



Diamond Harbour Wastewater Treatment Plant Annual Monitoring Report 07/2013 – 06/2014

Prepared by: City Care Ltd
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On behalf of

Christchurch City Council, City Water & Waste Unit

29 August 2014

Resource Consent Number: CRC101835
File Number: CO6C/14460
Client Name: Christchurch City Council
To: Discharge contaminants into water.
Consent Location: Pauaohinekotou 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 Pauaohinekotou Head, Diamond Harbour.
Non-compliance; heavy rain and stormwater flows required the UV system to be partially bypassed in July 2013 (24 events generally consecutive over several hours), September 2013 (once), October 2013 (twice) , March 2014 (82 points/periods, generally consecutive events over several hours), and April 2014 (64 events, generally consecutive events over several hours). A portion of the effluent flow discharged to the harbour was not fully treated during this period	
2	a. Treated sewage effluent shall only be discharged to Lyttelton Harbour/Whakaraupo via an existing outfall approximately 60 metres seaward from Pauaohinekotou 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.
Non-compliance; daily total exceeded once to 3301 m³/d (2012/2014 – twice up to 3,493 m³/d) and instantaneous flowrate exceeded 173 times up to 65.84 L/s (2012/2013 – 328 times up to 62.2 L/s) (Attachment 1) primarily due to extreme rain events	
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; median maximum BOD₅ = 11.5 mg/L	
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; median maximum TSS = 17.5 mg/L	
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; median maximums FC = 25 CFU/100 mL and ENT = 5 MPN/100 mL	
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 than 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.
	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 the following month. 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.
Compliance	
19	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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 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. b. The Management Practices to ensure compliance with conditions of the Resource Consent. 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.
Compliance; Management Plan submitted on 05/11/2012	
20	<ul style="list-style-type: none"> 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. b. The consent holder shall supply a copy of the report referred to in condition 20(a) to all the following organisations/groups/people: <ul style="list-style-type: none"> a. Cass Bay Residents Association b. Church Bay Neighborhood Association c. Diamond Harbour Community Association Incorporated d. Paula Smith C/o 1 Purau Avenue, RD 2, Diamond Harbour e. Te Hapu o Ngati Wheke (Rapaki) Runanga f. Te Runanga o Koukourarata g. Te Runanga o Ngai Tahu h. Governors Bay Community Association. 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.
Compliance via this report; CCC to distribute	
21	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> a. No later than 30 June 2015 all preliminary design details have been completed; b. No later than 30 September 2015, all necessary resource consents have been applied for; c. No later than 30 June 2017 detailed design work completed; d. No later than 31 December 2021 all works have been commissioned, and after a period of testing the treatment plant is decommissioned. 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). 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.
CCC to follow up	
22	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: <ul style="list-style-type: none"> 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 b. Requiring adoption of the best practicable option to remove or reduce any adverse effect on the environment; or c. Complying with the requirements of a relevant rule in an operative regional plan; or d. Amending the frequency of monitoring and the parameters monitored.
ECAN to request	
23	The consent holder shall surrender resource consent CRC031546 within 60 working days of the commencement of this consent.
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 <435 m³/d (Attachment 1). However, due to heavy rain in July/September/October 2013 and March/April 2014, the consented limit was exceeded once up to a 3301 m³/d, and the instantaneous flowrate limit of 34 L/s exceeded 173 times up to 65.84 L/s (Table 2). Other smaller rain events and possible superposition of various processes occurring simultaneously overloaded the network at other times. These events were usually short-lived and uncharacteristic of the normal flow regime. Overall, flowrate compliance was slightly better compared to last year's 328 exceedances due to more extreme rain events and likely greater infiltration of stormwater. To reduce peak flows, a coordinated programme of household inspections, review of pipe condition (and repair) and identification of zone inflow/infiltration sources has been approved and programmed for 2013/2014.

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 11.5 mg/L BOD₅ and 17.5 mg/L TSS were well below the 30-mg/L limits, and FC of 10 CFU/100 mL and ENT of 5 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). Human health related parameters of FC and ENT were usually at or 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 0.29 mg/L TN at 50 m due south of the outfall/ Church Bay and 0.089 mg/L NH₃ 50m due south of the outfall. 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 2013-June 2014.

