



Diamond Harbour 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: CRC101835
File Number: CO6C/14460
Client Name: Christchurch City Council
To: Discharge Contaminants Into Water.
Consent Location: Pauahinekotou Head, LYTTELTON HARBOUR
Status: Active

07/08/2012 Consent Commenced
 07/08/2017 Lapse Date
 03/09/2012 Given Effect to Date
 31/12/2021 Expiry Date

Subject to the Following Conditions:

1	The discharge shall be only treated sewage from the Diamond Harbour Wastewater Treatment Plant, located at the based of Pauahinekotou Head, Diamond Harbour.
Compliance	
2	a. Treated sewage effluent shall only be discharged to Lyttelton Harbour/Whakaraupo via an existing outfall approximately 60 metres seaward from Pauahinekotou Head, at or about map reference NZMS 260 M36: 8729-3141. b. The discharge at this location shall cease on 31 December 2021.
Compliance	
3	The volume of effluent discharged shall not exceed 2500 cubic metres per day at a maximum rate of 34 litres per second.
Compliance	The instantaneous inflow flowrate exceeded the consented limit of 34l/s 1,576 times during the twelve month period, primarily due to 4 major events. The peak flows through the treatment plant will be buffered through the large treatment tanks in the treatment plant prior to UV disinfection and discharge into the harbour. At present there is no flow meter on the discharge pipework. The maximum discharge never exceeded 2,500 m³ per day. (Attachment 1.1).
4	The consent holder shall measure flows from the Diamond Harbour Sewage Treatment Plant, on a continuous basis, to a degree of accuracy of plus or minus ten percent, and shall maintain a record of total daily flows. This record shall be made available to the Canterbury Regional Council on request.
Compliance	
5	The median concentration of the five-day biological oxygen demand in the effluent discharged shall not exceed 30 grams per cubic metre from the date of commencement of this consent.
Compliance	
6	The median concentration of the suspended solids in the effluent discharged shall not exceed 30 grams per cubic metre from the date of commencement of this consent.
Compliance	
7	a. The median concentration of faecal coliforms shall not exceed 700 colony forming units (CFU) per 100 millilitres of effluent. b. The median concentration of enterococci shall not exceed 1,750 MPN per 100 millilitres of effluent.
Complies	
8	For the purposes of determining whether the consent holder is complying with Conditions (5), (6) and (7): a. The effluent shall be sampled at any point after treatment and prior to discharge, and analysed for the concentration of the five-day biological oxygen demand, suspended solids, faecal coliforms and enterococci. b. The effluent shall be sampled at the following frequency: i. At least monthly samples shall be taken from 1 March to 30 November; and ii. At least weekly samples, on separate days selected at random, shall be taken during December, January and February. c. For the purposes of Conditions (5), (6) and (7), whenever a new sample result is available for each determinand, it shall be grouped with the previous four results obtained under Conditions (8)(a) and (b) or Condition (9), and the median result recorded. d. The time of day samples are taken shall be recorded.
Compliance	
9	If any sample measured has a faecal coliform count greater than 700 faecal coliforms per 100 millilitres of effluent or an enterococci count or more that 1,750 MPN per 100 millilitres of effluent, the consent holder shall take a further sample of treated effluent within two days of obtaining that result and shall test for faecal coliform and enterococci concentrations.

	Unable to confirm Compliance
10	If the median concentration of faecal coliforms or enterococci, as calculated in accordance with Condition 8(c), exceeds 700 faecal coliforms per 100 millilitres or 1,750 enterococci per 100 millilitres of effluent, the consent holder shall within ten working days of the exceedance, write to the Canterbury Regional Council outlining the measures the consent holder proposes to undertake to address the concentration exceedances, and the timeframe within which this will occur.
	Compliance; no exceedances occurred for either parameter
11	Prior to discharge, the effluent shall be sampled and analysed not less than once per month for the following: <ul style="list-style-type: none"> a. Dissolved reactive phosphorous (grams per cubic metre); b. Ammoniacal nitrogen (grams per cubic metre); c. Total oxidized nitrogen (grams per cubic metre); and d. Total nitrogen (grams per cubic metre).
	Compliance
12	Prior to discharge, the effluent shall be sampled at least annually during January and analysed for the following: <ul style="list-style-type: none"> a. Arsenic (milligrams per cubic metre); b. Cadmium (milligrams per cubic metre); c. Chromium (milligrams per cubic metre); d. Copper (milligrams per cubic metre); e. Lead (milligrams per cubic metre); f. Nickel (milligrams per cubic metre); and g. Zinc (milligrams per cubic metre).
	Compliance
13	<ul style="list-style-type: none"> a. The water of the receiving environment shall be sampled in January, March, May, June, September, November and December, at each of the following locations: <ul style="list-style-type: none"> i. 50 metres due north of the outfall; ii. 50 metres due south of the outfall; iii. 50 metres due east of the outfall; iv. 50 metres due west of the outfall; and v. surface water quality monitoring site SQ35187 (which is located at or about NZMS 260: M36:8636-3190, east of Quail Island/Otamahua). vi. surface water quality monitoring site at Church Bay, which is located at or about NZMS 260 M36:872-305. b. Each sample shall be analysed for the concentration of faecal coliforms, enterococci, total suspended solids, chlorophyll-a, ammoniacal nitrogen, total oxidized nitrogen total nitrogen and dissolved reactive phosphorus. The time the samples are taken shall be recorded. c. Samples shall be taken at approximately 0.5 metres below the surface of the water. d. Samples shall not be taken on consecutive days. e. Samples shall be taken within one hour of low water.
	Compliance
14	If any of the samples collected from around the mixing zone in accordance with Condition (13) contain concentrations of total nitrogen greater than 1.0 mgN/l or ammoniacal nitrogen greater than 0.91 mgN/l, the consent holder shall undertake an investigation of the operation of the Wastewater Treatment Plant and shall re-sample the discharge for ammoniacal nitrogen, total oxidized nitrogen, total nitrogen and dissolved reactive phosphorus, within 48 hours of receiving the results of the initial survey. The consent holder shall report the findings of the investigation to Canterbury Regional Council within one week of receipt of the results of the re-sample.
	Compliance
15	The monitoring required under Condition (13) shall be undertaken on the same day as the monitoring required under Condition (8). In the event that the monitoring required under Conditions (13) and (8) cannot be undertaken on the same days, the reason shall be recorded and submitted to the Canterbury Regional Council.
	Compliance
16	The sediment survey as carried out by Golders Associates (Report Number: 0978205527 – January 2010) for the application shall be repeated in 2015 in the month of November. The samples shall be analysed for total organic carbon, copper, lead and zinc and shall be collected from the following locations: <ul style="list-style-type: none"> a. At distances 25 metres perpendicular to the outfall; and b. At 50 metres and 150 metres along a transect in the same trajectory as the outfall pipe. These locations are illustrated on Plan CRC101835A which forms part of this consent.
	CCC to follow up
17	The laboratory carrying out the analyses for the purposes of Conditions (5), (6), (7), (9), (11), (12) and (13) of this consent shall be 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
18	The consent holder shall submit to the Canterbury Regional Council: <ul style="list-style-type: none"> a. The results of any monitoring required each month under the conditions of this consent, by the 10th working day of

