018	438.6
13-Aug-2017	409.3	13-Nov-2017	424.0	13-Feb-2018	513.7	14-May-2018	401.3
14-Aug-2017	2,749.8	14-Nov-2017	383.9	14-Feb-2018	521.3	15-May-2018	397.3
15-Aug-2017	2,357.6	15-Nov-2017	398.7	15-Feb-2018	533.4	16-May-2018	562.2
16-Aug-2017	1,321.2	16-Nov-2017	454.0	16-Feb-2018	551.1	17-May-2018	714.9
17-Aug-2017	995.7	17-Nov-2017	585.8	17-Feb-2018	616.2	18-May-2018	542.7
18-Aug-2017	786.9	18-Nov-2017	659.2	18-Feb-2018	611.5	19-May-2018	584.7

Date	Flow (m ³ /d)						
19-Aug-2017	835.4	19-Nov-2017	586.5	19-Feb-2018	494.1	20-May-2018	572.6
20-Aug-2017	811.0	20-Nov-2017	438.2	20-Feb-2018	1,370.0	21-May-2018	468.0
21-Aug-2017	768.6	21-Nov-2017	448.3	21-Feb-2018	2,739.4	22-May-2018	477.9
22-Aug-2017	592.1	22-Nov-2017	215.3	22-Feb-2018	1,175.9	23-May-2018	567.0
23-Aug-2017	536.7	23-Nov-2017	422.3	23-Feb-2018	939.8	24-May-2018	443.2
24-Aug-2017	491.3	24-Nov-2017	429.6	24-Feb-2018	828.1	25-May-2018	561.7
25-Aug-2017	493.3	25-Nov-2017	478.3	25-Feb-2018	762.3	26-May-2018	600.2
26-Aug-2017	500.6	26-Nov-2017	461.7	26-Feb-2018	773.7	27-May-2018	797.4
27-Aug-2017	500.2	27-Nov-2017	416.5	27-Feb-2018	602.5	28-May-2018	751.7
28-Aug-2017	378.9	28-Nov-2017	387.7	28-Feb-2018	594.5	29-May-2018	581.5
29-Aug-2017	358.2	29-Nov-2017	412.4	1-Mar-2018	544.2	30-May-2018	471.6
30-Aug-2017	346.1	30-Nov-2017	456.3	2-Mar-2018	559.3	31-May-2018	405.2
31-Aug-2017	592.3	1-Dec-2017	462.9	3-Mar-2018	609.0	1-Jun-2018	485.0
1-Sep-2017	1,483.1	2-Dec-2017	517.7	4-Mar-2018	595.6	2-Jun-2018	691.5
2-Sep-2017	2,319.9	3-Dec-2017	514.0	5-Mar-2018	537.7	3-Jun-2018	644.0
3-Sep-2017	1,666.9	4-Dec-2017	459.0	6-Mar-2018	509.2	4-Jun-2018	580.2
4-Sep-2017	1,143.8	5-Dec-2017	453.2	7-Mar-2018	480.7	5-Jun-2018	494.0
5-Sep-2017	845.1	6-Dec-2017	469.8	8-Mar-2018	464.4	6-Jun-2018	900.5