Parameter	Exceedances of Trigger Value
Flow <2,500 m ³ /d	1
Flow <34 L/s	173
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
TN <1 mg/L	0
NH ₃ <0.91 mg/L	0

Table 2. Non-Compliance of Flowrates from July 2013-June 2014.

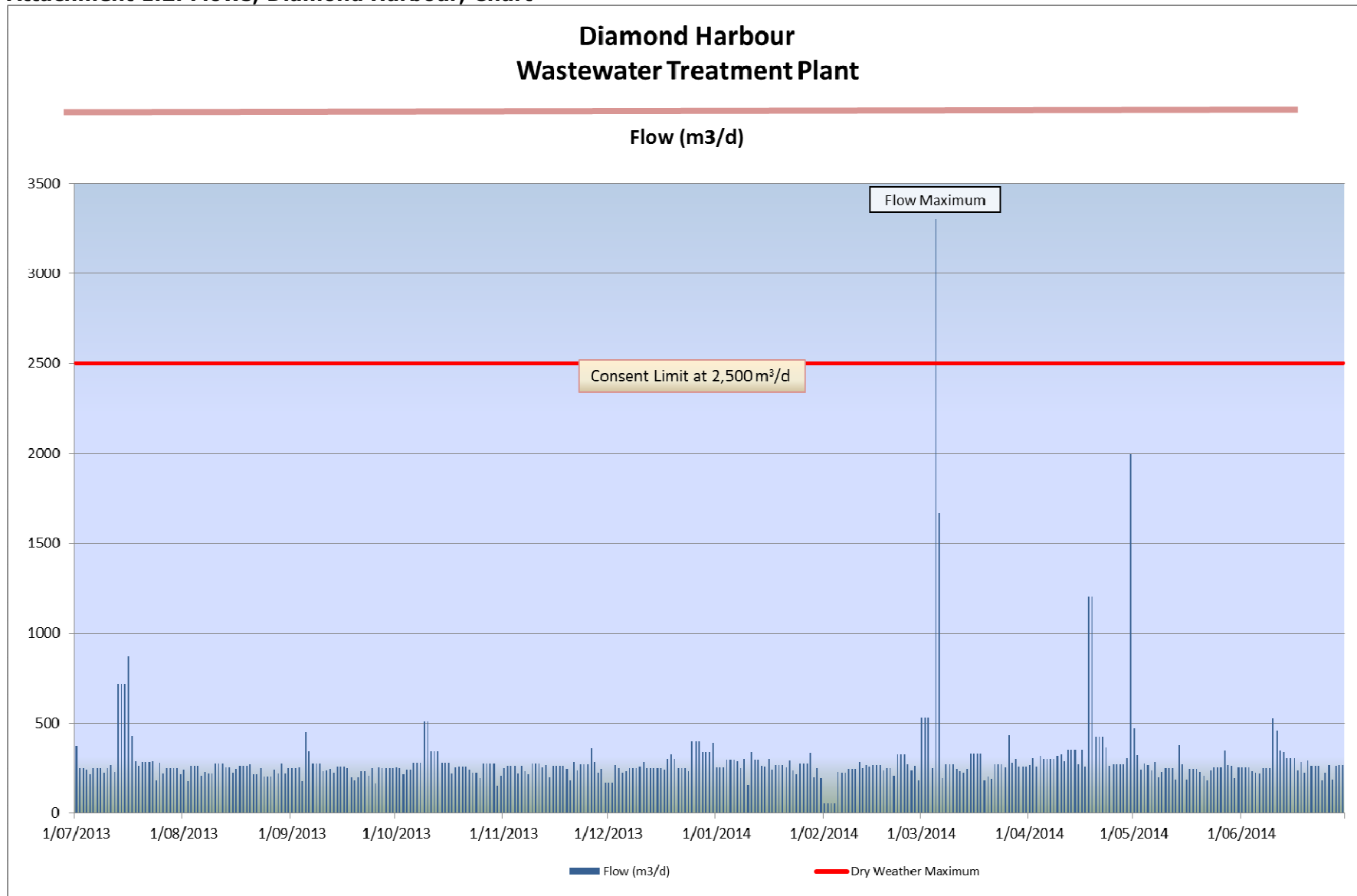
Month	Max Flowrate [L/s]	Values > 34 L/s [#]
Jul-13	48.63	24
Aug-13	27.93	
Sep-13	35.37	1
Oct-13	38.92	2
Nov-13	28.82	
Dec-13	33.95	
Jan-14	24.79	
Feb-14	25.07	
Mar-14	65.84	82
Apr-14	55.91	64
May-14	25.78	
Jun-14	30.65	
Total	441.66	173