	<p>the following month.</p> <p>b. The results of any sampling undertaken under Condition (9) that have a faecal coliform count greater than 700 faecal coliforms per 100 millilitres of effluent, or an enterococci count greater than 1,750 enterococci MPN per 100 millilitres of effluent, within three working days of receipt of any results.</p>
	Compliance
19	<p>The consent holder shall submit to the Canterbury Regional Council within three months of the commencement of this consent, a Management Plan. This shall include:</p> <p>a. An Operation and Maintenance Manual, which contains the key operation and maintenance tasks of the operator, normal operations, emergency operations and safety precautions. The emergency operations and safety precautions shall set out:</p> <p>i. The contingency measures to be taken at the pumping stations in the Diamond Harbour Wastewater Treatment Plant catchment and at the Treatment Plant in order to avoid the release of effluent to the environment during periods of any mechanical or electrical failure or power cut; and</p> <p>ii. the measures to be taken at the pumping stations in the Diamond Harbour catchment and at the Treatment Plant in the event of an emergency discharge or overflow.</p> <p>b. The Management Practices to ensure compliance with conditions of the Resource Consent.</p> <p>c. The Maintenance Contractor's monitoring programme and reporting provisions, including a specific requirement that monitoring is undertaken in accordance with Conditions (8), (9), (10), (11), (12), (13) (14), (15) and (16) of this consent.</p>
	Compliance; Management Plan submitted on 05/11/2012
20	<p>a. The consent holder shall submit a report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and upload the report on the consent holder's website by 31 August of each year summarizing the monitoring data collected and providing an interpretation of the results of the monitoring.</p> <p>b. The consent holder shall supply a copy of the report referred to in condition 20(a) to all the following organisations/groups/people:</p> <p>a. Cass Bay Residents Association</p> <p>b. Church Bay Neighborhood Association</p> <p>c. Diamond Harbour Community Association Incorporated</p> <p>d. Paula Smith C/o 1 Purau Avenue, RD 2, Diamond Harbour</p> <p>e. Te Hapu o Ngati Wheke (Rapaki) Runanga</p> <p>f. Te Runanga o Koukourarata</p> <p>g. Te Runanga o Ngai Tahu</p> <p>h. Governors Bay Community Association.</p> <p>c. The consent holder shall display all effluent and receiving environment monitoring data collected on the consent holder's website. This data shall be updated on a monthly basis.</p>
	Compliance via this report; CCC to distribute
21	<p>a. Within 60 days of the commencement date of this resource consent, the consent holder shall prepare an implementation plan which includes, but is not limited to the following matters:</p> <p>a. No later than 30 June 2015 all preliminary design details have been completed;</p> <p>b. No later than 30 September 2015, all necessary resource consents have been applied for;</p> <p>c. No later than 30 June 2017 detailed design work completed;</p> <p>d. No later than 31 December 2021 all works have been commissioned, and after a period of testing the treatment plant is decommissioned.</p> <p>b. The consent holder shall provide an annual report to the Canterbury Regional Council in July each year, outlining progress on the Implementation Plan for the removal of the sewage discharge from Lyttelton Harbour/Whakaraupo. A copy of this annual report will also be forwarded to all organisations/groups represented on the Lyttelton Harbour/Whakaraupo Wastewater Working Party and also all parties listed in condition 20(b).</p> <p>c. The consent holder shall hold a public meeting once a year to discuss the monitoring data collected in the previous year and also to provide an update on progress relating to the cessation of the discharge at map reference NZMS 260 M36:838-815 on 31 December 2018, and the removal of the sewage discharge from Lyttelton Harbour/Whakaraupo.</p>
	CCC to follow up
22	<p>The Canterbury Regional Council may, once per year, on any of the last five working days of June or November each year, serve notice of its intention to review the conditions of this consent for the purposes of:</p> <p>a. Dealing with any adverse effects which may arise from the exercise of this consent and which it is appropriate to deal with later; or</p> <p>b. Requiring adoption of the best practicable option to remove or reduce any adverse effect on the environment; or</p> <p>c. Complying with the requirements of a relevant rule in an operative regional plan; or</p> <p>d. Amending the frequency of monitoring and the parameters monitored.</p>
	ECAN to request
23	<p>The consent holder shall surrender resource consent CRC031546 within 60 working days of the commencement of this consent.</p>
	Compliance

Treatment Plant Effluent Monitoring

Daily flows for the Diamond Harbour Wastewater Treatment Plant (WwTP) were generally well under the 2,500 m³/d limit with 95% of all flows <515 m³/d (Attachment 1.3). Highest flows recorded were 2,236 m³/d on 2 June 2019 with the next highest of 2,228 m³/d on 1 June 2019, within the consented limit (N.B. flows are measured on the inlet).

