Akaroa
Wastewater Treatment Plant
Annual Monitoring Report
July 2018 – June 2019

Prepared by: Citycare Water
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On behalf of:

Christchurch City Council, City Water & Waste Unit

28 August 2019

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 66 occasions, but 12 of these were when rainfall exceeded depth of 50mm (over 3 days).
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 phorphorous (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 13 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
	Non-Compliance for BOD_5 (Attachment 3.1); maximum medians were 31 mg/l BOD_5 **Compliance for TSS (Attachment 3.1); max median of 28 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 exceedence; 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 NOx + 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 NOx 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	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. 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.
	Compliance
19	All wastewater and receiving environment samples shall: a. be collected by a suitably qualified or experienced person; and b. 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	At the time the wastewater and receiving environment samples are collected, the following parameters shall be recorded; a. time and date of sampling and time delay between wastewater and receiving environment samples collection; b. the precipitation over the three consecutive days prior to sampling; c. the tidal state in the receiving environment at the time of sampling in the receiving environment; and d. 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	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: a. Results of the monitoring undertaken in the previous year from 1 July to 30 June; b. An analysis of monitoring results against limits and trigger values specified in Conditions (8), (9), (13) and (17) of this consent; c. 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). d. 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; e. Comparison of monitoring results as required in Conditions (6), (11), (12), (15) and (16) with historical data; f. Comparison of the monitoring results required in Conditions (6), (11), (12), (15) and (16). with operation and performance issues from the WWTP; Consent detail g. An interpretation of the results in relation to the effects of the discharge on the environment; h. Identification of any measures taken to remedy any exceedences; i. Details of all changes or upgrades to the treatment plant that may affect the quality or volume of treated wastewater discharged; and j. 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	The consent holder shall submit to the Canterbury Regional Council, within six months of the grant of this consent, a management plan that details; a. 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; b. 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: 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: 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

Daily flows into the Akaroa Wastewater Treatment Plant (WWTP) were up on previous years with more accurate flowmeter readings. Flow recordings have resulted in exceedances over the consented volume (750m^3/day) 66 times for the Dry weather flows, on 12 occasions there was sufficient rain to be compliant leaving 54 non-compliant days. Total annual flow through the plant was marginally down on the previous year with 227,605m3, the previous reporting period (i.e., 236,327m3 in 2017-2018) and the 95th percentile for flow calculated at 910 m^3/d (Attachment 1.3) with a peak day flow of 2,975m3 recorded on 1 June 2019.

Plant performance relating to organic parameter TSS was good, with no exceedances above the 30-mg/L median limits for effluent quality, Max median TSS sample was 28 mg/l. BOD_5 samples exceeded consent limits max median limits exceeded 30 on 3 occasions (max =31) (Table 1 & attachment 3.1). BOD_5

Eleven single Faecal Coliform (FC) exceedances were recorded over the summer period (1Dec18 – 28Feb19) with a further 1 occurring in early March 2019, when an increased loading was received at the plant considered to coincide with the high summer seasonal holiday population. The old and failing existing UV System which was not coping was replaced with a new UV unit and became operational 5 June 2019.

Receiving Environment Monitoring

Some trigger limits were exceeded for human-health related parameters (Attachment 3.2). 23.1% of samples of FC samples were >43 CFU/100mL. 9 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.

