Porirua Wastewater Treatment Plant

2021/2022 Annual Resource Consents Report

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Control Sheet

**Document Title**: Porirua Wastewater Treatment Plant 2021/2022 Annual Resource Consents Report

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Document Control Register

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|  |  |  |  |

Executive Summary

The following report was prepared by Wellington Water on behalf of the Porirua City Council (PCC) for the Greater Wellington Regional Council (GWRC). This report includes results and observations that satisfy the reporting requirements of the following Porirua Wastewater Treatment Plant resource consents:

WGN 980083 [33805]

The Porirua WWTP is governed by the resource consent under the Greater Wellington Regional Council consent file number WGN980083. In general, the consent allows the discharge of treated and partially treated effluent from the Porirua City Council’s Wastewater Treatment Plant at Rukutane Point through an existing outfall at or about map reference NZMS 260:R27;320.097.

The report will cover the annual period from July 2021 to June 2022 as requested in this resource consent.

WGN 980083 (02)

The Porirua WWTP is governed by the resource consent under the Greater Wellington Regional Council consent file number WGN980083 (02). In general, the consent allows the discharge of contaminants from the Porirua City Council’s Wastewater Treatment Plant to the air at the or about map reference NZMS 260: R27;632.096.

The report will cover the annual period from July 2021 to June 2021 as requested in this resource consent.

WGN 980083 (03)

To occupy the coastal marine area with a concrete deflection wall and the outfall structures, the resource consent under the Greater Wellington Regional Council consent file number WGN980083 (03) was obtained.

Table of Contents

[WGN980083 1](#_Toc76113434)

[Condition (10) 1](#_Toc76113435)

[Condition (11) 2](#_Toc76113436)

[Section (a) 3](#_Toc76113437)

[Section (b) 4](#_Toc76113438)

[Section (c) 5](#_Toc76113439)

[Condition (14) 6](#_Toc76113440)

[Condition (15) 8](#_Toc76113441)

[Condition (18) 9](#_Toc76113442)

[Condition (21) 10](#_Toc76113443)

[Condition (23) 12](#_Toc76113444)

[Condition (24) 13](#_Toc76113445)

[WGN980083 (02) 14](#_Toc76113446)

[Condition (8) 14](#_Toc76113447)

[Condition (9) 15](#_Toc76113448)

WGN980083 [33805]

Condition (10)

|  |  |
| --- | --- |
| Before 1 October 2003, the permit holder shall sample the treated effluent at the sample point required by condition 9 and the following effluent standards shall apply.   1. Based on daily 24 hour flow proportioned composite sampling, with a running geometric mean and 90 percentile calculated each day using 90 consecutive daily test results, the effluent shall meet the following standard:    1. Biochemical Oxygen Demand: Geometric mean of 90 day consecutive BOD5 values shall not exceed 30g/m3 and no more than 10% of 90 consecutive daily values shall exceed 75g/m3.    2. Suspended solids: Geometric mean of 90 day consecutive daily suspended solids values shall not exceed 30g/m3 and no more than 10% of 90 consecutive daily values shall exceed 75g/m3. 2. Based on no fewer than one flow proportioned 24 hour composite sample collected on a normal Monday to Friday working day on a quarterly basis, concentrations of metals and other specified compounds shall not exceed the following limits: | |
| Arsenic  Cadmium as the element  Chromium  Copper as the element  Nickel as the element  Lead as the element  Zinc as the element  Mercury as the element  Phenol  Cyanide as CN  Chlorinated hydrocarbons | 0.5g/m3  0.05 g/m3  0.2 g/m3  0.8 g/m3  0.05 g/m3  0.5 g/m3  2.0 g/m3  0.002 g/m3  0.2 g/m3  0.1 g/m3  0.01 g/m3 |

Condition 10 is no longer enforced since the 1 October 2003 date has passed. Therefore, no reporting for this condition is required.

Condition (11)

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| --- | --- |
| After 1 October 2003, the permit holder shall sample the treated effluent at the sample point required by condition 9 and the following effluent standards shall apply.   1. Based on daily 24 hour flow proportioned composite sampling, with a running geometric mean and 90 percentile calculated each day using 90 consecutive daily test results, the effluent shall meet the following standard:    1. Biochemical Oxygen Demand: Geometric mean of 90 day consecutive BOD5 values shall not exceed 30g/m3 and no more than 10% of 90 consecutive daily values shall exceed 75g/m3.    2. Suspended Solids: Geometric mean of 90 day consecutive suspended solids values shall not exceed 30g/m3 and no more than 10% of 90 consecutive daily values shall exceed 75g/m3. 2. Based on no fewer than 20 representative grab samples per month, (such samples shall be taken from the date of commencement of this permit, on separate days per month between the hours of 9am and 5pm), the effluent shall not exceed the following standard: 3. Faecal coliform bacteria: Geometric mean of 1000 per 100 millilitres and no more than 10% of monthly samples shall exceed 2,000 per 100 millilitres. 4. Based on no fewer than one flow proportioned 24 hour composite sample collected on a normal Monday – Friday working day on a quarterly basis, concentrations of metals and other specified compounds shall not exceed the following limits: | |
| Arsenic  Cadmium as the element  Chromium  Copper as the element  Nickel as the element  Lead as the element  Zinc as the element  Mercury as the element  Phenol  Cyanide as CN  Chlorinated hydrocarbons | 0.5g/m3  0.05 g/m3  0.2 g/m3  0.8 g/m3  0.05 g/m3  0.5 g/m3  2.0 g/m3  0.002 g/m3  0.2 g/m3  0.1 g/m3  0.01 g/m3 |

Section (a)

Figure 1 and Figure 2 below presents a graphical summary of the geometric mean and the 90th percentile compliance for the Biological Oxygen Demand and the Suspended Solids daily analytical results.