Attachment 1.1: Flows, Diamond Harbour, Data

Plant:		Diamond Harbour Wastewater Treatment, Banks Peninsula					
Asset Owner:		Christchurch City Council					
Laboratory		Christchurch City Council Laboratory, City Water & Waste Unit					
Max:	2500	m³/d	Dry weather				
Date	Flow [m ³ /d]	Date	Flow [m ³ /d]	Date	Flow [m ³ /d]	Date	Flow [m ³ /d]
1/07/2013	374	1/10/2013	253	1/01/2014	255	1/04/2014	265
2/07/2013	246	2/10/2013	246	2/01/2014	255	2/04/2014	306
3/07/2013	246	3/10/2013	212	3/01/2014	255	3/04/2014	260
4/07/2013	236	4/10/2013	239	4/01/2014	297	4/04/2014	315
5/07/2013	211	5/10/2013	239	5/01/2014	297	5/04/2014	301
6/07/2013	250	6/10/2013	278	6/01/2014	297	6/04/2014	301
7/07/2013	250	7/10/2013	278	7/01/2014	290	7/04/2014	301
8/07/2013	250	8/10/2013	278	8/01/2014	249	8/04/2014	301
9/07/2013	220	9/10/2013	511	9/01/2014	299	9/04/2014	314
10/07/2013	245	10/10/2013	511	10/01/2014	155	10/04/2014	322
11/07/2013	267	11/10/2013	341	11/01/2014	336	11/04/2014	289
12/07/2013	223	12/10/2013	341	12/01/2014	295	12/04/2014	352
13/07/2013	715	13/10/2013	341	13/01/2014	295	13/04/2014	352
14/07/2013	715	14/10/2013	278	14/01/2014	261	14/04/2014	352
15/07/2013	715	15/10/2013	278	15/01/2014	258	15/04/2014	273
16/07/2013	874	16/10/2013	278	16/01/2014	300	16/04/2014	348
17/07/2013	423	17/10/2013	217	17/01/2014	236	17/04/2014	258
18/07/2013	289	18/10/2013	256	18/01/2014	268	18/04/2014	1204
19/07/2013	261	19/10/2013	258	19/01/2014	268	19/04/2014	1204
20/07/2013	284	20/10/2013	258	20/01/2014	268	20/04/2014	419
21/07/2013	284	21/10/2013	258	21/01/2014	253	21/04/2014	419
22/07/2013	284	22/10/2013	236	22/01/2014	293	22/04/2014	419
23/07/2013	287	23/10/2013	219	23/01/2014	231	23/04/2014	364
24/07/2013	180	24/10/2013	219	24/01/2014	212	24/04/2014	261
25/07/2013	278	25/10/2013	195	25/01/2014	275	25/04/2014	270
26/07/2013	217	26/10/2013	276	26/01/2014	275	26/04/2014	270
27/07/2013	244	27/10/2013	276	27/01/2014	275	27/04/2014	270
28/07/2013	244	28/10/2013	276	28/01/2014	332	28/04/2014	270
29/07/2013	244	29/10/2013	276	29/01/2014	197	29/04/2014	304
30/07/2013	244	30/10/2013	151	30/01/2014	249	30/04/2014	1997
31/07/2013	212	31/10/2013	206	31/01/2014	196	1/05/2014	473
1/08/2013	236	1/11/2013	245	1/02/2014	52	2/05/2014	319
2/08/2013	179	2/11/2013	262	2/02/2014	52	3/05/2014	238
3/08/2013	263	3/11/2013	262	3/02/2014	52	4/05/2014	277
4/08/2013	263	4/11/2013	262	4/02/2014	52	5/05/2014	266
5/08/2013	263	5/11/2013	217	5/02/2014	226	6/05/2014	235
6/08/2013	208	6/11/2013	261	6/02/2014	219	7/05/2014	284
7/08/2013	224	7/11/2013	227	7/02/2014	219	8/05/2014	199
8/08/2013	217	8/11/2013	213	8/02/2014	241	9/05/2014	226
9/08/2013	214	9/11/2013	275	9/02/2014	241	10/05/2014	246
10/08/2013	276	10/11/2013	275	10/02/2014	241	11/05/2014	246
11/08/2013	276	11/11/2013	275	11/02/2014	285	12/05/2014	246
12/08/2013	276	12/11/2013	255	12/02/2014	245	13/05/2014	185
13/08/2013	254	13/11/2013	267	13/02/2014	268	14/05/2014	379
14/08/2013	254	14/11/2013	198	14/02/2014	259	15/05/2014	271
15/08/2013	221	15/11/2013	263	15/02/2014	265	16/05/2014	185
16/08/2013	243	16/11/2013	263	16/02/2014	265	17/05/2014	242