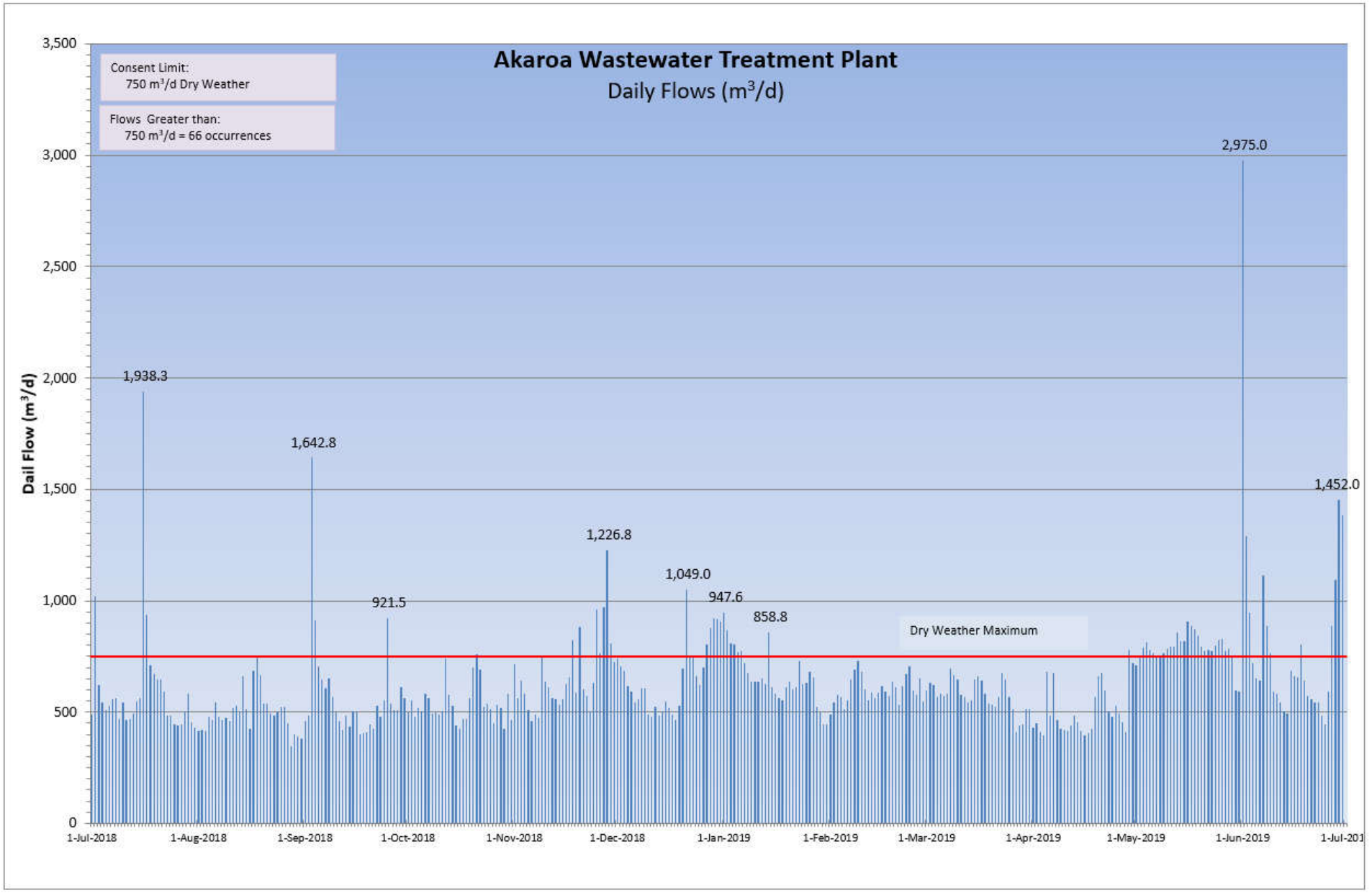
Treatment Plant Effluent			
Parameter	**Single Samples Exceeding Limit**	**Median Limit Exceedances**	**Condition Non-Compliances**
Dry Weather Flow > 750 m3/d	66	-	54
		-	
BOD_5 > 30 mg/L	3	3	3
TSS > 30 mg/L	3	0	
FC > 1,000 CFU/100 mL	12	13	13
Receiving Environment			
Parameter	**Single Samples Exceeding Limit**	**Median Limit or % Exceedances**	**Condition Non-Compliances**
Summer FC > 14 CFU/100 mL	18	13	NA
<10% Summer FC > 43 CFU/100 mL	8	23.1	
DIN > 0.062 mg/L (cond 17a) 250m	0		0
250 m North		0.016	
250m West		0.025	
250m South		0.023	
DRP median > 0.018 mg/L (cond 17b)	0		
250 m North		0.005	
250m West		0.006	
250m South		0.006	
NH3 median > 0.910 mg/L (cond 17c)	0		
250 m North		0.006	
250m West		0.006	
250m South		0.008	

