



Wainui

Wastewater Treatment Plant

Annual Monitoring Report

June 2018 – July 2019

Prepared by: Citycare Water
Kris Kaser

On behalf of

Christchurch City Council, City Water & Waste Unit

28 August 2018

Resource Consent Number: CRC091580

File Number: CO6C/28303

Client Name: Christchurch City Council, Water and Waste Unit

To: Discharge treated domestic wastewater onto land from the Wainui Wastewater Treatment Plant

Consent Location: Road Reserve, WAINUI

Status: Current

21/09/2011 Consent Commenced

02/05/2013 Given Effect To

21/09/2021 Lapse Date

21/09/2046 Consent Expires

1	The discharge shall be only treated domestic wastewater from Wainui.
	Compliance
2	Wastewater shall be discharged only onto land within the irrigation areas marked as IA1, IA2, IA3 and IA4, within Pt Lot DP 7501 as shown on the attached Plan CRC091580, centred on map reference NZMS 260 N36:0184-1125.
	Compliance; only IA2 (10,000 m³) utilised during reporting period
3	The volume of wastewater discharged shall not exceed 125 cubic metres per day as an annual average. The volume of wastewater discharged shall not exceed 214 cubic metres per day as a weekly average. The volume of wastewater discharged shall not exceed 250 cubic metres per day at any time.
	Compliance; maximum flow was 47.61 m³/d as measured at the treatment plant (4Sept18)
4	The consent holder shall measure and record the daily discharge flow from the wastewater treatment system to the irrigation areas in cubic metres using a flow meter that shall record flows to an accuracy of plus or minus 10 percent.
	Compliance
5	Prior to discharge, the wastewater shall be treated via the following treatment system: a. Screening of inflow; and then b. Biological secondary treatment; and then c. Disinfection by ultra violet light or another method that provides an equivalent level of treatment.
	Compliance
6	Prior to commissioning the wastewater treatment plant, the consent holder shall submit to Environment Canterbury, Attention: RMA Compliance and Enforcement Manager, details of the inlet screening system, the biological treatment method, the disinfection method, and the location of sampling points.
	Compliance
7	After exiting the wastewater treatment system, the wastewater shall be discharged via a land application system as follows: a. The land application system shall comprise drip irrigation tubing. The length of tubing installed shall be sufficient to ensure compliance with the hydraulic application rates specified in Condition 8. b. Lines of drip irrigation tubing shall be spaced at intervals not more than one metre apart. c. The drippers on the drip irrigation tubing shall be spaced at intervals not more than one metre apart. d. The wastewater shall be evenly dosed in fixed quantities over the land application system. e. The drip irrigation tubing shall be located on the ground surface or buried up to 150 millimetres below the ground surface.
	Compliance as per design
8	The wastewater shall be discharged at an annual average hydraulic application rate not exceeding 3.3 millimetres per day. The maximum weekly average hydraulic application rate shall be 7.2 millimetres per day. The maximum daily hydraulic application rate shall be 12 millimetres per day.
	Compliance; Annual Average hydraulic rate 0.26 mm/d, maximum daily application rate 4.76 mm/d
9	a. The land treatment areas shall be vegetated with trees and/or native vegetation. b. At least 75 percent of the area receiving wastewater shall be vegetated with trees and or native vegetation that are at least five years old or otherwise sufficient to avoid erosion and wastewater runoff.

	c. All trees shall be maintained in a healthy state until they reach an age where harvesting is appropriate.
	Compliance
10	The wastewater shall not be discharged onto land closer than 20 metres from any surface water body, including ephemeral waterways, and shall not be discharged onto land closer than 10 metres from the irrigation area property boundary.
	Compliance as per design
11	Wastewater shall be sampled in accordance with standard AS/NZS 5667.1.1998 after treatment and prior to discharge onto land at least once every month. The sampling frequency may be reduced to at least once every three months provided: <ul style="list-style-type: none"> a. At least ten years have elapsed since commissioning of the wastewater treatment system; and b. None of the contaminant triggers values specified in condition (14) have been exceeded during the previous ten years.
	Compliance
12	Samples of treated wastewater taken in compliance with condition (11) shall be analysed for the following contaminants: <ul style="list-style-type: none"> a. total suspended solids b. five day biochemical oxygen demand c. total nitrogen d. faecal coliforms.
	Compliance (Attachment 2)
13	Detailed records shall be kept of the specific irrigation areas used for wastewater irrigation.
	Compliance; only IA2 (10,000 m²) utilised during reporting period as per design
14	The median concentration of contaminants shall be compared to the following trigger values: <ul style="list-style-type: none"> a. total suspended solids 20 grams per cubic metre b. faecal coliforms 10,000 colony forming units/100 millilitres. For the purposes of this condition, the median shall be calculated from the results of any five consecutive treated wastewater samples analysed.
	Compliance: FC's were under on all occasions – Median FC=45 (Attachment 2) Non-Compliance: TSS were over on 4 occasions (attachment 2), additional sampling revealed that errors were most likely due to 'remixing' of a minute amount of silt in the sampling tank.
15	The consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 20 working days of the identification of any exceedence of any trigger value specified in Condition (14). The notification shall detail what measures the consent holder has implemented or will implement to mitigate any adverse environmental effects and to prevent a reoccurrence of a trigger value exceedence. Such measures may include: <ul style="list-style-type: none"> a. Additional sampling and analysis of the treated wastewater. b. Investigation of whether the exceedence has adversely affected soil quality or water quality in waterways adjacent to the irrigation areas. c. Further treatment of the wastewater discharge. <ul style="list-style-type: none"> i. The consent holder shall use their best endeavours to ensure that the trigger values specified in Condition (14) are not exceeded.
	Compliance
16	The discharge shall not result in any wastewater flowing off the irrigation areas IA1, IA2, IA3 and IA4 shown on Plan CRC091580.
	Compliance as per design (eg irrigation inhibited based on rainfall)
17	Wastewater shall not be discharged onto land with an average slope greater than 20 degrees.
	Compliance as per design
18	All samples required to be taken under this consent shall be: <ul style="list-style-type: none"> a. Taken by a suitably qualified person. b. Stored and transferred in accordance with AS/NZS 5667.1:1998 (Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples), and details of all that methodology shall be maintained and made available on request by the Canterbury Regional Council. c. Analysed using generally accepted methods and analysed by a laboratory that is accredited for each method of analysis by International Accreditation New Zealand or an equivalent accreditation body.
	Compliance
19	The discharge onto land shall not exceed a rate of 200 kilograms of nitrogen per hectare per year.
	Compliance; TN load estimated at 31.1 kg/ha
20	Fencing shall be established and maintained around the wastewater treatment system and irrigation areas to prevent livestock access and to deter public entry.