The treatment plant was compliant to effluent BOD and suspended solids quality requirement of the consent for financial year 2021/2022.

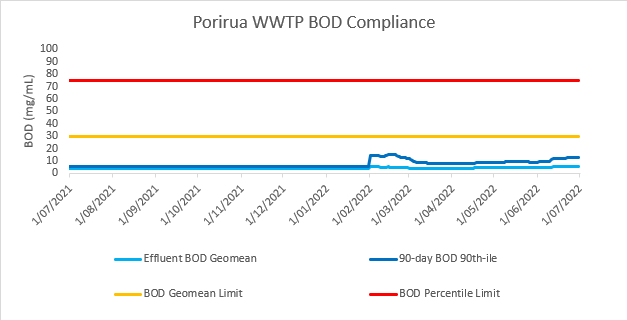


Figure 1- Effluent BOD geomean and 90th percentile data for the FY21/22.

A graphical representation of the daily effluent results can be found in Appendix i: Daily Effluent Results. The daily values can be found in quarterly reports and certificates of laboratory analysis can be provided upon request.

Chart, line chart

Description automatically generated

Figure 2- Effluent suspended solids geomean and 90th percentile data for the 21\_22 year

Section (b)

Table 2 below is a summary of the geometric mean and percent compliance for faecal coliforms analytical results.

In July 2015, an agreement with GWRC was made to use only the first 20 faecal coliform analytical results for compliance purposes.

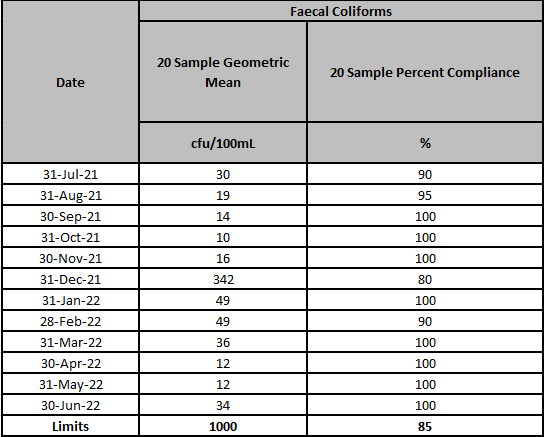


Table 1: Monthly Faecal Coliform Geometric Mean and Percent Compliance

In December 2021, the percent compliance for faecal coliform did not achieve the required percent compliance threshold.

GWRC have requested an explanation for the December 2021 effluent faecal coliform exceedance. A response was given on 26 April 2022.

In summary, the non-compliance in effluent faecal coliform was due to a combination of wet weather and a failure of the automated communication between the flow meter and the UV.

A graphical representation of the daily effluent results can be found in Appendix i: Daily Effluent Results. The daily values can be found in quarterly reports and certificates of laboratory analysis can be provided upon request.

Section (c)

Below is a summary of the quarterly metals and other specified compounds analytical results.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Compound** | **Units** | **Limit** | **05/07/2021** | **04/10/2021** | **25/01/2022** | **04/04/2022** |
| **Arsenic** | **g/m3** | **0.5** | 0.0011 | 0.0023 | 0.0013 | 0.00098 |
| **Cadmium as the element** | **g/m3** | **0.05** | 0.00005 | 0.00005 | 0.0005 | 5E-5 |
| **Chromium** | **g/m3** | **0.2** | 0.0013 | 0.0022 | 0.005 | 0.0022 |
| **Copper as the element** | **g/m3** | **0.8** | 0.0015 | 0.0018 | 0.002 | 0.0016 |
| **Nickel as the element** | **g/m3** | **0.05** | 0.00056 | 0.00076 | 0.001 | 0.00072 |
| **Lead as the element** | **g/m3** | **0.5** | 0.00019 | 0.00012 | 0.001 | 0.00015 |
| **Zinc as the element** | **g/m3** | **2.0** | 0.016000001 | 0.023 | 0.016000001 | 0.02 |
| **Mercury as the element** | **g/m3** | **0.002** | 5E-5 | 5E-5 | 0.0005 | 5E-5 |
| **Phenol** | **g/m3** | **0.2** | 0.002 | 0.01 | 0.004 | 0.002 |
| **Cyanide as CN** | **g/m3** | **0.1** | 0.005 | 0.005 | 0.005 | 0.005 |
| **Chlorinated hydrocarbons** | **g/m3** | **0.01** | See note | See note | See note | See note |

Table 3: Quarterly Metals and other Specified Compounds Analytical Results

Note: The Porirua WWTP Quarterly Reports contain the full analytical results of the metals and other specified compounds as well as the breakdown of the chlorinated hydrocarbons.

Condition (14)

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| The permit holder shall monitor the enterococci and faecal coliform contents of the receiving waters at six shoreline locations between Titahi Bay Beach and Te Korohiwa Rocks. The shoreline monitoring locations shall include the following sites:   * At or about 200 metres generally eastwards of the outfall; * At or about 200 metres generally southwestwards of the outfall; and * Titahi Bay Beach   In addition, the permit holder shall establish a sample control site and measure background enterococci and faecal coliform contents of the coastal waters. All sampling locations shall be to the satisfaction of the Manager, Consents management, Wellington Regional Council. |

Please note that the original control site posed a health and safety issue for the technician when collecting the sample. A meeting was held with GWRC on site 29th August 2020 regarding the relocation of the control site sampling location. GWRC agreed to the new sample location via e-mail on 12th September 2020 so the new control site is at the end of Whitireia Road. The following is a list of the seven sampling points and a map of their locations:

Sampling Point 1 - Te Korohiwa Rocks

Sampling Point 2 - West of Outfall

Sampling Point 3 - East of Outfall

Sampling Point 4 - Titahi Bay Beach South

Sampling Point 5 - Titahi Bay Beach

Sampling Point 6 - Mount Cooper

Control Point - Whitireia Park.