6-Sep-2017	735.6	7-Dec-2017	490.6	9-Mar-2018	545.9	7-Jun-2018	756.8
7-Sep-2017	661.7	8-Dec-2017	501.6	10-Mar-2018	574.3	8-Jun-2018	685.3
8-Sep-2017	676.3	9-Dec-2017	544.6	11-Mar-2018	552.1	9-Jun-2018	585.6
9-Sep-2017	662.0	10-Dec-2017	529.8	12-Mar-2018	427.4	10-Jun-2018	533.0
10-Sep-2017	649.3	11-Dec-2017	477.4	13-Mar-2018	424.4	11-Jun-2018	471.5
11-Sep-2017	789.0	12-Dec-2017	426.6	14-Mar-2018	505.0	12-Jun-2018	541.1
12-Sep-2017	675.2	13-Dec-2017	475.1	15-Mar-2018	449.6	13-Jun-2018	1,794.3
13-Sep-2017	585.6	14-Dec-2017	485.4	16-Mar-2018	482.5	14-Jun-2018	1,016.6
14-Sep-2017	540.8	15-Dec-2017	450.9	17-Mar-2018	540.8	15-Jun-2018	852.4
15-Sep-2017	544.0	16-Dec-2017	532.9	18-Mar-2018	523.3	16-Jun-2018	809.5
16-Sep-2017	604.5	17-Dec-2017	569.0	19-Mar-2018	476.9	17-Jun-2018	711.7
17-Sep-2017	557.7	18-Dec-2017	486.9	20-Mar-2018	462.0	18-Jun-2018	580.9
18-Sep-2017	848.2	19-Dec-2017	470.1	21-Mar-2018	419.9	19-Jun-2018	667.4
19-Sep-2017	924.0	20-Dec-2017	421.5	22-Mar-2018	979.9	20-Jun-2018	509.7
20-Sep-2017	774.6	21-Dec-2017	487.6	23-Mar-2018	589.2	21-Jun-2018	464.6
21-Sep-2017	838.7	22-Dec-2017	514.6	24-Mar-2018	650.2	22-Jun-2018	453.1
22-Sep-2017	1,706.5	23-Dec-2017	535.6	25-Mar-2018	621.5	23-Jun-2018	482.7
23-Sep-2017	1,069.2	24-Dec-2017	601.2	26-Mar-2018	514.5	24-Jun-2018	481.5
24-Sep-2017	818.2	25-Dec-2017	572.5	27-Mar-2018	486.9	25-Jun-2018	373.6
25-Sep-2017	718.7	26-Dec-2017	714.4	28-Mar-2018	499.2	26-Jun-2018	492.0
26-Sep-2017	611.4	27-Dec-2017	741.9	29-Mar-2018	515.4	27-Jun-2018	423.9
27-Sep-2017	542.9	28-Dec-2017	808.7	30-Mar-2018	717.6	28-Jun-2018	442.6
28-Sep-2017	500.1	29-Dec-2017	836.4	31-Mar-2018	841.9	29-Jun-2018	415.3
29-Sep-2017	536.5	30-Dec-2017	872.2	1-Apr-2018	843.5	30-Jun-2018	445.2
30-Sep-2017	592.3	31-Dec-2017	932.4				