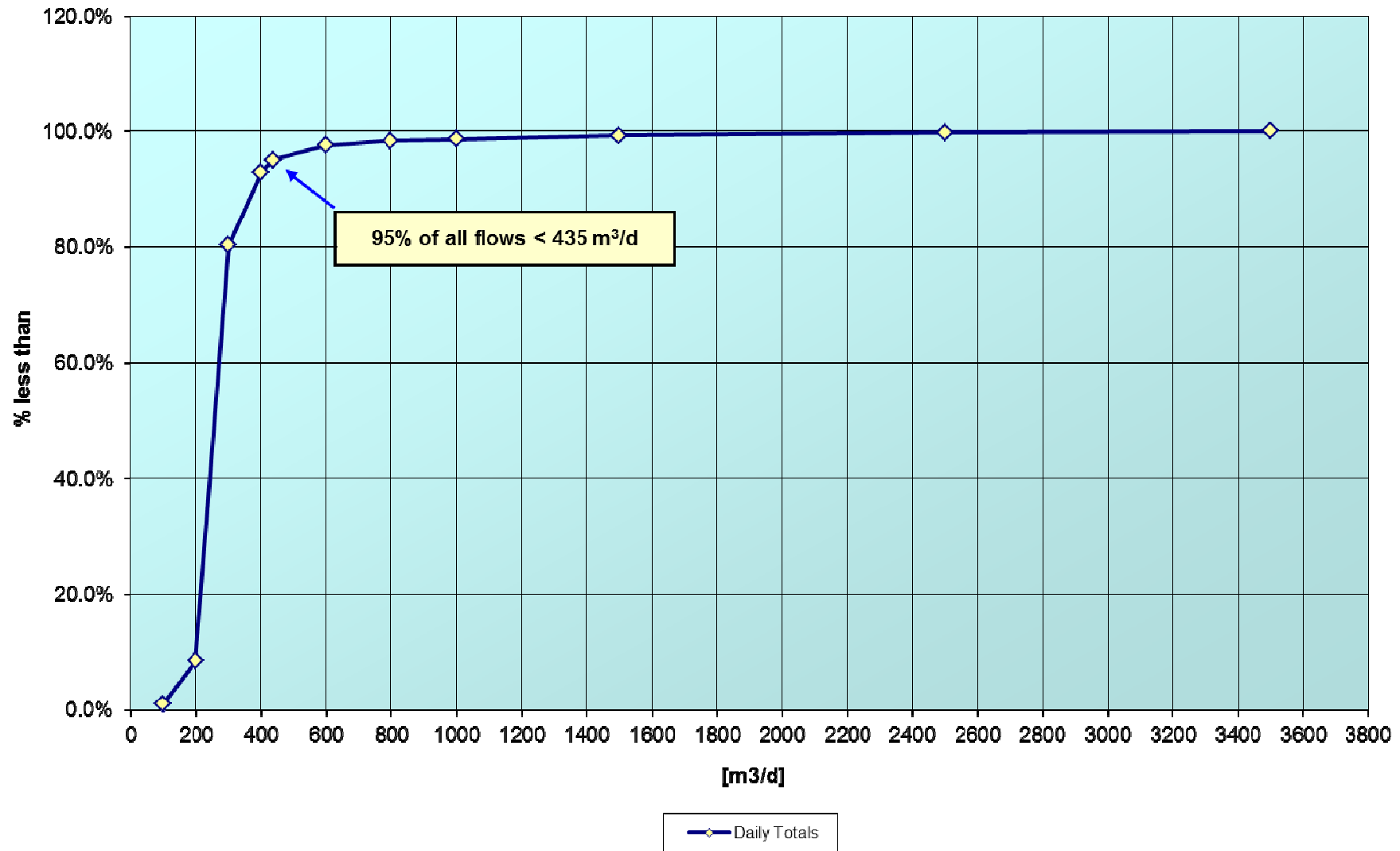
17/08/2013	262	17/11/2013	263	17/02/2014	265	18/05/2014	242
18/08/2013	262	18/11/2013	263	18/02/2014	234	19/05/2014	242
19/08/2013	262	19/11/2013	240	19/02/2014	249	20/05/2014	223
20/08/2013	270	20/11/2013	180	20/02/2014	246	21/05/2014	206
21/08/2013	211	21/11/2013	286	21/02/2014	206	22/05/2014	182
22/08/2013	211	22/11/2013	233	22/02/2014	324	23/05/2014	235
23/08/2013	246	23/11/2013	273	23/02/2014	324	24/05/2014	256
24/08/2013	201	24/11/2013	273	24/02/2014	324	25/05/2014	256
25/08/2013	201	25/11/2013	273	25/02/2014	270	26/05/2014	256
26/08/2013	201	26/11/2013	359	26/02/2014	234	27/05/2014	345
27/08/2013	236	27/11/2013	284	27/02/2014	262	28/05/2014	268
28/08/2013	216	28/11/2013	219	28/02/2014	182	29/05/2014	264
29/08/2013	274	29/11/2013	241	1/03/2014	525	30/05/2014	193
30/08/2013	217	30/11/2013	171	2/03/2014	525	31/05/2014	256
31/08/2013	244	1/12/2013	171	3/03/2014	525	1/06/2014	256
1/09/2013	244	2/12/2013	171	4/03/2014	248	2/06/2014	256
2/09/2013	244	3/12/2013	265	5/03/2014	3301	3/06/2014	256
3/09/2013	255	4/12/2013	244	6/03/2014	1666	4/06/2014	228
4/09/2013	178	5/12/2013	220	7/03/2014	195	5/06/2014	220
5/09/2013	446	6/12/2013	230	8/03/2014	273	6/06/2014	217
6/09/2013	340	7/12/2013	248	9/03/2014	273	7/06/2014	248
7/09/2013	277	8/12/2013	248	10/03/2014	273	8/06/2014	248