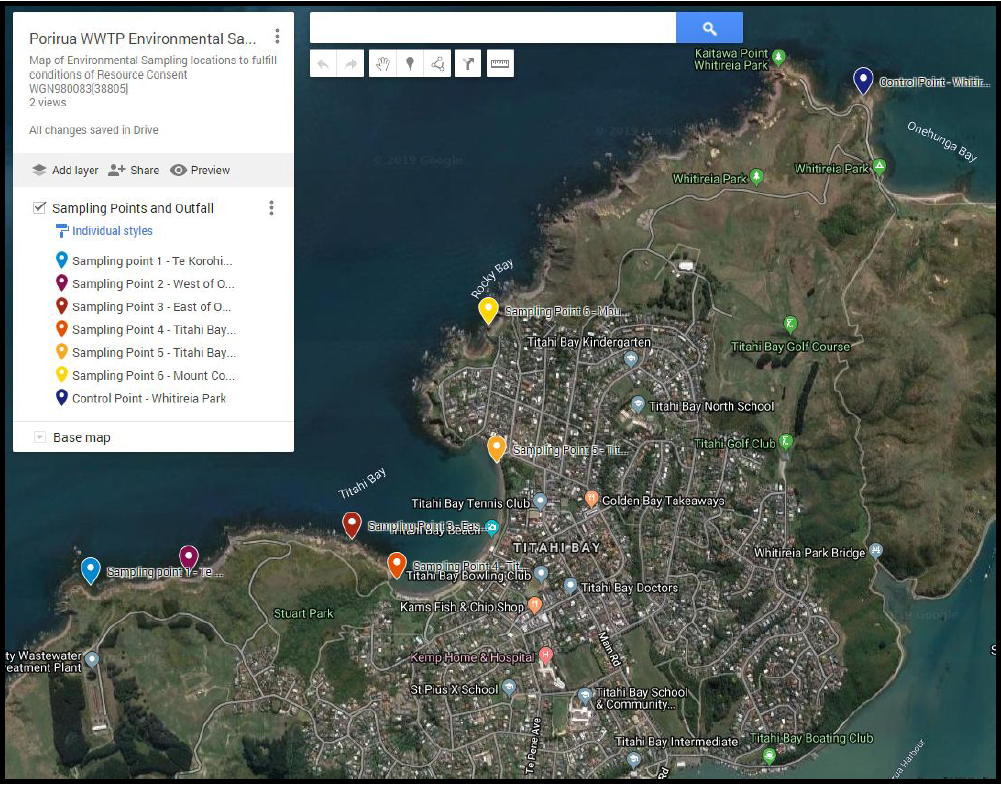


Figure 3: Shoreline Monitoring Sampling Sites

Condition (15)

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| The water at all sampling locations required by condition 14 shall be monitored for enterococci and faecal coliforms ~~at least three~~ monthly. ~~Between 1 April and 30 September and monthly between 1 October and 31 march, until such time as any new disinfection plant is commissioned. For the first 12 months after commissioning such monitoring shall be carried out on at least a monthly basis. Thereafter, the monitoring may be at such reduced intensity as determined by the Manager, Consents Management, Wellington Regional Council.~~  In the event of a discharge of partly or untreated sewage effluent due to either plant malfunction, or *plant overflow*, or *plant bypass*, the above said waters shall further be monitored at or about 24 hours, 72 hours, and 144 hours after that discharge commenced.  For each water sample required by this condition, the permit holder shall make record of the date, time, weather, wind and tidal conditions at its sampling location. These records for each preceding quarter shall be supplied to the Manager, Consents Management, Wellington Regional Council, in the quarterly monitoring report required by condition 17. |

Shoreline samples are collected from all the sampling locations mentioned in Condition (14) during bypass or overflow events 24 hours, 72 hours, 144 hours after the discharge. If there has not been a discharge event during the month period, samples are collected from all sampling locations at the end of the month to comply with Condition (15).

Below is a summary of the bypass and overflow events that have occurred each month during this reporting quarter. The breakdown for each month and explanation of the events can be found in Condition (21). The results from each set of samples collected can be found in Appendix ii: Shoreline Monitoring Data. Analytical results from each set of samples collected can be made available upon request.

|  |  |  |
| --- | --- | --- |
| **Month** | **Bypass/Overflow Events** | |
| **Consented** | **Non-Consented** |
| July 2021 | 2 | 0 |
| August 2021 | 2 | 1 |
| September 2021 | 0 | 0 |
| October 2021 | 1 | 0 |
| November 2021 | 0 | 0 |
| December 2021 | 2 | 0 |
| January 2022 | 0 | 0 |
| February 2022 | 2 | 0 |
| March 2022 | 0 | 0 |
| April 2022 | 0 | 0 |
| May 2022 | 0 | 0 |
| June 2022 | 1 | 0 |

Table 2: Monthly Bypass and Overflow Events

Condition (18)

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| Notwithstanding any enforcement action Wellington Regional Council may choose to take, should the criteria set out in conditions 10 or 11 be exceeded or breached, or the effects in condition 13 (a) – (c) be caused by the discharge, the permit holder shall undertake the following:   1. Immediately notify the Manager, Consents Management, Wellington Regional Council. 2. Immediately investigate the reason why the criteria was exceeded. 3. Immediately identify and undertake whatever appropriate remedial action to the satisfaction of the Manager, Consents Management, Wellington Regional Council, to mitigate the effects. 4. Forward within five working days to the Manager, Consents Management, Wellington Regional Council, a report on the steps taken to ensure that the criteria are not breached in the future. |

Notifications were sent to regional council if there were breaches in the consent except for the 19th of August 2021 sludge carry over incident.