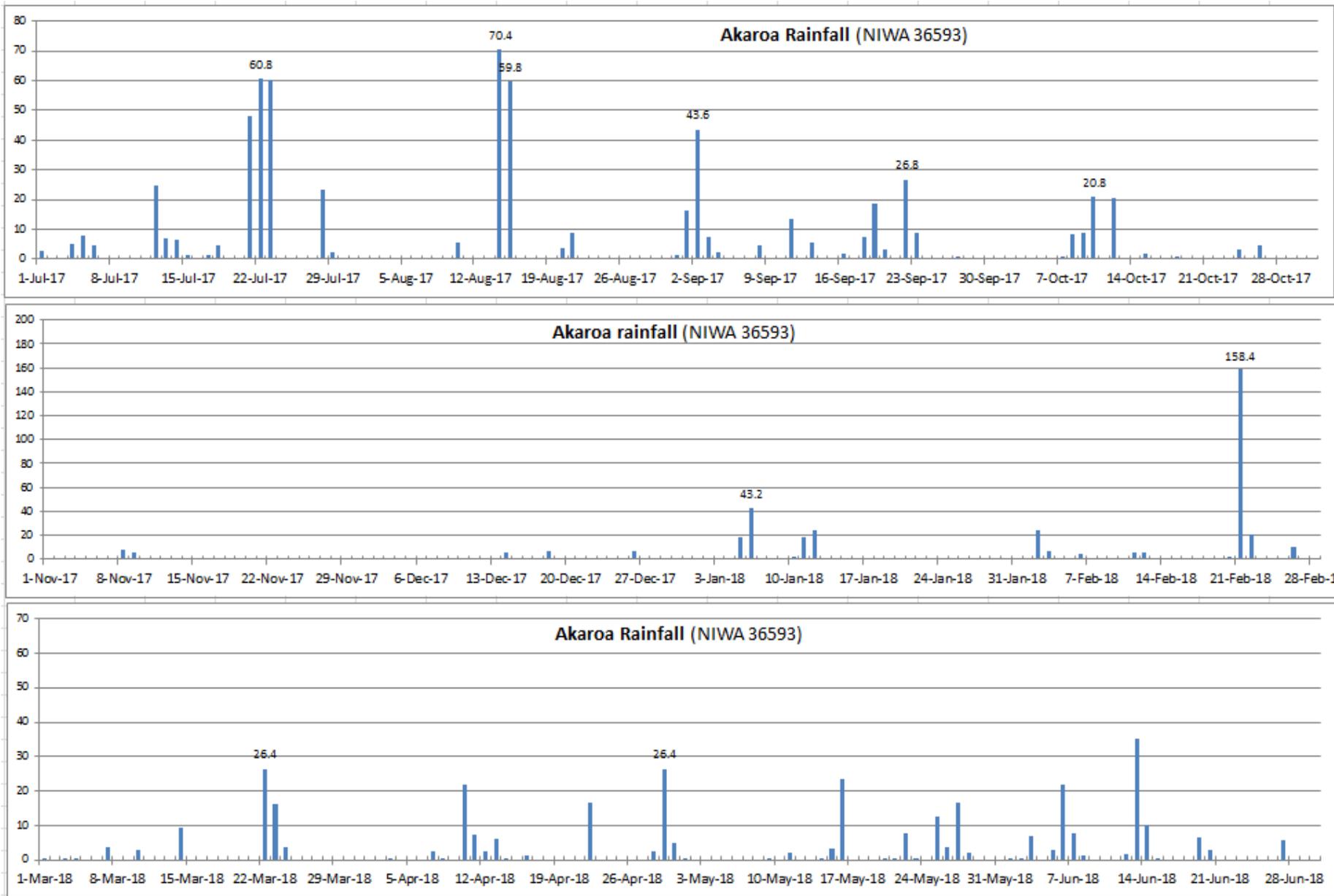
Attachment 1.2: Flows, Akaroa, Chart



Attachment 1.3: Flows, Akaroa, '% less than'



Attachment 2.1: Rainfall data



Attachment 3.1: Lab Data, Akaroa Wastewater Treatment Plant (Conditions 6-10)