	Compliance
21	The consent holder shall erect warning notices at the entrance gates to the wastewater treatment plant and irrigation areas. The notices shall be readable at a distance of five metres and shall state "Treated wastewater is irrigated onto land in this area. Public access is prohibited. For contact details, phone Christchurch City Council on 03-941-8999".
	Compliance
22	The wastewater treatment and land application systems shall be operated by trained and competent staff.
	Compliance
23	<p>a. Within one month of commissioning of the wastewater treatment and land irrigation systems, a Wastewater Management Plan that includes the detailed inspection, maintenance and contingency programmes to be undertaken to ensure compliance with conditions of this consent including conditions (3), (7d), (8), (9), (14), (16) and (19), shall be prepared and provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.</p> <p>b. The consent holder may, at any time, submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an amended Wastewater Management Plan provided it is for the purpose of avoiding or mitigating an adverse environmental effect, or maintaining or improving the overall effectiveness of the original Wastewater Management Plan.</p> <p>c. This consent shall be exercised in accordance with the current version of the Wastewater Management Plan.</p>
	Compliance per Wainui Wastewater Scheme Management Plan (Spire 2013)
24	The consent holder shall keep written records of all inspections, maintenance and upgrades of the wastewater treatment and land application systems. For upgrades and non-routine maintenance the records shall include the reason for the work, a description of the work, the expected outcome of the work and the date the work was completed. The consent holder shall forward a copy of the records to the Canterbury Regional Council upon request.
	Compliance (Attachment 3)
25	<p>An annual report on the performance of the wastewater treatment and land application systems shall be submitted to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 August each year. The report shall include as a minimum:</p> <ol style="list-style-type: none"> Daily discharge flow records. Wastewater sampling results. Median and 90 percentile wastewater quality concentrations. Records of the irrigation areas used. Daily wastewater application rates. Estimated annual areal nitrogen load applied to each of the irrigation areas. This shall be estimated using flow records and sample results. Summary details of inspections, maintenance and upgrades of the wastewater treatment and land application systems since the previous annual report.
	Compliance via this report; CCC to distribute
26	<p>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:</p> <ol style="list-style-type: none"> dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or requiring the consent holder to conduct monitoring instead of, or in addition to, that required by the consent.
	ECAN to request
27	The lapsing date for the purposes of section 125 of the Resource Management Act shall be 10 years after the date of resource consent commencement.
	Compliance
28	This consent shall expire 35 years after the date of resource consent commencement.
	Compliance

Monitoring Summary

This annual report covers the period from July 1, 2018 through June 30, 2019 based on the conditions of CRC091580.

Irrigation Field Flow Monitoring

Flows to the Wainui Wastewater Treatment Plant (WWTP) Irrigation Field were less than 7.1 m³/d for 95% of flows (Attachment 1). The maximum daily flow was 47.61 m³/d (4Sept18), which was well below the consented 250, 214, and 125 m³/d limits for daily, weekly average, and annual average periods. Based on the 10,000 m² irrigation area for IA2, the maximum application rate was 4.76 mm/d (4Sept18). thus, this flow was well within the consented rates of 12, 7.2, and 3.3 mm/d based on daily, weekly average, and annual average periods, respectively.