GWRC had requested an explanation in relation to non-compliances at Porirua Wastewater Treatment Plant on 9 March 2022. Wellington Water had provided the response on 26 April 2022.

The following non-compliance notices were given to Wellington Water during the financial year 2021/22.

|  |  |  |  |
| --- | --- | --- | --- |
| Month Issued | Facility | Non-compliance Notice | Description |
| August 2021 | Porirua WWTP | Abatement Notice A961 | Release of undisinfected effluent on 21 Jan 2021 due to power surge and also on 22-23 March 2021 due to human error. The notice requires that the abatement notice be complied with and the UV upgrade project be completed by 30 Sep 2021. |
| October 2021 | Porirua WWTP | Formal Warning | Effluent quality non-compliance to faecal coliform limits last October and December 2020. |

Table 3: Non-compliance Notices

Condition (21)

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| In the event of a plant malfunction or the discharge of untreated or partially treated effluent, the permit holder shall:   * Immediately notify both the Manager, Consents Management, Wellington Regional Council, and the Public Health Service. * If required by Manager, Consents Management, Wellington regional Council, provide within 48 hours a written report to the Manager, detailing manner and cause of the malfunction and the nature of the released effluent, and the steps taken (and being taken if appropriate) to remedy and control that discharge, and to prevent any such releases of untreated or partially treated effluent. |

Table 6 summarises the bypass and/or overflow events for the July 2020 to June 2021 reporting year. We had 10 bypass discharges during this reporting period, and one sludge carryover event on 19th August 2021.

Notifications were submitted to GWRC for all discharges except for the 19th of August 2021 event. The explanation for this incident was detailed on the response letter given to GWRC on 26th April 2022.

| **Start (Date + Time)** | **Finish (Date + Time)** | **Duration** | **Volume Treated During Bypass** | **Total Volume of Bypass** | **Consented** | **Cause** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **hrs/mins** | **m3** | **m3** | **Y/N** |
| 17/07/21 5:35 | 19/07/21 4:28 | 46 h 53 min | 143,205 | 10,453 | Y | Wet Weather |
| 22/07/21 7:28 | 23:07/21 1:52 | 18h 24 min | 53,558 | 2,567 | Y | Wet Weather |
| 08/08/21 12:40 | 09/08/21 4:40 | 16h 19 min | 53,352 | 3,666 | Y | Wet Weather |
| 19/08/21 | - | - |  | - | N | Sludge carry over |
| 28/08/21 8:22 | 28/08/2021 14:47 | 6h 25 min | 20,431 | 790 | Y | Wet Weather |
| 12/10/21 3:44 | 12/10/21 3:45 | 0h 1 min | 103 | 0.2 | Y | Wet Weather |
| 06/12/21 7:39 | 08/12/2021 0:20 | 40h 41 min | 135,998 | 1,999 | Y | Wet Weather |
| 16/12/21 11:38 | 16/12/21 13:21 | 01h 43 min | 5,759 | 149 | Y | Wet Weather |
| 5/02/22 4:05 | 6/02/22 18:41 | 38h 36 min | 128,884 | 109 | Y | Wet Weather |
| 12/02/22 15:59 | 14/02/22 14:22 | 46 h 23 min | 159,461 | 6,823 | Y | Wet Weather |
| 09/06/22 4:55 | 09/06/22 16:30 | 11h 35 min | 40,425 | 5,009 | Y | Wet Weather |

Table 4: Bypass and Overflow Events

Condition (23)

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| The permit holder shall take all reasonable steps to investigate and implement ways and means of minimizing infiltration and stormwater ingress into the sewerage system and provide the Manager, Consents Management, Wellington Regional Council with an annual progress report. |

An inflow and infiltration report can be found in appendix iii.

Condition (24)

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| Within nine months of the commencement of the permit, the permit holder shall establish a community liaison group. That community liaison group should include representatives of the Titahi Bay Residents and Ratepayers Progressive Assn Inc, Regional Public Health, the community as determined by the risk communication strategy, and the permit holder. Nothing in this condition shall be interpreted as requiring any member of the community liaison group to attend any or all of the group’s meetings. The permit holder shall report in writing to the Manager, Consents Management, Wellington Regional Council, annually as to the consultation activities undertaken. A copy of the report shall be forwarded by the permit holder to each member of the community liaison group. |

A Community Liaison Group was established with representatives of the Titahi Bay Residents and Ratepayers Progressive Assn Inc, Regional Public Health, the community as determined by the risk communication strategy, and the permit holder.

A community liaison group meeting was held on 23rd November 2021.

A webinar was held on 11th November 2021 to discuss the clarifier sludge carry over issue.

WGN980083 (02)

Condition (8)

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| If required by the Manager, Consents Management, Wellington Regional Council, the permit holder shall carry out monitoring of air-borne pathogens to demonstrate compliance with condition 6 or 7. The ,monitoring shall be undertaken at six monthly intervals and the results forwarded to the Manager, Consents Management, Wellington Regional Council within one moth of each survey being conducted. The location of the sample site shall be mutually agreed by the permit holder and the Manager, Consents Management, Wellington Regional Council. The survey s shall be carried out by a standard method to the satisfaction of the Manager, Consents Management, Wellington Regional Council. |

The Manager, Consents Management, Wellington Regional Council has not requested these surveys be performed.