The instantaneous inflow rate was greater than 34 l/s 1,576 times. The majority of the exceedances were during the four rainfall events. Other smaller rain events were usually short-lived and uncharacteristic of the normal flow regime. This is only 45 % of the previous years events when flows were exceeded 3,508 occasions (the SCADA logging rate exacerbates this). The discharge rate would be buffered and therefore the inflow rate is a conservative guide only of the discharge rate.

The plant operated with full compliance for effluent water quality relating to BOD₅, TSS, faecal coliforms (FC), and Enterococci (ENT) (Table 1). Maximum medians of 8.2 mg/L BOD₅ were below the 30-mg/L limits, TSS max of 18 mg/l compared to allowable 30 mg/l and FC of 30 CFU/100 mL and ENT of 20 MPN/100 mL were excellent compared to 700 CFU/100 mL and 1,750 MPN/100 mL consented.

Receiving Environment Monitoring

The receiving environment was monitored around the outfall and at two control sites (Quail Island and Church Bay) (Attachment 2.2). Human health related parameters of FC and ENT were usually well below the respective detection limits. Trigger levels of 1 mg/L for TN and 0.91 mg/L for NH₃ were not exceeded at any of the sites with maximum values of 0.470mg/L TN at 50 m due South of the outfall and 0.049 mg/L NH₃ at 50m due North of Outfall (same locations as previous year). Monitoring results did not appear to be significantly different between the outfall sites and the control sites.

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

Parameter	Exceedances of Trigger Value
Flow >2,500 m ³ /d	0
Discharge Flowrate >34 L/s	1576
BOD ₅ median >30 mg/L	0
TSS median >30 mg/L	0
FC >700 CFU/100 mL	0
ENT >1,750 MPN/100 mL	0
Receiving TN >1 mg/L	0
Receiving NH ₃ >0.91 mg/L	0

Table 2. Incoming instantaneous flowrates from July 2018-June 2019

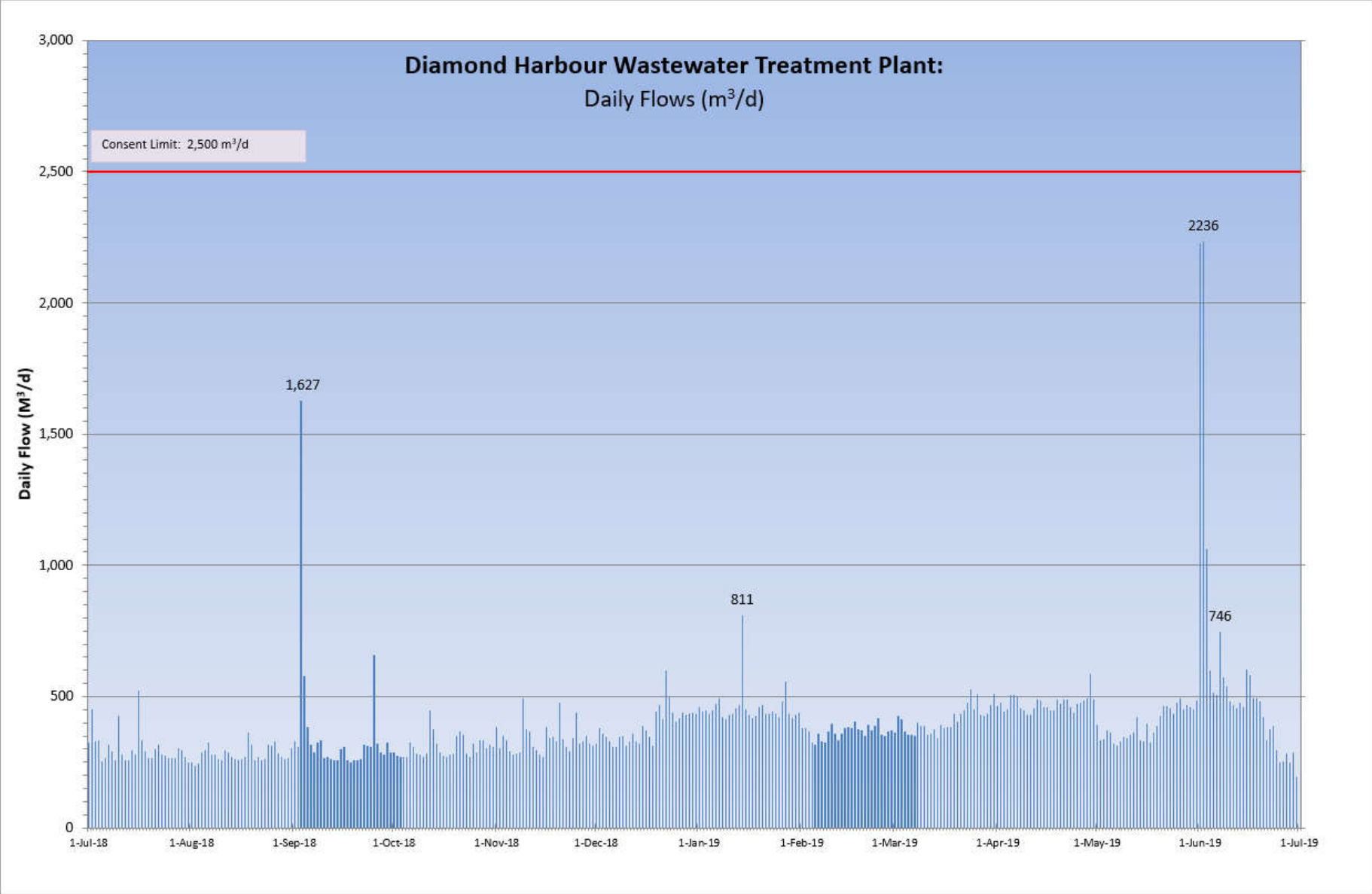
Month	Values > 34 L/s [#]
Jul-18	26
Aug-18	6
Sep-18	340
Oct-18	0
Nov-18	0
Dec-18	6
Jan-19	58
Feb-19	0
Mar-19	10
Apr-19	16
May-19	0
Jun-19	1114
Total	1576