8/09/2013	277	9/12/2013	248	11/03/2014	241	9/06/2014	248
9/09/2013	277	10/12/2013	258	12/03/2014	230	10/06/2014	523
10/09/2013	229	11/12/2013	282	13/03/2014	221	11/06/2014	459
11/09/2013	235	12/12/2013	252	14/03/2014	243	12/06/2014	344
12/09/2013	243	13/12/2013	252	15/03/2014	325	13/06/2014	336
13/09/2013	222	14/12/2013	252	16/03/2014	325	14/06/2014	304
14/09/2013	258	15/12/2013	252	17/03/2014	325	15/06/2014	304
15/09/2013	258	16/12/2013	252	18/03/2014	325	16/06/2014	304
16/09/2013	258	17/12/2013	239	19/03/2014	180	17/06/2014	231
17/09/2013	250	18/12/2013	300	20/03/2014	204	18/06/2014	283
18/09/2013	198	19/12/2013	321	21/03/2014	191	19/06/2014	218
19/09/2013	181	20/12/2013	301	22/03/2014	272	20/06/2014	292
20/09/2013	200	21/12/2013	249	23/03/2014	272	21/06/2014	262
21/09/2013	229	22/12/2013	249	24/03/2014	272	22/06/2014	262
22/09/2013	229	23/12/2013	249	25/03/2014	256	23/06/2014	262
23/09/2013	207	24/12/2013	228	26/03/2014	430	24/06/2014	181
24/09/2013	247	25/12/2013	400	27/03/2014	278	25/06/2014	219
25/09/2013	165	26/12/2013	400	28/03/2014	303	26/06/2014	269
26/09/2013	254	27/12/2013	400	29/03/2014	260	27/06/2014	185
27/09/2013	249	28/12/2013	336	30/03/2014	260	28/06/2014	264
28/09/2013	247	29/12/2013	336	31/03/2014	260	29/06/2014	264
29/09/2013	247	30/12/2013	336			30/06/2014	264
30/09/2013	247	31/12/2013	389				