Condition (9)

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| The permit holder shall keep a record of any complaints received. The complaints will be forwarded to the Manager, Consents Management, Wellington Regional Council, within twenty-four hours of the complaint being received by the permit holder. The permit holder shall endeavor to record the complainant’s name, time of the incident, wind direction and speed, as well as the plant operating conditions at the time of the complaint. |

The table below shows the complaints received for FY21/22.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date and time:** | **Incident Description** | **Wind direction:** | **Windspeed:** | **Notes** |
| 16/04/22 10:02 | the smell today was disgusting it was a beautiful hot day and we couldn’t have our windows open it stunk of raw sewage we brought this section for a high price with stringent rules around the smell. I’m really starting to get angry it’s not rocket science to work out there’s an odour problem so what’s been done about it. It’s about time there was some action and not talk | Northerly | Strong | Normal, no unusual odours detected by operator except usual farm smells. Centrifuges were not running, no bins were produced that day |
| 2/05/2022 8:07 pm | Porirua WWTP complaint stating: Good evening I am emailing to tell you that this evening the smell of sewerage was unbearable even know the wind was blowing about 50km per hour from the norwest.this is getting to be ridiculous this is starting to happen more often and it’s unacceptable I’d say since we haven’t had a strong northerly for a while the plant will be pumping sewarage out to mix up in rough ocean to disguise it we are only one family living here the neighbours will be moving in in one week so this will be a problem no doubt they will smell it too. |  |  | Complaint was received on 3/05/2022 7:32 pm from a consultant. Forwarded to Veolia for investigation on 4/05/2022 9:50 am. Please note that this complaint did not go to proper channel, so investigation was not made immediately. |
| 3/05/2022 7:32 pm | The smell was bad again today right up at the house what is your response or are you not the right person to talk to? |  |  | Complaint was received on 3/05/2022 7:32 pm from a consultant.Forwarded to Veolia for investigation on 4/05/2022 9:50 am. Please note that this complaint did not go to proper channel, so investigation was not made immediately. |