Plant performance relating to BOD₅, TN, TSS was generally good. However, there were several elevated single samples for TSS at 65,120,170,49 and 36 mg/l target - median is 20 for which the highest 5 median value was 65 mg/l. NB. a minute amount of silty matter in the bottom of the Holding/suction tank (500l) gets stirred as the treatment plant transfers new waste into the tank, in general the quality of the supernatant is of good quality (as was seen from the last repeated testing we did). Changes to the layout within the Sampling tank will eliminate these 'false' readings.

The annual TN load was calculated as 31.1 kg TN/ha based on the annual average of TN (32.4 mg/L), the total annual flow (962 m³), and the irrigation area available (IA2 = 10,000 m²). This nutrient load was well below the annual maximum of 200 kg TN/ha.

Table 1. Summary of Exceedances from July 2018-June 2019.

Parameter	Single Samples Above Limit	Trigger Limit Exceedances	Condition Non-Compliances
Flow	0	0	0
Application Rate	0	0	0
BOD ₅	0	0	0
TSS	5	0	0
FEC	0	0	0
Annual TN Load	0	0	0
Total	5	0	0

WWTP and Irrigation Field O&M:

No non-routine maintenance was conducted during this reporting period. Routine O&M tasks are summarised in Attachment 3. These rounds include equipment checks and O&M on a regular basis to ensure that the WWTP and irrigation field are operating as designed and any problems are identified quickly.

Attachment 1.1: Irrigation Field Flows, Wainui, Data

Plant:	Wainui Wastewater Treatment: Irrigation Field, Banks Peninsula: Daily Flows
Asset Owner:	Christchurch City Council
Laboratory:	Christchurch City Council Laboratory, City Water and Waste Unit