Attachment 1.2: Flows, Diamond Harbour, Chart



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

Diamond Harbour WWTP flows < x m³/d



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											
									5-Sample Median				
Date	BOD ₅	DRP	TSS	TN	NH ₄ -N	NO _x	FC	ENT	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	
24/07/2013	2.5	1.8	6	13.3	0.1	12	0.5	20	2.2	3.5	5.0	5	
21/08/2013	1.5	2.8	1.5	5.3	0.5	3.6	0.5	5	2.2	3.5	2.8	5	
19/09/2013	3.1	2.9	4	4	0.6	2	5	5	2.2	4.0	5.0	5	
22/10/2013	3	1.3	1.5	4.4	1.3	1.6	5	5	2.5	4.0	5.0	5	
20/11/2013	2.6	3	3	1.4	1.2	0.1	5	5	2.6	3.5	5.0	5	
3/12/2013	2.5		7				5	5	2.6	3.5	5.0	5	
12/12/2013	2.4	2.2	3	0.5	1.6	0.1	0.5	20	2.6	3.0	5.0	5	
18/12/2013	2.3		1.5				5	5	2.6	3.0	5.0	5	
24/12/2013	20		18				5	5	2.6	3.0	5.0	5	
3/01/2014	11		20				30	20	2.6	5.0	5.0	5	
7/01/2014	11	2	30	28.1	22	0.11	5.0	5	6.8	12.5	5.0	5	
16/01/2014	14		17				5.0	5	11.0	17.5	5.0	5	
23/01/2014	12		15				590	300	11.5	17.5	5.0	5	
28/01/2014	4.5		12				10	5	11.5	17.5	7.5	5	
5/02/2014	8.7		10				10	5	11.0	16.0	10.0	5	
11/02/2014	7.6	1.5	9	19.9	17	0.9	10	20	9.9	13.5	10.0	5	
20/02/2014	10		14				40	5	9.4	13.0	10.0	5	
26/02/2014	5.3		10				10	5	8.2	11.0	10.0	5	
19/03/2014	2.9	2.6	5	8.8	6.4	1.3	10	5	6.5	10.0	10.0	5	
16/04/2014	5.5	0.5	13	17.6	15	0.58	5	5	6.6	10.0	10.0	5	
14/05/2014	3.4	1.2	5	17.1	14	0.03	50	41	5.4	9.5	10.0	5	
17/06/2014	8.6	2.4	19	26	23	0.03	170	20	5.4	11.5	25.0	5	
									Limit	30	30	700	1750
									Exceedances	0	0	0	0
		As	Cd	Cr	Cu	Pb	Ni	Zn					
	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]					
3/01/2013	0.00075	0.0001	0.0005	0.0021	0.00075	0.00125	0.0160						
16/01/2014	0.00075	0.0001	0.0019	0.0051	0.0072	0.00125	0.2800						

Removed < for calculations and halved the value.