Attachment 1.1: Flows, Akaroa, Data

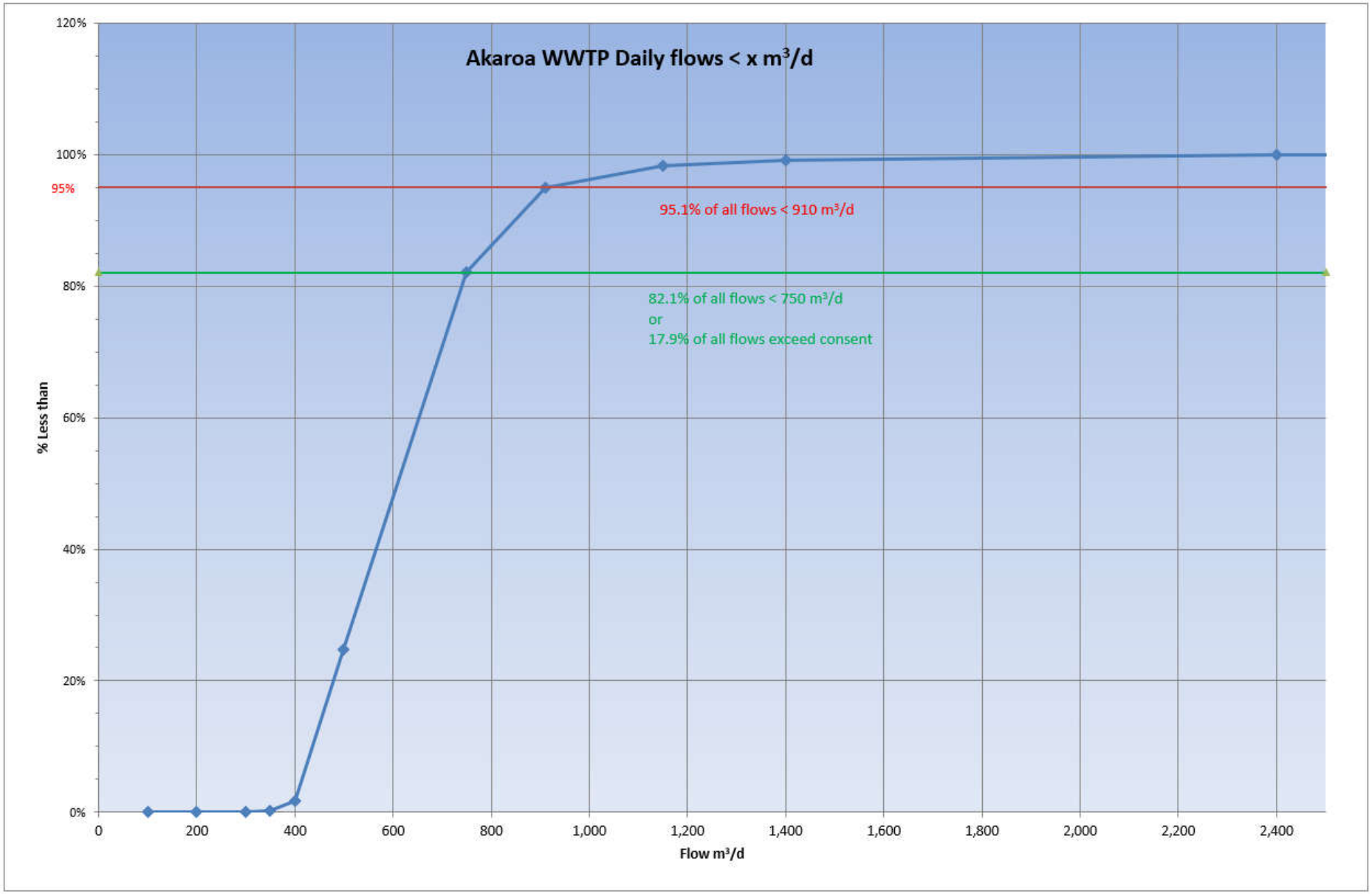
Plant	Akaroa Wastewater Treatment, Banks Peninsula: Daily Flows for July 2018 - June 2019						
Date	Flow (m^3/d)	Date	Flow (m^3/d)	Date	Flow (m^3/d)	Date	Flow (m^3/d)
1-Jul-2018	490.0	1-Oct-2018	499.1	1-Jan-2019	947.6	1-Apr-2019	430.0
2-Jul-2018	1,020.3	2-Oct-2018	552.0	2-Jan-2019	867.4	2-Apr-2019	450.0
3-Jul-2018	619.6	3-Oct-2018	479.2	3-Jan-2019	810.8	3-Apr-2019	412.0
4-Jul-2018	543.5	4-Oct-2018	519.0	4-Jan-2019	805.0	4-Apr-2019	395.0
5-Jul-2018	506.6	5-Oct-2018	501.7	5-Jan-2019	770.1	5-Apr-2019	681.0
6-Jul-2018	529.4	6-Oct-2018	580.9	6-Jan-2019	772.3	6-Apr-2019	484.0
7-Jul-2018	559.2	7-Oct-2018	563.5	7-Jan-2019	720.1	7-Apr-2019	675.0
8-Jul-2018	561.5	8-Oct-2018	491.9	8-Jan-2019	673.4	8-Apr-2019	463.0
9-Jul-2018	471.0	9-Oct-2018	500.0	9-Jan-2019	636.8	9-Apr-2019	427.0
10-Jul-2018	541.6	10-Oct-2018	490.1	10-Jan-2019	636.0	10-Apr-2019	420.0
11-Jul-2018	462.9	11-Oct-2018	502.0	11-Jan-2019	634.3	11-Apr-2019	415.0
12-Jul-2018	468.1	12-Oct-2018	738.4	12-Jan-2019	649.0	12-Apr-2019	438.0
13-Jul-2018	494.9	13-Oct-2018	577.8	13-Jan-2019	625.3	13-Apr-2019	484.0
14-Jul-2018	547.9	14-Oct-2018	526.8	14-Jan-2019	858.8	14-Apr-2019	454.0
15-Jul-2018	562.4	15-Oct-2018	440.9	15-Jan-2019	612.8	15-Apr-2019	413.0
16-Jul-2018	1,938.3	16-Oct-2018	422.7	16-Jan-2019	580.7	16-Apr-2019	395.0
17-Jul-2018	935.1	17-Oct-2018	467.9	17-Jan-2019	562.8	17-Apr-2019	407.0
18-Jul-2018	708.8	18-Oct-2018	467.3	18-Jan-2019	550.9	18-Apr-2019	424.0
19-Jul-2018	672.7	19-Oct-2018	565.0	19-Jan-2019	612.6	19-Apr-2019	570.0
20-Jul-2018	644.1	20-Oct-2018	699.1	20-Jan-2019	637.4	20-Apr-2019	660.0
21-Jul-2018	645.3	21-Oct-2018	761.3	21-Jan-2019	603.0	21-Apr-2019	677.0
22-Jul-2018	593.5	22-Oct-2018	688.5	22-Jan-2019	612.3	22-Apr-2019	597.0
23-Jul-2018	484.2	23-Oct-2018	525.7	23-Jan-2019	729.4	23-Apr-2019	504.0