Plant:	Akaroa Wastewater Treatment, Banks Peninsula													
Asset Owner:	Christchurch City Council													
Laboratory	Christchurch City Council Laboratory, City Water & Waste Unit													
						calc						5-Sample Median		
Date	NH ₄ -N [mg/l]	BOD ₅ [mg/l]	ENT MPN/100ml	FC CFU/100ml	Temp [deg C]	NOx [mg/l]	DRP [mg/l]	TP [mg/l]	TSS [mg/l]	TN [mg/l]	BOD ₅ [mg/l]	TSS [mg/l]	FC CFU/100ml	
17-Jul-17	14.0	14	10	10	NA	6.8	1.3	2.2	25	19	7.2	29	10	
24-Aug-17	9.9	10	10	10	NA	6.3	1.1	1.7	21	15	10.0	25	10	
14-Sep-17	11.0	9.5	10	60	11.8	5.0	1.2	1.1	18	12	10.0	22	10	
11-Oct-17	12.0	8	10	10	14.9	3.8	1.4	1.6	16	15	10.0	21	10	
2-Nov-17	23.0	19	10	30	18.6	5.2	1.9	2.7	28	23	10.0	21	10	
5-Dec-17	21.0	9.8	20	10	21.0	6.7	2.0	2.7	19	25	9.8	19	10	
13-Dec-17	16.0	9.5	41	870	NA	11.0	2.6	3.1	14	19	9.5	18	30	
20-Dec-17	12.0	8.6	10	70	NA	12.0	2.4	33.0	17	16	9.5	17	30	
27-Dec-17	24.0	17	1500	4400	NA	7.1	3.6	4.5	20	30	9.8	19	70	
3-Jan-18	37.0	18	2600	15000	NA	2.8	5.0	5.6	32	39	9.8	19	870	
10-Jan-18	19.0	15	910	2900	NA	11.0	3.0	5.0	28	25	15.0	20	2,900	
17-Jan-18	11.0	9	110	400	19.1	14.0	3.5	4.0	19	17	15.0	20	2,900	
24-Jan-18	2.9	11	430	20	NA	12.0	0.7	3.2	19	12	15.0	20	2,900	
31-Jan-18	8.1	8.6	10	10	NA	14.0	2.4	3.0	16	12	11.0	19	400	
7-Feb-18	13.0	14	280	33000	20.5	14.0	2.3	3.4	28	15	11.0	19	400	
14-Feb-18	13.0	15	3100	34000	NA	13.0	3.2	3.7	17	17	11.0	19	400	
20-Feb-18	11.0	12	10	10	21.0	14.0	3.1	3.7	22	15	12.0	19	20	
28-Feb-18	6.8	16	370	12000	NA	15.0	2.5	2.8	14	9.1	14.0	17	12,000	
14-Mar-18	11.0	12	1100	24000	19.0	16.0	3.0	3.4	17	14	14.0	17	24,000	
4-Apr-18	8.1	5.2	10	10	19.0	21.0	5.2	5.9	11	9.9	12.0	17	12,000	
2-May-18	0.8	4	10	10	14.5	17.0	2.3	2.8	7	1.5	12.0	14	10	
20-Jun-18	0.3	2.8	10	30	12.0	12.0	0.5	0.6	12	1.1	5.2	12	30	
	single	0		7					1	Limit	30	30	1,000	
										Exceedances	0	0	6	
										Max	15.0	29.0	24,000	
Date	As [mg/l]	Cd [mg/l]	Cr [mg/l]	Cu [mg/l]	Pb [mg/l]	Ni [mg/l]	Zn [mg/l]							
6 Jan 2016		<0.00020	<0.001	0.013	<0.0015		0.045							
4 Jan 2017		0.019	0.0024	0.032	0.0033		0.095							
3 Jan 2018		0.0010	0.0010	0.0069	0.0010		0.042							

Attachment 3.2: Lab Data, Receiving Environment (Condition 11-14 and 20)