Attachment 2.2: Lab Data, Receiving Environment

	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	
	TN	TN	TN	TN	TN	NH3	NH3	NH3	NH3	NH3	NOX	NOX	NOX	NOX	NOX	DRP	DRP	DRP	DRP	DRP	
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
20/11/2013	0.120	0.110	0.110	0.058	0.077	0.010	0.010	0.008	0.010	0.013	0.05	0.05	0.05	0.05	0.05	0.0058	0.0052	0.0048	0.0054	0.007	
12/12/2013	0.010	0.016	0.013	0.022	0.022	0.009	0.003	0.003	0.003	0.003	0.005	0.015	0.013	0.02	0.02	0.0045	0.0068	0.0067	0.0086	0.011	
7/01/2014	0.035	0.051	0.290	0.046	0.076	0.053	0.051	0.042	0.058	0.082	0.005	0.005	0.005	0.005	0.005	0.02	0.02	0.019	0.018	0.02	
11/02/2014	0.200	0.220	0.220	0.220	0.210	0.053	0.081	0.089	0.071	0.062	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.024	0.025	0.024	0.022	
19/03/2014	0.120	0.120	0.100	0.120	0.120	0.018	0.028	0.024	0.017	0.032	0.01	<0.010	<0.010	<0.010	0.012	0.014	0.014	0.014	0.014	0.014	
14/05/2014	0.220	0.270	0.210	0.250	0.290	0.007	0.008	0.007	0.007	0.014	0.071	0.091	0.084	0.086	0.089	0.013	0.012	0.013	0.013	0.012	
17/06/2014	0.13	0.074	0.066	0.063	0.092	0.0025	0.011	0.03	0.014	0.009	0.022	0.031	0.039	0.039	0.029	0.0094	0.014	0.015	0.017	0.0089	
average	0.119	0.123	0.144	0.111	0.127	0.022	0.027	0.029	0.026	0.031	0.027	0.038	0.038	0.040	0.034	0.013	0.014	0.014	0.014	0.014	
maximum	0.220	0.270	0.290	0.250	0.290	0.053	0.081	0.089	0.071	0.082	0.071	0.091	0.084	0.086	0.089	0.021	0.024	0.025	0.024	0.022	

	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay	OF - 50m due East	OF 50m due North	OF - 50m due South	OF - 50m due West	Church Bay
	TSS	TSS	TSS	TSS	TSS	Chla	Chla	Chla	Chla	Chla	ENT	ENT	ENT	ENT	ENT	FC	FC	FC	FC	FC
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MPN/ 100mL	MPN/ 100mL	MPN/ 100mL	MPN/ 100mL	MPN/ 100mL	CFU/ 100mL	CFU/ 100mL	CFU/ 100mL	CFU/ 100mL	CFU/ 100mL
20/11/2013	20	23	23	19	16	No result	2	2.2	2.4	2.2	10	5	5	10	5	5.0	5.0	5.0	5.0	5.0
12/12/2013	15	13	10	13	20	1.3	1	1.3	1.4	1.4	10	5	5	5	5	1.0	0.5	2.0	0.5	0.5
7/01/2014	23	16	16	24	160	2.1	2.3	2.3	2.3	3.5	0.005	0.005	0.005	10	0.005	1.0	2.0	0.5	1.0	0.5
11/02/2014	18	20	19	16	19	2.1	2.1	1.8	2.1	2.1	5	20	10	5	5	2.0	2.0	0.5	1.0	0.5
19/03/2014	17	12	13	12	15	2	2.5	2.5	2.1	2.2	5	5	5	5	5	0.5	1.0	0.5	0.5	0.5
14/05/2014	24	23	7	9	26	2.2	2.2	2.3	2.5	1.2	5	10	5	5	5	4.0	2.0	2.0	4.0	8.0
17/06/2014	35	28	30	31	20	3.7	8.7	3.8	3.7	2.7	5	5	5	10	5	10.0	5.0	5.0	10.0	5.0
average	21.714	19.286	16.857	17.714	39.429	2.24	3.1	2.317	2.333	2.186	5.715	7.144	5.001	7.143	4.286	3.357	2.500	2.214	3.143	2.857
maximum	35	28	30	31	160	3.7	8.7	3.8	3.7	3.5	10	20	10	10	5	10	5	5	10	8

Removed < for calculations and halved the value.