Consent limits - 125m³/d annual average; 214m³/d weekly average; 250m³/d daily

Consent limits - 3.3mm/d annual average; 7.2mm3/d weekly average; 12mm/d daily

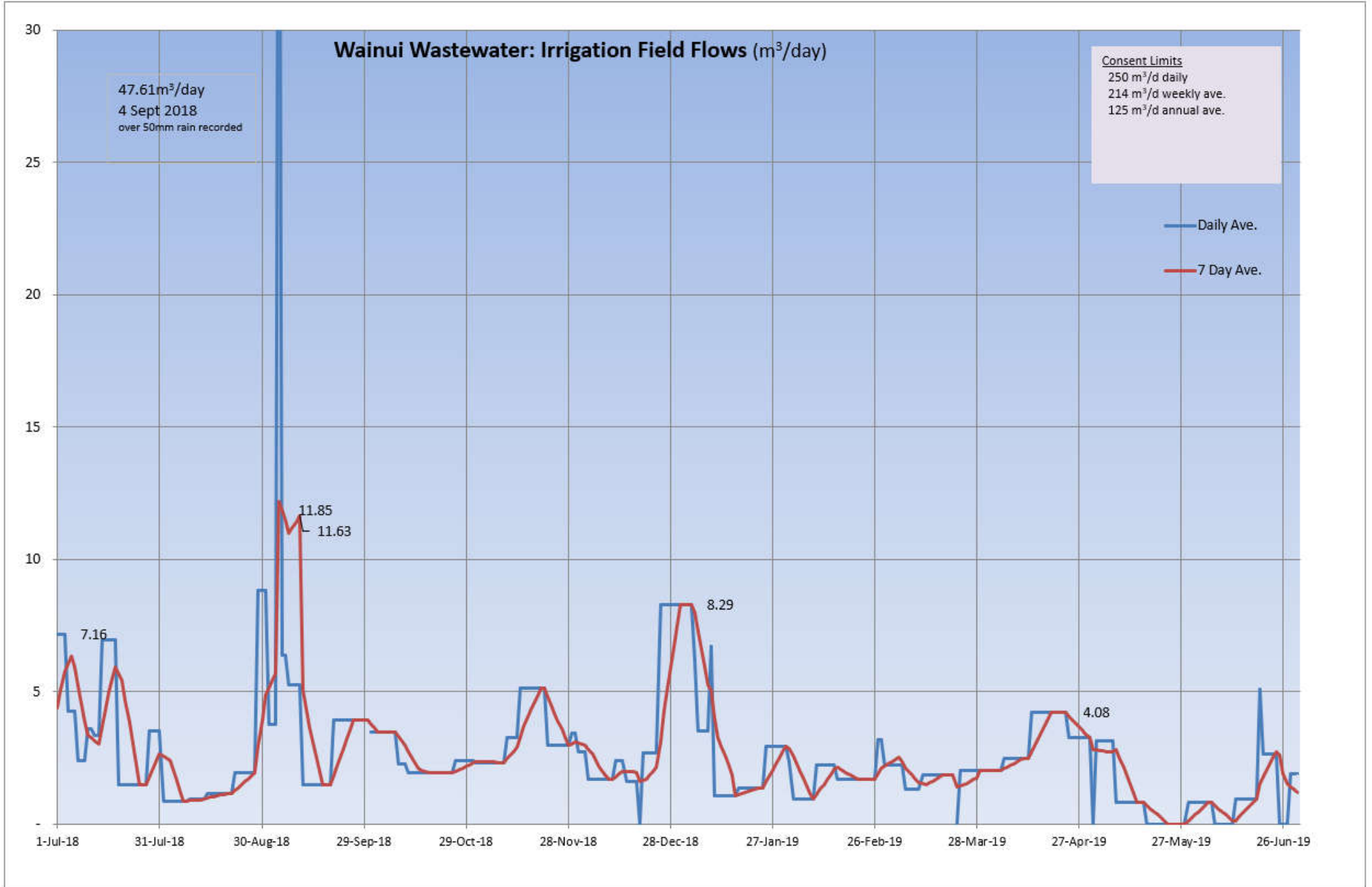
Date	Flow (m ³ /d)	Rate (mm/d)	Date	Flow (m ³ /d)	Rate (mm/d)	Date	Flow (m ³ /d)	Rate (mm/d)	Date	Flow (m ³ /d)	Rate (mm/d)
1-Jul-18	7.16	0.72	1-Oct-18	3.48	0.35	1-Jan-19	8.29	0.83	1-Apr-19	8.29	0.83
2-Jul-18	7.16	0.72	2-Oct-18	3.48	0.35	2-Jan-19	8.29	0.83	2-Apr-19	8.29	0.83
3-Jul-18	7.16	0.72	3-Oct-18	3.48	0.35	3-Jan-19	8.29	0.83	3-Apr-19	8.29	0.83
4-Jul-18	4.24	0.42	4-Oct-18	3.48	0.35	4-Jan-19	6.22	0.62	4-Apr-19	6.22	0.62
5-Jul-18	4.24	0.42	5-Oct-18	3.48	0.35	5-Jan-19	3.52	0.35	5-Apr-19	3.52	0.35
6-Jul-18	4.24	0.42	6-Oct-18	3.48	0.35	6-Jan-19	3.52	0.35	6-Apr-19	3.52	0.35
7-Jul-18	2.41	0.24	7-Oct-18	3.48	0.35	7-Jan-19	3.52	0.35	7-Apr-19	3.52	0.35
8-Jul-18	2.41	0.24	8-Oct-18	3.48	0.35	8-Jan-19	3.52	0.35	8-Apr-19	3.52	0.35
9-Jul-18	2.41	0.24	9-Oct-18	2.27	0.23	9-Jan-19	6.69	0.67	9-Apr-19	6.69	0.67
10-Jul-18	3.59	0.36	10-Oct-18	2.27	0.23	10-Jan-19	1.07	0.11	10-Apr-19	1.07	0.11
11-Jul-18	3.59	0.36	11-Oct-18	2.27	0.23	11-Jan-19	1.07	0.11	11-Apr-19	1.07	0.11
12-Jul-18	3.36	0.34	12-Oct-18	1.95	0.19	12-Jan-19	1.07	0.11	12-Apr-19	1.07	0.11
13-Jul-18	3.36	0.34	13-Oct-18	1.95	0.19	13-Jan-19	1.07	0.11	13-Apr-19	1.07	0.11
14-Jul-18	6.97	0.70	14-Oct-18	1.95	0.19	14-Jan-19	1.07	0.11	14-Apr-19	1.07	0.11
15-Jul-18	6.97	0.70	15-Oct-18	1.95	0.19	15-Jan-19	1.07	0.11	15-Apr-19	1.07	0.11
16-Jul-18	6.97	0.70	16-Oct-18	1.95	0.19	16-Jan-19	1.07	0.11	16-Apr-19	1.07	0.11
17-Jul-18	6.97	0.70	17-Oct-18	1.95	0.19	17-Jan-19	1.37	0.14	17-Apr-19	1.37	0.14
18-Jul-18	6.97	0.70	18-Oct-18	1.95	0.19	18-Jan-19	1.37	0.14	18-Apr-19	1.37	0.14
19-Jul-18	1.50	0.15	19-Oct-18	1.93	0.19	19-Jan-19	1.37	0.14	19-Apr-19	1.37	0.14
20-Jul-18	1.50	0.15	20-Oct-18	1.93	0.19	20-Jan-19	1.37	0.14	20-Apr-19	1.37	0.14