24-Jul-2018	482.6	24-Oct-2018	537.7	24-Jan-2019	628.7	24-Apr-2019	477.0
25-Jul-2018	444.8	25-Oct-2018	513.7	25-Jan-2019	630.7	25-Apr-2019	529.0
26-Jul-2018	438.8	26-Oct-2018	448.8	26-Jan-2019	678.4	26-Apr-2019	492.0
27-Jul-2018	442.7	27-Oct-2018	531.9	27-Jan-2019	656.5	27-Apr-2019	456.0
28-Jul-2018	505.8	28-Oct-2018	518.3	28-Jan-2019	522.4	28-Apr-2019	411.0
29-Jul-2018	580.6	29-Oct-2018	426.1	29-Jan-2019	500.2	29-Apr-2019	780.0
30-Jul-2018	453.1	30-Oct-2018	580.9	30-Jan-2019	446.6	30-Apr-2019	719.0
31-Jul-2018	428.3	31-Oct-2018	466.0	31-Jan-2019	443.1	1-May-2019	709.0
1-Aug-2018	415.2	1-Nov-2018	714.0	1-Feb-2019	490.0	2-May-2019	755.0
2-Aug-2018	419.8	2-Nov-2018	562.6	2-Feb-2019	543.0	3-May-2019	789.0
3-Aug-2018	417.1	3-Nov-2018	643.1	3-Feb-2019	576.0	4-May-2019	813.0
4-Aug-2018	478.9	4-Nov-2018	584.0	4-Feb-2019	566.0	5-May-2019	778.0
5-Aug-2018	464.5	5-Nov-2018	507.3	5-Feb-2019	513.0	6-May-2019	764.0
6-Aug-2018	545.5	6-Nov-2018	461.3	6-Feb-2019	555.0	7-May-2019	749.0
7-Aug-2018	480.7	7-Nov-2018	489.2	7-Feb-2019	644.0	8-May-2019	746.0
8-Aug-2018	465.8	8-Nov-2018	475.7	8-Feb-2019	689.0	9-May-2019	764.0
9-Aug-2018	476.6	9-Nov-2018	750.1	9-Feb-2019	732.0	10-May-2019	786.0
10-Aug-2018	459.9	10-Nov-2018	637.9	10-Feb-2019	679.0	11-May-2019	794.0
11-Aug-2018	517.5	11-Nov-2018	612.0	11-Feb-2019	602.0	12-May-2019	795.0
12-Aug-2018	526.4	12-Nov-2018	561.1	12-Feb-2019	551.0	13-May-2019	859.0
13-Aug-2018	503.9	13-Nov-2018	555.5	13-Feb-2019	586.0	14-May-2019	818.0
14-Aug-2018	662.0	14-Nov-2018	532.7	14-Feb-2019	564.0	15-May-2019	818.0
15-Aug-2018	512.9	15-Nov-2018	560.3	15-Feb-2019	586.0	16-May-2019	905.0
16-Aug-2018	426.1	16-Nov-2018	625.5	16-Feb-2019	619.0	17-May-2019	889.0
17-Aug-2018	686.8	17-Nov-2018	658.0	17-Feb-2019	594.0	18-May-2019	872.0
18-Aug-2018	747.0	18-Nov-2018	823.5	18-Feb-2019	571.0	19-May-2019	844.0