Attachment 1.1: Flows, Diamond Harbour, Data

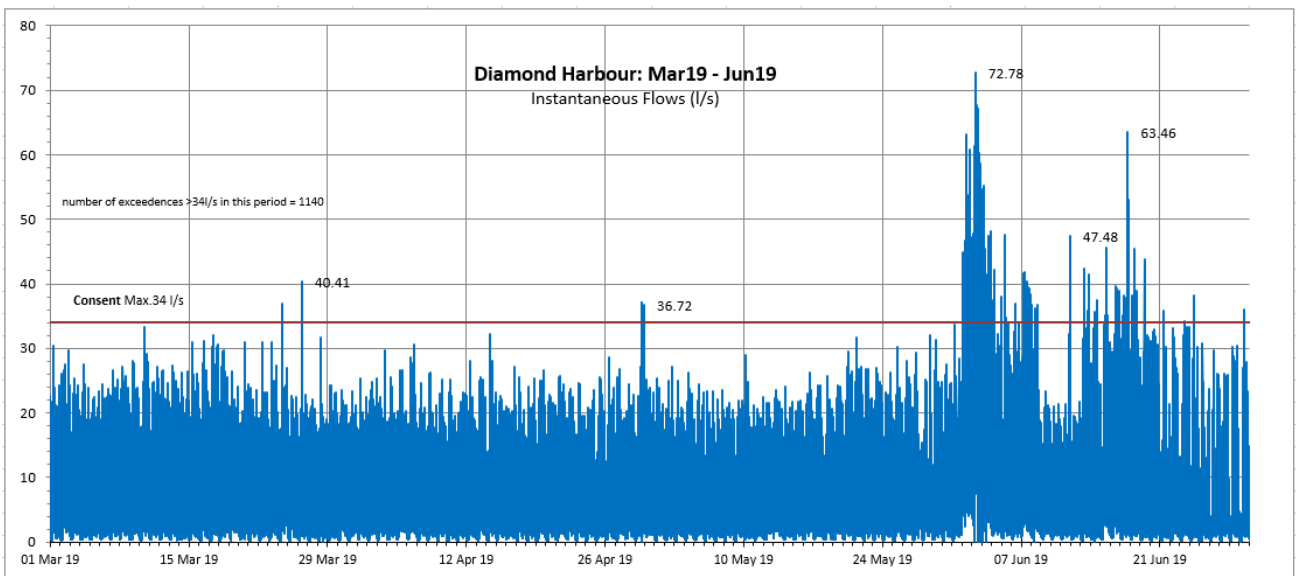
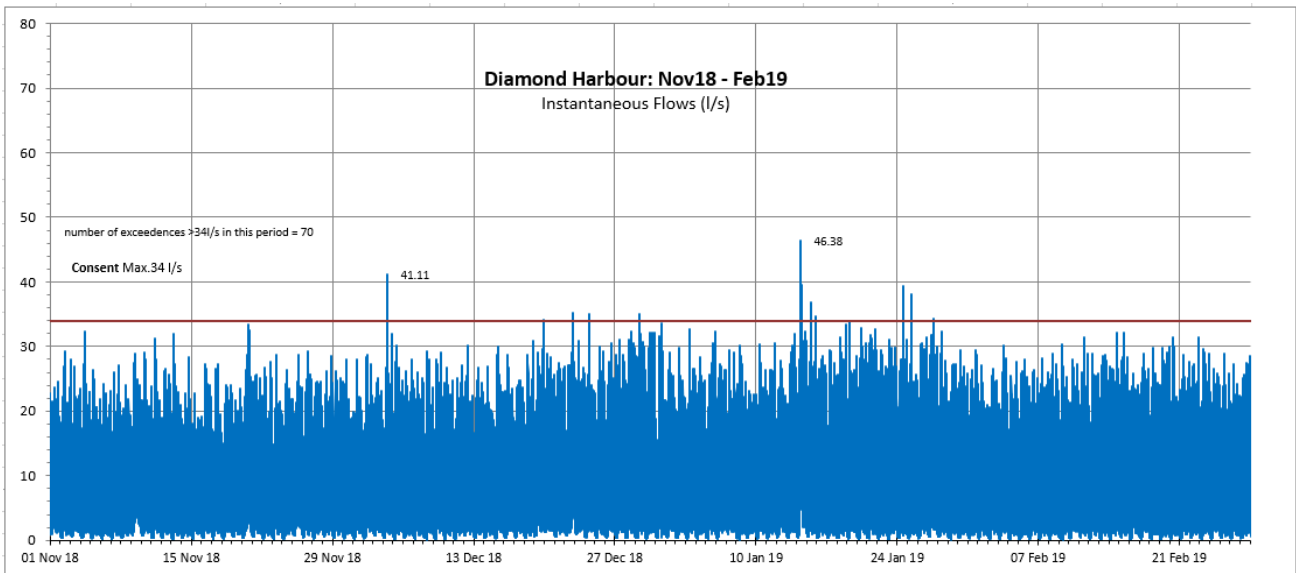
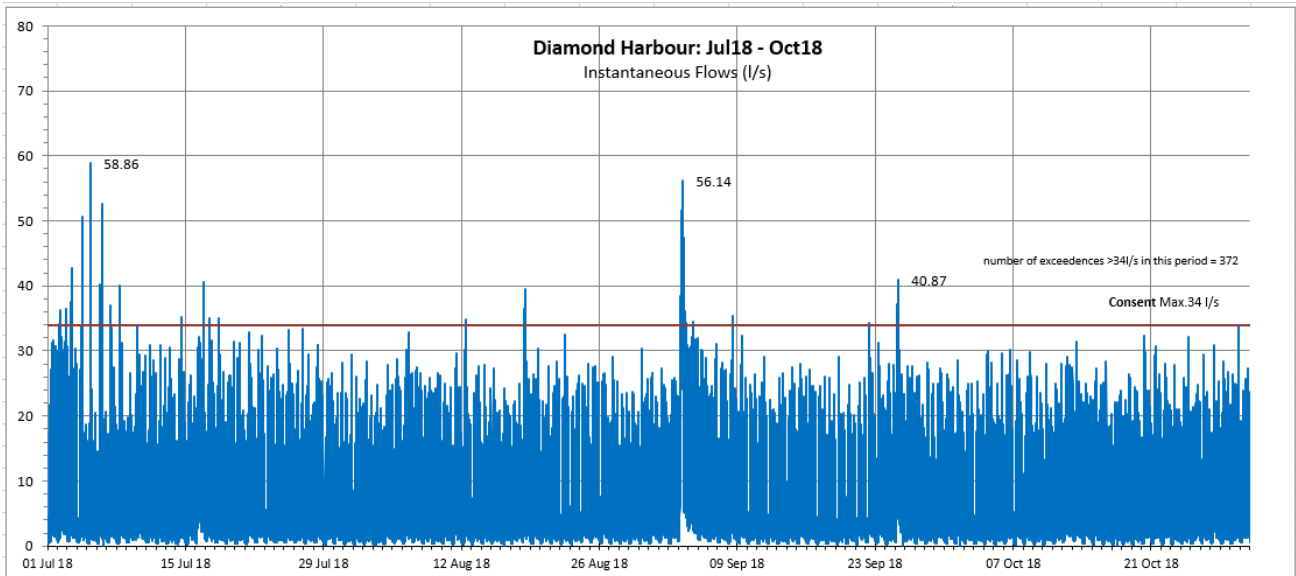
Plant : Diamond Harbour Wastewater Treatment, Banks Peninsula: Daily Flows for July 2018 - June 2018							
Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
1-Jul-18	325	1-Oct-18	288	1-Jan-19	459	1-Apr-19	463
2-Jul-18	453	2-Oct-18	273	2-Jan-19	444	2-Apr-19	476
3-Jul-18	330	3-Oct-18	269	3-Jan-19	448	3-Apr-19	443
4-Jul-18	334	4-Oct-18	271	4-Jan-19	433	4-Apr-19	451
5-Jul-18	254	5-Oct-18	269	5-Jan-19	446	5-Apr-19	506
6-Jul-18	267	6-Oct-18	324	6-Jan-19	472	6-Apr-19	508
7-Jul-18	316	7-Oct-18	307	7-Jan-19	494	7-Apr-19	501
8-Jul-18	290	8-Oct-18	283	8-Jan-19	421	8-Apr-19	455
9-Jul-18	256	9-Oct-18	280	9-Jan-19	413	9-Apr-19	447
10-Jul-18	424	10-Oct-18	271	10-Jan-19	430	10-Apr-19	430
11-Jul-18	277	11-Oct-18	284	11-Jan-19	434	11-Apr-19	431
12-Jul-18	259	12-Oct-18	447	12-Jan-19	456	12-Apr-19	456
13-Jul-18	258	13-Oct-18	374	13-Jan-19	469	13-Apr-19	488
14-Jul-18	297	14-Oct-18	319	14-Jan-19	811	14-Apr-19	484
15-Jul-18	278	15-Oct-18	288	15-Jan-19	453	15-Apr-19	459
16-Jul-18	524	16-Oct-18	274	16-Jan-19	431	16-Apr-19	461
17-Jul-18	333	17-Oct-18	272	17-Jan-19	418	17-Apr-19	445
18-Jul-18	293	18-Oct-18	277	18-Jan-19	426	18-Apr-19	445
19-Jul-18	264	19-Oct-18	282	19-Jan-19	459	19-Apr-19	491
20-Jul-18	267	20-Oct-18	352	20-Jan-19	470	20-Apr-19	472
21-Jul-18	299	21-Oct-18	365	21-Jan-19	435	21-Apr-19	489