21-Jul-18	1.50	0.15	21-Oct-18	1.93	0.19	21-Jan-19	1.37	0.14	21-Apr-19	1.37	0.14
22-Jul-18	1.50	0.15	22-Oct-18	1.93	0.19	22-Jan-19	1.37	0.14	22-Apr-19	1.37	0.14
23-Jul-18	1.50	0.15	23-Oct-18	1.93	0.19	23-Jan-19	1.37	0.14	23-Apr-19	1.37	0.14
24-Jul-18	1.50	0.15	24-Oct-18	1.93	0.19	24-Jan-19	1.37	0.14	24-Apr-19	1.37	0.14
25-Jul-18	1.50	0.15	25-Oct-18	1.93	0.19	25-Jan-19	2.93	0.29	25-Apr-19	2.93	0.29
26-Jul-18	1.50	0.15	26-Oct-18	2.37	0.24	26-Jan-19	2.93	0.29	26-Apr-19	2.93	0.29
27-Jul-18	1.50	0.15	27-Oct-18	2.37	0.24	27-Jan-19	2.93	0.29	27-Apr-19	2.93	0.29
28-Jul-18	3.52	0.35	28-Oct-18	2.37	0.24	28-Jan-19	2.93	0.29	28-Apr-19	2.93	0.29
29-Jul-18	3.52	0.35	29-Oct-18	2.37	0.24	29-Jan-19	2.93	0.29	29-Apr-19	2.93	0.29
30-Jul-18	3.52	0.35	30-Oct-18	2.37	0.24	30-Jan-19	2.93	0.29	30-Apr-19	2.93	0.29
31-Jul-18	3.52	0.35	31-Oct-18	2.37	0.24	31-Jan-19	2.93	0.29	1-May-19	2.93	0.29
1-Aug-18	0.87	0.09	1-Nov-18	2.33	0.23	1-Feb-19	2.37	0.24	2-May-19	2.37	0.24
2-Aug-18	0.87	0.09	2-Nov-18	2.33	0.23	2-Feb-19	0.94	0.09	3-May-19	0.94	0.09
3-Aug-18	0.87	0.09	3-Nov-18	2.33	0.23	3-Feb-19	0.94	0.09	4-May-19	0.94	0.09
4-Aug-18	0.87	0.09	4-Nov-18	2.33	0.23	4-Feb-19	0.94	0.09	5-May-19	0.94	0.09
5-Aug-18	0.87	0.09	5-Nov-18	2.33	0.23	5-Feb-19	0.94	0.09	6-May-19	0.94	0.09
6-Aug-18	0.87	0.09	6-Nov-18	2.33	0.23	6-Feb-19	0.94	0.09	7-May-19	0.94	0.09
7-Aug-18	0.87	0.09	7-Nov-18	2.33	0.23	7-Feb-19	0.94	0.09	8-May-19	0.94	0.09
8-Aug-18	0.87	0.09	8-Nov-18	2.33	0.23	8-Feb-19	0.94	0.09	9-May-19	0.94	0.09
9-Aug-18	0.95	0.10	9-Nov-18	2.33	0.23	9-Feb-19	2.22	0.22	10-May-19	2.22	0.22
10-Aug-18	0.95	0.10	10-Nov-18	3.28	0.33	10-Feb-19	2.22	0.22	11-May-19	2.22	0.22
11-Aug-18	0.95	0.10	11-Nov-18	3.28	0.33	11-Feb-19	2.22	0.22	12-May-19	2.22	0.22
12-Aug-18	0.95	0.10	12-Nov-18	3.28	0.33	12-Feb-19	2.25	0.22	13-May-19	2.25	0.22
13-Aug-18	0.95	0.10	13-Nov-18	3.28	0.33	13-Feb-19	2.25	0.22	14-May-19	2.25	0.22
14-Aug-18	1.14	0.11	14-Nov-18	5.12	0.51	14-Feb-19	2.25	0.22	15-May-19	2.25	0.22