Table 4: Complaints Received FY21/22

Appendix i

Daily Effluent Quality Results

Effluent BOD Results

Effluent Suspended Solid Results

Effluent Faecal Coliforms Results

Appendix ii

Shoreline Monitoring Results

Shoreline Monitoring Data

|  | **Te Korohiwa Rocks** | | | | | | | | **200m South West of Outfall** | | | | | | | | **200m East of Outfall** | | | | | | | | **South End Titahi Bay** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Source**  **(if out of spec)** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Sources**  **(if out of spec)** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Sources**  **(if out of spec)** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Sources**  **(if out of spec)** |
| **dd/mm/yyyy** | **cfu/100mL** | **cfu/100mL** | **--** | **--** | **--** | **--** | **Y/N** | **--** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** |
| 19/07/2021 | 6 | 9 | S | Light | Mid | Flood | Y - 72hr | N/A | 18 | 2 | S | Light | Mid | Flood | Y - 72hr | N/A | 6 | 2 | S | Light | Mid | Flood | Y - 72hr | N/A | 9 | 6 | S | Light | Mid | Flood | Y - 72hr | N/A |
| 21/07/2021 | 2 | 2 | N | Light | Low | Flood | Y - 144hr | N/A | 18 | 84 | N | Light | Low | Flood | Y - 144hr | N/A | 6 | 6 | N | Light | Low | Flood | Y - 144hr | N/A | 2 | 2 | N | Light | Low | Flood | Y - 144hr | N/A |
| 23/07/2021 | 2 | 2 | S | Light | Low | Ebb | Y - 24hr | N/A | 18 | 8 | S | Light | Low | Ebb | Y - 24hr | N/A | 34 | 28 | S | Light | Low | Ebb | Y - 24hr | N/A | 14 | 18 | S | Light | Low | Ebb | Y - 24hr | N/A |
| 25/07/2021 | 2 | 2 | S | Light | Low | Flood | Y - 72hr | N/A | 2 | 4 | S | Light | Low | Flood | Y - 72hr | N/A | 2 | 2 | S | Light | Low | Flood | Y - 72hr | N/A | 6 | 4 | S | Light | Low | Flood | Y - 72hr | N/A |
| 28/07/2021 | 6 | 2 | S | Light | Low | Ebb | Y - 144hr | N/A | 2 | 8 | S | Light | Low | Ebb | Y - 144hr | N/A | 2 | 2 | S | Light | Low | Ebb | Y - 144hr | N/A | 2 | 2 | S | Light | Low | Ebb | Y - 144hr | N/A |
| 30/07/2021 | 2 | 4 | NW | Light | Low | Ebb | N | N/A | 2 | 4 | NW | Light | Low | Ebb | N | N/A | 2 | 6 | NW | Light | Low | Ebb | N | N/A | 2 | 2 | NW | Light | Low | Ebb | N | N/A |
| 8/08/2021 | 60 | 110 | S | Moderate | Low | Flood | Y - 24hr | N/A | 86 | 170 | S | Moderate | Low | Flood | Y - 24hr | N/A | 68 | 98 | S | Moderate | Low | Flood | Y - 24hr | N/A | 80 | 130 | S | Moderate | Low | Flood | Y - 24hr | N/A |
| 10/08/2021 | 14 | 10 | NW | Light | Low | Ebb | Y - 72hr | N/A | 24 | 20 | NW | Light | Low | Ebb | Y - 72hr | N/A | 16 | 32 | NW | Light | Low | Ebb | Y - 72hr | N/A | 20 | 36 | NW | Light | Low | Ebb | Y - 72hr | N/A |
| 14/08/2021 | 54 | 38 | SE | Light | Low | Ebb | Y - 144hr | N/A | 2 | 2 | SE | Light | Low | Ebb | Y - 144hr | N/A | 56 | 20 | SE | Light | Low | Ebb | Y - 144hr | N/A | 12 | 14 | SE | Light | Low | Ebb | Y - 144hr | N/A |
| 25/08/2021 | 2 | 14 | N | Light | Low | Ebb | N | N/A | 2 | 14 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A | 6 | 8 | N | Light | Low | Ebb | N | N/A |
| 28/08/2021 | 2 | 2 | NW | Moderate | Low | Ebb | Y - 24hr | N/A | 2 | 10 | NW | Moderate | Low | Ebb | Y - 24hr | N/A | 2 | 2 | NW | Moderate | Low | Ebb | Y - 24hr | N/A | 12 | 2 | NW | Moderate | Low | Ebb | Y - 24hr | N/A |
| 30/08/2021 | 2 | 8 | N | Moderate | Mid | Ebb | Y - 72hr | N/A | 2 | 10 | N | Moderate | Mid | Ebb | Y - 72hr | N/A | 2 | 16 | N | Moderate | Mid | Ebb | Y - 72hr | N/A | 80 | 250 | N | Moderate | Mid | Ebb | Y - 72hr | N/A |
| 2/09/2021 | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A |
| 12/09/2021 | 2 | 2 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A | 18 | 8 | N | Light | Low | Ebb | N | N/A |
| 28/10/2021 | 2 | 2 | S | Light | Low | Ebb | N | N/A | 2 | 7 | S | Light | Low | Ebb | N | N/A | 2 | 4 | S | Light | Low | Ebb | N | N/A | 2 | 7 | S | Light | Low | Ebb | N | N/A |