22-Jul-18	317	22-Oct-18	353	22-Jan-19	433	22-Apr-19	489
23-Jul-18	279	23-Oct-18	283	23-Jan-19	444	23-Apr-19	461
24-Jul-18	276	24-Oct-18	270	24-Jan-19	435	24-Apr-19	440
25-Jul-18	265	25-Oct-18	320	25-Jan-19	422	25-Apr-19	474
26-Jul-18	265	26-Oct-18	289	26-Jan-19	481	26-Apr-19	478
27-Jul-18	264	27-Oct-18	334	27-Jan-19	557	27-Apr-19	486
28-Jul-18	305	28-Oct-18	334	28-Jan-19	436	28-Apr-19	495
29-Jul-18	295	29-Oct-18	304	29-Jan-19	418	29-Apr-19	588
30-Jul-18	270	30-Oct-18	318	30-Jan-19	430	30-Apr-19	490
31-Jul-18	248	31-Oct-18	306	31-Jan-19	439	1-May-19	391
1-Aug-18	249	1-Nov-18	383	1-Feb-19	381	2-May-19	334
2-Aug-18	238	2-Nov-18	303	2-Feb-19	379	3-May-19	336
3-Aug-18	244	3-Nov-18	351	3-Feb-19	367	4-May-19	373
4-Aug-18	289	4-Nov-18	332	4-Feb-19	324	5-May-19	364
5-Aug-18	297	5-Nov-18	293	5-Feb-19	318	6-May-19	319
6-Aug-18	326	6-Nov-18	277	6-Feb-19	359	7-May-19	312
7-Aug-18	278	7-Nov-18	282	7-Feb-19	327	8-May-19	329
8-Aug-18	277	8-Nov-18	289	8-Feb-19	323	9-May-19	345
9-Aug-18	263	9-Nov-18	493	9-Feb-19	369	10-May-19	343
10-Aug-18	256	10-Nov-18	374	10-Feb-19	395	11-May-19	354
11-Aug-18	294	11-Nov-18	368	11-Feb-19	357	12-May-19	364
12-Aug-18	286	12-Nov-18	308	12-Feb-19	335	13-May-19	423
13-Aug-18	268	13-Nov-18	294	13-Feb-19	357	14-May-19	334
14-Aug-18	261	14-Nov-18	280	14-Feb-19	378	15-May-19	330
15-Aug-18	259	15-Nov-18	272	15-Feb-19	383	16-May-19	396
16-Aug-18	261	16-Nov-18	382	16-Feb-19	380	17-May-19	323
17-Aug-18	269	17-Nov-18	340	17-Feb-19	403	18-May-19	364

Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
18-Aug-18	363	18-Nov-18	346	18-Feb-19	375	19-May-19	386
19-Aug-18	318	19-Nov-18	327	19-Feb-19	371	20-May-19	428
20-Aug-18	258	20-Nov-18	476	20-Feb-19	349	21-May-19	462
21-Aug-18	268	21-Nov-18	336	21-Feb-19	391	22-May-19	462
22-Aug-18	256	22-Nov-18	309	22-Feb-19	371	23-May-19	455
23-Aug-18	262	23-Nov-18	292	23-Feb-19	389	24-May-19	435
24-Aug-18	315	24-Nov-18	340	24-Feb-19	416	25-May-19	475
25-Aug-18	313	25-Nov-18	437	25-Feb-19	356	26-May-19	492
26-Aug-18	327	26-Nov-18	319	26-Feb-19	352	27-May-19	450
27-Aug-18	284	27-Nov-18	330	27-Feb-19	369	28-May-19	467
28-Aug-18	268	28-Nov-18	352	28-Feb-19	371	29-May-19	460
29-Aug-18	261	29-Nov-18	320	1-Mar-19	361	30-May-19	450
30-Aug-18	264	30-Nov-18	311	2-Mar-19	425	31-May-19	484
31-Aug-18	303	1-Dec-18	322	3-Mar-19	415	1-Jun-19	2228
1-Sep-18	328	2-Dec-18	380	4-Mar-19	367	2-Jun-19	2236
2-Sep-18	308	3-Dec-18	359	5-Mar-19	354	3-Jun-19	1061
3-Sep-18	1,627	4-Dec-18	344	6-Mar-19	353	4-Jun-19	597
4-Sep-18	577	5-Dec-18	331	7-Mar-19	352	5-Jun-19	513
5-Sep-18	382	6-Dec-18	307	8-Mar-19	402	6-Jun-19	507
6-Sep-18	316	7-Dec-18	307	9-Mar-19	386	7-Jun-19	746
7-Sep-18	285	8-Dec-18	346	10-Mar-19	387	8-Jun-19	575
8-Sep-18	324	9-Dec-18	352	11-Mar-19	355	9-Jun-19	539
9-Sep-18	334	10-Dec-18	312	12-Mar-19	359	10-Jun-19	482
10-Sep-18	265	11-Dec-18	327	13-Mar-19	374	11-Jun-19	469
11-Sep-18	268	12-Dec-18	359	14-Mar-19	341	12-Jun-19	455
12-Sep-18	263	13-Dec-18	329	15-Mar-19	391	13-Jun-19	477
13-Sep-18	259	14-Dec-18	322	16-Mar-19	379	14-Jun-19	459
14-Sep-18	258	15-Dec-18	386	17-Mar-19	383	15-Jun-19	602
15-Sep-18	300	16-Dec-18	372	18-Mar-19	384	16-Jun-19	580
16-Sep-18	309	17-Dec-18	348	19-Mar-19	436	17-Jun-19	495
17-Sep-18	257	18-Dec-18	314	20-Mar-19	405	18-Jun-19	492
18-Sep-18	251	19-Dec-18	444	21-Mar-19	433	19-Jun-19	479
19-Sep-18	256	20-Dec-18	470	22-Mar-19	446	20-Jun-19	423
20-Sep-18	257	21-Dec-18	415	23-Mar-19	477	21-Jun-19	333
21-Sep-18	262	22-Dec-18	600	24-Mar-19	529	22-Jun-19	375
22-Sep-18	318	23-Dec-18	502	25-Mar-19	450	23-Jun-19	386
23-Sep-18	313	24-Dec-18	439	26-Mar-19	512	24-Jun-19	296
24-Sep-18	306	25-Dec-18	406	27-Mar-19	431	25-Jun-19	249
25-Sep-18	657	26-Dec-18	416	28-Mar-19	426	26-Jun-19	254
26-Sep-18	322	27-Dec-18	437	29-Mar-19	436	27-Jun-19	282
27-Sep-18	289	28-Dec-18	429	30-Mar-19	470	28-Jun-19	247
28-Sep-18	278	29-Dec-18	435	31-Mar-19	509	29-Jun-19	287
29-Sep-18	326	30-Dec-18	440			30-Jun-19	193
30-Sep-18	288	31-Dec-18	435				