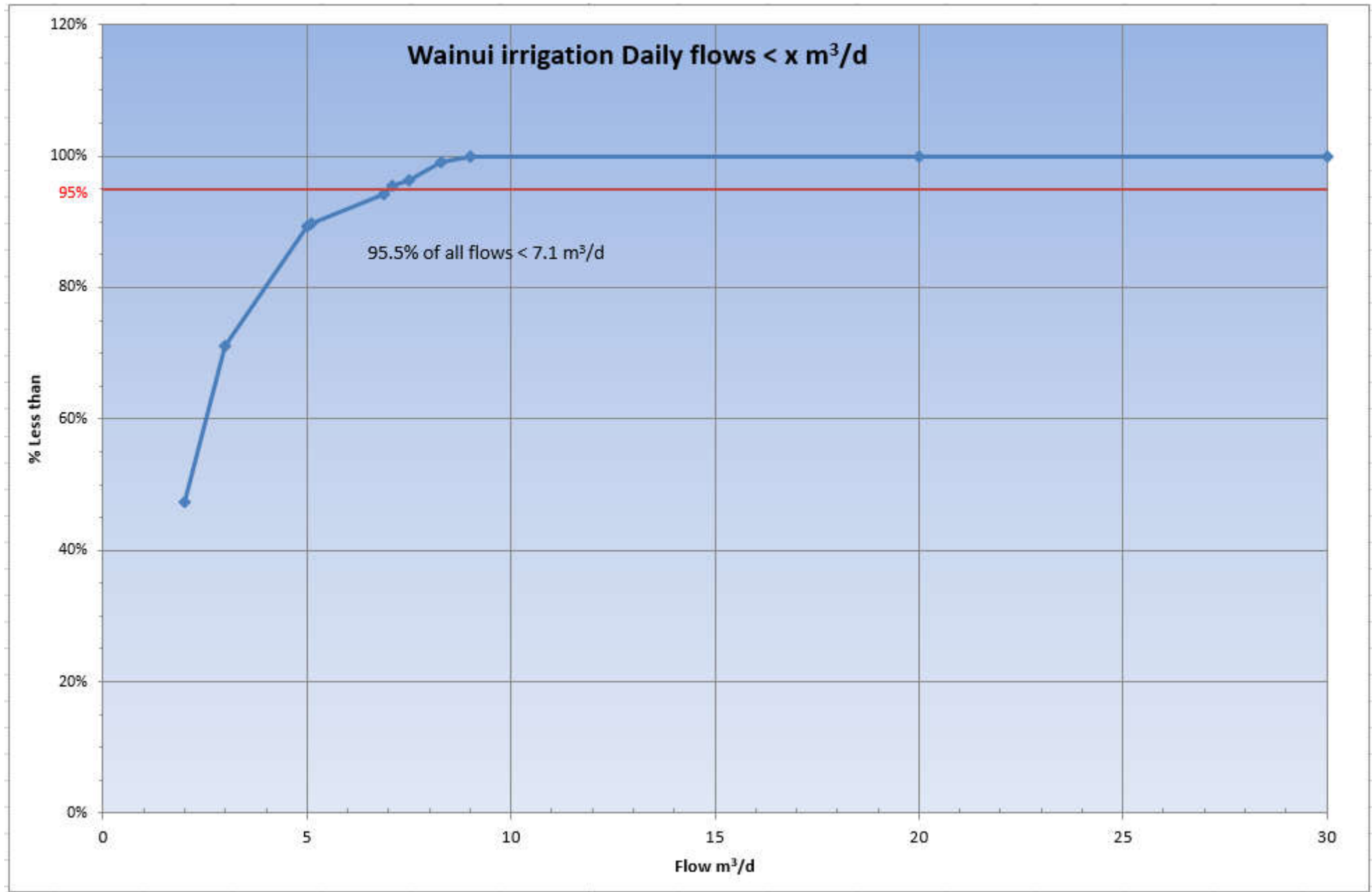
Date	Flow	Rate	Date	Flow	Rate	Date	Flow	Rate	Date	Flow	Rate
15-Aug-18	1.14	0.11	15-Nov-18	5.12	0.51	15-Feb-19	1.67	0.17	16-May-19	1.67	0.17
16-Aug-18	1.14	0.11	16-Nov-18	5.12	0.51	16-Feb-19	1.67	0.17	17-May-19	1.67	0.17
17-Aug-18	1.14	0.11	17-Nov-18	5.12	0.51	17-Feb-19	1.67	0.17	18-May-19	1.67	0.17
18-Aug-18	1.14	0.11	18-Nov-18	5.12	0.51	18-Feb-19	1.67	0.17	19-May-19	1.67	0.17
19-Aug-18	1.14	0.11	19-Nov-18	5.12	0.51	19-Feb-19	1.67	0.17	20-May-19	1.67	0.17
20-Aug-18	1.14	0.11	20-Nov-18	5.12	0.51	20-Feb-19	1.67	0.17	21-May-19	1.67	0.17
21-Aug-18	1.14	0.11	21-Nov-18	5.12	0.51	21-Feb-19	1.67	0.17	22-May-19	1.67	0.17
22-Aug-18	1.94	0.19	22-Nov-18	2.97	0.30	22-Feb-19	1.67	0.17	23-May-19	1.67	0.17
23-Aug-18	1.94	0.19	23-Nov-18	2.97	0.30	23-Feb-19	1.67	0.17	24-May-19	1.67	0.17
24-Aug-18	1.94	0.19	24-Nov-18	2.97	0.30	24-Feb-19	1.67	0.17	25-May-19	1.67	0.17
25-Aug-18	1.94	0.19	25-Nov-18	2.97	0.30	25-Feb-19	1.67	0.17	26-May-19	1.67	0.17
26-Aug-18	1.94	0.19	26-Nov-18	2.97	0.30	26-Feb-19	1.67	0.17	27-May-19	1.67	0.17
27-Aug-18	1.94	0.19	27-Nov-18	2.97	0.30	27-Feb-19	3.18	0.32	28-May-19	3.18	0.32
28-Aug-18	1.94	0.19	28-Nov-18	2.97	0.30	28-Feb-19	3.18	0.32	29-May-19	3.18	0.32
29-Aug-18	8.82	0.88	29-Nov-18	3.42	0.34	1-Mar-19	2.24	0.22	30-May-19	2.24	0.22
30-Aug-18	8.82	0.88	30-Nov-18	3.42	0.34	2-Mar-19	2.24	0.22	31-May-19	2.24	0.22
31-Aug-18	8.82	0.88	1-Dec-18	2.73	0.27	3-Mar-19	2.24	0.22	1-Jun-19	2.24	0.22
1-Sep-18	3.78	0.38	2-Dec-18	2.73	0.27	4-Mar-19	2.24	0.22	2-Jun-19	2.24	0.22
2-Sep-18	3.78	0.38	3-Dec-18	2.73	0.27	5-Mar-19	2.24	0.22	3-Jun-19	2.24	0.22
3-Sep-18	3.78	0.38	4-Dec-18	1.68	0.17	6-Mar-19	2.24	0.22	4-Jun-19	2.24	0.22
4-Sep-18	47.61	4.76	5-Dec-18	1.68	0.17	7-Mar-19	1.30	0.13	5-Jun-19	1.30	0.13
5-Sep-18	6.37	0.64	6-Dec-18	1.68	0.17	8-Mar-19	1.30	0.13	6-Jun-19	1.30	0.13