Date	Flow (m^3/d)	Date	Flow (m^3/d)	Date	Flow (m^3/d)	Date	Flow (m^3/d)
19-Aug-2018	664.0	19-Nov-2018	587.1	19-Feb-2019	636.0	20-May-2019	796.0
20-Aug-2018	536.9	20-Nov-2018	882.3	20-Feb-2019	613.0	21-May-2019	774.0
21-Aug-2018	540.0	21-Nov-2018	602.0	21-Feb-2019	531.0	22-May-2019	777.0
22-Aug-2018	492.0	22-Nov-2018	571.4	22-Feb-2019	617.0	23-May-2019	775.0
23-Aug-2018	483.1	23-Nov-2018	504.3	23-Feb-2019	672.0	24-May-2019	797.0
24-Aug-2018	499.0	24-Nov-2018	631.3	24-Feb-2019	705.0	25-May-2019	822.0
25-Aug-2018	521.0	25-Nov-2018	963.2	25-Feb-2019	599.0	26-May-2019	830.0
26-Aug-2018	524.7	26-Nov-2018	764.9	26-Feb-2019	578.0	27-May-2019	776.0
27-Aug-2018	449.0	27-Nov-2018	969.7	27-Feb-2019	651.0	28-May-2019	785.0
28-Aug-2018	345.5	28-Nov-2018	1,226.8	28-Feb-2019	549.0	29-May-2019	749.0
29-Aug-2018	401.7	29-Nov-2018	810.8	1-Mar-2019	599.0	30-May-2019	599.0
30-Aug-2018	392.5	30-Nov-2018	726.4	2-Mar-2019	630.0	31-May-2019	591.0
31-Aug-2018	379.9	1-Dec-2018	738.6	3-Mar-2019	623.0	1-Jun-2019	2,975.0
1-Sep-2018	459.6	2-Dec-2018	706.2	4-Mar-2019	570.0	2-Jun-2019	1,290.0
2-Sep-2018	485.1	3-Dec-2018	687.0	5-Mar-2019	580.0	3-Jun-2019	947.0
3-Sep-2018	1,642.8	4-Dec-2018	616.9	6-Mar-2019	572.0	4-Jun-2019	720.0
4-Sep-2018	909.6	5-Dec-2018	594.5	7-Mar-2019	581.0	5-Jun-2019	649.0
5-Sep-2018	707.7	6-Dec-2018	542.9	8-Mar-2019	695.0	6-Jun-2019	640.0
6-Sep-2018	644.7	7-Dec-2018	556.0	9-Mar-2019	665.0	7-Jun-2019	1,115.0
7-Sep-2018	605.4	8-Dec-2018	604.6	10-Mar-2019	644.0	8-Jun-2019	885.0
8-Sep-2018	653.0	9-Dec-2018	608.4	11-Mar-2019	576.0	9-Jun-2019	764.0
9-Sep-2018	568.5	10-Dec-2018	489.4	12-Mar-2019	567.0	10-Jun-2019	591.0
10-Sep-2018	500.2	11-Dec-2018	477.9	13-Mar-2019	544.0	11-Jun-2019	583.0
11-Sep-2018	458.0	12-Dec-2018	525.9	14-Mar-2019	554.0	12-Jun-2019	541.0
12-Sep-2018	421.7	13-Dec-2018	483.0	15-Mar-2019	644.0	13-Jun-2019	502.0
13-Sep-2018	485.3	14-Dec-2018	503.0	16-Mar-2019	663.0	14-Jun-2019	496.0
14-Sep-2018	433.9	15-Dec-2018	546.3	17-Mar-2019	639.0	15-Jun-2019	687.0
15-Sep-2018	502.7	16-Dec-2018	518.0	18-Mar-2019	584.0	16-Jun-2019	661.0
16-Sep-2018	505.4	17-Dec-2018	489.8	19-Mar-2019	536.0	17-Jun-2019	657.0
17-Sep-2018	399.5	18-Dec-2018	463.5	20-Mar-2019	533.0	18-Jun-2019	803.0
18-Sep-2018	404.4	19-Dec-2018	530.3	21-Mar-2019	525.0	19-Jun-2019	639.0
19-Sep-2018	411.2	20-Dec-2018	694.0	22-Mar-2019	569.0	20-Jun-2019	575.0
20-Sep-2018	445.2	21-Dec-2018	1,049.0	23-Mar-2019	675.0	21-Jun-2019	557.0
21-Sep-2018	425.1	22-Dec-2018	745.5	24-Mar-2019	645.0	22-Jun-2019	541.0
22-Sep-2018	530.7	23-Dec-2018	755.9	25-Mar-2019	567.0	23-Jun-2019	543.0
23-Sep-2018	479.7	24-Dec-2018	659.9	26-Mar-2019	515.0	24-Jun-2019	484.0
24-Sep-2018	554.2	25-Dec-2018	622.3	27-Mar-2019	410.0	25-Jun-2019	443.0
25-Sep-2018	921.5	26-Dec-2018	702.8	28-Mar-2019	441.0	26-Jun-2019	593.0
26-Sep-2018	536.5	27-Dec-2018	801.3	29-Mar-2019	445.0	27-Jun-2019	887.0
27-Sep-2018	506.9	28-Dec-2018	875.4	30-Mar-2019	515.0	28-Jun-2019	1,093.0
28-Sep-2018	506.9	29-Dec-2018	922.1	31-Mar-2019	513.0	29-Jun-2019	1,452.0
29-Sep-2018	610.6	30-Dec-2018	914.6	1-Apr-2019	430.0	30-Jun-2019	1,385.0
30-Sep-2018	564.4	31-Dec-2018	907.6				