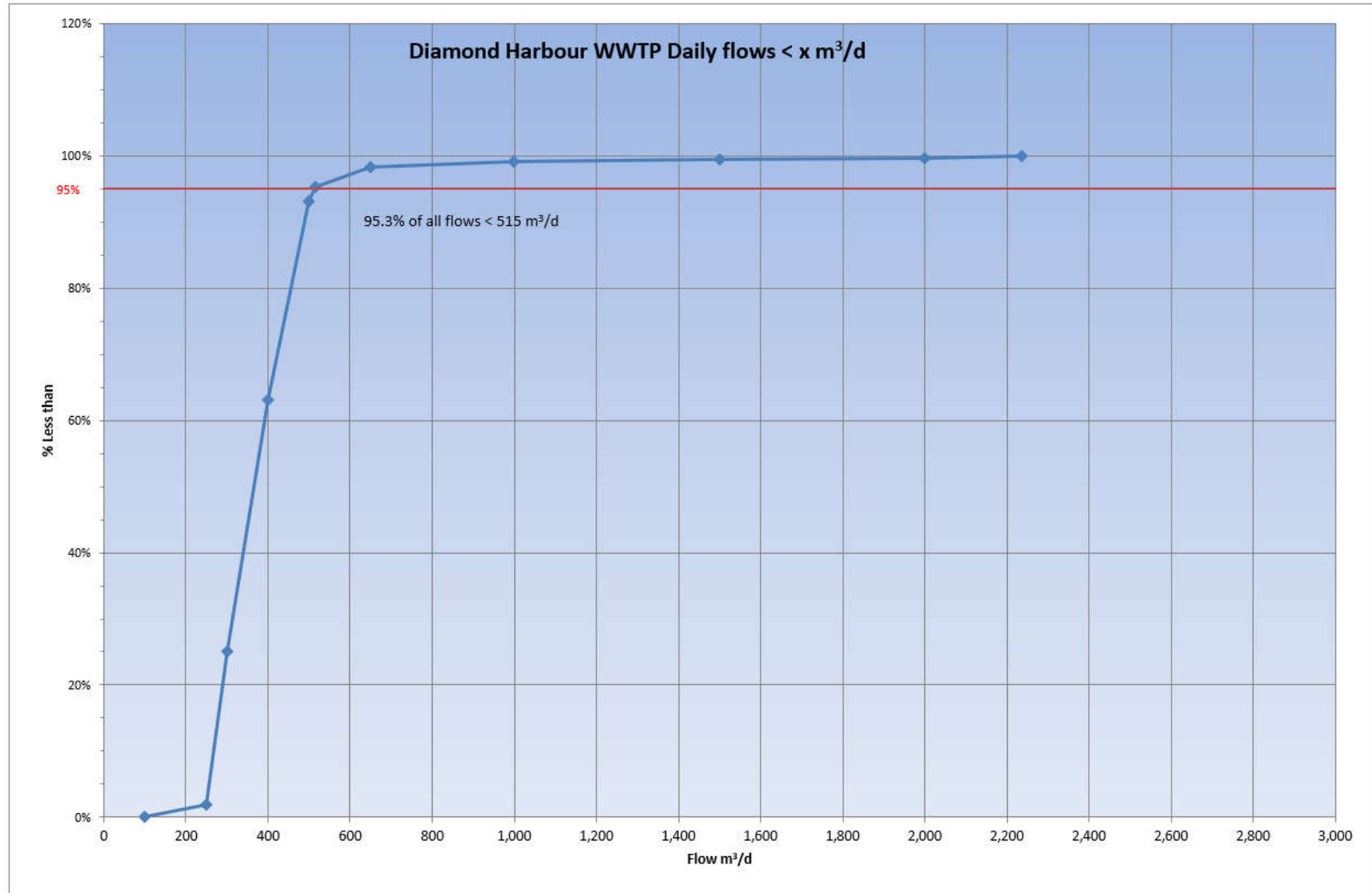
Attachment 1.2: Flows, Diamond Harbour, Chart



Attachment 1.3: Instantaneous Flows, Diamond Harbour



Attachment 1.3: Flows, Diamond Harbour, '% less than'



Attachment 2.1: Lab Data, Diamond Harbour Wastewater Treatment Plant

Plant:		Diamond Harbour Wastewater Treatment, Banks Peninsula											
Asset Owner:		Christchurch City Council											
Laboratory		Christchurch City Council Laboratory, City Water & Waste Unit											
Date	BOD ₅	DRP	TSS	TN	NH ₄ -N	NO _x	FC	ENT	5-Sample Median				
									BOD ₅	TSS	FC	ENT	
	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	CFU/100ml	MPN/100ml	[mg/l]	[mg/l]	CFU/100ml	MPN/100ml	
5-Jul-18	7	4.3	3	18	0.41	16	10	10	5.1	8.0	10.0	10	
13-Aug-18	12	2.8	36	25	0.005	21	10	10	7.0	8.0	10.0	10	
7-Sep-18	8.2	0.042	18	26	5.7	17	30	31	8.2	18.0	10.0	10	
11-Oct-18	4.3	0.15	11	3.1	0.27	0.57	10	10	7.0	11.0	10.0	10	
5-Nov-18	17	0.44	23	10	2.2	0.66	410	620	8.2	18.0	10.0	10	
6-Dec-18	2	1.3	9	2.3	0.4	0.53	30	20	8.2	18.0	30.0	20	
13-Dec-18	2.1		4.6				10	10	4.3	11.0	30.0	20	
20-Dec-18	1.5		9.3				10	10	2.1	9.3	10.0	10	
27-Dec-18	11		29				5000	190	2.1	9.3	30.0	20	
3-Jan-19	3.7		12				90	60	2.1	9.3	30.0	20	
8-Jan-19	5.4	4.5	24	4.9	0.67	1.3	20	10	3.7	12.0	20.0	10	
17-Jan-19	2.5		6.4				30	20	3.7	12.0	30.0	20	
24-Jan-19	1.7		5.5				10	10	3.7	12.0	30.0	20	
30-Jan-19	3.2		16				10	10	3.2	12.0	20.0	10	
7-Feb-19	2.6	7.1	3.3	12	8.2	1.5	30	10	2.6	6.4	20.0	10	
14-Feb-19	6.2		8.5				10	20	2.6	6.4	10.0	10	
21-Feb-19	2.6		9.2				10	10	2.6	8.5	10.0	10	
28-Feb-19	6.4		41				110	97	3.2	9.2	10.0	10	
6-Mar-19	2.3	1.5	22	4.1	0.041	0.35	10	10	2.6	9.2	10.0	10	
16-Apr-19	3.2	2.5	11	5.2	0.99	2.6	10	10	3.2	11.0	10.0	10	
22-May-19	3.6	1.2	9.2	6.7	1.2	3.4	10	10	3.2	11.0	10.0	10	
26-Jun-19	2.3	1.5	11	9.3	0.31	7.6	10	10	3.2	11.0	10.0	10	
								Limit	30	30	700	1750	
								Exceedances	0	0	0	0	
								Max	8.2	18.0	30.0	20.0	
	As	Cd	Cr	Cu	Pb	Ni	Zn						
	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]						
12 Jan 2016	<0.0015	<0.00020	<0.0010	0.0039	<0.0015	<0.0025	0.025						
18 Jan 2017	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.02						
17 Jan 2018	0.0015	<0.0010	<0.0010	0.0026	<0.0010	0.0012	0.047						
17-Jan-19	0.0013	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	0.025						