6-Sep-18	6.37	0.64	7-Dec-18	1.68	0.17	9-Mar-19	1.30	0.13	7-Jun-19	1.30	0.13
7-Sep-18	5.27	0.53	8-Dec-18	1.68	0.17	10-Mar-19	1.30	0.13	8-Jun-19	1.30	0.13
8-Sep-18	5.27	0.53	9-Dec-18	1.68	0.17	11-Mar-19	1.30	0.13	9-Jun-19	1.30	0.13
9-Sep-18	5.27	0.53	10-Dec-18	1.68	0.17	12-Mar-19	1.87	0.19	10-Jun-19	1.87	0.19
10-Sep-18	5.27	0.53	11-Dec-18	1.68	0.17	13-Mar-19	1.87	0.19	11-Jun-19	1.87	0.19
11-Sep-18	1.47	0.15	12-Dec-18	2.41	0.24	14-Mar-19	1.87	0.19	12-Jun-19	1.87	0.19
12-Sep-18	1.47	0.15	13-Dec-18	2.41	0.24	15-Mar-19	1.87	0.19	13-Jun-19	1.87	0.19
13-Sep-18	1.47	0.15	14-Dec-18	2.41	0.24	16-Mar-19	1.87	0.19	14-Jun-19	1.87	0.19
14-Sep-18	1.47	0.15	15-Dec-18	1.61	0.16	17-Mar-19	1.87	0.19	15-Jun-19	1.87	0.19
15-Sep-18	1.47	0.15	16-Dec-18	1.61	0.16	18-Mar-19	1.87	0.19	16-Jun-19	1.87	0.19
16-Sep-18	1.47	0.15	17-Dec-18	1.61	0.16	19-Mar-19		-	17-Jun-19		-
17-Sep-18	1.47	0.15	18-Dec-18	1.61	0.16	20-Mar-19		-	18-Jun-19		-
18-Sep-18	1.47	0.15	19-Dec-18	-	-	21-Mar-19		-	19-Jun-19		-
19-Sep-18	1.47	0.15	20-Dec-18	2.67	0.27	22-Mar-19	-	-	20-Jun-19	-	-
20-Sep-18	3.92	0.39	21-Dec-18	2.67	0.27	23-Mar-19	2.02	0.20	21-Jun-19	2.02	0.20
21-Sep-18	3.92	0.39	22-Dec-18	2.67	0.27	24-Mar-19	2.02	0.20	22-Jun-19	2.02	0.20
22-Sep-18	3.92	0.39	23-Dec-18	2.67	0.27	25-Mar-19	2.02	0.20	23-Jun-19	2.02	0.20
23-Sep-18	3.92	0.39	24-Dec-18	2.67	0.27	26-Mar-19	2.02	0.20	24-Jun-19	2.02	0.20
24-Sep-18	3.92	0.39	25-Dec-18	8.29	0.83	27-Mar-19	2.02	0.20	25-Jun-19	2.02	0.20
25-Sep-18	3.92	0.39	26-Dec-18	8.29	0.83	28-Mar-19	2.02	0.20	26-Jun-19	2.02	0.20
26-Sep-18	3.92	0.39	27-Dec-18	8.29	0.83	29-Mar-19	2.02	0.20	27-Jun-19	2.02	0.20
27-Sep-18		-	28-Dec-18	8.29	0.83	30-Mar-19	2.02	0.20	28-Jun-19	2.02	0.20
28-Sep-18		-	29-Dec-18	8.29	0.83	31-Mar-19	2.02	0.20	29-Jun-19	2.02	0.20
29-Sep-18		-	30-Dec-18	8.29	0.83				30-Jun-19	2.02	0.20
30-Sep-18		-	31-Dec-18	8.29	0.83						