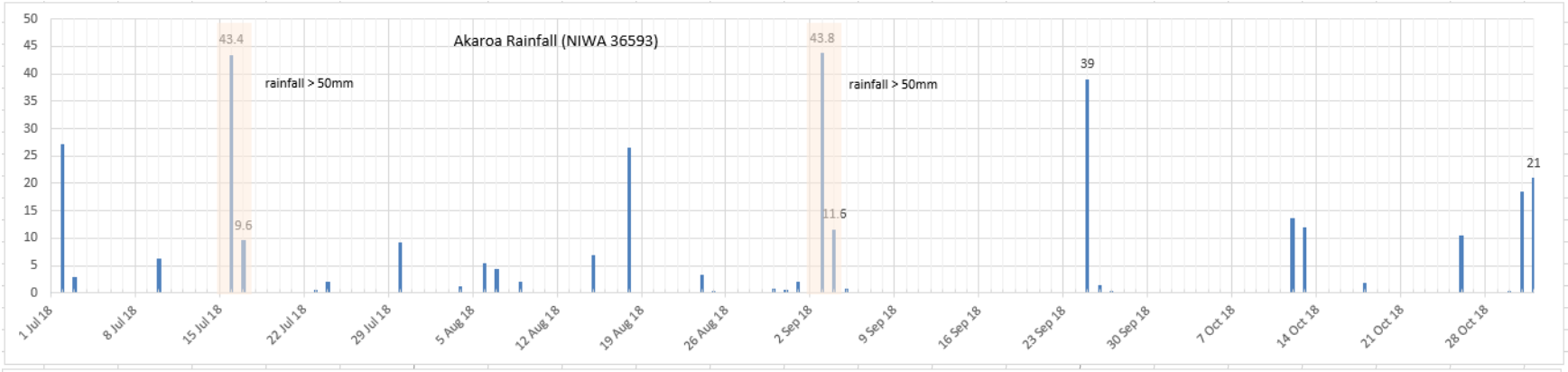
Attachment 1.2: Flows, Akaroa, Chart

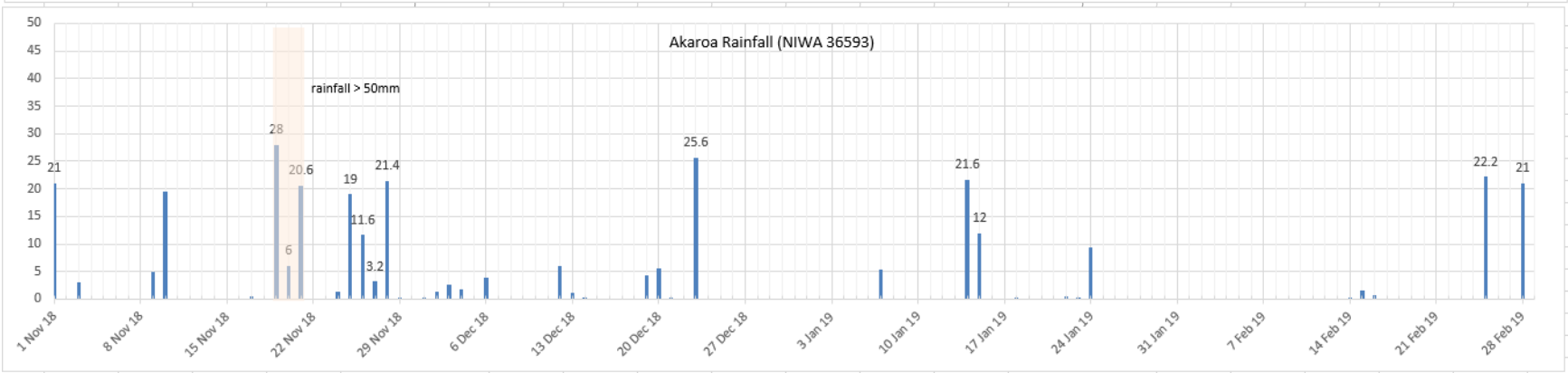


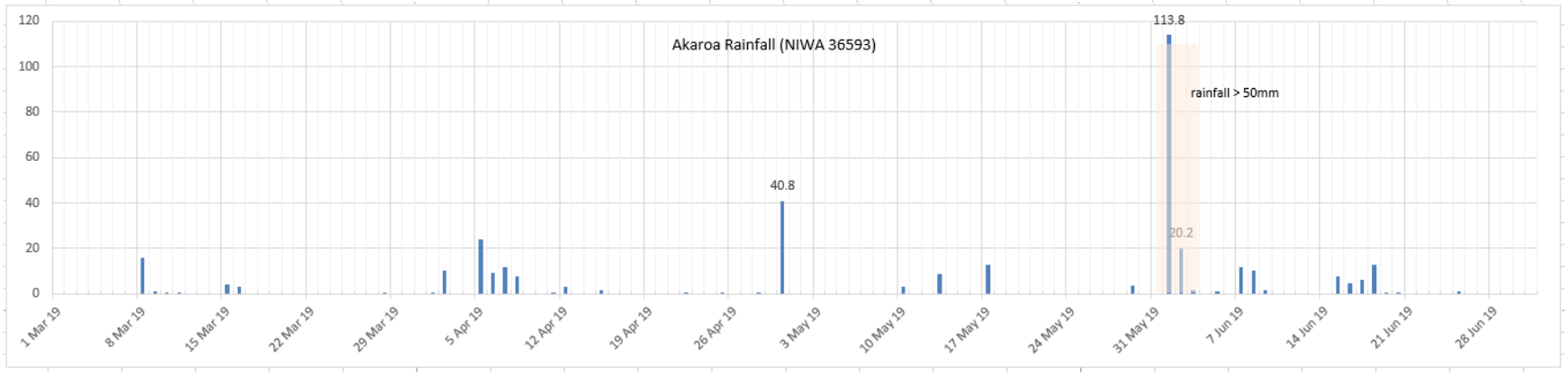
Attachment 1.3: Flows, Akaroa, '% less than'



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	BOD_5	ENT	FC	Temp	NOx	DRP	TP	TSS	TN	BOD_5	TSS	FC
	[mg/l]	[mg/l]	MPN/100ml	CFU/100ml	[deg C]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	CFU/100ml
10-Jul-18	2	6.1	10	10	11	16	1	1.4	16	4.8	5.2	12	10
9-Aug-18	1.7	6.9	120	730	11	13	1.3	1.2	16	2.9	5.2	12	10
17-Sep-18	6.5	11	10	40	14	15	1.2	1.9	20	9	6.1	16	30
8-Oct-18	14	9.6	420	4,000	14.9	8	1.7	2.2	17	18	6.9	16	40
8-Nov-18	12	9.1	1,800	24,000	17	8.3	1.4	2	14	14	9.1	16	730
6-Dec-18	14	12	10	10	17	6.6	1.1	1.3	20	13	9.6	17	730
13-Dec-18	13	20	20,000	180,000	NA	7.1	1.2	1.9	22	16	11.0	20	4,000
20-Dec-18	15	38	250	80	NA	6.2	1.3	2.3	26	21	12.0	20	4,000
27-Dec-18	31	49	24,000	1,100,000	15.9	2.2	2.4	3.2	17	36	20.0	20	24,000
3-Jan-19	38	31	19,000	420,000	18.5	0.13	3.8	5	32	46	31.0	22	180,000