| 24/11/2021 | 2 | 2 | N | Moderate | Low | Ebb | N | N/A | 2 | 110 | N | Moderate | Low | Ebb | N | N/A | 7 | 2 | N | Moderate | Low | Ebb | N | N/A | 2 | 110 | N | Moderate | Low | Ebb | N | N/A |
| 6/12/2021 | 420 | 88 | S | Moderate | Low | Flood | Y - 24hr | Unknown | 1900 | 1700 | S | Moderate | Low | Flood | Y - 24hr | WWTP | 120 | 52 | S | Moderate | Low | Flood | Y - 24hr | N/A | 400 | 620 | S | Moderate | Low | Flood | Y - 24hr | Unknown |
| 8/12/2021 | 2 | 2 | N | Moderate | Low | Flood | Y - 72hr | N/A | 4 | 11 | N | Moderate | Low | Flood | Y - 72hr | N/A | 2 | 4 | N | Moderate | Low | Flood | Y - 72hr | N/A | 2 | 2 | N | Moderate | Low | Flood | Y - 72hr | N/A |
| 11/12/2021 | 16 | 6 | N | Moderate | Low | Ebb | Y - 144hr | N/A | 2 | 2 | N | Moderate | Low | Ebb | Y - 144hr | N/A | 4 | 4 | N | Moderate | Low | Ebb | Y - 144hr | N/A | 6 | 18 | N | Moderate | Low | Ebb | Y - 144hr | N/A |
| 20/12/2021 | 2 | 2 | N | Moderate | Low | Flood | N | N/A | 6 | 6 | N | Moderate | Low | Flood | N | N/A | 2 | 2 | N | Moderate | Low | Flood | N | N/A | 4 | 2 | N | Moderate | Low | Flood | N | N/A |
| 22/01/2022 | 2 | 2 | N | Light | Clear | Ebb | Y - 24hr | N/A | 210 | 760 | N | Light | Clear | Ebb | Y - 24hr | N/A | 2 | 6 | N | Light | Clear | Ebb | Y - 24hr | N/A | 210 | 1300 | N | Light | Clear | Ebb | Y - 24hr | N/A |
| 5/02/2022 | 12 | 14 | S | Moderate | High | Ebb | Y - 24hr | N/A | 45 | 63 | S | Moderate | High | Ebb | Y - 24hr | N/A | 45 | 54 | S | Moderate | High | Ebb | Y - 24hr | N/A | 4 | 27 | S | Moderate | High | Ebb | Y - 24hr | N/A |
| 7/02/2022 | 14 | 98 | S | Moderate | High | Ebb | Y - 72hr | N/A | 94 | 10 | S | Moderate | High | Ebb | Y - 72hr | N/A | 72 | 4 | S | Moderate | High | Ebb | Y - 72hr | N/A | 6 | 6 | S | Moderate | High | Ebb | Y - 72hr | N/A |
| 10/02/2022 | 10 | 2 | N | Light | Mid | Ebb | Y - 144hr | N/A | 20 | 110 | N | Light | Mid | Ebb | Y - 144hr | N/A | 34 | 110 | N | Light | Mid | Ebb | Y - 144hr | N/A | 6 | 14 | N | Light | Mid | Ebb | Y - 144hr | N/A |
| 12/02/2022 | 6500 | 2000 | S | Moderate | Mid | Flood | Y - 24hr | Unknown | 5900 | 3500 | S | Moderate | Mid | Flood | Y - 24hr | Unknown | 120 | 180 | S | Moderate | Mid | Flood | Y - 24hr | N/A | 560 | 260 | S | Moderate | Mid | Flood | Y - 24hr | Unknown |
| 14/02/2022 | 460 | 540 | S | Moderate | Low | Flood | Y - 72hr | Unknown | 29 | 130 | S | Moderate | Low | Flood | Y - 72hr | N/A | 24 | 48 | S | Moderate | Low | Flood | Y - 72hr | N/A | 120 | 190 | S | Moderate | Low | Flood | Y - 72hr | N/A |
| 17/02/2022 | 2 | 2 | SE | Light | Low | Flood | Y - 144hr | N/A | 2 | 2 | SE | Light | Low | Flood | Y - 144hr | N/A | 2 | 6 | SE | Light | Low | Flood | Y - 144hr | N/A | 370 | 100 | SE | Light | Low | Flood | Y - 144hr | N/A |
| 17/02/2022 | 2 | 2 | SE | Light | Low | Flood | N | N/A | 8 | 2 | SE | Light | Low | Flood | N | N/A | 4 | 2 | SE | Light | Low | Flood | N | N/A | 350 | 130 | SE | Light | Low | Flood | N | N/A |
| 9/06/2022 | 160.0 | 31 | NW | Moderate | Low | Ebb | Y - 24hr |  | 38 | 18 | NW | Moderate | Low | Ebb | Y - 24hr |  | 130 | 25 | NW | Moderate | Low | Ebb | Y - 24hr |  | 2200 | 1300 | NW | Moderate | Low | Ebb | Y - 24hr |  |
| 11/06/2022 | 74.0 | 58 | N | Moderate | Mid | Ebb | Y - 72hr |  | 88 | 52 | N | Moderate | Mid | Ebb | Y - 72hr |  | 110 | 62 | N | Moderate | Mid | Ebb | Y - 72hr |  | 360 | 140 | N | Moderate | Mid | Ebb | Y - 72hr |  |
| 14/06/2022 | 2.0 | 8 | NE | Light | High | Ebb | Y - 144hr |  | 34 | 18 | NE | Light | High | Ebb | Y - 144hr |  | 22 | 30 | NE | Light | High | Ebb | Y - 144hr |  | 130 | 32 | NE | Light | High | Ebb | Y - 144hr |  |
| 19/07/2021 | 6 | 9 | S | Light | Mid | Flood | Y - 72hr | N/A | 18 | 2 | S | Light | Mid | Flood | Y - 72hr | N/A | 6 | 2 | S | Light | Mid | Flood | Y - 72hr | N/A | 9 | 6 | S | Light | Mid | Flood | Y - 72hr | N/A |