Akaroa STP	STP	400m	400m	Shoreline	400m	400m	Shoreline	400m Shoreline North		400m Shoreline South		Shoreline nearest Outfall	
		Shoreline North	Shoreline South	nearest OF	Shoreline North	Shoreline South	nearest OF	Sample Time	Time between samples taken from STP &	Sample Time	Time between samples taken from STP &	Sample Time	Time between samples taken from STP &
		ENT MPN/100ml	ENT MPN/100ml	ENT MPN/100ml	FC CFU/100ml	FC CFU/100ml	FC CFU/100ml						
17 Jul 2017	11:05				12	1	1	12:11	1:06	12:05	1:00	12:03	0:58
24 Aug 2017	8:45	10	10	10	3	3	10	9:00	0:15	8:50	0:05	8:55	0:10
14 Sep 2017	8:30				1	1	1	8:45	0:15	8:40	0:10	9:30	1:00
11 Oct 2017	7:45				35	39	50	8:20	0:35	8:00	0:15	8:10	0:25
2 Nov 2017	10:00				5	7	5	10:25	0:25	10:05	0:05	10:15	0:15
5 Dec 2017	7:50	30	31	31	150	150	170	7:40	0:10	7:20	0:30	7:30	0:20
13 Dec 2017	9:45	10	10	10	1	1	1	9:55	0:10	9:48	0:03	9:52	0:07
20 Dec 2017	7:45	31	41	31	84	81	97	7:58	0:13	7:50	0:05	7:53	0:08
27 Dec 2017	10:30	20	10	10	1	1	2	10:50	0:20	10:36	0:06	10:39	0:09
3 Jan 2018	9:50	74	10	10	14	10	2	10:12	0:22	9:58	0:08	10:00	0:10
10 Jan 2018	8:35	10	10	10	2	1	4	8:43	0:08	8:40	0:05	8:45	0:10
17 Jan 2018	10:15	10	10	10	1	1	2	10:46	0:31	10:25	0:10	10:28	0:13
24 Jan 2018	8:07	10	10	10	3	1	1	8:21	0:14	8:14	0:07	8:17	0:10
31 Jan 2018	7:45	20	10	10	1	1	6	8:03	0:18	7:56	0:11	7:58	0:13
7 Feb 2018	8:45	10	20	10	6	13	8	8:30	0:15	8:15	0:30	8:00	0:45
14 Feb 2018	7:00	20	10	10	19	20	23	7:20	0:20	7:25	0:25	7:15	0:15
20 Feb 2018	8:00	10	10	10	1	6	1	8:05	0:05	8:15	0:15	8:10	0:10
28 Feb 2018	14:00	10	590	370	4	450	310	14:00	0:00	14:00	0:00	14:00	0:00
14 Mar 2018	7:00				120	4	92	6:50	0:10	6:40	0:30	6:45	0:15
22 Mar 2018	12:15				10	4		12:15	0:00	12:15	0:00		
4 Apr 2018	9:00				6	5	3	9:10	0:10	9:20	0:20	9:15	0:15
2 May 2018	9:20				9	7	11	8:25	0:55	8:30	0:50	8:35	0:45
20 Jun 2018	9:50	10	10	10	27	22	19	10:15	0:25	10:00	0:10	10:08	0:18
				summer FC singles > 14	3	4	4						
5 sample median of Summer samples >14 (Condition 13a)					1	1	1						
# summer samples > 43 (cond 13b)					2	3	3						
% summer samples > 43					15.4%	23.1%	23.1%						
# total samples > 43 (Cond 13b)					1	1	1						
% total samples > 43					7.7%	7.7%	7.7%						
# all summer samples > 43 (cond 13b)													8
% all summer samples > 43													20.5

Attachment 3.3: Lab Data, Receiving Environment (Conditions 15-18)

Date	250 metres due North							250 metres due West							250 metres due South							
	Temp °C	TN mg/L	NOx mg/L	NH3 mg/L	DIN mg/L	TP mg/L	DRP mg/L	Temp °C	TN mg/L	NOx mg/L	NH3 mg/L	DIN mg/L	TP mg/L	DRP mg/L	Temp °C	TN mg/L	NOx mg/L	NH3 mg/L	DIN mg/L	TP mg/L	DRP mg/L	
TRIGGER				0.910	0.062		0.018				0.910	0.062		0.018				0.910	0.062		0.018	
5-Dec-17		0.180	0.010	0.005	0.015	0.053	0.006		0.160	0.010	0.005	0.015	0.060	0.007		0.200	0.010	0.005	0.015	0.057	0.006	
27-Dec-17		0.120	0.010	0.005	0.015	0.970	0.009		0.130	0.010	0.005	0.015	0.078	0.009		0.018	0.016	0.034	0.050	0.074	0.014	
17-Jan-18	19.1	0.150	0.010	0.005	0.015	0.046	0.010	19.1	0.240	0.010	0.005	0.015	0.041	0.008	19.1	0.170	0.010	0.005	0.015	0.046	0.010	
7-Feb-18	16.5	0.200	0.010	0.005	0.015	0.026	0.009	16.5	0.210	0.01	0.005	0.015	0.025	0.011	16.5	0.240	0.026	0.020	0.046	0.029	0.016	
2017/2018 4-Sample M		0.165	0.010	0.005	0.015	0.050	0.009		0.185	0.010	0.005	0.015	0.051	0.009		0.185	0.013	0.013	0.031	0.052	0.012	
	Plant Effluent																					
	TN	NOx	NH3	TP	DRP																	
	mg/L	mg/L	mg/L	mg/L	mg/L	temp°C																
5-Dec-17	25	6.7	21.0	2.7	2.0	21																
27-Dec-17	30	7.1	24.0	4.5	3.6																	
17-Jan-18	17	14.0	11.0	4.0	3.5	19.1																
7-Feb-18	15	14.0	13.0	3.4	2.3	20.5																