10-Jan-19	27	26	20,000	240,000	19.2	0.11	2.4	4.1	33	36	31.0	26	240,000
17-Jan-19	23	17	2,900	130,000	16.8	0.19	2.3	3.2	28	28	31.0	28	240,000
24-Jan-19	16	20	17,000	1,400,000	17.5	2.6	1.4	2.3	21	22	26.0	28	420,000
31-Jan-19	11	24	170	31,000	NA	16	2	3.1	20	14	24.0	28	240,000
7-Feb-19	12	19	24,000	60,000	15.9	6.9	1.1	2	20	16	20.0	21	130,000
14-Feb-19	7.5	2.8	100	100	NA	9	1.3	2.1	25	12	19.0	21	60,000
21-Feb-19	8	16	10	10	7.8	7.1	1.1	1.7	14	11	19.0	20	31,000
28-Feb-19	12	23	14,000	37,000	9.1	5.8	1.6	2.2	21	17	19.0	20	31,000
7-Mar-19	6.5	20	1,100	13,000	NA	5	0.55	1.4	25	9	19.0	21	13,000
29-Apr-19	9.4	18	84	370	16	14	2.4	5.4	100	13	18.0	25	370
16-May-19	0.99	3	10	10	3.8	16	0.18	0.73	18	2.7	18.0	21	370
13-Jun-19	0.51	4.8	10	10	NA	14	0.28	0.65	16	1.9	18.0	21	370
	single	3		12					3	Limit	30	30	1,000
										Exceedances	3	0	13
										Max	31.0	28.0	420,000

Date	Cd	Cr	Cu	Pb	Zn
	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[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
3 Jan 2019	<0.0010	<0.0010	0.013	0.0010	0.063