Attachment 2.2: Lab Data, Receiving Environment

Diamond Harbour	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	
CRC101835	East	North	South	West			East	North	South	West			East	North	South	West			East	North	South	West			
Date	TN mg/L	TN mg/L	TN mg/L	TN mg/L	TN mg/L	TN mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L	
			not to exceed 1.0							not to exceed 0.91															
13-Jul-18	0.28	0.29	0.35	0.32		0.31	0.016	0.012	0.014	0.016		0.015	0.11	0.11	0.11	0.1		0.12	0.024	0.021	0.022	0.021		0.021	
7-Sep-18	0.45	0.46	0.47	0.46	0.54	0.39	0.044	0.049	0.04	0.035	0.019	0.02	0.043	0.052	0.042	0.039	0.042	0.045	0.015	0.014	0.016	0.015	0.015	0.015	
5-Nov-18	0.19	0.21	0.18	0.19	0.16	0.19	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.008	0.008	0.007	0.006	0.008	0.006	
6-Dec-18	0.27	0.22	0.36	0.17	0.19	0.16	0.019	0.02	0.014	0.017	0.012	0.015	0.011	0.01	0.01	0.01	0.01	0.01	0.0078	0.0077	0.0088	0.0075	0.0084	0.0079	
8-Jan-19	0.32	0.3	0.27	0.35	0.28	0.31	0.0088	0.0086	0.011	0.011	0.005	0.0091	0.01	0.01	0.01	0.01	0.017	0.01	0.0066	0.0077	0.0071	0.0067	0.0076	0.0072	
6-Mar-19	0.1	0.088	0.14	0.14	0.12	0.094	0.019	0.013	0.023	0.015	0.02	0.019	0.01	0.01	0.01	0.01	0.01	0.01	0.003	0.003	0.0083	0.003	0.0039	0.003	
17-May-19	0.25	0.27	0.32	0.24	0.3	0.26	0.027	0.019	0.017	0.019	0.014	0.027	0.023	0.017	0.01	0.012	0.018	0.019	0.017	0.017	0.016	0.015	0.021	0.017	
26-Jun-19	0.34	0.38	0.28	0.32	0.29	0.29	0.0073	0.0085	0.0066	0.005	0.0051	0.005	0.098	0.11	0.1	0.1	0.094	0.1	0.026	0.025	0.023	0.028	0.022	0.021	
average	0.275	0.277	0.296	0.274	0.269	0.251	0.018	0.017	0.016	0.015	0.011	0.014	0.039	0.041	0.038	0.036	0.029	0.041	0.013	0.013	0.014	0.013	0.012	0.012	
maximum	0.450	0.460	0.470	0.460	0.540	0.390	0.044	0.049	0.040	0.035	0.020	0.027	0.110	0.110	0.110	0.100	0.094	0.120	0.026	0.025	0.023	0.028	0.022	0.021	

Diamond Harbour	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control
CRC101835	East	North	South	West			East	North	South	West			East	North	South	West			East	North	South	West		
Date	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL
13-Jul-18	14	14	8	33		10	0.8		0.97	0.9		1.1	10	10	10	10		10	1	1	1	1		1
7-Sep-18	98	96	94	92	160	36	3	2.7	2.8	2.7	3.1	3	10	10	10	10	10	10	4	2	4	6	10	8
5-Nov-18	27	27	13	12	16	11	5.6	5.6	4.8	3.6	3.1	4.2	10	10	10	10	10	10	1	1	1	1	1	1
6-Dec-18	56	14	70	34	48	19	3.5	2.4	3.7	23	3.3	3	10	10	10	10	10	10	1	1	1	2	1	8
8-Jan-19	16	15	16	14	20	16	1.8	2.4	2.3	2	3.7	3.3	10	10	10	10	10	10	1	1	1	1	1	1
6-Mar-19	17	17	16	17	11	13	1.7	1.8	2.1	1.4	1	1.7	10		10	10	10	10	1		1	1	1	1
17-May-19	14	24	22	27	36	20	2.3	1.6	1.6	1.2	1.7	1.8	10	10	10	10	10	10	1	1	2	1	4	1
26-Jun-19	7.6	8	6.5	6.7	6.6	7.5	2	1.3	2	1.9	1.4	2.4	10	10	10	10	10	10	1	1	1	1	1	1
average	31.200	26.875	30.688	29.463	42.514	16.563	2.588	2.543	2.534	4.588	2.471	2.563	10.000	10.000	10.000	10.000	10.000	10.000	1.375	1.143	1.500	1.750	2.714	2.750
maximum	98	96	94	92	160	36	6	6	5	23	4	4	10	10	10	10	10	10	4	2	4	6	10	8

* TN should not be > 1
 * NH3 should not be > 0.91