Summary Statistics

Daily max	47.61 m ³ /d
	4.76 mm/d
Annual av	2.65 m ³ /d
	0.26 mm/d

Attachment 1.2: Flows, Wainui, Chart





Attachment 2: Lab Data and Calculations, Wainui

Plant: Wainui WWTP Irrigation Field, Banks Peninsula									
Asset Owner: Christchurch City Council									
Laboratory: Christchurch City Council Laboratory, City Water & Waste Unit									
Date	Lab analysis				IF	5-Sample Median			
	BOD5 [mg/l]	TSS [mg/l]	FEC [cfu/100ml]	TN [mg/l]	Flow [m3/month]	TN Load [kgN/ha]	TSS [mg/l]	FEC [cfu/100ml]	
10-Jul-18	1.9	16	800	33	117.78	3.9	15.0	40	
9-Aug-18	1.9	3	10	34	60.92	2.1	15.0	40	
17-Sep-18	2.6	10	440	34	147.38	5.0	10.0	40	
8-Oct-18	2.7	6.3	2000	49	76.02	3.7	10.0	440	
8-Nov-18	1.4	4.3	50	35	102.63	3.6	6.3	440	
6-Dec-18	1	11	40	23	106.62	2.5	6.3	50	
10-Jan-19	44	65	100	24	90.80	2.2	10.0	100	
7-Feb-19	1	120	10	6.4	48.74	0.3	11.0	50	
29-Mar-19	1.3	170	20	26	51.18	1.3	65.0	40	
29-Apr-19	5.3	49	750	74	97.17	7.2	65.0	40	
16-May-19	3	14	10	24	28.54	0.7	65.0	20	
28-May-19		4.9				0.0	49.0	15	
30-May-19		3				0.0	14.0	20	
5-Jun-19		3	Additional TSS sampling done			0.0	4.9	380	
6-Jun-19		3				0.0	3.0	10	
13-Jun-19	4.2	36	10	26	34.52	0.9	3.0	10	
					962.3	33.3			
Median:	2.3	10.5	45.0	29.5	83.4				
90th Percentile:	5.2	92.5	795.0	47.6	116.7				
Average:	5.9	32.4	353.3	32.4	80.2				
Maximum/Limit:	44.0	170.0	2,000.0	74.0	147.4	200	20	10,000	
Exceedances:	1.0	5.0	0.0			0	4	0	
Total flow (m3)	962.3								
Maximum daily flow (m3)	47.6								
Annual average TN (mg/L)	32.4								
Estimated TN load (kg/ha/yr)	31.1								

Attachment 3: O&M Rounds, Wainui

Frequency	Seaview WWTP		Warnerville Irrigation Field	
	Task Description	Comments	Task Description	Comments
Every Visit	<ul style="list-style-type: none"> Check line flow and pressure readings. 	Flow meter 205.0 PL002 FT01 readings should range 1.1L/s to 2.2L/s. Pressure transducer 205.0 PL002 PT01 high pressure should not be >900kPa. Pressure switch 205.3PL001PS01 low pressure should not be < -40kPa.	<ul style="list-style-type: none"> Check line flow and pressure readings. Check tank level is sufficient for full submergence of pumps 305.0.OP001 & 305.0.OP003. 	Pressure transmitters 315.1 PL001 PT01 & 315.2 PL001 PT01 should range 400kPa to 900 kPa Normal range of 305.0.OT001LT01 is 1.675m to 3.8m (measured from tank bottom)
Every Week	<ul style="list-style-type: none"> Visually check for leaks. Check pumps 205.1 & 205.2 OP001 for excessive heat, noise, vibration, and correct operation. Check current drawn. Level control operation is OK. Check for fat build-up in septic tanks Check hatches and doors for odour and condition Monitor motor running currents 	Sound should be < 85dB at 1 m from the pump. Temperature should be < 50°C. By SCADA/VSD	<ul style="list-style-type: none"> Check current drawn. Monitor motor running currents 	Rated current is 13A By SCADA/VSD
Every 6 Months	<ul style="list-style-type: none"> Check level switch 010.1 TT001 LS01 and level transducer 0101.1 TT001 LT01 operation Check flow meter 205.0 PL002 FT01 calibration & accuracy Check pressure transducer 205.0 PL002 PT01 calibration & accuracy Operate/grease all valves and check for gland leakage. Check pump mechanical seals, and replace if necessary. Check shaft or shaft sleeve for scouring. Check alignment for pumps and motors. Check holding down bolt for tightness. Check coupling for wear. 	If suspected issue only If suspected issue only Visual check	<ul style="list-style-type: none"> Operate all valves and check for gland leakage. Check flow meters calibration & accuracy 315.1 PL001 FT01 & 315.2 PL001 FT01 Check pressure transmitters calibration & accuracy 315.1 PL001 PT01 & 315.2 PL001 PT01 <p><u>Irrigation System:</u></p> <ul style="list-style-type: none"> Check main to submain connection Check flush points at each zone Visual check for leaks at top chamber Check even drip distribution Check sub main pins are secure Check air valve works Check indexing valve works to each of the 3 zones Remove and clean twin disk filter Open all flush valves at the end of the drip lines (along fence line) and run for 5 min before closing or once lines are sufficiently flushed. Check pressures at the top and bottom of each zone when zone is operating Open and flush submains at bottom of each zone. Ensure holding downpipes for pumps 305.0.OP001 & 305.0.OP003 are secure. 	If suspected issue only If suspected issue only Flush tubes using plastic valve Run pump and check valve Visual monitoring required On discharge line to irrigation field (may require confined space entry permit) Check with pressure instrument Normal operating ranges is 141.5 to 222kPa Black polyethylene pipe
Every 12 Months	<ul style="list-style-type: none"> Check rotating elements for wear. Check mountings are secure. Check operation of controls and test critical alarms. Coordinate RPZ certification 	2 RPZ (1 potable supply and 1 process supply); Martin Fry	<ul style="list-style-type: none"> Check operation of electronic controls and test critical alarms. Check mechanical pump seals Test insulation on motors Coordinate RPZ certification 	1 RPZ; Martin Fry
Every 5 Years	<ul style="list-style-type: none"> Replace motor bearings and check general condition of motor. 	As required if noisy		