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

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

Akaroa STP CRC133179 11-14 & 20	STP	400m Shoreline North	400m Shoreline South	Shoreline nearest OF	400m Shoreline North	400m Shoreline South	Shoreline nearest OF	400m Shoreline North		400m Shoreline South		Shoreline nearest Outfall	
	Sample Time	ENT MPN/100ml	ENT MPN/100ml	ENT MPN/100ml	FC CFU/100ml	FC CFU/100ml	FC CFU/100ml	Sample Time	Time between samples taken from STP & RCV	Sample Time	Time between samples taken from STP & RCV	Sample Time	Time between samples taken from STP & RCV
10 Jul 2018	9:00				2	4	2	9:15	0:15	9:05	0:05	9:10	0:10
9 Aug 2018	9:10				1	2	1	9:15	0:05	9:25	0:15	9:20	0:10
17 Sep 2018	8:05				1	1	6	8:05	0:00	7:45	0:20	7:50	0:15
8 Oct 2018	14:52				1	1	1	13:10	1:42	13:00	1:52	13:05	1:47
8 Nov 2018	7:15				19	24	34	7:25	0:10	7:35	0:20	7:30	0:15
6 Dec 2018	7:30	20	31	10	9	7	8	7:35	0:05	7:45	0:15	7:40	0:10
13 Dec 2018	7:30	20	10	10	21	20	130	7:52	0:22	7:45	0:15	7:48	0:18
20 Dec 2018	7:45	31	10	10	230	9	43	8:05	0:20	7:55	0:10	8:00	0:15
27 Dec 2018	10:27	30	10	10	97	14	87	10:41	0:14	10:05	0:22		
3 Jan 2019	13:20	20	10	10	1	20	1	9:45	3:35	9:55	3:25	9:59	3:21
10 Jan 2019	9:55	10	10	10	1	6	26	8:40	1:15	8:23	1:32	8:25	1:30
17 Jan 2019	9:50	10	10	10	1	4	1	9:36	0:14	8:00	1:50	8:05	1:45
24 Jan 2019	8:25	75	41	20	46	102	107	8:35	0:10	8:10	0:15	8:13	0:12
31 Jan 2019	7:25	10	10	10	41	1	2	7:37	0:12	7:30	0:05	7:35	0:10
7 Feb 2019	8:55	10	10	10	11	12	23			8:32	0:23	8:35	0:20
14 Feb 2019	8:10	10	10	10	1	144	10	9:25	1:15	9:10	1:00	9:15	1:05
21 Feb 2019	8:25	20	10	210	1	1	260	8:35	0:10	8:25	0:00	8:28	0:03
28 Feb 2019	8:35	10	10	41	8	17	20	8:55	0:20	8:10	0:25	8:15	0:20
7 Mar 2019	13:00	10	10	10	1	1	1	12:55	0:05	10:25	2:35	13:10	0:10
29 Apr 2019	11:15	10	10	10	13	10	12	11:10	0:05	10:50	0:25	11:00	0:15
16 May 2019	7:55				2	3	1	8:05	0:10	7:35	0:20	7:40	0:15
13 Jun 2019	7:40				1	2	120	7:55	0:15	7:45	0:05	7:48	0:08
				summer FC singles > 14	5	5	8	18					
5 sample median of Summer samples >14 (Condition 13a)					4	0	9	13					
# summer samples > 43 (cond 13b)					3	2	4						
% summer samples > 43					23.1%	15.4%	30.8%						
# total samples > 43 (Cond 13b)		1	0	1	3	2	4	9					
% total samples > 43		7.7%	0.0%	7.7%	13.0%	8.7%	17.4%						
# all summer samples > 43 (cond 13b)							9						
% all summer samples > 43							23.1						

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
6-Dec-18		0.33	0.041	0.0062	0.047	0.035	0.016		0.32	0.044	0.005	0.049	0.03	0.015		0.3	0.039	0.005	0.044	0.03	0.014
27-Dec-18		0.12	0.010	0.0053	0.015	0.019	0.0031		0.098	0.01	0.0055	0.016	0.015	0.003		0.13	0.010	0.011	0.021	0.017	0.0038
17-Jan-19	16.8	0.26	0.010	0.005	0.015	0.027	0.0055	16.8	0.22	0.018	0.0067	0.025	0.028	0.0057	16.8	0.19	0.010	0.005	0.015	0.026	0.0048
7-Feb-19	15.9	0.11	0.010	0.0073	0.017	0.023	0.005	15.9	0.11	0.01	0.015	0.025	0.023	0.0067	15.9	0.26	0.010	0.015	0.025	0.028	0.0074
2018/2019 4-Sample Me		0.190	0.010	0.006	0.016	0.025	0.005		0.165	0.014	0.006	0.025	0.026	0.006		0.225	0.010	0.008	0.023	0.027	0.006

Date	Plant Effluent					
	TN mg/L	NOx mg/L	NH3 mg/L	TP mg/L	DRP mg/L	temp°C
6-Dec-18	14	6.6	14	1.3	1.1	17.0
27-Dec-18	31	2.2	31	3.2	2.4	15.9
17-Jan-19	23	0.19	23	3.2	2.3	16.8
31-Jan-19	11	16	11	3.1	2.0	NA