|  | **Titahi Bay Beach** | | | | | | | | **Mount Cooper** | | | | | | | | **Control** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Source**  **(if out of spec)** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Sources**  **(if out of spec)** | **Enterococci** | **Faecal Coliforms** | **Wind Direction** | **Wind strength** | **Tide** | **Sea conditions** | **WWTP Bypass/**  **Overflow Event** | **Possible Sources**  **(if out of spec)** |
| **dd/mm/yyyy** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** | **cfu/100mL** | **cfu/100ml** | **--** | **--** | **--** | **--** | **Y/N** | **--** |
| 19/07/2021 | 11 | 6 | S | Light | Mid | Flood | Y - 72hr | N/A | 6 | 6 | S | Light | Mid | Flood | Y - 72hr | N/A | 6 | 22 | S | Light | Mid | Flood | Y - 72hr | N/A |
| 21/07/2021 | 38 | 64 | N | Light | Low | Flood | Y - 144hr | N/A | 2 | 2 | N | Light | Low | Flood | Y - 144hr | N/A | 2 | 2 | N | Light | Low | Flood | Y - 144hr | N/A |
| 23/07/2021 | 18 | 190 | S | Light | Low | Ebb | Y - 24hr | N/A | 16 | 8 | S | Light | Low | Ebb | Y - 24hr | N/A | 2 | 2 | S | Light | Low | Ebb | Y - 24hr | N/A |
| 25/07/2021 | 2 | 2 | S | Light | Low | Flood | Y - 72hr | N/A | 2 | 2 | S | Light | Low | Flood | Y - 72hr | N/A | 2 | 2 | S | Light | Low | Flood | Y - 72hr | N/A |
| 28/07/2021 | 2 | 16 | S | Light | Low | Ebb | Y - 144hr | N/A | 2 | 2 | S | Light | Low | Ebb | Y - 144hr | N/A | 2 | 4 | S | Light | Low | Ebb | Y - 144hr | N/A |
| 30/07/2021 | 4 | 4 | NW | Light | Low | Ebb | N | N/A | 2 | 6 | NW | Light | Low | Ebb | N | N/A | 2 | 2 | NW | Light | Low | Ebb | N | N/A |
| 8/08/2021 | 76 | 150 | S | Moderate | Low | Flood | Y - 24hr | N/A | 78 | 110 | S | Moderate | Low | Flood | Y - 24hr | N/A | 96 | 140 | S | Moderate | Low | Flood | Y - 24hr | N/A |
| 10/08/2021 | 26 | 36 | NW | Light | Low | Ebb | Y - 72hr | N/A | 10 | 24 | NW | Light | Low | Ebb | Y - 72hr | N/A | 12 | 24 | NW | Light | Low | Ebb | Y - 72hr | N/A |
| 14/08/2021 | 14 | 22 | SE | Light | Low | Ebb | Y - 144hr | N/A | 56 | 28 | SE | Light | Low | Ebb | Y - 144hr | N/A | 2 | 2 | SE | Light | Low | Ebb | Y - 144hr | N/A |
| 25/08/2021 | 2 | 4 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A |  |  |  |  |  |  |  |  |
| 28/08/2021 | 2 | 4 | NW | Moderate | Low | Ebb | Y - 24hr | N/A | 2 | 2 | NW | Moderate | Low | Ebb | Y - 24hr | N/A |  |  |  |  |  |  |  |  |
| 30/08/2021 | 30 | 30 | N | Moderate | Mid | Ebb | Y - 72hr | N/A | 2 | 6 | N | Moderate | Mid | Ebb | Y - 72hr | N/A |  |  |  |  |  |  |  |  |
| 2/09/2021 | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A | 2 | 2 | NE | Light | High | Ebb | Y - 144hr | N/A |
| 12/09/2021 | 12 | 6 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A | 2 | 2 | N | Light | Low | Ebb | N | N/A |
| 28/10/2021 | 2 | 2 | S | Light | Low | Ebb | N | N/A | 2 | 2 | S | Light | Low | Ebb | N | N/A | 2 | 2 | S | Light | Low | Ebb | N | N/A |
| 24/11/2021 | 2 | 2 | N | Moderate | Low | Ebb | N | N/A | 2 | 2 | N | Moderate | Low | Ebb | N | N/A | 2 | 2 | N | Moderate | Low | Ebb | N | N/A |
| 6/12/2021 | 52 | 80 | S | Moderate | Low | Flood | Y - 24hr | N/A | 120 | 31 | S | Moderate | Low | Flood | Y - 24hr | N/A | 540 | 80 | S | Moderate | Low | Flood | Y - 24hr | Unknnown |
| 8/12/2021 | 27 | 22 | N | Moderate | Low | Flood | Y - 72hr | N/A | 2 | 2 | N | Moderate | Low | Flood | Y - 72hr | N/A | 2 | 4 | N | Moderate | Low | Flood | Y - 72hr | N/A |
| 11/12/2021 | 12 | 24 | N | Moderate | Low | Ebb | Y - 144hr | N/A | 6 | 10 | N | Moderate | Low | Ebb | Y - 144hr | N/A | 2 | 2 | N | Moderate | Low | Ebb | Y - 144hr | N/A |
| 20/12/2021 | 2 | 2 | N | Moderate | Low | Flood | N | N/A | 4 | 2 | N | Moderate | Low | Flood | N | N/A | 2 | 4 | N | Moderate | Low | Flood | N | N/A |
| 22/01/2022 | 4 | 4 | N | Light | Clear | Ebb | Y - 24hr | N/A | 2 | 2 | N | Light | Clear | Ebb | Y - 24hr | N/A | 2 | 6 | N | Light | Clear | Ebb | Y - 24hr | N/A |
| 5/02/2022 | 1000 | 590 | S | Moderate | High | Ebb | Y - 24hr | N/A | 640 | 370 | S | Moderate | High | Ebb | Y - 24hr | Unknown | 18 | 10 | S | Moderate | High | Ebb | Y - 24hr | N/A |
| 7/02/2022 | 7 | 18 | S | Moderate | High | Ebb | Y - 72hr | N/A | 64 | 100 | S | Moderate | High | Ebb | Y - 72hr | N/A | 68 | 8 | S | Moderate | High | Ebb | Y - 72hr | N/A |
| 10/02/2022 | 10 | 14 | N | Light | Mid | Ebb | Y - 144hr | N/A | 16 | 94 | N | Light | Mid | Ebb | Y - 144hr | N/A | 2 | 2 | N | Light | Mid | Ebb | Y - 144hr | N/A |
| 12/02/2022 | 460 | 260 | S | Moderate | Mid | Flood | Y - 24hr | N/A | 4700 | 2300 | S | Moderate | Mid | Flood | Y - 24hr | Unknown | 7900 | 3200 | S | Moderate | Mid | Flood | Y - 24hr | Unknown |
| 14/02/2022 | 82 | 520 | S | Moderate | Low | Flood | Y - 72hr | N/A | 29 | 88 | S | Moderate | Low | Flood | Y - 72hr | N/A | 460 | 460 | S | Moderate | Low | Flood | Y - 72hr | Unknown |
| 17/02/2022 | 50 | 10 | SE | Light | Low | Flood | Y - 144hr | N/A | 8 | 76 | SE | Light | Low | Flood | Y - 144hr | N/A | 6 | 96 | SE | Light | Low | Flood | Y - 144hr | N/A |
| 17/02/2022 | 28 | 20 | SE | Light | Low | Flood | N | N/A | 6 | 70 | SE | Light | Low | Flood | N | N/A | 2 | 100 | SE | Light | Low | Flood | N | N/A |
| 9/06/2022 | 170 | 86 | NW | Moderate | Low | Ebb | Y - 24hr |  | 64 | 54 | NW | Moderate | Low | Ebb | Y - 24hr |  | 86 | 100 | S | Moderate | Low | Flood | Y - 24hr |  |
| 11/06/2022 | 14 | 22 | N | Moderate | Mid | Ebb | Y - 72hr |  | 260 | 88 | N | Moderate | Mid | Ebb | Y - 72hr |  | 68 | 50 | NW | Light | Low | Ebb | Y - 72hr |  |
| 14/06/2022 | 30 | 26 | NE | Light | High | Ebb | Y - 144hr |  | 68 | 20 | NE | Light | High | Ebb | Y - 144hr |  | 66 | 12 | SE | Light | Low | Ebb | Y - 144hr |  |

Appendix iii

Inflow and Infiltration Report